Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

September 29, 2021

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

RE: Notice of Exempt Modification
50 Plantation Road, East Windsor, CT 06016 (also known as 65 Plantation Road)
Latitude: 41.876000000
Longitude: -72.564700000
T-Mobile Site#: CTHA535A – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 120-foot level of the existing 132-foot water tank at 50 Plantation Road, East Windsor, CT. The 132-foot water tank and property are owned by Plantation Properties LLC. T-Mobile now intends to remove the three (3) existing antennas and add nine (9) new 600/700/1900/2100/2500 MHz antennas. The new antennas will support 5G services and will be installed at the same 120-foot level of the tower.

Planned Modifications:
Tower:
Remove
(3) Diplexers
(6) 7/8" Coax

Remove and Replace:
(3) RFS APXV18-206517S for (3) RFS APX16DWV-16DWV-S-E-A20 1900/2100 MHz antennas

Install New:
(3) AIR 6449 B41 2500 MHz antennas
(3) APXVAALL24_43 600/700 MHz antennas
(3) Radio 4460 B25+B66
(3) Radio 4480 B71+B85
(3) 1-5/8" Hybrid

Existing to Remain:
N/A

This water tank was originally approved for a telecommunications facility for Sprint by the Town of East Windsor Planning and Zoning Commission in October 8, 1996. A copy of this approval is included with this submission. Subsequent carriers have been approved by the Connecticut Siting Council for tower-share and exempt modifications at the facility, including Metro PCS (now under T-Mobile).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman -James Bowsza, Elected Official, and Michael D'Amato, Interim Town Planner, as well as the 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,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: James Bowsza – First Selectman – Town of East Windsor
Michael D'Amato – Interim Town Planner – Town of East Windsor
Plantation Properties LLC – Owner

Kyle Richers

From: UPS <pkginfo@ups.com>
Sent: Wednesday, September 29, 2021 11:32 AM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Tracking Number 1ZV257424294582651

You have a package coming.

Scheduled Delivery Date: Thursday, 09/30/2021

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424294582651
Ship To:	Michael D'Amato Town of East Windsor 11 Rye Street BROAD BROOK, CT 06016 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	09/30/2021
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CTHA535A CSC ZO

Kyle Richers

From: UPS <pkginfo@ups.com>
Sent: Wednesday, September 29, 2021 11:33 AM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Tracking Number 1ZV257424292648665

You have a package coming.

Scheduled Delivery Date: Thursday, 09/30/2021

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424292648665
Ship To:	James Bowsza Town of East Windsor 11 Rye Street BROAD BROOK, CT 06016 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	09/30/2021
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CTHA535A CSC EO

Kyle Richers

From: UPS <pkginfo@ups.com>
Sent: Wednesday, September 29, 2021 11:43 AM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Tracking Number 1ZV257424292118675

A signature is required for package delivery. Log in or enroll in UPS My Choice to take any action.

You have a package coming.

Scheduled Delivery Date: Thursday, 09/30/2021

Sign Now

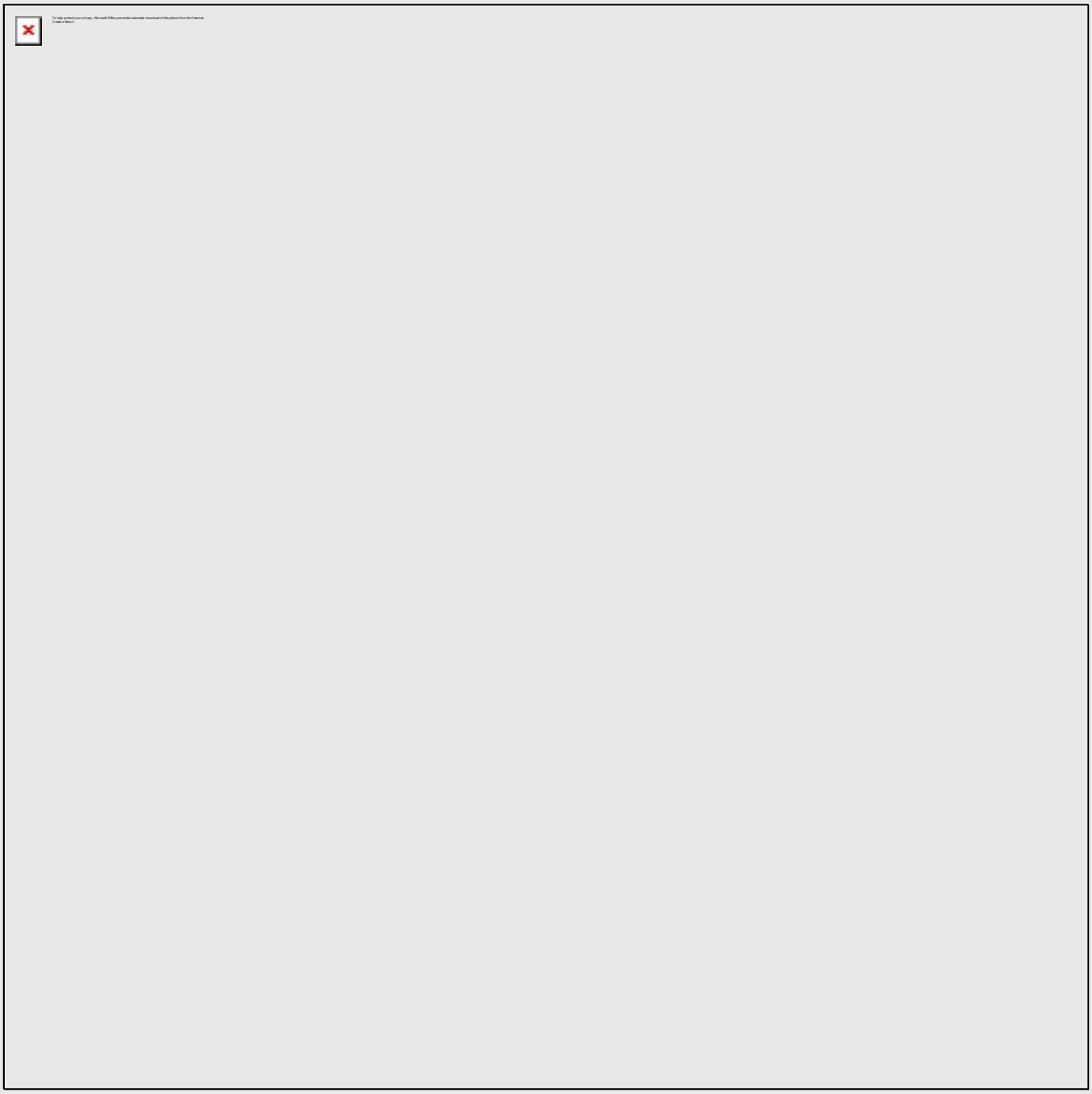
Change Delivery | Manage Preferences | View Delivery Planner

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424292118675
Ship To:	Plantation Properties LLC 27 Rye Street BROAD BROOK, CT 06016 US

UPS Service:	UPS GROUND
Number of Packages:	1
Package Weight:	1.0 LBS
Scheduled Delivery:	09/30/2021
Signature Required:	A signature is required for package delivery
Reference Number 1:	CTHA535A CSC Owner



Download the UPS mobile app

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2017.

Information on the Property Records for the Municipality of East Windsor was last updated on 7/2/2021.

Parcel Information

Location:	50 PLANTATION RD	Property Use:	Vacant Land	Primary Use:	Commercial Vacant Land
Unique ID:	01162500	Map Block Lot:	016 50 001C	Acres:	0.78
490 Acres:	0.00	Zone:	A-1	Volume / Page:	0231/0053
Developers Map / Lot:		Census:	4842000		

Value Information

	Appraised Value	Assessed Value
Land	245,276	171,690
Buildings	0	0
Detached Outbuildings	21,368	14,960

	Appraised Value	Assessed Value
Total	266,644	186,650

Owner's Information

Owner's Data
PLANTATION PROPERTIES LLC P O BOX 542 BROAD BROOK CT 06016-0542

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Pump House Utility	1960			154

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Sale Price
PLANTATION PROPERTIES LLC	0231	0053	09/27/2001		$1

CTHA535A

Property Information

Property ID 01162500
Location P O BOX 542
Owner

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of East Windsor, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 5/21/2021
Data updated 5/15/2020

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

TOWN OF EAST WINDSOR - PLANNING & ZONING COMMISSION
OCTOBER 8, 1996 - PUBLIC HEARING #1273

CONDITIONS OF APPROVAL

SBA, INC. - APPLICANT
DEAN A. & CAREN E. RASMUSSEN - OWNERS
SITE PLAN APPROVAL
S/S PLANTATION ROAD
BROAD BROOK, CONNECTICUT

Motion by: Sonia Morell

Seconded by: Brian Chisholm

TO APPROVE the application of SBA, Inc. for Site Plan Approval to place communication antennae on an existing water tower and to locate support equipment adjacent to tower, on property located on the south side of Plantation Road. This property, which is owned by Dean A. and Caren E. Rasmussen, is presently zoned A-1 and is shown on Assessor's Map 40, Block 50, Lot 1C. This approval is subject to conformance with the referenced plans and the following conditions:

Referenced Plans:

- "Property Survey Prepared for Dean & Caren Rasmussen 47 Plantation Road, East Windsor Connecticut Proposed Sprint Spectrum LP Improvements added to survey by SEA Consultants, Inc. Rocky Hill, CT" Dated Received by East Windsor Planning and Zoning Commission September 10, 1996.
- "Lucent Technologies/Bechtel Alliance SSLP Project, Rasmussen Water Tower Site Plan" by SEA Consultants Inc. Dated 9/9/96 and stamped "received" by the East Windsor Planning and Zoning Commission on September 10, 1996.

Conditions to be met prior to signing mylars:

1. A copy of this approval Motion shall be recorded on the land records.

Conditions to be met prior to the issuance of a Zoning Permit:

2. A mylar copy of the referenced plans shall be submitted for the East Windsor Planning and Zoning Commission signature prior to the issuance of zoning permits.

Conditions to be met Prior to Certificate of Compliance:

3. All conditions of this approval motion shall be complied with.

SBA, INC. - APPLICANT
DEAN A. & CAREN E. RASMUSSEN - OWNERS
SITE PLAN APPROVAL
S/S PLANTATION ROAD
BROAD BROOK, CONNECTICUT

General Conditions:

4. No work may begin until a Zoning and Building Permit have been issued.

5. Construction of improvements as approved by this special use/site plan approval must commence by October 8, 1997 and all improvements must be completed within 1 year from the start of construction, otherwise approval shall become null and void unless an extension is granted by the Commission.

6. This Site Plan Approval is for the specific use identified in the application. Any changes in use or tenancy require a new zoning permit and may require additional Commission approvals.

7. No structures or buildings other than what are shown on the approved plans shall be erected without further Site Plan Review by the Commission.

8. This project shall be constructed and maintained in accordance with the referenced plans. Minor modifications to the approved plans which result in lesser impacts may be allowed subject to staff review and approval.

9. By acceptance of this permit and conditions, the applicant and owner acknowledge the right of Town staff to periodically enter upon the subject property for the purpose of determining compliance with the terms of this approval.

VOTE: In Favor: Unanimous

PERMIT # 176-96

ZONING PERMIT

EAST WINDSOR, CONNECTICUT

PLEASE NOTE THAT THIS IS NOT A BUILDING PERMIT

This Permit is hereby applied for in accordance with the requirements of the East Windsor Zoning Regulations for:

____ Principal Building - new
__X__ Principal Building - add.
____ Other:
____ Accessory Structure
____ Change of Use: ____

Lot located at or near 47 Plantation Road (House No.) (Street) on south side of street

Tax Map No. 40 Block No. 50 Lot No. 1C EWLR Map No. ____

Zoning District: A-1 Lot Area: 0.80 Ac Frontage: 175 feet

Lot Owner: Dean & Caren Rasmussen
Address: 47 Plantation Road East Windsor, CT Telephone: (860) 627-9368

Applicant: SBA, Inc agent for SPRINT PCS
Address: 9 Barnes Industrial Road Telephone: (203) 237-1747
Wallingford, CT

Proposed Use: Erection of telecommunication antennae and ground support equipment.

Proposed Structures: 3-antenna panel arrays Existing Structures: Water tank/pump house

1. Dimensions 10' X 2.5" X (hgt) 5' Number: 1 each
2. Dimensions 8.5' X 30" X (hgt) 5' Present Uses: ____
3. Dimensions ____ X ____ X (hgt) ____
4. Parking Spaces: Required ____ Provided 1
5. Signage: Allowed N/A Proposed N/A
6. Coverage: Allowed ____ Bldg N/A Total Impervious N/A
   Proposed 18.6 sf Bldg N/A Total Impervious 18.6 sf

Prior Approval Status:

1. ZBA Variance # ____ for N/A
2. Health Approval Date ____
3. Sewer Approval Date ____
4. Legal Nonconforming ____
5. Conn. D.O.T. Permit ____
6. PZC Approval Date 10/08/96
7. Subdivision Appr. Date ____
8. Town Engineer Appr. ____
9. I.W.W. Approval Date N.J.
10. S&E Plan Approval ____
11. DEP Permit ____
12. Army Corps of Engr. Permit ____
13. Floodproof Certif. Date ____
14. Flood Elevation ____
15. Other Approvals ____
16. Building Plans (Titled) ON FILE IN BUILDING DEPT.
    (By) ____ (Dated) ____ (Revised) ____

Permit hereby X ISSUED or ____ DENIED subject to conformance with/to the East Windsor Zoning Regulations and attached Site or Plot Plan:
Titled: ON FILE IN PLANNING OFFICE
Prepared By: ____, Dated ____, Revised ____
and the following conditions (reasons): (1) See attached conditions
(2) Final inspection required.

As-Builts Required: N/A Foundation (including elevation)
N/A Final As-Built

Permit void if (a) Work/activity not commenced within 1 year of date of issuance; or
(b) Construction authorized not completed within 2 years of date of issuance.

Failure to comply with the conditions of approval of this Permit shall constitute a violation of the East Windsor Zoning Regulations.

A Zoning Certificate of Compliance is required prior to occupancy of any structure or commencement of any use applied for under this Permit.

I hereby certify that the above information is correct to the best of my knowledge & belief.

Fee: #81.56 - Paid 11-18-96 ck #22316

Signature of Agent or Owner Date: 11/12/96

By: ____ Date: 11/18/96
Zoning Enforcement Officer
East Windsor Planning & Zoning Commission

White - ZONING DEPT.
Yellow - APPLICANT
Pink - BUILDING DEPT.

T-Mobile

UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)

67E5A998E 6160

T-MOBILE A+L TEMPLATE (PROVIDED BY RFDS)

67E5998E_1xAIR+1OP+1QP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTON, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

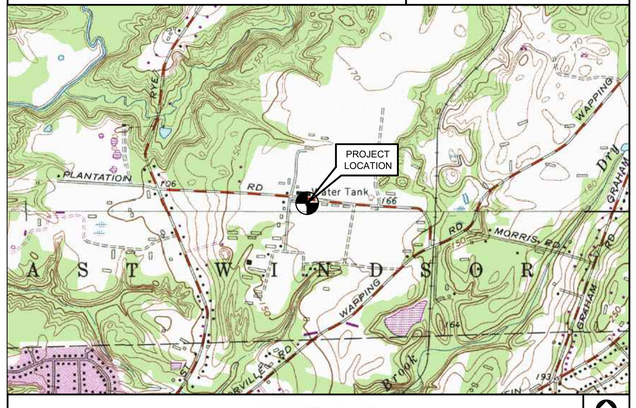
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 50 PLANTATION RD
EAST WINDSOR, CT 06016

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	3.80 MI.
3.	USE THE RIGHT 2 LANES TO TURN RIGHT ONTO CT-75 S.	0.20 MI.
4.	USE THE LEFT 2 LANES TO TURN LEFT TO MERGE ONTO I-91 N TOWARD SPRINGFIELD.	4.30 MI.
5.	TAKE EXIT 44 FOR US-5 S TOWARD E. WINDSOR.	0.30 MI.
6.	TURN RIGHT ONTO US-5 S.	1.10 MI.
7.	TURN LEFT ONTO TROMLEY RD.	1.70 MI.
8.	CONTINUE ONTO CEMETERY RD.	0.50 MI.
9.	TURN LEFT ONTO OMELIA RD.	0.31 MI.
10.	TURN RIGHT ONTO ELLSWORTH RD.	0.40 MI.
11.	CONTINUE ONTO RYE ST.	1.00 MI.
12.	TURN LEFT ONTO PLANTATION RD.	0.50 MI.

SITE COORDINATES: LATITUDE: 41° 52' 32.11" N
LONGITUDE: 72° 33' 53.30" W
GROUND ELEVATION: ±163' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP — NORTH

NOTE: ALL MODIFICATIONS PER THE STRUCTURAL REPORT PREPARED BY APT, JOB #CT1141NB7760 DATED 07.09.20 TO BE INSTALLED PRIOR TO THE PROPOSED INSTALLATION.

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. REMOVE EXISTING RBS6201 ODE CABINET
2. REMOVE AND REPLACE EXISTING 100A PPC WITH 200A PPC
3. INSTALL (1) ENCLOSURE 6160 AND (1) BATTERY CABINET B160
4. INSTALL (3) RRUS 4480 B71+B85 AND (3) RRUS4460 B25+B66
5. REMOVE (1) RFS APXV18-206517S-C-A20 PER SECTOR. TOTAL (3)
6. INSTALL (1) RFS APXVAALL24_43-U-NA20 PER SECTOR. TOTAL (3)
7. INSTALL (1) RFS APX16DWV-16DWV-S-E-A20 PER SECTOR. TOTAL (3)
8. INSTALL (1) ERICSSON AIR6449 B41 PER SECTOR. TOTAL (3)
9. INSTALL 100A BREAKER
10. REMOVE ALL EXISTING COAX, INSTALL (3) 6/24 4AWG HYBRIDS
11. INSTALL NEW 200A CIRCUIT BREAKER AT METER
12. REMOVE EXISTING DIPLEXERS AT GRADE

PROJECT INFORMATION

SITE NAME:	UNISON E WINDSOR WATERTANK
SITE ID:	CTHA535A
SITE ADDRESS:	50 PLANTATION RD, EAST WINDSOR, CT 06016
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488-0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41° 52' 32.11" N LONGITUDE: 72° 33' 53.30" W GROUND ELEVATION: ±163' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — CARLO F. CENTORE — LICENSED PROFESSIONAL ENGINEER

T-Mobile — Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

TITLE SHEET

T-1

Sheet No. 1 of 11

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 105 MPH (Vasd) (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
18. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

WATER TANK NOTES

GENERAL:

1. THE CONTRACTOR SHALL OBTAIN, IN WRITING, FROM THE OWNER REQUIREMENTS FOR TANK INSPECTIONS PRIOR TO COMMENCING WITH THE WORK ON THE TANK.
2. CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION TO THE EXISTING WATER TANK AND STRUCTURE DURING INSTALLATION. SHOULD ANY DAMAGE OCCUR, THE CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER AND WATER TANK OWNER, AND IS LIABLE TO RECTIFY DAMAGE AT NO EXTRA COST TO THE CLIENT OR OWNER. THE EMERGENCY CONTACT INFORMATION IS AS FOLLOWS:
   CONNECTICUT WATER COMPANY: AL BRAIG (860) 664-6058.
   CENTEK ENGINEERING, INC.: CARLO F. CENTORE 203-488-0580 EXTN:122

SURFACE PREPARATION:

1. PREPARE SURFACE TO BE WELDED BY SPOT REMOVING PAINT TO BARE METAL USING POWER WIRE BRUSHING IN ACCORDANCE WITH SSPC-SP-11 STANDARDS, (STEEL STRUCTURES PAINTING COUNCIL)
2. CLEANING PROCEDURES SHALL BE VERIFIED AS MEETING THE MINIMUM REQUIREMENTS PER THE STUD MANUFACTURER'S WRITTEN INSTRUCTIONS. CONTRACTOR SHALL SUBMIT MANUFACTURER'S SPECIFICATION TO THE ENGINEER PRIOR TO COMMENCING WITH THE WORK.
3. WHERE LEAD BASED PAINT HAS BEEN DETERMINED TO BE PRESENT AN APPROVED VACUUM ATTACHMENT TO THE GRINDER SHALL BE USED.
4. FOLLOW POWER TOOL CLEANING WITH A SOLVENT CLEANING TO REMOVE ANY OILS, CONTAMINANTS, RUST OR DIRT PRIOR TO STUD WELDING, (SSPC-SP1 BY STEEL STRUCTURES PAINTING COUNCIL)

REPAINTING AND FINISHING:

1. ALL EXISTING PAINT ON WATER TANK STRUCTURES SHALL BE TESTED BY AN OUTSIDE CONSULTANT IF MAKE-UP OF PAINT IS UNKNOWN. TESTING SHALL BE PERFORMED PRIOR TO THE START OF ANY CONSTRUCTION AND IS NOT THE RESPONSIBILITY OF THE CONTRACTOR.
2. A 3" RADIAL AREA SHALL BE PREPARED AND PAINTED AFTER INSTALLATION OF ALL STUD WELDS. WHERE A CONTINUOUS RUN OF WELDS IS PROPOSED, A CONTINUOUS STRIP 3" PAST THE OUTERMOST PROPOSED STUD PLACEMENT SHALL BE PREPARED AND PAINTED TO CREATE A MORE AESTHETICALLY FINISHED INSTALLATION.
3. ANY REMEDIAL PAINTING CAUSED BY THE INSTALLATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. PAINT SHALL MATCH BOTH IN COLOR AND SPECIFICATION TO THE WATER TANK'S EXISTING CONDITION.
4. SURFACE TO BE REPAINTED SHALL BE FIRST POWER TOOL CLEANED FOLLOWED BY SOLVENT CLEANED TO REMOVE ANY OILS, CONTAMINANTS, RUST OR DIRT PRIOR TO REPAINTING. (SSPC-SP1 BY STEEL STRUCTURES PAINTING COUNCIL).
5. SURFACE CLEANING SHALL BE FOLLOWED WITH A PRIMER COAT ON THE SAME DAY.
6. CONTRACTOR TO VERIFY EXISTING PAINT ON THE WATER TANK BY CONTACTING DAVID POPE OF TNEMEC (PHONE# 203-247-8218).

STUD WELDING AND BOLTING TO EXISTING WATER TANK:

1. ALL ATTACHMENTS TO WATER TANK SHALL BE DONE BY STUD WELD. STUD WELDS SHALL BE BY THE CAPACITOR DISCHARGE-CONTACT METHOD. STUDS SHALL BE NELSON TFTC (LOW CARBON MILD STEEL) 1/4" DIAMETER MAXIMUM. WELD SHALL CONFORM TO AWS DI.I, LATEST EDITION.
2. USE LOW CARBON MILD STEELL HEX NUTS AND LOCK WASHERS. MAXIMUM HEX NUT TORQUE TO 6 FT-LB (72 IN-LB) CONTACT TRW NELSON STUD WELDING (1-888-635-9395 OR 1-215-363-0180) FOR EQUIPMENT AND WELDING TEST/CERTIFICATION.
3. UNAUTHORIZED WELDING TO THE WATERTANK IS PROHIBITTED.
4. CONTRACTOR SHALL RECEIVE IN WRITING THE OWNERS REQUIREMENTS FOR TANK INSPECTIONS PRIOR TO COMMENCING WITH THE WORK ON THE TANK. UPON THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A WRITTEN RELEASE FROM THE OWNER STATING THAT ALL WORK DONE WAS PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND THE OWNERS WRITTEN REQUIREMENTS AND RELEASES ALL LIABILITY TO THE CONTRACTOR, THE ENGINEER, AND THE STUD MANUFACTURER.
5. CONTRACTOR SHALL COMPLY WITH AWS D1.1 AND AWS C5.4 FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES." CONTRACTOR SHALL ADHERE TO AWS RECOMMENDED "SAFE PRACTICES FOR WELDING."
6. WELDING PARAMETERS, MACHINE POWER AND DWELL TIME SHALL BE QUALIFIED FOR THE WELDING POSITION, MATERIAL THICKNESS AND STUD SIZE TO BE USED. IF CHANGES IN THE SET-UP OCCUR AS DEFINED IN AWS D1.1, THE PROCEDURE MUST BE REQUALIFIED.
7. ALL STUD WELDING TO BE TO THE EXISTING TANK SHALL BE PERFORMED WITH A CAPACITOR DISCHARGE STUD WELDER AS MANUFACTURED BY TRW , INC. OR APPROVED EQUAL. ALL WELDS TO BE PERFORMED BY A CERTIFIED WELDER.
8. ALL PAINTED SURFACES AFFECTED BY WELDING OPERATIONS SHALL BE REPAINTED TO MATCH ADJACENT EXISTING SURFACES. PAINTING SHALL INCLUDE COATING OF THE STUDS.

STUD QUALIFICATION TESTING AND SAMPLING:

1. THE QUALIFICATION OF STUD APPLICATION AND PRE-PRODUCTION TESTING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 "STUD WELDING" OF AWS D1.1. INITIAL QUALIFICATION TESTING SHALL BE PERFORMED UNDER INSPECTION BY THE ENGINEER.
2. STUD APPLICATION SHALL BE QUALIFIED BY STUD WELDING TEN (10) SPECIMENS CONSECUTIVELY TO ASTM A-36 STEEL BASE MATERIALS USING RECOMMENDED PROCEDURES AND SETTINGS FOR EACH DIAMETER, POSITION, AND SURFACE GEOMETRY. THE TEN SPECIMENS SHALL BE TORQUE OR BEND TESTED TO FAILURE. STUD APPLICATION SHALL BE CONSIDERED QUALIFIED IF ALL TEST SPECIMENS ARE TESTED TO DESTRUCTION WITHOUT FAILURE IN THE WELD.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

GENERAL NOTES AND SPECIFICATIONS

N-1

NOTE:
ALL COAX LENGTHS TO BE MEASURED
AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX
A1	PROPOSED	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	120'	60°	(P) RADIO 4480 B71+B85 (1)		(1) 6/24 4AWG HYBRID CABLE
A2	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	120'	60°			
A3	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	120'	60°	(P) RADIO 4460 B25+B66A (1)		
B1	PROPOSED	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	120'	180°	(P) RADIO 4480 B71+B85 (1)		(1) 6/24 4AWG HYBRID CABLE
B2	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	120'	180°			
B3	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	120'	180°	(P) RADIO 4460 B25+B66A (1)		
C1	PROPOSED	ERICSSON AIR6449 B41	33.1 x 20.6 x 8.6	120'	300°			(1) 6/24 4AWG HYBRID CABLE
C2	PROPOSED	RFS–APX16DWV–16DWV–S–E–A20	55.9 x 13 x 3.15	120'	300°	(P) RADIO 4480 B71+B85 (1)		
C3	PROPOSED	RFS–APXVAALL24_43–U–NA20	95.9 x 24 x 8.5	120'	300°	(P) RADIO 4460 B25+B66A (1)		

1 C-1 SITE LOCATION PLAN
SCALE: NOT TO SCALE

TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

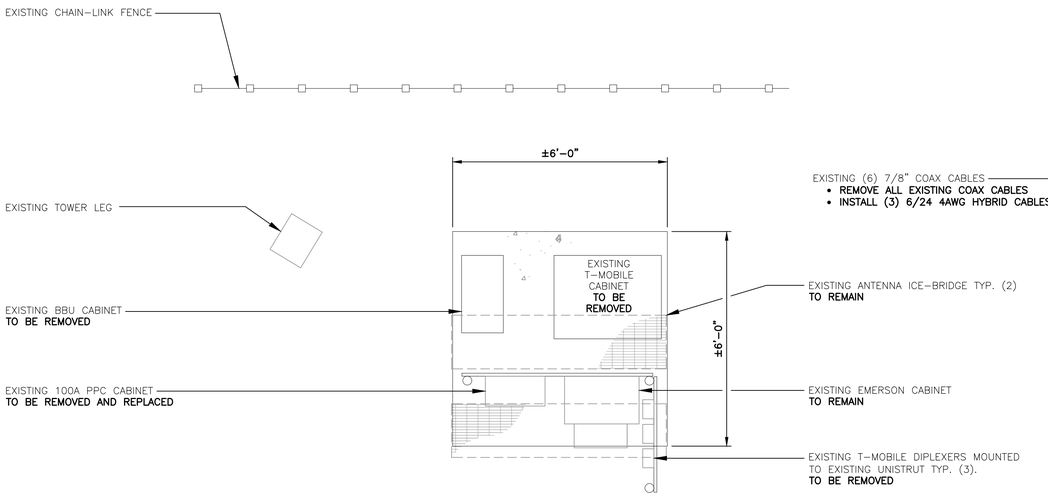
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

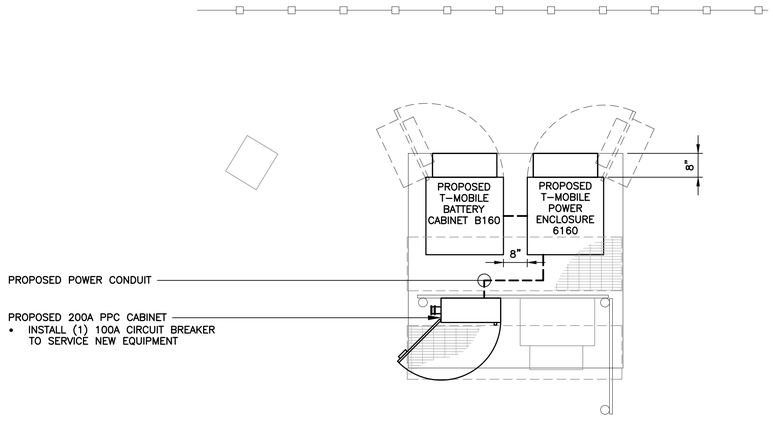
SITE LOCATION PLAN

C-1

Sheet No. 3 of 11

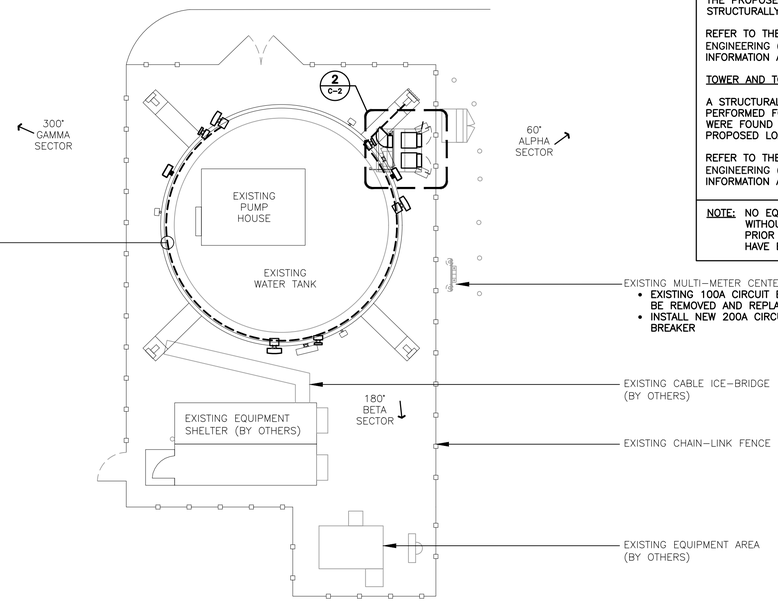


1 C-2 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'
TRUE NORTH



2 C-2 **PORPOSED EQUIPMENT PLAN**
SCALE: 1/2" = 1'
TRUE NORTH

NOTE: ALL MODIFICATIONS PER THE STRUCTURAL REPORT PREPARED BY APT, JOB #CT1141NB7760 DATED 07.09.20 TO BE INSTALLED PRIOR TO THE PROPOSED INSTALLATION.



3 C-2 **PROPOSED COMPOUND PLAN**
SCALE: 1" = 10'
TRUE NORTH

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING..

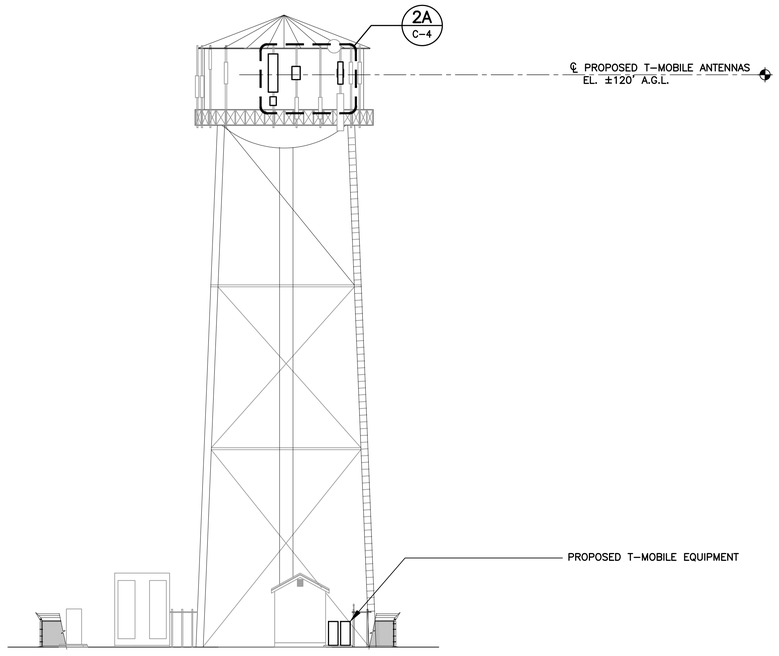
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21022.15) DATED 08/03/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21022.15) DATED 08/02/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.



4 C-2 **WEST ELEVATION - PROPOSED**
SCALE: 1" = 5'

GRAPHIC SCALE
5 0 2.5 5 10 20
1" = 5'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile
Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

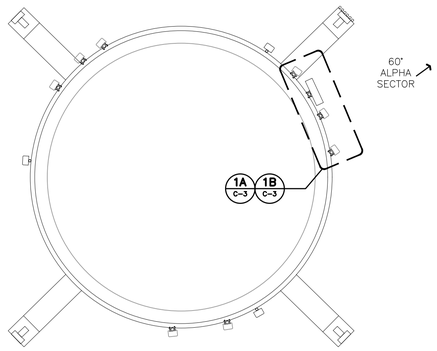
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

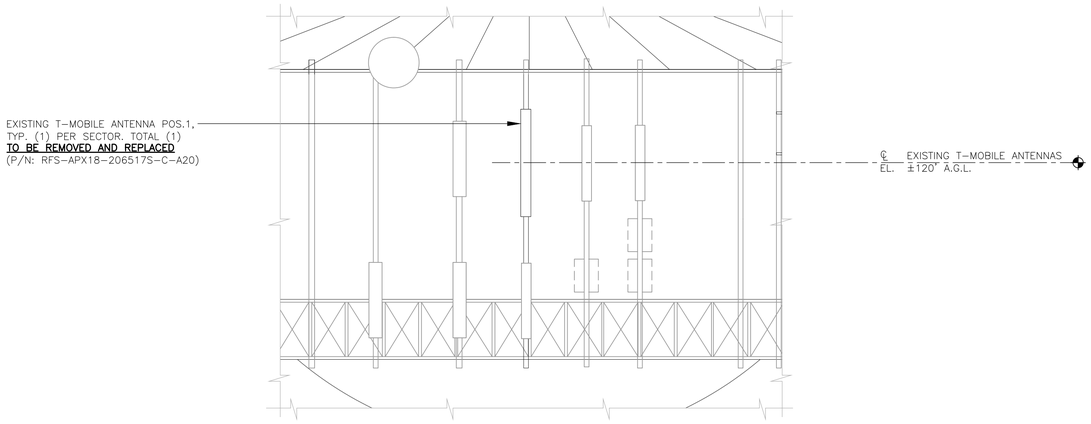
Sheet No. 4 of 11



1 C-3 EXISTING ANTENNA PLAN - ALPHA

SCALE: 3/16" = 1'

TRUE NORTH

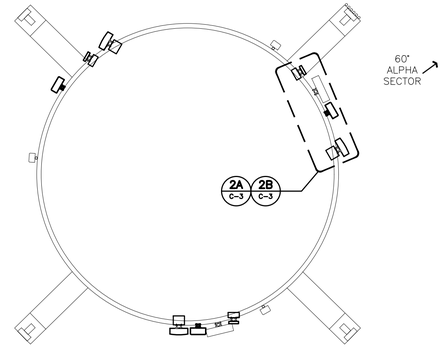


1A C-3 EXISTING ANTENNA ELEVATION - ALPHA

SCALE: 1/4" = 1'

1B C-3 EXISTING PHOTO SIM - ALPHA

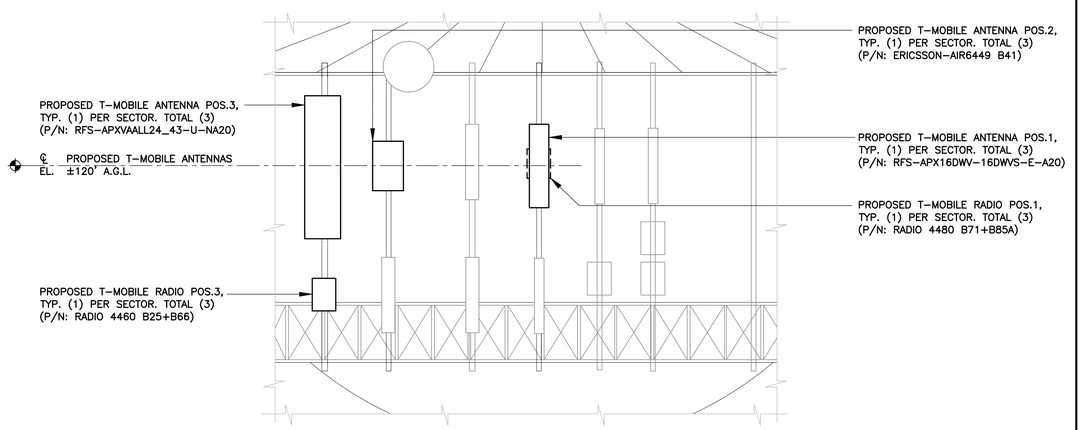
SCALE: NOT TO SCALE



2 C-3 PROPOSED ANTENNA PLAN - ALPHA

SCALE: 3/16" = 1'

TRUE NORTH



2A C-3 PROPOSED ANTENNA ELEVATION - ALPHA

SCALE: 1/4" = 1'

2B C-3 PROPOSED PHOTO SIM - ALPHA

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RYS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

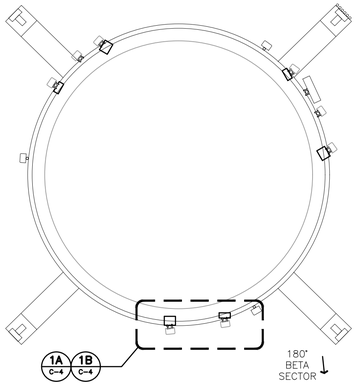
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

ANTENNA PLANS AND ELEVATIONS (ALPHA)

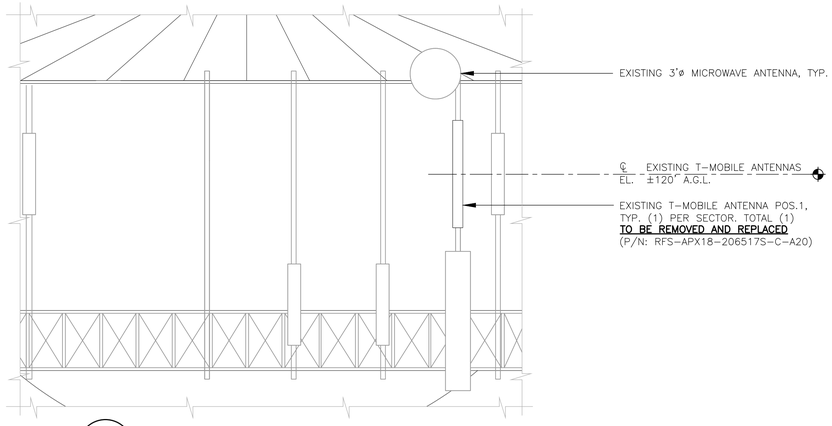
C-3

Sheet No. 5 of 11

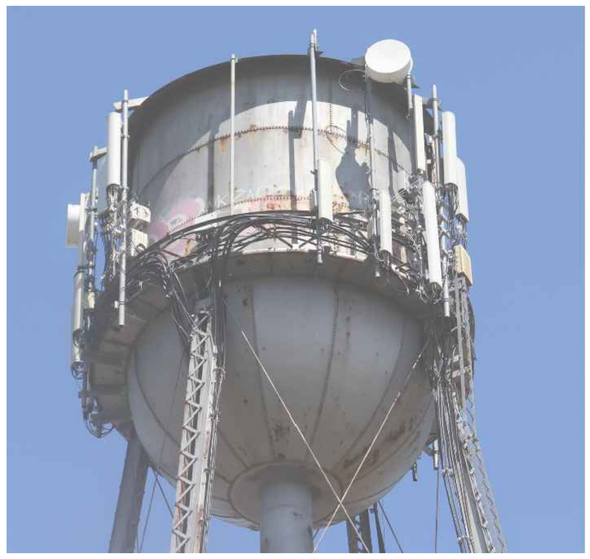


1 / C-4 **EXISTING ANTENNA PLAN - BETA**
SCALE: 3/16" = 1'

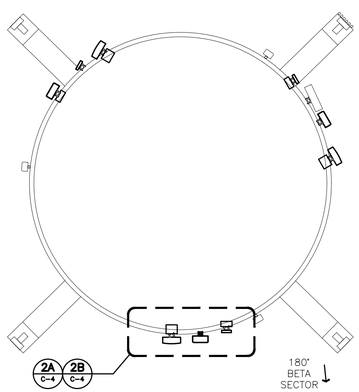
TRUE NORTH



1A / C-4 **EXISTING ANTENNA ELEVATION - BETA**
SCALE: 1/4" = 1'

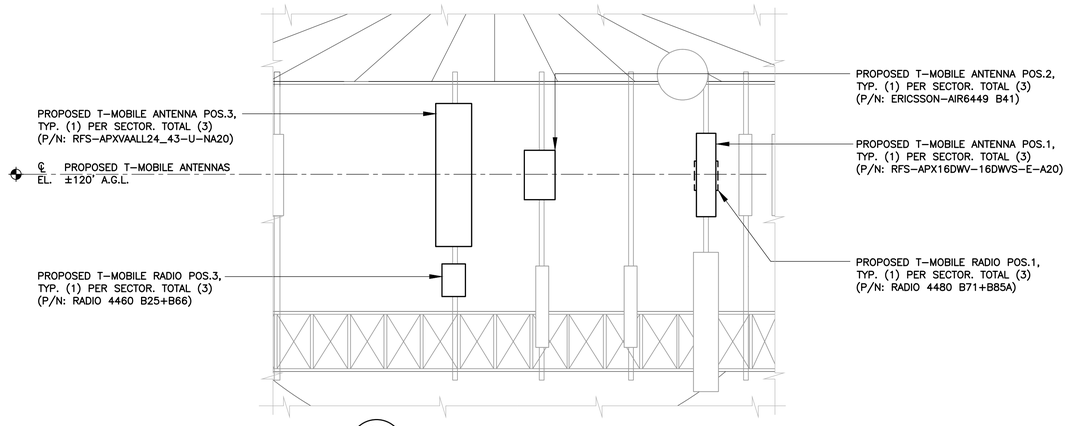


1B / C-4 **EXISTING PHOTO SIM - BETA**
SCALE: 1/4" = 1'

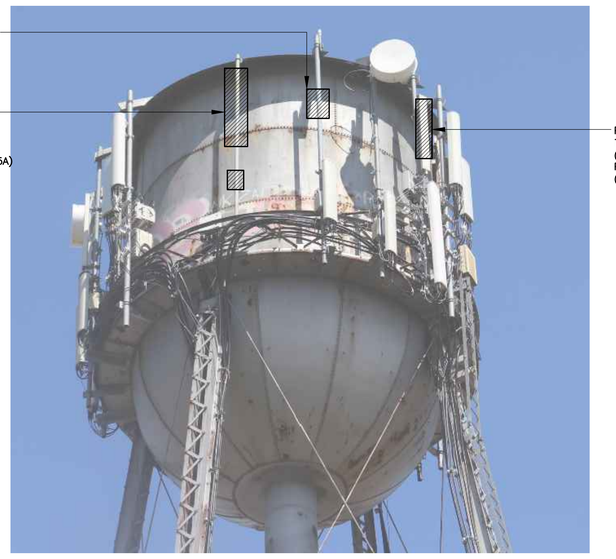


2 / C-4 **PROPOSED ANTENNA PLAN - BETA**
SCALE: 3/16" = 1'

TRUE NORTH



2A / C-4 **PROPOSED ANTENNA ELEVATION - BETA**
SCALE: 1/4" = 1'



2B / C-4 **PROPOSED PHOTO SIM - BETA**
SCALE: 1/4" = 1'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile
Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

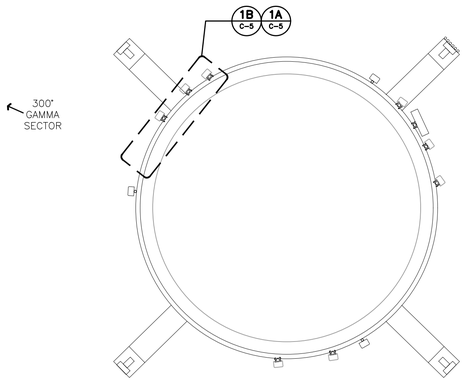
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

ANTENNA PLANS AND ELEVATIONS (BETA)

C-4

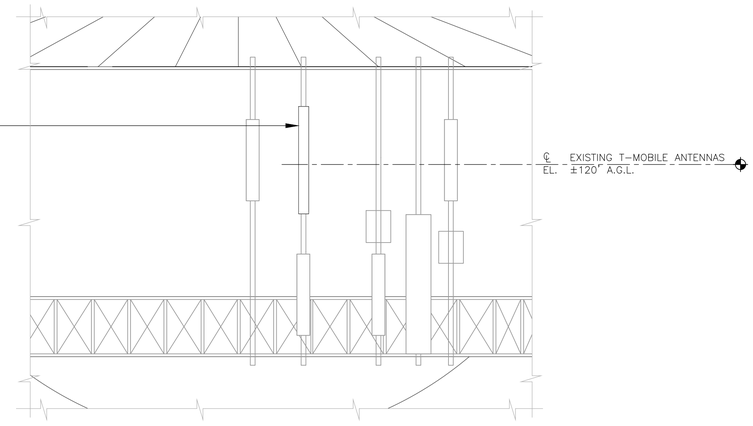
Sheet No. 6 of 11



1 C-5 EXISTING ANTENNA PLAN - GAMMA

SCALE: 3/16" = 1'

TRUE NORTH

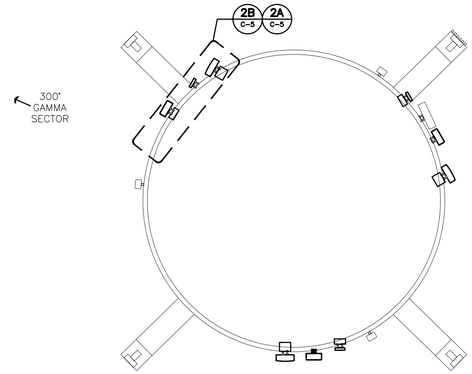


1A C-5 EXISTING ANTENNA ELEVATION - GAMMA

SCALE: 1/4" = 1'

1B C-5 EXISITNG PHOTO SIM - GAMMA

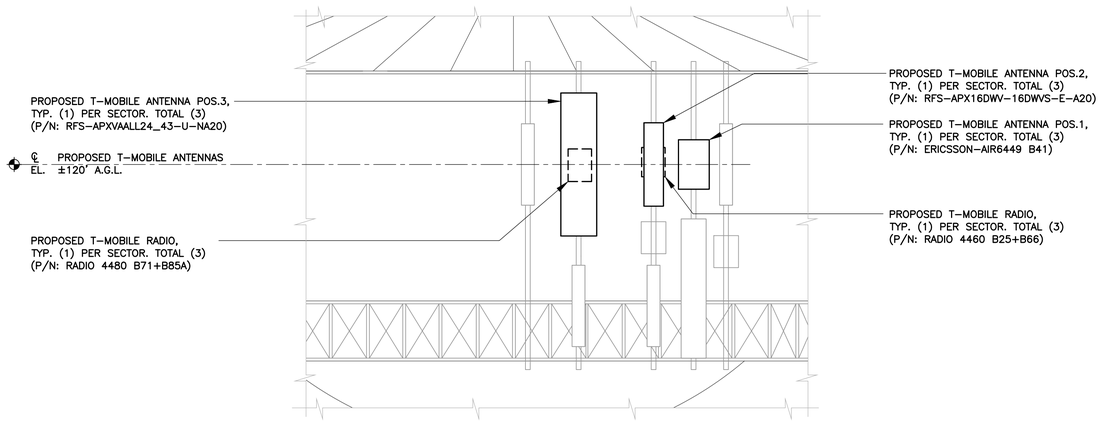
SCALE: 1/4" = 1'



2 C-5 PROPOSED ANTENNA PLAN - GAMMA

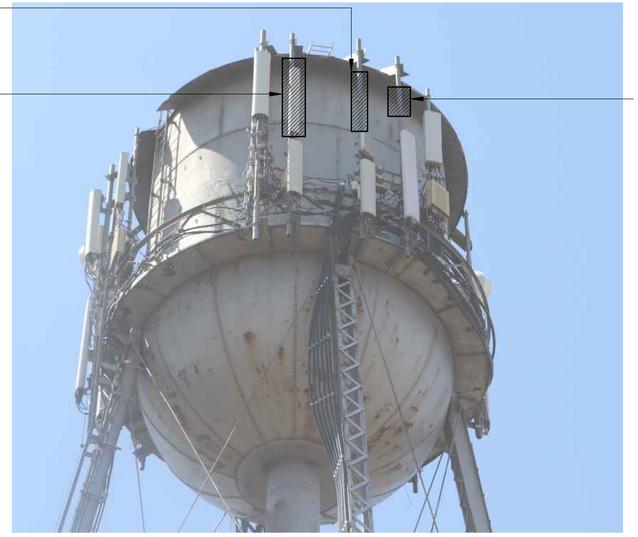
SCALE: 3/16" = 1'

TRUE NORTH



2A C-5 PROPOSED ANTENNA ELEVATION - GAMMA

SCALE: 1/4" = 1'



2B C-5 PROPOSED PHOTO SIM - GAMMA

SCALE: 1/4" = 1'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RYS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

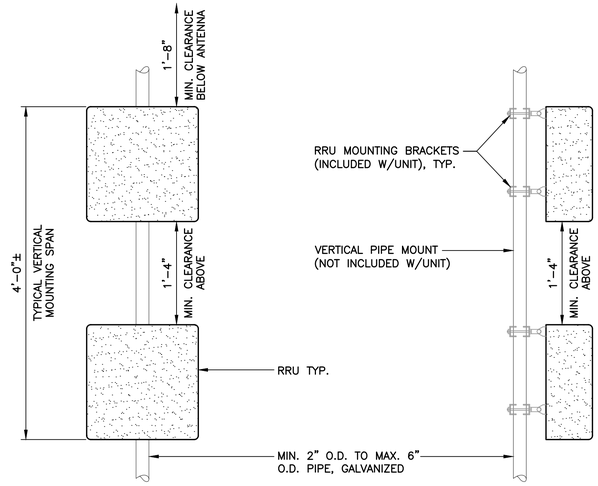
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

ANTENNA PLANS AND ELEVATIONS (GAMMA)

C-5

Sheet No. 7 of 11

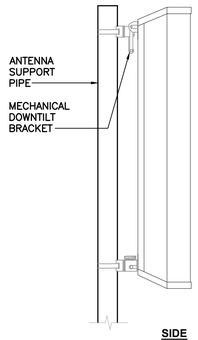


FRONT ELEVATION SIDE ELEVATION

NOTES:

1. T–MOBILE SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 C–6 **TYPICAL RRU MOUNTING DETAIL**
SCALE: NOT TO SCALE



SIDE

AIR6449 B41

APXVAALL24_43-U-NA20

APX16DWV-16DWVS-E-A20

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
MAKE: RFS MODEL: APXVAALL24_43–U–NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.
MAKE: RFS MODEL: APX16DWV–16DWVS–E–A20	55.9"L x 13"W x 3.15"D	±41 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

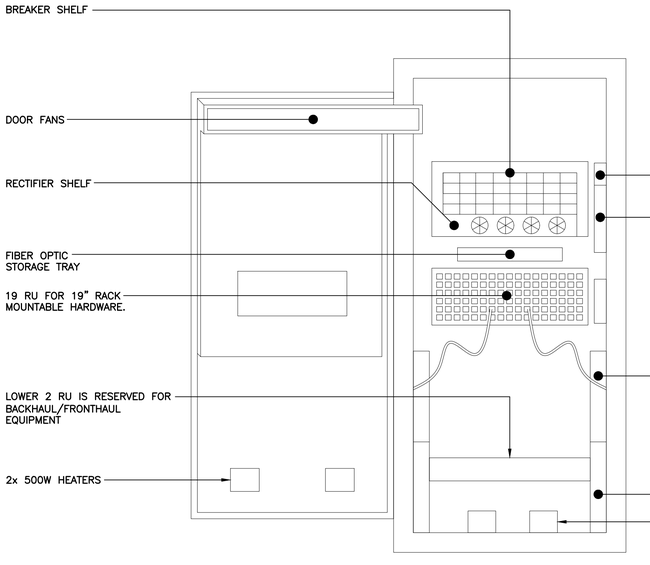
2 C–6 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE

RADIO 4460 B25+B66

RADIO 4480 B71+B85A

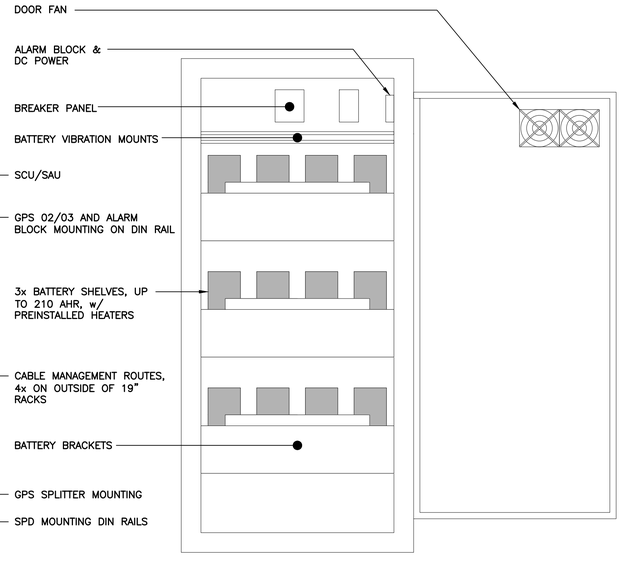
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4460 B25+B66	19.6"L x 15.7"W x 12.1"D	±109 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4480 B71+B85A	21.8"L x 15.7"W x 7.5"D	±84 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

3 C–6 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE



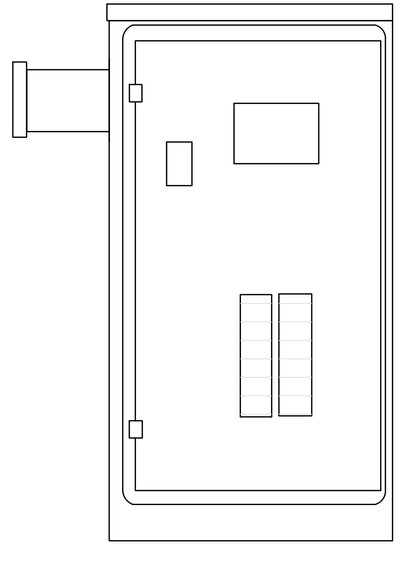
EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160 CABINET	62.0"H x 26.0"W x 26.0"D	±1200 LBS

4 C–6 **ENCLOSURE 6160 CABINET DETAIL**
SCALE: NOT TO SCALE



EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY B160 CABINET	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 C–6 **BATTERY B160 CABINET DETAIL**
SCALE: NOT TO SCALE



PPC CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: EMERSON MODEL: CAC–A75201090	40.0"H x 20.0"W x 10.0"D	±80 LBS

6 C–6 **PPC CABINET DETAIL**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile
Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

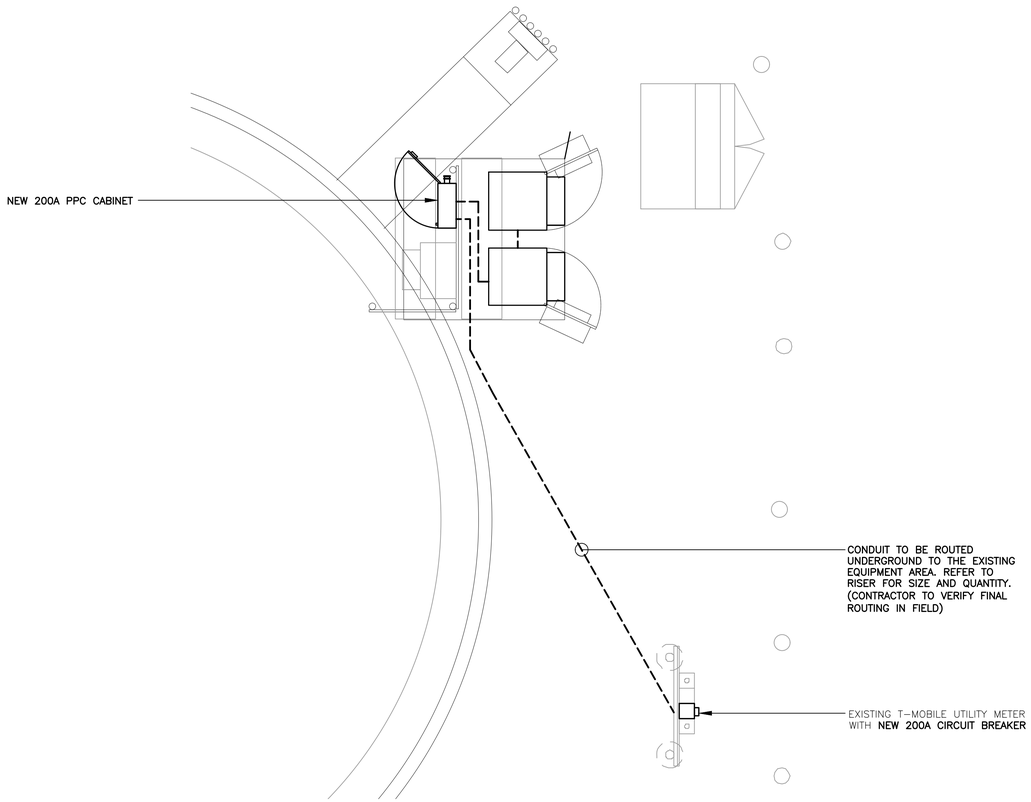
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

TYPICAL EQUIPMENT DETAILS

C-6

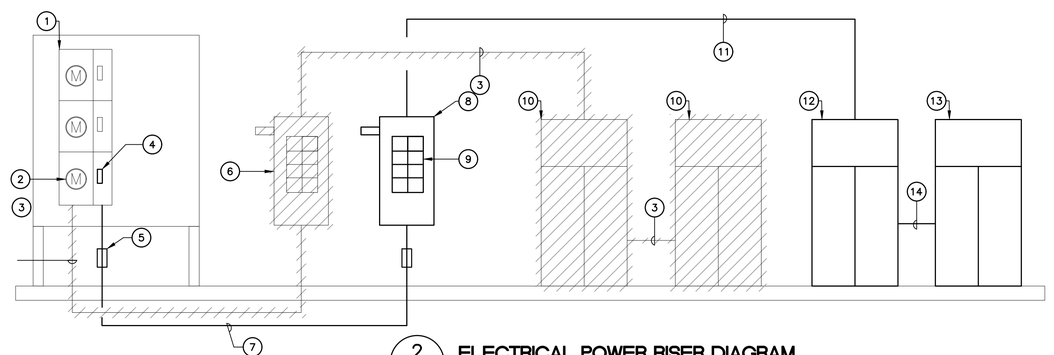
Sheet No. 8 of 11



1 E-1 **ELECTRICAL CONDUIT ROUTING**
SCALE: 3/8" = 1'

RISER DIAGRAM NOTES

1. EXISTING 3-GANG METER CENTER TO REMAIN.
2. EXISTING 200A UTILITY METER TO REMAIN.
3. EXISTING CONDUITS AND CONDUCTORS TO BE REMOVED
4. EXISTING 100A/2P CIRCUIT BREAKER TO BE REMOVED AND REPLACED WITH NEW 200A/2P CIRCUIT BREAKER. COORDINATE ALL ADDITIONAL REQUIREMENTS WITH UTILITY COMPANY.
5. EXPANSION COUPLING TYP.
6. EXISTING 100A PPC CABINET TO BE REMOVED AND REPLACED. RELOCATE ALL EXISTING CIRCUIT BREAKERS TO NEW PPC CABINET.
7. (3) 3/0 AWG, (1) #6 AWG GROUND, 2" CONDUIT.
8. NEW 200A PPC CABINET.
9. NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
10. EXISTING CABINETS TO BE REMOVED.
11. (3) #1 AWG, (1) #8 AWG GROUND, 1-1/2" CONDUIT.
12. NEW T-MOBILE EQUIPMENT CABINET
13. NEW T-MOBILE BATTERY CABINET
14. DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.



2 E-1 **ELECTRICAL POWER RISER DIAGRAM**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RYS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

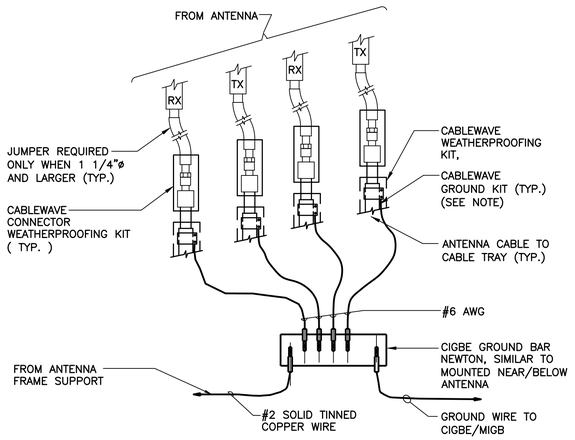
UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE:	04/05/21
SCALE:	AS NOTED
JOB NO.	21022.15

ELECTRICAL RISER AND CONDUIT ROUTING

E-1

Sheet No. 9 of 11

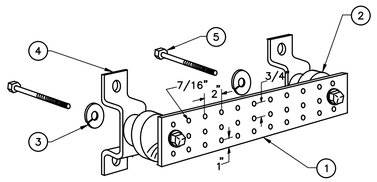


NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

1 E-2 CONNECTION OF GROUND WIRES TO GROUND BAR

SCALE: NOT TO SCALE

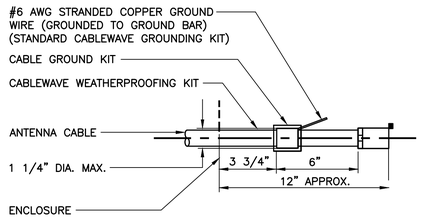


NOTES

1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

2 E-2 GROUND BAR DETAIL

SCALE: NOT TO SCALE

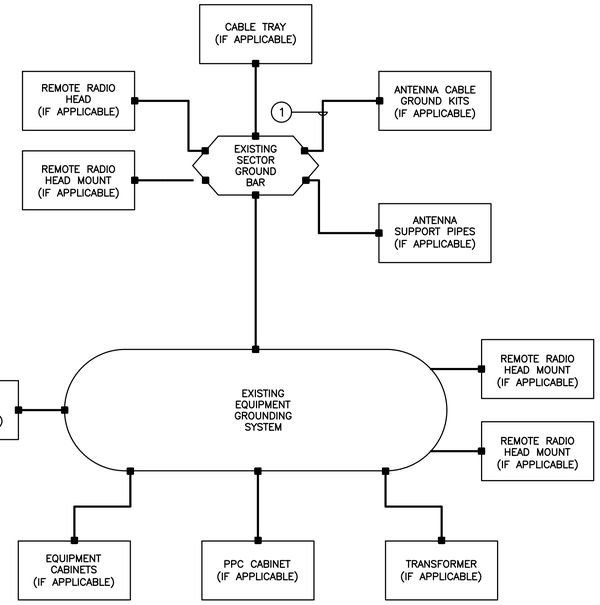


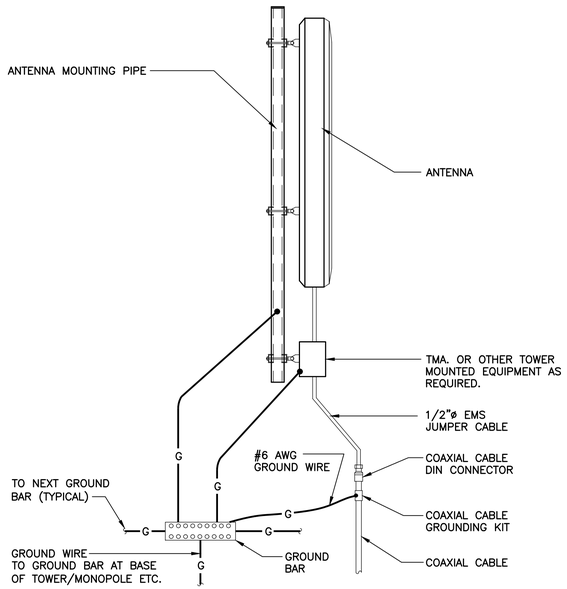
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

3 E-2 ANTENNA CABLE GROUNDING DETAIL

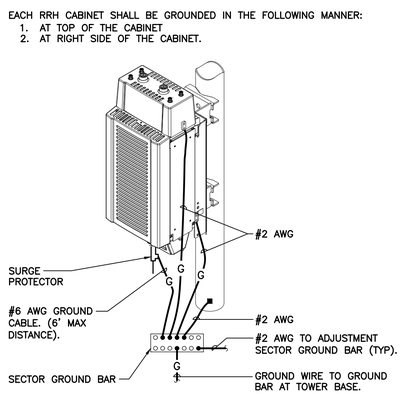
SCALE: NOT TO SCALE





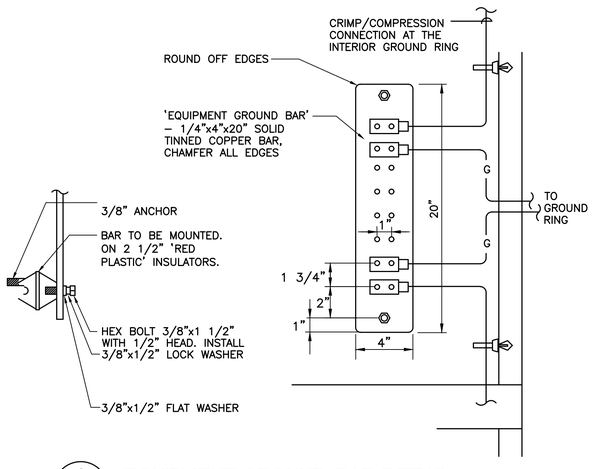
4 E-2 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



5 E-2 RRH POLE MOUNT GROUNDING

SCALE: NOT TO SCALE



6 E-2 EQUIPMENT GROUND BAR DETAIL

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

(1) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
7. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
8. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
9. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 E-2 ELECTRICAL SCHEMATIC DIAGRAM

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile · Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

UNISON E WINDSOR WATERTANK

SITE ID: CTHA535A

50 PLANTATION RD

EAST WINDSOR, CT 06016

DATE:	04/05/21
SCALE:	AS NOTED
JOB NO.	21022.15

TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 10 of 11

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR THE SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

F. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

G. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

H. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

I. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

J. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

K. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

L. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

M. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.

2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

N. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUITS

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". CONDUITS SHALL BE PROPERLY FASTENED AS REQUIRED BY THE N.E.C.

B. THE INTERIOR OF RACEWAYS/ENCLOSURES INSTALLED UNDERGROUND SHALL BE CONSIDERED TO BE WET LOCATION, INSULATED CONDUCTORS SHALL BE LISTED FOR USE IN WET LOCATIONS. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

C. CONDUIT INSTALLED UNDERGROUND SHALL BE INSTALLED TO MEET MINIMUM COVER REQUIREMENTS OF TABLE 300.5.

D. PROVIDE RIGID GALVANIZED STEEL CONDUIT (RMC) FOR THE FIRST 10 FOOT SECTION WHEN LEAVING A BUILDING OR SECTIONS PASSING THROUGH FLOOR SLABS

E. ONLY LISTED PVC CONDUIT AND FITTINGS ARE PERMITTED FOR THE INSTALLATION OF ELECTRICAL CONDUCTORS, SUITABLE FOR UNDERGROUND APPLICATIONS.

CONDUIT SCHEDULE SECTION 16111

CONDUIT TYPE	NEC REFERENCE	APPLICATION	MIN. BURIAL DEPTH (PER NEC TABLE 300.5) [2,3]
EMT	ARTICLE 358	INTERIOR CIRCUITING, EQUIPMENT ROOMS, SHELTERS	N/A
RMC, RIGID GALV. STEEL	ARTICLE 344, 300.5, 300.50	ALL INTERIOR/ EXTERIOR CIRCUITING, ALL UNDERGROUND INSTALLATIONS.	6 INCHES
PVC, SCHEDULE 40	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
PVC, SCHEDULE 80	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
LIQUID TIGHT FLEX. METAL	ARTICLE 350	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A
FLEX. METAL	ARTICLE 348	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A

[1] PHYSICAL DAMAGE IS SUBJECT TO THE AUTHORITY HAVING JURISDICTION.

[2] UNDERGROUND CONDUIT INSTALLED UNDER ROADS, HIGHWAYS, DRIVEWAYS, PARKING LOTS SHALL HAVE MINIMUM DEPTH OF 24".

[3] WHERE SOLID ROCK PREVENTS COMPLIANCE WITH MINIMUM COVER DEPTHS, WIRING SHALL BE INSTALLED IN PERMITTED RACEWAY FOR DIRECT BURIAL. THE RACEWAY SHALL BE COVERED BY A MINIMUM OF 2" OF CONCRETE EXTENDING DOWN TO ROCK.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

	120/208/240V	277/480V
LINE	COLOR	COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE

3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE

4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.

2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.

2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.

3. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 10 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS

2. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).

3. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.

2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.

3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE CONNECTED TO THE PANELBOARDS SO THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/03/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

UNISON E WINDSOR WATERTANK
SITE ID: CTHA535A
50 PLANTATION RD
EAST WINDSOR, CT 06016

DATE: 04/05/21
SCALE: AS NOTED
JOB NO. 21022.15

ELECTRICAL SPECIFICATIONS

E-3

Sheet No. 11 of 11

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

132-ft Existing Watertank

Proposed T-Mobile
Antenna Upgrade

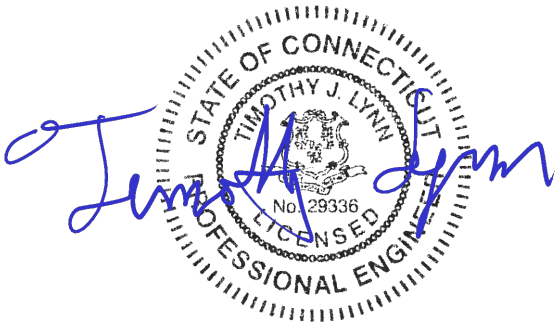
T-Mobile Site Ref: CTHA535A

65 Plantation Road
East Windsor, CT

CENTEK Project No. 21022.15

Date: August 2, 2021

Max Stress Ratio = 90%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

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

The host water tank is a 132-ft, 4-leg steel lattice water tower. Originally designed information was unavailable for use in this report. The tank geometry, structure member sizes and foundation information were all obtained from a previous structural analysis report prepared by All-Points Technology Corp. dated July 9, 2020.

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

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

Antenna and Appurtenance Summary

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

- VERIZON (EXISTING/RESERVED):
  Antennas: Six (6) Commscope NNHH-65B-R4 panel antennas, three (3) Samsung B5/B13 remote radio heads, three (3) Samsung B2/B66A remote radio heads and one (1) OVP box pipe mounted to the tower legs with RAD center elevations of 102'/94'-ft above grade level
  Coax Cables: One (1) 12x24 fiber cable running on a leg of the water tank.
- T-MOBILE (EXISTING TO REMOVE):
  Antennas: Three (3) RFS APXV18-206517S panel antennas, three (3) TMAs and three (3) diplexers pipe mounted on pipe masts to the water tank façade with a RAD center elevation of 120-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg of the water tank.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas, three (3) Ericsson 4460 remote radio units and three (3) Ericsson 4480 remote radio units mounted on pipe masts to the water tank façade with a RAD center elevation of 120-ft above grade level.
  Cables: Three (3) 6x24 fiber cables running on a leg of the water tank.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.
- **Previous reinforcements per the below listed structural analysis and modification report are assumed to be installed.**
  - **Structural report prepared by APT job no. CT141NB7760 dated July 9, 2020 must be installed.**

Analysis

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

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

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

Loading

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

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

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

Capacity

- Calculated stresses were found to be within allowable limits. This tank was found to be at **55.0%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Tank Leg (T3)	0.00'-37.00'	52.0%	**PASS**
Tank Diagonal (T3)	0.00'-37.00'	55.0%	**PASS**

Foundation

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

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

Location	Vector	Proposed Reactions
Base	Shear	70 kips
	Compression	87 kips
	Moment	5217 kip-ft

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

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	90%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS(1)	Proposed Loading (FS)(1)	Result
Reinforced Concrete Pier	Uplift	1.0	1.33	**PASS**

Note 1: FS denotes Factor of Safety.

Note 2: OTM denotes Overturning Moment

Conclusion

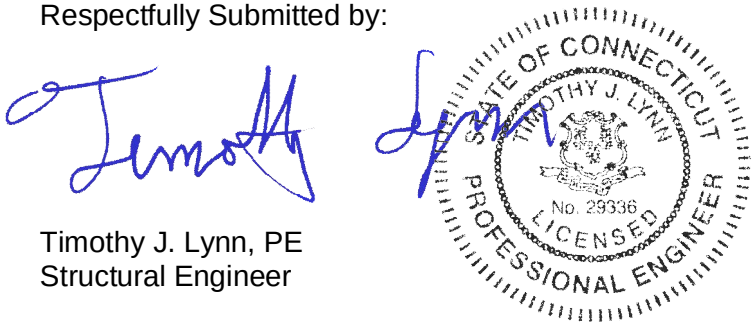
This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration with the below conditions.

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

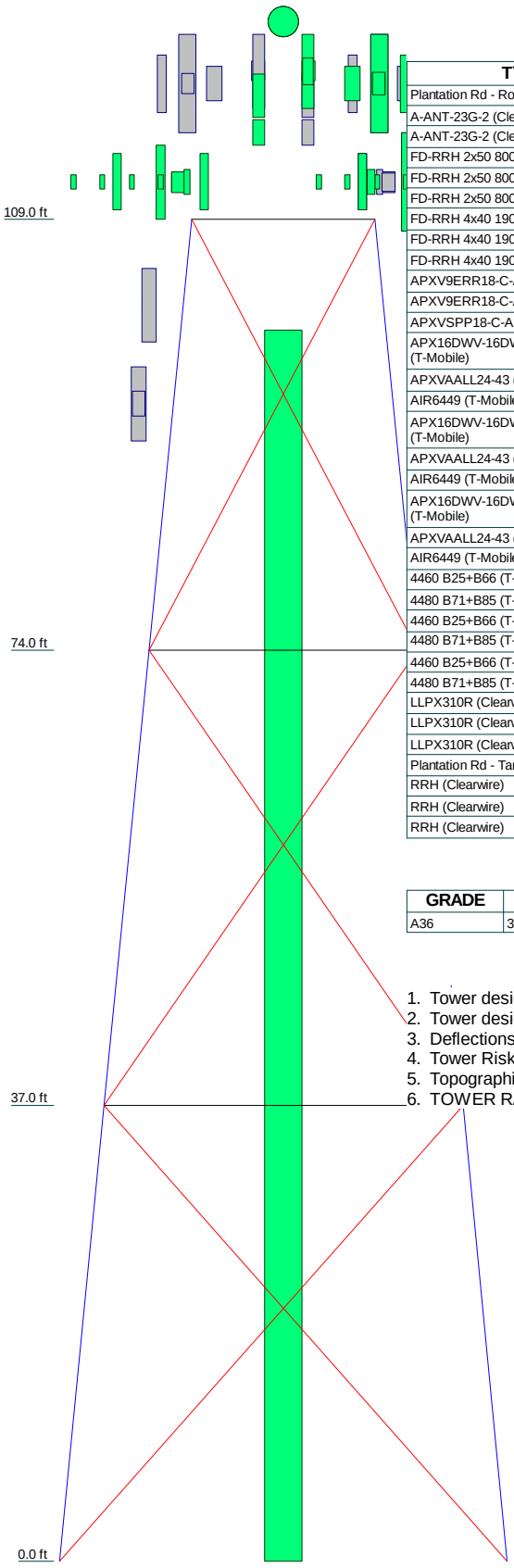
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

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

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



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Plantation Rd - Roof Cone	129	(2) 7770.00 (ATI)	112
A-ANT-23G-2 (Clearwire)	125	AM-X-CD-16-65-00T-RET(72") (ATI)	112
A-ANT-23G-2 (Clearwire)	125	(4) LGP21401 TMA (ATI)	112
FD-RRH 2x50 800 (Sprint)	121	(4) LGP21401 TMA (ATI)	112
FD-RRH 2x50 800 (Sprint)	121	(4) LGP21401 TMA (ATI)	112
FD-RRH 2x50 800 (Sprint)	121	RRUS-11 (ATI)	112
FD-RRH 4x40 1900 (Sprint)	121	RRUS-11 (ATI)	112
FD-RRH 4x40 1900 (Sprint)	121	RRUS-11 (ATI)	112
FD-RRH 4x40 1900 (Sprint)	121	RRUS-12 (ATI)	112
APXV9ERR18-C-A20 (Sprint)	121	RRUS-12 (ATI)	112
APXV9ERR18-C-A20 (Sprint)	121	RRUS-12 (ATI)	112
APXVSPP18-C-A20 (Sprint)	121	DC6-48-60-18-8F Surge Arrestor (ATI)	112
APX16DWV-16DWVS-E-A20 (T-Mobile)	120	DC6-48-60-18-8F Surge Arrestor (ATI)	112
		DC6-48-60-18-8F Surge Arrestor (ATI)	112
APXVAALL24-43 (T-Mobile)	120	P65-17-XLH-RR (ATI)	112
AIR6449 (T-Mobile)	120	(2) 7770.00 (ATI)	112
APX16DWV-16DWVS-E-A20 (T-Mobile)	120	(2) 7770.00 (ATI)	112
APXVAALL24-43 (T-Mobile)	120	P65-17-XLH-RR (ATI)	112
AIR6449 (T-Mobile)	120	Plantation Rd - Handrail	110.5
APX16DWV-16DWVS-E-A20 (T-Mobile)	120	Plantation Rd - Tank Bulb	104.5
		NNHH-65B-R4 (Verizon Reserved)	102
APXVAALL24-43 (T-Mobile)	120	NNHH-65B-R4 (Verizon Reserved)	102
AIR6449 (T-Mobile)	120	B5/B13 RRH (Verizon Reserved)	102
4460 B25+B66 (T-Mobile)	120	B5/B13 RRH (Verizon Reserved)	102
4480 B71+B85 (T-Mobile)	120	B5/B13 RRH (Verizon Reserved)	102
4460 B25+B66 (T-Mobile)	120	B2/B66A RRH (Verizon Reserved)	102
4480 B71+B85 (T-Mobile)	120	B2/B66A RRH (Verizon Reserved)	102
4460 B25+B66 (T-Mobile)	120	B2/B66A RRH (Verizon Reserved)	102
4480 B71+B85 (T-Mobile)	120	NNHH-65B-R4 (Verizon Reserved)	102
LLPX310R (Clearwire)	119	NNHH-65B-R4 (Verizon Reserved)	94
LLPX310R (Clearwire)	119	NNHH-65B-R4 (Verizon Reserved)	94
LLPX310R (Clearwire)	119	RVZDC-6627-PF-48 (Verizon Reserved)	94
Plantation Rd - Tank Cylinder	118	RVZDC-6627-PF-48 (Verizon Reserved)	94
RRH (Clearwire)	116		
RRH (Clearwire)	116	NNHH-65B-R4 (Verizon Reserved)	94
RRH (Clearwire)	116	Plantation Rd - Riser	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

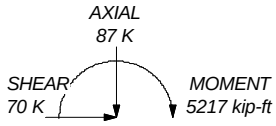
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-G Standard.
3. Deflections are based upon a 60 mph wind.
4. Tower Risk Category II.
5. Topographic Category 1 with Crest Height of 0.00 ft
6. TOWER RATING: 55%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 123 K
SHEAR: 18 K

UPLIFT: -85 K
SHEAR: 32 K



TORQUE 75 kip-ft
REACTIONS - 125 mph WIND

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

Job: 21022.15 - CTHA535A			
Project: 132' WaterTower - East Windsor, CT			
Client: T-Mobile	Drawn by: TJL		App'd:
Code: TIA-222-G	Date: 08/03/21		Scale: NTS
Path: J:\Jobs\2102200.WI\15_CTHA535A\05_Structural\Structural Analysis\Calcs\Water Tower.eri			Dwg No. E-1

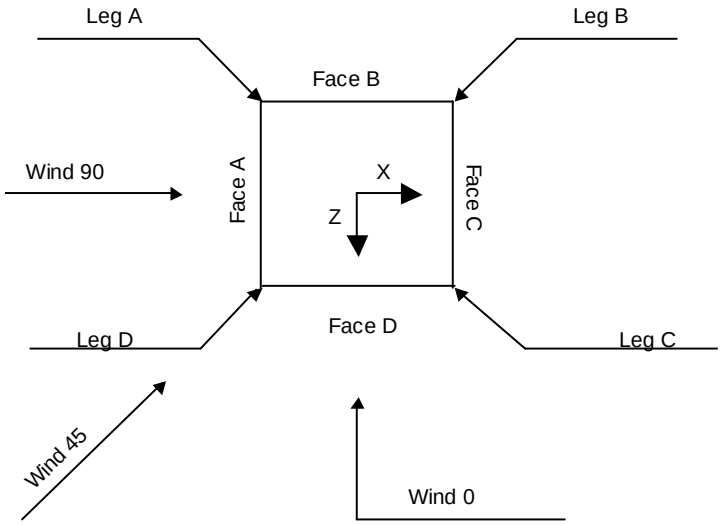
Tower Input Data

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

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

Options

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



Square Tower

Tower Section Geometry

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

Tower Section Geometry *(cont'd)*

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

Tower Section Geometry *(cont'd)*

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

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

Tower Section Geometry *(cont'd)*

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

Tower Section Geometry *(cont'd)*

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

Tower Section Geometry *(cont'd)*

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

Tower Section Geometry *(cont'd)*

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

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		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	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75
109.00-74.00														
T2 74.00-37.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 37.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
109.00-74.00														
T2 74.00-37.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 37.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	109.00-74.00	A	0.000	0.000	6.930	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	20.790	0.000	0.20
		D	0.000	0.000	105.280	0.000	0.75
T2	74.00-37.00	A	0.000	0.000	7.326	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	21.978	0.000	0.21
		D	0.000	0.000	111.296	0.000	0.80
T3	37.00-0.00	A	0.000	0.000	7.326	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	21.978	0.000	0.21
		D	0.000	0.000	111.296	0.000	0.80

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	109.00-74.00	-2.9443	16.3148	-2.9443	16.3148
T2	74.00-37.00	-3.8027	20.7259	-3.8027	20.7259
T3	37.00-0.00	-4.5934	24.7983	-4.5934	24.7983

Shielding Factor Ka

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

Discrete Tower Loads

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

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FD-RRH 4x40 1900 (Sprint)	C	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.24	2.32	0.06
FD-RRH 4x40 1900 (Sprint)	D	From Face	4.00 -2.00 0.00	0.0000	121.00	No Ice	2.24	2.32	0.06
LLPX310R (Clearwire)	B	From Face	4.00 2.00 0.00	0.0000	119.00	No Ice	4.30	1.95	0.03
LLPX310R (Clearwire)	C	From Face	4.00 2.00 0.00	0.0000	119.00	No Ice	4.30	1.95	0.03
LLPX310R (Clearwire)	D	From Face	4.00 2.00 0.00	0.0000	119.00	No Ice	4.30	1.95	0.03
RRH (Clearwire)	B	From Face	4.00 2.00 0.00	0.0000	116.00	No Ice	2.50	1.89	0.05
RRH (Clearwire)	C	From Face	4.00 2.00 0.00	0.0000	116.00	No Ice	2.50	1.89	0.05
RRH (Clearwire)	D	From Face	4.00 2.00 0.00	0.0000	116.00	No Ice	2.50	1.89	0.05
APX16DWV-16DWVS-E-A20 (T-Mobile)	A	From Leg	2.00 -3.00 0.00	0.0000	120.00	No Ice	6.46	2.15	0.04
APXVAALL24-43 (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	A	From Leg	2.00 3.00 0.00	0.0000	120.00	No Ice	5.65	2.42	0.10
APX16DWV-16DWVS-E-A20 (T-Mobile)	B	From Leg	2.00 -3.00 0.00	0.0000	120.00	No Ice	6.46	2.15	0.04
APXVAALL24-43 (T-Mobile)	B	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	B	From Leg	2.00 3.00 0.00	0.0000	120.00	No Ice	5.65	2.42	0.10
APX16DWV-16DWVS-E-A20 (T-Mobile)	C	From Leg	2.00 -3.00 0.00	0.0000	120.00	No Ice	6.46	2.15	0.04
APXVAALL24-43 (T-Mobile)	C	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	20.24	8.89	0.15
AIR6449 (T-Mobile)	C	From Leg	2.00 3.00 0.00	0.0000	120.00	No Ice	5.65	2.42	0.10
4460 B25+B66 (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.56	1.98	0.11
4480 B71+B85 (T-Mobile)	A	From Leg	2.00 0.00 0.00	0.0000	120.00	No Ice	2.85	1.38	0.08

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

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DC6-48-60-18-8F Surge Arrestor (AT&T)	B	From Leg	0.50 0.50 0.00	0.0000	112.00	No Ice	1.91	1.91	0.02
DC6-48-60-18-8F Surge Arrestor (AT&T)	C	From Leg	0.50 0.50 0.00	0.0000	112.00	No Ice	1.91	1.91	0.02
DC6-48-60-18-8F Surge Arrestor (AT&T)	D	From Leg	0.50 0.50 0.00	0.0000	112.00	No Ice	1.91	1.91	0.02
Plantation Rd - Roof Cone	B	None		0.0000	129.00	No Ice	41.00	41.00	5.20
Plantation Rd - Tank Cylinder	B	None		0.0000	118.00	No Ice	205.00	205.00	11.80
Plantation Rd - Tank Bulb	B	None		0.0000	104.50	No Ice	71.00	71.00	7.80
Plantation Rd - Handrail	B	None		0.0000	110.50	No Ice	8.00	8.00	2.00
Plantation Rd - Riser	B	None		0.0000	50.00	No Ice	180.00	180.00	9.60
NNHH-65B-R4 (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	12.27	5.75	0.07
NNHH-65B-R4 (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	12.27	5.75	0.07
NNHH-65B-R4 (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	12.27	5.75	0.07
B5/B13 RRH (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	1.87	1.02	0.07
B5/B13 RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	1.87	1.02	0.07
B5/B13 RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	1.87	1.02	0.07
B2/B66A RRH (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	2.54	1.61	0.06
B2/B66A RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	2.54	1.61	0.06
B2/B66A RRH (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	102.00	No Ice	2.54	1.61	0.06
NNHH-65B-R4 (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	12.27	5.75	0.07
NNHH-65B-R4 (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	12.27	5.75	0.07
NNHH-65B-R4 (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	12.27	5.75	0.07
RVZDC-6627-PF-48 (Verizon Reserved)	A	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	3.25	2.15	0.03
RVZDC-6627-PF-48 (Verizon Reserved)	C	From Leg	4.00 0.00 0.00	0.0000	94.00	No Ice	3.25	2.15	0.03

Dishes

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

Tower Pressures - No Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 109.00-74.00	91.50	1.242	42	676.021	A	91.492	8.518	82.461	82.45	6.930	0.000
					B	91.492	8.518		82.45	0.000	0.000
					C	91.492	8.518		82.45	20.790	0.000
					D	91.492	8.518		82.45	105.280	0.000
T2 74.00-37.00	55.50	1.118	38	978.091	A	100.772	10.750	87.174	78.17	7.326	0.000
					B	100.772	10.750		78.17	0.000	0.000
					C	100.772	10.750		78.17	21.978	0.000
					D	100.772	10.750		78.17	111.296	0.000
T3 37.00-0.00	18.50	0.887	30	1248.93 1	A	105.999	11.948	87.174	73.91	7.326	0.000
					B	105.999	11.948		73.91	0.000	0.000
					C	105.999	11.948		73.91	21.978	0.000
					D	105.999	11.948		73.91	111.296	0.000

Tower Pressure - Service

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 109.00-74.00	91.50	1.242	10	676.021	A	91.492	8.518	82.461	82.45	6.930	0.000
					B	91.492	8.518		82.45	0.000	0.000
					C	91.492	8.518		82.45	20.790	0.000
					D	91.492	8.518		82.45	105.280	0.000
T2 74.00-37.00	55.50	1.118	9	978.091	A	100.772	10.750	87.174	78.17	7.326	0.000
					B	100.772	10.750		78.17	0.000	0.000
					C	100.772	10.750		78.17	21.978	0.000
					D	100.772	10.750		78.17	111.296	0.000
T3 37.00-0.00	18.50	0.887	7	1248.93	A	105.999	11.948	87.174	73.91	7.326	0.000

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

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.02	8.39	A	0.148	3.215	42	1	1	96.324	13.98	399.45	D
109.00-74.00			B	0.148	3.215		1	1	96.324			
			C	0.148	3.215		1	1	96.324			
			D	0.148	3.215		1	1	96.324			
T2	1.08	9.73	A	0.114	3.379	38	1	1	106.844	14.39	388.99	D
74.00-37.00			B	0.114	3.379		1	1	106.844			
			C	0.114	3.379		1	1	106.844			
			D	0.114	3.379		1	1	106.844			
T3 37.00-0.00	1.08	10.62	A	0.094	3.478	30	1	1	112.741	12.22	330.22	D
			B	0.094	3.478		1	1	112.741			
			C	0.094	3.478		1	1	112.741			
			D	0.094	3.478		1	1	112.741			
Sum Weight:	3.18	28.74						OTM	2304.07 kip-ft	40.59		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.02	8.39	A	0.148	3.215	42	1.111	1.111	107.012	15.21	434.69	D
109.00-74.00			B	0.148	3.215		1.111	1.111	107.012			
			C	0.148	3.215		1.111	1.111	107.012			
			D	0.148	3.215		1.111	1.111	107.012			
T2	1.08	9.73	A	0.114	3.379	38	1.086	1.086	115.981	15.39	415.95	D
74.00-37.00			B	0.114	3.379		1.086	1.086	115.981			
			C	0.114	3.379		1.086	1.086	115.981			
			D	0.114	3.379		1.086	1.086	115.981			
T3 37.00-0.00	1.08	10.62	A	0.094	3.478	30	1.071	1.071	120.726	12.93	349.47	D
			B	0.094	3.478		1.071	1.071	120.726			
			C	0.094	3.478		1.071	1.071	120.726			
			D	0.094	3.478		1.071	1.071	120.726			
Sum Weight:	3.18	28.74						OTM	2485.47 kip-ft	43.53		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.02	8.39	A	0.148	3.215	10	1	1	96.324	3.22	92.03	D
109.00-74.00			B	0.148	3.215		1	1	96.324			
			C	0.148	3.215		1	1	96.324			
			D	0.148	3.215		1	1	96.324			
T2	1.08	9.73	A	0.114	3.379	9	1	1	106.844	3.32	89.62	D
74.00-37.00			B	0.114	3.379		1	1	106.844			
			C	0.114	3.379		1	1	106.844			
			D	0.114	3.379		1	1	106.844			
T3 37.00-0.00	1.08	10.62	A	0.094	3.478	7	1	1	112.741	2.82	76.08	D
			B	0.094	3.478		1	1	112.741			
			C	0.094	3.478		1	1	112.741			
			D	0.094	3.478		1	1	112.741			
Sum Weight:	3.18	28.74						OTM	530.86 kip-ft	9.35		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	1.02	8.39	A	0.148	3.215	10	1.111	1.111	107.012	3.51	100.15	D
109.00-74.00			B	0.148	3.215		1.111	1.111	107.012			
			C	0.148	3.215		1.111	1.111	107.012			
			D	0.148	3.215		1.111	1.111	107.012			
T2	1.08	9.73	A	0.114	3.379	9	1.086	1.086	115.981	3.55	95.83	D
74.00-37.00			B	0.114	3.379		1.086	1.086	115.981			
			C	0.114	3.379		1.086	1.086	115.981			
			D	0.114	3.379		1.086	1.086	115.981			
T3 37.00-0.00	1.08	10.62	A	0.094	3.478	7	1.071	1.071	120.726	2.98	80.52	D
			B	0.094	3.478		1.071	1.071	120.726			
			C	0.094	3.478		1.071	1.071	120.726			
			D	0.094	3.478		1.071	1.071	120.726			
Sum Weight:	3.18	28.74						OTM	572.65 kip-ft	10.03		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	18.12					
Bracing Weight	10.62					
Total Member Self-Weight	28.74			28.25	-22.32	
Total Weight	72.52			28.25	-22.32	

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 0 deg - No Ice		-0.71	-66.60	-4893.77	50.08	6.18
Wind 30 deg - No Ice		34.07	-59.87	-4355.25	-2500.88	42.73
Wind 45 deg - No Ice		48.55	-48.67	-3529.22	-3565.01	57.23
Wind 60 deg - No Ice		59.72	-34.16	-2460.77	-4387.72	67.83
Wind 90 deg - No Ice		66.43	0.71	100.64	-4923.44	74.75
Wind 120 deg - No Ice		60.44	35.39	2642.65	-4460.11	61.65
Wind 135 deg - No Ice		49.56	49.68	3688.10	-3667.39	48.49
Wind 150 deg - No Ice		35.30	60.59	4484.13	-2626.27	32.03
Wind 180 deg - No Ice		0.71	66.60	4950.26	-94.71	-6.18
Wind 210 deg - No Ice		-34.07	59.87	4411.74	2456.25	-42.73
Wind 225 deg - No Ice		-48.55	48.67	3585.72	3520.38	-57.23
Wind 240 deg - No Ice		-59.72	34.16	2517.26	4343.08	-67.83
Wind 270 deg - No Ice		-66.43	-0.71	-44.15	4878.81	-74.75
Wind 300 deg - No Ice		-60.44	-35.39	-2586.16	4415.47	-61.65
Wind 315 deg - No Ice		-49.56	-49.68	-3631.60	3622.76	-48.49
Wind 330 deg - No Ice		-35.30	-60.59	-4427.64	2581.64	-32.03
Total Weight	72.52			28.25	-22.32	
Wind 0 deg - Service		-0.16	-15.35	-1131.77	2.82	1.42
Wind 30 deg - Service		7.85	-13.80	-1007.69	-584.92	9.84
Wind 45 deg - Service		11.19	-11.21	-817.38	-830.10	13.18
Wind 60 deg - Service		13.76	-7.87	-571.20	-1019.65	15.63
Wind 90 deg - Service		15.31	0.16	18.95	-1143.08	17.22
Wind 120 deg - Service		13.92	8.15	604.62	-1036.33	14.20
Wind 135 deg - Service		11.42	11.45	845.50	-853.68	11.17
Wind 150 deg - Service		8.13	13.96	1028.90	-613.81	7.38
Wind 180 deg - Service		0.16	15.35	1136.30	-30.54	-1.42
Wind 210 deg - Service		-7.85	13.80	1012.22	557.20	-9.84
Wind 225 deg - Service		-11.19	11.21	821.91	802.38	-13.18
Wind 240 deg - Service		-13.76	7.87	575.74	991.93	-15.63
Wind 270 deg - Service		-15.31	-0.16	-14.41	1115.36	-17.22
Wind 300 deg - Service		-13.92	-8.15	-600.09	1008.61	-14.20
Wind 315 deg - Service		-11.42	-11.45	-840.96	825.97	-11.17
Wind 330 deg - Service		-8.13	-13.96	-1024.37	586.09	-7.38

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 45 deg - No Ice
7	0.9 Dead+1.0 Wind 45 deg - No Ice
8	1.2 Dead+1.0 Wind 60 deg - No Ice
9	0.9 Dead+1.0 Wind 60 deg - No Ice
10	1.2 Dead+1.0 Wind 90 deg - No Ice
11	0.9 Dead+1.0 Wind 90 deg - No Ice
12	1.2 Dead+1.0 Wind 120 deg - No Ice
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice
15	0.9 Dead+1.0 Wind 135 deg - No Ice
16	1.2 Dead+1.0 Wind 150 deg - No Ice
17	0.9 Dead+1.0 Wind 150 deg - No Ice
18	1.2 Dead+1.0 Wind 180 deg - No Ice

Comb. No.	Description
19	0.9 Dead+1.0 Wind 180 deg - No Ice
20	1.2 Dead+1.0 Wind 210 deg - No Ice
21	0.9 Dead+1.0 Wind 210 deg - No Ice
22	1.2 Dead+1.0 Wind 225 deg - No Ice
23	0.9 Dead+1.0 Wind 225 deg - No Ice
24	1.2 Dead+1.0 Wind 240 deg - No Ice
25	0.9 Dead+1.0 Wind 240 deg - No Ice
26	1.2 Dead+1.0 Wind 270 deg - No Ice
27	0.9 Dead+1.0 Wind 270 deg - No Ice
28	1.2 Dead+1.0 Wind 300 deg - No Ice
29	0.9 Dead+1.0 Wind 300 deg - No Ice
30	1.2 Dead+1.0 Wind 315 deg - No Ice
31	0.9 Dead+1.0 Wind 315 deg - No Ice
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	Dead+Wind 0 deg - Service
35	Dead+Wind 30 deg - Service
36	Dead+Wind 45 deg - Service
37	Dead+Wind 60 deg - Service
38	Dead+Wind 90 deg - Service
39	Dead+Wind 120 deg - Service
40	Dead+Wind 135 deg - Service
41	Dead+Wind 150 deg - Service
42	Dead+Wind 180 deg - Service
43	Dead+Wind 210 deg - Service
44	Dead+Wind 225 deg - Service
45	Dead+Wind 240 deg - Service
46	Dead+Wind 270 deg - Service
47	Dead+Wind 300 deg - Service
48	Dead+Wind 315 deg - Service
49	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	109 - 74	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-47.45	11.63	-0.96
			Max. Mx	30	-5.04	-16.89	0.98
			Max. My	15	-22.04	-1.53	-15.34
			Max. Vy	30	-6.12	-0.00	0.00
			Max. Vx	6	-6.02	-0.00	0.00
		Diagonal	Max Tension	2	21.95	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-7.03	0.00	0.00
			Max. Mx	6	-4.92	0.54	0.00
			Max. My	26	-6.89	0.00	-0.05
			Max. Vy	6	-0.14	0.00	0.00
			Max. Vx	26	0.01	0.00	0.00
T2	74 - 37	Leg	Max Tension	15	24.94	-16.03	-0.98
			Max. Compression	14	-86.87	9.57	-0.89
			Max. Mx	30	20.46	-16.89	0.98
			Max. My	15	-26.86	-1.53	-15.34
			Max. Vy	6	2.48	-13.94	-0.56
			Max. Vx	30	-2.24	-1.80	12.70
		Diagonal	Max Tension	26	28.21	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-13.61	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-10.86	1.15	0.00
			Max. My	10	-0.86	0.00	-0.11
			Max. Vy	8	-0.21	0.00	0.00
			Max. Vx	10	0.02	0.00	0.00
T3	37 - 0	Leg	Max Tension	15	53.46	-13.13	-0.90
			Max. Compression	14	-123.92	0.00	0.00
			Max. Mx	6	45.77	-13.94	-0.56
			Max. My	15	-32.18	-1.28	-12.71
			Max. Vy	30	-1.50	-13.84	0.90
			Max. Vx	14	-1.45	-1.80	-12.71
		Diagonal	Max Tension	26	31.51	0.00	0.00
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.88	0.00	0.00
			Max. Mx	32	-9.64	2.26	0.00
			Max. My	10	-16.95	0.00	-0.22
			Max. Vy	32	-0.31	0.00	0.00
			Max. Vx	10	0.03	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	22	119.63	12.56	-12.48
	Max. H_x	22	119.63	12.56	-12.48
	Max. H_z	5	-77.88	-18.01	24.29
	Min. Vert	7	-81.14	-22.62	21.26
	Min. H_x	9	-77.77	-25.58	16.68
	Min. H_z	22	119.63	12.56	-12.48
Leg C	Max. Vert	14	123.19	-12.93	-12.81
	Max. H_x	29	-79.94	25.96	17.28
	Max. H_z	33	-80.04	18.43	24.84
	Min. Vert	31	-83.41	23.04	21.86
	Min. H_x	14	123.19	-12.93	-12.81
	Min. H_z	14	123.19	-12.93	-12.81
Leg B	Max. Vert	6	119.44	-12.48	12.56
	Max. H_x	25	-77.92	23.94	-18.32
	Max. H_z	6	119.44	-12.48	12.56
	Min. Vert	23	-81.29	21.24	-22.64
	Min. H_x	6	119.44	-12.48	12.56
	Min. H_z	21	-78.02	16.99	-25.30
Leg A	Max. Vert	30	121.52	12.67	12.79
	Max. H_x	30	121.52	12.67	12.79
	Max. H_z	30	121.52	12.67	12.79
	Min. Vert	15	-84.65	-21.83	-23.06
	Min. H_x	13	-81.18	-24.41	-18.82
	Min. H_z	17	-81.29	-17.66	-25.61

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	72.52	0.00	0.00	28.24	-22.26	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	87.03	-0.71	-66.60	-4896.50	46.16	5.91
0.9 Dead+1.0 Wind 0 deg - No Ice	65.27	-0.71	-66.60	-4903.08	52.80	5.88
1.2 Dead+1.0 Wind 30 deg - No Ice	87.03	34.07	-59.87	-4357.17	-2509.55	42.64
0.9 Dead+1.0 Wind 30 deg - No Ice	65.27	34.07	-59.87	-4363.94	-2501.95	42.67
1.2 Dead+1.0 Wind 45 deg - No Ice	87.03	48.55	-48.67	-3529.80	-3575.49	57.18
0.9 Dead+1.0 Wind 45 deg - No Ice	65.27	48.55	-48.67	-3536.90	-3567.46	57.18
1.2 Dead+1.0 Wind 60 deg - No Ice	87.03	59.72	-34.16	-2459.55	-4399.59	67.85
0.9 Dead+1.0 Wind 60 deg - No Ice	65.27	59.72	-34.16	-2467.10	-4391.21	67.83
1.2 Dead+1.0 Wind 90 deg - No Ice	87.03	66.43	0.71	105.93	-4936.17	74.52
0.9 Dead+1.0 Wind 90 deg - No Ice	65.27	66.43	0.71	97.49	-4927.62	74.48
1.2 Dead+1.0 Wind 120 deg - No Ice	87.03	60.44	35.39	2652.84	-4472.13	61.67
0.9 Dead+1.0 Wind 120 deg - No Ice	65.27	60.44	35.39	2643.38	-4463.73	61.69
1.2 Dead+1.0 Wind 135 deg - No Ice	87.03	49.56	49.68	3700.07	-3678.09	48.55
0.9 Dead+1.0 Wind 135 deg - No Ice	65.27	49.56	49.68	3690.18	-3670.01	48.55
1.2 Dead+1.0 Wind 150 deg - No Ice	87.03	35.30	60.59	4497.44	-2635.20	32.12
0.9 Dead+1.0 Wind 150 deg - No Ice	65.27	35.30	60.59	4487.23	-2627.55	32.10
1.2 Dead+1.0 Wind 180 deg - No Ice	87.03	0.71	66.60	4964.23	-98.79	-5.88
0.9 Dead+1.0 Wind 180 deg - No Ice	65.27	0.71	66.60	4953.91	-92.12	-5.85
1.2 Dead+1.0 Wind 210 deg - No Ice	87.03	-34.07	59.87	4424.89	2456.27	-42.70
0.9 Dead+1.0 Wind 210 deg - No Ice	65.27	-34.07	59.87	4414.71	2462.03	-42.67
1.2 Dead+1.0 Wind 225 deg - No Ice	87.03	-48.55	48.67	3597.47	3522.19	-57.18
0.9 Dead+1.0 Wind 225 deg - No Ice	65.27	-48.55	48.67	3587.63	3527.50	-57.18
1.2 Dead+1.0 Wind 240 deg - No Ice	87.03	-59.72	34.16	2527.19	4346.23	-67.77
0.9 Dead+1.0 Wind 240 deg - No Ice	65.27	-59.72	34.16	2517.79	4351.21	-67.80
1.2 Dead+1.0 Wind 270 deg - No Ice	87.03	-66.43	-0.71	-38.96	4882.77	-74.54
0.9 Dead+1.0 Wind 270 deg - No Ice	65.27	-66.43	-0.71	-47.40	4887.56	-74.51
1.2 Dead+1.0 Wind 300 deg - No Ice	87.03	-60.44	-35.39	-2585.04	4418.71	-61.72
0.9 Dead+1.0 Wind 300 deg - No Ice	65.27	-60.44	-35.39	-2592.55	4423.65	-61.69
1.2 Dead+1.0 Wind 315 deg - No Ice	87.03	-49.56	-49.68	-3632.25	3624.67	-48.55
0.9 Dead+1.0 Wind 315 deg - No Ice	65.27	-49.56	-49.68	-3639.32	3629.93	-48.55

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 330 deg - No Ice	87.03	-35.30	-60.59	-4429.61	2581.79	-32.07
0.9 Dead+1.0 Wind 330 deg - No Ice	65.27	-35.30	-60.59	-4436.36	2587.49	-32.09
Dead+Wind 0 deg - Service	72.52	-0.16	-15.35	-1107.23	-5.57	1.39
Dead+Wind 30 deg - Service	72.52	7.85	-13.79	-983.01	-593.99	9.82
Dead+Wind 45 deg - Service	72.52	11.19	-11.21	-792.42	-839.50	13.18
Dead+Wind 60 deg - Service	72.52	13.76	-7.87	-545.91	-1029.33	15.63
Dead+Wind 90 deg - Service	72.52	15.31	0.16	44.93	-1152.91	17.19
Dead+Wind 120 deg - Service	72.52	13.92	8.15	631.30	-1046.02	14.20
Dead+Wind 135 deg - Service	72.52	11.42	11.45	872.52	-863.12	11.19
Dead+Wind 150 deg - Service	72.52	8.13	13.96	1056.19	-622.91	7.41
Dead+Wind 180 deg - Service	72.52	0.16	15.35	1163.71	-38.95	-1.39
Dead+Wind 210 deg - Service	72.52	-7.85	13.79	1039.49	549.48	-9.85
Dead+Wind 225 deg - Service	72.52	-11.19	11.21	848.90	794.99	-13.19
Dead+Wind 240 deg - Service	72.52	-13.76	7.87	602.38	984.82	-15.61
Dead+Wind 270 deg - Service	72.52	-15.31	-0.16	11.55	1108.41	-17.19
Dead+Wind 300 deg - Service	72.52	-13.92	-8.15	-574.81	1001.53	-14.23
Dead+Wind 315 deg - Service	72.52	-11.42	-11.45	-816.02	818.61	-11.18
Dead+Wind 330 deg - Service	72.52	-8.13	-13.96	-999.70	578.39	-7.39

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-72.52	0.00	0.00	72.52	0.00	0.000%
2	-0.71	-87.03	-66.60	0.71	87.03	66.60	0.000%
3	-0.71	-65.27	-66.60	0.71	65.27	66.60	0.000%
4	34.07	-87.03	-59.87	-34.07	87.03	59.87	0.000%
5	34.07	-65.27	-59.87	-34.07	65.27	59.87	0.000%
6	48.55	-87.03	-48.67	-48.55	87.03	48.67	0.000%
7	48.55	-65.27	-48.67	-48.55	65.27	48.67	0.000%
8	59.72	-87.03	-34.16	-59.72	87.03	34.16	0.000%
9	59.72	-65.27	-34.16	-59.72	65.27	34.16	0.000%
10	66.43	-87.03	0.71	-66.43	87.03	-0.71	0.001%
11	66.43	-65.27	0.71	-66.43	65.27	-0.71	0.000%
12	60.44	-87.03	35.39	-60.44	87.03	-35.39	0.000%
13	60.44	-65.27	35.39	-60.44	65.27	-35.39	0.000%
14	49.56	-87.03	49.68	-49.56	87.03	-49.68	0.000%
15	49.56	-65.27	49.68	-49.56	65.27	-49.68	0.000%
16	35.30	-87.03	60.59	-35.30	87.03	-60.59	0.000%
17	35.30	-65.27	60.59	-35.30	65.27	-60.59	0.000%
18	0.71	-87.03	66.60	-0.71	87.03	-66.60	0.001%
19	0.71	-65.27	66.60	-0.71	65.27	-66.60	0.000%
20	-34.07	-87.03	59.87	34.07	87.03	-59.87	0.000%
21	-34.07	-65.27	59.87	34.07	65.27	-59.87	0.000%
22	-48.55	-87.03	48.67	48.55	87.03	-48.67	0.000%
23	-48.55	-65.27	48.67	48.55	65.27	-48.67	0.000%
24	-59.72	-87.03	34.16	59.72	87.03	-34.16	0.000%
25	-59.72	-65.27	34.16	59.72	65.27	-34.16	0.000%
26	-66.43	-87.03	-0.71	66.43	87.03	0.71	0.000%
27	-66.43	-65.27	-0.71	66.43	65.27	0.71	0.000%
28	-60.44	-87.03	-35.39	60.44	87.03	35.39	0.000%
29	-60.44	-65.27	-35.39	60.44	65.27	35.39	0.000%
30	-49.56	-87.03	-49.68	49.56	87.03	49.68	0.000%
31	-49.56	-65.27	-49.68	49.56	65.27	49.68	0.000%
32	-35.30	-87.03	-60.59	35.30	87.03	60.59	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
33	-35.30	-65.27	-60.59	35.30	65.27	60.59	0.000%
34	-0.16	-72.52	-15.35	0.16	72.52	15.35	0.000%
35	7.85	-72.52	-13.80	-7.85	72.52	13.79	0.000%
36	11.19	-72.52	-11.21	-11.19	72.52	11.21	0.000%
37	13.76	-72.52	-7.87	-13.76	72.52	7.87	0.000%
38	15.31	-72.52	0.16	-15.31	72.52	-0.16	0.000%
39	13.92	-72.52	8.15	-13.92	72.52	-8.15	0.000%
40	11.42	-72.52	11.45	-11.42	72.52	-11.45	0.000%
41	8.13	-72.52	13.96	-8.13	72.52	-13.96	0.000%
42	0.16	-72.52	15.35	-0.16	72.52	-15.35	0.000%
43	-7.85	-72.52	13.80	7.85	72.52	-13.79	0.000%
44	-11.19	-72.52	11.21	11.19	72.52	-11.21	0.000%
45	-13.76	-72.52	7.87	13.76	72.52	-7.87	0.000%
46	-15.31	-72.52	-0.16	15.31	72.52	0.16	0.000%
47	-13.92	-72.52	-8.15	13.92	72.52	8.15	0.000%
48	-11.42	-72.52	-11.45	11.42	72.52	11.45	0.000%
49	-8.13	-72.52	-13.96	8.13	72.52	13.96	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00041779
3	Yes	5	0.00000001	0.00039291
4	Yes	4	0.00000001	0.00025905
5	Yes	4	0.00000001	0.00026720
6	Yes	4	0.00000001	0.00026397
7	Yes	4	0.00000001	0.00027238
8	Yes	4	0.00000001	0.00026002
9	Yes	4	0.00000001	0.00026838
10	Yes	5	0.00000001	0.00064858
11	Yes	6	0.00000001	0.00015773
12	Yes	4	0.00000001	0.00026135
13	Yes	4	0.00000001	0.00026917
14	Yes	4	0.00000001	0.00026644
15	Yes	4	0.00000001	0.00027421
16	Yes	4	0.00000001	0.00026323
17	Yes	4	0.00000001	0.00027081
18	Yes	4	0.00000001	0.00049213
19	Yes	6	0.00000001	0.00020135
20	Yes	4	0.00000001	0.00025941
21	Yes	4	0.00000001	0.00026787
22	Yes	4	0.00000001	0.00026352
23	Yes	4	0.00000001	0.00027205
24	Yes	4	0.00000001	0.00025814
25	Yes	4	0.00000001	0.00026649
26	Yes	6	0.00000001	0.00004120
27	Yes	6	0.00000001	0.00003905
28	Yes	4	0.00000001	0.00026507
29	Yes	4	0.00000001	0.00027272
30	Yes	4	0.00000001	0.00026689
31	Yes	4	0.00000001	0.00027480
32	Yes	4	0.00000001	0.00026318
33	Yes	4	0.00000001	0.00027100
34	Yes	4	0.00000001	0.00007003

35	Yes	4	0.00000001	0.00008287
36	Yes	4	0.00000001	0.00008891
37	Yes	4	0.00000001	0.00008599
38	Yes	4	0.00000001	0.00006580
39	Yes	4	0.00000001	0.00008895
40	Yes	4	0.00000001	0.00009636
41	Yes	4	0.00000001	0.00008922
42	Yes	4	0.00000001	0.00006638
43	Yes	4	0.00000001	0.00008690
44	Yes	4	0.00000001	0.00009547
45	Yes	4	0.00000001	0.00009806
46	Yes	4	0.00000001	0.00007129
47	Yes	4	0.00000001	0.00008932
48	Yes	4	0.00000001	0.00010837
49	Yes	4	0.00000001	0.00009441

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
T1	109 - 74	0.319	41	0.0039	0.0076
T2	74 - 37	0.234	47	0.0040	0.0059
T3	37 - 0	0.119	49	0.0026	0.0028

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
129.00	Plantation Rd - Roof Cone	41	0.319	0.0039	0.0076	Inf
125.00	A-ANT-23G-2	41	0.319	0.0039	0.0076	Inf
121.00	APXV9ERR18-C-A20	41	0.319	0.0039	0.0076	Inf
120.00	APX16DWV-16DWVS-E-A20	41	0.319	0.0039	0.0076	Inf
119.00	LLPX310R	41	0.319	0.0039	0.0076	Inf
118.00	Plantation Rd - Tank Cylinder	41	0.319	0.0039	0.0076	Inf
116.00	RRH	41	0.319	0.0039	0.0076	Inf
112.00	(2) 7770.00	41	0.319	0.0039	0.0076	Inf
110.50	Plantation Rd - Handrail	41	0.319	0.0039	0.0076	Inf
104.50	Plantation Rd - Tank Bulb	41	0.309	0.0039	0.0074	Inf
102.00	NNHH-65B-R4	41	0.303	0.0040	0.0073	Inf
94.00	NNHH-65B-R4	47	0.284	0.0040	0.0070	858251
50.00	Plantation Rd - Riser	47	0.161	0.0033	0.0040	Inf

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
T1	109 - 74	1.684	31	0.0216	0.0465
T2	74 - 37	1.204	31	0.0110	0.0286

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T3	37 - 0	0.605	31	0.0082	0.0133

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
129.00	Plantation Rd - Roof Cone	31	1.684	0.0216	0.0465	745537
125.00	A-ANT-23G-2	31	1.684	0.0216	0.0465	745537
121.00	APXV9ERR18-C-A20	31	1.684	0.0216	0.0465	745537
120.00	APX16DWV-16DWVS-E-A20	31	1.684	0.0216	0.0465	745537
119.00	LLPX310R	31	1.684	0.0216	0.0465	745537
118.00	Plantation Rd - Tank Cylinder	31	1.684	0.0216	0.0465	745537
116.00	RRH	31	1.684	0.0216	0.0465	745537
112.00	(2) 7770.00	31	1.684	0.0216	0.0465	745537
110.50	Plantation Rd - Handrail	31	1.684	0.0216	0.0465	745537
104.50	Plantation Rd - Tank Bulb	31	1.625	0.0199	0.0442	745537
102.00	NNHH-65B-R4	31	1.592	0.0189	0.0428	532522
94.00	NNHH-65B-R4	31	1.486	0.0159	0.0387	248510
50.00	Plantation Rd - Riser	31	0.821	0.0093	0.0186	382176

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	109 - 74	Plantation Rd Leg	35.34	35.34	91.9 K=1.00	12.0950	-47.45	251.15	0.189 [1] ✔
T2	74 - 37	Plantation Rd Leg	37.36	37.36	97.2 K=1.00	12.0950	-86.87	238.35	0.364 [1] ✔
T3	37 - 0	Plantation Rd Leg	37.36	37.36	97.2 K=1.00	12.0950	-123.92	238.35	0.520 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	109 - 74	Plantation Road Upper Girt	14.85	13.68	96.6 K=1.00	4.7800	-7.03	94.72	0.074 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	Plantation Road Upper Girt	21.77	20.60	145.5 K=1.00	4.7800	-13.61	51.00	0.267 [1] ✔
T3	37 - 0	Plantation Road Lower Girt	29.09	27.92	164.2 K=1.00	5.2600	-18.88	44.06	0.428 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	Plantation Rd Leg	37.36	37.36	97.2	12.0950	24.94	391.88	0.064 [1] ✔
T3	37 - 0	Plantation Rd Leg	37.36	37.36	97.2	12.0950	53.46	391.88	0.136 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	109 - 74	1 3/8	39.65	37.17	1297.5	1.4849	21.95	48.11	0.456 [1] ✔
T2	74 - 37	1 1/2	45.05	43.00	1376.0	1.7672	28.21	57.26	0.493 [1] ✔
T3	37 - 0	1 1/2	49.55	47.79	1529.4	1.7672	31.51	57.26	0.550 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	74 - 37	Plantation Road Upper Girt	21.77	20.60	145.5	4.7800	1.31	154.87	0.008 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	37 - 0	Plantation Road Lower Girt	29.09	27.92	164.2	5.2600	1.87	170.42	0.011 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	109 - 74	Leg	Plantation Rd Leg	2	-47.45	251.15	18.9	Pass
T2	74 - 37	Leg	Plantation Rd Leg	18	-86.87	238.35	36.4	Pass
T3	37 - 0	Leg	Plantation Rd Leg	34	-123.92	238.35	52.0	Pass
T1	109 - 74	Diagonal	1 3/8	11	21.95	48.11	45.6	Pass
T2	74 - 37	Diagonal	1 1/2	26	28.21	57.26	49.3	Pass
T3	37 - 0	Diagonal	1 1/2	42	31.51	57.26	55.0	Pass
T1	109 - 74	Top Girt	Plantation Road Upper Girt	6	-7.03	94.72	7.4	Pass
T2	74 - 37	Top Girt	Plantation Road Upper Girt	21	-13.61	51.00	26.7	Pass
T3	37 - 0	Top Girt	Plantation Road Lower Girt	37	-18.88	44.06	42.8	Pass
							Summary	
						Leg (T3)	52.0	Pass
						Diagonal (T3)	55.0	Pass
						Top Girt (T3)	42.8	Pass
						RATING =	**55.0**	**Pass**

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt
Location:	East Windsor, CT
Rev. 0: 8/2/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.15

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 85·kips	(Input From tnxTower)
Compression Force =	Compression := 123·kips	(Input From tnxTower)
Shear Force =	Shear := 32·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTMA307

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

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

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

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

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

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

Check Original Anchor Bolt:

Maximum Tensile Force = $T_{Max} := \frac{Tension\cdot\%_{exst}}{N_{exst}} = 37.8\cdot kips$

Maximum Compressive Force = $C_{Max} := \frac{Compression\cdot\%_{exst}}{N_{exst}} = 54.7\cdot kips$

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

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

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

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

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

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

Bolt % of Capacity = $\frac{\left(T_{Max}\right)}{\Phi R_{nt'}}\cdot 100 = 70.2$

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

Condition1 = "OK"

CENTEK engineering
Centered on Solutions™ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt
Location:	East Windsor, CT
Rev. 0: 8/2/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21022.15

Check Proposed Anchor Bolts:

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

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

Maximum Tensile Force = $T_{Max} := \frac{Tension \cdot \%_{prop}}{N_{prop}} = 9.4 \cdot kips$

Maximum Compressive Force = $C_{Max} := \frac{Compression \cdot \%_{prop}}{N_{prop}} = 13.7 \cdot kips$

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

Bolt % of Capacity = $\frac{(T_{Max})}{T_{all}} \cdot 100 = 89.9$

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

$Condition1 = "OK"$

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

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

$Condition2 = "OK"$

Foundation Analysis

Input Data:

Max. Reactions at Tower Leg:

Shear =	Shear := 32·kips = 32·kips	(User Input)
Compression =	Comp := 123·kips = 123·kips	(User Input)
Uplift =	Uplift := 85·kips = 85·kips	(User Input)

Tower Properties:

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

Foundation Properties:

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

Subgrade Properties:

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

Calculated Data:

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

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

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

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

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

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

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

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

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

Check Uplift:

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{Mass_{tot}}{Uplift} = 1.33$

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

Uplift_Check = "OK"

Check Bearing:

$P_{tot} := Comp + 1.2 \cdot Mass_{Conc} = 177 \cdot kips$

$Bearing := \frac{P_{tot}}{P_{w2}^2} = 2.1 \cdot ksf$

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

Bearing_Check = "OK"

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

CTHA535A_Anchor_6_draft

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

Section 1 - Site Information

Site ID: CTHA535A
Status: Draft
Version: 6
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 4/30/2021 7:59:45 AM
Last Modified By: Dominic.Kallas2@T-Mobile.com

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

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

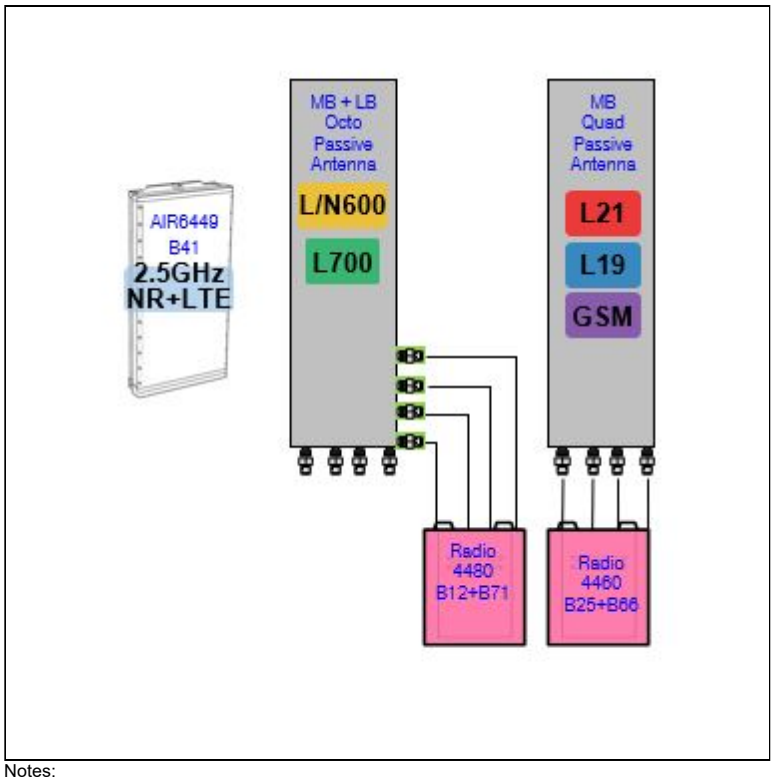
RAN Template: 67E5A998E 6160		**AL Template:** 67E5998E_1xAIR+1OP+1QP		
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

----- This section is intentionally blank. -----

Section 3 - Proposed Template Images

67E5A998E.JPG



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

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

CTHA535A_Anchor_6_draft

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

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 94DB Outdoor (evolved from 4A)

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

Proposed RAN Equipment

Template: 67E5A998E 6160

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

RAN Scope of Work:

Upgrade AC service to 200 Amp.

Cabinet radios will become unused. Remove all cabinet radios.

Remove Existing RBS6201 ODE.

Add (1) Enclosure 6160.

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

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

Add (1) iXRe Router to new Enclosure 6160.

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

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

Add (1) DCDU to new Enclosure 6160.

Add (1) Battery Cabinet B160.

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

Remove all coaxial lines.

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

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

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

CTHA535A_Anchor_6_draft

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

Section 6 - A&L Equipment

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

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

Unconnected Equipment:

Scope of Work:

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

CTHA535A_Anchor_6_draft

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

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	60				60		60	
M. Tilt	0				0		0	
Height	120				120		120	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Active Tech.	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500	U2100 L2100 L1900	U2100 L2100 L1900
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)					Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment								

Unconnected Equipment:

Scope of Work:

There will be three antennae per sector.

Remove existing antenna.

Remove all TMAs.

Remove all Coaxial Lines.

Remove all diplexers.

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

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

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

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

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

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

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

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

CTHA535A_Anchor_6_draft

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

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

Unconnected Equipment:

Scope of Work:

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

CTHA535A_Anchor_6_draft

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

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	180				180		180	
M. Tilt	0				0		0	
Height	120				120		120	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Active Tech.	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500	U2100 L2100 L1900	U2100 L2100 L1900
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)					Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment								

Unconnected Equipment:

Scope of Work:

There will be three antennae per sector.

Remove existing antenna.

Remove all TMAs.

Remove all Coaxial Lines.

Remove all diplexers.

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

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

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

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

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

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

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

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

CTHA535A_Anchor_6_draft

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

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

Unconnected Equipment:

Scope of Work:

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

CTHA535A_Anchor_6_draft

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

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	300				300		300	
M. Tilt	0				0		0	
Height	120				120		120	
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Active Tech.	L700 L600 N600	L700 L600 N600			L2500 N2500	L2500 N2500	U2100 L2100 L1900	U2100 L2100 L1900
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables	Coax Jumper **(x2)** Fiber Jumper	Coax Jumper **(x2)** Fiber Jumper			Fiber Jumper **(x2)**	Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**	Coax Jumper **(x2)** Fiber Jumper **(x2)**
TMAs								
Diplexers / Combiners								
Radio	Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)					Radio 4460 B25+B66 (At Antenna)	SHARED Radio 4460 B25+B66 (At Antenna)
Sector Equipment								

Unconnected Equipment:

Scope of Work:

There will be three antennae per sector.

Remove existing antenna.

Remove all TMAs.

Remove all Coaxial Lines.

Remove all diplexers.

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

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

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

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

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

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

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

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

CTHA535A_Anchor_6_draft

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

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mounts

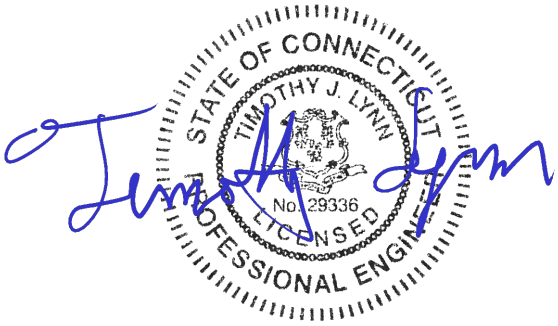
Proposed T-Mobile
Equipment Upgrade

Site Ref: CTHA535A

65 Plantation Road
East Windsor, CT 06016

CENTEK Project No. 21022.15

Date: August 3, 2021



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

Introduction

The purpose of this structural analysis report (SAR) is to summarize the results, of the impacted structural components, by the modified equipment upgrade proposed by T-Mobile on the existing host structure located in East Windsor, CT.

The T-Mobile antennas located in all sectors are mounted on antenna masts attached to the water tank roof at the top and to the catwalk around the water tank at the bottom. The equipment platform/antenna mounts structure geometry and member size information were obtained from previous CDs/structural report and a site visit performed by Centek personnel on April 14, 2021.

Primary Assumptions Used in the Analysis

- The host structure's theoretical capacity not including any assessment of the condition of the host structure.
- The existing elevated steel platform carries the horizontal and vertical loads due to the weight of equipment, and wind and transfers into host structure.
- Proposed reinforcement and support steel will be properly installed and maintained.
- Structure is in plumb condition.
- Loading for equipment and enclosure as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as observed during roof framing mapping.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.

Antenna and Equipment Summary

Location	Appurtenance / Equipment	Rad Center	Mount Type
Alpha Sector	**(1) RFS-APXVAALL24_43-U-NA20 Antenna** **(1) RFS-APX16DWV-16DWVS-E-A20** **(1) Ericsson AIR6449 Antenna** **(1) Ericsson 4480 RRH** **(1) Ericsson 4460 RRH**	120-ft	Antenna Masts Attached to Water Tank
Beta Sector	**(1) RFS-APXVAALL24_43-U-NA20 Antenna** **(1) RFS-APX16DWV-16DWVS-E-A20** **(1) Ericsson AIR6449 Antenna** **(1) Ericsson 4480 RRH** **(1) Ericsson 4460 RRH**	120-ft	Antenna Masts Attached to Water Tank
Gamma Sector	**(1) RFS-APXVAALL24_43-U-NA20 Antenna** **(1) RFS-APX16DWV-16DWVS-E-A20** **(1) Ericsson AIR6449 Antenna** **(1) Ericsson 4480 RRH** **(1) Ericsson 4460 RRH**	120-ft	Antenna Masts Attached to Water Tank

Equipment – Indicates equipment to be installed.
Equipment – Indicates equipment to remain.

Analysis

The antenna frames were analyzed using a comprehensive computer program titled Risa3D. The program analyzes the equipment platform and antenna mounts considering the worst case code prescribed loading condition. The structures were considered to be loaded by concentric forces, and the model assumes that the members are subjected to bending, axial, and shear forces.

Design Loading

Loading was determined per the requirements of the 2015 International Building Code amended by the 2018 CSBC and ASCE 7-10 "Minimum Design Loads for Buildings and Other Structures".

Wind Speed:	V_{ult} = 125 mph	*Appendix N of the 2018 CT State Building Code*
Risk Category:	II	*2015 IBC; Table 1604.05*
Exposure Category:	Surface Roughness C	*ASCE 7-10; Section 26.7.2*
Ground Snow Load	35 psf	*Appendix N of the 2018 CT State Building Code*
Dead Load	Equipment and framing self-weight	*Identified within SAR design calculations*
Live Load	20 psf	*ASCE 7-10; Table 4-1 "Roofs – All Other Construction"*

Reference Standards

2015 International Building Code:

1. ACI 318-14, *Building Code Requirements for Structural Concrete*.
2. ACI 530-13, *Building Code Requirements for Masonry Structures*.
3. AISC 360-10, *Specification for Structural Steel Buildings*
4. AWS D1.1 – 00, *Structural Welding Code – Steel*.
5. AF&PA-12, Span Tables for Joists and Rafters.
6. ANSI/AWC NDS-2015, National Design Specifications (NDS) for Wood Construction – with 2012 Supplement.

Results

Member stresses and design reactions were calculated utilizing the structural analysis software RISA 3D.

The following table provides a summary of structural components impacted by the proposed upgrade along with associated member percent capacity and PASS/FAIL result:

Location	Component	Capacity (%)	Result
Antenna Sectors	Pipe 3.0 STD. Antenna Mast	68%	**PASS**

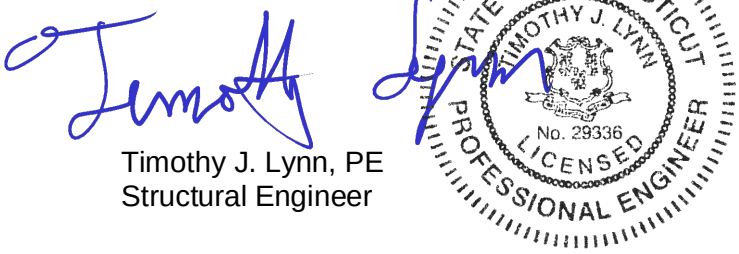
Conclusion

This analysis shows that the subject antenna mounts **have sufficient capacity** to support the proposed modified antenna configuration.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Prepared by:

Pablo Perez-Gomez
Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Wind Load on Equipment per ASCE 7-10

Location: East Windsor, CT

Rev. 0: 06/18/2021

Prepared by: P.P.G. ; Checked by: T.J.L.
Job No. 21022.15

Design Wind Load on Other Structures:

(Based on IBC 2015 and ASCE 7-10)

Wind Speed =	$V := 135$	mph	(User Input)	(ASCE 7-10)
Risk Category =	$BC := IV$		(User Input)	(IBC Table 1604.5)
Exposure Category =	$Exp := C$		(User Input)	
Height Above Grade =	$Z := 128$	ft	(User Input)	
Structure Type =	$Structuretype := Square\_Chimney$			
Structure Height =	$Height := 8$	ft	(User Input) (User Input)	
Horizontal Dimension of Structure =	$Width := 2$	ft	(User Input)	

Terrain Exposure Constants:

Nominal Height of the Atmospheric Boundary Layer =

$$zg := \left\| \begin{array}{l} \text{if } Exp = B \\ \quad \| \; 1200 \\ \text{if } Exp = C \\ \quad \| \; 900 \\ \text{if } Exp = D \\ \quad \| \; 700 \end{array} \right\| = 900$$

(Table 26.9-1)

3-Sec Gust Speed Power Law Exponent =

$$\alpha := \left\| \begin{array}{l} \text{if } Exp = B \\ \quad \| \; 7 \\ \text{if } Exp = C \\ \quad \| \; 9.5 \\ \text{if } Exp = D \\ \quad \| \; 11.5 \end{array} \right\| = 9.5$$

(Table 26.9-1)

Integral Length Scale Factor =

$$l := \left\| \begin{array}{l} \text{if } Exp = B \\ \quad \| \; 320 \\ \text{if } Exp = C \\ \quad \| \; 500 \\ \text{if } Exp = D \\ \quad \| \; 650 \end{array} \right\| = 500$$

(Table 26.9-1)

Integral Length Scale Power Law Exponent =

$$E := \left\| \begin{array}{l} \text{if } Exp = B \\ \quad \| \; \frac{1}{3} \\ \text{if } Exp = C \\ \quad \| \; \frac{1}{5} \\ \text{if } Exp = D \\ \quad \| \; \frac{1}{8} \end{array} \right\| = 0.2$$

(Table 26.9-1)

Turbulence Intensity Factor =

$$c := \left\| \begin{array}{l} \text{if } Exp = B \\ \quad \| \; 0.3 \\ \text{if } Exp = C \\ \quad \| \; 0.2 \\ \text{if } Exp = D \\ \quad \| \; 0.15 \end{array} \right\| = 0.2$$

(Table 26.9-1)

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Wind Load on Equipment per ASCE 7-10

Location: East Windsor, CT

Rev. 0: 06/18/2021

Prepared by: P.P.G. ; Checked by: T.J.L.
Job No. 21022.15

Exposure Constant =	$Z_{min} := \left\| \begin{array}{l} \text{if } Exp = B \\ \quad \left\| 30 \right. \\ \text{if } Exp = C \\ \quad \left\| 15 \right. \\ \text{if } Exp = D \\ \quad \left\| 7 \right. \end{array} \right. = 15$	(Table 26.9-1)
Exposure Coefficient =	$K_z := \left\| \begin{array}{l} \text{if } 15 \le Z \le zg \\ \quad \left\| 2.01 \cdot \left(\frac{Z}{zg}\right)^{\left(\frac{2}{\alpha}\right)} \right. \\ \text{if } Z < 15 \\ \quad \left\| 2.01 \cdot \left(\frac{15}{zg}\right)^{\left(\frac{2}{\alpha}\right)} \right. \end{array} \right. = 1.33$	(Table 29.3-1)
Topographic Factor =	$K_{zt} := 1$	(Eq. 26.8-2)
Wind Directionality Factor =	$K_d = 0.9$	(Table 26.6-1)
Velocity Pressure =	$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 = 55.98$	(Eq. 29.3-1)
Peak Factor for Background Response =	$g_Q := 3.4$	(Sec 26.9.4)
Peak Factor for Wind Response =	$g_v := 3.4$	(Sec 26.9.4)
Equivalent Height of Structure =	$z := \left\| \begin{array}{l} \text{if } Z_{min} > 0.6 \cdot Height \\ \quad \left\| Z_{min} \right. \\ \text{else} \\ \quad \left\| 0.6 \cdot Height \right. \end{array} \right. = 15$	(Sec 26.9.4)
Intensity of Turbulence =	$I_z := c \cdot \left(\frac{33}{z}\right)^{\left(\frac{1}{6}\right)} = 0.228$	(Eq. 26.9-7)
Integral Length Scale of Turbulence =	$L_Z := l \cdot \left(\frac{z}{33}\right)^{E} = 427.057$	(Eq. 26.9-9)
Background Response Factor =	$Q := \sqrt{\frac{1}{1 + 0.63 \cdot \left(\frac{Width + Height}{L_Z}\right)^{0.63}}} = 0.972$	(Eq. 26.9-8)
Gust Response Factor =	$G := 0.925 \cdot \left(\frac{\left(1 + 1.7 \cdot g_Q \cdot I_z \cdot Q\right)}{1 + 1.7 \cdot g_v \cdot I_z}\right) = 0.91$	(Eq. 26.9-6)
Force Coefficient =	$C_f = 1.35$	(Fig 29.5-1 - 29.5-3)
Wind Force =	$F := q_z \cdot G \cdot C_f = 69$	psf

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Wind Load on Equipment per ASCE 7-10

Location: East Windsor, CT

Rev. 0: 06/18/2021

Prepared by: P.P.G. ; Checked by: T.J.L.
Job No. 21022.15

Development of Wind on Antennas

Antenna Data:

Antenna Model =	RFS - APXVAA4L24_43-U-NA20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 150$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 1099$	lbs

Wind Load (Side)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 5.7$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 389$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 150$	lbs

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Wind Load on Equipment per ASCE 7-10

Location: East Windsor, CT

Rev. 0: 06/18/2021

Prepared by: P.P.G. ; Checked by: T.J.L.
Job No. 21022.15

Development of Wind on Antennas

Antenna Data:

Antenna Model =	ERICSSON AIR6449 B41		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.6$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 104$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 326$	lbs

Wind Load (Side)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 2$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 2$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 134$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 104$	lbs

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Wind Load on Equipment per ASCE 7-10

Location: East Windsor, CT

Rev. 0: 06/18/2021

Prepared by: P.P.G. ; Checked by: T.J.L.
Job No. 21022.15

Development of Wind on Antennas

Antenna Data:

Antenna Model =	RFS - APX16DWV-16DWVS-E-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 41$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (Front)

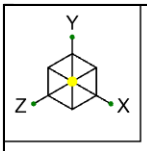
Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 5$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 347$	lbs

Wind Load (Side)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1.2$	sf
Total Antenna Wind Force =	$F_{ant} := F \cdot A_{ant} = 84$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 41$	lbs



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering	CTHA535A	SK-1
PPG		Jun 17, 2021
21022.15		Antenna Frame.r3d

Nodes

	Label	X [ft]	Y [ft]	Z [ft]	Temp [deg F]	Detach From Dia…
1	N35	0	0	0		
2	N2	0	-16	0		

Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N35	Reaction	Reaction	Reaction		Reaction	
2	N2	Reaction	Reaction	Reaction		Reaction	

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. C…	Density [k…	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.2	58	1.1
6	A53 Grad…	29000	11154	0.3	0.65	0.49	35	1.5	58	1.2

General Section Sets

	Label	Shape	Type	Material	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	GEN1A	RE4X4	Beam	gen_Conc3NW	16	21.333	21.333	31.573
2	RIGID		None	RIGID	1e+06	1e+06	1e+06	1e+06

Hot Rolled Member Properties

	Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp t…	Lcomp…	L-Torqu…	K y-y	K z-z	Cb	Function
1	M1	PIPE_3.0	16			Lbyy						Lateral

Member Point Loads (BLC 2 : Weight of Equipment)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
1	M1	Y	-0.15	%25	Active
2	M1	Y	-0.15	%75	Active

Member Point Loads (BLC 3 : Wind X-Direction)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
1	M1	X	0.389	%75	Active
2	M1	X	0.389	%25	Active

Member Point Loads (BLC 4 : Wind Z-Direction)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
1	M1	Z	1.099	%25	Active
2	M1	Z	1.099	%75	Active

Basic Load Cases

	BLC Desc…	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Me…	Surface(P…
1	Self Weight	DL		-1						
2	Weight of…	DL					2			
3	Wind X-Di…	WLX					2			
4	Wind Z-Di…	WLZ					2			
5	Roof Dea…	DL								
6	Snow Load	SL								
7	LL	LL								

Load Combinations

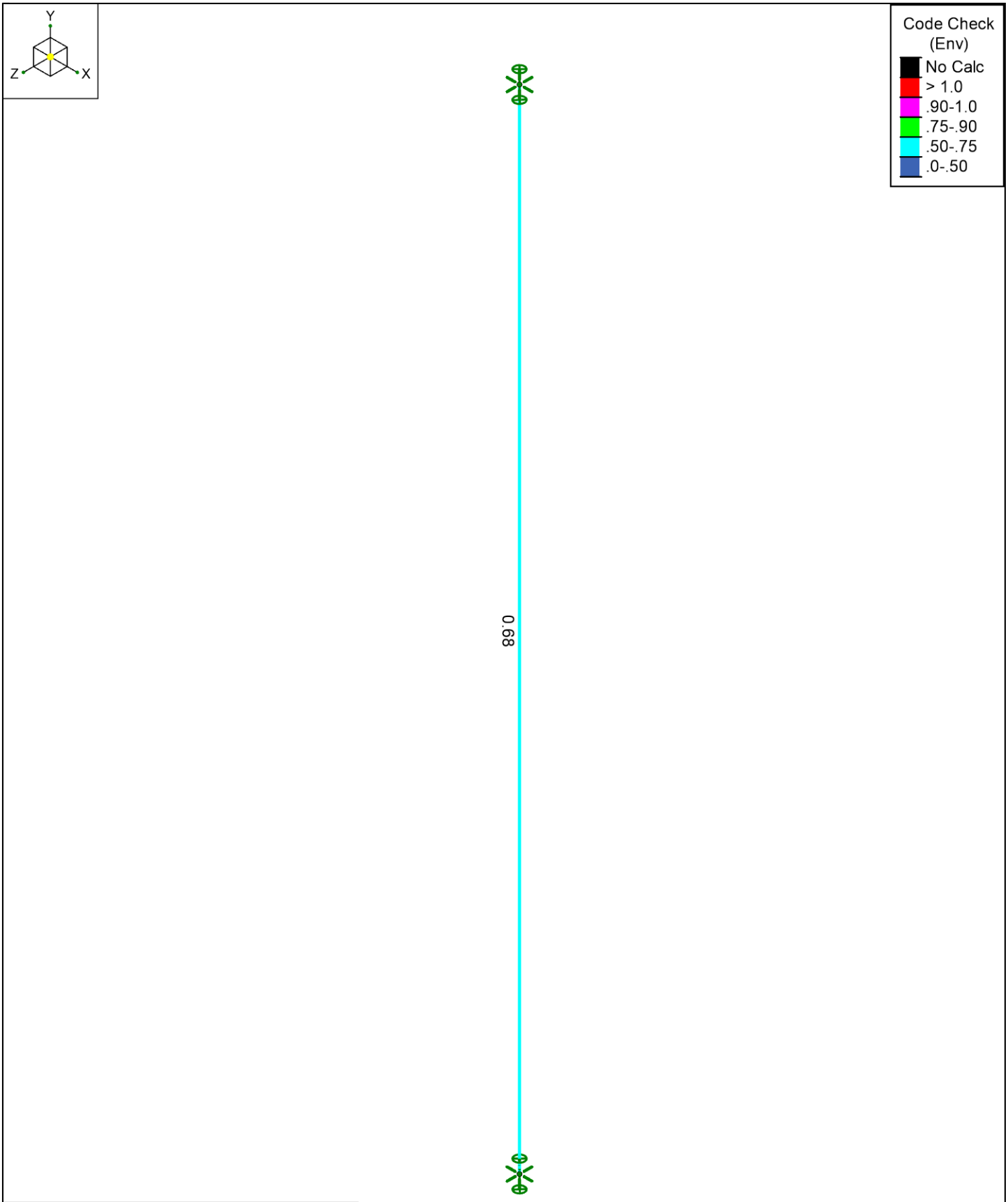
	De…	So…	PD…	SR…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…
1	IB…	Yes	Y		DL	1																		
2	IB…	Yes	Y		DL	1	LL	1	LLS	1														
3	IB…	Yes	Y		DL	1	RLL	1																
4	IB…	Yes	Y		DL	1	SL	1	SLN	1														
5	IB…	Yes	Y		DL	1	RL	1																
6	IB…	Yes	Y		DL	1	LL	0.75	LLS	0.75	RLL	0.75												
7	IB…	Yes	Y		DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75										
8	IB…	Yes	Y		DL	1	LL	0.75	LLS	0.75	RL	0.75												
9	IB…	Yes	Y		DL	1	WLX	0.6																
10	IB…	Yes	Y		DL	1	WLZ	0.6																
11	IB…	Yes	Y		DL	1	WLX	-0.6																
12	IB…	Yes	Y		DL	1	WLZ	-0.6																
13	IB…	Yes	Y		DL	1	WLX	0.45	LL	0.75	LLS	0.75	RLL	0.75										
14	IB…	Yes	Y		DL	1	WLZ	0.45	LL	0.75	LLS	0.75	RLL	0.75										
15	IB…	Yes	Y		DL	1	WLX	-0.45	LL	0.75	LLS	0.75	RLL	0.75										
16	IB…	Yes	Y		DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	RLL	0.75										
17	IB…	Yes	Y		DL	1	WLX	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
18	IB…	Yes	Y		DL	1	WLZ	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
19	IB…	Yes	Y		DL	1	WLX	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
20	IB…	Yes	Y		DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
21	IB…	Yes	Y		DL	1	WLX	0.45	LL	0.75	LLS	0.75	RL	0.75										
22	IB…	Yes	Y		DL	1	WLZ	0.45	LL	0.75	LLS	0.75	RL	0.75										
23	IB…	Yes	Y		DL	1	WLX	-0.45	LL	0.75	LLS	0.75	RL	0.75										
24	IB…	Yes	Y		DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	RL	0.75										
25	IB…	Yes	Y		DL	0.6	WLX	0.6																
26	IB…	Yes	Y		DL	0.6	WLZ	0.6																
27	IB…	Yes	Y		DL	0.6	WLX	-0.6																
28	IB…	Yes	Y		DL	0.6	WLZ	-0.6																

Node Reactions

	Node…		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N35	max	0.233	27	0.206	24	0.659	28	0	28	0	28	0	28
2		min	-0.233	9	0.124	25	-0.659	10	0	1	0	1	0	1
3	N2	max	0.233	27	0.206	24	0.659	28	0	28	0	28	0	28
4		min	-0.233	9	0.124	25	-0.659	10	0	1	0	1	0	1
5	Totals:	max	0.467	27	0.413	24	1.319	28						
6		min	-0.467	9	0.248	25	-1.319	10						

Asd360

	Member	Shape	Code…	Loc [ft]	LC	Shear…	Loc [ft]	Dir	LC	Pnc/o…	Pnt/o…	Mnyy/…	Mnzz/…	Cb	Eqn
1	M1	PIPE…	0.678	12	12	0.049	16		28	11.62	44.623	3.934	3.934	1	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering	CTHA535A	SK-2
PPG		Jun 17, 2021
21022.15		Antenna Frame.r3d

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTHA535A

Unison E. Windsor Watertank
65 Plantation Road
East Windsor, Connecticut 06016

September 28, 2021

EBI Project Number: 6221005550

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**32.43%**

21 B Street, Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

September 28, 2021

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

Emissions Analysis for Site: CTHA535A - Unison E. Windsor Watertank

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **65 Plantation Road** in **East Windsor, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general 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 ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 65 Plantation Road in East Windsor, Connecticut 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 manufacturer's 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 power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 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.

5) 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.

6) 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.

7) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.

8) 1 LTE Broadcast channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.

9) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

10) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.

11) 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.

12) 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

13) The antennas used in this modeling are the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector A, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector B, the RFS APXVAALL24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APX16DWV-16DWV-S-E-A20 for the 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power

levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

14) The antenna mounting height centerline of the proposed antennas is 120 feet above ground level (AGL).

15) 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.

16) 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:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20	Make / Model:	RFS APXVAALL24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd
Height (AGL):	120 feet	Height (AGL):	120 feet	Height (AGL):	120 feet
Channel Count:	5	Channel Count:	5	Channel Count:	5
Total TX Power (W):	200 Watts	Total TX Power (W):	200 Watts	Total TX Power (W):	200 Watts
ERP (W):	4,151.83	ERP (W):	4,151.83	ERP (W):	4,151.83
Antenna A1 MPE %:	**2.73%**	Antenna B1 MPE %:	**2.73%**	Antenna C1 MPE %:	**2.73%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	120 feet	Height (AGL):	120 feet	Height (AGL):	120 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A2 MPE %:	**10.06%**	Antenna B2 MPE %:	**10.06%**	Antenna C2 MPE %:	**10.06%**
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20	Make / Model:	RFS APX16DWV-16DWV-S-E-A20
Frequency Bands:	1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz / 2100 MHz
Gain:	15.9 dBd / 15.9 dBd / 15.9 dBd	Gain:	15.9 dBd / 15.9 dBd / 15.9 dBd	Gain:	15.9 dBd / 15.9 dBd / 15.9 dBd
Height (AGL):	120 feet	Height (AGL):	120 feet	Height (AGL):	120 feet
Channel Count:	6	Channel Count:	6	Channel Count:	6
Total TX Power (W):	300 Watts	Total TX Power (W):	300 Watts	Total TX Power (W):	300 Watts
ERP (W):	11,671.35	ERP (W):	11,671.35	ERP (W):	11,671.35
Antenna A3 MPE %:	**3.23%**	Antenna B3 MPE %:	**3.23%**	Antenna C3 MPE %:	**3.23%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	16.02%
Verizon	7.95%
AT&T	4.64%
Sprint	3.69%
Clearwire	0.13%
Site Total MPE % :	32.43%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	16.02%
T-Mobile Sector B Total:	16.02%
T-Mobile Sector C Total:	16.02%
Site Total MPE % :	32.43%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 600 MHz LTE	2	591.73	120.0	3.27	600 MHz LTE	400	0.82%
T-Mobile 600 MHz NR	1	1577.94	120.0	4.37	600 MHz NR	400	1.09%
T-Mobile 700 MHz LTE	2	695.22	120.0	3.85	700 MHz LTE	467	0.82%
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	120.0	30.55	2500 MHz LTE 1C & 2C Traffic	1000	3.06%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	120.0	2.97	2500 MHz LTE 1C & 2C Broadcast	1000	0.30%
T-Mobile 2500 MHz NR Traffic	1	22089.26	120.0	61.11	2500 MHz NR Traffic	1000	6.11%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	120.0	5.94	2500 MHz NR Broadcast	1000	0.59%
T-Mobile 1900 MHz LTE	2	2334.27	120.0	12.91	1900 MHz LTE	1000	1.29%
T-Mobile 2100 MHz UMTS	2	1167.14	120.0	6.46	2100 MHz UMTS	1000	0.65%
T-Mobile 2100 MHz LTE	2	2334.27	120.0	12.91	2100 MHz LTE	1000	1.29%
						Total:	**16.02%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	16.02%
Sector B:	16.02%
Sector C:	16.02%
T-Mobile Maximum MPE % (Sector A):	16.02%
Site Total:	32.43%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **32.43%** 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.