



Northeast Site Solutions  
Denise Sabo  
420 Main Street, Sturbridge MA 01566  
860-209-4690  
[denise@northeastsitesolutions.com](mailto:denise@northeastsitesolutions.com)

April, 30 2018

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

RE: Exempt Modification Application  
95 HIGH STREET, PORTLAND, CT 06480  
Latitude: 41.58115  
Longitude: -72.7262217  
T-Mobile Site#: CTHA242A-MWAAV

Dear Ms. Bachman:

T-Mobile is requesting to file an exempt modification for an existing 120-foot lattice tower located at 95 High Street, Portland CT 06480. T-Mobile currently has approval for nine (6) six antennas at the 110-foot level of the existing 120-foot tower. The property and the tower are both owned by Town of Portland. T-Mobile now intends to install one (1) IBR1300 Dish. The new dish would be installed at the 110-foot and level of the tower.

Planned Tower Modifications:  
Remove: NONE

Remove and Replace:  
NONE

Install New:  
(1)IBR1300 Dish  
(1)Fiber line  
(2)CAT6 Cables

Existing to Remain:  
(18) 1-5/8" Coax  
(1)Fiber line  
(3) TMA  
(3) RRU  
(6) AIR21 Antenna – 700/1900/2100 Mhz

This facility was approved by the CT Siting Council. Per the attached TS No. TS-T-MOBILE-139-060606 – Dated June, 27 2006. Please see attached original approval minutes from 2006.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to First Selectwoman Susan S. Bransfield and Dan Bourret, Zoning Enforcement Officer of the Town of Portland, as well as the tower owner and property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo  
Mobile: 860-209-4690  
Fax: 413-521-0558  
Office: 4 Angela's Way, Burlington CT 06013  
Email: denise@northeastsitesolutions.com

Attachments

cc: First Selectwoman Susan S. Bransfield, as elected official  
Dan Bourret, Zoning Enforcement Director  
Town of Portland - as tower owner & property owner

# Exhibit A

*(item 16 on the CSC agenda)*EM-CING-057-060531 - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1 Butternut Hollow Road, Greenwich, Connecticut.

*(item 17 on the CSC agenda)*EM-CING-064-060602 - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 439-455 Homestead Avenue, Hartford, Connecticut.

*(item 18 on the CSC agenda)*EM-CING-014-084-060602 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 21 Acorn Road, Branford; and 10 Bona Road, Milford, Connecticut.

*(item 19 on the CSC agenda)*EM-NEXTEL-161-060606 - Sprint Nextel Communications, Inc. notice of intent to modify an existing telecommunications facility located at 24-½ Richdale Drive, Wilton, Connecticut.

*(item 21 on the CSC agenda)*TS-T-MOBILE-128-060606 - Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at 344 Firetown Road, Simsbury, Connecticut.

*(item 22 on the CSC agenda)*TS-T-MOBILE-113-060607 - Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at 95 High Street, Portland, Connecticut.

*(item 25 on the CSC agenda)*EM-CING-148-101-060-060609 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 945 East Center Street, Wallingford; 120 Universal Drive, North Haven; and 1919 Boston Post Road, Guilford, Connecticut.

*(item 26 on the CSC agenda)*EM-CING-052-132-060609 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 263 Farmington Avenue, Farmington; and 67 McGuire Road, South Windsor, Connecticut.

*(item 27 on the CSC agenda)*TS-T-MOBILE-119-060613 - Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at North Street, Rocky Hill, Connecticut.

*(item 28 on the CSC agenda)*EM-CING-095-060613 - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 26 Washington Street, New London, Connecticut.

*(item 29 on the CSC agenda)*EM-CING-093-084-060613 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 310 Orange Street, New Haven; and 528-530 Wheelers Farm Road, Milford, Connecticut.

*(item 30 on the CSC agenda)*EM-CING-062-014-060616 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 2755 State Street, Hamden; and 10 Sylvia Street, Branford, Connecticut.

*(item 31 on the CSC agenda)*EM-CING-155-159-060616 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 27-31 South Main Street, West Hartford; and 23 Kelleher Court, Wethersfield, Connecticut.

Mr. Ashton moved to approve and/or acknowledge the above referenced exempt modifications and/or tower sharing applications (items 16-19; 21-22, 25-31); seconded by Mr. Emerick. The motion passed unanimously.

**Meeting Minutes**  
**Meeting of June 27, 2006**

A meeting of the Connecticut Siting Council (energy/telecommunications) was held on Monday, June 27, 2006, in Hearing Room One, Ten Franklin Square, New Britain, Connecticut. The meeting was called to order with a quorum present by Pamela B. Katz at 1:30 p.m.

**Council Members Present:**

Pamela B. Katz  
Chairman  
Brian Emerick  
(designee for Commissioner McCarthy)  
Gerald J. Heffernan  
(designee for Commissioner Downes)

Colin C. Tait  
Vice Chairman  
Philip T. Ashton  
Dr. Barbara Currier Bell  
James J. Murphy, Jr.  
Edward S. Wilensky

**Council Member Absent:**

Daniel P. Lynch, Jr.

**Staff Members Present:**

Robert Marconi  
Assistant Attorney General  
S. Derek Phelps  
Executive Director  
Fred O. Cunliffe  
Supervising Siting Analyst  
Christina Lepage  
Siting Analyst

John Haines  
Assistant Attorney General  
Robert D. Mercier  
Siting Analyst  
David Martin  
Siting Analyst  
Michael Perrone  
Siting Analyst

**Recording Secretary:**

Lisa A. Fontaine

**Minutes of June 7, 2006.**

Mr. Heffernan moved to approve the Minutes of June 7, 2006; seconded by Mr. Ashton. The motion passed with Mr. Emerick abstaining.

**DOCKET NO. 190 - PDC - El Paso Meriden LLC Certificate of Environmental Compatibility and Public Need for a proposed Meriden Power Project located in the City of Meriden and the Town of Berlin, Connecticut. Request for Approval of Conservation Restrictions and Easements.**

Mr. Murphy moved to approve that specific parties with conservation easements, a right of enforcement by a local land trust, or similarly situated parties may be incorporated into the deeds of the land transfer; seconded by Mr. Heffernan. The motion passed unanimously.

**DOCKET NO. 272 - The Connecticut Light and Power Company and The United Illuminating Company Certificate of Environmental Compatibility and Public Need for the Construction of a New 345-kV Electric Transmission Line and Associated Facilities Between Scovill Rock Switching Station in Middletown and Norwalk Substation in Norwalk, Connecticut Including the Reconstruction of Portions of Existing 115-kV and 345-kV Electric Transmission Lines, the Construction of the Beseck Switching Station in Wallingford, East Devon Substation in Milford, and Singer Substation in Bridgeport, Modifications at Scovill Rock Switching Station and Norwalk Substation and the Reconfiguration of Certain Interconnections. Development and Management Plan – Segment 4b Sasco Creek, Westport to Intersection of Father Conlon Place and North Avenue, Norwalk.**

Mr. Wilensky moved to approve the Development and Management (D&M) Plan for Segment 4b – Sasco Creek, Westport to Intersection of Father Conlon Place and North Avenue, Norwalk with the following conditions regarding the trenching of 345-kV XLPE transmission cable D&M Plan:

- That CL&P conduct pre-construction meetings with the Town of Westport and City of Norwalk including businesses and emergency responders, time of construction, explore vault locations to avoid former landfill in Town of Westport, and conform to the greatest extent possible with the Department of Transportation (DOT).
- That CL&P provide two weeks advance notice to the Council and municipalities prior to commencement of construction.
- That CL&P provide a weekly Environmental Inspector's report.
- That CL&P provide a quarterly construction reports noting milestones of construction activity.
- That CL&P provide the locations of the contractors' yard and staging areas to the Council prior to use.
- That CL&P provide a copy of the DOT Encroachment Permit, including management and protection of traffic plan prior to the commencement of construction.
- That CL&P submit a Spill Prevention and Response Plan which should address actions to prevent spills, to provide emergency notification if spills occur, and to clean up spills and a soil and groundwater management plan including locations for treatment and/or disposal be provided to the Council prior to construction.
- That CL&P provide noise mitigation plan prior to the commencement of construction and submit non-resolution of constituent concerns after 15 days to the Council.

**DOCKET NO. 311 - Northeast Utilities Service Company, on behalf of The Connecticut Light and Power Company (CL&P) application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of the proposed Wilton 35A Substation at 53 Old Danbury Road, Wilton, Connecticut. Draft Findings of Fact.**

Mr. Ashton moved to take this item off the table; seconded by Dr. Bell. The motion passed unanimously.

After reviewing the draft Findings of Fact, Chairman Katz polled the Council members with Mr. Ashton, Mr. Heffernan, Mr. Emerick, Mr. Wilensky, Dr. Bell, Mr. Murphy, and Chairman Katz in favor of granting a Certificate for the proposed Substation; and Mr. Tait abstaining.

Chairman Katz directed staff to draft a favorable Opinion and Decision and Order to be reviewed at the next meeting.

**DOCKET NO. 314 - Bay Communications, LLC application for the recertification of a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at 170 Southeast Road, New Hartford, Connecticut. Draft Findings of Fact.**

Chairman Katz requested that Mr. Tait act as Chairman for this discussion.

After reviewing the draft Findings of Fact, Vice Chairman Tait polled the Council members with Mr. Ashton, Mr. Heffernan, Mr. Emerick, Mr. Wilensky, Dr. Bell, and Mr. Murphy in favor of granting a Certificate for the proposed telecommunications facility.

Vice Chairman Tait directed staff to draft a favorable Opinion and Decision and Order to be reviewed at the next meeting.

Chairman Katz resumed her position as Chair.

**DOCKET NO. 316 - Optasite, Inc. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility at 50 Fairchild Road, Middletown, Connecticut. Completeness Review, Schedule, Custodian of the Docket, Deposition of the Transcript, Request for Party/Intervenor Status.**

Mr. Ashton moved to approve the application as complete and to approve the schedule for processing the docket as per staff recommendations; the appointment of Lisa Fontaine as custodian of the docket; deposition of the transcript in the City of Middletown; and a public field review and hearing in Middletown on Tuesday, September 26, 2006; seconded by Mr. Murphy. The motion passed unanimously.

***(item 20 on the CSC agenda)*TS-T-MOBILE-139-060606 - Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at 848 East Street South, Suffield, Connecticut.**

Mr. Ashton moved to approve Omnipoint Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility; seconded by Mr. Heffernan. The motion passed unanimously.

***(item 23 on the CSC agenda)*EM-VER-089-119-060608 - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify existing telecommunications facilities located at 1 Hartford Square, New Britain; and 1218 Cromwell Avenue, Rocky Hill, Connecticut.**

Mr. Emerick moved to acknowledge Cellco Partnership d/b/a Verizon Wireless notice of intent to modify these existing telecommunications facilities with the condition that the recommendation on page 3 of the structural analysis report for the New Britain site is implemented; seconded by Mr. Tait. The motion passed unanimously.

***(item 24 on the CSC agenda)*EM-CING-064-043-155-094-060609 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 11 Mountain Road, Hartford; 2 Prestige Park Drive, East Hartford; 125 South Main Street, West Hartford; and 123 Costello Road, Newington, Connecticut.**

Dr. Bell moved to table the Hartford site until further information is received; seconded by Mr. Ashton. The motion passed unanimously.

Mr. Ashton moved to approve New Cingular Wireless PCS, LLC notice of intent to modify the East Hartford, West Hartford, and Newington existing telecommunications facilities; seconded by Mr. Heffernan. The motion passed unanimously.

***(item 32 on the CSC agenda)*EM-CING-155-060616 - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 139 North Main Street, West Hartford, Connecticut.**

Mr. Emerick moved to acknowledge New Cingular Wireless PCS, LLC notice of intent to modify this existing telecommunications facility with the following conditions:

1. A detailed structural analysis letter is provided to the Council and all recommendations by the engineer are implemented prior to the antenna installation.
2. All conditions recommended by the State Historic Preservation Officer in the June 6, 2006 letter are met.



Chairman Katz thanked staff and Council members for the “wonderful ride” on the Connecticut Siting Council, and appreciated the opportunity to work with such talented individuals.

**Adjournment.**

Chairman Katz adjourned the Council meeting at 3:25 p.m.

**Respectfully submitted,**

**Pamela B. Katz, P.E.**  
**Chairman**

PBK/laf

# Exhibit B

# Portland, CT : Assessor Database

**Property Search:**

Parcel ID: Alternate ID: Owner 1 Name: Street Number: Street Name:  
 95 HIGH ST

Search Reset

**Property Detail:**

Parcel ID: 039-0059 Alternate ID/Map Block Lot: 00217600 Card: Card: Street Name: HIGH ST Street Number: 95 Zoning: R15 LUC: Communication Towers Acres: 15.50

**Owner Information:**

Owner 1 Name: PORTLAND TOWN OF  
 Owner 2 Name: PORTLAND MIDDLE SCHOOL  
 Street 1: PO BOX 71  
 Street 2:  
 City: PORTLAND  
 State: CT  
 Zip: 06480  
 Volume: 84  
 Page: 141

**Valuation:**

Appraised Land: \$1,536,000.00  
 Appraised Bldg: \$108,000.00  
 Appraised Total: \$1,644,000.00  
 Total Assessment: \$1,150,800.00

**Property Images:**

Picture:

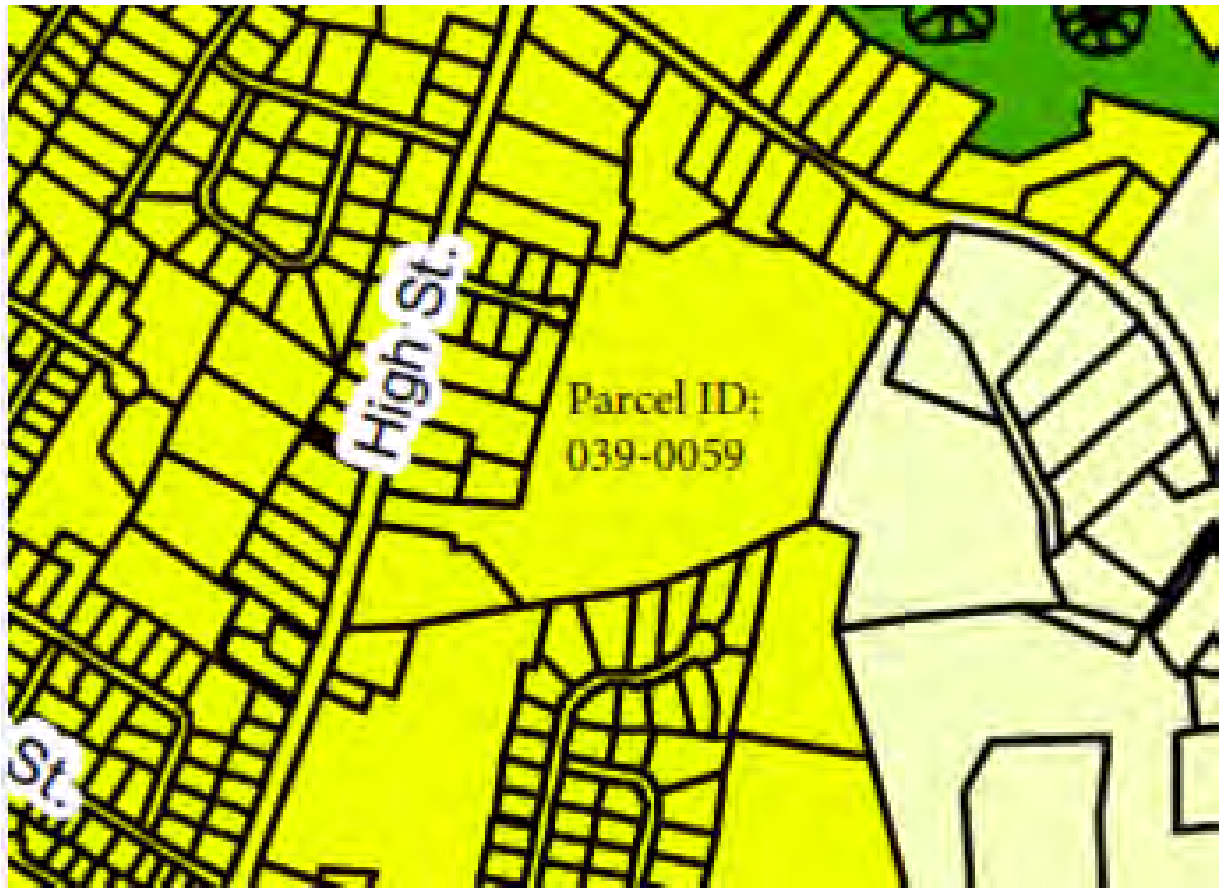


**Sketch:**

There is no sketch available.

**Out-Buildings:**

Code:	Description:	Units:	Year Built:	Size1:	Size2:	Area:	Grade:	Condition:
TT4	TOWER CELLULAR	4	2009	1	120	0	1	



# Exhibit C

Copyright © 2016 Foresite LLC. All rights reserved. The details, templates, drawing formats or any portion of this document generated by Foresite LLC may not be duplicated, traced or used otherwise for any profit-driven enterprise.

MODIFICATION TO EXISTING WIRELESS  
TELECOMMUNICATION FACILITY BY

# T-Mobile

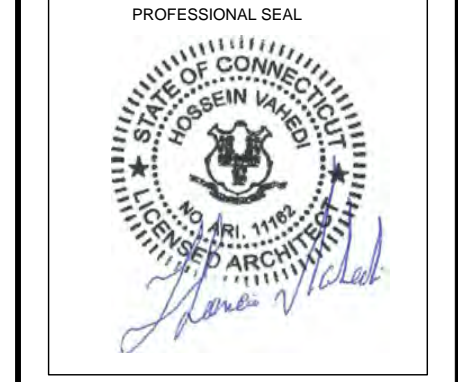
## T-MOBILE NORTHEAST LLC

SITE NUMBER: CTHA242A  
SITE NAME: HA242/PORTLANDHS\_SST  
SITE ADDRESS: 95 HIGH STREET  
PORTLAND, CT 06480

**APPLICANT:**  
**T-Mobile**  
**T-MOBILE NORTHEAST LLC**  
35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
860-692-7100

**PROJECT MANGER**  
**NSS** NORTHEAST  
SITE SOLUTIONS  
*Turnkey Wireless Development*  
420 MAIN STREET, BLDG 4  
STURBRIDGE, MA 01566  
203-275-6669

**CONSULTANT:**  
**FORESITE** LLC  
Architects . Engineers . Surveyors  
462 WALNUT STREET  
NEWTON, MA 02460  
617-212-3123



THIS DOCUMENT IS THE DESIGN PROPERTY AND  
COPYRIGHT OF FORESITE, LLC. AND FOR THE  
EXCLUSIVE USE BY THE TITLE CLIENT.  
DUPLICATION OR USE WITHOUT THE EXPRESS  
WRITTEN CONSENT  
OF THE CREATOR IS STRICTLY PROHIBITED.  
DRAWING SCALES ARE INTENDED FOR 22"x34" SIZE  
PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES  
ARE DEEMED "NOT TO SCALE".

REV	DESCRIPTION	DATE
A	PRELIMINARY	03/23/18

SITE NUMBER: CTHA242A  
ADDRESS: 95 HIGH STREET  
PORTLAND, CT 06480

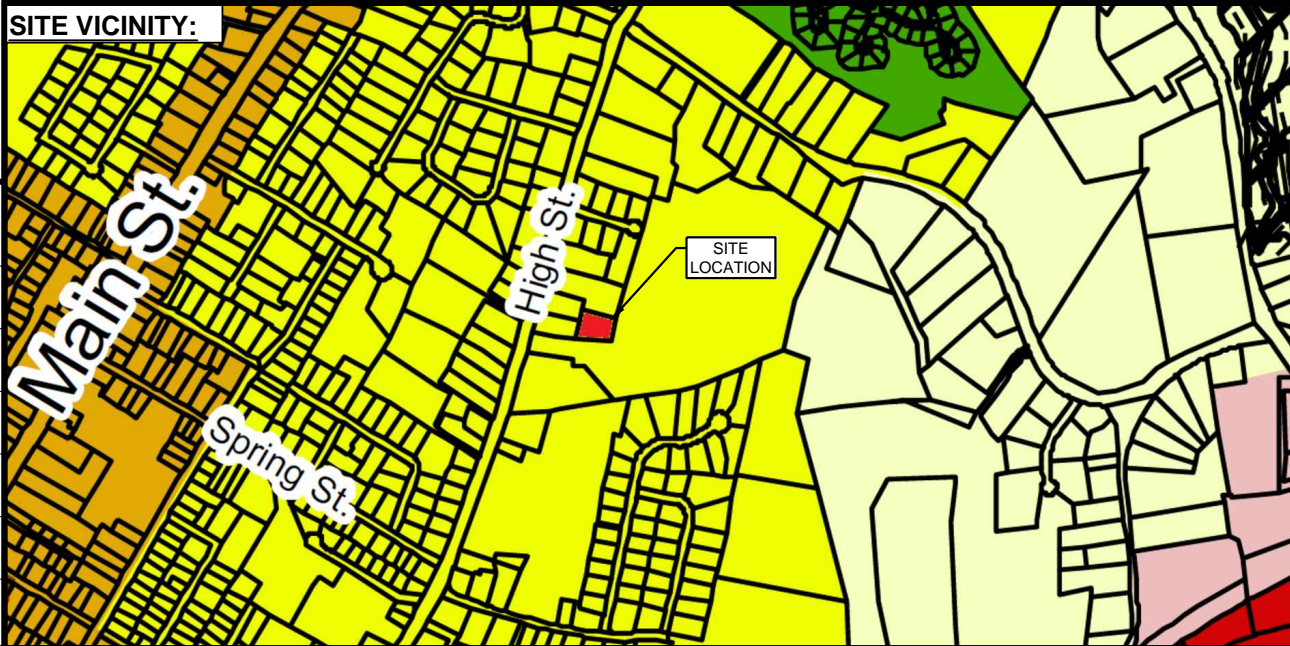
SHEET TITLE:  
T-1: TITLE SHEET

**PROJECT SCOPE:**  
ADDITION OF A BACKHAUL RADIO, (1) FIBER AND (2) CAT6 CABLES TO EXISTING TOWER.

- PROJECT NOTES:**
- THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS IS NOT REQUIRED. POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED. NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
  - CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
  - DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.
  - PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT, A STRUCTURAL EVALUATION SHOULD BE PERFORMED TO CERTIFY THAT THE EXISTING/PROPOSED STRUCTURE AND COMPONENTS HAVE ADEQUATE STRUCTURAL CAPACITY PER ALL THE APPLICABLE CODES AND STANDARDS IN THE PROJECT JURISDICTION. CONTRACTOR SHOULD REVIEW THE REPORT AND ADHERE TO THE REPORT FULLY AND ALL THE RECOMMENDATIONS THEREIN, INCLUDING BUT NOT LIMITED TO ANTENNA PLACEMENT, COAX ROUTING, STRUCTURAL IMPROVEMENTS, ETC.

**T-MOBILE APPROVALS:**

FSA CM	DATE
RF ENGINEER	DATE
FOPS	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE



**PROJECT INFORMATION:**

ADDRESS: 95 HIGH STREET  
PORTLAND, CT 06480

COORDINATES: N 41.58115 , W -72.622217

STRUCTURE TYPE: EXISTING 120' LATTICE TOWER

JURISDICTION: TOWN OF PORTLAND, CT

CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY

**PROJECT TEAM:**

APPLICANT: T-MOBILE NORTHEAST, LLC.  
35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
860-692-7100

LANDLORD: TOWN OF PORTLAND  
33 EAST MAIN STREET  
P.O. BOX 71  
PORTLAND, CT 06480

PROJECT MANGER: NORTHEAST SITE SOLUTIONS  
420 MAIN STREET, BLDG 4  
STURBRIDGE, MA 01566  
SHELDON FREINCLE  
SHELDON@NORTHEASTSITESOLUTIONS.COM  
201-776-8521

CONSULTANTS: FORESITE LLC  
462 WALNUT ST  
NEWTON, MA 02460  
SAEED MOSSAVAT  
SMOSSAVAT@FORESITELLC.COM  
617-212-3123

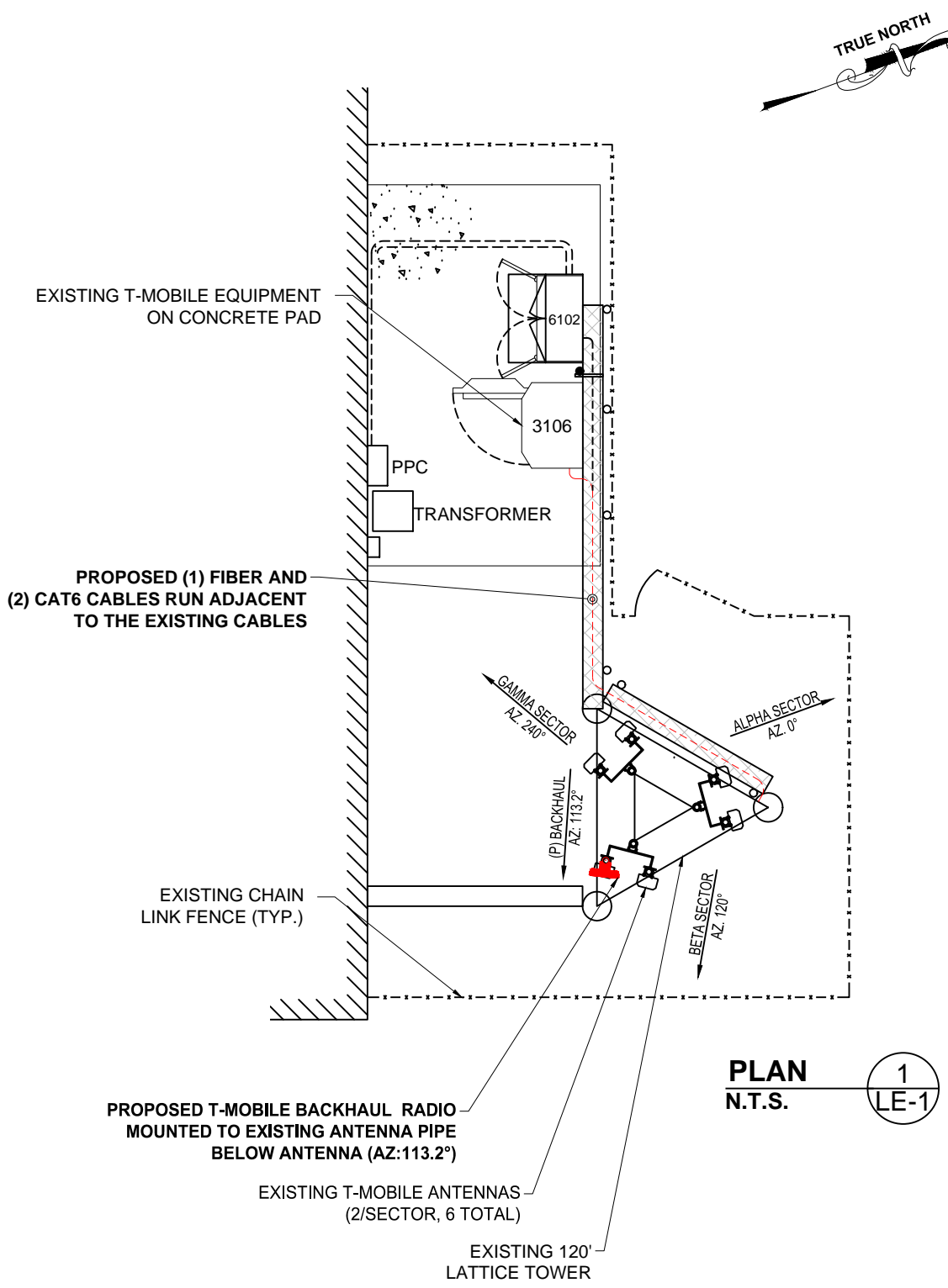
**SHEET INDEX:**

T-1: TITLE SHEET

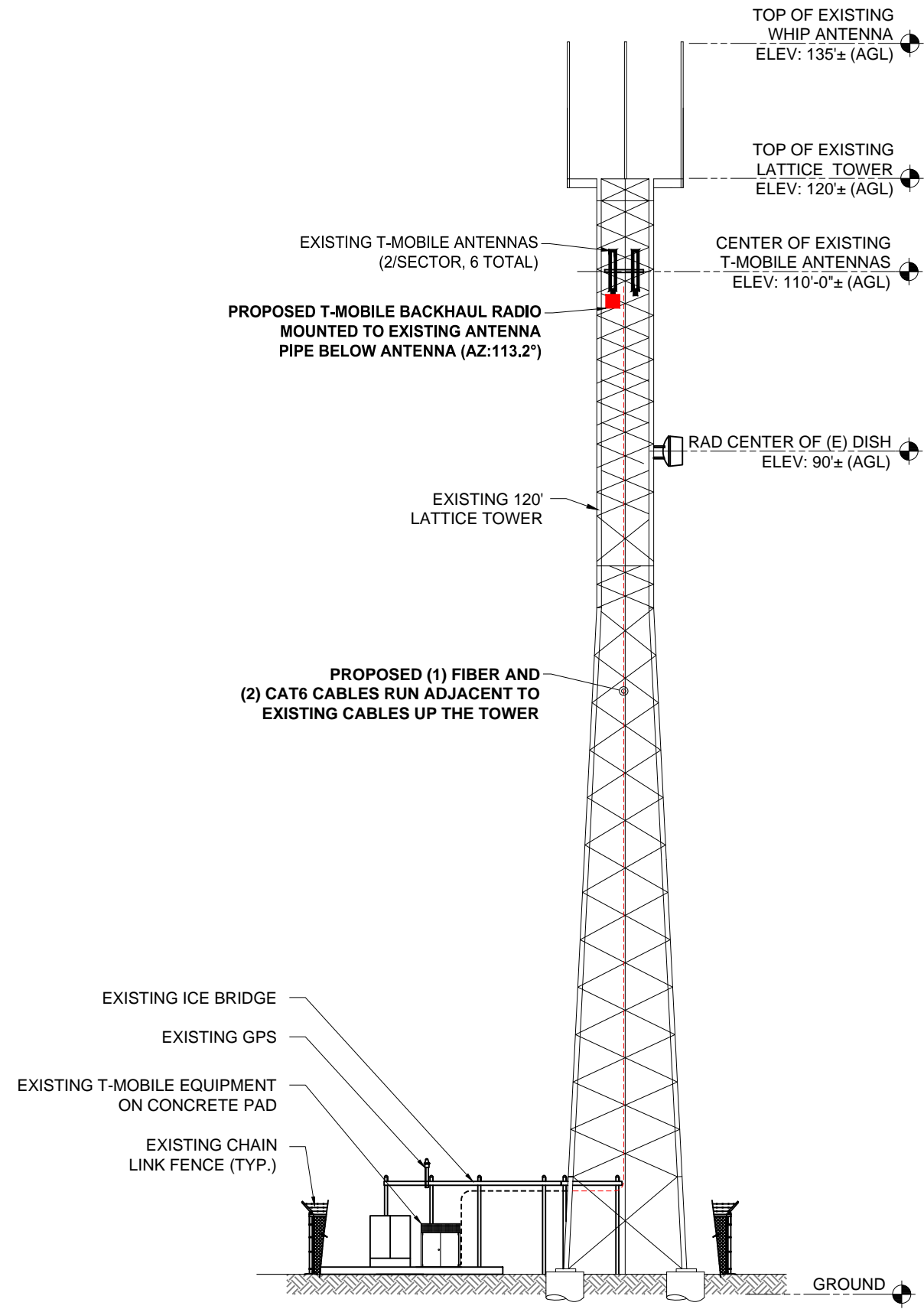
LE-1: PLANS AND ELEVATIONS

LE-2: DETAILS

Copyright © 2016 Foresite LLC all rights reserved. The details, templates, drawing formats or any portion of this document generated by Foresite LLC may not be duplicated, traced or used otherwise for any profit-driven enterprise.



**PLAN**  
N.T.S. 1  
LE-1

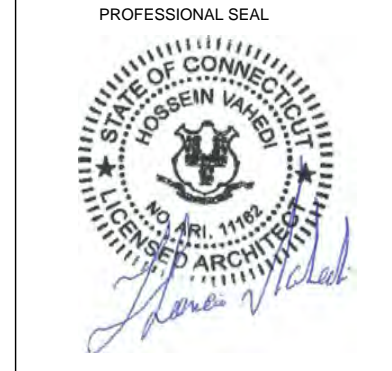


**ELEVATION**  
N.T.S. 2  
LE-1

APPLICANT:  
**T-Mobile**  
**T-MOBILE NORTHEAST LLC**  
35 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002  
860-692-7100

PROJECT MANGER  
**NSS NORTHEAST**  
SITE SOLUTIONS  
*Turnkey Wireless Development*  
420 MAIN STREET, BLDG 4  
STURBRIDGE, MA 01566  
203-275-6669

CONSULTANT:  
**FORESITE** LLC  
Architects . Engineers . Surveyors  
462 WALNUT STREET  
NEWTON, MA 02460  
617-212-3123



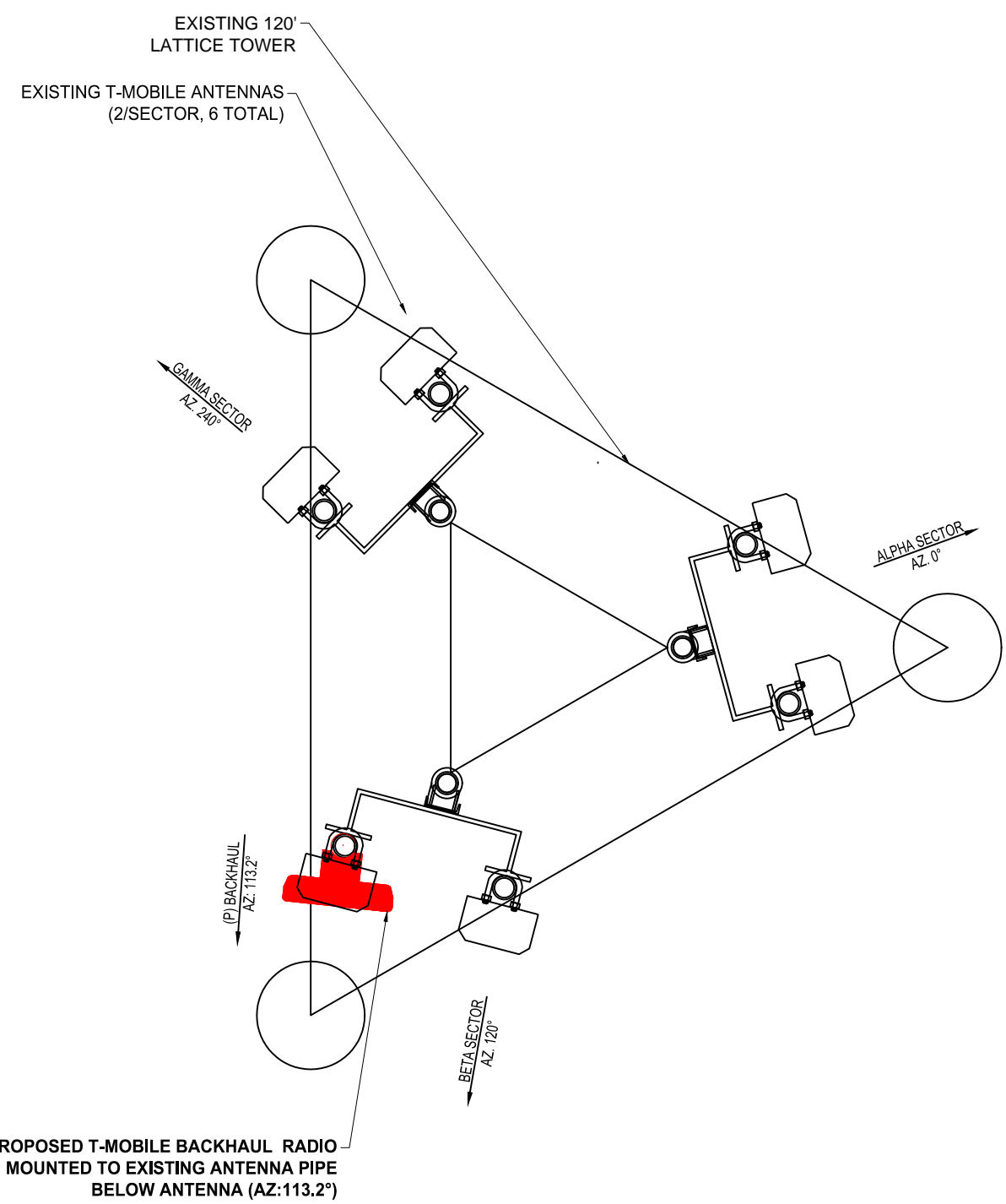
THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF FORESITE, LLC. AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED. DRAWING SCALES ARE INTENDED FOR 22"x34" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

REV	DESCRIPTION	DATE
A	PRELIMINARY	03/23/18

SITE NUMBER: CTHA242A  
ADDRESS: 95 HIGH STREET  
PORTLAND, CT 06480

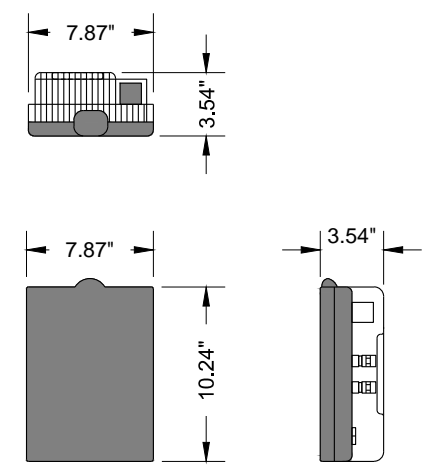
SHEET TITLE:  
LE-1: PLAN AND ELEVATION

Copyright © 2016 Foresite LLC all rights reserved. The details, templates, drawing formats or any portion of this document generated by Foresite LLC may not be duplicated, traced or used otherwise for any profit-driven enterprise.



**ANTENNA PLAN**  
N.T.S

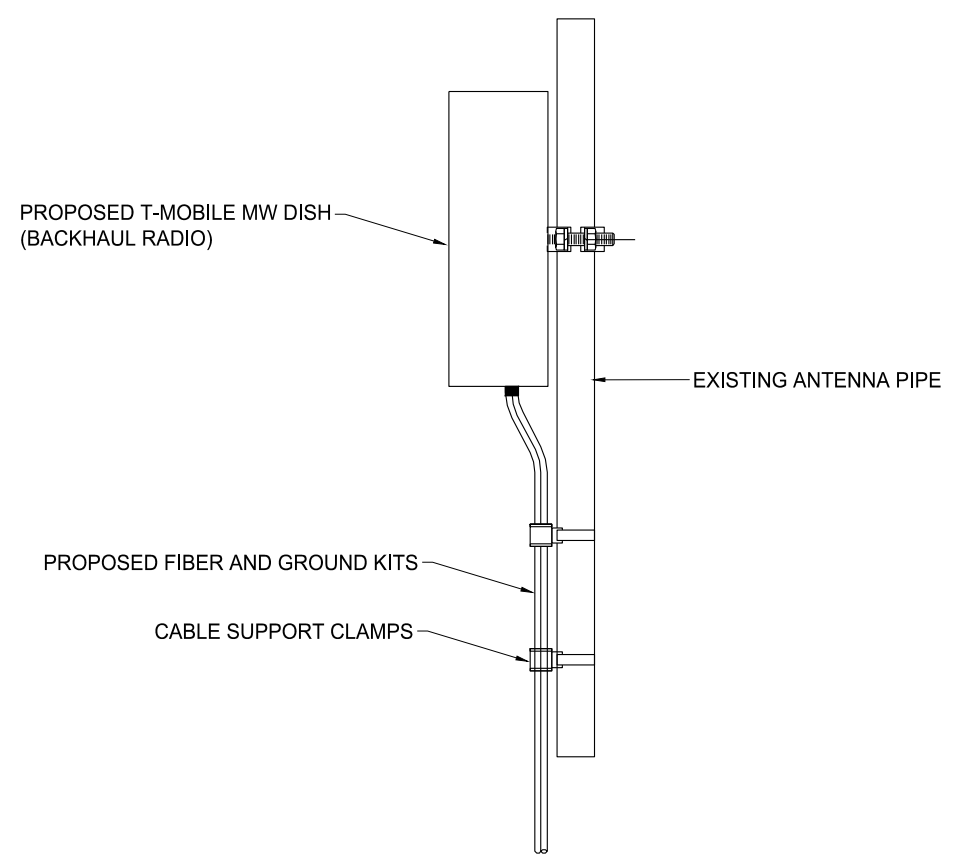
1  
LE-2



MANUFACTURER: FASTBACK  
 MODEL: IBR 1300  
 FOOTPRINT: 10.24"HX7.87"WX3.54"D  
 WEIGHT: 8.82 LBS

**BACKHAUL RADIO SPECIFICATIONS**  
N.T.S

2  
LE-2



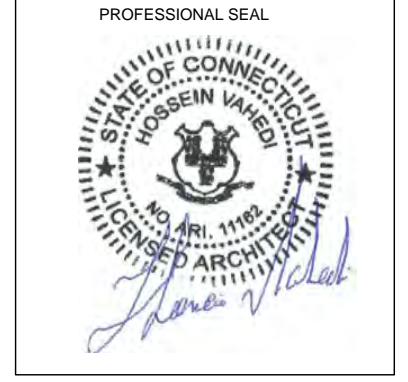
**BACKHAUL RADIO MOUNTING DETAIL**  
N.T.S

3  
LE-2

APPLICANT:  
**T-Mobile**  
**T-MOBILE NORTHEAST LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 860-692-7100

PROJECT MANGER  
**NSS NORTHEAST**  
 SITE SOLUTIONS  
*Turnkey Wireless Development*  
 420 MAIN STREET, BLDG 4  
 STURBRIDGE, MA 01566  
 203-275-6669

CONSULTANT:  
**FORESITE** LLC  
 Architects . Engineers . Surveyors  
 462 WALNUT STREET  
 NEWTON, MA 02460  
 617-212-3123



THIS DOCUMENT IS THE DESIGN PROPERTY AND COPYRIGHT OF FORESITE, LLC, AND FOR THE EXCLUSIVE USE BY THE TITLE CLIENT. DUPLICATION OR USE WITHOUT THE EXPRESS WRITTEN CONSENT OF THE CREATOR IS STRICTLY PROHIBITED. DRAWING SCALES ARE INTENDED FOR 22"x34" SIZE PRINTED MEDIA ONLY. ALL OTHER PRINTED SIZES ARE DEEMED "NOT TO SCALE".

REV	DESCRIPTION	DATE
A	PRELIMINARY	03/23/18

SITE NUMBER: CTHA242A  
 ADDRESS: 95 HIGH STREET  
 PORTLAND, CT 06480

SHEET TITLE:  
 LE-2: ANTENNA PLAN AND DETAILS



# Exhibit D

**STRUCTURAL ANALYSIS REPORT  
SELF-SUPPORT TOWER**



Prepared For:



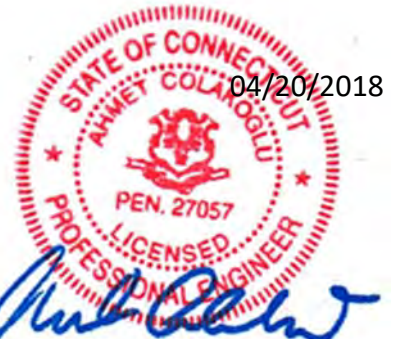
**T-Mobile Northeast, LLC  
35 Griffin Road South  
Bloomfield, CT 06002**



**Structure Rating**

**Self-Support Tower : Pass (80.3%)  
Foundation : Pass (79.2%)**

Sincerely,  
Destek Engineering, LLC  
License No: PEC0001429



Ahmet Colakoglu, PE  
Connecticut Professional Engineer  
License No: 27057

**Site ID: CTHA242A  
Site Name: HA242/PORTLANDHS\_SST  
95 High Street,  
Portland, CT 06480**

## **CONTENTS**

1.0 – SUBJECT AND REFERENCES

1.1 – STRUCTURE

2.0 – EXISTING AND PROPOSED APPURTENANCES

3.0 - CODES AND LOADING

4.0 - STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING  
STRUCTURES

5.0 - ANALYSIS AND ASSUMPTIONS

6.0 – RESULTS AND CONCLUSION

APPENDIX

A –CALCULATIONS

## 1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing 120 feet tall self-support tower, located at 95 High Street, Portland, CT 06480 for the additions and alterations proposed by T-Mobile.

The structural analysis of the site is based on the following documents provided to us:

- Structural Analysis Report prepared by the Destek for T-Mobile, dated 08/27/2014.
- Structural Analysis Report prepared by the Atlantis Group for T-Mobile, dated 05/13/2013
- Structural Analysis Report prepared by Velocitel, dated 05/04/2009.
- Proposed antenna information provided by T-Mobile.

## 1.1 STRUCTURE

The structure is a 120 feet tall, triangular based self-support tower. Truss legs and solid rod legs are X-braced along its elevation. The tower is 4.5 feet wide at the top and 10 feet wide at the bottom. Please refer to the software output in Appendix A, for tower geometry, member sizes and other details.

## 2.0 EXISTING AND PROPOSED APPURTENANCES

This analysis was based on the following existing and proposed appurtenances:

### Existing Configuration of T-MOBILE Appurtenances:

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
110	(3) AIR21 B2A/B4P (3) AIR21 B4A/B12P 8ft (3) dd B4 (3) RRUS11_B12	(18) 1 $\frac{5}{8}$ " + (1) 1 $\frac{5}{8}$ " Hybrid Cable	(3) Sector Mounts

**Proposed and Final Configuration of T-MOBILE Appurtenances:**

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
110	(3) AIR21 B2A/B4P (3) AIR21 B4A/B12P 8ft (3) dd B4 (3) RRUS11_B12 (1) IBR 1300 Radio Unit	(18) 1 $\frac{5}{8}$ " + (1) 1 $\frac{5}{8}$ " Hybrid Cable + (2) Cat 6 + (1) Fiber	(3) Sector Mounts

**Existing and Remaining Appurtenances by Others:**

RAD CENTER (FT)	ANTENNA & TMA	COAX	MOUNT
120	(3) PD220	(3) $\frac{7}{8}$ "	(3) Side Arms
100	(1) 6' Dish	(1) $\frac{5}{8}$ "	(1) Leg Mount
40	(1) GPS Antenna	(1) $\frac{1}{2}$ "	(1) Side Mount

**3.0 CODES AND LOADING**

The tower was analyzed per *TIA/EIA-222-G* as referenced by the *2016 Connecticut State Building Code* with all of the adopted Addendums and Supplements. The following wind loading was used in compliance with the standard for Manchester, CT:

- Basic wind speed 101 mph without ice ( $V$ )
- Basic wind speed 50 mph with 0.75" escalating ice ( $W_i$ )
- Exposure Category C
- Topographic Category 1
- Structure Class II

The following load combinations were used with wind blowing at 0°, 30°, 45°, 60°, and 90° measured from a line normal to the face of the self-support Tower.

- 1.2 D + 1.6  $W_0$
- 0.9 D + 1.6  $W_0$
- 1.2 D + 1.0  $D_i$  + 1.0  $W_i$

D: Dead Load of structure and appurtenances

$W_0$ : Wind Load, without ice

$W_i$ : Wind Load, with ice

$D_i$ : Weight of Ice

#### **4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES**

The analysis is based on the information provided to Destek and is assumed to be current and correct. Unless otherwise noted, the structure and the foundation system are assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed additions and alterations. Any deviation of the proposed equipment and placement, etc., will require Destek to generate an additional structural analysis.

#### **5.0 ANALYSIS AND ASSUMPTIONS**

The tower was analyzed by utilizing tnxTower, a non-linear, three-dimensional, finite element-analysis software package, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix A of this report.

All member end connection details are sufficient to resist the maximum supported member loading.

## 6.0 RESULTS AND CONCLUSION

Based on analysis, per TIA-222-G, the existing self-support tower **has adequate** structural capacity for the proposed changes by T-Mobile. As a maximum, the self-support tower leg between 50 feet and 70 feet is stressed to **80.3%** of its capacity. Tower diagonals and girts are stressed to **62.8%** and **52.2%** respectively.

Based on reaction comparison, the tower foundation is found to have **adequate** capacity for the proposed changes by T-Mobile.

### Reactions:

Maximums	Pirod Design Reactions	Destek Analysis Reactions	Comparison
Leg Compression (kips)	144.6x1.35=195.21	150.01	76.85%
Leg Uplift (kip)	131.9x1.35=178.07	141.04	79.20%
Tower Shear (kips)	24.2x1.35=32.67	18.15	55.56%

**\*Reactions have been multiplied by 1.35 as per Section 15.5.1 of ANSI/TIA-222-G.**

Therefore, the proposed additions and alterations by T-Mobile **can** be implemented as intended with the conditions outlined in this report.

Should you have any questions about this report, please contact us at (770) 693-0835.

**APPENDIX A  
CALCULATIONS &  
COAX LAYOUT**



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD220	125	dd B4 TMA	110
PD220	125	dd B4 TMA	110
PD220	125	AIR 21 B4A B12P 8ft w/Mount pipe	110
Pirod 4' Side Mount Standoff (1)	120	AIR 21 B4A B12P 8ft w/Mount pipe	110
Pirod 4' Side Mount Standoff (1)	120	AIR 21 B4A B12P 8ft w/Mount pipe	110
Pirod 4' Side Mount Standoff (1)	120	RRUS 11	110
Pirod 4' Side Mount Standoff (1)	120 - 100	RRUS 11	110
7'x2 1/2" Pipe Mount	110	RRUS 11	110
7'x2 1/2" Pipe Mount	110	Side Arm Mount [SO 101-1]	110
7'x2 1/2" Pipe Mount	110	Side Arm Mount [SO 101-1]	110
AIR21 B2A/B4P with pipe	110	Side Arm Mount [SO 101-1]	110
AIR21 B2A/B4P with pipe	110	IBR 1300 Series	110
AIR21 B2A/B4P with pipe	110	Andrew 6' w/Radome	100
dd B4 TMA	110	GPS	40

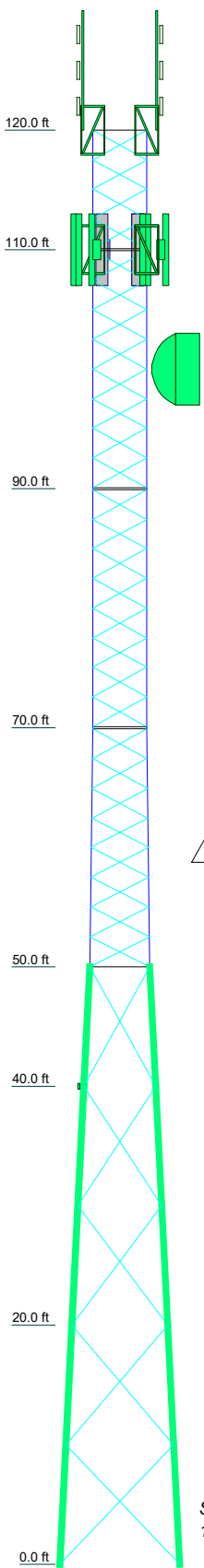
### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

### TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 80.3%

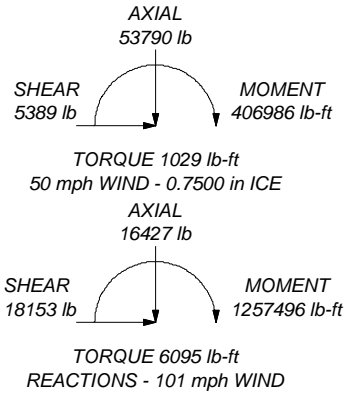
T1	T2	T3	T4	T5	T6	T7
SR 1 3/4	SR 3/4	SR 2	SR 2 1/4	Pirod 105244	Pirod 105217	
SR 3/4	SR 3/4	SR 7/8	A572-50	L2 1/2x2 1/2x3/16	N.A.	
SR 3/4	SR 3/4	SR 7/8	A36	N.A.	N.A.	
SR 3/4	SR 3/4	SR 7/8	8 @ 2.48958	5 @ 10	8	
20 @ 2.47917	902.4	1201.3	1397.1	1066.3	2333.6	2381.8
471.5						
4.5						



ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:  
 DOWN: 150008 lb  
 SHEAR: 13078 lb

UPLIFT: -141037 lb  
 SHEAR: 12355 lb



**Destek Engineering LLC**  
 1281 Kennestone Circle, Suite 100  
 Marietta, GA 30066  
 Phone: 770693-0835  
 FAX:

Job: **CTHA242A**  
 Project: **CTHA242A**  
 Client: T-Mobile | Drawn by: Ahmet Colakoglu | App'd:  
 Code: TIA-222-G | Date: 04/20/18 | Scale: NTS  
 Path: Z:\Projects\2018\75 - ForeSite LLC\1875008 - CTHA242A\Inx\CTHA242A.dwg | Dwg No. E-1

<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:</p>	<b>Job</b> CTHA242A	<b>Page</b> 1 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

## Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 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 4.50 ft at the top and 10.00 ft at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Middlesex County, Connecticut.

Basic wind speed of 101 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

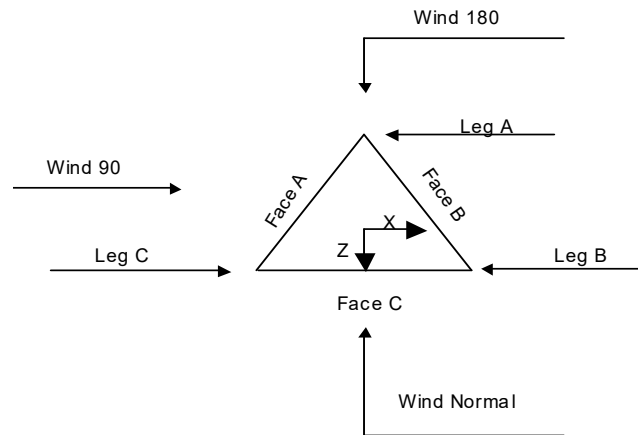
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>√ Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>√ SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>√ Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>√ Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>√ SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> <li style="background-color: #e0e0e0;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|--|

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 2 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu



**Triangular Tower**

### Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	120.00-110.00			4.50	1	10.00
T2	110.00-90.00			4.50	1	20.00
T3	90.00-70.00			4.50	1	20.00
T4	70.00-50.00			4.50	1	20.00
T5	50.00-40.00			5.00	1	10.00
T6	40.00-20.00			6.00	1	20.00
T7	20.00-0.00			8.00	1	20.00

### 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	120.00-110.00	2.48	X Brace	No	No	0.0000	1.0000
T2	110.00-90.00	2.48	X Brace	No	No	1.0000	1.0000
T3	90.00-70.00	2.48	X Brace	No	No	1.0000	1.0000
T4	70.00-50.00	2.49	X Brace	No	No	1.0000	0.0000
T5	50.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T6	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T7	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	3 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

### Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-110.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 110.00-90.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 90.00-70.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 70.00-50.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T5 50.00-40.00	Truss Leg	Pirod 105244	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 20.00-0.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	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 120.00-110.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T2 110.00-90.00	Solid Round	3/4	A36 (36 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 90.00-70.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 70.00-50.00	Solid Round	7/8	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 120.00-110.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 110.00-90.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 90.00-70.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 70.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 50.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 4 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor $A_f$	Adjust. Factor $A_r$	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

### Tower Section Geometry (cont'd)

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors <sup>1</sup>								
			Legs	X Brace Diags	K Brace Diags	Single Diags	Girts	Horiz.	Sec. Horiz.	Inner Brace	
											X
ft			Y	Y	Y	Y	Y	Y	Y	Y	
T1	Yes	Yes	1	1	1	1	1	1	1	1	1
120.00-110.00				1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1
110.00-90.00				1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1
90.00-70.00				1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1
70.00-50.00				1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1
50.00-40.00				1	1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1	1
T7 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1

<sup>1</sup>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	Truss-Leg K Factors					
	Truss-Legs Used As Leg Members			Truss-Legs Used As Inner Members		
	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T5	1	1	1	1	0.5	0.85
50.00-40.00						
T6	1	1	1	1	0.5	0.85
40.00-20.00						
T7 20.00-0.00	1	1	1	1	0.5	0.85

### Tower Section Geometry (cont'd)

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 5 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 120.00-110.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 110.00-90.00	0.0000	1	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 90.00-70.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 70.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 50.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

### Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 120.00-110.00	Sleeve DS	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2 110.00-90.00	Sleeve DS	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3 90.00-70.00	Sleeve DS	0.7500	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T4 70.00-50.00	Flange	1.0000	0	1.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5 50.00-40.00	Flange	1.0000	0	1.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T6 40.00-20.00	Flange	1.0000	0	1.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7 20.00-0.00	Flange	1.0000	6	1.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
AVA5-50 (7/8 LOW DENSI.FOAM) ***	A	No	Ar (CaAa)	120.00 - 0.00	-2.0000	-0.4	6	3	0.7500	1.1000		0.30
AVA7-50 (1-5/8 LOW DENSI. FOAM) ***	C	No	Ar (CaAa)	110.00 - 0.00	-2.0000	-0.4	18	6	0.7500	1.9800		0.72
AVA7-50	A	No	Ar (CaAa)	100.00 - 0.00	0.0000	0	1	1	1.9800	1.9800		0.72

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	6 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	# Per Row	#	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(1-5/8 LOW DENSL. FOAM) ***												
LDF4-50A (1/2 FOAM) ***	A	No	Ar (CaAa)	40.00 - 0.00	0.0000	0	1	1	0.6300	0.6300		0.15
***PROPOSE D*** ***												
Highcapacity Hybrid for TMO - 1.584"	C	No	Ar (CaAa)	110.00 - 0.00	0.0000	0	1	1	0.2000 1.5840	1.5840		1.61
CAT6(1/4) Fiber	C	No	Ar (CaAa)	110.00 - 0.00	0.0000	0.2	2	2	0.2500	0.2400		0.05
	C	No	Ar (CaAa)	110.00 - 0.00	0.0000	0.1	1	1	0.2000 1.5840	1.5840		1.61

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
***							
***PROPOSED***							

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
T1	120.00-110.00	A	0.000	0.000	6.600	0.000	18.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	110.00-90.00	A	0.000	0.000	15.180	0.000	43.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	78.576	0.000	325.76
T3	90.00-70.00	A	0.000	0.000	17.160	0.000	50.40
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	78.576	0.000	325.76
T4	70.00-50.00	A	0.000	0.000	17.160	0.000	50.40
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	78.576	0.000	325.76
T5	50.00-40.00	A	0.000	0.000	8.580	0.000	25.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	39.288	0.000	162.88
T6	40.00-20.00	A	0.000	0.000	18.420	0.000	53.40
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	78.576	0.000	325.76
T7	20.00-0.00	A	0.000	0.000	18.420	0.000	53.40
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	78.576	0.000	325.76

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 7 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
T1	120.00-110.00	A	1.699	0.000	0.000	12.962	0.000	181.37
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	110.00-90.00	A	1.676	0.000	0.000	31.091	0.000	440.17
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	87.923	0.000	1799.25
T3	90.00-70.00	A	1.639	0.000	0.000	36.015	0.000	510.26
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	87.114	0.000	1771.13
T4	70.00-50.00	A	1.592	0.000	0.000	35.503	0.000	495.41
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	86.098	0.000	1736.16
T5	50.00-40.00	A	1.547	0.000	0.000	17.503	0.000	240.59
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	42.555	0.000	851.30
T6	40.00-20.00	A	1.486	0.000	0.000	41.532	0.000	541.94
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	83.766	0.000	1657.53
T7	20.00-0.00	A	1.331	0.000	0.000	39.213	0.000	482.67
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	80.388	0.000	1547.48

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
T1	120.00-110.00	-2.6800	1.3725	-0.5929	0.3036
T2	110.00-90.00	1.7417	2.8598	0.5924	1.4067
T3	90.00-70.00	1.5680	2.6666	0.4698	1.2908
T4	70.00-50.00	1.6253	2.7677	0.5051	1.3666
T5	50.00-40.00	1.4758	2.5216	0.3457	0.9224
T6	40.00-20.00	1.7616	3.0934	0.3630	1.2400
T7	20.00-0.00	2.2235	3.9194	0.5778	1.8066

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T1	1	AVA5-50 (7/8 LOW DENSIFOAM)	110.00 - 120.00	0.6000	0.4859
T2	1	AVA5-50 (7/8 LOW DENSIFOAM)	90.00 - 110.00	0.6000	0.5211
T2	3	AVA7-50 (1-5/8 LOW DENSIFOAM)	90.00 - 110.00	0.6000	0.5211
T2	5	AVA7-50 (1-5/8 LOW DENSIFOAM)	90.00 - 100.00	0.6000	0.5211
T2	11	Highcapacity Hybrid for	90.00 - 110.00	0.6000	0.5211



<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	8 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
		TMO - 1.584"			
T2	12	CAT6(1/4)	90.00 - 110.00	0.6000	0.5211
T2	13	Fiber	90.00 - 110.00	0.6000	0.5211
T3	1	AVA5-50 (7/8 LOW DENSIFOAM)	70.00 - 90.00	0.6000	0.5143
T3	3	AVA7-50 (1-5/8 LOW DENSIFOAM)	70.00 - 90.00	0.6000	0.5143
T3	5	AVA7-50 (1-5/8 LOW DENSIFOAM)	70.00 - 90.00	0.6000	0.5143
T3	11	Highcapacity Hybrid for TMO - 1.584"	70.00 - 90.00	0.6000	0.5143
T3	12	CAT6(1/4)	70.00 - 90.00	0.6000	0.5143
T3	13	Fiber	70.00 - 90.00	0.6000	0.5143
T4	1	AVA5-50 (7/8 LOW DENSIFOAM)	50.00 - 70.00	0.6000	0.5282
T4	3	AVA7-50 (1-5/8 LOW DENSIFOAM)	50.00 - 70.00	0.6000	0.5282
T4	5	AVA7-50 (1-5/8 LOW DENSIFOAM)	50.00 - 70.00	0.6000	0.5282
T4	11	Highcapacity Hybrid for TMO - 1.584"	50.00 - 70.00	0.6000	0.5282
T4	12	CAT6(1/4)	50.00 - 70.00	0.6000	0.5282
T4	13	Fiber	50.00 - 70.00	0.6000	0.5282
T5	1	AVA5-50 (7/8 LOW DENSIFOAM)	40.00 - 50.00	0.6000	0.3425
T5	3	AVA7-50 (1-5/8 LOW DENSIFOAM)	40.00 - 50.00	0.6000	0.3425
T5	5	AVA7-50 (1-5/8 LOW DENSIFOAM)	40.00 - 50.00	0.6000	0.3425
T5	11	Highcapacity Hybrid for TMO - 1.584"	40.00 - 50.00	0.6000	0.3425
T5	12	CAT6(1/4)	40.00 - 50.00	0.6000	0.3425
T5	13	Fiber	40.00 - 50.00	0.6000	0.3425
T6	1	AVA5-50 (7/8 LOW DENSIFOAM)	20.00 - 40.00	0.6000	0.4467
T6	3	AVA7-50 (1-5/8 LOW DENSIFOAM)	20.00 - 40.00	0.6000	0.4467
T6	5	AVA7-50 (1-5/8 LOW DENSIFOAM)	20.00 - 40.00	0.6000	0.4467
T6	7	LDF4-50A (1/2 FOAM)	20.00 - 40.00	0.6000	0.4467
T6	11	Highcapacity Hybrid for TMO - 1.584"	20.00 - 40.00	0.6000	0.4467
T6	12	CAT6(1/4)	20.00 - 40.00	0.6000	0.4467
T6	13	Fiber	20.00 - 40.00	0.6000	0.4467
T7	1	AVA5-50 (7/8 LOW DENSIFOAM)	0.00 - 20.00	0.6000	0.5527
T7	3	AVA7-50 (1-5/8 LOW DENSIFOAM)	0.00 - 20.00	0.6000	0.5527
T7	5	AVA7-50 (1-5/8 LOW DENSIFOAM)	0.00 - 20.00	0.6000	0.5527
T7	7	LDF4-50A (1/2 FOAM)	0.00 - 20.00	0.6000	0.5527
T7	11	Highcapacity Hybrid for TMO - 1.584"	0.00 - 20.00	0.6000	0.5527
T7	12	CAT6(1/4)	0.00 - 20.00	0.6000	0.5527
T7	13	Fiber	0.00 - 20.00	0.6000	0.5527

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	9 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

## Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
PD220	A	From Leg	1.00	0.0000	125.00	No Ice	3.56	3.56	23.00
			0.00			1/2" Ice	7.13	7.13	46.00
			0.00			1" Ice	10.70	10.70	69.00
PD220	B	From Leg	1.00	0.0000	125.00	No Ice	3.56	3.56	23.00
			0.00			1/2" Ice	7.13	7.13	46.00
			0.00			1" Ice	10.70	10.70	69.00
PD220	C	From Leg	1.00	0.0000	125.00	No Ice	3.56	3.56	23.00
			0.00			1/2" Ice	7.13	7.13	46.00
			0.00			1" Ice	10.70	10.70	69.00
Pirod 4' Side Mount Standoff (1)	A	From Leg	0.00	0.0000	120.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
Pirod 4' Side Mount Standoff (1)	B	From Leg	0.00	0.0000	120.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	120.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
***									
7'x2 1/2" Pipe Mount	A	From Leg	0.00	0.0000	110.00	No Ice	2.01	2.01	40.50
			0.00			1/2" Ice	2.59	2.59	55.31
			0.00			1" Ice	3.02	3.02	74.85
7'x2 1/2" Pipe Mount	B	From Leg	0.00	0.0000	110.00	No Ice	2.01	2.01	40.50
			0.00			1/2" Ice	2.59	2.59	55.31
			0.00			1" Ice	3.02	3.02	74.85
7'x2 1/2" Pipe Mount	C	From Leg	0.00	0.0000	110.00	No Ice	2.01	2.01	40.50
			0.00			1/2" Ice	2.59	2.59	55.31
			0.00			1" Ice	3.02	3.02	74.85
***									
Pirod 4' Side Mount Standoff (1)	B	From Leg	0.00	0.0000	100.00 - 120.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
***									
GPS	C	From Leg	0.50	0.0000	40.00	No Ice	0.33	0.33	6.08
			0.00			1/2" Ice	0.48	0.48	11.71
			0.00			1" Ice	0.65	0.65	18.88
***									
***PREVIOUS***									
***									
AIR21 B2A/B4P with pipe	A	From Leg	1.00	0.0000	110.00	No Ice	6.35	6.03	134.62
			1.50			1/2" Ice	6.82	6.98	201.01
			0.00			1" Ice	7.26	7.70	276.18
AIR21 B2A/B4P with pipe	B	From Leg	1.00	0.0000	110.00	No Ice	6.35	6.03	134.62
			1.50			1/2" Ice	6.82	6.98	201.01
			0.00			1" Ice	7.26	7.70	276.18
AIR21 B2A/B4P with pipe	C	From Leg	1.00	0.0000	110.00	No Ice	6.35	6.03	134.62
			1.50			1/2" Ice	6.82	6.98	201.01
			0.00			1" Ice	7.26	7.70	276.18
dd B4 TMA	A	From Leg	0.50	0.0000	110.00	No Ice	0.57	0.47	22.43
			1.50			1/2" Ice	0.72	0.64	31.53
			0.00			1" Ice	0.88	0.81	43.17
dd B4 TMA	B	From Leg	0.50	0.0000	110.00	No Ice	0.57	0.47	22.43
			1.50			1/2" Ice	0.72	0.64	31.53
			0.00			1" Ice	0.88	0.81	43.17

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	10 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	CAAA Front	CAAA Side	Weight	
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
dd B4 TMA	C	From Leg	0.50 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.57 0.72 0.81	0.47 0.64 0.81	22.43 31.53 43.17
AIR 21 B4A B12P 8ft w/Mount pipe	A	From Leg	1.00 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	11.50 12.12 12.74	9.08 9.75 10.44	63.07 138.58 221.99
AIR 21 B4A B12P 8ft w/Mount pipe	B	From Leg	1.00 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	11.50 12.12 12.74	9.08 9.75 10.44	63.07 138.58 221.99
AIR 21 B4A B12P 8ft w/Mount pipe	C	From Leg	1.00 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	11.50 12.12 12.74	9.08 9.75 10.44	63.07 138.58 221.99
RRUS 11	A	From Leg	0.50 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.70 71.50 95.33
RRUS 11	B	From Leg	0.50 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.70 71.50 95.33
RRUS 11	C	From Leg	0.50 -1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.70 71.50 95.33
Side Arm Mount [SO 101-1]	A	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	3.75 4.45 5.15	1.28 1.39 1.50	84.00 111.00 138.00
Side Arm Mount [SO 101-1]	B	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	3.75 4.45 5.15	1.28 1.39 1.50	84.00 111.00 138.00
Side Arm Mount [SO 101-1]	C	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	3.75 4.45 5.15	1.28 1.39 1.50	84.00 111.00 138.00
IBR 1300 Series	B	From Face	0.50 1.50 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	0.67 0.78 0.89	0.23 0.30 0.37	8.81 14.23 21.25

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				ft ft ft	°	°	ft	ft	ft <sup>2</sup>	lb	
Andrew 6' w/Radome	B	Paraboloid w/Shroud (HP)	From Leg	0.50 0.00 0.00	0.0000		100.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 29.86	380.00 450.00 520.00

## Truss-Leg Properties

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 11 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

Section Designation	Area in <sup>2</sup>	Area Ice in <sup>2</sup>	Self Weight lb	Ice Weight lb	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in <sup>2</sup>
Pirod 105244	1026.8606	3073.2757	562.76	1018.54	7.1310	21.3422	3.6816
Pirod 105217	2130.7479	6346.4670	619.35	2105.84	7.3984	22.0363	5.3014
Pirod 105217	2130.7479	6209.8165	619.35	2027.30	7.3984	21.5619	5.3014

### Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M <sub>x</sub> lb-ft	Sum of Overturning Moments, M <sub>z</sub> lb-ft	Sum of Torques lb-ft
Leg Weight	6757.76					
Bracing Weight	2996.14					
Total Member Self-Weight	9753.91			3912.64	-3719.40	
Total Weight	13689.44			3912.64	-3719.40	
Wind 0 deg - No Ice		-424.09	-11168.65	-751359.44	38643.22	2002.26
Wind 30 deg - No Ice		5303.15	-9028.39	-611047.68	-367880.66	3751.99
Wind 60 deg - No Ice		8694.15	-4710.15	-315605.81	-610734.10	3504.23
Wind 90 deg - No Ice		9864.21	215.64	25430.01	-692007.97	2459.47
Wind 120 deg - No Ice		9128.62	5265.06	366286.35	-632387.38	1155.71
Wind 150 deg - No Ice		5650.55	9346.51	642663.09	-397936.17	-615.84
Wind 180 deg - No Ice		263.33	10919.09	750130.75	-30006.49	-2571.62
Wind 210 deg - No Ice		-5175.26	9102.23	626256.55	347653.12	-3751.99
Wind 240 deg - No Ice		-8990.65	4695.72	314036.28	619174.05	-2968.82
Wind 270 deg - No Ice		-10032.43	-267.08	-22749.40	701391.00	-2121.59
Wind 300 deg - No Ice		-9089.28	-5242.35	-364140.77	634786.12	-1121.77
Wind 330 deg - No Ice		-5779.21	-9466.47	-646833.60	403363.71	277.96
Member Ice	23618.33					
Total Weight Ice	51052.57			18587.12	-11669.54	
Wind 0 deg - Ice		-113.49	-5336.36	-355099.40	-335.51	471.26
Wind 30 deg - Ice		2612.28	-4482.08	-296072.11	-195809.42	952.65
Wind 60 deg - Ice		4424.44	-2471.50	-154510.57	-325852.50	929.58
Wind 90 deg - Ice		5069.58	57.60	24332.22	-371579.72	669.24
Wind 120 deg - Ice		4509.37	2601.80	202356.13	-330287.90	314.54
Wind 150 deg - Ice		2696.53	4552.41	338670.24	-203288.87	-136.17
Wind 180 deg - Ice		70.39	5288.61	390325.98	-18693.48	-631.45
Wind 210 deg - Ice		-2577.99	4501.88	335226.00	169041.48	-952.65
Wind 240 deg - Ice		-4487.34	2458.04	188925.99	306355.18	-772.51
Wind 270 deg - Ice		-5114.68	-71.39	11462.66	352750.82	-578.65
Wind 300 deg - Ice		-4515.42	-2605.29	-166944.63	310001.98	-311.41
Wind 330 deg - Ice		-2731.02	-4584.57	-304712.25	183399.45	45.58
Total Weight	13689.44			3912.64	-3719.40	
Wind 0 deg - Service		-149.66	-3941.49	-265871.33	13818.54	706.61
Wind 30 deg - Service		1871.52	-3186.18	-216354.39	-129646.41	1324.10
Wind 60 deg - Service		3068.22	-1662.24	-112091.01	-215350.99	1236.67
Wind 90 deg - Service		3481.15	76.10	8262.78	-244033.07	867.96
Wind 120 deg - Service		3221.55	1858.08	128553.22	-222992.57	407.86
Wind 150 deg - Service		1994.12	3298.44	226088.39	-140253.20	-217.33
Wind 180 deg - Service		92.93	3853.42	264014.44	-10408.40	-907.54
Wind 210 deg - Service		-1826.38	3212.24	220298.42	122870.17	-1324.10
Wind 240 deg - Service		-3172.86	1657.15	110113.83	218691.69	-1047.72
Wind 270 deg - Service		-3540.51	-94.26	-8740.05	247706.59	-748.72
Wind 300 deg - Service		-3207.67	-1850.06	-129219.31	224201.29	-395.88
Wind 330 deg - Service		-2039.52	-3340.78	-228983.47	142530.80	98.09

<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:</p>	<p><b>Job</b></p> <p style="text-align: center;">CTHA242A</p>	<p><b>Page</b></p> <p style="text-align: center;">12 of 26</p>
	<p><b>Project</b></p> <p style="text-align: center;">CTHA242A</p>	<p><b>Date</b></p> <p style="text-align: center;">17:02:47 04/20/18</p>
	<p><b>Client</b></p> <p style="text-align: center;">T-Mobile</p>	<p><b>Designed by</b></p> <p style="text-align: center;">Ahmet Colakoglu</p>

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	1.2D+1.6W (pattern 1) 0 deg - No Ice
4	1.2D+1.6W (pattern 2) 0 deg - No Ice
5	0.9 Dead+1.6 Wind 0 deg - No Ice
6	1.2 Dead+1.6 Wind 30 deg - No Ice
7	1.2D+1.6W (pattern 1) 30 deg - No Ice
8	1.2D+1.6W (pattern 2) 30 deg - No Ice
9	0.9 Dead+1.6 Wind 30 deg - No Ice
10	1.2 Dead+1.6 Wind 60 deg - No Ice
11	1.2D+1.6W (pattern 1) 60 deg - No Ice
12	1.2D+1.6W (pattern 2) 60 deg - No Ice
13	0.9 Dead+1.6 Wind 60 deg - No Ice
14	1.2 Dead+1.6 Wind 90 deg - No Ice
15	1.2D+1.6W (pattern 1) 90 deg - No Ice
16	1.2D+1.6W (pattern 2) 90 deg - No Ice
17	0.9 Dead+1.6 Wind 90 deg - No Ice
18	1.2 Dead+1.6 Wind 120 deg - No Ice
19	1.2D+1.6W (pattern 1) 120 deg - No Ice
20	1.2D+1.6W (pattern 2) 120 deg - No Ice
21	0.9 Dead+1.6 Wind 120 deg - No Ice
22	1.2 Dead+1.6 Wind 150 deg - No Ice
23	1.2D+1.6W (pattern 1) 150 deg - No Ice
24	1.2D+1.6W (pattern 2) 150 deg - No Ice
25	0.9 Dead+1.6 Wind 150 deg - No Ice
26	1.2 Dead+1.6 Wind 180 deg - No Ice
27	1.2D+1.6W (pattern 1) 180 deg - No Ice
28	1.2D+1.6W (pattern 2) 180 deg - No Ice
29	0.9 Dead+1.6 Wind 180 deg - No Ice
30	1.2 Dead+1.6 Wind 210 deg - No Ice
31	1.2D+1.6W (pattern 1) 210 deg - No Ice
32	1.2D+1.6W (pattern 2) 210 deg - No Ice
33	0.9 Dead+1.6 Wind 210 deg - No Ice
34	1.2 Dead+1.6 Wind 240 deg - No Ice
35	1.2D+1.6W (pattern 1) 240 deg - No Ice
36	1.2D+1.6W (pattern 2) 240 deg - No Ice
37	0.9 Dead+1.6 Wind 240 deg - No Ice
38	1.2 Dead+1.6 Wind 270 deg - No Ice
39	1.2D+1.6W (pattern 1) 270 deg - No Ice
40	1.2D+1.6W (pattern 2) 270 deg - No Ice
41	0.9 Dead+1.6 Wind 270 deg - No Ice
42	1.2 Dead+1.6 Wind 300 deg - No Ice
43	1.2D+1.6W (pattern 1) 300 deg - No Ice
44	1.2D+1.6W (pattern 2) 300 deg - No Ice
45	0.9 Dead+1.6 Wind 300 deg - No Ice
46	1.2 Dead+1.6 Wind 330 deg - No Ice
47	1.2D+1.6W (pattern 1) 330 deg - No Ice
48	1.2D+1.6W (pattern 2) 330 deg - No Ice
49	0.9 Dead+1.6 Wind 330 deg - No Ice
50	1.2 Dead+1.0 Ice+1.0 Temp
51	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
52	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
53	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
54	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
55	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
56	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
57	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
58	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
59	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	13 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

<i>Comb. No.</i>	<i>Description</i>
60	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
61	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
62	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
63	Dead+Wind 0 deg - Service
64	Dead+Wind 30 deg - Service
65	Dead+Wind 60 deg - Service
66	Dead+Wind 90 deg - Service
67	Dead+Wind 120 deg - Service
68	Dead+Wind 150 deg - Service
69	Dead+Wind 180 deg - Service
70	Dead+Wind 210 deg - Service
71	Dead+Wind 240 deg - Service
72	Dead+Wind 270 deg - Service
73	Dead+Wind 300 deg - Service
74	Dead+Wind 330 deg - Service

### Maximum Member Forces

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Axial lb</i>	<i>Major Axis Moment lb-ft</i>	<i>Minor Axis Moment lb-ft</i>
T1	120 - 110	Leg	Max Tension	29	3077.89	-0.11	107.65
			Max. Compression	18	-3580.53	32.86	19.46
			Max. Mx	40	-3112.98	-96.81	19.55
			Max. My	28	2560.79	-0.26	108.41
			Max. Vy	18	734.40	32.86	19.46
			Max. Vx	2	-838.03	-0.82	-38.28
		Diagonal	Max Tension	38	554.17	0.00	0.00
			Max. Compression	14	-556.06	0.00	0.00
			Max. Mx	59	253.79	-5.06	0.08
			Max. My	57	-27.67	-5.01	-0.22
			Max. Vy	56	9.75	-5.05	0.00
			Max. Vx	57	0.10	0.00	0.00
		Top Girt	Max Tension	37	125.71	0.00	0.00
			Max. Compression	42	-141.38	0.00	0.00
			Max. Mx	51	63.13	17.44	0.00
			Max. My	30	4.91	0.00	-0.00
			Max. Vy	51	-15.50	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Bottom Girt	Max Tension	18	141.75	0.00	0.00
			Max. Compression	45	-141.56	0.00	0.00
			Max. Mx	51	19.87	17.44	0.00
Max. My	30		4.75	0.00	-0.00		
Max. Vy	51		-15.50	0.00	0.00		
Max. Vx	30		0.00	0.00	0.00		
T2	110 - 90	Leg	Max Tension	45	31852.31	-158.45	-89.31
			Max. Compression	18	-34673.88	-101.48	-56.26
			Max. Mx	38	24928.17	-161.92	-40.89
			Max. My	2	-33126.15	-21.59	-172.22
			Max. Vy	34	-3158.90	102.23	-47.11
			Max. Vx	2	-3407.98	8.72	111.75
		Diagonal	Max Tension	38	3018.90	0.00	0.00
			Max. Compression	38	-3057.91	0.00	0.00
			Max. Mx	55	749.75	-5.47	0.10
			Max. My	10	-2483.49	-1.10	1.06
			Max. Vy	55	9.77	-5.47	0.10
			Max. Vx	10	0.42	0.00	0.00
		Top Girt	Max Tension	18	324.41	0.00	0.00
			Max. Compression	42	-325.30	0.00	0.00

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	14 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft			
T3	90 - 70	Bottom Girt	Max. Mx	51	86.94	17.14	0.00			
			Max. My	30	3.66	0.00	-0.00			
			Max. Vy	51	-15.23	0.00	0.00			
			Max. Vx	30	0.00	0.00	0.00			
			Max Tension	42	315.30	0.00	0.00			
			Max. Compression	21	-304.97	0.00	0.00			
			Max. Mx	51	-73.82	17.14	0.00			
			Max. My	30	6.56	0.00	-0.00			
			Max. Vy	51	-15.23	0.00	0.00			
			Max. Vx	30	0.00	0.00	0.00			
			Max Tension	45	75411.57	-153.90	-84.85			
			Max. Compression	18	-78388.80	-194.69	-109.07			
		Leg	Max. Mx	34	-33318.50	365.32	-160.19			
			Max. My	2	-33127.07	39.04	395.59			
			Max. Vy	34	-4246.41	192.41	-99.20			
			Max. Vx	2	-4639.28	8.03	215.41			
			Diagonal	Max Tension	38	3864.31	0.00	0.00		
				Max. Compression	38	-3912.60	0.00	0.00		
				Max. Mx	55	932.39	-7.03	0.02		
				Max. My	30	-2859.51	0.60	-1.83		
			Top Girt	Max. Vy	55	11.19	-7.03	0.02		
				Max. Vx	30	0.72	0.60	-1.83		
				Max Tension	18	89.70	0.00	0.00		
				Max. Compression	45	-103.17	0.00	0.00		
			Bottom Girt	Max. Mx	51	44.33	18.96	0.00		
				Max. My	30	1.24	0.00	-0.00		
				Max. Vy	51	-16.85	0.00	0.00		
				Max. Vx	30	0.00	0.00	0.00		
Max Tension	42	360.59		0.00	0.00					
Max. Compression	18	-368.44		0.00	0.00					
Max. Mx	51	-94.60		18.96	0.00					
Max. My	30	6.30		0.00	-0.00					
Max. Vy	51	-16.85		0.00	0.00					
Max. Vx	30	0.00		0.00	0.00					
T4	70 - 50	Leg		Max Tension	45	113536.64	81.60	0.03		
				Max. Compression	18	-116849.63	786.82	-3.35		
			Max. Mx	18	-116849.63	786.82	-3.35			
			Max. My	46	-7402.01	48.25	291.37			
			Max. Vy	18	-3632.31	525.80	-9.57			
			Max. Vx	6	2011.69	11.79	-191.93			
			Diagonal	Max Tension	38	3502.53	0.00	0.00		
				Max. Compression	38	-3566.90	0.00	0.00		
				Max. Mx	55	738.83	-7.48	0.21		
				Max. My	10	-3092.79	-0.83	1.90		
			Top Girt	Max. Vy	55	11.68	-7.48	0.21		
				Max. Vx	10	-0.74	0.00	0.00		
		Max Tension		3	15.99	0.00	0.00			
		Max. Compression		43	-29.28	0.00	0.00			
		Bottom Girt	Max. Mx	51	14.61	18.38	0.00			
			Max. My	30	-7.32	0.00	-0.00			
			Max. Vy	51	-16.33	0.00	0.00			
			Max. Vx	30	0.00	0.00	0.00			
			Max Tension	42	2249.07	0.00	0.00			
			Max. Compression	21	-2075.52	0.00	0.00			
			Max. Mx	51	-450.07	22.67	0.00			
			Max. My	30	-100.04	0.00	-0.00			
			Max. Vy	51	18.14	0.00	0.00			
			Max. Vx	30	0.00	0.00	0.00			
			T5	50 - 40	Leg	Max Tension	45	111262.64	-770.79	3.99
						Max. Compression	18	-114195.78	5205.11	-5.93
		Max. Mx				42	110363.12	-5569.99	40.40	

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	15 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T6	40 - 20	Diagonal	Max. My	38	-6945.22	27.09	-10265.22
			Max. Vy	42	593.91	-5569.99	40.40
			Max. Vx	46	-1099.31	39.82	10258.63
			Max Tension	37	6098.73	0.00	0.00
			Max. Compression	10	-6617.98	0.00	0.00
			Max. Mx	42	2380.69	117.30	-15.47
			Max. My	10	1391.87	-53.38	-28.09
		Leg	Max. Vy	57	29.80	59.29	0.86
			Max. Vx	10	5.72	0.00	0.00
			Max Tension	45	125154.24	-5850.29	17.21
			Max. Compression	18	-130459.42	5006.33	-6.41
			Max. Mx	45	125154.24	-5850.29	17.21
			Max. My	38	-7976.45	27.05	-10265.22
			Max. Vy	61	213.53	-2446.01	37.81
T7	20 - 0	Diagonal	Max. Vx	46	794.06	39.78	10258.62
			Max Tension	6	3326.52	0.00	0.00
			Max. Compression	13	-3610.88	0.00	0.00
			Max. Mx	18	2592.77	87.92	-9.24
			Max. My	33	-1823.58	-48.65	15.82
			Max. Vy	57	34.20	54.74	-7.43
			Max. Vx	33	-3.11	-48.65	15.82
		Leg	Max Tension	45	136117.14	-4458.89	22.59
			Max. Compression	18	-143986.22	0.00	0.02
			Max. Mx	18	-137516.38	5006.33	-6.41
			Max. My	38	-9312.12	-60.67	-7753.15
			Max. Vy	42	-554.23	-4512.20	25.46
			Max. Vx	46	866.32	-49.85	7747.22
			Max Tension	13	4161.77	0.00	0.00
Diagonal	Max. Compression	34	-4622.25	0.00	0.00		
	Max. Mx	18	1723.36	68.55	-8.09		
	Max. My	33	-2945.40	-25.14	15.31		
	Max. Vy	56	36.72	52.75	-10.42		
	Max. Vx	58	-2.74	0.00	0.00		

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	34	146446.95	11252.31	-6259.11
	Max. H <sub>x</sub>	34	146446.95	11252.31	-6259.11
	Max. H <sub>z</sub>	13	-135262.23	-10463.10	5733.75
	Min. Vert	13	-135262.23	-10463.10	5733.75
	Min. H <sub>x</sub>	13	-135262.23	-10463.10	5733.75
	Min. H <sub>z</sub>	34	146446.95	11252.31	-6259.11
Leg B	Max. Vert	18	150008.49	-11380.19	-6443.80
	Max. H <sub>x</sub>	45	-141036.51	10749.88	6089.26
	Max. H <sub>z</sub>	45	-141036.51	10749.88	6089.26
	Min. Vert	45	-141036.51	10749.88	6089.26
	Min. H <sub>x</sub>	18	150008.49	-11380.19	-6443.80
	Min. H <sub>z</sub>	18	150008.49	-11380.19	-6443.80
Leg A	Max. Vert	2	145912.80	112.95	12854.78
	Max. H <sub>x</sub>	10	70339.83	839.67	6230.27
	Max. H <sub>z</sub>	2	145912.80	112.95	12854.78
	Min. Vert	29	-135374.40	-182.40	-11924.48
	Min. H <sub>x</sub>	40	7866.11	-801.32	619.51
	Min. H <sub>z</sub>	29	-135374.40	-182.40	-11924.48



<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	16 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
----------	-----------	-----------------	-------------	------------------	------------------

## Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overtuning Moment, M <sub>x</sub> lb-ft	Overtuning Moment, M <sub>z</sub> lb-ft	Torque lb-ft
Dead Only	13689.44	-0.07	-0.07	3919.96	-3727.59	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	16427.31	-678.43	-17909.59	-1216220.38	63756.10	3259.49
1.2D+1.6W (pattern 1) 0 deg - No Ice	16427.31	-681.39	-16611.05	-1071460.44	64091.18	3141.79
1.2D+1.6W (pattern 2) 0 deg - No Ice	16427.31	-404.10	-14948.92	-1066503.94	36121.98	2801.22
0.9 Dead+1.6 Wind 0 deg - No Ice	12320.47	-678.36	-17909.17	-1215341.19	64753.65	3245.23
1.2 Dead+1.6 Wind 30 deg - No Ice	16427.30	8692.37	-14805.01	-1008995.72	-604508.22	6095.22
1.2D+1.6W (pattern 1) 30 deg - No Ice	16427.31	8038.91	-13678.99	-883469.07	-531648.80	5949.52
1.2D+1.6W (pattern 2) 30 deg - No Ice	16427.31	7257.73	-12414.56	-890154.61	-530385.22	5002.54
0.9 Dead+1.6 Wind 30 deg - No Ice	12320.48	8692.57	-14805.32	-1008523.43	-602383.48	6075.52
1.2 Dead+1.6 Wind 60 deg - No Ice	16427.30	15389.43	-8390.07	-561739.29	-1072111.80	5678.84
1.2D+1.6W (pattern 1) 60 deg - No Ice	16427.31	14260.52	-7738.30	-489082.94	-946253.83	5556.01
1.2D+1.6W (pattern 2) 60 deg - No Ice	16427.30	12878.06	-7138.14	-504762.96	-938853.04	4819.35
0.9 Dead+1.6 Wind 60 deg - No Ice	12320.47	15389.76	-8390.25	-562005.25	-1069216.62	5659.55
1.2 Dead+1.6 Wind 90 deg - No Ice	16427.30	17482.75	345.19	39441.22	-1214150.01	3969.94
1.2D+1.6W (pattern 1) 90 deg - No Ice	16427.31	16180.85	348.09	39763.63	-1069013.62	3902.17
1.2D+1.6W (pattern 2) 90 deg - No Ice	16427.31	14569.21	204.20	25233.56	-1061477.87	3567.30
0.9 Dead+1.6 Wind 90 deg - No Ice	12320.48	17483.13	345.20	38189.49	-1211023.71	3956.58
1.2 Dead+1.6 Wind 120 deg - No Ice	16427.31	15724.27	9069.86	626737.40	-1083480.22	1867.77
1.2D+1.6W (pattern 1) 120 deg - No Ice	16427.31	14598.22	8423.16	554642.01	-957953.18	1862.74
1.2D+1.6W (pattern 2) 120 deg - No Ice	16427.31	13076.09	7540.93	546984.43	-945345.92	1851.66
0.9 Dead+1.6 Wind 120 deg - No Ice	12320.47	15723.91	9069.65	624491.50	-1080513.22	1863.04
1.2 Dead+1.6 Wind 150 deg - No Ice	16427.30	9040.32	14953.10	1033320.95	-639374.86	-988.09
1.2D+1.6W (pattern 1) 150 deg - No Ice	16427.31	8391.88	13830.09	908123.94	-567087.93	-929.02
1.2D+1.6W (pattern 2) 150 deg - No Ice	16427.31	7461.45	12500.39	908204.64	-550734.97	-613.25
0.9 Dead+1.6 Wind 150 deg - No Ice	12320.48	9040.52	14953.42	1030440.60	-637191.71	-982.87
1.2 Dead+1.6 Wind 180 deg - No Ice	16427.30	421.29	17509.84	1211116.41	-46897.37	-4167.38

<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:</p>	<b>Job</b>	CTHA242A	<b>Page</b>	17 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2D+1.6W (pattern 1) 180 deg - No Ice	16427.31	424.25	16211.42	1066361.38	-47220.53	-4049.53
1.2D+1.6W (pattern 2) 180 deg - No Ice	16427.30	249.81	14708.97	1067223.45	-29612.66	-3324.30
0.9 Dead+1.6 Wind 180 deg - No Ice	12320.47	421.31	17510.22	1207942.86	-45686.11	-4153.01
1.2 Dead+1.6 Wind 210 deg - No Ice	16427.30	-8488.15	14922.92	1030390.58	574837.33	-6094.87
1.2D+1.6W (pattern 1) 210 deg - No Ice	16427.31	-7834.59	13796.95	904858.04	501988.49	-5949.13
1.2D+1.6W (pattern 2) 210 deg - No Ice	16427.31	-7135.28	12485.25	906778.52	508978.07	-5002.38
0.9 Dead+1.6 Wind 210 deg - No Ice	12320.48	-8488.32	14923.24	1027513.41	575022.17	-6075.28
1.2 Dead+1.6 Wind 240 deg - No Ice	16427.31	-15864.18	8367.25	556100.38	1088647.14	-4826.30
1.2D+1.6W (pattern 1) 240 deg - No Ice	16427.31	-14735.17	7715.42	483429.33	962792.49	-4703.56
1.2D+1.6W (pattern 2) 240 deg - No Ice	16427.31	-13163.00	7124.49	505173.51	945171.55	-4351.26
0.9 Dead+1.6 Wind 240 deg - No Ice	12320.47	-15863.78	8367.10	553992.98	1087915.58	-4806.89
1.2 Dead+1.6 Wind 270 deg - No Ice	16427.30	-17751.85	-427.05	-38213.44	1232255.89	-3432.68
1.2D+1.6W (pattern 1) 270 deg - No Ice	16427.31	-16449.95	-430.07	-38549.12	1087120.72	-3365.17
1.2D+1.6W (pattern 2) 270 deg - No Ice	16427.31	-14730.67	-253.23	-20700.99	1068740.11	-3245.24
0.9 Dead+1.6 Wind 270 deg - No Ice	12320.48	-17752.22	-427.06	-39321.45	1231344.68	-3418.94
1.2 Dead+1.6 Wind 300 deg - No Ice	16427.30	-15660.90	-9033.28	-626425.75	1090360.45	-1813.77
1.2D+1.6W (pattern 1) 300 deg - No Ice	16427.30	-14534.96	-8386.63	-554335.55	964836.51	-1808.80
1.2D+1.6W (pattern 2) 300 deg - No Ice	16427.30	-13037.99	-7518.94	-543006.51	945871.80	-1797.51
0.9 Dead+1.6 Wind 300 deg - No Ice	12320.47	-15661.24	-9033.47	-626572.50	1089681.50	-1808.93
1.2 Dead+1.6 Wind 330 deg - No Ice	16427.30	-9245.76	-15145.22	-1043204.54	651080.85	449.95
1.2D+1.6W (pattern 1) 330 deg - No Ice	16427.31	-8597.43	-14022.16	-918004.09	578801.75	391.09
1.2D+1.6W (pattern 2) 330 deg - No Ice	16427.31	-7584.63	-12615.72	-910353.15	554155.42	290.87
0.9 Dead+1.6 Wind 330 deg - No Ice	12320.48	-9245.96	-15145.54	-1042669.92	651120.44	444.60
1.2 Dead+1.0 Ice+1.0 Temp	53790.45	-0.12	-0.17	19771.14	-12694.06	0.03
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	53790.45	-113.49	-5341.08	-361954.24	-1130.94	517.49
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	53790.45	2638.44	-4527.47	-304192.13	-202318.30	1028.72
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	53790.45	4622.22	-2585.72	-163868.01	-345555.55	1013.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	53790.45	5292.89	57.57	25679.44	-393509.53	737.74
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	53790.45	4661.47	2689.60	212629.10	-347024.94	351.12
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	53790.45	2696.32	4552.05	346314.99	-208195.13	-141.41
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	53790.45	70.36	5293.27	399602.55	-19896.75	-677.71

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	18 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturning Moment, M <sub>x</sub> lb-ft	Overturning Moment, M <sub>z</sub> lb-ft	Torque lb-ft
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	53790.45	-2604.20	4547.21	345839.53	173368.86	-1028.31
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	53790.45	-4685.16	2572.23	200656.33	324028.57	-857.06
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	53790.45	-5338.02	-71.40	12522.74	372686.82	-648.43
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	53790.45	-4667.53	-2693.13	-174823.24	324731.75	-348.42
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	53790.45	-2730.83	-4584.26	-309982.53	186294.81	50.59
Dead+Wind 0 deg - Service	13689.43	-149.65	-3950.28	-265085.54	11294.32	717.09
Dead+Wind 30 deg - Service	13689.43	1917.30	-3265.52	-219428.13	-135946.83	1338.06
Dead+Wind 60 deg - Service	13689.43	3394.47	-1850.62	-120884.55	-238981.90	1250.96
Dead+Wind 90 deg - Service	13689.43	3856.16	76.10	11580.70	-270277.17	878.19
Dead+Wind 120 deg - Service	13689.43	3468.26	2000.51	140990.24	-241489.90	411.13
Dead+Wind 150 deg - Service	13689.43	1993.98	3298.21	230579.65	-143631.04	-221.52
Dead+Wind 180 deg - Service	13689.43	92.92	3862.18	269755.07	-13082.62	-918.24
Dead+Wind 210 deg - Service	13689.43	-1872.20	3291.56	229928.61	123908.76	-1337.99
Dead+Wind 240 deg - Service	13689.43	-3499.13	1845.53	125424.65	237117.98	-1061.94
Dead+Wind 270 deg - Service	13689.43	-3915.53	-94.24	-5527.19	268759.20	-759.16
Dead+Wind 300 deg - Service	13689.42	-3454.35	-1992.42	-135132.63	237495.73	-399.57
Dead+Wind 330 deg - Service	13689.43	-2039.38	-3340.56	-226962.70	140704.33	102.43

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	-0.00	-13689.44	-0.00	0.07	13689.44	0.07	0.001%
2	-678.54	-16427.32	-17910.79	678.43	16427.31	17909.59	0.005%
3	-681.50	-16427.32	-16612.09	681.39	16427.31	16611.05	0.004%
4	-404.16	-16427.32	-14950.02	404.10	16427.31	14948.92	0.005%
5	-678.54	-12320.49	-17910.79	678.36	12320.47	17909.17	0.007%
6	8693.27	-16427.32	-14806.10	-8692.37	16427.30	14805.01	0.006%
7	8039.65	-16427.32	-13679.91	-8038.91	16427.31	13678.99	0.005%
8	7258.52	-16427.32	-12415.56	-7257.73	16427.31	12414.56	0.006%
9	8693.27	-12320.49	-14806.10	-8692.57	12320.48	14805.32	0.005%
10	15390.88	-16427.32	-8390.86	-15389.43	16427.30	8390.07	0.007%
11	14261.72	-16427.32	-7738.94	-14260.52	16427.31	7738.30	0.006%
12	12879.35	-16427.32	-7138.86	-12878.06	16427.30	7138.14	0.007%
13	15390.88	-12320.49	-8390.86	-15389.76	12320.47	8390.25	0.006%
14	17484.17	-16427.32	345.02	-17482.75	16427.30	-345.19	0.006%
15	16182.05	-16427.32	347.98	-16180.85	16427.31	-348.09	0.005%
16	14570.49	-16427.32	204.05	-14569.21	16427.31	-204.20	0.006%
17	17484.17	-12320.49	345.02	-17483.13	12320.48	-345.20	0.005%
18	15725.34	-16427.32	9070.48	-15724.27	16427.31	-9069.86	0.005%
19	14599.15	-16427.32	8423.69	-14598.22	16427.31	-8423.16	0.005%
20	13077.07	-16427.32	7541.50	-13076.09	16427.31	-7540.93	0.005%
21	15725.34	-12320.49	9070.48	-15723.91	12320.47	-9069.65	0.008%
22	9040.88	-16427.32	14954.42	-9040.32	16427.30	-14953.10	0.006%
23	8392.39	-16427.32	13831.19	-8391.88	16427.31	-13830.09	0.005%
24	7461.96	-16427.32	12501.58	-7461.45	16427.31	-12500.39	0.006%
25	9040.88	-12320.49	14954.42	-9040.52	12320.48	-14953.42	0.005%
26	421.33	-16427.32	17511.49	-421.29	16427.30	-17509.84	0.007%
27	424.30	-16427.32	16212.79	-424.25	16427.31	-16211.42	0.006%
28	249.84	-16427.32	14710.45	-249.81	16427.30	-14708.97	0.007%
29	421.33	-12320.49	17511.49	-421.31	12320.47	-17510.22	0.006%
30	-8488.65	-16427.32	14924.24	8488.15	16427.30	-14922.92	0.006%

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 19 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
31	-7835.03	-16427.32	13798.05	7834.59	16427.31	-13796.95	0.005%
32	-7135.75	-16427.32	12486.44	7135.28	16427.31	-12485.25	0.006%
33	-8488.65	-12320.49	14924.24	8488.32	12320.48	-14923.24	0.005%
34	-15865.28	-16427.32	8367.76	15864.18	16427.31	-8367.25	0.005%
35	-14736.13	-16427.32	7715.84	14735.17	16427.31	-7715.42	0.004%
36	-13163.99	-16427.32	7125.00	13163.00	16427.31	-7124.49	0.005%
37	-15865.28	-12320.49	8367.76	15863.78	12320.47	-8367.10	0.008%
38	-17753.32	-16427.32	-427.33	17751.85	16427.30	427.05	0.006%
39	-16451.20	-16427.32	-430.30	16449.95	16427.31	430.07	0.005%
40	-14731.98	-16427.32	-253.44	14730.67	16427.31	253.23	0.006%
41	-17753.32	-12320.49	-427.33	17752.22	12320.48	427.06	0.005%
42	-15662.40	-16427.32	-9034.14	15660.90	16427.30	9033.28	0.007%
43	-14536.21	-16427.32	-8387.35	14534.96	16427.30	8386.63	0.006%
44	-13039.30	-16427.32	-7519.69	13037.99	16427.30	7518.94	0.007%
45	-15662.40	-12320.49	-9034.14	15661.24	12320.47	9033.47	0.006%
46	-9246.74	-16427.32	-15146.35	9245.76	16427.30	15145.22	0.006%
47	-8598.25	-16427.32	-14023.12	8597.43	16427.31	14022.16	0.005%
48	-7585.47	-16427.32	-12616.74	7584.63	16427.31	12615.72	0.006%
49	-9246.74	-12320.49	-15146.35	9245.96	12320.48	15145.54	0.005%
50	-0.00	-53790.45	-0.00	0.12	53790.45	0.17	0.000%
51	-113.49	-53790.45	-5341.44	113.49	53790.45	5341.08	0.001%
52	2638.66	-53790.45	-4527.78	-2638.44	53790.45	4527.47	0.001%
53	4622.58	-53790.45	-2585.89	-4622.22	53790.45	2585.72	0.001%
54	5293.29	-53790.45	57.60	-5292.89	53790.45	-57.57	0.001%
55	4661.81	-53790.45	2689.81	-4661.47	53790.45	-2689.60	0.001%
56	2696.53	-53790.45	4552.41	-2696.32	53790.45	-4552.05	0.001%
57	70.39	-53790.45	5293.69	-70.36	53790.45	-5293.27	0.001%
58	-2604.37	-53790.45	4547.57	2604.20	53790.45	-4547.21	0.001%
59	-4685.48	-53790.45	2572.44	4685.16	53790.45	-2572.23	0.001%
60	-5338.40	-53790.45	-71.39	5338.02	53790.45	71.40	0.001%
61	-4667.86	-53790.45	-2693.31	4667.53	53790.45	2693.13	0.001%
62	-2731.02	-53790.45	-4584.57	2730.83	53790.45	4584.26	0.001%
63	-149.66	-13689.44	-3950.52	149.65	13689.43	3950.28	0.002%
64	1917.45	-13689.44	-3265.73	-1917.30	13689.43	3265.52	0.002%
65	3394.71	-13689.44	-1850.74	-3394.47	13689.43	1850.62	0.002%
66	3856.42	-13689.44	76.10	-3856.16	13689.43	-76.10	0.002%
67	3468.49	-13689.44	2000.64	-3468.26	13689.43	-2000.51	0.002%
68	1994.12	-13689.44	3298.44	-1993.98	13689.43	-3298.21	0.002%
69	92.93	-13689.44	3862.45	-92.92	13689.43	-3862.18	0.002%
70	-1872.31	-13689.44	3291.79	1872.20	13689.43	-3291.56	0.002%
71	-3499.35	-13689.44	1845.65	3499.13	13689.43	-1845.53	0.002%
72	-3915.79	-13689.44	-94.26	3915.53	13689.43	94.24	0.002%
73	-3454.60	-13689.44	-1992.63	3454.35	13689.42	1992.42	0.002%
74	-2039.52	-13689.44	-3340.78	2039.38	13689.43	3340.56	0.002%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	9	0.00000001	0.00012790
2	Yes	14	0.00000001	0.00010069
3	Yes	14	0.00000001	0.00010410
4	Yes	14	0.00000001	0.00010199
5	Yes	13	0.00006978	0.00012878
6	Yes	14	0.00000001	0.00012176
7	Yes	14	0.00000001	0.00012231

<p style="text-align: center;"><b><i>tnxTower</i></b></p> <p style="text-align: center;"><b>Destek Engineering LLC</b>  1281 Kennestone Circle, Suite 100  Marietta, GA 30066  Phone: 770693-0835  FAX:</p>	<b>Job</b>	CTHA242A	<b>Page</b>	20 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

8	Yes	14	0.00000001	0.00012064
9	Yes	14	0.00000001	0.00009130
10	Yes	14	0.00007304	0.00013799
11	Yes	14	0.00000001	0.00013633
12	Yes	14	0.00000001	0.00013553
13	Yes	14	0.00000001	0.00010687
14	Yes	14	0.00000001	0.00011846
15	Yes	14	0.00000001	0.00011885
16	Yes	14	0.00000001	0.00011838
17	Yes	14	0.00000001	0.00008839
18	Yes	14	0.00000001	0.00009953
19	Yes	14	0.00000001	0.00010285
20	Yes	14	0.00000001	0.00010125
21	Yes	13	0.00006884	0.00012687
22	Yes	14	0.00000001	0.00011847
23	Yes	14	0.00000001	0.00011887
24	Yes	14	0.00000001	0.00011839
25	Yes	14	0.00000001	0.00008838
26	Yes	14	0.00007301	0.00013793
27	Yes	14	0.00000001	0.00013627
28	Yes	14	0.00000001	0.00013547
29	Yes	14	0.00000001	0.00010683
30	Yes	14	0.00000001	0.00012164
31	Yes	14	0.00000001	0.00012222
32	Yes	14	0.00000001	0.00012052
33	Yes	14	0.00000001	0.00009119
34	Yes	14	0.00000001	0.00010067
35	Yes	14	0.00000001	0.00010410
36	Yes	14	0.00000001	0.00010197
37	Yes	13	0.00006979	0.00012876
38	Yes	14	0.00006487	0.00012275
39	Yes	14	0.00000001	0.00012326
40	Yes	14	0.00000001	0.00012096
41	Yes	14	0.00000001	0.00009251
42	Yes	14	0.00007349	0.00013891
43	Yes	14	0.00000001	0.00013725
44	Yes	14	0.00007246	0.00013605
45	Yes	14	0.00000001	0.00010778
46	Yes	14	0.00006494	0.00012288
47	Yes	14	0.00000001	0.00012338
48	Yes	14	0.00000001	0.00012110
49	Yes	14	0.00000001	0.00009261
50	Yes	13	0.00000001	0.00012078
51	Yes	16	0.00000001	0.00009657
52	Yes	16	0.00000001	0.00009906
53	Yes	16	0.00000001	0.00010119
54	Yes	16	0.00000001	0.00009913
55	Yes	16	0.00000001	0.00009774
56	Yes	16	0.00000001	0.00009964
57	Yes	16	0.00000001	0.00010179
58	Yes	16	0.00000001	0.00009981
59	Yes	16	0.00000001	0.00009728
60	Yes	16	0.00000001	0.00009883
61	Yes	16	0.00000001	0.00010082
62	Yes	16	0.00000001	0.00009864
63	Yes	14	0.00000001	0.00009370
64	Yes	14	0.00000001	0.00009811
65	Yes	14	0.00000001	0.00010155
66	Yes	14	0.00000001	0.00009685
67	Yes	14	0.00000001	0.00009319
68	Yes	14	0.00000001	0.00009690
69	Yes	14	0.00000001	0.00010153
70	Yes	14	0.00000001	0.00009808
71	Yes	14	0.00000001	0.00009372

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	21 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

72	Yes	14	0.00000001	0.00009807
73	Yes	14	0.00000001	0.00010195
74	Yes	14	0.00000001	0.00009815

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 110	4.332	67	0.3003	0.0579
T2	110 - 90	3.702	67	0.2991	0.0578
T3	90 - 70	2.463	67	0.2747	0.0480
T4	70 - 50	1.397	67	0.2152	0.0335
T5	50 - 40	0.627	67	0.1372	0.0187
T6	40 - 20	0.383	67	0.0939	0.0117
T7	20 - 0	0.094	67	0.0432	0.0042

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.00	PD220	67	4.332	0.3003	0.0579	403450
120.00	Pirod 4' Side Mount Standoff (1)	67	4.332	0.3003	0.0579	403450
115.00	Pirod 4' Side Mount Standoff (1)	67	4.017	0.3002	0.0582	403450
110.00	7"x2 1/2" Pipe Mount	67	3.702	0.2991	0.0578	351553
105.00	Pirod 4' Side Mount Standoff (1)	67	3.386	0.2963	0.0565	151275
100.00	Andrew 6' w/Radome	67	3.071	0.2914	0.0542	55987
40.00	GPS	67	0.383	0.0939	0.0117	18062

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 110	19.474	42	1.3406	0.2635
T2	110 - 90	16.661	42	1.3351	0.2630
T3	90 - 70	11.118	42	1.2323	0.2186
T4	70 - 50	6.321	42	0.9706	0.1524
T5	50 - 40	2.840	42	0.6206	0.0854
T6	40 - 20	1.731	42	0.4245	0.0534
T7	20 - 0	0.425	42	0.1948	0.0189

### Critical Deflections and Radius of Curvature - Design Wind

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 22 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
125.00	PD220	42	19.474	1.3406	0.2635	88739
120.00	Pirod 4' Side Mount Standoff (1)	42	19.474	1.3406	0.2635	88739
115.00	Pirod 4' Side Mount Standoff (1)	42	18.069	1.3397	0.2646	88739
110.00	7x2 1/2" Pipe Mount	42	16.661	1.3351	0.2630	79443
105.00	Pirod 4' Side Mount Standoff (1)	42	15.249	1.3235	0.2570	34496
100.00	Andrew 6' w/Radome	42	13.845	1.3033	0.2468	13027
40.00	GPS	42	1.731	0.4245	0.0534	3943

### Bolt Design Data

Section No.	Elevation	Component Type	Bolt Grade	Bolt Size	Number Of Bolts	Maximum Load per Bolt	Allowable Load	Ratio Load Allowable	Allowable Ratio	Criteria
	ft			in		lb	lb			
T7	20	Leg	A325N	1.0000	6	21866.60	53014.40	0.412 ✓	1	Bolt Tension

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation	Size	L	L <sub>u</sub>	KI/r	A	P <sub>u</sub>	φP <sub>n</sub>	Ratio P <sub>u</sub> / φP <sub>n</sub>
	ft		ft	ft		in <sup>2</sup>	lb	lb	
T1	120 - 110	1 3/4	10.00	2.48	68.0 K=1.00	2.4053	-3089.25	77187.30	0.040 <sup>1</sup> ✓
T2	110 - 90	1 3/4	20.00	2.48	68.0 K=1.00	2.4053	-32230.40	77187.30	0.418 <sup>1</sup> ✓
T3	90 - 70	2	20.00	2.48	59.5 K=1.00	3.1416	-75121.80	109130.00	0.688 <sup>1</sup> ✓
T4	70 - 50	2 1/4	20.00	2.49	53.1 K=1.00	3.9761	-116850.00	145571.00	0.803 <sup>1</sup> ✓
T5	50 - 40	Pirod 105244	10.02	10.02	45.4 K=1.00	3.6816	-114196.00	142493.00	0.801 <sup>1</sup> ✓
T6	40 - 20	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-130459.00	214859.00	0.607 <sup>1</sup> ✓
T7	20 - 0	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-143986.00	214859.00	0.670 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Truss-Leg Diagonal Data

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	23 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Section No.	Elevation ft	Diagonal Size	$L_d$ ft	$Kl/r$	$\phi P_n$ lb	$A$ in <sup>2</sup>	$V_u$ lb	$\phi V_n$ lb	Stress Ratio
T5	50 - 40	0.5	1.48	142.4	165670.00	0.1963	1099.35	2448.25	0.449
T6	40 - 20	0.5	1.47	141.2	238565.00	0.1963	794.88	2490.00	0.319
T7	20 - 0	0.5	1.47	141.2	238565.00	0.1963	866.45	2490.00	0.348

### Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	$L$ ft	$L_u$ ft	$Kl/r$	$A$ in <sup>2</sup>	$P_u$ lb	$\phi P_n$ lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	5.14	2.49	143.2 K=0.90	0.4418	-556.06	4869.00	0.114 <sup>1</sup>
T2	110 - 90	3/4	5.14	2.49	143.2 K=0.90	0.4418	-3057.91	4869.00	0.628 <sup>1</sup>
T3	90 - 70	7/8	5.14	2.47	122.1 K=0.90	0.6013	-3912.60	8884.30	0.440 <sup>1</sup>
T4	70 - 50	7/8	5.50	2.66	131.5 K=0.90	0.6013	-3566.90	7838.70	0.455 <sup>1</sup>
T5	50 - 40	L2 1/2x2 1/2x3/16	11.42	5.19	124.5 K=0.99	0.9020	-6617.98	12925.50	0.512 <sup>1</sup>
T6	40 - 20	L2 1/2x2 1/2x3/16	11.93	5.59	131.9 K=0.97	0.9020	-3610.88	11697.40	0.309 <sup>1</sup>
T7	20 - 0	L2 1/2x2 1/2x3/16	13.80	6.54	149.3 K=0.94	0.9020	-4622.25	9138.55	0.506 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	$L$ ft	$L_u$ ft	$Kl/r$	$A$ in <sup>2</sup>	$P_u$ lb	$\phi P_n$ lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4.50	4.35	195.1 K=0.70	0.4418	-141.38	2622.93	0.054 <sup>1</sup>
T2	110 - 90	3/4	4.50	4.35	195.1 K=0.70	0.4418	-325.30	2622.93	0.124 <sup>1</sup>
T3	90 - 70	7/8	4.50	4.33	166.4 K=0.70	0.6013	-103.17	4906.13	0.021 <sup>1</sup>
T4	70 - 50	7/8	4.50	4.31	165.7 K=0.70	0.6013	-29.28	4948.87	0.006 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls



<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	24 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

### Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4.50	4.35	195.1 K=0.70	0.4418	-141.56	2622.93	0.054 <sup>1</sup> ✓
T2	110 - 90	3/4	4.50	4.35	195.1 K=0.70	0.4418	-304.97	2622.93	0.116 <sup>1</sup> ✓
T3	90 - 70	7/8	4.50	4.33	166.4 K=0.70	0.6013	-368.44	4906.13	0.075 <sup>1</sup> ✓
T4	70 - 50	7/8	5.00	4.81	184.8 K=0.70	0.6013	-2075.52	3977.79	0.522 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	1 3/4	10.00	0.08	2.3	2.4053	3077.89	108238.00	0.028 <sup>1</sup> ✓
T2	110 - 90	1 3/4	20.00	0.08	2.3	2.4053	31852.30	108238.00	0.294 <sup>1</sup> ✓
T3	90 - 70	2	20.00	0.08	2.0	3.1416	75411.60	141372.00	0.533 <sup>1</sup> ✓
T4	70 - 50	2 1/4	20.00	2.49	53.1	3.9761	113537.00	178924.00	0.635 <sup>1</sup> ✓
T5	50 - 40	Pirod 105244	10.02	10.02	45.4	3.6816	111263.00	165670.00	0.672 <sup>1</sup> ✓
T6	40 - 20	Pirod 105217	20.03	10.02	37.8	5.3014	125154.00	238565.00	0.525 <sup>1</sup> ✓
T7	20 - 0	Pirod 105217	20.03	10.02	37.8	5.3014	136117.00	238565.00	0.571 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L <sub>d</sub> ft	Kl/r	φP <sub>n</sub> lb	A in <sup>2</sup>	V <sub>u</sub> lb	φV <sub>n</sub> lb	Stress Ratio
T5	50 - 40	0.5	1.48	142.4	165670.00	0.1963	1099.35	2448.25	0.449 ✓
T6	40 - 20	0.5	1.47	141.2	238565.00	0.1963	794.88	2490.00	0.319

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b>	CTHA242A	<b>Page</b>	25 of 26
	<b>Project</b>	CTHA242A	<b>Date</b>	17:02:47 04/20/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Ahmet Colakoglu

Section No.	Elevation ft	Diagonal Size	$L_d$ ft	$Kl/r$	$\phi P_n$ lb	$A$ in <sup>2</sup>	$V_u$ lb	$\phi V_n$ lb	Stress Ratio
T7	20 - 0	0.5	1.47	141.2	238565.00	0.1963	866.45	2490.00	0.348

### Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	$L$ ft	$L_u$ ft	$Kl/r$	$A$ in <sup>2</sup>	$P_u$ lb	$\phi P_n$ lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	5.14	2.49	159.1	0.4418	554.17	14313.90	0.039 <sup>1</sup>
T2	110 - 90	3/4	5.14	2.49	159.1	0.4418	3018.90	14313.90	0.211 <sup>1</sup>
T3	90 - 70	7/8	5.14	2.47	135.7	0.6013	3864.31	19482.80	0.198 <sup>1</sup>
T4	70 - 50	7/8	5.50	2.66	146.1	0.6013	3502.53	19482.80	0.180 <sup>1</sup>
T5	50 - 40	L2 1/2x2 1/2x3/16	11.42	5.19	80.1	0.9020	6098.73	29224.80	0.209 <sup>1</sup>
T6	40 - 20	L2 1/2x2 1/2x3/16	11.93	5.59	86.2	0.9020	3326.52	29224.80	0.114 <sup>1</sup>
T7	20 - 0	L2 1/2x2 1/2x3/16	13.80	6.54	100.8	0.9020	4161.77	29224.80	0.142 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	$L$ ft	$L_u$ ft	$Kl/r$	$A$ in <sup>2</sup>	$P_u$ lb	$\phi P_n$ lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4.50	4.35	278.7	0.4418	125.71	14313.90	0.009 <sup>1</sup>
T2	110 - 90	3/4	4.50	4.35	278.7	0.4418	324.41	14313.90	0.023 <sup>1</sup>
T3	90 - 70	7/8	4.50	4.33	237.7	0.6013	89.70	19482.80	0.005 <sup>1</sup>
T4	70 - 50	7/8	4.50	4.31	236.7	0.6013	15.99	19482.80	0.001 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Bottom Girt Design Data (Tension)

<b>tnxTower</b>  <b>Destek Engineering LLC</b> 1281 Kennestone Circle, Suite 100 Marietta, GA 30066 Phone: 770693-0835 FAX:	<b>Job</b> CTHA242A	<b>Page</b> 26 of 26
	<b>Project</b> CTHA242A	<b>Date</b> 17:02:47 04/20/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Ahmet Colakoglu

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	A $in^2$	$P_u$ lb	$\phi P_n$ lb	Ratio $\frac{P_u}{\phi P_n}$
T1	120 - 110	3/4	4.50	4.35	278.7	0.4418	141.75	14313.90	0.010 <sup>1</sup>
T2	110 - 90	3/4	4.50	4.35	278.7	0.4418	315.30	14313.90	0.022 <sup>1</sup>
T3	90 - 70	7/8	4.50	4.33	237.7	0.6013	360.59	19482.80	0.019 <sup>1</sup>
T4	70 - 50	7/8	5.00	4.81	264.0	0.6013	2249.07	19482.80	0.115 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail	
T1	120 - 110	Leg	1 3/4	2	-3089.25	77187.30	4.0	Pass	
T2	110 - 90	Leg	1 3/4	35	-32230.40	77187.30	41.8	Pass	
T3	90 - 70	Leg	2	92	-75121.80	109130.00	68.8	Pass	
T4	70 - 50	Leg	2 1/4	149	-116850.00	145571.00	80.3	Pass	
T5	50 - 40	Leg	Pirod 105244	206	-114196.00	142493.00	80.1	Pass	
T6	40 - 20	Leg	Pirod 105217	215	-130459.00	214859.00	60.7	Pass	
T7	20 - 0	Leg	Pirod 105217	230	-143986.00	214859.00	67.0	Pass	
T1	120 - 110	Diagonal	3/4	11	-556.06	4869.00	11.4	Pass	
T2	110 - 90	Diagonal	3/4	43	-3057.91	4869.00	62.8	Pass	
T3	90 - 70	Diagonal	7/8	100	-3912.60	8884.30	44.0	Pass	
T4	70 - 50	Diagonal	7/8	163	-3566.90	7838.70	45.5	Pass	
T5	50 - 40	Diagonal	L2 1/2x2 1/2x3/16	211	-6617.98	12925.50	51.2	Pass	
T6	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	224	-3610.88	11697.40	30.9	Pass	
T7	20 - 0	Diagonal	L2 1/2x2 1/2x3/16	232	-4622.25	9138.55	50.6	Pass	
T1	120 - 110	Top Girt	3/4	6	-141.38	2622.93	5.4	Pass	
T2	110 - 90	Top Girt	3/4	39	-325.30	2622.93	12.4	Pass	
T3	90 - 70	Top Girt	7/8	96	-103.17	4906.13	2.1	Pass	
T4	70 - 50	Top Girt	7/8	153	-29.28	4948.87	0.6	Pass	
T1	120 - 110	Bottom Girt	3/4	9	-141.56	2622.93	5.4	Pass	
T2	110 - 90	Bottom Girt	3/4	42	-304.97	2622.93	11.6	Pass	
T3	90 - 70	Bottom Girt	7/8	99	-368.44	4906.13	7.5	Pass	
T4	70 - 50	Bottom Girt	7/8	156	-2075.52	3977.79	52.2	Pass	
Summary									
							Leg (T4)	80.3	Pass
							Diagonal (T2)	62.8	Pass
							Top Girt (T2)	12.4	Pass
							Bottom Girt (T4)	52.2	Pass
							Bolt Checks	41.2	Pass
							<b>RATING =</b>	<b>80.3</b>	<b>Pass</b>

# Feed Line Plan 20'

Round

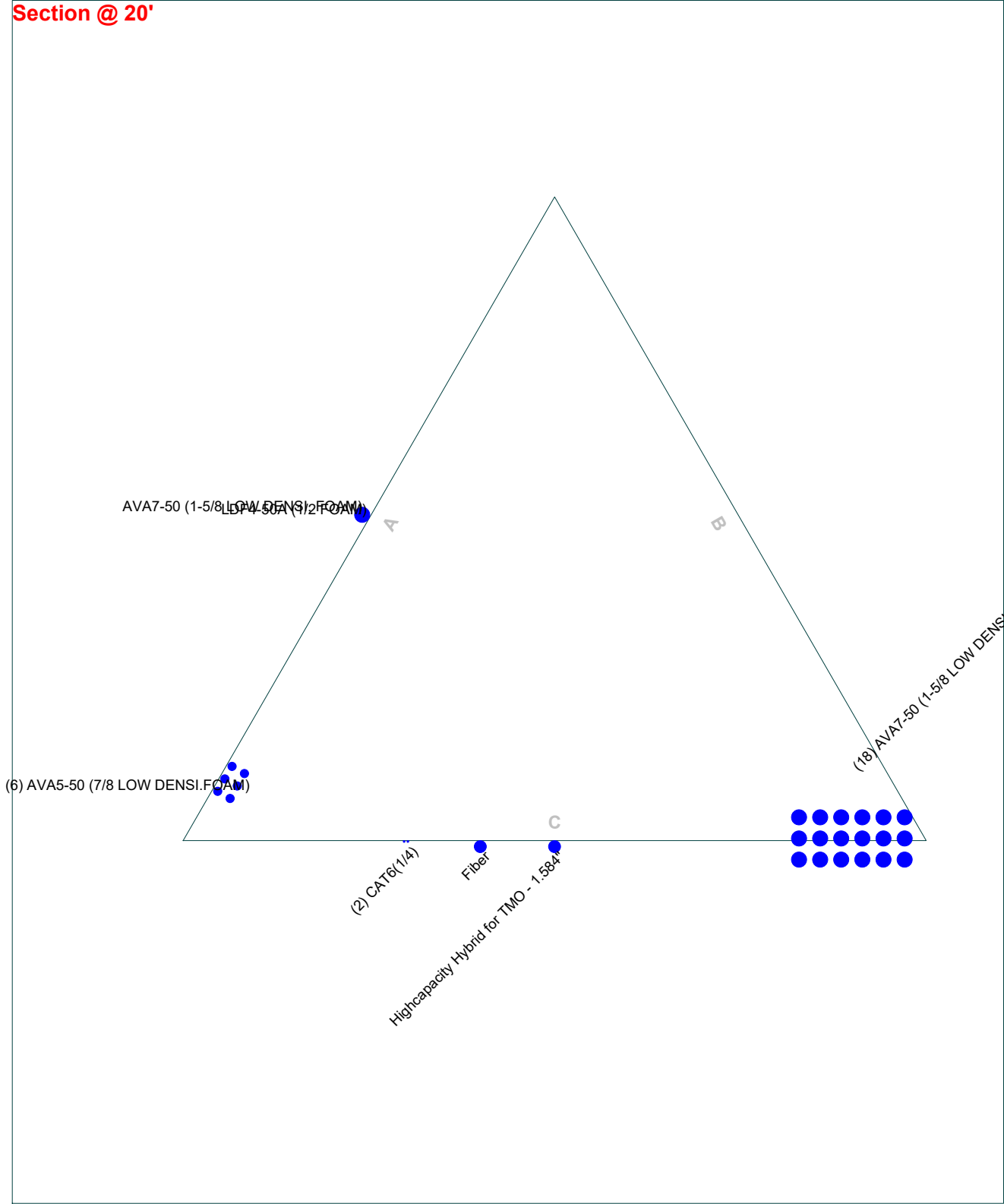
Flat

App In Face

App Out Face

Truss-Leg

## Section @ 20'



**Destek Engineering LLC**  
 1281 Kennestone Circle, Suite 100  
 Marietta, GA 30066  
 Phone: 770693-0835  
 FAX:

Job: <b>CTHA242A</b>	
Project: <b>CTHA242A</b>	
Client: T-Mobile	Drawn by: Ahmet Colakoglu
Code: TIA-222-G	Date: 04/20/18
Path: Z:\Projects\2018\75 - ForeSite LLC\1975008 - CTHA242A\Inx\CTHA242A.dwg	App'd: _____ Scale: NTS Dwg No. E-7

# Exhibit E



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

T-Mobile Existing Facility

Site ID: CTHA242A

HA242/PortlandHS\_SST  
95 High Street  
Portland, CT 06480

**April 24, 2018**

**EBC Project Number: 6218002358**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>11.372 %</b>



April 24, 2018

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

## Emissions Analysis for Site: **CTHA242A – HA242/PortlandHS\_SST**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **95 High Street, Portland, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 population 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 population 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 ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 700 MHz Band is approximately  $467 \mu\text{W}/\text{cm}^2$ . The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 5 GHz Microwave bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 **95 High Street, Portland, 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 for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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 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.
- 2) 2 UMTS channels (AWS Band - 2100 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) 2 LTE channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 6) 1 microwave backhaul channel (5 GHz) was considered for the proposed facility. This channel has a transmit power of 1 Watt.





- 7) 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.
- 8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.
- 9) The antennas used in this modeling are the **Ericsson AIR21 B2A/B4P** and the **Ericsson AIR21 B4A/B12P** for 1900 MHz (PCS), 2100 MHz (AWS) and 700 MHz channels and the **Fastback IBR1300** for the proposed 5 GHz microwave backhaul. This is based on feedback from the carrier with regard to anticipated antenna selection. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR21 B4A/B12P** has a maximum gain of **13.6 dBd** at its main lobe at 700 MHz and a maximum gain of **15.9 dBd** at its main lobe at 2100 MHz. The **Fastback IBR1300** has a directional panel antenna with a maximum gain of **10 dBd**. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.
- 10) The antenna mounting height centerline of the proposed directional panel antennas for the 1900 MHz channels is **110 feet** above ground level (AGL) and the 5 GHz microwave antenna is at **107 feet** above ground level (AGL).
- 11) 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.
- 12) All calculations were done with respect to uncontrolled / general population threshold limits.



### T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B12P-8	Make / Model:	Ericsson AIR21 B4A/B12P-8	Make / Model:	Ericsson AIR21 B4A/B12P-8
Gain:	15.9 / 13.6 dBd	Gain:	15.9 / 13.6 dBd	Gain:	15.9 / 13.6 dBd
Height (AGL):	110	Height (AGL):	110	Height (AGL):	110
Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz	Frequency Bands	2100 MHz (AWS) / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	6,043.06	ERP (W):	6,043.06	ERP (W):	6,043.06
Antenna A1 MPE%	<b>2.530</b>	Antenna B1 MPE%	<b>2.530</b>	Antenna C1 MPE%	<b>2.530</b>
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A / B4P	Make / Model:	Ericsson AIR21 B2A / B4P	Make / Model:	Ericsson AIR21 B2A / B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	110	Height (AGL):	110	Height (AGL):	110
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	7,002.81	ERP (W):	7,002.81	ERP (W):	7,002.81
Antenna A2 MPE%	<b>2.328</b>	Antenna B2 MPE%	<b>2.328</b>	Antenna C2 MPE%	<b>2.328</b>

### Microwave Backhaul Data

Make / Model:	Gain	Height (AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
Fastback IBR1300	10 dBd	107	5 GHz	1	1	10	<b>0.004</b>	<b>B</b>

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Sector B)	<b>4.862%</b>
Clearwire	0.190%
Whip Antenna	1.460%
212-1 Dipole	4.860%
Andrew Dish	0.000%
<b>Site Total MPE %:</b>	<b>11.372%</b>

T-Mobile Sector A Total:	4.858%
T-Mobile Sector B Total:	<b>4.862%</b>
T-Mobile Sector C Total:	4.858%
<b>Site Total:</b>	<b>11.372%</b>



## T-Mobile Max Power Values (Sector B)

T-Mobile _Max Power Values (Sector B)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	110	15.52	AWS - 2100 MHz	1000	1.552%
T-Mobile 700 MHz LTE	2	687.26	110	4.57	700 MHz	1000	0.978%
T-Mobile AWS - 2100 MHz UMTS	2	1,167.14	110	7.76	AWS - 2100 MHz	1000	0.776%
T-Mobile PCS - 1900 MHz UMTS	2	1,167.14	110	7.76	PCS - 1900 MHz	1000	0.776%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	110	7.76	PCS - 1900 MHz	1000	0.776%
T-Mobile 10 GHz Microwave	1	1717.91	107	0.34	10 GHz	1000	0.004%
						<b>Total:</b>	<b>4.862%</b>



## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population 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 population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	4.858%
Sector B:	4.862%
Sector C:	4.858%
T-Mobile Per Sector Maximum (Sector B):	4.862%
Site Total:	11.372 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **11.372%** of the allowable FCC established general population 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.

Cut on dotted line.

## Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. **DO NOT PHOTO COPY OR ALTER LABEL.**
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, **DO NOT TAPE OVER BARCODE.** Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

## Click-N-Ship® Label Record

**USPS TRACKING # / Insurance Number:**  
**9405 8036 9930 0630 3656 23**

Trans. #:	433799676	Priority Mail® Postage:	<b>\$6.70</b>
Print Date:	04/30/2018	Insurance Fee	<b><u>\$0.00</u></b>
Ship Date:	05/01/2018	Total	<b>\$6.70</b>
Expected			
Delivery Date:	05/02/2018		
Insured Value:	\$1.00		

**From:** DEBORAH CHASE  
 T-MOBILE USA- NSS  
 35 GRIFFIN RD S  
 BLOOMFIELD CT 06002-1351

Ref#: 242 AAVZAP

**To:** RYAN CURLEY  
 TOWN OF PORTLAND CT  
 33 MAIN ST  
 PORTLAND CT 06480

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
 Check the status of your shipment on the USPS Tracking® page at [usps.com](http://usps.com)

Cut on dotted line.

## Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. **DO NOT PHOTO COPY OR ALTER LABEL.**
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, **DO NOT TAPE OVER BARCODE.** Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

## Click-N-Ship® Label Record

**USPS TRACKING # / Insurance Number:**  
**9405 8036 9930 0630 3655 93**

Trans. #:	433799676	Priority Mail® Postage:	<b>\$6.70</b>
Print Date:	04/30/2018	Insurance Fee	<b><u>\$0.00</u></b>
Ship Date:	05/01/2018	Total	<b>\$6.70</b>
Expected			
Delivery Date:	05/02/2018		
Insured Value:	\$1.00		

**From:** DEBORAH CHASE  
 T-MOBILE/NSS  
 35 GRIFFIN RD S  
 BLOOMFIELD CT 06002-1351

Ref#: 242 AAVZAP

**To:** SUSAN S BRANSFIELD  
 TOWN OF PORTLAND  
 PO BOX 71  
 PORTLAND CT 06480-0071

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!  
 Check the status of your shipment on the USPS Tracking® page at [usps.com](http://usps.com)

## Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. **DO NOT PHOTO COPY OR ALTER LABEL.**
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, **DO NOT TAPE OVER BARCODE.** Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

## Click-N-Ship® Label Record

**USPS TRACKING # / Insurance Number:**

**9405 8036 9930 0630 3656 16**

Trans. #:	433799676	Priority Mail® Postage:	<b>\$6.70</b>
Print Date:	04/30/2018	Insurance Fee	<b>\$0.00</b>
Ship Date:	05/01/2018	Total	<b>\$6.70</b>
Expected			
Delivery Date:	05/02/2018		
Insured Value:	\$1.00		

**From:** DEBORAH CHASE Ref#: 242 AAVZAP  
 T-MOBILE USA- NSS  
 35 GRIFFIN RD S  
 BLOOMFIELD CT 06002-1351

**To:** DAN BOURETT  
 TOWN OF PORTLAND-ZONING ENFORCEMENT  
 DIRECTOR  
 33 MAIN ST  
 # 1  
 PORTLAND CT 06480

\* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



*Thank you for shipping with the United States Postal Service!*  
 Check the status of your shipment on the USPS Tracking® page at [usps.com](http://usps.com)