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
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

November 29, 2021

Kyle Richers
Transcend Wireless
10 Industrial Avenue, Suite 3
Mahwah, NJ 07430
krichers@transcendwireless.com

RE: **EM-T-MOBILE-047-211006** – T-Mobile notice of intent to modify an existing telecommunciations facility located at 50 Plantation Road, East Windsor, Connecticut.

Dear Mr. Richers:

The Connecticut Siting Council (Council) is in receipt of your correspondence of November 26, 2021 submitted in response to the Council's November 9, 2021 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/FOC/emr

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

132-ft Existing Watertank

Proposed T-Mobile
Antenna Upgrade

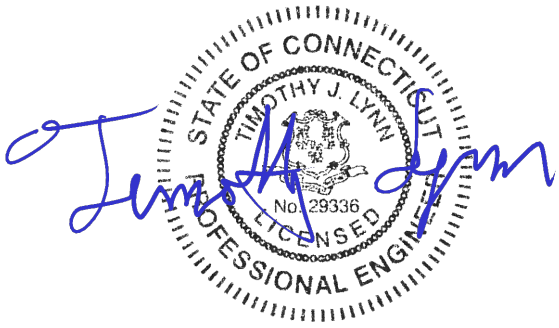
T-Mobile Site Ref: CTHA535A

65 Plantation Road
East Windsor, CT

CENTEK Project No. 21022.15

~~Date: August 2, 2021~~
Rev 2: November 24, 2021

Max Stress Ratio = 91%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing water tank located in East Windsor, Connecticut.

The host water tank is a 132-ft, 4-leg steel lattice water tower. Originally designed information was unavailable for use in this report. The tank geometry, structure member sizes and foundation information were all obtained from a previous structural analysis report prepared by All-Points Technology Corp. dated September 30, 2021.

Antenna and appurtenance information were taken from the aforementioned structural analysis report and a T-Mobile RF sheet.

The water tank consists of four (4) steel lattice legs. Diagonal bracing consists of tension-only solid rounds. The tank tapers from a base width of 36.4-ft to 14.8-ft at its attachment to the tank wall.

Antenna and Appurtenance Summary

- CLEARWIRE (EXISTING):
  Antennas: Two (2) 3-ft microwave dishes pipe mounted to the tank with a RAD center elevation of 124-ft above grade level
  Coax Cables: Two (2) 1/2" ∅ cables running on a leg of the water tank.
- CLEARWIRE (EXISTING):
  Antennas: Three (3) Argus LLPX310 panel antennas and three (3) remote radio heads pipe mounted to the tank with a RAD center elevation of 119-ft above grade level.
  Coax Cables: Two (2) 2-1/4" ∅ innerducts running on a leg of the water tank.
- SPRINT (EXISTING):
  Antennas: Two (2) RFS APVX9EERR18 panel antennas, one (1) RFS APXVSPP18 panel antenna, three (3) 800 MHz remote radio heads and three (3) 1900 MHz remote radio heads pipe mounted to the tank with a RAD center elevation of 121-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ fiber cables running on a leg of the water tank.
- AT&T (EXISTING):
  Antennas: Six (6) Powerwave 7770 panel antennas, two (2) Powerwave P65-17-XLH-RR panel antennas, one (1) KMW AM-X-CD-16-65-00T panel antennas, twelve (12) Powerwave LGP-21401 TMAs, three (3) Ericson RRUS-11 remote radio heads, three (3) Ericson RRUS-12 remote radio heads and three (3) surge arrestors mounted on pipe masts to the water tank façade with a RAD center elevation of 112-ft above grade level.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables, (1) fiber cable and two (2) DC trunks running on a leg of the water tank.

- VERIZON (EXISTING/RESERVED):
  Antennas: Three (3) Commscope NHH-65B-R2B panel antennas, three (3) Commscope NHHSS-65B-R2B panel antennas, three (3) Samsung MT6407-77A panel antennas, three (3) Samsung B5/B13 remote radio heads, three (3) Samsung B2/B66A remote radio heads, three (3) Samsung CBRS RRH-RT4401-48A remote radio heads and three (3) OVP boxes pipe mounted to the tower legs with RAD center elevations of 102'/94'-ft above grade level
  Coax Cables: Three (3) 12x24 fiber cables running on a leg of the water tank.
- T-MOBILE (EXISTING TO REMOVE):
  Antennas: Three (3) RFS APXV18-206517S panel antennas, three (3) TMAs and three (3) diplexers pipe mounted on pipe masts to the water tank façade with a RAD center elevation of 120-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg of the water tank.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Commscope VV-65A-R1 panel antennas, three (3) Ericsson 4460 remote radio units and three (3) Ericsson 4480 remote radio units mounted on pipe masts to the water tank façade with a RAD center elevation of 120-ft above grade level.
  Cables: Three (3) 6x24 fiber cables running on a leg of the water tank.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.
- **Previous reinforcements per the aforementioned structural analysis and modification report are assumed to be installed.**

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components.

Load Cases:	Load Case 1; 125 mph (Vult) wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Capacity

- Calculated stresses were found to be within allowable limits. This tank was found to be at **56.2%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Tank Leg (T3)	0.00'-37.00'	52.7%	**PASS**
Tank Diagonal (T3)	0.00'-37.00'	56.2%	**PASS**

Foundation

The foundation consists of a four (4) 3.5-ft square tapering to 9.17-ft square x 7-ft tall concrete piers.

The tank base reactions developed from the governing Load Case were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	71 kips
	Compression	88 kips
	Moment	5292 kip-ft

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	91%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS(1)	Proposed Loading (FS)(1)	Result
Reinforced Concrete Pier	Uplift	1.0	1.31	**PASS**

Note 1: FS denotes Factor of Safety.

Note 2: OTM denotes Overturning Moment

Conclusion

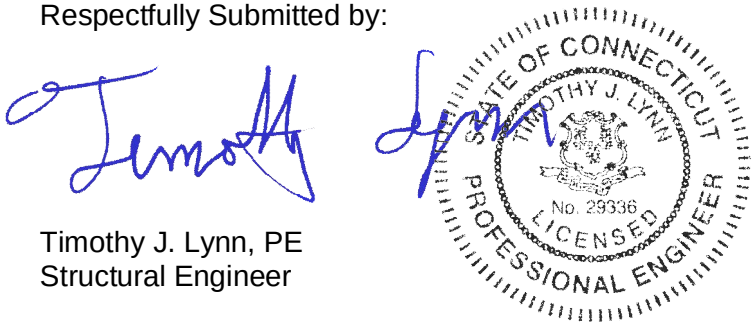
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration with the below conditions.

- **All modifications per the structural report prepared by APT job no. CT141NB7760 dated July 9, 2020 must be installed.**

The analysis is based, in part, on the information provided to this office by AT&T. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

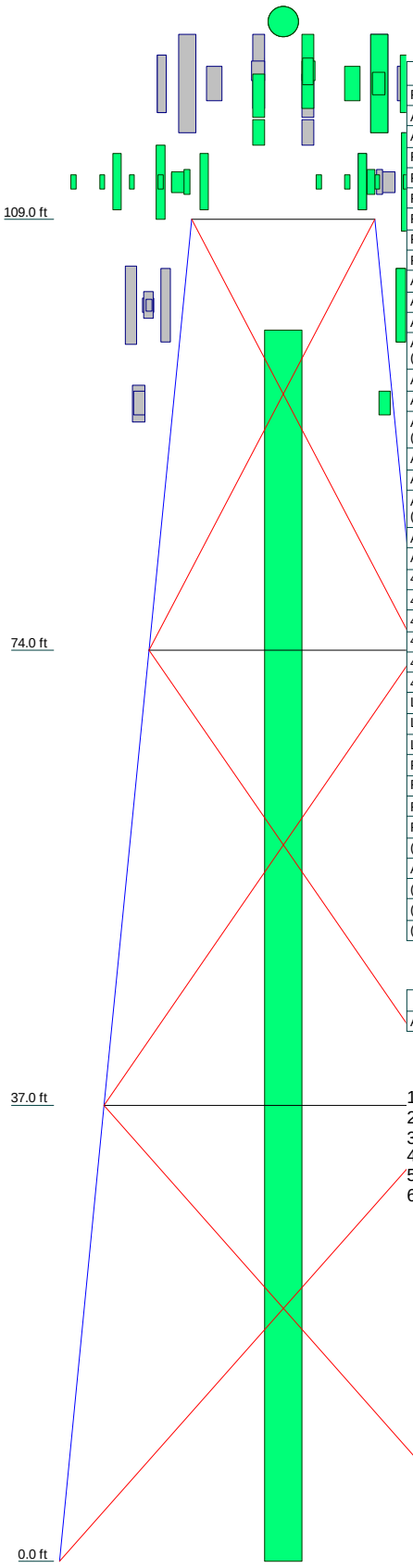
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T1	T2	T3
Legs	Plantation Rd Leg		
Leg Grade	A36		
Diagonals	SR 1 3/8	SR 1 1/2	
Diagonal Grade	A36		
Top Girts	Plantation Road Upper Girt	Plantation Road Lower Girt	
Face Width (ft)	14.85	21.77	29.09	36.41
# Panels @ (ft)	1 @ 35	2 @ 37	
Weight (K)	8.4	9.7	10.6	28.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Plantation Rd - Roof Cone	129	RRUS-11 (AT&T)	112
A-ANT-23G-2 (Clearwire)	125	RRUS-11 (AT&T)	112
A-ANT-23G-2 (Clearwire)	125	RRUS-11 (AT&T)	112
FD-RRH 2x50 800 (Sprint)	121	RRUS-12 (AT&T)	112
FD-RRH 2x50 800 (Sprint)	121	RRUS-12 (AT&T)	112
FD-RRH 2x50 800 (Sprint)	121	RRUS-12 (AT&T)	112
FD-RRH 4x40 1900 (Sprint)	121	DC6-48-60-18-8F Surge Arrestor (AT&T)	112
FD-RRH 4x40 1900 (Sprint)	121	DC6-48-60-18-8F Surge Arrestor (AT&T)	112
FD-RRH 4x40 1900 (Sprint)	121	DC6-48-60-18-8F Surge Arrestor (AT&T)	112
APXV9ERR18-C-A20 (Sprint)	121	P65-17-XLH-RR (AT&T)	112
APXV9ERR18-C-A20 (Sprint)	121	(2) 7770.00 (AT&T)	112
APXVSPP18-C-A20 (Sprint)	121	(2) 7770.00 (AT&T)	112
APX16DWV-16DWVS-E-A20 (T-Mobile)	120	P65-17-XLH-RR (AT&T)	112
		Plantation Rd - Handrail	110.5
APXVAALL24-43 (T-Mobile)	120	Plantation Rd - Tank Bulb	104.5
AIR6449 (T-Mobile)	120	NHH-65B-R2B (Verizon Reserved)	102
APX16DWV-16DWVS-E-A20 (T-Mobile)	120	NHH-65B-R2B (Verizon Reserved)	102
		NHHSS-65B-R2B (Verizon Reserved)	102
APXVAALL24-43 (T-Mobile)	120	NHHSS-65B-R2B (Verizon Reserved)	102
AIR6449 (T-Mobile)	120	NHHSS-65B-R2B (Verizon Reserved)	102
APX16DWV-16DWVS-E-A20 (T-Mobile)	120	B5/B13 RRH (Verizon Reserved)	102
		B5/B13 RRH (Verizon Reserved)	102
APXVAALL24-43 (T-Mobile)	120	B5/B13 RRH (Verizon Reserved)	102
AIR6449 (T-Mobile)	120	B2/B66A RRH (Verizon Reserved)	102
4460 B25+B66 (T-Mobile)	120	B2/B66A RRH (Verizon Reserved)	102
4480 B71+B85 (T-Mobile)	120	B2/B66A RRH (Verizon Reserved)	102
4460 B25+B66 (T-Mobile)	120	CBRS RRH-RT4401-48A (Verizon Reserved)	102
4480 B71+B85 (T-Mobile)	120		
4460 B25+B66 (T-Mobile)	120	CBRS RRH-RT4401-48A (Verizon Reserved)	102
4480 B71+B85 (T-Mobile)	120		
LLPX310R (Clearwire)	119	CBRS RRH-RT4401-48A (Verizon Reserved)	102
LLPX310R (Clearwire)	119		
LLPX310R (Clearwire)	119	NHH-65B-R2B (Verizon Reserved)	102
Plantation Rd - Tank Cylinder	118	MT6407-77A (Verizon Reserved)	94
RRH (Clearwire)	116	MT6407-77A (Verizon Reserved)	94
RRH (Clearwire)	116	RRFDC-3315-PF-48 (Verizon Reserved)	94
RRH (Clearwire)	116		
(2) 7770.00 (AT&T)	112	(2) RRFDC-3315-PF-48 (Verizon Reserved)	94
AM-X-CD-16-65-00T-RET(72") (AT&T)	112	MT6407-77A (Verizon Reserved)	94
(4) LGP21401 TMA (AT&T)	112	Plantation Rd - Riser	50
(4) LGP21401 TMA (AT&T)	112		
(4) LGP21401 TMA (AT&T)	112		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

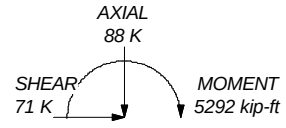
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-G Standard.
3. Deflections are based upon a 60 mph wind.
4. Tower Risk Category II.
5. Topographic Category 1 with Crest Height of 0.00 ft
6. TOWER RATING: 56.2%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 125 K
SHEAR: 18 K

UPLIFT: -86 K
SHEAR: 32 K



TORQUE 86 kip-ft
REACTIONS - 125 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **21022.15 - CTHA535A**			
Project: **132' WaterTower - East Windsor, CT**			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 11/24/21	Scale: NTS	
Path: J:\Jobs\2102200.WI\15_CTHA535A\05_Structural\Structural Analysis\Rev (2)\Calcs\Water Tower.eri		Dwg No. E-1	

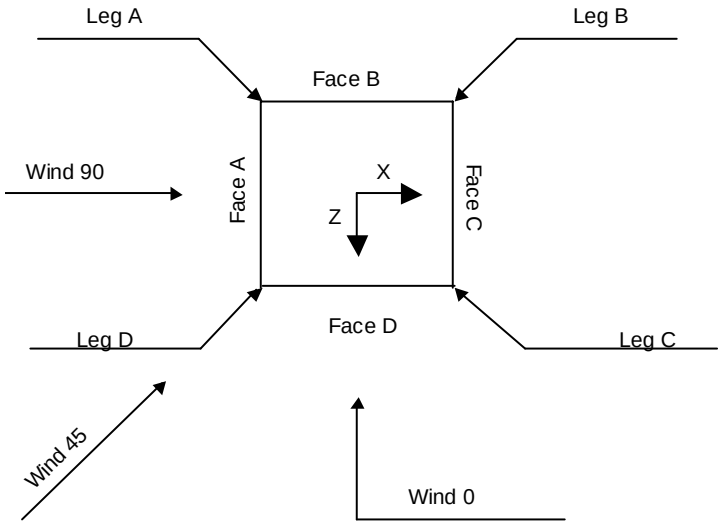
Tower Input Data

The main tower is a 4x free standing tower with an overall height of 109.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 14.85 ft at the top and 36.41 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

ASCE 7-10 Wind Data is used.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Deflections calculated using a wind speed of 60 mph.
Tension only take-up is 0.0313 in.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	109.00-74.00			14.85	1	35.00
T2	74.00-37.00			21.77	1	37.00
T3	37.00-0.00			29.09	1	37.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	109.00-74.00	35.00	TX Brace	No	Yes	0.0000	0.0000
T2	74.00-37.00	37.00	TX Brace	No	Yes	0.0000	0.0000
T3	37.00-0.00	37.00	TX Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 109.00-74.00	Arbitrary Shape	Plantation Rd Leg	A36 (36 ksi)	Solid Round	1 3/8	A36 (36 ksi)
T2 74.00-37.00	Arbitrary Shape	Plantation Rd Leg	A36 (36 ksi)	Solid Round	1 1/2	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T3 37.00-0.00	Arbitrary Shape	Plantation Rd Leg	A36 (36 ksi)	Solid Round	1 1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 109.00-74.00	Arbitrary Shape	Plantation Road Upper Girt	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 74.00-37.00	Arbitrary Shape	Plantation Road Upper Girt	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 37.00-0.00	Arbitrary Shape	Plantation Road Lower Girt	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 109.00-74.00	None	Single Angle		A36 (36 ksi)	Wide Flange	W4x13	A36 (36 ksi)
T2 74.00-37.00	None	Solid Round		A572-50 (50 ksi)	Wide Flange	W4x13	A36 (36 ksi)
T3 37.00-0.00	None	Single Angle		A36 (36 ksi)	Wide Flange	W4x13	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 109.00-74.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000	36.0000
T2 74.00-37.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 37.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1		1		1		1		1		1		1	
109.00-74.00				1		1		1		1		1		1		1	
T2	Yes	Yes	1	1		1		1		1		1		1		1	
74.00-37.00				1		1		1		1		1		1		1	
T3 37.00-0.00	Yes	Yes	1	1		1		1		1		1		1		1	
				1		1		1		1		1		1		1	

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
109.00-74.00														
T2 74.00-37.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 37.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Elevation ft	Redundant Horizontal Net Width Deduct in	Redundant Horizontal U	Redundant Diagonal Net Width Deduct in	Redundant Diagonal U	Redundant Sub-Diagonal Net Width Deduct in	Redundant Sub-Diagonal U	Redundant Sub-Horizontal Net Width Deduct in	Redundant Sub-Horizontal U	Redundant Vertical Net Width Deduct in	Redundant Vertical U	Redundant Hip Net Width Deduct in	Redundant Hip U	Redundant Hip Diagonal Net Width Deduct in	Redundant Hip Diagonal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
109.00-74.00														
T2 74.00-37.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 37.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 1/4 (AT&T)	D	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	0.45	12	6	1.5500	1.5500		0.66
Fiber Trunk (AT&T)	D	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	0.41	1	1	0.4000	0.4000		1.00
DC Trunk (AT&T)	D	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	0.41	2	2	0.4000	0.4000		0.11

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
HYBRIFLEX 1-5/8" (T-Mobile)	C	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	-0.45	3	3	1.9800	1.9800		1.90
HYBRIFLEX 1-5/8" (Verizon)	A	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	-0.45	3	3	1.9800	1.9800		1.90
HYBRIFLEX 1-1/4" (Sprint/Clearwire)	D	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	-0.45	3	3	1.5400	1.5400		1.30
1/2 (Sprint/Clearwire)	D	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	-0.4	2	2	0.5800	0.5800		0.25
2-1/4" Innerduct (Sprint/Clearwire)	D	No	No	Ar (CaAa)	109.00 - 0.00	2.0000	-0.4	2	2	2.2500	2.2500		4.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	109.00-74.00	A	0.000	0.000	20.790	0.000	0.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	20.790	0.000	0.20
		D	0.000	0.000	105.280	0.000	0.75
T2	74.00-37.00	A	0.000	0.000	21.978	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	21.978	0.000	0.21
		D	0.000	0.000	111.296	0.000	0.80
T3	37.00-0.00	A	0.000	0.000	21.978	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	21.978	0.000	0.21
		D	0.000	0.000	111.296	0.000	0.80

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	109.00-74.00	-5.2420	18.0408	-5.2420	18.0408
T2	74.00-37.00	-6.7401	22.9826	-6.7401	22.9826
T3	37.00-0.00	-8.1238	27.5526	-8.1238	27.5526

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	1 1/4	74.00 - 109.00	0.6000	0.6000
T1	2	Fiber Trunk	74.00 - 109.00	0.6000	0.6000
T1	3	DC Trunk	74.00 - 109.00	0.6000	0.6000
T1	4	HYBRIFLEX 1-5/8"	74.00 - 109.00	0.6000	0.6000
T1	5	HYBRIFLEX 1-5/8"	74.00 - 109.00	0.6000	0.6000
T1	6	HYBRIFLEX 1-1/4"	74.00 - 109.00	0.6000	0.6000
T1	7	1/2	74.00 - 109.00	0.6000	0.6000
T1	8	2-1/4" Innerduct	74.00 - 109.00	0.6000	0.6000
T2	1	1 1/4	37.00 - 74.00	0.6000	0.6000
T2	2	Fiber Trunk	37.00 - 74.00	0.6000	0.6000
T2	3	DC Trunk	37.00 - 74.00	0.6000	0.6000
T2	4	HYBRIFLEX 1-5/8"	37.00 - 74.00	0.6000	0.6000
T2	5	HYBRIFLEX 1-5/8"	37.00 - 74.00	0.6000	0.6000
T2	6	HYBRIFLEX 1-1/4"	37.00 - 74.00	0.6000	0.6000
T2	7	1/2	37.00 - 74.00	0.6000	0.6000
T2	8	2-1/4" Innerduct	37.00 - 74.00	0.6000	0.6000
T3	1	1 1/4	0.00 - 37.00	0.6000	0.6000
T3	2	Fiber Trunk	0.00 - 37.00	0.6000	0.6000
T3	3	DC Trunk	0.00 - 37.00	0.6000	0.6000
T3	4	HYBRIFLEX 1-5/8"	0.00 - 37.00	0.6000	0.6000
T3	5	HYBRIFLEX 1-5/8"	0.00 - 37.00	0.6000	0.6000
T3	6	HYBRIFLEX 1-1/4"	0.00 - 37.00	0.6000	0.6000
T3	7	1/2	0.00 - 37.00	0.6000	0.6000
T3	8	2-1/4" Innerduct	0.00 - 37.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXV9ERR18-C-A20 (Sprint)	B	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	8.02	5.81	0.06
APXV9ERR18-C-A20 (Sprint)	C	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	8.02	5.81	0.06
APXVSPP18-C-A20 (Sprint)	D	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	8.02	5.28	0.06
FD-RRH 2x50 800 (Sprint)	B	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.06	1.93	0.06
FD-RRH 2x50 800 (Sprint)	C	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.06	1.93	0.06
FD-RRH 2x50 800 (Sprint)	D	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.06	1.93	0.06
FD-RRH 4x40 1900 (Sprint)	B	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.24	2.32	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FD-RRH 4x40 1900 (Sprint)	C	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.24	2.32	0.06
FD-RRH 4x40 1900 (Sprint)	D	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.24	2.32	0.06
LLPX310R (Clearwire)	B	From Face	4.00 2.00 0.00	0.0000	119.00	No Ice	4.30	1.95	0.03
LLPX310R (Clearwire)	C	From Face	4.00 2.00 0.00	0.0000	119.00	No Ice	4.30	1.95	0.03
LLPX310R (Clearwire)	D	From Face	4.00 2.00 0.00	0.0000	119.00	No Ice	4.30	1.95	0.03
RRH (Clearwire)	B	From Face	4.00 2.00 0.00	0.0000	116.00	No Ice	2.50	1.89	0.05
RRH (Clearwire)	C	From Face	4.00 2.00 0.00	0.0000	116.00	No Ice	2.50	1.89	0.05
RRH (Clearwire)	D	From Face	4.00 2.00 0.00	0.0000	116.00	No Ice	2.50	1.89	0.05
APX16DWV-16DWVS-E-A 20 (T-Mobile)	A	From Leg	2.00 -3.00 0.00	0.0000	120.00	No Ice	6.46	2.15	0.04
APXVAALL24-43 (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	A	From Leg	2.00 3.00 0.00	0.0000	120.00	No Ice	5.65	2.42	0.10
APX16DWV-16DWVS-E-A 20 (T-Mobile)	A	From Leg	2.00 -3.00 0.00	0.0000	120.00	No Ice	6.46	2.15	0.04
APXVAALL24-43 (T-Mobile)	B	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	B	From Leg	2.00 3.00 0.00	0.0000	120.00	No Ice	5.65	2.42	0.10
APX16DWV-16DWVS-E-A 20 (T-Mobile)	C	From Leg	2.00 -3.00 0.00	0.0000	120.00	No Ice	6.46	2.15	0.04
APXVAALL24-43 (T-Mobile)	C	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	C	From Leg	2.00 3.00 0.00	0.0000	120.00	No Ice	5.65	2.42	0.10
4460 B25+B66 (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.85	1.38	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4460 B25+B66 (T-Mobile)	B	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	B	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.85	1.38	0.08
4460 B25+B66 (T-Mobile)	C	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	C	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.85	1.38	0.08
(2) 7770.00 (AT&T)	B	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	5.51	2.93	0.04
P65-17-XLH-RR (AT&T)	B	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	11.47	6.80	0.06
(2) 7770.00 (AT&T)	C	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	5.51	2.93	0.04
P65-17-XLH-RR (AT&T)	C	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	11.47	6.80	0.06
(2) 7770.00 (AT&T)	D	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	5.51	2.93	0.04
AM-X-CD-16-65-00T-RET(72") (AT&T)	D	From Leg	4.00 0.00 0.00	0.0000	112.00	No Ice	8.02	4.64	0.05
(4) LGP21401 TMA (AT&T)	B	From Leg	4.00 5.00 0.00	0.0000	112.00	No Ice	0.82	0.35	0.02
(4) LGP21401 TMA (AT&T)	C	From Leg	4.00 5.00 0.00	0.0000	112.00	No Ice	0.82	0.35	0.02
(4) LGP21401 TMA (AT&T)	D	From Leg	4.00 5.00 0.00	0.0000	112.00	No Ice	0.82	0.35	0.02
RRUS-11 (AT&T)	B	From Leg	4.00 -2.00 0.00	0.0000	112.00	No Ice	2.57	1.07	0.05
RRUS-11 (AT&T)	C	From Leg	4.00 -2.00 0.00	0.0000	112.00	No Ice	2.57	1.07	0.05
RRUS-11 (AT&T)	D	From Leg	4.00 -2.00 0.00	0.0000	112.00	No Ice	2.57	1.07	0.05
RRUS-12 (AT&T)	B	From Leg	4.00 -2.00 0.00	0.0000	112.00	No Ice	3.15	1.29	0.06
RRUS-12 (AT&T)	C	From Leg	4.00 -2.00 0.00	0.0000	112.00	No Ice	3.15	1.29	0.06
RRUS-12 (AT&T)	D	From Leg	4.00 -2.00 0.00	0.0000	112.00	No Ice	3.15	1.29	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DC6-48-60-18-8F Surge Arrestor (AT&T)	B	From Leg	0.50 0.50 0.00	0.0000	112.00	No Ice	1.91	1.91	0.02
DC6-48-60-18-8F Surge Arrestor (AT&T)	C	From Leg	0.50 0.50 0.00	0.0000	112.00	No Ice	1.91	1.91	0.02
DC6-48-60-18-8F Surge Arrestor (AT&T)	D	From Leg	0.50 0.50 0.00	0.0000	112.00	No Ice	1.91	1.91	0.02
Plantation Rd - Roof Cone	B	None		0.0000	129.00	No Ice	41.00	41.00	5.20
Plantation Rd - Tank Cylinder	B	None		0.0000	118.00	No Ice	205.00	205.00	11.80
Plantation Rd - Tank Bulb	B	None		0.0000	104.50	No Ice	71.00	71.00	7.80
Plantation Rd - Handrail	B	None		0.0000	110.50	No Ice	8.00	8.00	2.00
Plantation Rd - Riser	B	None		0.0000	50.00	No Ice	180.00	180.00	9.60
NHH-65B-R2B (Verizon Reserved)	A	From Leg	4.00 -2.00 0.00	0.0000	102.00	No Ice	11.19	8.69	0.07
NHH-65B-R2B (Verizon Reserved)	C	From Leg	4.00 -2.00 0.00	0.0000	102.00	No Ice	11.19	8.69	0.07
NHH-65B-R2B (Verizon Reserved)	C	From Leg	4.00 -2.00 0.00	0.0000	102.00	No Ice	11.19	8.69	0.07
NHHSS-65B-R2B (Verizon Reserved)	A	From Leg	4.00 2.00 0.00	0.0000	102.00	No Ice	8.05	5.36	0.05
NHHSS-65B-R2B (Verizon Reserved)	C	From Leg	4.00 2.00 0.00	0.0000	102.00	No Ice	8.05	5.36	0.05
NHHSS-65B-R2B (Verizon Reserved)	C	From Leg	4.00 2.00 0.00	0.0000	102.00	No Ice	8.05	5.36	0.05
B5/B13 RRH (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	1.87	1.02	0.07
B5/B13 RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	1.87	1.02	0.07
B5/B13 RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	1.87	1.02	0.07
B2/B66A RRH (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	2.54	1.61	0.06
B2/B66A RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	2.54	1.61	0.06
B2/B66A RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	2.54	1.61	0.06
CBRS RRH-RT4401-48A (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	0.86	0.42	0.02
CBRS RRH-RT4401-48A (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	0.86	0.42	0.02
CBRS RRH-RT4401-48A	C	From Leg	4.00	0.0000	102.00	No Ice	0.86	0.42	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon Reserved)			0.00 0.00						
MT6407-77A (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	4.71	1.84	0.00
MT6407-77A (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	4.71	1.84	0.00
MT6407-77A (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	4.71	1.84	0.00
RRFDC-3315-PF-48 (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	3.01	1.96	0.03
(2) RRFDC-3315-PF-48 (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	3.01	1.96	0.03

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-23G-2 (Clearwire)		Paraboloid w/Radome	None		0.0000		125.00	2.50	No Ice	4.91	0.04
A-ANT-23G-2 (Clearwire)		Paraboloid w/Radome	None		0.0000		125.00	2.50	No Ice	4.91	0.04

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	91.50	1.242	42	676.021	A	91.492	8.518	82.461	82.45	20.790	0.000
109.00-74.00					B	91.492	8.518		82.45	0.000	0.000
					C	91.492	8.518		82.45	20.790	0.000
					D	91.492	8.518		82.45	105.280	0.000
T2 74.00-37.00	55.50	1.118	38	978.091	A	100.772	10.750	87.174	78.17	21.978	0.000
					B	100.772	10.750		78.17	0.000	0.000
					C	100.772	10.750		78.17	21.978	0.000
					D	100.772	10.750		78.17	111.296	0.000
T3 37.00-0.00	18.50	0.887	30	1248.93	A	105.999	11.948	87.174	73.91	21.978	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
				1	B	105.999	11.948		73.91	0.000	0.000
					C	105.999	11.948		73.91	21.978	0.000
					D	105.999	11.948		73.91	111.296	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	91.50	1.242	10	676.021	A	91.492	8.518	82.461	82.45	20.790	0.000
109.00-74.00					B	91.492	8.518		82.45	0.000	0.000
					C	91.492	8.518		82.45	20.790	0.000
					D	91.492	8.518		82.45	105.280	0.000
T2 74.00-37.00	55.50	1.118	9	978.091	A	100.772	10.750	87.174	78.17	21.978	0.000
					B	100.772	10.750		78.17	0.000	0.000
					C	100.772	10.750		78.17	21.978	0.000
					D	100.772	10.750		78.17	111.296	0.000
T3 37.00-0.00	18.50	0.887	7	1248.93 1	A	105.999	11.948	87.174	73.91	21.978	0.000
					B	105.999	11.948		73.91	0.000	0.000
					C	105.999	11.948		73.91	21.978	0.000
					D	105.999	11.948		73.91	111.296	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.15	8.39	A	0.148	3.215	42	1	1	96.324	14.28	407.98	D
109.00-74.00			B	0.148	3.215		1	1	96.324			
			C	0.148	3.215		1	1	96.324			
			D	0.148	3.215		1	1	96.324			
T2	1.22	9.73	A	0.114	3.379	38	1	1	106.844	14.68	396.66	D
74.00-37.00			B	0.114	3.379		1	1	106.844			
			C	0.114	3.379		1	1	106.844			
			D	0.114	3.379		1	1	106.844			
T3 37.00-0.00	1.22	10.62	A	0.094	3.478	30	1	1	112.741	12.44	336.32	D
			B	0.094	3.478		1	1	112.741			
			C	0.094	3.478		1	1	112.741			
			D	0.094	3.478		1	1	112.741			
Sum Weight:	3.59	28.74						OTM	2351.32 kip-ft	41.40		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.15	8.39	A	0.148	3.215	42	1.111	1.111	107.012	15.51	443.22	D
109.00-74.00			B	0.148	3.215		1.111	1.111	107.012			
			C	0.148	3.215		1.111	1.111	107.012			
			D	0.148	3.215		1.111	1.111	107.012			
T2	1.22	9.73	A	0.114	3.379	38	1.086	1.086	115.981	15.67	423.63	D
74.00-37.00			B	0.114	3.379		1.086	1.086	115.981			
			C	0.114	3.379		1.086	1.086	115.981			
			D	0.114	3.379		1.086	1.086	115.981			
T3 37.00-0.00	1.22	10.62	A	0.094	3.478	30	1.071	1.071	120.726	13.16	355.56	D
			B	0.094	3.478		1.071	1.071	120.726			
			C	0.094	3.478		1.071	1.071	120.726			
			D	0.094	3.478		1.071	1.071	120.726			
Sum Weight:	3.59	28.74						OTM	2532.73 kip-ft	44.34		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.15	8.39	A	0.148	3.215	10	1	1	96.324	3.29	94.00	D
109.00-74.00			B	0.148	3.215		1	1	96.324			
			C	0.148	3.215		1	1	96.324			
			D	0.148	3.215		1	1	96.324			
T2	1.22	9.73	A	0.114	3.379	9	1	1	106.844	3.38	91.39	D
74.00-37.00			B	0.114	3.379		1	1	106.844			
			C	0.114	3.379		1	1	106.844			
			D	0.114	3.379		1	1	106.844			
T3 37.00-0.00	1.22	10.62	A	0.094	3.478	7	1	1	112.741	2.87	77.49	D
			B	0.094	3.478		1	1	112.741			
			C	0.094	3.478		1	1	112.741			
			D	0.094	3.478		1	1	112.741			
Sum Weight:	3.59	28.74						OTM	541.75 kip-ft	9.54		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.15	8.39	A	0.148	3.215	10	1.111	1.111	107.012	3.57	102.12	D
109.00-74.00			B	0.148	3.215		1.111	1.111	107.012			
			C	0.148	3.215		1.111	1.111	107.012			
			D	0.148	3.215		1.111	1.111	107.012			
T2	1.22	9.73	A	0.114	3.379	9	1.086	1.086	115.981	3.61	97.60	D
74.00-37.00			B	0.114	3.379		1.086	1.086	115.981			
			C	0.114	3.379		1.086	1.086	115.981			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			D	0.114	3.379		1.086	1.086	115.981			
T3 37.00-0.00	1.22	10.62	A	0.094	3.478	7	1.071	1.071	120.726	3.03	81.92	D
			B	0.094	3.478		1.071	1.071	120.726			
			C	0.094	3.478		1.071	1.071	120.726			
			D	0.094	3.478		1.071	1.071	120.726			
Sum Weight:	3.59	28.74						OTM	583.54 kip-ft	10.22		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	18.12					
Bracing Weight	10.62					
Total Member Self-Weight	28.74			33.46	-16.52	
Total Weight	72.97			33.46	-16.52	
Wind 0 deg - No Ice		-0.63	-67.70	-4969.04	50.07	-2.65
Wind 30 deg - No Ice		34.69	-60.87	-4422.63	-2540.36	40.91
Wind 45 deg - No Ice		49.39	-49.51	-3585.02	-3620.24	59.23
Wind 60 deg - No Ice		60.72	-34.78	-2500.82	-4454.53	73.52
Wind 90 deg - No Ice		67.53	0.63	100.05	-4998.13	86.42
Wind 120 deg - No Ice		61.34	35.87	2683.08	-4521.12	76.17
Wind 135 deg - No Ice		50.28	50.40	3746.12	-3714.41	62.99
Wind 150 deg - No Ice		35.78	61.50	4556.15	-2655.70	45.51
Wind 180 deg - No Ice		0.63	67.70	5035.96	-83.12	2.65
Wind 210 deg - No Ice		-34.69	60.87	4489.56	2507.31	-40.91
Wind 225 deg - No Ice		-49.39	49.51	3651.95	3587.19	-59.23
Wind 240 deg - No Ice		-60.72	34.78	2567.74	4421.48	-73.52
Wind 270 deg - No Ice		-67.53	-0.63	-33.13	4965.08	-86.42
Wind 300 deg - No Ice		-61.34	-35.87	-2616.16	4488.07	-76.17
Wind 315 deg - No Ice		-50.28	-50.40	-3679.20	3681.36	-62.99
Wind 330 deg - No Ice		-35.78	-61.50	-4489.22	2622.65	-45.51
Total Weight	72.97			33.46	-16.52	
Wind 0 deg - Service		-0.14	-15.60	-1149.87	1.87	-0.61
Wind 30 deg - Service		7.99	-14.02	-1023.98	-594.97	9.43
Wind 45 deg - Service		11.38	-11.41	-830.99	-843.77	13.65
Wind 60 deg - Service		13.99	-8.01	-581.19	-1035.99	16.94
Wind 90 deg - Service		15.56	0.14	18.05	-1161.24	19.91
Wind 120 deg - Service		14.13	8.26	613.18	-1051.34	17.55
Wind 135 deg - Service		11.58	11.61	858.10	-865.47	14.51
Wind 150 deg - Service		8.24	14.17	1044.73	-621.54	10.49
Wind 180 deg - Service		0.14	15.60	1155.28	-28.82	0.61
Wind 210 deg - Service		-7.99	14.02	1029.39	568.01	-9.43
Wind 225 deg - Service		-11.38	11.41	836.40	816.82	-13.65
Wind 240 deg - Service		-13.99	8.01	586.60	1009.04	-16.94
Wind 270 deg - Service		-15.56	-0.14	-12.64	1134.28	-19.91
Wind 300 deg - Service		-14.13	-8.26	-607.77	1024.38	-17.55
Wind 315 deg - Service		-11.58	-11.61	-852.69	838.52	-14.51
Wind 330 deg - Service		-8.24	-14.17	-1039.32	594.59	-10.49

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 45 deg - No Ice
7	0.9 Dead+1.0 Wind 45 deg - No Ice
8	1.2 Dead+1.0 Wind 60 deg - No Ice
9	0.9 Dead+1.0 Wind 60 deg - No Ice
10	1.2 Dead+1.0 Wind 90 deg - No Ice
11	0.9 Dead+1.0 Wind 90 deg - No Ice
12	1.2 Dead+1.0 Wind 120 deg - No Ice
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice
15	0.9 Dead+1.0 Wind 135 deg - No Ice
16	1.2 Dead+1.0 Wind 150 deg - No Ice
17	0.9 Dead+1.0 Wind 150 deg - No Ice
18	1.2 Dead+1.0 Wind 180 deg - No Ice
19	0.9 Dead+1.0 Wind 180 deg - No Ice
20	1.2 Dead+1.0 Wind 210 deg - No Ice
21	0.9 Dead+1.0 Wind 210 deg - No Ice
22	1.2 Dead+1.0 Wind 225 deg - No Ice
23	0.9 Dead+1.0 Wind 225 deg - No Ice
24	1.2 Dead+1.0 Wind 240 deg - No Ice
25	0.9 Dead+1.0 Wind 240 deg - No Ice
26	1.2 Dead+1.0 Wind 270 deg - No Ice
27	0.9 Dead+1.0 Wind 270 deg - No Ice
28	1.2 Dead+1.0 Wind 300 deg - No Ice
29	0.9 Dead+1.0 Wind 300 deg - No Ice
30	1.2 Dead+1.0 Wind 315 deg - No Ice
31	0.9 Dead+1.0 Wind 315 deg - No Ice
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	Dead+Wind 0 deg - Service
35	Dead+Wind 30 deg - Service
36	Dead+Wind 45 deg - Service
37	Dead+Wind 60 deg - Service
38	Dead+Wind 90 deg - Service
39	Dead+Wind 120 deg - Service
40	Dead+Wind 135 deg - Service
41	Dead+Wind 150 deg - Service
42	Dead+Wind 180 deg - Service
43	Dead+Wind 210 deg - Service
44	Dead+Wind 225 deg - Service
45	Dead+Wind 240 deg - Service
46	Dead+Wind 270 deg - Service
47	Dead+Wind 300 deg - Service
48	Dead+Wind 315 deg - Service
49	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	109 - 74	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.07	11.49	-1.19
			Max. Mx	30	-5.02	-16.74	1.22
			Max. My	15	-22.52	-1.55	-15.42
			Max. Vy	30	-6.20	-0.00	0.00
			Max. Vx	6	-6.16	-0.00	0.00
		Diagonal	Max Tension	2	22.41	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-7.15	0.00	0.00
			Max. Mx	6	-5.06	0.54	0.00
			Max. My	26	-7.06	0.00	-0.05
			Max. Vy	6	-0.14	0.00	0.00
			Max. Vx	26	0.01	0.00	0.00
T2	74 - 37	Leg	Max Tension	15	25.47	-15.88	-1.22
			Max. Compression	14	-87.95	9.61	-1.10
			Max. Mx	30	20.98	-16.74	1.22
			Max. My	15	-27.39	-1.55	-15.42
			Max. Vy	6	2.49	-13.97	-0.53
			Max. Vx	30	-2.28	-1.84	12.95
		Diagonal	Max Tension	26	28.88	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-13.94	0.00	0.00
			Max. Mx	8	-11.00	1.15	0.00
			Max. My	10	-1.01	0.00	-0.11
			Max. Vy	8	-0.21	0.00	0.00
			Max. Vx	10	0.02	0.00	0.00
T3	37 - 0	Leg	Max Tension	15	54.38	-13.17	-1.12
			Max. Compression	14	-125.49	0.00	0.00
			Max. Mx	6	46.67	-13.97	-0.53
			Max. My	15	-32.80	-1.30	-12.96
			Max. Vy	30	-1.50	-13.88	1.11
			Max. Vx	14	-1.48	-1.84	-12.96
		Diagonal	Max Tension	26	32.20	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.30	0.00	0.00
			Max. Mx	32	-9.58	2.26	0.00
			Max. My	10	-17.10	0.00	-0.22
			Max. Vy	32	-0.31	0.00	0.00
			Max. Vx	10	0.03	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	22	121.63	12.77	-12.69
	Max. H_x	22	121.63	12.77	-12.69
	Max. H_z	5	-79.26	-18.32	24.74
	Min. Vert	7	-82.58	-23.04	21.63
	Min. H_x	9	-79.15	-26.09	16.94
	Min. H_z	22	121.63	12.77	-12.69
Leg C	Max. Vert	14	124.77	-13.11	-12.96
	Max. H_x	29	-81.25	26.52	17.37
	Max. H_z	33	-81.35	18.86	25.06
	Min. Vert	31	-84.76	23.54	22.02
	Min. H_x	14	124.77	-13.11	-12.96
	Min. H_z	14	124.77	-13.11	-12.96

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg B	Max. Vert	6	121.07	-12.66	12.73
	Max. H_x	25	-79.58	24.29	-18.73
	Max. H_z	6	121.07	-12.66	12.73
	Min. Vert	23	-83.00	21.61	-23.06
	Min. H_x	6	121.07	-12.66	12.73
	Min. H_z	21	-79.68	17.34	-25.71
Leg A	Max. Vert	30	123.12	12.82	12.97
	Max. H_x	30	123.12	12.82	12.97
	Max. H_z	30	123.12	12.82	12.97
	Min. Vert	15	-85.99	-21.99	-23.57
	Min. H_x	13	-82.48	-24.62	-19.26
	Min. H_z	17	-82.58	-17.76	-26.16

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	72.97	0.00	0.00	33.45	-16.47	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	87.56	-0.63	-67.70	-4970.90	47.29	-2.93
0.9 Dead+1.0 Wind 0 deg - No Ice	65.67	-0.63	-67.70	-4979.00	52.19	-2.96
1.2 Dead+1.0 Wind 30 deg - No Ice	87.56	34.69	-60.87	-4423.68	-2547.97	40.82
0.9 Dead+1.0 Wind 30 deg - No Ice	65.67	34.69	-60.87	-4431.97	-2542.09	40.85
1.2 Dead+1.0 Wind 45 deg - No Ice	87.56	49.39	-49.51	-3584.69	-3629.70	59.18
0.9 Dead+1.0 Wind 45 deg - No Ice	65.67	49.39	-49.51	-3593.33	-3623.36	59.18
1.2 Dead+1.0 Wind 60 deg - No Ice	87.56	60.72	-34.78	-2498.67	-4465.41	73.53
0.9 Dead+1.0 Wind 60 deg - No Ice	65.67	60.72	-34.78	-2507.77	-4458.72	73.50
1.2 Dead+1.0 Wind 90 deg - No Ice	87.56	67.53	0.63	106.33	-5009.88	86.17
0.9 Dead+1.0 Wind 90 deg - No Ice	65.67	67.53	0.63	96.30	-5003.02	86.13
1.2 Dead+1.0 Wind 120 deg - No Ice	87.56	61.34	35.87	2694.39	-4532.14	76.19
0.9 Dead+1.0 Wind 120 deg - No Ice	65.67	61.34	35.87	2683.34	-4525.43	76.22
1.2 Dead+1.0 Wind 135 deg - No Ice	87.56	50.27	50.40	3759.25	-3724.08	63.05
0.9 Dead+1.0 Wind 135 deg - No Ice	65.67	50.27	50.40	3747.76	-3717.71	63.05
1.2 Dead+1.0 Wind 150 deg - No Ice	87.56	35.78	61.50	4570.64	-2663.56	45.61
0.9 Dead+1.0 Wind 150 deg - No Ice	65.67	35.78	61.50	4558.83	-2657.63	45.58
1.2 Dead+1.0 Wind 180 deg - No Ice	87.56	0.63	67.70	5051.12	-86.47	2.71
0.9 Dead+1.0 Wind 180 deg - No Ice	65.67	0.63	67.70	5039.16	-81.79	2.74
1.2 Dead+1.0 Wind 210 deg - No Ice	87.56	-34.69	60.87	4503.91	2508.60	-40.87

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 210 deg - No Ice	65.67	-34.69	60.87	4492.12	2512.59	-40.85
1.2 Dead+1.0 Wind 225 deg - No Ice	87.56	-49.39	49.51	3664.88	3590.29	-59.18
0.9 Dead+1.0 Wind 225 deg - No Ice	65.67	-49.39	49.51	3653.43	3593.84	-59.18
1.2 Dead+1.0 Wind 240 deg - No Ice	87.56	-60.72	34.78	2578.82	4425.95	-73.45
0.9 Dead+1.0 Wind 240 deg - No Ice	65.67	-60.72	34.78	2567.83	4429.15	-73.48
1.2 Dead+1.0 Wind 270 deg - No Ice	87.56	-67.53	-0.63	-26.92	4970.39	-86.18
0.9 Dead+1.0 Wind 270 deg - No Ice	65.67	-67.53	-0.63	-36.92	4973.39	-86.15
1.2 Dead+1.0 Wind 300 deg - No Ice	87.56	-61.34	-35.87	-2614.10	4492.61	-76.27
0.9 Dead+1.0 Wind 300 deg - No Ice	65.67	-61.34	-35.87	-2623.15	4495.77	-76.24
1.2 Dead+1.0 Wind 315 deg - No Ice	87.56	-50.27	-50.40	-3678.93	3684.54	-63.05
0.9 Dead+1.0 Wind 315 deg - No Ice	65.67	-50.27	-50.40	-3687.53	3688.04	-63.05
1.2 Dead+1.0 Wind 330 deg - No Ice	87.56	-35.78	-61.50	-4490.31	2624.03	-45.56
0.9 Dead+1.0 Wind 330 deg - No Ice	65.67	-35.78	-61.50	-4498.58	2627.97	-45.58
Dead+Wind 0 deg - Service	72.97	-0.14	-15.60	-1120.60	-1.11	-0.64
Dead+Wind 30 deg - Service	72.97	7.99	-14.02	-994.55	-598.64	9.40
Dead+Wind 45 deg - Service	72.97	11.38	-11.41	-801.29	-847.80	13.65
Dead+Wind 60 deg - Service	72.97	13.99	-8.01	-551.14	-1040.30	16.94
Dead+Wind 90 deg - Service	72.97	15.56	0.14	48.81	-1165.69	19.88
Dead+Wind 120 deg - Service	72.97	14.13	8.26	644.64	-1055.65	17.54
Dead+Wind 135 deg - Service	72.97	11.58	11.61	889.92	-869.52	14.53
Dead+Wind 150 deg - Service	72.97	8.24	14.17	1076.83	-625.25	10.52
Dead+Wind 180 deg - Service	72.97	0.14	15.60	1187.50	-31.82	0.64
Dead+Wind 210 deg - Service	72.97	-7.99	14.02	1061.46	565.72	-9.43
Dead+Wind 225 deg - Service	72.97	-11.38	11.41	868.19	814.87	-13.65
Dead+Wind 240 deg - Service	72.97	-13.99	8.01	618.04	1007.37	-16.92
Dead+Wind 270 deg - Service	72.97	-15.56	-0.14	18.10	1132.78	-19.87
Dead+Wind 300 deg - Service	72.97	-14.13	-8.26	-577.72	1022.74	-17.58
Dead+Wind 315 deg - Service	72.97	-11.58	-11.61	-823.00	836.59	-14.53
Dead+Wind 330 deg - Service	72.97	-8.24	-14.17	-1009.90	592.31	-10.49

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-72.97	0.00	0.00	72.97	0.00	0.000%
2	-0.63	-87.56	-67.70	0.63	87.56	67.70	0.000%
3	-0.63	-65.67	-67.70	0.63	65.67	67.70	0.000%
4	34.69	-87.56	-60.87	-34.69	87.56	60.87	0.000%
5	34.69	-65.67	-60.87	-34.69	65.67	60.87	0.000%
6	49.39	-87.56	-49.51	-49.39	87.56	49.51	0.000%
7	49.39	-65.67	-49.51	-49.39	65.67	49.51	0.000%
8	60.72	-87.56	-34.78	-60.72	87.56	34.78	0.000%
9	60.72	-65.67	-34.78	-60.72	65.67	34.78	0.000%
10	67.53	-87.56	0.63	-67.53	87.56	-0.63	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
11	67.53	-65.67	0.63	-67.53	65.67	-0.63	0.001%
12	61.34	-87.56	35.87	-61.34	87.56	-35.87	0.000%
13	61.34	-65.67	35.87	-61.34	65.67	-35.87	0.000%
14	50.28	-87.56	50.40	-50.27	87.56	-50.40	0.000%
15	50.28	-65.67	50.40	-50.27	65.67	-50.40	0.000%
16	35.78	-87.56	61.50	-35.78	87.56	-61.50	0.000%
17	35.78	-65.67	61.50	-35.78	65.67	-61.50	0.000%
18	0.63	-87.56	67.70	-0.63	87.56	-67.70	0.000%
19	0.63	-65.67	67.70	-0.63	65.67	-67.70	0.004%
20	-34.69	-87.56	60.87	34.69	87.56	-60.87	0.000%
21	-34.69	-65.67	60.87	34.69	65.67	-60.87	0.000%
22	-49.39	-87.56	49.51	49.39	87.56	-49.51	0.000%
23	-49.39	-65.67	49.51	49.39	65.67	-49.51	0.000%
24	-60.72	-87.56	34.78	60.72	87.56	-34.78	0.000%
25	-60.72	-65.67	34.78	60.72	65.67	-34.78	0.000%
26	-67.53	-87.56	-0.63	67.53	87.56	0.63	0.000%
27	-67.53	-65.67	-0.63	67.53	65.67	0.63	0.000%
28	-61.34	-87.56	-35.87	61.34	87.56	35.87	0.000%
29	-61.34	-65.67	-35.87	61.34	65.67	35.87	0.000%
30	-50.28	-87.56	-50.40	50.27	87.56	50.40	0.000%
31	-50.28	-65.67	-50.40	50.27	65.67	50.40	0.000%
32	-35.78	-87.56	-61.50	35.78	87.56	61.50	0.000%
33	-35.78	-65.67	-61.50	35.78	65.67	61.50	0.000%
34	-0.14	-72.97	-15.60	0.14	72.97	15.60	0.000%
35	7.99	-72.97	-14.02	-7.99	72.97	14.02	0.000%
36	11.38	-72.97	-11.41	-11.38	72.97	11.41	0.000%
37	13.99	-72.97	-8.01	-13.99	72.97	8.01	0.000%
38	15.56	-72.97	0.14	-15.56	72.97	-0.14	0.000%
39	14.13	-72.97	8.26	-14.13	72.97	-8.26	0.000%
40	11.58	-72.97	11.61	-11.58	72.97	-11.61	0.000%
41	8.24	-72.97	14.17	-8.24	72.97	-14.17	0.000%
42	0.14	-72.97	15.60	-0.14	72.97	-15.60	0.000%
43	-7.99	-72.97	14.02	7.99	72.97	-14.02	0.000%
44	-11.38	-72.97	11.41	11.38	72.97	-11.41	0.000%
45	-13.99	-72.97	8.01	13.99	72.97	-8.01	0.000%
46	-15.56	-72.97	-0.14	15.56	72.97	0.14	0.000%
47	-14.13	-72.97	-8.26	14.13	72.97	8.26	0.000%
48	-11.58	-72.97	-11.61	11.58	72.97	11.61	0.000%
49	-8.24	-72.97	-14.17	8.24	72.97	14.17	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00028378
3	Yes	5	0.00000001	0.00026275
4	Yes	4	0.00000001	0.00026113
5	Yes	4	0.00000001	0.00026893
6	Yes	4	0.00000001	0.00026617
7	Yes	4	0.00000001	0.00027421
8	Yes	4	0.00000001	0.00026275
9	Yes	4	0.00000001	0.00027071
10	Yes	5	0.00000001	0.00081965
11	Yes	5	0.00000001	0.00079344
12	Yes	4	0.00000001	0.00026276

13	Yes	4	0.00000001	0.00027026
14	Yes	4	0.00000001	0.00026822
15	Yes	4	0.00000001	0.00027566
16	Yes	4	0.00000001	0.00026526
17	Yes	4	0.00000001	0.00027252
18	Yes	4	0.00000001	0.00023324
19	Yes	4	0.00000001	0.00090870
20	Yes	4	0.00000001	0.00026142
21	Yes	4	0.00000001	0.00026954
22	Yes	4	0.00000001	0.00026554
23	Yes	4	0.00000001	0.00027370
24	Yes	4	0.00000001	0.00025983
25	Yes	4	0.00000001	0.00026783
26	Yes	6	0.00000001	0.00004517
27	Yes	6	0.00000001	0.00004277
28	Yes	4	0.00000001	0.00026679
29	Yes	4	0.00000001	0.00027411
30	Yes	4	0.00000001	0.00026861
31	Yes	4	0.00000001	0.00027620
32	Yes	4	0.00000001	0.00026459
33	Yes	4	0.00000001	0.00027209
34	Yes	6	0.00000001	0.00005133
35	Yes	4	0.00000001	0.00009017
36	Yes	4	0.00000001	0.00009755
37	Yes	4	0.00000001	0.00008928
38	Yes	4	0.00000001	0.00007206
39	Yes	4	0.00000001	0.00009409
40	Yes	4	0.00000001	0.00011027
41	Yes	4	0.00000001	0.00009696
42	Yes	4	0.00000001	0.00006777
43	Yes	4	0.00000001	0.00008935
44	Yes	4	0.00000001	0.00009243
45	Yes	4	0.00000001	0.00010020
46	Yes	4	0.00000001	0.00007293
47	Yes	4	0.00000001	0.00011020
48	Yes	4	0.00000001	0.00010868
49	Yes	4	0.00000001	0.00009378

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	109 - 74	0.326	41	0.0040	0.0087
T2	74 - 37	0.238	47	0.0040	0.0065
T3	37 - 0	0.121	49	0.0026	0.0030

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
129.00	Plantation Rd - Roof Cone	41	0.326	0.0040	0.0087	Inf
125.00	A-ANT-23G-2	41	0.326	0.0040	0.0087	Inf
121.00	APXV9ERR18-C-A20	41	0.326	0.0040	0.0087	Inf
120.00	APX16DWV-16DWVS-E-A20	41	0.326	0.0040	0.0087	Inf

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	LLPX310R	41	0.326	0.0040	0.0087	Inf
118.00	Plantation Rd - Tank Cylinder	41	0.326	0.0040	0.0087	Inf
116.00	RRH	41	0.326	0.0040	0.0087	Inf
112.00	(2) 7770.00	41	0.326	0.0040	0.0087	Inf
110.50	Plantation Rd - Handrail	41	0.326	0.0040	0.0087	Inf
104.50	Plantation Rd - Tank Bulb	41	0.315	0.0040	0.0085	Inf
102.00	NHH-65B-R2B	41	0.309	0.0040	0.0083	Inf
94.00	MT6407-77A	47	0.289	0.0041	0.0079	878689
50.00	Plantation Rd - Riser	47	0.164	0.0033	0.0043	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	109 - 74	1.712	31	0.0221	0.0508
T2	74 - 37	1.222	31	0.0112	0.0312
T3	37 - 0	0.613	31	0.0083	0.0146

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
129.00	Plantation Rd - Roof Cone	31	1.712	0.0221	0.0508	767830
125.00	A-ANT-23G-2	31	1.712	0.0221	0.0508	767830
121.00	APXV9ERR18-C-A20	31	1.712	0.0221	0.0508	767830
120.00	APX16DWV-16DWVS-E-A20	31	1.712	0.0221	0.0508	767830
119.00	LLPX310R	31	1.712	0.0221	0.0508	767830
118.00	Plantation Rd - Tank Cylinder	31	1.712	0.0221	0.0508	767830
116.00	RRH	31	1.712	0.0221	0.0508	767830
112.00	(2) 7770.00	31	1.712	0.0221	0.0508	767830
110.50	Plantation Rd - Handrail	31	1.712	0.0221	0.0508	767830
104.50	Plantation Rd - Tank Bulb	31	1.652	0.0202	0.0482	767830
102.00	NHH-65B-R2B	31	1.618	0.0192	0.0467	548442
94.00	MT6407-77A	31	1.509	0.0162	0.0419	255942
50.00	Plantation Rd - Riser	31	0.833	0.0094	0.0205	383106

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	109 - 74	Plantation Rd Leg	35.34	35.34	91.9	12.0950	-48.07	251.15	0.191 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	Plantation Rd Leg	37.36	37.36	97.2 K=1.00	12.0950	-87.95	238.35	0.369 [1]
T3	37 - 0	Plantation Rd Leg	37.36	37.36	97.2 K=1.00	12.0950	-125.49	238.35	0.527 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	109 - 74	Plantation Road Upper Girt	14.85	13.68	96.6 K=1.00	4.7800	-7.15	94.72	0.075 [1]
T2	74 - 37	Plantation Road Upper Girt	21.77	20.60	145.5 K=1.00	4.7800	-13.94	51.00	0.273 [1]
T3	37 - 0	Plantation Road Lower Girt	29.09	27.92	164.2 K=1.00	5.2600	-19.30	44.06	0.438 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	Plantation Rd Leg	37.36	37.36	97.2	12.0950	25.47	391.88	0.065 [1]
T3	37 - 0	Plantation Rd Leg	37.36	37.36	97.2	12.0950	54.38	391.88	0.139 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	109 - 74	1 3/8	39.65	37.17	1297.5	1.4849	22.41	48.11	0.466 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	1 1/2	45.05	43.00	1376.0	1.7672	28.88	57.26	0.504 [1]
T3	37 - 0	1 1/2	49.55	47.79	1529.4	1.7672	32.20	57.26	0.562 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	Plantation Road Upper Girt	21.77	20.60	145.5	4.7800	1.33	154.87	0.009 [1]
T3	37 - 0	Plantation Road Lower Girt	29.09	27.92	164.2	5.2600	1.89	170.42	0.011 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	109 - 74	Leg	Plantation Rd Leg	2	-48.07	251.15	19.1	Pass
T2	74 - 37	Leg	Plantation Rd Leg	18	-87.95	238.35	36.9	Pass
T3	37 - 0	Leg	Plantation Rd Leg	34	-125.49	238.35	52.7	Pass
T1	109 - 74	Diagonal	1 3/8	11	22.41	48.11	46.6	Pass
T2	74 - 37	Diagonal	1 1/2	26	28.88	57.26	50.4	Pass
T3	37 - 0	Diagonal	1 1/2	42	32.20	57.26	56.2	Pass
T1	109 - 74	Top Girt	Plantation Road Upper Girt	6	-7.15	94.72	7.5	Pass
T2	74 - 37	Top Girt	Plantation Road Upper Girt	21	-13.94	51.00	27.3	Pass
T3	37 - 0	Top Girt	Plantation Road Lower Girt	37	-19.30	44.06	43.8	Pass
							Summary	
						Leg (T3)	52.7	Pass
						Diagonal (T3)	56.2	Pass
						Top Girt (T3)	43.8	Pass
						RATING =	**56.2**	**Pass**

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Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt
Location:	East Windsor, CT
Rev. 2: 11/24/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.15

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 86·kips	(Input From tnxTower)
Compression Force =	Compression := 125·kips	(Input From tnxTower)
Shear Force =	Shear := 32·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA307

Number of Original Anchor Bolts =	$N_{exst} := 2$	(User Input)
Number of Reinforcement Anchor Bolts =	$N_{prop} := 1$	(User Input)
Nominal Tensile Strength =	$F_{nt} := 45 \cdot ksi$	(User Input)
Nominal Shear Strength =	$F_{nv} := 27 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D_{exst} := 1.5 \cdot in$	(User Input)
Threads per Inch =	$n := 6$	(User Input)
Diameter of Anchor Bolts =	$D_{prop} := 0.75 \cdot in$	(User Input)
Threads per Inch =	$n := 6$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)

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Subject:	Anchor Bolt
Location:	East Windsor, CT
Rev. 2: 11/24/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.15

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt= $A_{gexst} := \frac{\pi}{4}\cdot\left(D_{exst}\right)^2 = 1.767\cdot in^2$

Gross Area of Bolt= $A_{gprop} := \frac{\pi}{4}\cdot\left(D_{prop}\right)^2 = 0.442\cdot in^2$

% of Load on Original Bolts = $\%_{exst} := \frac{A_{gexst}\cdot N_{exst}}{A_{gexst}\cdot N_{exst} + A_{gprop}\cdot N_{prop}} = 0.889$

% of Load on Proposed Bolts = $\%_{prop} := \frac{A_{gprop}\cdot N_{prop}}{A_{gexst}\cdot N_{exst} + A_{gprop}\cdot N_{prop}} = 0.111$

Check Original Anchor Bolt:

Maximum Tensile Force = $T_{Max} := \frac{Tension\cdot\%_{exst}}{N_{exst}} = 38.2\cdot kips$

Maximum Compressive Force = $C_{Max} := \frac{Compression\cdot\%_{exst}}{N_{exst}} = 55.6\cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear\cdot\%_{exst}}{N_{exst}} = 14.2\cdot kips$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_{gexst}} = 8.048\cdot ksi$

Design Tensile Strength = $\Phi R_{nt} := 0.75\cdot F_{nt}\cdot A_{gexst} = 59.6\cdot k$

Design Shear Strength = $\Phi R_{nv} := 0.75\cdot F_{nv}\cdot A_{gexst} = 35.8\cdot k$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3\cdot F_{nt} - \frac{F_{nt}}{\phi\cdot F_{nv}}\cdot f_v\right) & \text{if } 1.3\cdot F_{nt} - \frac{F_{nt}}{\phi\cdot F_{nv}}\cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 40.62\cdot ksi$

Adjusted Design Tensile Strength = $\Phi R_{nt'} := 0.75\cdot F'_{nt}\cdot A_{gexst} = 53.8\cdot k$

Bolt % of Capacity = $\frac{\left(T_{Max}\right)}{\Phi R_{nt'}}\cdot 100 = 71$

Condition1 = $Condition1 := if\left[\frac{\left(T_{Max}\right)}{\Phi R_{nt'}} \le 1.00, "OK", "Overstressed"\right]$

Condition1 = "OK"

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Subject:	Anchor Bolt
Location:	East Windsor, CT
Rev. 2: 11/24/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.15

Check Proposed Anchor Bolts:

Allowable Tension = $T_{all} := 10.5 \cdot kips$ (User Input)

Allowable Shear = $V_{all} := 19 \cdot kips$ (User Input)

Maximum Tensile Force = $T_{Max} := \frac{Tension \cdot \%_{prop}}{N_{prop}} = 9.6 \cdot kips$

Maximum Compressive Force = $C_{Max} := \frac{Compression \cdot \%_{prop}}{N_{prop}} = 13.9 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear \cdot \%_{prop}}{N_{prop}} = 3.6 \cdot kips$

Bolt % of Capacity = $\frac{(T_{Max})}{T_{all}} \cdot 100 = 91$

Condition1 = $Condition1 := if\left[\frac{(T_{Max})}{T_{all}} \le 1.00, "OK", "Overstressed"\right]$

$Condition1 = "OK"$

Bolt % of Capacity = $\frac{(V_{Max})}{T_{all}} \cdot 100 = 33.9$

Condition1 = $Condition2 := if\left[\frac{(V_{Max})}{V_{all}} \le 1.00, "OK", "Overstressed"\right]$

$Condition2 = "OK"$

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Subject:	Foundation Analysis
Location:	East Windsor, CT
Rev. 2: 11/24/21	Prepared by: T.J.L. Checked by: C.F.C.

Foundation Analysis

Input Data:

Max. Reactions at Tower Leg:

Shear =	Shear := 32·kips = 32·kips	(User Input)
Compression =	Comp := 125·kips = 125·kips	(User Input)
Uplift =	Uplift := 86·kips = 86·kips	(User Input)

Tower Properties:

Tower Height =	$H_t := 132 \cdot ft$	(User Input)

Foundation Properties:

Pier Height =	$P_H := 7 \cdot ft$	(User Input)
Pier Width Top =	$P_{w1} := 3.5 \cdot ft$	(User Input)
Pier Width Botttom =	$P_{w2} := 9.17 \cdot ft$	(User Input)
Pier Projection Above Grade =	$P_P := 1 \cdot ft$	(User Input)
Pad Width =	$Pd_w := 0 \cdot ft$	(User Input)
Pad Thickness =	$Pd_t := 0 \cdot ft$	(User Input)

Subgrade Properties:

Concrete Unit Weight =	$\gamma c := 150 \cdot pcf$	(User Input)
Water Unit Weight =	$\gamma w := 62.4 \cdot pcf$	(User Input)
Soil Unit Weight =	$\gamma s := 110 \cdot pcf$	(User Input)
Uplift Angle =	$\psi := 32.0 \cdot deg$	(User Input)
Soil Bearing Capacity =	$q_u := 8000 \cdot psf$	(User Input)
Coefficient of Friction =	$\mu := 0.45$	(User Input)
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\psi)}{1 - \sin(\psi)} = 3.255$	

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Subject: Foundation Analysis

Location: East Windsor, CT

Rev. 2: 11/24/21 Prepared by: T.J.L. Checked by: C.F.C.

Calculated Data:

Volume of the Concrete Pad = $V_{pad} := Pd_w^2 \cdot Pd_t = 0 \cdot ft^3$

Volume of the Concrete Pier = $V_{pier} := \frac{(P_H)}{3} \cdot \left(P_{w1}^2 + P_{w2}^2 + \sqrt{P_{w1}^2 \cdot P_{w2}^2}\right) = 299.68 \cdot ft^3$

Resisting Pyramid Base 1 = $B_1 := P_{w2}^2 = 84.089 ft^2$

Resisting Pyramid Base 2 = $B_2 := \left[2 \cdot \tan(\psi) \cdot (P_H - P_P) + P_{w2}\right]^2 = 278 ft^2$

Volume of Soil = $V_{soil} := \left[\frac{(P_H - P_P)}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right] - V_{pier} = 730 \cdot ft^3$

Total Vdume of Concrete = $V_{Conc} := V_{pad} + V_{pier} = 300 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 45 \cdot kips$

Mass of Soil = $Mass_{Soil} := V_{soil} \cdot \gamma s = 80 \cdot kips$

Total Mass = $Mass_{tot} := \left(Mass_{Conc} + Mass_{Soil}\right) \cdot 0.9 = 113 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{Mass_{tot}}{Uplift} = 1.31$

$Uplift\_Check := if\left(\frac{Mass_{tot}}{Uplift} \geq F_S, "OK", "Overstressed"\right)$

Uplift_Check = "OK"

Check Bearing:

$P_{tot} := Comp + 1.2 \cdot Mass_{Conc} = 179 \cdot kips$

$Bearing := \frac{P_{tot}}{P_{w2}^2} = 2.13 \cdot ksf$

$Bearing\_Check := if\left(Bearing \leq 0.75 q_u, "OK", "No Good"\right)$

Bearing_Check = "OK"

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Section 1 - Site Information

Site ID: CTHA535A
Status: Final
Version: 6
Project Type: Anchor
Approved: 10/26/2021 2:2:06 PM
Approved By: Pratik.Patil30@T-Mobile.com
Last Modified: 10/26/2021 2:2:06 PM
Last Modified By: Pratik.Patil30@T-Mobile.com

Site Name: Unison E. Windsor Watertank
Site Class: Watertank
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: <undefined>

Latitude: 41.87600000
Longitude: -72.56470000
Address: 65 Plantation Rd
City, State: Broad Brook, CT
Region: NORTHEAST

RAN Template: 67E5A998E 6160			**AL Template:** 67E5998E_1xAIR+1OP+1QP	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

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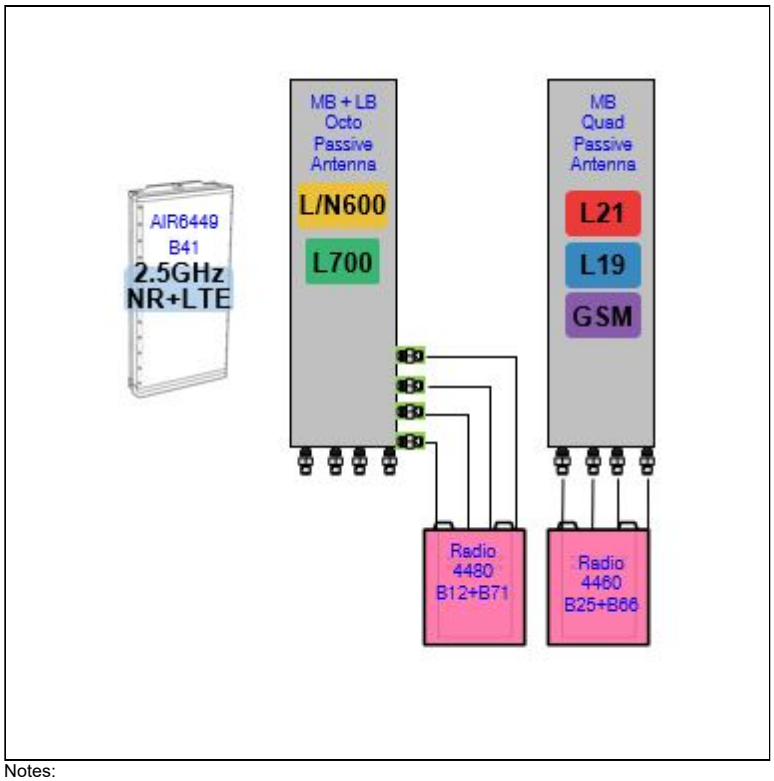
Section 3 - Proposed Template Images

67E5A998E.JPG



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 94DB Outdoor (evolved from 4A)

Enclosure	**1**
Enclosure Type	RBS 6201 ODE
Baseband	DUW30 [U2100] ; DUW30 ; BB 6630 [L2100] [L1900]
Radio	RUS01 B2 **(x 3)** [L1900] ; RUS01 B4 **(x 3)** [U2100] ; RUS01 B4 **(x 6)** [L2100]

Proposed RAN Equipment

Template: 67E5A998E 6160

	1	2
Enclosure Type	Enclosure 6160	B160
Baseband	DUW30 [U2100] ; BB 6630 [L2100] [L1900] ; BB 6648 [L700] [L600] [N600] ; BB 6648 [L2500] [N2500] ; RBS6601	
Hybrid Cable System	Ericsson Hybrid Trunk 6/24 4AWG 80m **(x 3)** ; PSU 4813 vR2A (Kit)	
Transport System	CSR IXRe V2 (Gen2)	

RAN Scope of Work:

Upgrade AC service to 200 Amp.

Cabinet radios will become unused. Remove all cabinet radios.

Remove Existing RBS6201 ODE.

Add (1) Enclosure 6160.

Move BB6630 for L2100 and L1900 (both carriers) to new Enclosure 6160.

Add (1) BB6648 for L600, L700, and N600 (MMBB - Mixed Mode Baseband) to new Enclosure 6160.

Add (1) iXRe Router to new Enclosure 6160.

Add (1) BB6648 for L2500 and N2500 (MMBB - Mixed Mode Baseband) to new Enclosure 6160.

Add (1) PSU4813 Voltage Booster to new Enclosure 6160.

Add (1) DCDU to new Enclosure 6160.

Add (1) Battery Cabinet B160.

Existing: (6) 7/8" coaxial lines.

Remove all coaxial lines.

Add (3) 6X24 HCS ([1] per sector).

Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Section 6 - A&L Equipment

Existing Template:
Proposed Template: 67E5998E_1xAIR+1OP+1QP

Sector 1 (Existing) view from behind	
Coverage Type	A - Outdoor Macro
Antenna	1
Antenna Model	RFS - APXV18-206517S-C-A20 (Dual)
Azimuth	60
M. Tilt	0
Height	120
Ports	P1
Active Tech.	U2100 L2100 L1900
Dark Tech.	
Restricted Tech.	
Decomm. Tech.	
E. Tilt	2
Cables	1-5/8" Coax - 250 ft.
TMAs	Generic Twin Style 3CX - PCS/AWS3+600/700BP (AtAntenna)
Diplexers / Combiners	Generic AWS/PCS Diplexer (AtAntenna)
Radio	
Sector Equipment	

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		Commscope_VV-65A-R1 (Quad)	
Azimuth	60				60		60	
M. Tilt	0				0		0	
Height	120				120		120	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Active Tech.	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500	L2100 L1900 U2100	L2100 L1900 U2100
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)					Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment								

Unconnected Equipment:

Scope of Work:

There will be three antennae per sector.

Remove existing antenna.

Remove all TMAs.

Remove all Coaxial Lines.

Remove all diplexers.

Install (1) Low-Band/Mid-Band Octo in Position 1.

Add (1) Radio 4480 B71+B85 for L600, L700, and N600 in Position 1 at antenna, and connect its ports to the Low-Band ports of the Octo Antenna.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 2.

Install (1) Mid-Band Quad in Position 3.

Add (1) Radio 4460 B25+B66 for L2100, L1900, and GSM to Position 3 at antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 2 (Existing) view from behind	
Coverage Type	A - Outdoor Macro
Antenna	**1**
Antenna Model	RFS - APXV18-206517S-C-A20 (Dual)
Azimuth	180
M. Tilt	0
Height	120
Ports	**P1**
Active Tech.	U2100 L2100 L1900
Dark Tech.	
Restricted Tech.	
Decomm. Tech.	
E. Tilt	2
Cables	1-5/8" Coax - 190 ft.
TMAs	Generic Twin Style 3CX - PCS/AWS3+600/700BP (AtAntenna)
Diplexers / Combiners	Generic AWS/PCS Diplexer (AtAntenna)
Radio	
Sector Equipment	

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		Commscope_VV-65A-R1 (Quad)	
Azimuth	180				180		180	
M. Tilt	0				0		0	
Height	120				120		120	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500	L2100 L1900 U2100	L2100 L1900 U2100
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)					Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment								

Unconnected Equipment:

Scope of Work:

There will be three antennae per sector.

Remove existing antenna.

Remove all TMAs.

Remove all Coaxial Lines.

Remove all diplexers.

Install (1) Low-Band/Mid-Band Octo in Position 1.

Add (1) Radio 4480 B71+B85 for L600, L700, and N600 in Position 1 at antenna, and connect its ports to the Low-Band ports of the Octo Antenna.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 2.

Install (1) Mid-Band Quad in Position 3.

Add (1) Radio 4460 B25+B66 for L2100, L1900, and GSM to Position 3 at antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 3 (Existing) view from behind	
Coverage Type	A - Outdoor Macro
Antenna	**1**
Antenna Model	RFS - APXV18-206517S-C-A20 (Dual)
Azimuth	300
M. Tilt	0
Height	120
Ports	**P1**
Active Tech.	U2100 L2100 L1900
Dark Tech.	
Restricted Tech.	
Decomm. Tech.	
E. Tilt	2
Cables	1-5/8" Coax - 190 ft.
TMAs	Generic Twin Style 3CX - PCS/AWS3+600/700BP (AtAntenna)
Diplexers / Combiners	Generic AWS/PCS Diplexer (AtAntenna)
Radio	
Sector Equipment	

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		Commscope_VV-65A-R1 (Quad)	
Azimuth	300				300		300	
M. Tilt	0				0		0	
Height	120				120		120	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500	L2100 L1900 U2100	L2100 L1900 U2100
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)					Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment								

Unconnected Equipment:

Scope of Work:

There will be three antennae per sector.

Remove existing antenna.

Remove all TMAs.

Remove all Coaxial Lines.

Remove all diplexers.

Install (1) Low-Band/Mid-Band Octo in Position 1.

Add (1) Radio 4480 B71+B85 for L600, L700, and N600 in Position 1 at antenna, and connect its ports to the Low-Band ports of the Octo Antenna.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 2.

Install (1) Mid-Band Quad in Position 3.

Add (1) Radio 4460 B25+B66 for L2100, L1900, and GSM to Position 3 at antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67E5A998E 6160	67E5998E_1xAIR+1OP+1QP

CTHA535A_Anchor_6

Print Name: Preliminary (Scoped_with_U2100)
PORs: Anchor_Phase 3
L600_5G POPs

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

	Proposed Power Systems Equipment
Enclosure	1
Enclosure Type	Enclosure 6160