INDUSTRIAL AVE,
TE 3
HWAH NJ 07430

ONE: 201.684.0055
X: 201.684.0066

Transcend Wireless

April 30, 2022

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

RE: Notice of Exempt Modification
723 Leetes Island Road, Branford, CT 06405
Latitude: 41.155891
Longitude: -72.435969
T-Mobile Site#: CTNH804C - L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 80 foot level of the existing 109 foot water tank at 723 Leetes Island Road, Branford, CT. The 109-foot water tank is owned by Verizon Wireless (managed by KGI Wireless) and the property is owned by James Medlyn. T-Mobile now intends to add (3) antennas to the 81-foot level of the water tank. These antennas will support 5G services.

Planned Modifications:
Tower:
Install New:
(3) RFS APXVAALL24 43 U NA20 Antennas
(3) Radio 4480 B71 B85

To Remain:
(6) Ericsson AIR21 Antennas
(3) 6x24 HCS Cables

This facility was approved by the Siting Council in Docket No. 413 on July 28, 2011. The proposed modification complies with the original approval.

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 Cosgrove, Elected Official, and Harry Smith, Town Planner, as well as the tower and property owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Eric Breun
Transcend Wireless
Cell: 201-658-7728
Email: ebreun@transcendwireless.com

Attachments
cc: James Cosgrove - First Selectman of Branford
Harry Smith - Town Planner
Verizon Wireless (KGI Wireless) - Tower Owner
James Medlyn - Property Owner

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS

1 OF 1

SHIP TO:
TOWN PLANNER
HARRY SMITH
1019 MAIN STREET
BRANFORD CT 06405

CT 065 2-01

UPS GROUND
TRACKING #: 1Z V25 742 03 9493 0722

BILLING: P/P

Reference #1: CTNH804C

XOL 22.04.20 NV45 18.0A 04/2022*

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS

1 OF 1

SHIP TO:
JAMES MEDLYN
710 LEETES ISLAND ROAD
BRANFORD CT 06405

CT 065 2-01

UPS GROUND
TRACKING #: 1Z V25 742 03 9364 0716

BILLING: P/P

Reference #1: CTNH804C

XOL 22.04.20 NV45 18.0A 04/2022*

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS

1 OF 1

SHIP TO:
KGI WIRELESS
BUILDING 3 #370
805 LAS CIMAS PARKWAY
AUSTIN TX 78746

TX 787 9-75

UPS GROUND
TRACKING #: 1Z V25 742 03 9212 2742

BILLING: P/P

Reference #1: CTNH804C

XOL 22.01.20 NV45 18.0A 04/2022*

ERIC BREUN
2016587728
1 INTERNATIONAL BLVD.
MAHWAH NJ 07495

1 LBS

1 OF 1

SHIP TO:
JAMES B COSGROVE
1019 MAIN STREET
BRANFORD CT 06405

CT 065 2-01

UPS GROUND
TRACKING #: 1Z V25 742 03 9222 4730

BILLING: P/P

Reference #1: CTNH804C

XOL 22.01.20 NV45 18.0A 04/2022*

Hello, your package has been delivered.

Delivery Date: Thursday, 04/28/2022

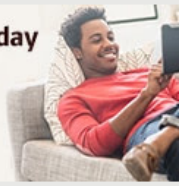
Delivery Time: 11:04 AM

Left At: FRONT DOOR

Experience UPS My Choice® Premium Today

Be in total control of how, when and where your packages are delivered.

Upgrade to Premium Now



Set Delivery Instructions | Manage Preferences | View M

TRANSCEND WIRELESS

Tracking Number:	1ZV257420393640716
Ship To:	JAMES MEDLYN 710 LEETES ISLAND ROAD BRANFORD, CT 06405 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTNH804C

Hello, your package has been delivered.

Delivery Date: Thursday, 04/28/2022

Delivery Time: 3:27 PM

Signed by: MILICI

TRANSCEND WIRELESS

Tracking Number:	1ZV257420394930722
Ship To:	HARRY SMITH 1019 MAIN STREET BRANFORD, CT 06405 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTNH804C

Hello, your package has been delivered.

Delivery Date: Thursday, 04/28/2022

Delivery Time: 3:28 PM

Signed by: COSGROVE

TRANSCEND WIRELESS

Tracking Number:	1ZV257420392224730
Ship To:	JAMES B COSGROVE 1019 MAIN STREET BRANFORD, CT 06405 US
Number of Packages:	1
UPS Service:	UPS Ground
Package Weight:	1.0 LBS
Reference Number:	CTNH804C

Your shipment
1ZV257420392122742

Estimated delivery

Monday, May 02 by 7:00 P.M.

- Label Created
- **On the Way**
- Out for Delivery
- Delivery

Ship To
AUSTIN, TX US

Detailed Parcel Information

GIS ID
K09-000-004-00008

Parcel ID
K09/000/004/00008

Unique ID
13123

Owner
MEDLYN JAMES JOHN

Location
723 LEETES ISLAND RD

MAILING ADDRESS
710 LEETES ISLAND RD
BRANFORD CT 06405

Quick Links: Quick Map | Property Card | Assessor Tax Map

Scroll Down For Complete Property Detail

PARCEL VALUATIONS

	Appraised Value	Assessed Value
Buildings	0	0
Land	318400	219200
TOTAL:	347500	239600

PROPERTY INFORMATION

Total Acres	19.12
GIS Acres	20.29
Land Use	FARM
Land Class Code	S
Zoning	R5
Census Tract	
Neighborhood	0080
Lot Description	Suburban
Lot Utilities	UNKNOWN

SALE INFORMATION

Sale Date	1975-08-29
Sale Price	0
Book / Page	0270/0272

BUILDING AREA

Building Gross - sqft	0
Living Area - sqft	0

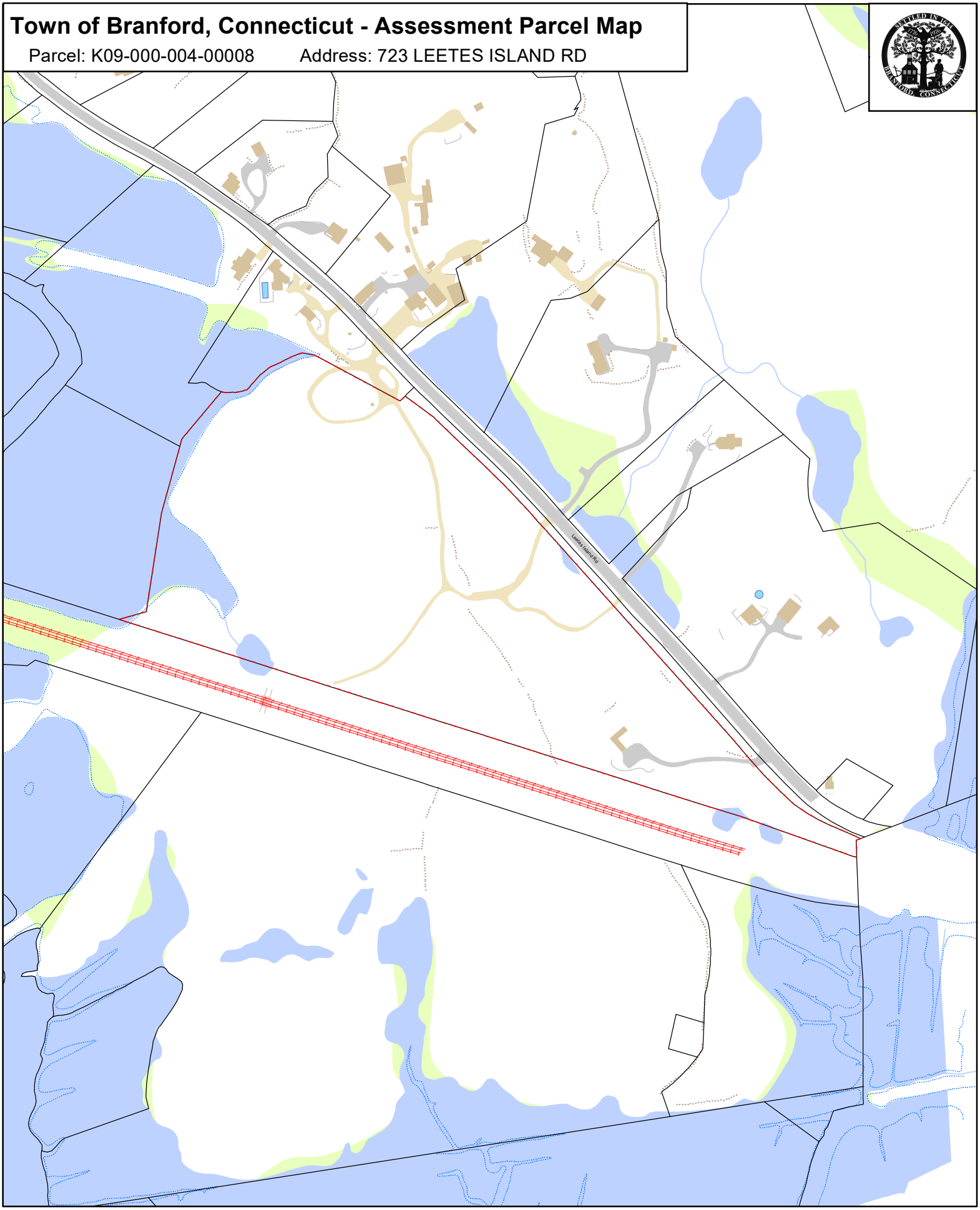
CONSTRUCTION DETAILS

Building Style	UNKNOWN
Building Condition	
Number of Rooms	0
Number of Bedrooms	0
Number of Bathrooms	0
Stories	
Roof Structure	
Primary Exterior Wall Type	
Heating/Cooling Type	
AC_Type	
Heating Fuel	

Back

Town of Branford, Connecticut - Assessment Parcel Map

Parcel: K09-000-004-00008 Address: 723 LEETES ISLAND RD



Approximate Scale: 1 inch : 300 feet

Grand List Date June 2021

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user. The Town of Branford and its mapping contractors assume no legal responsibility for the information contained herein.

DOCKET NO. 413 - Cellco Partnership d/b/a Verizon Wireless application for a Certificate of Environmental Compatibility and	}	Connecticut
Public Need for the construction, maintenance and operation of a telecommunications facility located at 723 Leetes Island Road,	}	Siting
Branford, Connecticut.	}	Council

July 28, 2011

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, maintenance, and operation of a telecommunications facility, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Cellco Partnership d/b/a Verizon Wireless, hereinafter referred to as the Certificate Holder, for a telecommunications facility located at 723 Leetes Island Road, Branford, Connecticut.

Unless otherwise approved by the Council, the facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be a monopole designed and constructed to look like an old-fashioned railroad water tank. The water tank/tower shall be no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of the Certificate Holder and other entities, both public and private, but the top of such water tank/tower shall not exceed a height of 109 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of Branford for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping; and
    b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. Prior to the commencement of operation, the Certificate Holder shall provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any Town of Branford public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.

7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed with at least one fully operational wireless telecommunications carrier providing wireless service within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.

8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Branford. Any proposed modifications to this Decision and Order shall likewise be so served.

9. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

10. Any nonfunctioning antenna, and associated antenna mounting equipment, on this facility shall be removed within 60 days of the date the antenna ceased to function.

11. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction, and the commencement of site operation.

12. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.

13. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

14. The Certificate Holder shall maintain the facility and associated equipment in a reasonable physical and operational condition, including but not limited to, the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line and landscaping, that is consistent with this Decision and Order and a Development and Management Plan to be approved by the Council.

Pursuant to General Statutes **§** 16-50p, the Council hereby directs that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the New Haven Register.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

Applicant	**Its Representative**
Cellco Partnership d/b/a Verizon Wireless	Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103-3597
Intervenor	**Its Representatives**
T-Mobile Northeast, LLC	Julie D. Kohler, Esq. Jesse A. Langer, Esq. Cohen and Wolf, P.C. 1115 Broad Street Bridgeport, CT 06604

Intervenor
New Cingular Wireless PCS, LLC (AT&T)

Its Representatives
Christopher B. Fisher, Esq.
Lucia Chiocchio, Esq.
Cuddy & Feder LLP
445 Hamilton Avenue, 14th floor
White Plains, NY 10601

Intervenor
Town of Branford

Its Representative
Keith R. Ainsworth, Esq.
Evans Feldman & Ainsworth, L.L.C.
#101240
261 Bradley Street
P.O. Box 1694
New Haven, CT 06507-1694

SITE NAME: AMTRAK BRANFORD 4
SITE ID: CTNH804C
723 LEETES ISLAND RD
BRANFORD, CT 06405

T-MOBILE A&L TEMPLATE (PROVIDED BY RFDS)
67D92DBL_1xAIR+1OP

RAN TEMPLATE (PROVIDED BY RFDS)
67D92C OUTDOOR

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 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: 723 LEETES ISLAND RD
BRANFORD, CT 06405

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.30 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187. CONTINUE TO FOLLOW CT-187.	0.14 MI.
4.	STAY STRAIGHT TO GO ONTO BLUE HILLS AVE/CT-187.	2.72 MI.
5.	TURN LEFT ONTO E WINTONBURY AVE/CT-178. CONTINUE TO FOLLOW CT-178.	1.77 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD.	30.11 MI.
7.	TAKE THE E CENTER ST EXIT, EXIT 14, TOWARD WALLINGFORD/CT-150.	0.18 MI.
8.	TURN RIGHT ONTO E CENTER ST.	0.03 MI.
9.	TAKE THE 1ST LEFT ONTO S AIRLINE RD.	0.88 MI.
10.	TURN LEFT ONTO WOODHOUSE AVE/CT-150	1.99 MI.
11.	TURN RIGHT TO STAY ON WOODHOUSE AVE/CT-150.	0.50 MI.
12.	TURN SLIGHT LEFT TO STAY ON WOODHOUSE AVE/CT-150.	0.70 MI.
13.	WOODHOUSE AVE/CT-150 BECOMES CLINTONVILLE RD/CT-22	0.24 MI.
14.	TURN RIGHT ONTO FOREST RD/CT-22. CONTINUE TO FOLLOW CT-22.	4.50 MI.
15.	TURN LEFT ONTO FOXON RD/CT-80/CT-22.	1.37 MI.
16.	TURN RIGHT ONTO BRANFORD RD/CT-139.	1.51 MI.
17.	TURN LEFT ONTO SCHOOL GROUND RD.	0.53 MI.
18.	SCHOOL GROUND RD BECOMES LEETES ISLAND RD.	1.81 MI.
19.	TURN SLIGHT LEFT ONTO LEETES ISLAND RD/CT-146.	1.39 MI.
20.	723 LEETES ISLAND RD, BRANFORD, CT 06405	

SITE COORDINATES: LATITUDE: 41° 15' 58.91" N
LONGITUDE: 72° 43' 59.69" W
GROUND ELEVATION: ±45' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH

VICINITY MAP

NORTH

PROJECT SUMMARY

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

1. INSTALL (1) RADIO 4480 B71+B85 PER SECTOR. (TOTAL OF 3)
2. INSTALL (1) RFS-APXVAALL24_43-U-NA20 ANTENNA PER SECTOR. (TOTAL OF 3)
3. EXISTING T-MOBILE 3106 CABINET TO BE UPGRADED TO PROPOSED CABINET 6131
4. INSTALL (3) NEW PIPE MASTS WITH BASE PLATES FOR PROPOSED ANTENNAS AND RRUS. (TO MATCH EXISTING ANTENNA MOUNTING)

PROJECT INFORMATION

SITE NAME:	AMTRAK BRANFORD 4
SITE ID:	CTNH804C
SITE ADDRESS:	723 LEETES ISLAND BRANFORD, CT 06405
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° 15' 58.91" N LONGITUDE: 72° 43' 59.69" W GROUND ELEVATION: ±45' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION	0
C-3	ANTENNA PLANS AND ELEVATIONS	0
C-4	TYPICAL EQUIPMENT DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS	0
E-2	ELECTRICAL SPECIFICATIONS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/27/22	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

SITE NAME: AMTRAK BRANFORD 4
SITE ID: CTNH804C
723 LEETES ISLAND
BRANFORD, CT 06405

DATE: 11/18/21
SCALE: AS NOTED
JOB NO. 21022.39

TITLE SHEET

T-1

Sheet No. 1 of 8

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)
- ULTIMATE DESIGN SPEED: 130 MPH (Vasd) (EXPOSURE C/ 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.

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BRANFORD, CT 06405

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GENERAL NOTES AND SPECIFICATIONS

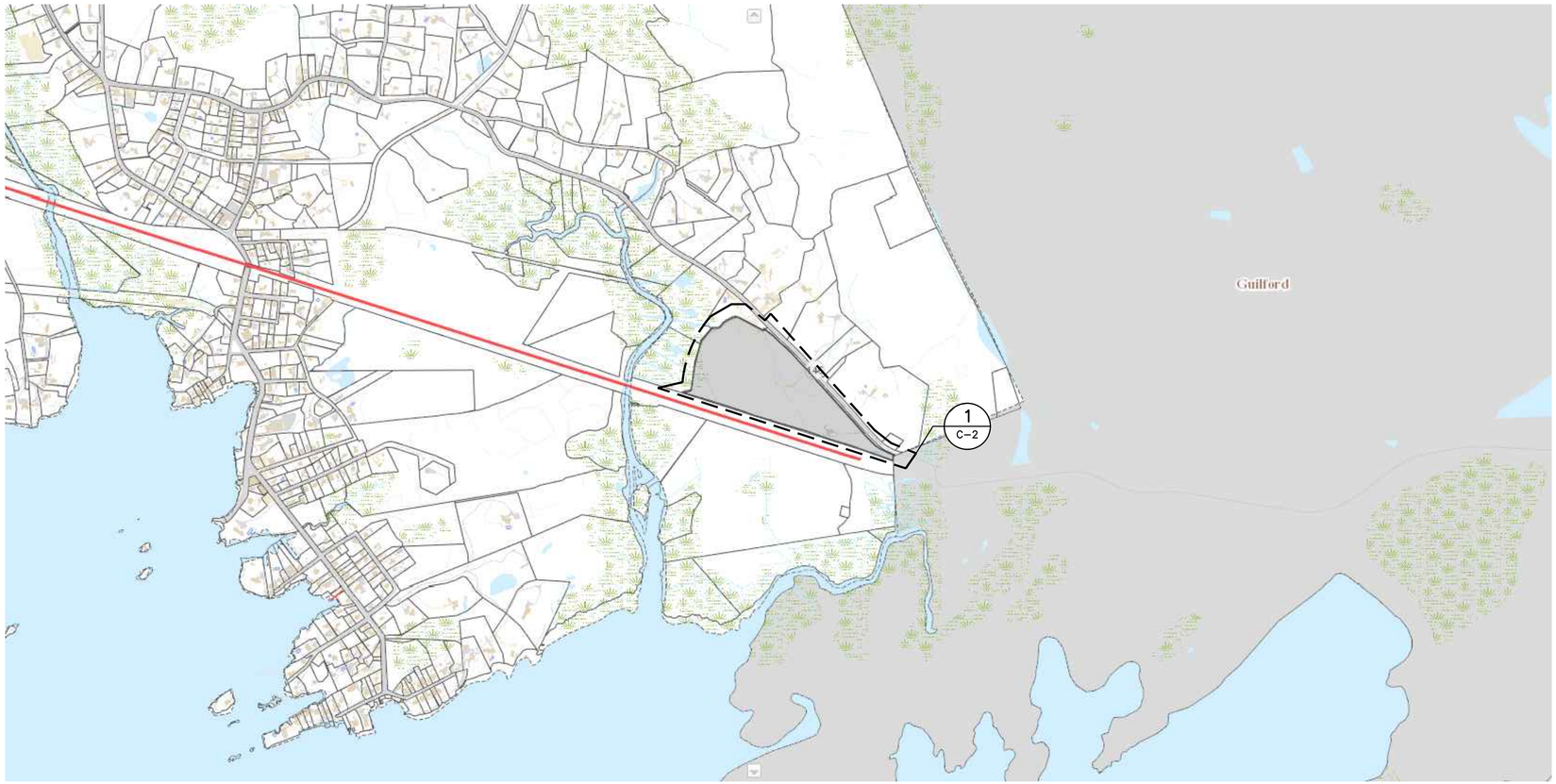
N-1

Sheet No. 2 of 8

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	EXISTING	ERICSSON (AIR21 KRC118023-1_B2A_B4P)	56.3 x 12.1 x 7.9	80'	0°			(1) 6/24 4AWG HYBRID CABLE
A2	EXISTING	ERICSSON (AIR21 KRC118023-1_B2P_B4A)	56.3 x 12.1 x 7.9	80'	0°			
A3	PROPOSED	RFS (APXVAALL24_43-U_NA20)	95.9 x 24 x 8.7	81'	0°	(P) RADIO 4480 B71+B85 (1)		
B1	EXISTING	ERICSSON (AIR21 KRC118023-1_B2A_B4P)	56.3 x 12.1 x 7.9	110'	120°			(1) 6/24 4AWG HYBRID CABLE
B2	EXISTING	ERICSSON (AIR21 KRC118023-1_B2P_B4A)	56.3 x 12.1 x 7.9	110'	120°			
B3	PROPOSED	RFS (APXVAALL24_43-U_NA20)	95.9 x 24 x 8.7	110'	120°	(P) RADIO 4480 B71+B85 (1)		
C1	EXISTING	ERICSSON (AIR21 KRC118023-1_B2A_B4P)	56.3 x 12.1 x 7.9	110'	270°			(1) 6/24 4AWG HYBRID CABLE
C2	EXISTING	ERICSSON (AIR21 KRC118023-1_B2P_B4A)	56.3 x 12.1 x 7.9	110'	270°			
C3	PROPOSED	RFS (APXVAALL24_43-U_NA20)	95.9 x 24 x 8.7	110'	270°	(P) RADIO 4480 B71+B85 (1)		



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

TRUE NORTH

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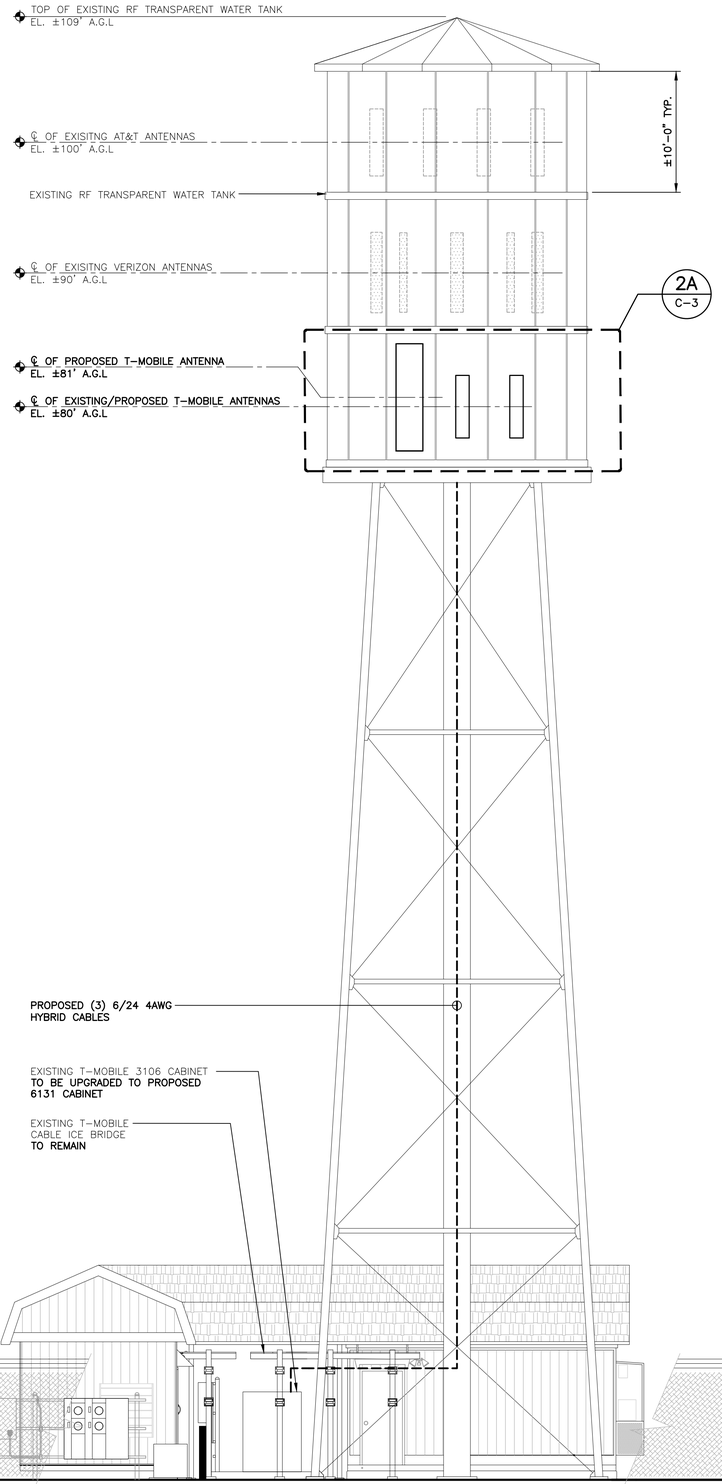
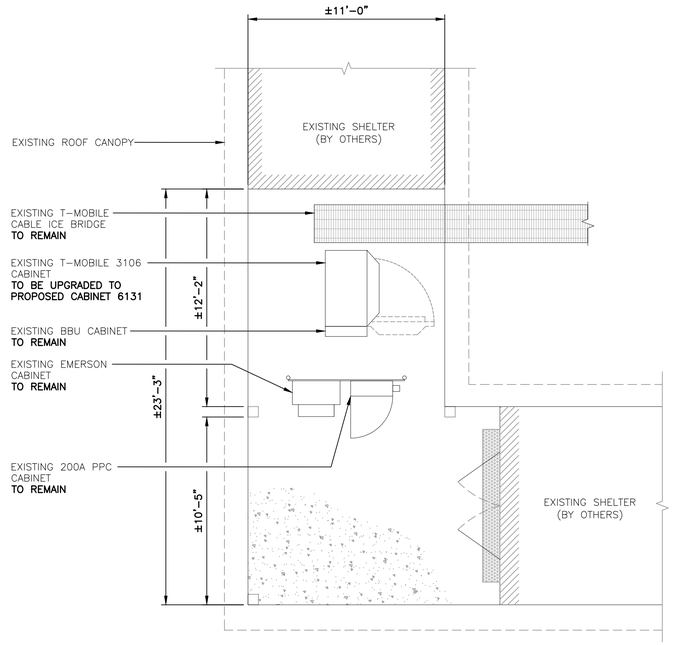
SITE LOCATION PLAN

C-1

Sheet No. 3 of 8

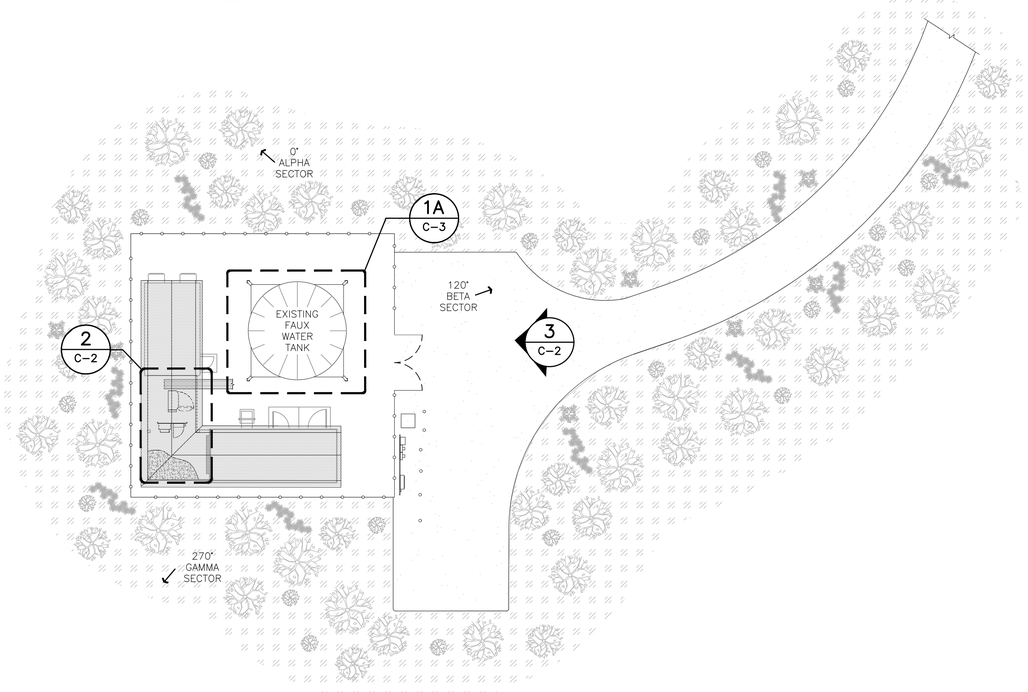


3 C-2 **SOUTH ELEVATION - PROPOSED**
SCALE: 1" = 5'



2 C-2 **EQUIPMENT PLAN - EXISTING/PROPOSED**
SCALE: 1" = 5'

TRUE NORTH



1 C-2 **COMPOUND PLAN - PROPOSED**
SCALE: 1" = 5'

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 # 21022.39) DATED 01/12/22 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

FAUX WATERTANK

A STRUCTURAL ANALYSIS IS TO BE COMPLETED "BY OTHERS" OF THE FAUX WATERTANK. NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT "BY OTHERS"

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.

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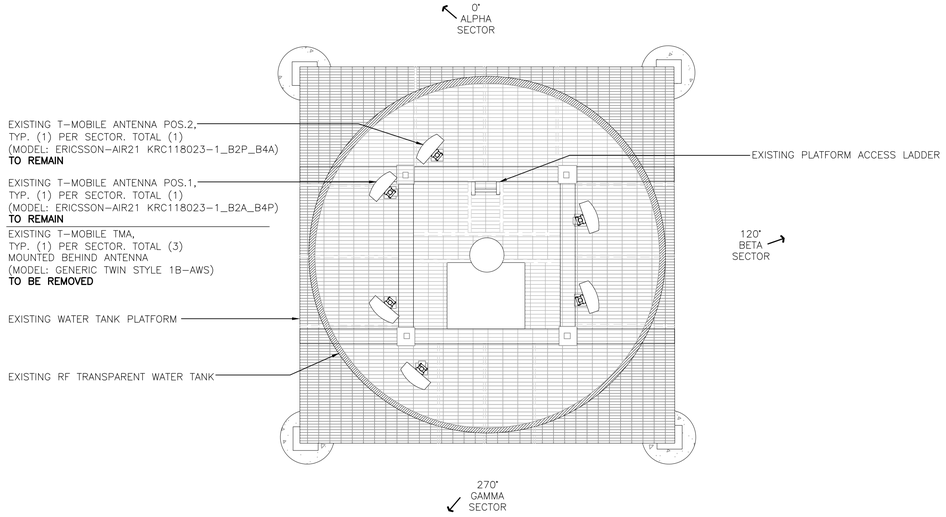
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

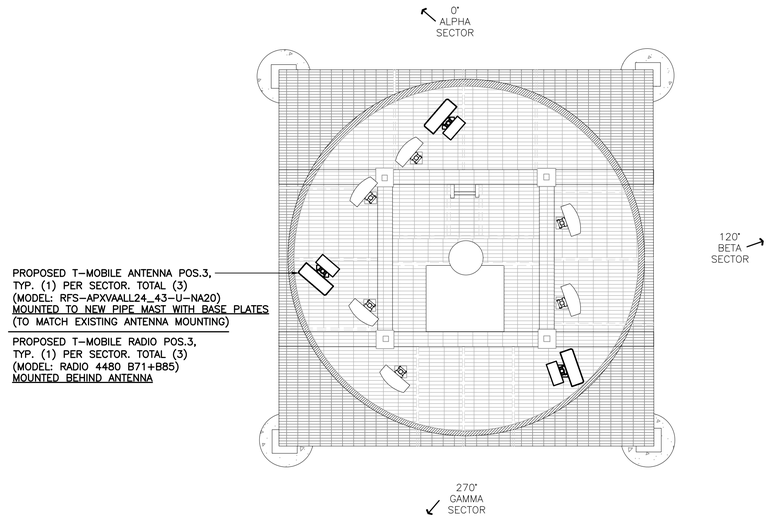
Sheet No. 4 of 8



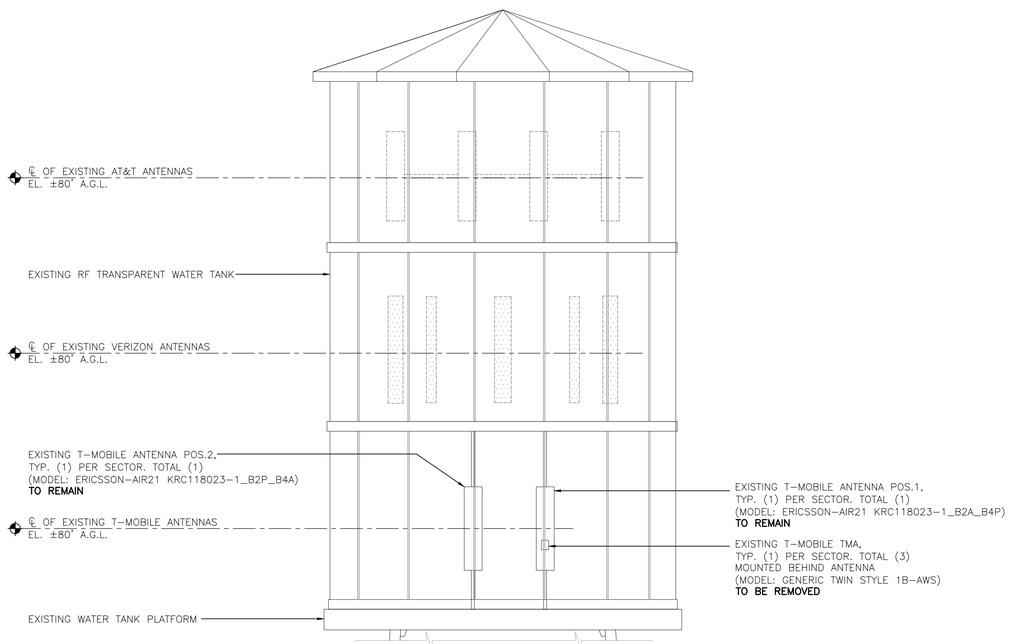
1 / C-3 **ANTENNA PLAN - EXISTING**
SCALE: 1/4" = 1'
TRUE NORTH

NOTE:

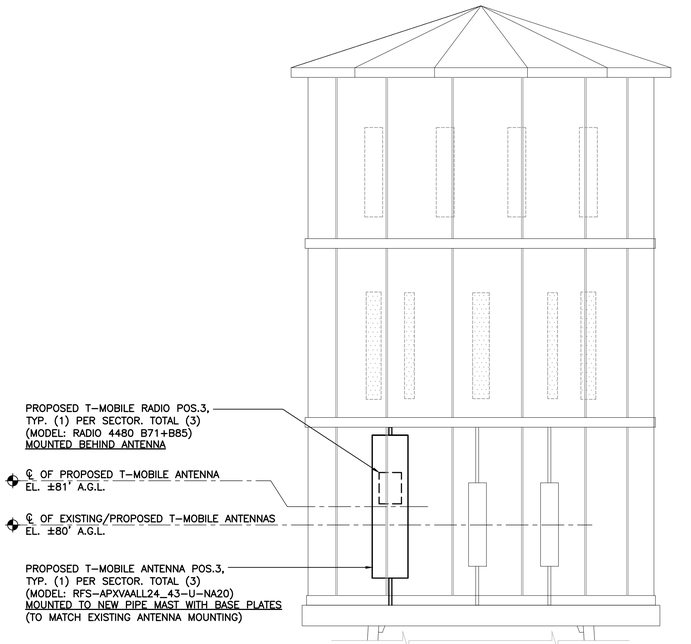
RELOCATE EXISTING PIPE MAST/ANTENNA AS REQUIRED TO AVOID INTERFERENCE



1A / C-3 **ANTENNA PLAN - PROPOSED**
SCALE: 1/4" = 1'
TRUE NORTH



2 / C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/4" = 1'



2A / C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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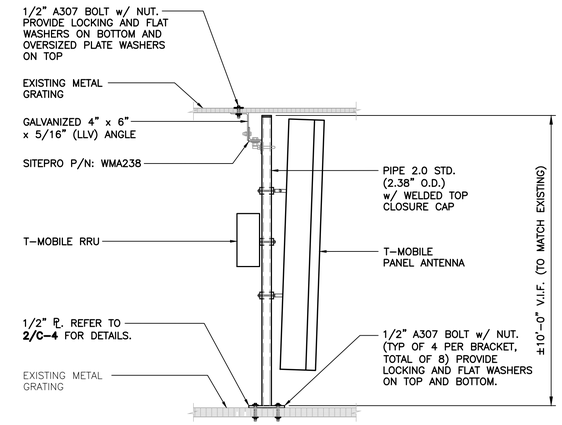
ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 8

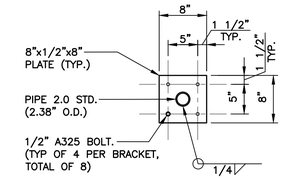


NOTES

1. ATTACHMENT OF ANTENNAS AND RRUs TO MOUNTS SHALL BE PER MANUFACTURER'S REQUIREMENTS.

1 / C-4 ANTENNA AND RRU MOUNTING DETAIL

SCALE: NOT TO SCALE



2 / C-4 BOTTOM PLATE DETAIL

SCALE: NOT TO SCALE

APXVAALL24_43-U-NA20

ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAALL24_43-U-NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

3 / C-4 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE

RADIO 4480 B71+B85

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4480 B71+B85	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.

4 / C-4 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE

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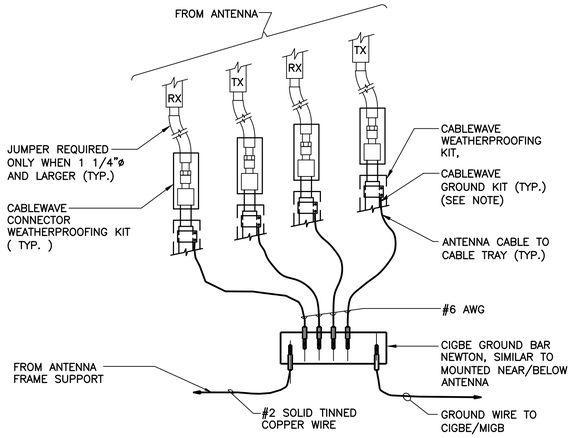
TYPICAL EQUIPMENT DETAILS

C-4

Sheet No. 6 of 8

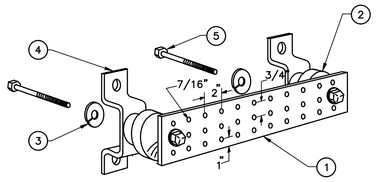


NOTES:

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

1 E-1 CONNECTION OF GROUND WIRES TO GROUND BAR

SCALE: NOT TO SCALE

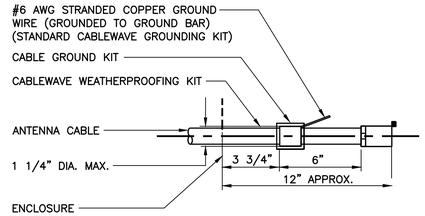


NOTES

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-1 GROUND BAR DETAIL

SCALE: NOT TO SCALE

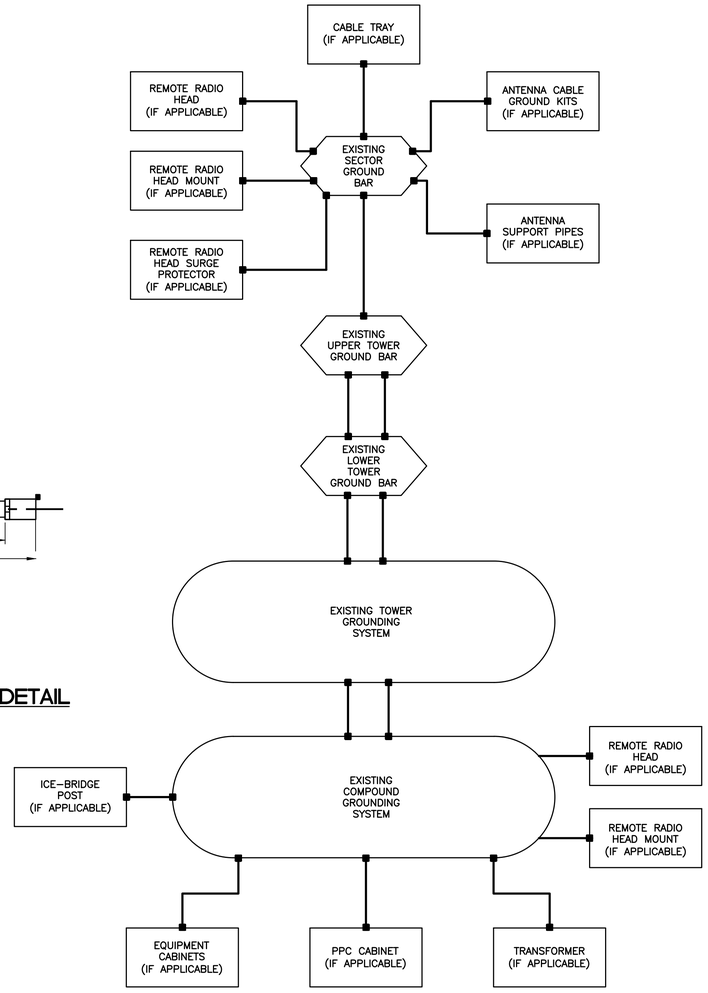


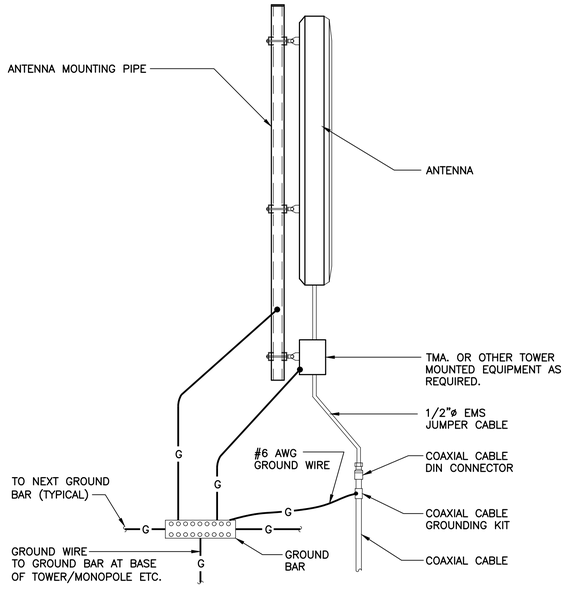
NOTES:

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

3 E-1 ANTENNA CABLE GROUNDING DETAIL

SCALE: NOT TO SCALE



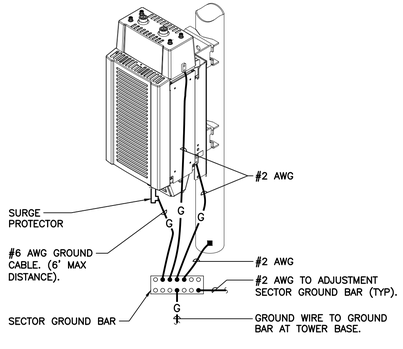


4 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

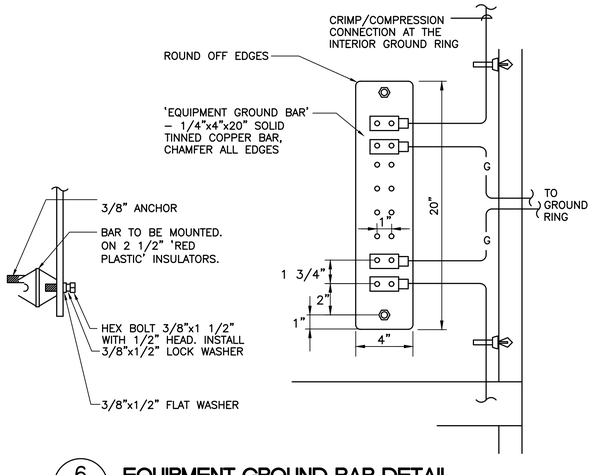
EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:

1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



5 E-1 RRH POLE MOUNT GROUNDING

SCALE: NOT TO SCALE



6 E-1 EQUIPMENT GROUND BAR DETAIL

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

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 TOWER 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-1 ELECTRICAL SCHEMATIC DIAGRAM

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/27/22	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

SITE NAME: AMTRAK BRANFORD 4
SITE ID: CTNH804C
723 LEETES ISLAND
BRANFORD, CT 06405

DATE:	11/18/21
SCALE:	AS NOTED
JOB NO.	21022.39

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 7 of 8

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	04/27/22	RYS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

CONNECTICUT LICENSED PROFESSIONAL ENGINEER

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(203) 488-0580
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63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

SITE NAME: AMTRAK BRANFORD 4
SITE ID: CTNH804C
723 LEETES ISLAND
BRANFORD, CT 06405

DATE: 11/18/21
SCALE: AS NOTED
JOB NO. 21022.39

ELECTRICAL SPECIFICATIONS

E-2

Sheet No. 8 of 8

Structural Analysis Report

Prepared for:

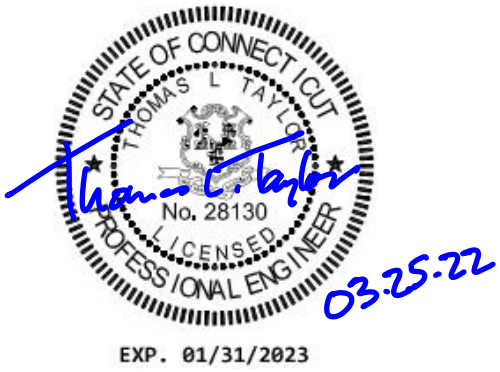
KGI

Austin, TX 78746

805 Las Cimas Parkway, Building Three, Suite 370

ATTN: Ms. Tracy Severance

Structure	:	**109 ft Faux Water Tower**
Site ID	:	**28241**
Proposed Carrier	:	**T-Mobile**
Site Name	:	**Branford South**
Site Location	:	**723 Leetes Island Road** **Branford, CT** **41.2664, -72.7333**
County	:	**New Haven**
Date	:	**March 24, 2022**
Max Structure Usage	:	**100%**
Max Foundation Usage	:	**99%**
Result	:	**Pass**



EXP. 01/31/2023

Prepared By:
Nathan Wood, E.I.T.
Structural Engineer

Thomas L. Taylor
Digitally signed by Thomas L. Taylor
Date: 2022.03.25 10:13:59 -05'00'

Table of Contents

Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 109 ft Faux Water Tower to reflect the change in loading by T-Mobile.

Supporting Documents

Tower Drawing	Stealth Job #VZ12-00120W-33R0
Foundation Drawing	Stealth Job #VZ12-00120W-33R0
Geotechnical Report	DET Job #2010.19, dated January 28, 2012
Mount Analysis	Centek Project #21022.39, dated January 12, 2022
Tower Inventory	KGI TLF Site #28241, dated February 8, 2022

Analysis

The tower was analyzed using TNX tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed	122 mph (3-Second Gust) Vult
Basic Wind Speed w/Ice	50 mph (3-Second Gust) w/ 1" radial ice concurrent
Code	ANSI/TIA-222-H / 2018 IBC / 2018 Connecticut State Building Code
Risk Category	II
Exposure Category	D
Topographic Category	1
Crest Height	0 ft
Spectral Response	Ss = 0.201 , S1 = 0.053
Site Class	B - Competent Rock
Ground Elevation	44.78 ft

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact Semaan Engineering Solutions at 402-289-1888.

Existing and Reserved Equipment

This loading **is** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
100.0	100.0	9	AM-X-CD-14-65-00T-RET	(12) 10'x2" Pipe Mounts	(4) 1 5/8" DC Lines (2) 3/8" Fiber	AT&T
		12	RRU (20.04 x 15.08 x 6.65)			
		6	RRU (18.2 x 25.0 x 6.7)			
		3	OVP (23.5 x 9.7)			
90.0	90.0	3	MT6407-77A w/RRU	(15) 10'x2" Pipe Mounts (3) BSAMNT-SBS-1-2	(6) 1 5/8" (2) 6x12 Hybrid	Verizon
		6	JAHH-65B-R3B			
		6	LPA-80063/6CF			
		3	B2/B66A RRH-BR049			
		3	B5/B13 RRH BR04C			
		3	FDJ85020Q4-S1			
		2	OVP-6			
		3	RRH 4X30-4T4R-B13		(6) 1 5/8" (1) Hybrid Cable	Verizon (Reserved)
		1	OVP Junction Box			
80.0	80.0	3	AIR21 KRC118023 B2A B4P	(9) 10'x2" Pipe Mounts	(6) 1 5/8" (1) 1 5/8" Hybrid	T-Mobile
		3	AIR21 KRC11803 B4P B2A			

Equipment to be Removed

This loading **is not** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
80.0	80.0	3	Twin Style 1B AWS TMAs	-	(6) 1 5/8"	T-Mobile

Proposed Equipment

This loading **is** included in the analysis.

Centerline Elevation (ft)		Qty.	Antenna	Mount Type	Coax (in)	Carrier
Mount	Equip.					
80.0	80.0	3	APXVAALL24_43-U-NA20	(3) **Existing** 10'x2" Pipe Mounts	(1) 1 5/8" Fiber (2) 1 5/8" Hybrid	T-Mobile
		3	4480 B71/B85			

Install proposed coax inside the pole shaft.

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Legs	100%	Pass
Diagonals	33%	Pass
Horizontals	28%	Pass
Bolts	56%	Pass
Flange	2%	Pass
Baseplate	2%	Pass
Anchor Bolts	35%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	3,631.6	37%
Axial (Kips)	137.2	0.5%
Total Shear (Kips)	56.2	12%
Reinf. Conc. Fnd. Capacity	N/A	99%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Standard Conditions

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

-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

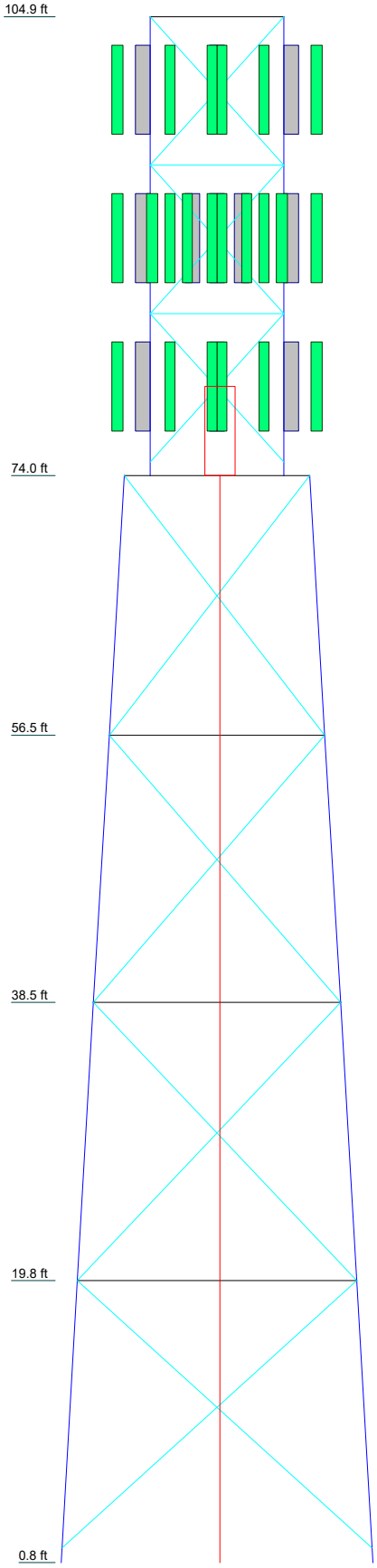
-- Information from drawings in the possession of Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings 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 that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and Semaan Engineering Solutions, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. 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.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (K)
L1	HSS4x4x1/4	A500-42	L3x3x3/16	A36	HSS4x4x1/4	HSS4x4x1/4	9	3 @ 10.0011	3.9
T1	HSS5x5x1/4				W10x49		12.5508	1 @ 17.5	5.7
T2			L6x6x5/16			N.A.	14.5607	1 @ 18	4.2
T3	HSS6x6x1/4				L6x6x5/16		16.628	1 @ 18.75	4.7
T4							18.7814	1 @ 18	5.0
							20.9635		23.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Roof	104.92	(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92
(3) 20'Øx 10' SSV Water Tower Sections	104.92 - 74.92	B2/B66A RRH-BR049 (Verizon)	84.92
20'Ø Ring Platform	104.92	B2/B66A RRH-BR049 (Verizon)	84.92
20'Ø Ring Platform	94.92	B2/B66A RRH-BR049 (Verizon)	84.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92	B5/B13 RRH BR04C (Verizon)	84.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92	B5/B13 RRH BR04C (Verizon)	84.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92	B5/B13 RRH BR04C (Verizon)	84.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92	FDJ85020Q4-S1 (Verizon)	84.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92	FDJ85020Q4-S1 (Verizon)	84.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92	FDJ85020Q4-S1 (Verizon)	84.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92	OVP-6 (Verizon)	84.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92	OVP-6 (Verizon)	84.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92	OVP Junction Box (Verizon)	84.92
OVP (23.5 x 9.7) (ATT)	94.92	RRH 4X30-4T4R-B13 (Verizon)	84.92
OVP (23.5 x 9.7) (ATT)	94.92	RRH 4X30-4T4R-B13 (Verizon)	84.92
OVP (23.5 x 9.7) (ATT)	94.92	RRH 4X30-4T4R-B13 (Verizon)	84.92
10'x2" Pipe Mount (ATT)	94.92	10'x2" Pipe Mount (Verizon)	84.92
10'x2" Pipe Mount (ATT)	94.92	10'x2" Pipe Mount (Verizon)	84.92
10'x2" Pipe Mount (ATT)	94.92	10'x2" Pipe Mount (Verizon)	84.92
L1 Ice Weight Offset (SST LP Section)	89.46	21' Main Platform Deck	74
20'Ø Ring Platform	84.92	6' x 24"Ø STD Pipe (Inside Water Tower)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	84.92	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	84.92	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	84.92	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92	4480 B71/B85 (T-Mobile)	74
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92	4480 B71/B85 (T-Mobile)	74
		4480 B71/B85 (T-Mobile)	74
		6' x 24"Ø STD Pipe (Below Water Tower)	74 - 0.75

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

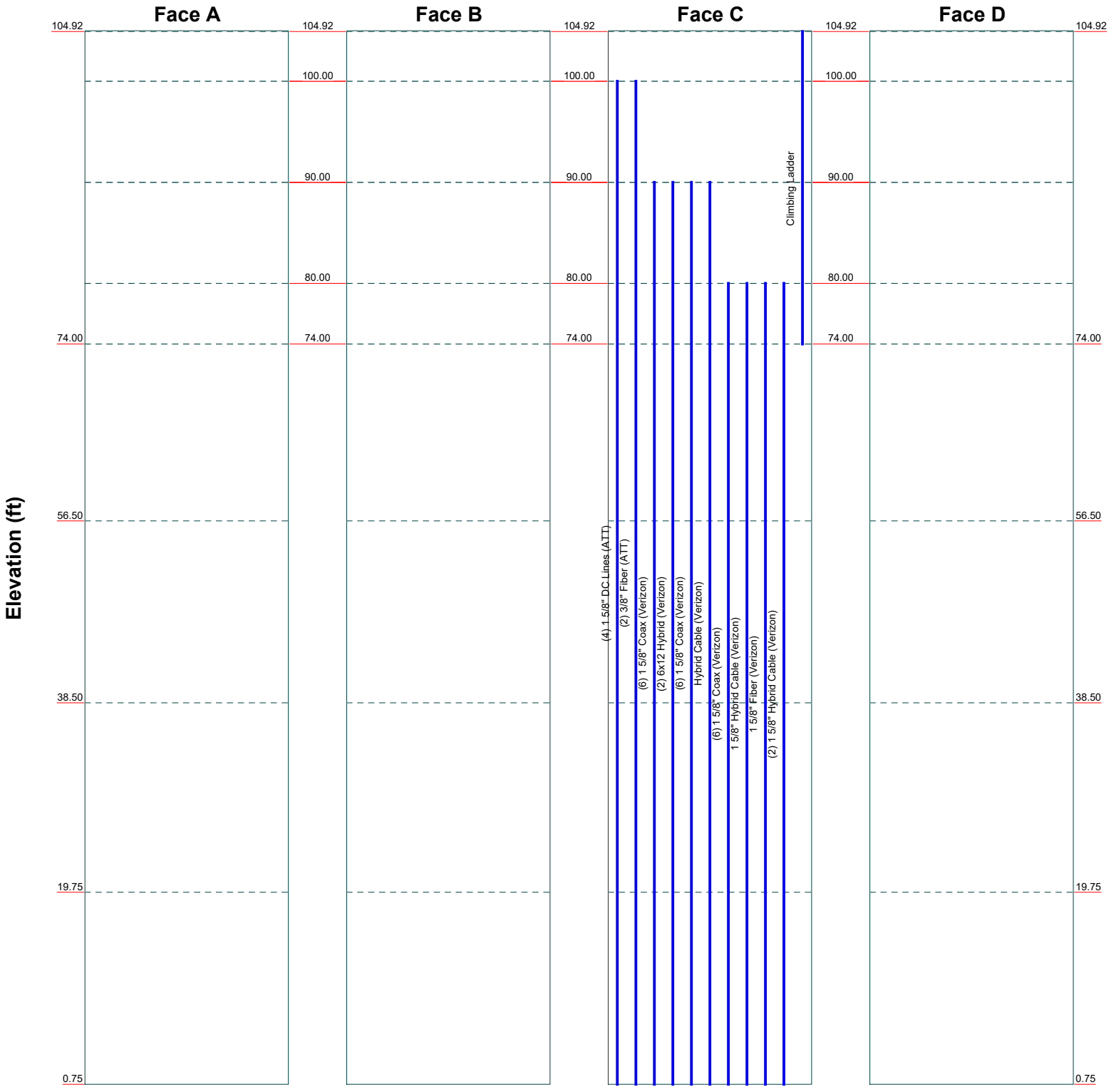
1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure D to the TIA-222-H Standard.
3. Tower designed for a 122 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft

Semaan Engineering Solutions
1047 N 205th Street
Elkhorn, NE 68022
Phone: 402.289.1888
FAX:

Job: ***28241_Branford South***			
Project: ***REV01_Full***			
Client: KGI	Drawn by: NathanW	App'd:	
Code: TIA-222-H	Date: 03/24/22	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Full.eri		Dwg No. E-1	

Feed Line Distribution Chart
9" - 104'11-1/32"

Round | Flat | App In Face | App Out Face | Truss Leg



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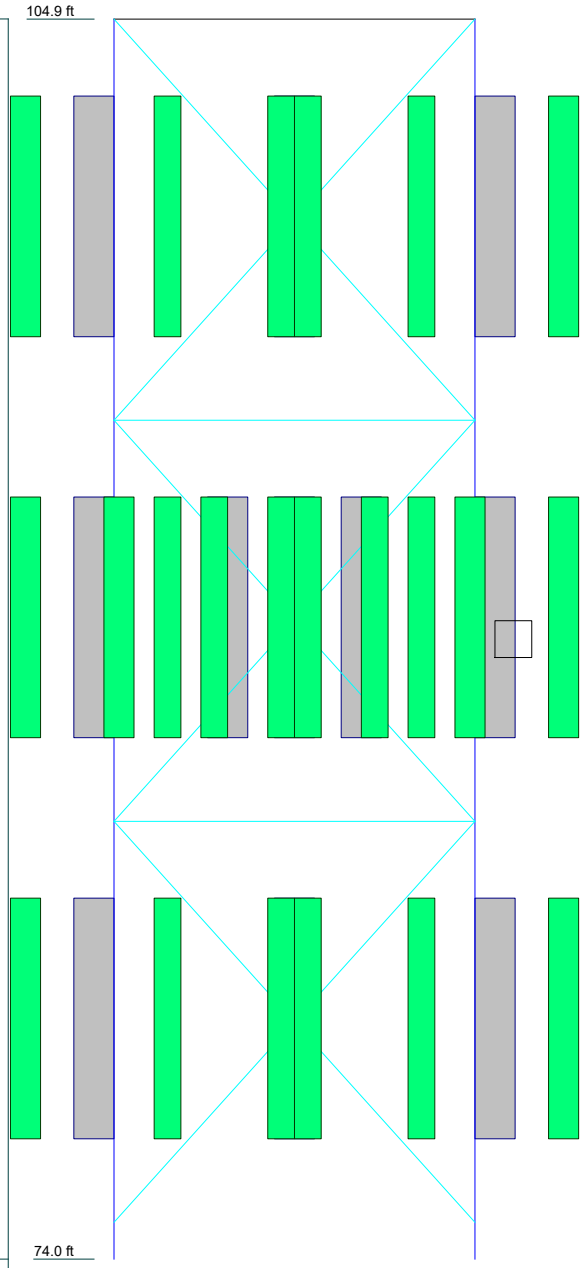
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Full.eri		Dwg No. E-7

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	HSS4x4x1/4	A500-42	L3x3x3/16	A36	HSS4x4x1/4	HSS4x4x1/4	9	3 @ 10.0011	3.9
									3.9



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Roof	104.92	B2/B66A RRH-BR049 (Verizon)	84.92
(3) 20'Øx 10' SSV Water Tower Sections	104.92 - 74.92	B2/B66A RRH-BR049 (Verizon)	84.92
20'Ø Ring Platform	104.92	B5/B13 RRH BR04C (Verizon)	84.92
20'Ø Ring Platform	94.92	B5/B13 RRH BR04C (Verizon)	84.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92	B5/B13 RRH BR04C (Verizon)	84.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92	FDJ85020Q4-S1 (Verizon)	84.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92	FDJ85020Q4-S1 (Verizon)	84.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92	FDJ85020Q4-S1 (Verizon)	84.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92	OVP-6 (Verizon)	84.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92	OVP-6 (Verizon)	84.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92	OVP Junction Box (Verizon)	84.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92	RRH 4X30-4T4R-B13 (Verizon)	84.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92	RRH 4X30-4T4R-B13 (Verizon)	84.92
OVP (23.5 x 9.7) (ATT)	94.92	RRH 4X30-4T4R-B13 (Verizon)	84.92
OVP (23.5 x 9.7) (ATT)	94.92	10'x2" Pipe Mount (Verizon)	84.92
OVP (23.5 x 9.7) (ATT)	94.92	10'x2" Pipe Mount (Verizon)	84.92
10'x2" Pipe Mount (ATT)	94.92	10'x2" Pipe Mount (Verizon)	84.92
10'x2" Pipe Mount (ATT)	94.92	20'Ø Ring Platform	84.92
10'x2" Pipe Mount (ATT)	94.92	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
L1 Ice Weight Offset (SST LP Section)	89.46	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	84.92	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	84.92	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	84.92	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92	4480 B71/B85 (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92	4480 B71/B85 (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92	4480 B71/B85 (T-Mobile)	74
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92		
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92		
B2/B66A RRH-BR049 (Verizon)	84.92		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure D to the TIA-222-H Standard.
3. Tower designed for a 122 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft

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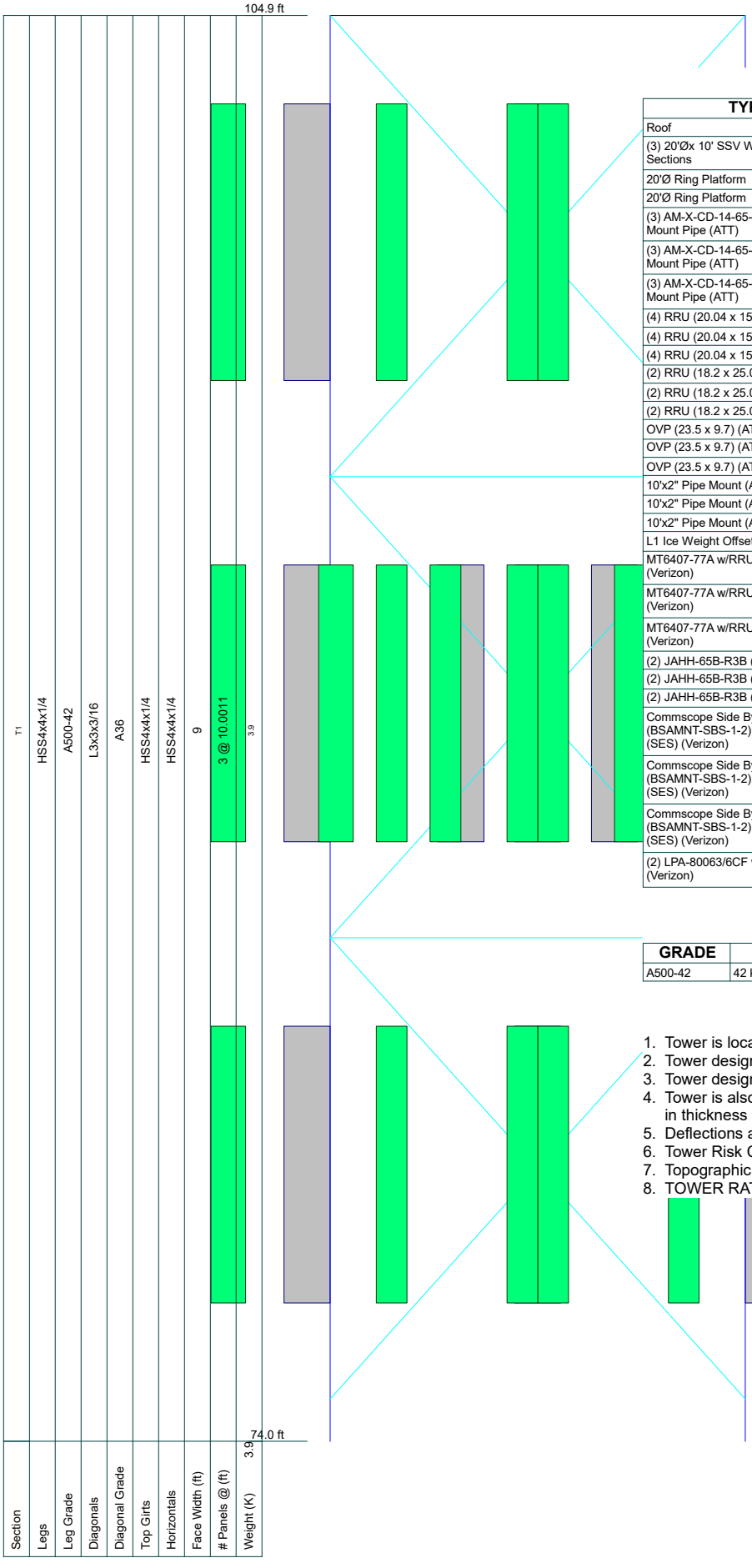
Project: ***REV01_Top***			
Client: KGI	Drawn by: NathanW	App'd:	
Code: TIA-222-H	Date: 03/24/22	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Top.eri		Dwg No. E-1	



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
Roof	104.92
(3) 20'Øx 10' SSV Water Tower Sections	104.92 - 74.92
20'Ø Ring Platform	104.92
20'Ø Ring Platform	94.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	94.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	94.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	94.92
OVP (23.5 x 9.7) (ATT)	94.92
OVP (23.5 x 9.7) (ATT)	94.92
OVP (23.5 x 9.7) (ATT)	94.92
10'x2" Pipe Mount (ATT)	94.92
10'x2" Pipe Mount (ATT)	94.92
10'x2" Pipe Mount (ATT)	94.92
L1 Ice Weight Offset (SST LP Section)	89.46
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	84.92
(2) JAHH-65B-R3B (Verizon)	84.92
(2) JAHH-65B-R3B (Verizon)	84.92
(2) JAHH-65B-R3B (Verizon)	84.92
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	84.92
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92

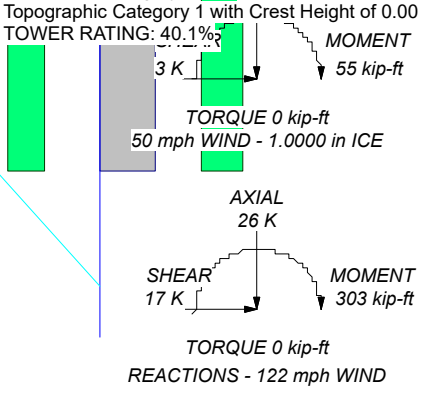
TYPE	ELEVATION
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	84.92
B2/B66A RRH-BR049 (Verizon)	84.92
B2/B66A RRH-BR049 (Verizon)	84.92
B2/B66A RRH-BR049 (Verizon)	84.92
B5/B13 RRH BR04C (Verizon)	84.92
B5/B13 RRH BR04C (Verizon)	84.92
B5/B13 RRH BR04C (Verizon)	84.92
FDJ85020Q4-S1 (Verizon)	84.92
FDJ85020Q4-S1 (Verizon)	84.92
FDJ85020Q4-S1 (Verizon)	84.92
OVP-6 (Verizon)	84.92
OVP-6 (Verizon)	84.92
OVP Junction Box (Verizon)	84.92
RRH 4X30-4T4R-B13 (Verizon)	84.92
RRH 4X30-4T4R-B13 (Verizon)	84.92
RRH 4X30-4T4R-B13 (Verizon)	84.92
10'x2" Pipe Mount (Verizon)	84.92
10'x2" Pipe Mount (Verizon)	84.92
10'x2" Pipe Mount (Verizon)	84.92
20'Ø Ring Platform	84.92
AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
4480 B71/B85 (T-Mobile)	74
4480 B71/B85 (T-Mobile)	74
4480 B71/B85 (T-Mobile)	74
AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure D to the TIA-222-H Standard.
3. Tower designed for a 122 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II. *39 K*
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 40.1%



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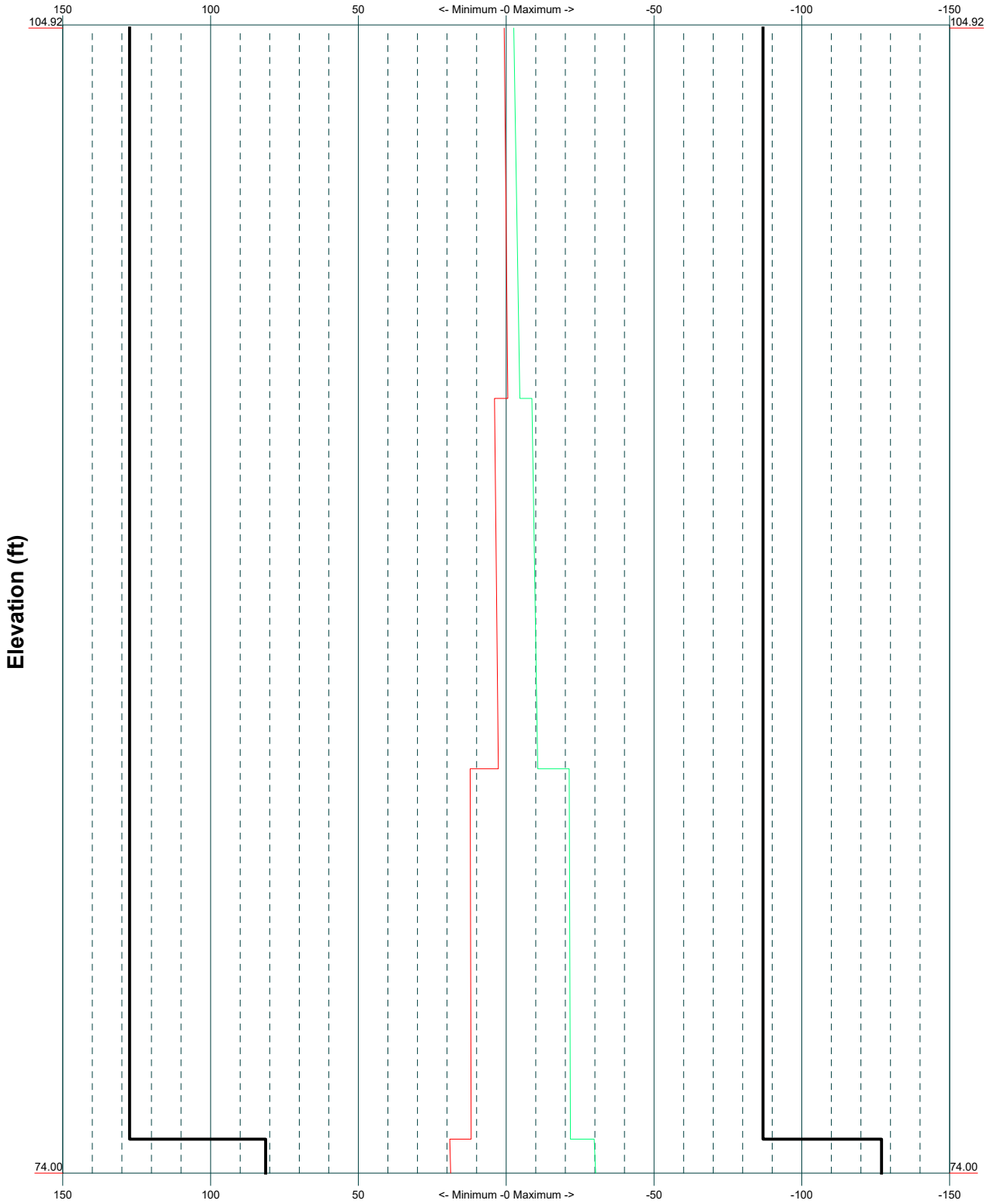
Job: ***28241_Branford South***			
Project: ***REV01_Top***			
Client: KGI	Drawn by: NathanW	App'd:	
Code: TIA-222-H	Date: 03/24/22	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Top.eri		Dwg No. E-1	

TIA-222-H - 122 mph/50 mph 1.0000 in Ice Exposure D

Leg Capacity ——— **Leg Compression (K)**



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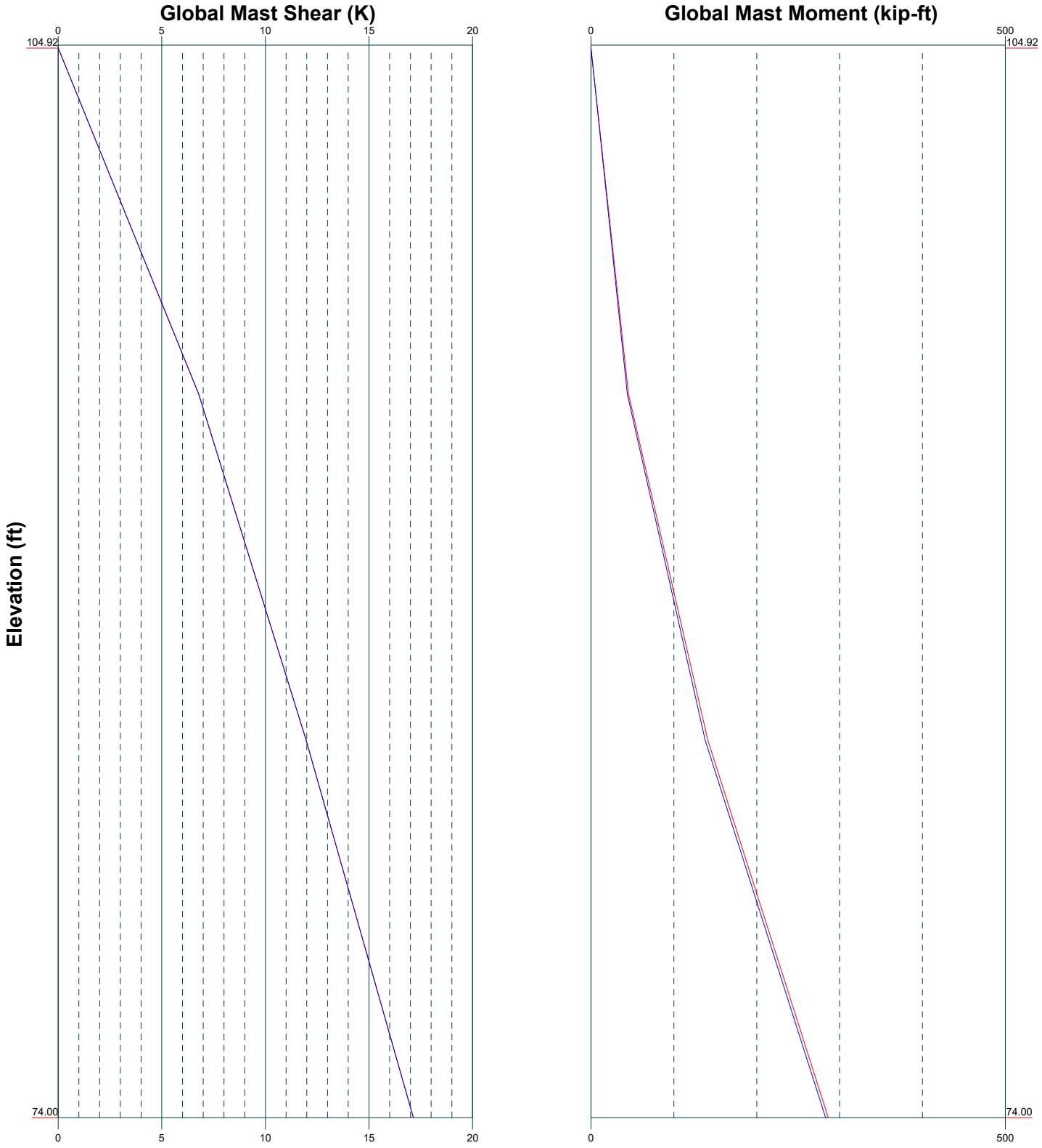
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Top.eri		Dwg No. E-3	

TIA-222-H - 122 mph/50 mph 1.0000 in Ice Exposure D

Maximum Values

Vx Vz Mx Mz



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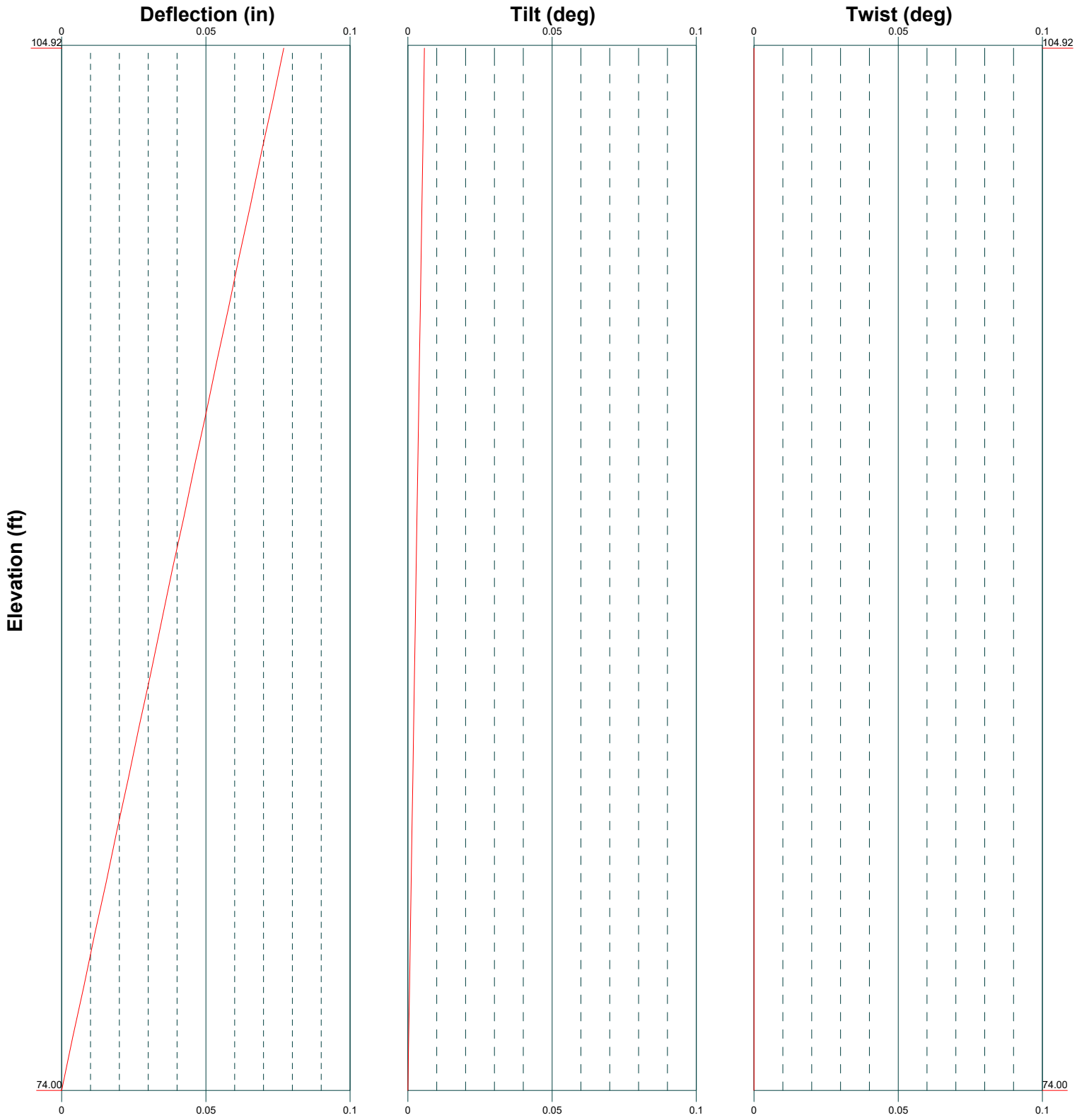
Code: TIA-222-H	Date: 03/24/22	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Top.eri		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values



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Job: ***28241_Branford South***		
Project: ***REV01_Top***		
Client: KGI	Drawn by: NathanW	App'd:
Code: TIA-222-H	Date: 03/24/22	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Top.eri		Dwg No. E-5

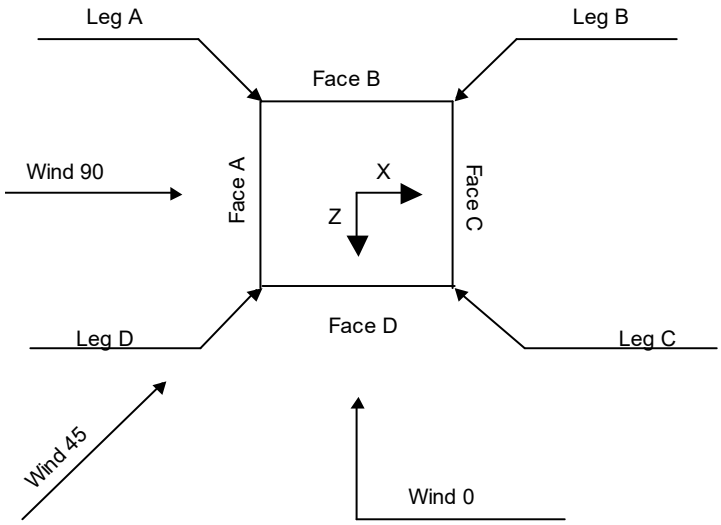
Tower Input Data

The main tower is a 4x free standing tower with an overall height of 104.92 ft above the ground line.
The base of the tower is set at an elevation of 74.00 ft above the ground line.
The face width of the tower is 9.00 ft at the top and 9.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Tower base elevation above sea level: 118.78 ft.
Basic wind speed of 122 mph.
Risk Category II.
Exposure Category D.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	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-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H 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 ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	104.92-74.00			9.00	1	30.92

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	104.92-74.00	10.00	X Brace	No	Yes	0.0000	11.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 104.92-74.00	Tube	HSS4x4x1/4	A500-42 (42 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 104.92-74.00	Tube	HSS4x4x1/4	A500-42 (42 ksi)	Equal 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 104.92-74.00	None	Flat Bar		A36 (36 ksi)	Tube	HSS4x4x1/4	A500-42 (42 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 104.92-74.00	0.00	0.2500	A572-50 (50 ksi)	0	0	1	0.0000	0.0000	0.0000

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	No	1	1	1	1	1	1	1	1
104.92-74.00				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 104.92-74.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower 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 104.92-74.00	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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 104.92-74.00	Flange	0.6250 A325N	4	0.6250 A325X	2	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	2	0.6250 A325X	0

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8" DC Lines (ATT)	C	No	Yes	CaAa (In Face)	100.00 - 74.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.78 1.78 1.78
3/8" Fiber (ATT)	C	No	Yes	CaAa (In Face)	100.00 - 74.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.06 0.06 0.06
*									
1 5/8" Coax (Verizon)	C	No	Yes	CaAa (In Face)	90.00 - 74.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
6x12 Hybrid (Verizon)	C	No	Yes	CaAa (In Face)	90.00 - 74.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.70 1.70 1.70
1 5/8" Coax (Verizon)	C	No	Yes	CaAa (In Face)	90.00 - 74.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
Hybrid Cable	C	No	Yes	CaAa (In	90.00 - 74.00	1	No Ice	0.00	1.78

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(Verizon)				Face)			1/2" Ice	0.00	1.78
							1" Ice	0.00	1.78
*									
1 5/8" Coax	C	No	Yes	CaAa (In	80.00 - 74.00	6	No Ice	0.00	1.04
(Verizon)				Face)			1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
1 5/8" Hybrid Cable	C	No	Yes	CaAa (In	80.00 - 74.00	1	No Ice	0.00	1.78
(Verizon)				Face)			1/2" Ice	0.00	1.78
							1" Ice	0.00	1.78
1 5/8" Fiber	C	No	Yes	CaAa (In	80.00 - 74.00	1	No Ice	0.00	1.04
(Verizon)				Face)			1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
1 5/8" Hybrid Cable	C	No	Yes	CaAa (In	80.00 - 74.00	2	No Ice	0.00	1.78
(Verizon)				Face)			1/2" Ice	0.00	1.78
							1" Ice	0.00	1.78
*									
Climbing Ladder	C	No	Yes	CaAa (In	104.92 - 74.00	1	No Ice	0.00	3.60
				Face)			1/2" Ice	0.00	3.60
							1" Ice	0.00	3.60

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	104.92-74.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.66
		D	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	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	104.92-74.00	A	1.105	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.66
		D		0.000	0.000	0.000	0.000	0.00

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	1 5/8" DC Lines	74.00 - 100.00	1.0000	1.0000
T1	2	3/8" Fiber	74.00 - 100.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	4	1 5/8" Coax	74.00 - 90.00	1.0000	1.0000
T1	5	6x12 Hybrid	74.00 - 90.00	1.0000	1.0000
T1	6	1 5/8" Coax	74.00 - 90.00	1.0000	1.0000
T1	7	Hybrid Cable	74.00 - 90.00	1.0000	1.0000
T1	9	1 5/8" Coax	74.00 - 80.00	1.0000	1.0000
T1	10	1 5/8" Hybrid Cable	74.00 - 80.00	1.0000	1.0000
T1	11	1 5/8" Fiber	74.00 - 80.00	1.0000	1.0000
T1	12	1 5/8" Hybrid Cable	74.00 - 80.00	1.0000	1.0000
T1	14	Climbing Ladder	74.00 - 104.92	1.0000	1.0000

User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle		Weight	F_x	F_z	Wind Force	C_AA_C
	ft	ft	°		K	K	K	K	ft²
L1 Ice Weight Offset (SST LP Section)	89.46	0.00	0.0000	No Ice	0.00	0.00	0.00	**0.00**	0.00
				Ice	-3.93	0.00	0.00	**0.00**	0.00
				Service	0.00	0.00	0.00	**0.00**	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft²	ft²	K
Roof	D	From Centroid-Face	0.00 0.00 1.30	0.0000	104.92	No Ice 1/2" Ice 1" Ice	40.00 40.80 41.60	40.00 40.80 41.60	1.45 2.70 3.95
(3) 20'Øx 10' SSV Water Tower Sections	D	None		0.0000	104.92 - 74.92	No Ice 1/2" Ice 1" Ice	402.00 403.70 405.40	402.00 403.70 405.40	3.05 7.45 11.85
20'Ø Ring Platform	D	None		0.0000	104.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	2.35 2.35 2.35
20'Ø Ring Platform	D	None		0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	2.35 2.35 2.35
20'Ø Ring Platform	D	None		0.0000	84.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	2.35 2.35 2.35
*									
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	B	From Centroid-Face	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.09 0.09 0.09
(3) AM-X-CD-14-65-00T-RET	C	From Centroid-Le	4.50 0.00	0.0000	94.92	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.09 0.09

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
w/10' Mount Pipe (ATT)		g	5.08			1" Ice	0.00	0.00	0.09
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	D	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.09 0.09 0.09
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	B	From Centroid-Fa ce	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.04 0.04
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	C	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.04 0.04
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	D	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.04 0.04
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	B	From Centroid-Fa ce	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	C	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	D	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
OVP (23.5 x 9.7) (ATT)	B	From Centroid-Fa ce	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
OVP (23.5 x 9.7) (ATT)	C	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
OVP (23.5 x 9.7) (ATT)	D	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
10'x2" Pipe Mount (ATT)	B	From Centroid-Fa ce	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.05 0.05
10'x2" Pipe Mount (ATT)	C	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.05 0.05
10'x2" Pipe Mount (ATT)	D	From Centroid-Le g	4.50 0.00 5.08	0.0000	94.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.05 0.05
*									
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	B	From Centroid-Fa ce	4.50 0.00 5.08	0.0000	84.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.14 0.14 0.14
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	C	From Centroid-Le g	4.50 0.00 5.08	0.0000	84.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.14 0.14 0.14
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	D	From Centroid-Le g	4.50 0.00 5.08	0.0000	84.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.14 0.14 0.14
(2) JAHH-65B-R3B (Verizon)	B	From Centroid-Fa ce	4.50 0.00 5.08	0.0000	84.92	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
(2) JAHH-65B-R3B (Verizon)	C	From Centroid-Le	4.50 0.00	0.0000	84.92	No Ice 1/2" Ice	0.00 0.00	0.00 0.00	0.06 0.06

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
		g	5.08			1" Ice	0.00	0.00	0.06
(2) JAHH-65B-R3B	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.06
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.06
		g	5.08			1" Ice	0.00	0.00	0.06
Commscope Side By Side	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.08
(BSAMNT-SBS-1-2) w/10'		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.08
Mount Pipe (SES)		ce	5.08			1" Ice	0.00	0.00	0.08
(Verizon)									
Commscope Side By Side	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.08
(BSAMNT-SBS-1-2) w/10'		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.08
Mount Pipe (SES)		g	5.08			1" Ice	0.00	0.00	0.08
(Verizon)									
Commscope Side By Side	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.08
(BSAMNT-SBS-1-2) w/10'		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.08
Mount Pipe (SES)		g	5.08			1" Ice	0.00	0.00	0.08
(Verizon)									
(2) LPA-80063/6CF w/10'	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.08
Mount Pipe		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.08
(Verizon)		ce	5.08			1" Ice	0.00	0.00	0.08
(2) LPA-80063/6CF w/10'	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.08
Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.08
(Verizon)		g	5.08			1" Ice	0.00	0.00	0.08
(2) LPA-80063/6CF w/10'	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.08
Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.08
(Verizon)		g	5.08			1" Ice	0.00	0.00	0.08
B2/B66A RRH-BR049	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.10
(Verizon)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.10
		ce	5.08			1" Ice	0.00	0.00	0.10
B2/B66A RRH-BR049	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.10
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.10
		g	5.08			1" Ice	0.00	0.00	0.10
B2/B66A RRH-BR049	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.10
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.10
		g	5.08			1" Ice	0.00	0.00	0.10
B5/B13 RRH BR04C	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.07
(Verizon)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.07
		ce	5.08			1" Ice	0.00	0.00	0.07
B5/B13 RRH BR04C	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.07
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.07
		g	5.08			1" Ice	0.00	0.00	0.07
B5/B13 RRH BR04C	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.07
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.07
		g	5.08			1" Ice	0.00	0.00	0.07
FDJ85020Q4-S1	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.02
(Verizon)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.02
		ce	5.08			1" Ice	0.00	0.00	0.02
FDJ85020Q4-S1	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.02
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.02
		g	5.08			1" Ice	0.00	0.00	0.02
FDJ85020Q4-S1	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.02
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.02
		g	5.08			1" Ice	0.00	0.00	0.02
OVP-6	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.02
(Verizon)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.02
		ce	5.08			1" Ice	0.00	0.00	0.02
OVP-6	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.02
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.02

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
		g	5.08			1" Ice	0.00	0.00	0.02
OVP Junction Box	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.02
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.02
		g	5.08			1" Ice	0.00	0.00	0.02
RRH 4X30-4T4R-B13	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.03
(Verizon)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.03
		ce	5.08			1" Ice	0.00	0.00	0.03
RRH 4X30-4T4R-B13	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.03
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.03
		g	5.08			1" Ice	0.00	0.00	0.03
RRH 4X30-4T4R-B13	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.03
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.03
		g	5.08			1" Ice	0.00	0.00	0.03
10'x2" Pipe Mount	B	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.04
(Verizon)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.04
		ce	5.08			1" Ice	0.00	0.00	0.04
10'x2" Pipe Mount	C	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.04
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.04
		g	5.08			1" Ice	0.00	0.00	0.04
10'x2" Pipe Mount	D	From	4.50	0.0000	84.92	No Ice	0.00	0.00	0.04
(Verizon)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.04
		g	5.08			1" Ice	0.00	0.00	0.04
*									
AIR21 KRC118023 B2A B4P	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.15
w/10' Mount Pipe		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.15
(T-Mobile)		ce	6.00			1" Ice	0.00	0.00	0.15
AIR21 KRC118023 B2A B4P	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.15
w/10' Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.15
(T-Mobile)		g	6.00			1" Ice	0.00	0.00	0.15
AIR21 KRC118023 B2A B4P	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.15
w/10' Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.15
(T-Mobile)		g	6.00			1" Ice	0.00	0.00	0.15
AIR21 KRC11803 B4P B2A	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.15
w/10' Mount Pipe		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.15
(T-Mobile)		ce	6.00			1" Ice	0.00	0.00	0.15
AIR21 KRC11803 B4P B2A	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.15
w/10' Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.15
(T-Mobile)		g	6.00			1" Ice	0.00	0.00	0.15
AIR21 KRC11803 B4P B2A	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.15
w/10' Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.15
(T-Mobile)		g	6.00			1" Ice	0.00	0.00	0.15
APXVAALL24_43-U-NA20	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.11
w/10' Mount Pipe		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.11
(T-Mobile)		ce	6.00			1" Ice	0.00	0.00	0.11
APXVAALL24_43-U-NA20	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.11
w/10' Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.11
(T-Mobile)		g	6.00			1" Ice	0.00	0.00	0.11
APXVAALL24_43-U-NA20	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.11
w/10' Mount Pipe		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.11
(T-Mobile)		g	6.00			1" Ice	0.00	0.00	0.11
4480 B71/B85	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.08
(T-Mobile)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.08
		ce	6.00			1" Ice	0.00	0.00	0.08
4480 B71/B85	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.08
(T-Mobile)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.08
		g	6.00			1" Ice	0.00	0.00	0.08
4480 B71/B85	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	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
(T-Mobile)		Centroid-Leg	0.00 6.00			1/2" Ice 1" Ice	0.00 0.00	0.00 0.00	0.08 0.08

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 104.92-74.00	89.46	1.405	45	288.587	A	0.000	0.000	20.613	100.00	0.000	0.000
					B	0.000	0.000		100.00	0.000	0.000
					C	0.000	0.000		100.00	0.000	0.000
					D	0.000	0.000		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	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 104.92-74.00	89.46	1.405	8	1.1049	294.280	A	0.000	0.000	32.001	100.00	0.000	0.000
						B	0.000	0.000		100.00	0.000	0.000
						C	0.000	0.000		100.00	0.000	0.000
						D	0.000	0.000		100.00	0.000	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 104.92-74.00	89.46	1.405	11	288.587	A	0.000	0.000	20.613	100.00	0.000	0.000
					B	0.000	0.000		100.00	0.000	0.000
					C	0.000	0.000		100.00	0.000	0.000
					D	0.000	0.000		100.00	0.000	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	0.66	3.85	A	0	4	45	1	1	0.000	0.00	0.00	D
104.92-74.00			B	0	4		1	1	0.000			
			C	0	4		1	1	0.000			
			D	0	4		1	1	0.000			
Sum Weight:	0.66	3.85						OTM	0.00 kip-ft	0.00		

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	0.66	3.85	A	0	4	45	1	1	0.000	0.00	0.00	D
104.92-74.00			B	0	4		1	1	0.000			
			C	0	4		1	1	0.000			
			D	0	4		1	1	0.000			
Sum Weight:	0.66	3.85						OTM	0.00 kip-ft	0.00		

Tower Forces - With 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	0.66	7.78	A	0	4	8	1	1	0.000	0.00	0.00	D
104.92-74.00			B	0	4		1	1	0.000			
			C	0	4		1	1	0.000			
			D	0	4		1	1	0.000			
Sum Weight:	0.66	7.78						OTM	0.00 kip-ft	0.00		

Tower Forces - With 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	0.66	7.78	A	0	4	8	1	1	0.000	0.00	0.00	D
104.92-74.00			B	0	4		1	1	0.000			
			C	0	4		1	1	0.000			

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
Sum Weight:	0.66	7.78	D	0	4		1	1 OTM	0.000 0.00 kip-ft	0.00		

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 ft²	F K	w plf	Ctrl. Face
T1 104.92-74.00	0.66	3.85	A B C D	0 0 0 0	4 4 4 4	11	1 1 1 1	1 1 1 1	0.000 0.000 0.000 0.000	0.00	0.00	D
Sum Weight:	0.66	3.85						OTM	0.00 kip-ft	0.00		

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 ft²	F K	w plf	Ctrl. Face
T1 104.92-74.00	0.66	3.85	A B C D	0 0 0 0	4 4 4 4	11	1 1 1 1	1 1 1 1	0.000 0.000 0.000 0.000	0.00	0.00	D
Sum Weight:	0.66	3.85						OTM	0.00 kip-ft	0.00		

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	1.42					
Bracing Weight	2.44					
Total Member Self-Weight	3.85			3.57	0.00	
Total Weight	21.81			3.57	0.00	
Wind 0 deg - No Ice		0.00	-17.13	-295.16	0.00	0.00
Wind 45 deg - No Ice		12.12	-12.12	-207.66	-211.23	0.00
Wind 90 deg - No Ice		17.13	0.00	3.57	-298.73	0.00
Wind 135 deg - No Ice		12.12	12.12	214.80	-211.23	0.00
Wind 180 deg - No Ice		0.00	17.13	302.30	0.00	0.00
Wind 225 deg - No Ice		-12.12	12.12	214.80	211.23	0.00
Wind 270 deg - No Ice		-17.13	0.00	3.57	298.73	0.00

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 315 deg - No Ice		-12.12	-12.12	-207.66	211.23	0.00
Member Ice	3.93					
Total Weight Ice	34.40			3.60	0.00	
Wind 0 deg - Ice		0.00	-2.91	-47.35	0.00	0.00
Wind 45 deg - Ice		2.06	-2.06	-32.42	-36.03	0.00
Wind 90 deg - Ice		2.91	0.00	3.60	-50.95	0.00
Wind 135 deg - Ice		2.06	2.06	39.63	-36.03	0.00
Wind 180 deg - Ice		0.00	2.91	54.56	0.00	0.00
Wind 225 deg - Ice		-2.06	2.06	39.63	36.03	0.00
Wind 270 deg - Ice		-2.91	0.00	3.60	50.95	0.00
Wind 315 deg - Ice		-2.06	-2.06	-32.42	36.03	0.00
Total Weight	21.81			3.57	0.00	
Wind 0 deg - Service		0.00	-4.14	-68.68	0.00	0.00
Wind 45 deg - Service		2.93	-2.93	-47.52	-51.09	0.00
Wind 90 deg - Service		4.14	0.00	3.57	-72.25	0.00
Wind 135 deg - Service		2.93	2.93	54.66	-51.09	0.00
Wind 180 deg - Service		0.00	4.14	75.82	0.00	0.00
Wind 225 deg - Service		-2.93	2.93	54.66	51.09	0.00
Wind 270 deg - Service		-4.14	0.00	3.57	72.25	0.00
Wind 315 deg - Service		-2.93	-2.93	-47.52	51.09	0.00

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 45 deg - No Ice
5	0.9 Dead+1.0 Wind 45 deg - No Ice
6	1.2 Dead+1.0 Wind 90 deg - No Ice
7	0.9 Dead+1.0 Wind 90 deg - No Ice
8	1.2 Dead+1.0 Wind 135 deg - No Ice
9	0.9 Dead+1.0 Wind 135 deg - No Ice
10	1.2 Dead+1.0 Wind 180 deg - No Ice
11	0.9 Dead+1.0 Wind 180 deg - No Ice
12	1.2 Dead+1.0 Wind 225 deg - No Ice
13	0.9 Dead+1.0 Wind 225 deg - No Ice
14	1.2 Dead+1.0 Wind 270 deg - No Ice
15	0.9 Dead+1.0 Wind 270 deg - No Ice
16	1.2 Dead+1.0 Wind 315 deg - No Ice
17	0.9 Dead+1.0 Wind 315 deg - No Ice
18	1.2 Dead+1.0 Ice+1.0 Temp
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 45 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 135 deg - Service
31	Dead+Wind 180 deg - Service

Comb. No.	Description
32	Dead+Wind 225 deg - Service
33	Dead+Wind 270 deg - Service
34	Dead+Wind 315 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	104.92 - 74	Leg	Max Tension	13	19.07	4.03	0.00
			Max. Compression	8	-30.26	0.00	-0.00
			Max. Mx	12	-29.75	-4.91	-0.01
			Max. My	4	-5.74	-0.23	3.58
			Max. Vy	12	-5.36	0.00	0.00
			Max. Vx	16	-3.89	0.00	-0.00
		Diagonal	Max Tension	15	6.29	0.00	0.00
			Max. Compression	6	-6.65	0.00	0.00
			Max. Mx	24	-0.38	0.05	0.00
			Max. My	10	-6.61	-0.00	-0.01
			Max. Vy	22	-0.03	0.05	-0.00
			Max. Vx	10	-0.00	0.00	0.00
		Horizontal	Max Tension	10	1.61	0.00	0.00
			Max. Compression	11	-0.61	0.00	0.00
			Max. Mx	18	0.33	0.21	0.00
			Max. Vy	18	-0.09	0.00	0.00
		Top Girt	Max Tension	2	0.21	0.00	0.00
			Max. Compression	3	-0.02	0.00	0.00
			Max. Mx	18	0.19	0.21	0.00
			Max. Vy	18	-0.09	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	12	30.32	3.53	-3.52
	Max. H_x	14	23.40	4.40	-0.69
	Max. H_z	3	-11.53	-0.30	4.22
	Min. Vert	5	-18.38	-3.25	3.25
	Min. H_x	7	-11.53	-4.22	0.30
	Min. H_z	10	23.40	0.69	-4.40
Leg C	Max. Vert	8	30.32	-3.53	-3.52
	Max. H_x	15	-11.53	4.22	0.30
	Max. H_z	3	-11.53	0.30	4.22
	Min. Vert	17	-18.38	3.25	3.25
	Min. H_x	6	23.40	-4.40	-0.69
	Min. H_z	10	23.40	-0.69	-4.40
Leg B	Max. Vert	4	29.85	-3.51	3.52
	Max. H_x	15	-11.89	4.23	-0.30
	Max. H_z	2	22.93	-0.68	4.40
	Min. Vert	13	-18.73	3.26	-3.25
	Min. H_x	6	22.93	-4.39	0.69
	Min. H_z	11	-11.89	0.31	-4.23
Leg A	Max. Vert	16	29.85	3.51	3.52
	Max. H_x	14	22.93	4.39	0.69

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_z	2	22.93	0.68	4.40
	Min. Vert	9	-18.73	-3.26	-3.25
	Min. H_x	7	-11.89	-4.23	-0.30
	Min. H_z	11	-11.89	-0.31	-4.23

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	21.81	0.00	0.00	3.57	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	26.17	0.00	-17.13	-294.91	0.00	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	19.63	0.00	-17.13	-295.86	0.00	0.00
1.2 Dead+1.0 Wind 45 deg - No Ice	26.17	12.12	-12.12	-207.28	-211.56	0.00
0.9 Dead+1.0 Wind 45 deg - No Ice	19.63	12.12	-12.12	-208.27	-211.48	0.00
1.2 Dead+1.0 Wind 90 deg - No Ice	26.17	17.13	-0.00	4.29	-299.20	0.00
0.9 Dead+1.0 Wind 90 deg - No Ice	19.63	17.13	-0.00	3.22	-299.08	0.00
1.2 Dead+1.0 Wind 135 deg - No Ice	26.17	12.12	12.12	215.85	-211.56	0.00
0.9 Dead+1.0 Wind 135 deg - No Ice	19.63	12.12	12.12	214.70	-211.48	0.00
1.2 Dead+1.0 Wind 180 deg - No Ice	26.17	0.00	17.13	303.48	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	19.63	0.00	17.13	302.29	0.00	0.00
1.2 Dead+1.0 Wind 225 deg - No Ice	26.17	-12.12	12.12	215.85	211.56	-0.00
0.9 Dead+1.0 Wind 225 deg - No Ice	19.63	-12.12	12.12	214.70	211.48	-0.00
1.2 Dead+1.0 Wind 270 deg - No Ice	26.17	-17.13	-0.00	4.29	299.20	-0.00
0.9 Dead+1.0 Wind 270 deg - No Ice	19.63	-17.13	-0.00	3.22	299.08	-0.00
1.2 Dead+1.0 Wind 315 deg - No Ice	26.17	-12.12	-12.12	-207.28	211.56	-0.00
0.9 Dead+1.0 Wind 315 deg - No Ice	19.63	-12.12	-12.12	-208.27	211.48	-0.00
1.2 Dead+1.0 Ice+1.0 Temp	38.76	0.00	0.00	4.32	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	38.76	0.00	-2.91	-46.71	0.00	0.00
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	38.76	2.06	-2.06	-31.77	-36.09	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	38.76	2.91	0.00	4.32	-51.03	0.00
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	38.76	2.06	2.06	40.41	-36.09	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	38.76	0.00	2.91	55.36	0.00	0.00
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	38.76	-2.06	2.06	40.41	36.09	-0.00
1.2 Dead+1.0 Wind 270	38.76	-2.91	0.00	4.32	51.03	-0.00

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 315	38.76	-2.06	-2.06	-31.77	36.09	-0.00
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	21.81	0.00	-4.14	-68.77	0.00	0.00
Dead+Wind 45 deg - Service	21.81	2.93	-2.93	-47.58	-51.15	0.00
Dead+Wind 90 deg - Service	21.81	4.14	0.00	3.57	-72.35	0.00
Dead+Wind 135 deg - Service	21.81	2.93	2.93	54.72	-51.15	-0.00
Dead+Wind 180 deg - Service	21.81	0.00	4.14	75.92	0.00	0.00
Dead+Wind 225 deg - Service	21.81	-2.93	2.93	54.72	51.15	0.00
Dead+Wind 270 deg - Service	21.81	-4.14	0.00	3.57	72.35	-0.00
Dead+Wind 315 deg - Service	21.81	-2.93	-2.93	-47.58	51.15	-0.00

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	-21.81	0.00	0.00	21.81	0.00	0.000%
2	0.00	-26.17	-17.13	0.00	26.17	17.13	0.000%
3	0.00	-19.63	-17.13	0.00	19.63	17.13	0.000%
4	12.12	-26.17	-12.12	-12.12	26.17	12.12	0.000%
5	12.12	-19.63	-12.12	-12.12	19.63	12.12	0.000%
6	17.13	-26.17	0.00	-17.13	26.17	0.00	0.000%
7	17.13	-19.63	0.00	-17.13	19.63	0.00	0.000%
8	12.12	-26.17	12.12	-12.12	26.17	-12.12	0.000%
9	12.12	-19.63	12.12	-12.12	19.63	-12.12	0.000%
10	0.00	-26.17	17.13	0.00	26.17	-17.13	0.000%
11	0.00	-19.63	17.13	0.00	19.63	-17.13	0.000%
12	-12.12	-26.17	12.12	12.12	26.17	-12.12	0.000%
13	-12.12	-19.63	12.12	12.12	19.63	-12.12	0.000%
14	-17.13	-26.17	0.00	17.13	26.17	0.00	0.000%
15	-17.13	-19.63	0.00	17.13	19.63	0.00	0.000%
16	-12.12	-26.17	-12.12	12.12	26.17	12.12	0.000%
17	-12.12	-19.63	-12.12	12.12	19.63	12.12	0.000%
18	0.00	-38.76	0.00	0.00	38.76	0.00	0.000%
19	0.00	-38.76	-2.91	0.00	38.76	2.91	0.000%
20	2.06	-38.76	-2.06	-2.06	38.76	2.06	0.000%
21	2.91	-38.76	0.00	-2.91	38.76	0.00	0.000%
22	2.06	-38.76	2.06	-2.06	38.76	-2.06	0.000%
23	0.00	-38.76	2.91	0.00	38.76	-2.91	0.000%
24	-2.06	-38.76	2.06	2.06	38.76	-2.06	0.000%
25	-2.91	-38.76	0.00	2.91	38.76	0.00	0.000%
26	-2.06	-38.76	-2.06	2.06	38.76	2.06	0.000%
27	0.00	-21.81	-4.14	0.00	21.81	4.14	0.000%
28	2.93	-21.81	-2.93	-2.93	21.81	2.93	0.000%
29	4.14	-21.81	0.00	-4.14	21.81	0.00	0.000%
30	2.93	-21.81	2.93	-2.93	21.81	-2.93	0.000%
31	0.00	-21.81	4.14	0.00	21.81	-4.14	0.000%
32	-2.93	-21.81	2.93	2.93	21.81	-2.93	0.000%
33	-4.14	-21.81	0.00	4.14	21.81	0.00	0.000%
34	-2.93	-21.81	-2.93	2.93	21.81	2.93	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	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	104.92 - 74	0.077	31	0.0060	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.92	Roof	31	0.077	0.0060	0.0000	Inf
99.92	(3) 20'Øx 10' SSV Water Tower Sections	31	0.064	0.0050	0.0000	Inf
94.92	(3) 20'Øx 10' SSV Water Tower Sections	31	0.052	0.0040	0.0000	Inf
89.92	(3) 20'Øx 10' SSV Water Tower	31	0.039	0.0031	0.0000	Inf

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Sections					
89.46	L1 Ice Weight Offset (SST LP Section)	31	0.038	0.0030	0.0000	Inf
84.92	(3) 20'Øx 10' SSV Water Tower Sections	31	0.027	0.0021	0.0000	Inf
79.92	(3) 20'Øx 10' SSV Water Tower Sections	31	0.015	0.0011	0.0000	Inf
74.92	(3) 20'Øx 10' SSV Water Tower Sections	31	0.002	0.0002	0.0000	Inf
74.00	AIR21 KRC118023 B2A B4P w/10' Mount Pipe	0	0.000	0.0000	0.0000	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	104.92 - 74	0.313	10	0.0239	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.92	Roof	10	0.313	0.0239	0.0000	Inf
99.92	(3) 20'Øx 10' SSV Water Tower Sections	10	0.263	0.0201	0.0000	Inf
94.92	(3) 20'Øx 10' SSV Water Tower Sections	10	0.212	0.0162	0.0000	Inf
89.92	(3) 20'Øx 10' SSV Water Tower Sections	10	0.161	0.0123	0.0000	Inf
89.46	L1 Ice Weight Offset (SST LP Section)	10	0.157	0.0120	0.0000	Inf
84.92	(3) 20'Øx 10' SSV Water Tower Sections	10	0.111	0.0085	0.0000	Inf
79.92	(3) 20'Øx 10' SSV Water Tower Sections	10	0.060	0.0046	0.0000	Inf
74.92	(3) 20'Øx 10' SSV Water Tower Sections	10	0.009	0.0007	0.0000	Inf
74.00	AIR21 KRC118023 B2A B4P w/10' Mount Pipe	0	0.000	0.0000	0.0000	Inf

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	104.92	Leg	A325N	0.6250	4	4.77	20.34	0.234 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	2	3.15	7.85	0.401 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	0.80	16.09	0.050 ✔	1	Gusset Bearing
		Top Girt	A325X	0.6250	2	0.11	16.09	0.007 ✔	1	Gusset Bearing

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	104.92 - 74	HSS4x4x1/4	30.92	10.00	79.0 K=1.00	3.3700	-21.74	86.86	0.250 [1] ✔

[1] P_u / ϕP_n controls

Diagonal 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	104.92 - 74	L3x3x3/16	13.45	6.27	124.9 K=0.99	1.0900	-6.65	19.95	0.333 [1] ✔

[1] P_u / ϕP_n controls

Horizontal 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	104.92 - 74	HSS4x4x1/4	9.00	8.67	68.4 K=1.00	3.3700	-0.61	95.55	0.006 [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	104.92 - 74	HSS4x4x1/4	9.00	8.67	68.4 K=1.00	3.3700	-0.02	95.55	0.000 [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 $\frac{P_u}{\phi P_n}$
T1	104.92 - 74	HSS4x4x1/4	30.92	0.92	7.2	3.3700	19.07	127.39	0.150 [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	104.92 - 74	L3x3x3/16	13.45	6.27	82.8	0.7120	6.29	30.97	0.203 [1] ✔

[1] P_u / ϕP_n controls

Horizontal 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	104.92 - 74	HSS4x4x1/4	9.00	8.67	68.4	3.3700	1.61	127.39	0.013 [1] ✔

[1] P_u / ϕP_n controls

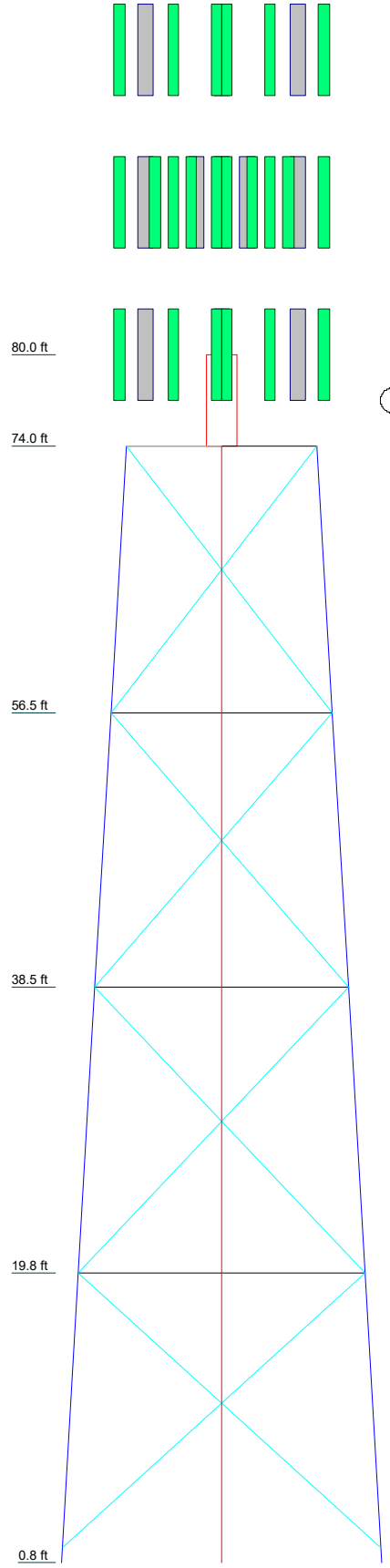
Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	104.92 - 74	HSS4x4x1/4	9.00	8.67	68.4	3.3700	0.21	127.39	0.002 [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	104.92 - 74	Leg	HSS4x4x1/4	2	-21.74	86.86	25.0	Pass
		Diagonal	L3x3x3/16	10	-6.65	19.95	33.3	Pass
		Horizontal	HSS4x4x1/4	17	1.61	127.39	1.3	Pass
		Top Girt	HSS4x4x1/4	5	0.21	127.39	0.2	Pass
							Summary	
						Leg (T1)	25.0	Pass
						Diagonal (T1)	33.3	Pass
						Horizontal (T1)	1.3	Pass
						Top Girt (T1)	0.2	Pass
						Bolt Checks	40.1	Pass
						RATING =	**40.1**	**Pass**



Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
L1	A	A53-B-42	N.A.	N.A.	N.A.	2	N.A.	0.6
T1	HSS5x5x1/4	A500-42	L6x6x5/16	A36	W10x49	12.5508	1 @ 17.5	7.4
T2						14.5607	1 @ 18	5.9
T3					L6x6x5/16	16.628	1 @ 18.75	6.5
T4	HSS6x6x1/4					18.7814	1 @ 18	6.8
						20.9635		27.1

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
L1 Ice Weight Offset (6'x24"Ø STD Pipe)	91	(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	74
(3) 20'Øx 10' SSV Water Tower Sections	74	(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	74
20'Ø Ring Platform	74	(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	74
20'Ø Ring Platform	74		
20'Ø Ring Platform	74	B2/B66A RRH-BR049 (Verizon)	74
21' Main Platform Deck	74	B2/B66A RRH-BR049 (Verizon)	74
Top Tower Section	74	B2/B66A RRH-BR049 (Verizon)	74
6' x 24"Ø STD Pipe (Below Water Tower)	74 - 0.75	B5/B13 RRH BR04C (Verizon)	74
		B5/B13 RRH BR04C (Verizon)	74
Coax in Top Tower Weight	74	B5/B13 RRH BR04C (Verizon)	74
Climb Ladder	74	FDJ85020Q4-S1 (Verizon)	74
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	74	FDJ85020Q4-S1 (Verizon)	74
		FDJ85020Q4-S1 (Verizon)	74
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	74	OVP-6 (Verizon)	74
		OVP-6 (Verizon)	74
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe (ATT)	74	OVP Junction Box (Verizon)	74
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	74	RRH 4X30-4T4R-B13 (Verizon)	74
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	74	RRH 4X30-4T4R-B13 (Verizon)	74
(4) RRU (20.04 x 15.08 x 6.65) (ATT)	74	RRH 4X30-4T4R-B13 (Verizon)	74
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	74	10'x2" Pipe Mount (Verizon)	74
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	74	10'x2" Pipe Mount (Verizon)	74
(2) RRU (18.2 x 25.0 x 6.7) (ATT)	74	10'x2" Pipe Mount (Verizon)	74
OVP (23.5 x 9.7) (ATT)	74	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
OVP (23.5 x 9.7) (ATT)	74	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
OVP (23.5 x 9.7) (ATT)	74	AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	74
10'x2" Pipe Mount (ATT)	74	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
10'x2" Pipe Mount (ATT)	74	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
10'x2" Pipe Mount (ATT)	74	AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	74	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	74	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	74	APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	74	4480 B71/B85 (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	74	4480 B71/B85 (T-Mobile)	74
(2) JAHH-65B-R3B (Verizon)	74	4480 B71/B85 (T-Mobile)	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	74	Roof	74
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	74		
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	74		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P24x3/8<ERW>		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure D to the TIA-222-H Standard.
3. Tower designed for a 122 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft

Semaan Engineering Solutions
1047 N 205th Street
Elkhorn, NE 68022
Phone: 402.289.1888
FAX:

Job: ***28241_Branford South***			
Project: ***REV01_Base***			
Client: KGI	Drawn by: NathanW	App'd:	
Code: TIA-222-H	Date: 03/24/22	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Base.eri		Dwg No. E-1	

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P24x3/8<ERW>		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
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TOWER DESIGN NOTES

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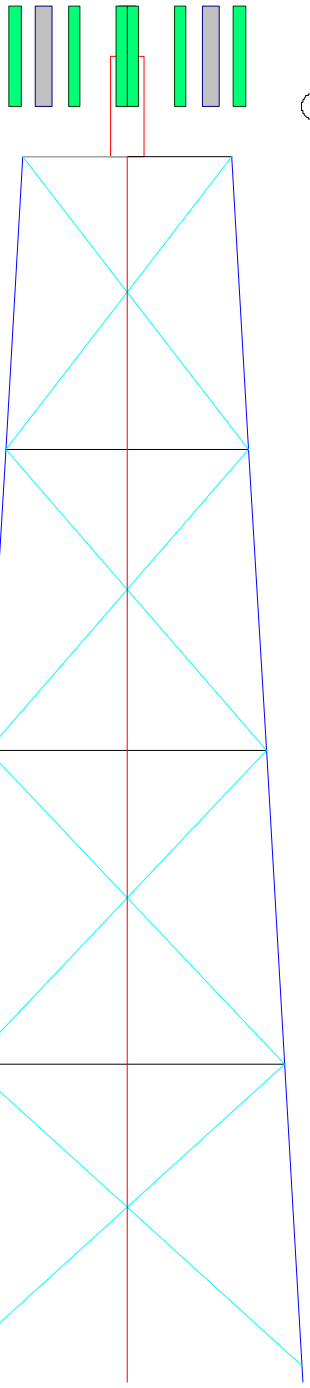
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. CCISeismic Note: Seismic loads generated by CCISeismic 3.3.6
9. CCISeismic Note: Seismic calculations are in accordance with TIA-222-H-1
10. TOWER RATING: 100%



Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
L1	A	A53-B-42	N.A.	N.A.	N.A.	2	N.A.	0.6
T1	HSS5x5x1/4	A500-42	L6x6x5/16	A36	W10x49	12.5508	1 @ 17.5	7.4
T2					L6x6x5/16	14.5607	1 @ 18	5.9
T3						16.628	1 @ 18.75	6.5
T4	HSS6x6x1/4					18.7814	1 @ 18	6.8
						20.9635		27.1

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 137 K
SHEAR: 25 K

UPLIFT: -111 K
SHEAR: 22 K

AXIAL 71 K
SHEAR 2 K *MOMENT 179 kip-ft*
TORQUE 0 kip-ft
SEISMIC

AXIAL 97 K
SHEAR 10 K *MOMENT 676 kip-ft*
TORQUE 8 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 69 K
SHEAR 56 K *MOMENT 3632 kip-ft*
TORQUE 47 kip-ft
REACTIONS - 122 mph WIND

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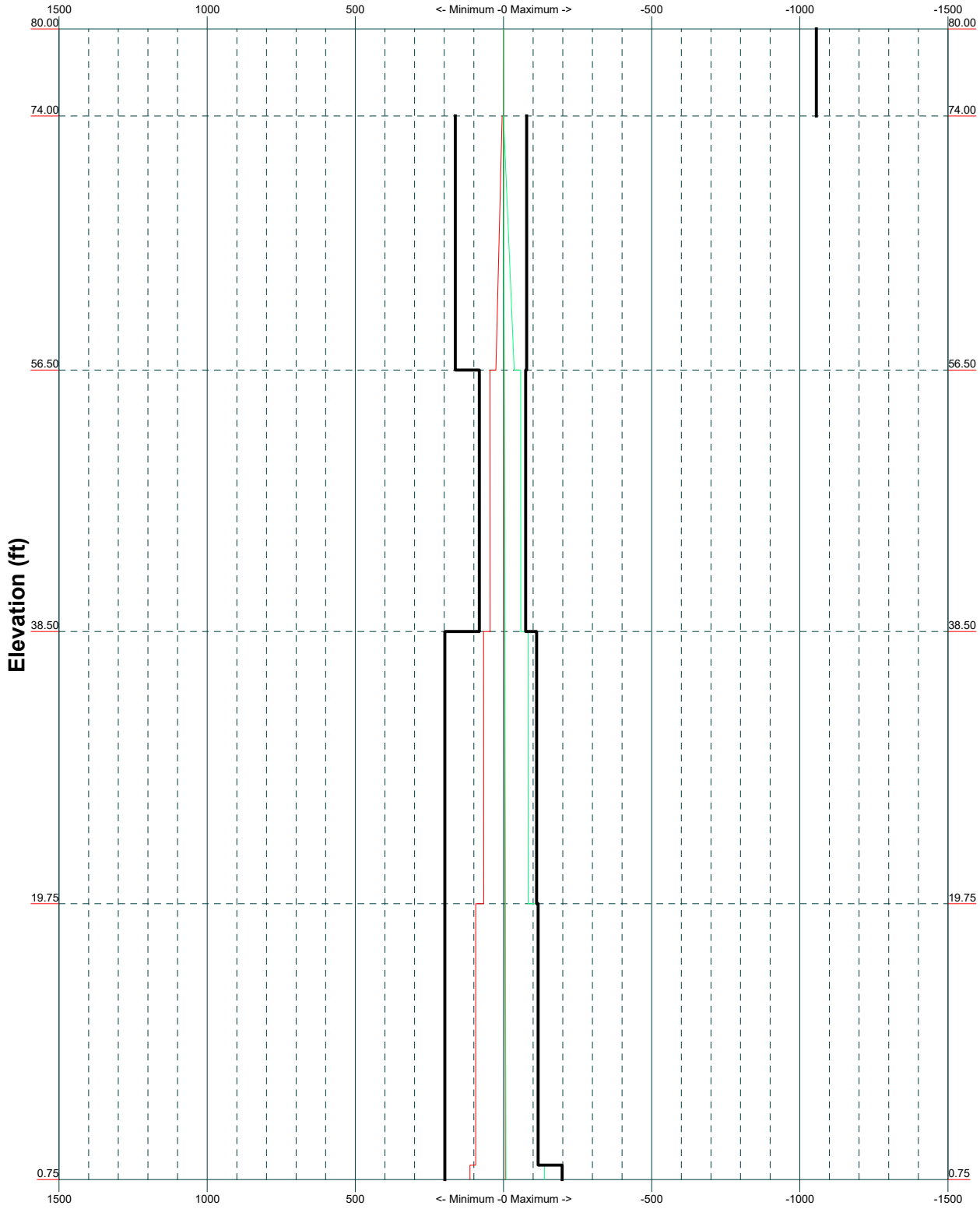
Job: ***28241_Branford South***			
Project: ***REV01_Base***			
Client: KGI	Drawn by: NathanW	App'd:	
Code: TIA-222-H	Date: 03/24/22	Scale: NTS	
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Base.eri		Dwg No. E-1	

TIA-222-H - 122 mph/50 mph 1.0000 in Ice Exposure D

Leg Capacity ——— **Leg Compression (K)**



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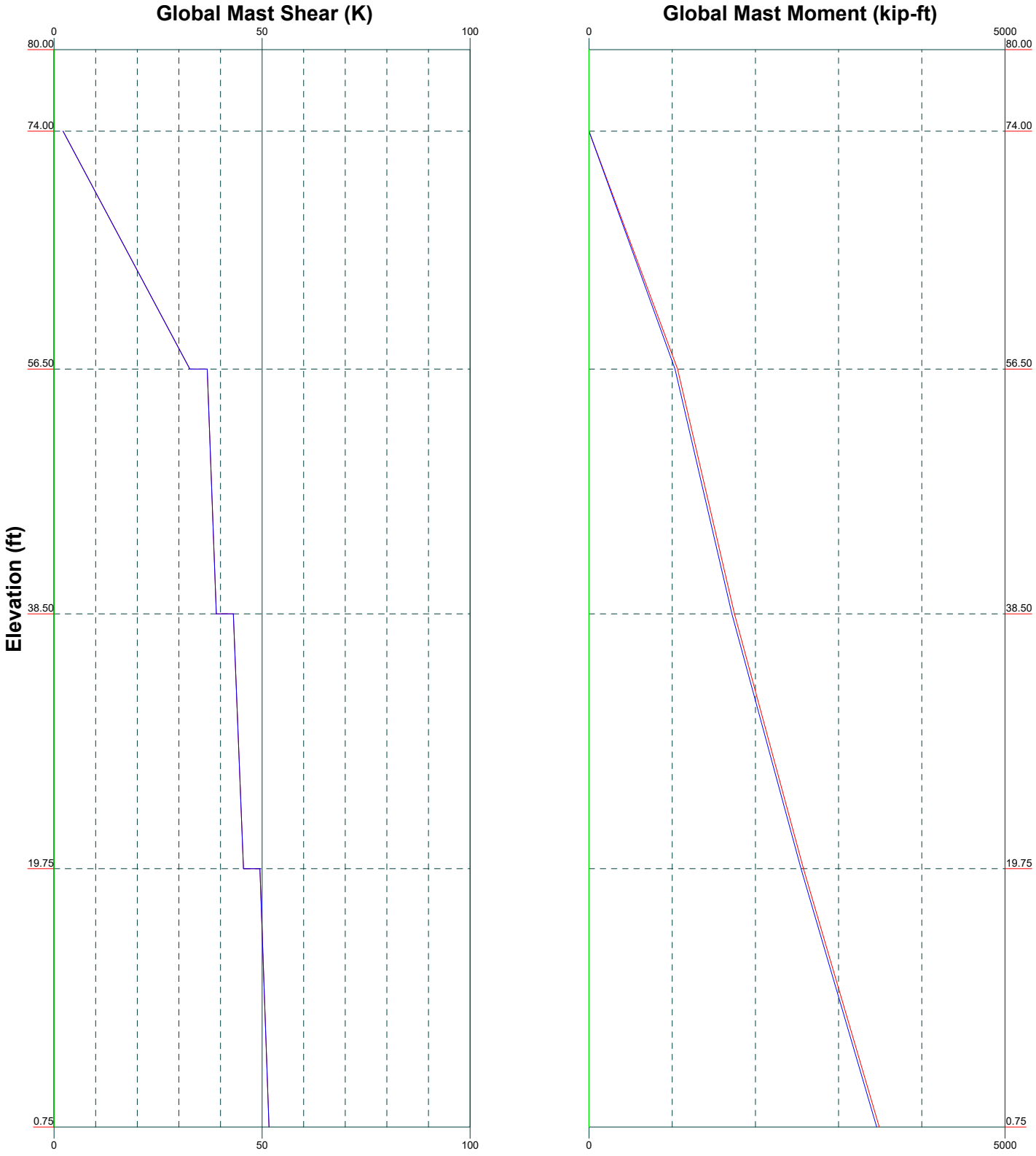
Job: ***28241_Branford South***		
Project: ***REV01_Base***		
Client: KGI	Drawn by: NathanW	App'd:
Code: TIA-222-H	Date: 03/24/22	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Base.eri		Dwg No. E-3

TIA-222-H - 122 mph/50 mph 1.0000 in Ice Exposure D

Maximum Values

Vx Vz Mx Mz



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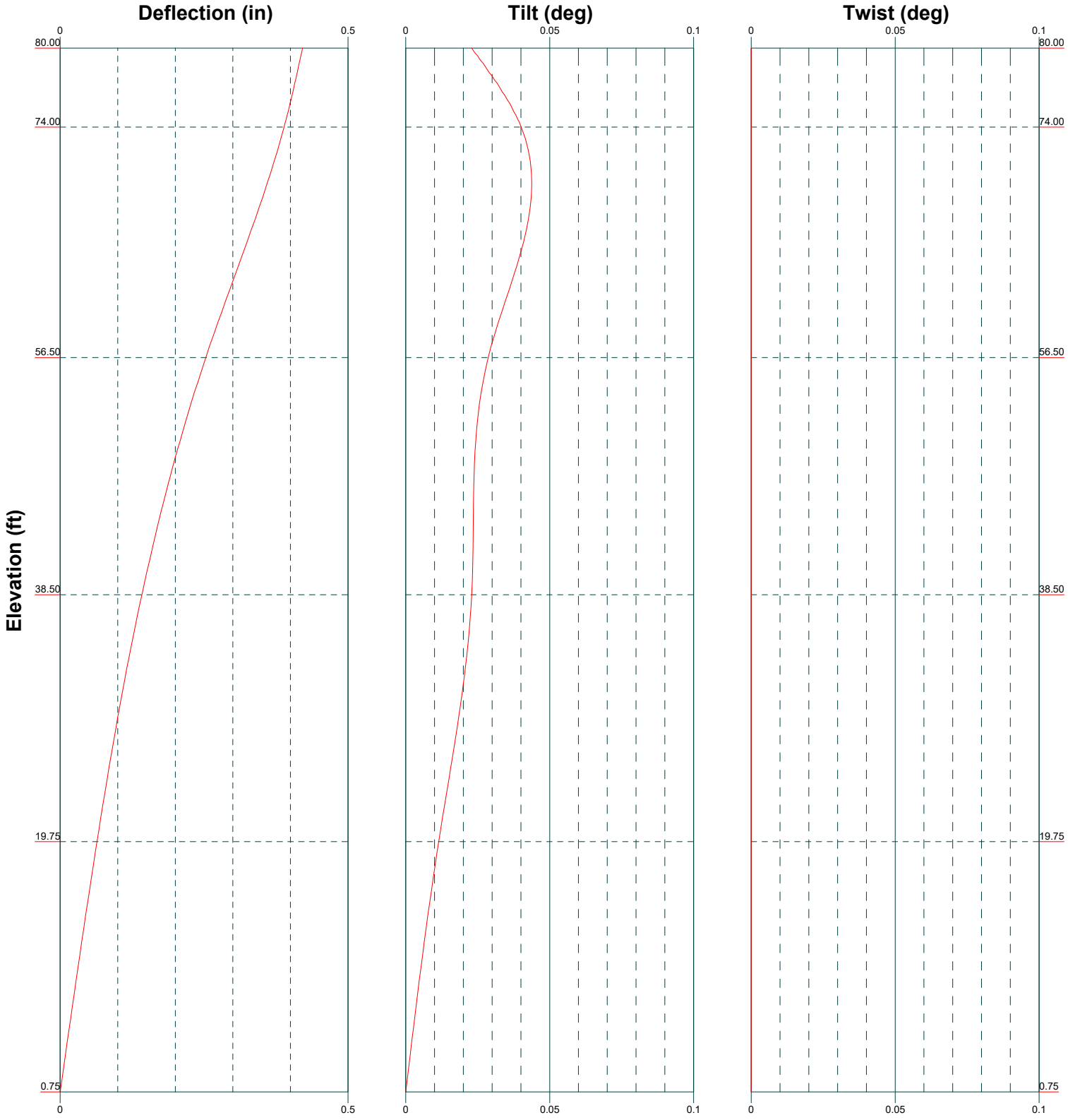
Job: ***28241_Branford South***		
Project: ***REV01_Base***		
Client: KGI	Drawn by: NathanW	App'd:
Code: TIA-222-H	Date: 03/24/22	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Base.eri		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values



Semaan Engineering Solutions
1047 N 205th Street
Elkhorn, NE 68022
Phone: 402.289.1888
FAX:

Job: ***28241_Branford South***		
Project: ***REV01_Base***		
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Code: TIA-222-H	Date: 03/24/22	Scale: NTS
Path: \\DMZSESSERVER01\Common\TNX files\28241\28241_REV01\28241_REV01_Base.eri		Dwg No. E-5

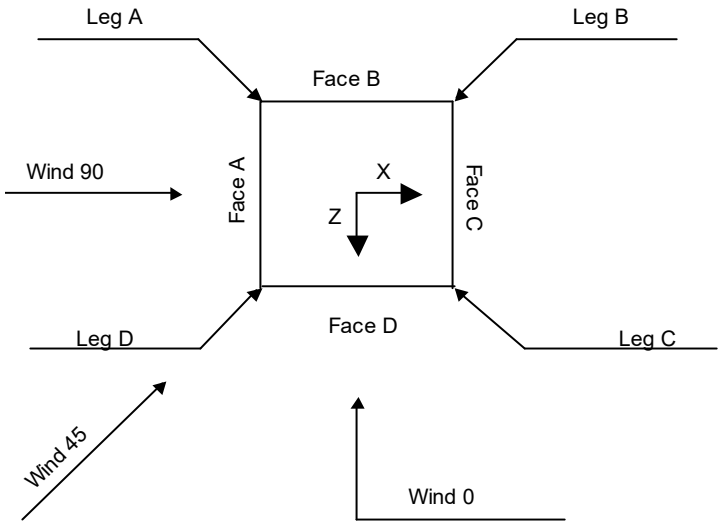
Tower Input Data

The main tower is a 4x free standing tower with an overall height of 80.00 ft above the ground line.
The base of the tower is set at an elevation of 0.75 ft above the ground line.
The face width of the tower is 12.55 ft at the top and 20.96 ft at the base.
An index plate is provided at the 4x free standing -tower connection.
There is a pole section.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Tower base elevation above sea level: 45.53 ft.
Basic wind speed of 122 mph.
Risk Category II.
Exposure Category D.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
CCISeismic Note: Seismic loads generated by CCISeismic 3.3.6.
CCISeismic Note: Seismic calculations are in accordance with TIA-222-H-1.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H 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

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	80.00-74.00	6.00	P24x3/8<ERW>	A53-B-42 (42 ksi)	73.25

Tower Elevation ft	Gusset Area (per face) ft²	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
L1 80.00-74.00				0	0	1.07409			

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	74.00-56.50			12.55	1	17.50
T2	56.50-38.50			14.56	1	18.00
T3	38.50-19.75			16.63	1	18.75
T4	19.75-0.75			18.78	1	19.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation* *ft*	*Diagonal Spacing* *ft*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset* *in*	*Bottom Girt Offset* *in*
T1	74.00-56.50	17.50	X Brace	No	No	0.0000	0.0000
T2	56.50-38.50	18.00	X Brace	No	No	0.0000	0.0000
T3	38.50-19.75	18.75	X Brace	No	No	0.0000	0.0000
T4	19.75-0.75	18.00	X Brace	No	No	0.0000	12.0000

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
T1 74.00-56.50	Tube	HSS5x5x1/4	A500-42 (42 ksi)	Equal Angle	L6x6x5/16	A36 (36 ksi)
T2 56.50-38.50	Tube	HSS5x5x1/4	A500-42 (42 ksi)	Equal Angle	L6x6x5/16	A36 (36 ksi)
T3 38.50-19.75	Tube	HSS6x6x1/4	A500-42 (42 ksi)	Equal Angle	L6x6x5/16	A36 (36 ksi)
T4 19.75-0.75	Tube	HSS6x6x1/4	A500-42 (42 ksi)	Equal Angle	L6x6x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
T1 74.00-56.50	Wide Flange	W10x49	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 56.50-38.50	Equal Angle	L6x6x5/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T3 38.50-19.75	Equal Angle	L6x6x5/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T4 19.75-0.75	Equal Angle	L6x6x5/16	A36 (36 ksi)	Equal Angle		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 74.00-56.50	0.11	0.3125	A572-50 (50 ksi)	1	1	1.01579	0.0000	0.0000	0.0000
T2 56.50-38.50	0.11	0.3125	A572-50	1	1	1.02046	0.0000	0.0000	0.0000

Tower Elevation ft	Gusset Area (per face) ft²	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
T3 38.50-19.75	0.11	0.3125	(50 ksi) A572-50	1	1	1.01917	0.0000	0.0000	0.0000
T4 19.75-0.75	0.11	0.3125	(50 ksi) A572-50	1	1	1.0187	0.0000	0.0000	0.0000

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	No	1	1	1	1	1	1	1	1
74.00-56.50				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
56.50-38.50				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
38.50-19.75				1	1	1	1	1	1	1
T4 19.75-0.75	Yes	No	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 74.00-56.50	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 56.50-38.50	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 38.50-19.75	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 19.75-0.75	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower 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 74.00-56.50	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
T2 56.50-38.50	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 38.50-19.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

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
T4 19.75-0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 74.00-56.50	Flange	0.0000 A325N	0	0.7500 A325X	2	0.6250 A325X	3	0.0000 A325X	0	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0
T2 56.50-38.50	Flange	0.6250 A325N	4	0.7500 A325X	2	0.7500 A325X	2	0.0000 A325X	0	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0
T3 38.50-19.75	Flange	0.0000 A325N	0	0.7500 A325X	2	0.7500 A325X	2	0.0000 A325X	0	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0
T4 19.75-0.75	Flange	0.0000 A325N	0	0.7500 A325X	2	0.7500 A325X	2	0.0000 A325X	0	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8" DC Lines (ATT)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	4	No Ice	0.00	1.78
							1/2" Ice	0.00	0.00
							1" Ice	0.00	0.00
3/8" Fiber (ATT)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
*									
1 5/8" Coax (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	6	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
6x12 Hybrid (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	2	No Ice	0.00	1.70
							1/2" Ice	0.00	1.70
							1" Ice	0.00	1.70
1 5/8" Coax (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	6	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
Hybrid Cable (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	1	No Ice	0.00	1.78
							1/2" Ice	0.00	1.78
							1" Ice	0.00	1.78
*									
1 5/8" Coax (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	6	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
1 5/8" Hybrid Cable	C	No	Yes	CaAa (In	74.00 - 0.75	1	No Ice	0.00	1.78

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(Verizon)				Face)			1/2" Ice	0.00	1.78
							1" Ice	0.00	1.78
1 5/8" Fiber (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	1	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
1 5/8" Hybrid Cable (Verizon)	C	No	Yes	CaAa (In Face)	74.00 - 0.75	2	No Ice	0.00	1.78
							1/2" Ice	0.00	1.78
							1" Ice	0.00	1.78

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
L1	80.00-74.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
		D	0.000	0.000	0.000	0.000	0.00
T1	74.00-56.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.66
		D	0.000	0.000	0.000	0.000	0.00
T2	56.50-38.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.68
		D	0.000	0.000	0.000	0.000	0.00
T3	38.50-19.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.70
		D	0.000	0.000	0.000	0.000	0.00
T4	19.75-0.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.71
		D	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	80.00-74.00	A	1.088	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
		D		0.000	0.000	0.000	0.000	0.00
T1	74.00-56.50	A	1.071	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.53
		D		0.000	0.000	0.000	0.000	0.00
T2	56.50-38.50	A	1.037	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.55

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		D		0.000	0.000	0.000	0.000	0.00
T3	38.50-19.75	A	0.988	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.57
		D		0.000	0.000	0.000	0.000	0.00
T4	19.75-0.75	A	0.890	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.58
		D		0.000	0.000	0.000	0.000	0.00

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	1 5/8" DC Lines	56.50 - 74.00	1.0000	1.0000
T1	2	3/8" Fiber	56.50 - 74.00	1.0000	1.0000
T1	4	1 5/8" Coax	56.50 - 74.00	1.0000	1.0000
T1	5	6x12 Hybrid	56.50 - 74.00	1.0000	1.0000
T1	6	1 5/8" Coax	56.50 - 74.00	1.0000	1.0000
T1	7	Hybrid Cable	56.50 - 74.00	1.0000	1.0000
T1	9	1 5/8" Coax	56.50 - 74.00	1.0000	1.0000
T1	10	1 5/8" Hybrid Cable	56.50 - 74.00	1.0000	1.0000
T1	11	1 5/8" Fiber	56.50 - 74.00	1.0000	1.0000
T1	12	1 5/8" Hybrid Cable	56.50 - 74.00	1.0000	1.0000
T2	1	1 5/8" DC Lines	38.50 - 56.50	1.0000	1.0000
T2	2	3/8" Fiber	38.50 - 56.50	1.0000	1.0000
T2	4	1 5/8" Coax	38.50 - 56.50	1.0000	1.0000
T2	5	6x12 Hybrid	38.50 - 56.50	1.0000	1.0000
T2	6	1 5/8" Coax	38.50 - 56.50	1.0000	1.0000
T2	7	Hybrid Cable	38.50 - 56.50	1.0000	1.0000
T2	9	1 5/8" Coax	38.50 - 56.50	1.0000	1.0000
T2	10	1 5/8" Hybrid Cable	38.50 - 56.50	1.0000	1.0000
T2	11	1 5/8" Fiber	38.50 - 56.50	1.0000	1.0000
T2	12	1 5/8" Hybrid Cable	38.50 - 56.50	1.0000	1.0000
T3	1	1 5/8" DC Lines	19.75 - 38.50	1.0000	1.0000
T3	2	3/8" Fiber	19.75 - 38.50	1.0000	1.0000
T3	4	1 5/8" Coax	19.75 - 38.50	1.0000	1.0000
T3	5	6x12 Hybrid	19.75 - 38.50	1.0000	1.0000
T3	6	1 5/8" Coax	19.75 - 38.50	1.0000	1.0000
T3	7	Hybrid Cable	19.75 - 38.50	1.0000	1.0000
T3	9	1 5/8" Coax	19.75 - 38.50	1.0000	1.0000
T3	10	1 5/8" Hybrid Cable	19.75 - 38.50	1.0000	1.0000
T3	11	1 5/8" Fiber	19.75 - 38.50	1.0000	1.0000
T3	12	1 5/8" Hybrid Cable	19.75 - 38.50	1.0000	1.0000
T4	1	1 5/8" DC Lines	0.75 - 19.75	1.0000	1.0000
T4	2	3/8" Fiber	0.75 - 19.75	1.0000	1.0000
T4	4	1 5/8" Coax	0.75 - 19.75	1.0000	1.0000
T4	5	6x12 Hybrid	0.75 - 19.75	1.0000	1.0000
T4	6	1 5/8" Coax	0.75 - 19.75	1.0000	1.0000
T4	7	Hybrid Cable	0.75 - 19.75	1.0000	1.0000
T4	9	1 5/8" Coax	0.75 - 19.75	1.0000	1.0000
T4	10	1 5/8" Hybrid Cable	0.75 - 19.75	1.0000	1.0000
T4	11	1 5/8" Fiber	0.75 - 19.75	1.0000	1.0000
T4	12	1 5/8" Hybrid Cable	0.75 - 19.75	1.0000	1.0000

User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle		Weight	F_x	F_z	Wind Force	C_AA_C
	ft	ft	°		K	K	K	K	ft²
L1 Ice Weight Offset (6'x24"Ø STD Pipe)	91.00	0.00	0.0000	No Ice	0.00	0.00	0.00	**0.00**	0.00
				Ice	-0.20	0.00	0.00	**0.00**	0.00
				Service	0.00	0.00	0.00	**0.00**	0.00

User Defined Loads - Seismic

Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
CCISeismic Tower Section 1	65.25	0.00	0.0000	0.14	0.00	0.00	0.27
CCISeismic Tower Section 2	47.50	0.00	0.0000	0.10	0.00	0.00	0.14
CCISeismic Tower Section 3	29.13	0.00	0.0000	0.11	0.00	0.00	0.10
CCISeismic Tower Section 4	10.25	0.00	0.0000	0.12	0.00	0.00	0.03
CCISeismic Roof	74.00	0.00	0.0000	0.04	0.00	0.00	0.08
CCISeismic (3) 20'Øx 10' SSV Water Tower Sections	74.00	0.00	0.0000	0.07	0.00	0.00	0.16
CCISeismic 20'Ø Ring Platform	74.00	0.00	0.0000	0.06	0.00	0.00	0.13
CCISeismic 20'Ø Ring Platform	74.00	0.00	0.0000	0.06	0.00	0.00	0.13
CCISeismic 20'Ø Ring Platform	74.00	0.00	0.0000	0.06	0.00	0.00	0.13
CCISeismic 21' Main Platform Deck	74.00	0.00	0.0000	0.15	0.00	0.00	0.32
CCISeismic Top Tower Section	74.00	0.00	0.0000	0.09	0.00	0.00	0.21
CCISeismic 6' x 24"Ø STD Pipe (Inside Water Tower)	74.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic 6' x 24"Ø STD Pipe (Below Water Tower)	37.38	0.00	0.0000	0.16	0.00	0.00	0.17
CCISeismic Coax in Top Tower Weight	74.00	0.00	0.0000	0.01	0.00	0.00	0.03
CCISeismic Climb Ladder	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe	74.00	0.00	0.0000	0.01	0.00	0.00	0.02
CCISeismic (3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe	74.00	0.00	0.0000	0.01	0.00	0.00	0.02
CCISeismic (3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe	74.00	0.00	0.0000	0.01	0.00	0.00	0.02
CCISeismic (4) RRU (20.04 x 15.08 x 6.65)	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (4) RRU (20.04 x 15.08 x 6.65)	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (4) RRU (20.04 x	74.00	0.00	0.0000	0.00	0.00	0.00	0.01

Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
15.08 x 6.65)							
CCISeismic (2) RRU (18.2 x 25.0 x 6.7)	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) RRU (18.2 x 25.0 x 6.7)	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) RRU (18.2 x 25.0 x 6.7)	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic OVP (23.5 x 9.7)	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic OVP (23.5 x 9.7)	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic OVP (23.5 x 9.7)	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 10'x2" Pipe Mount	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 10'x2" Pipe Mount	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 10'x2" Pipe Mount	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic MT6407-77A w/RRU w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic MT6407-77A w/RRU w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic MT6407-77A w/RRU w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) JAHH-65B-R3B	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) JAHH-65B-R3B	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) JAHH-65B-R3B	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES)	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES)	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES)	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) LPA-80063/6CF w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) LPA-80063/6CF w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (2) LPA-80063/6CF w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic B2/B66A RRH-BR049	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic B2/B66A RRH-BR049	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic B2/B66A RRH-BR049	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic B5/B13 RRH BR04C	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic B5/B13 RRH BR04C	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic B5/B13 RRH BR04C	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic FDJ85020Q4-S1	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic FDJ85020Q4-S1	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic FDJ85020Q4-S1	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic OVP-6	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic OVP-6	74.00	0.00	0.0000	0.00	0.00	0.00	0.00

Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
CCISeismic OVP Junction Box	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic RRH 4X30-4T4R-B13	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic RRH 4X30-4T4R-B13	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic RRH 4X30-4T4R-B13	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 10'x2" Pipe Mount	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 10'x2" Pipe Mount	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 10'x2" Pipe Mount	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic AIR21 KRC118023 B2A B4P w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic AIR21 KRC118023 B2A B4P w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic AIR21 KRC118023 B2A B4P w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic AIR21 KRC11803 B4P B2A w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic AIR21 KRC11803 B4P B2A w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic AIR21 KRC11803 B4P B2A w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic APXVAALL24_43-U-NA20 w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic APXVAALL24_43-U-NA20 w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic APXVAALL24_43-U-NA20 w/10' Mount Pipe	74.00	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic 4480 B71/B85	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 4480 B71/B85	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 4480 B71/B85	74.00	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (4) 1 5/8" DC Lines From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (4) 1 5/8" DC Lines From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (4) 1 5/8" DC Lines From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (4) 1 5/8" DC Lines From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 3/8" Fiber From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 3/8" Fiber From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 3/8" Fiber From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 3/8" Fiber From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax	65.25	0.00	0.0000	0.00	0.00	0.00	0.01

Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
From 0 to 73.25 (55.75ft to73.25ft)							
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 6x12 Hybrid From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 6x12 Hybrid From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 6x12 Hybrid From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 6x12 Hybrid From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic Hybrid Cable From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic Hybrid Cable From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic Hybrid Cable From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic Hybrid Cable From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.01
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (6) 1 5/8" Coax From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Hybrid Cable From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Hybrid Cable From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Hybrid Cable From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Hybrid Cable From 0 to 73.25 (0ft	10.25	0.00	0.0000	0.00	0.00	0.00	0.00

Description	Elevation ft	Offset From Centroid ft	Azimuth Angle °	E_v K	E_{hx} K	E_{hz} K	E_h K
to19ft)							
CCISeismic 1 5/8" Fiber From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Fiber From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Fiber From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic 1 5/8" Fiber From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 1 5/8" Hybrid Cable From 0 to 73.25 (55.75ft to73.25ft)	65.25	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 1 5/8" Hybrid Cable From 0 to 73.25 (37.75ft to55.75ft)	47.50	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 1 5/8" Hybrid Cable From 0 to 73.25 (19ft to37.75ft)	29.13	0.00	0.0000	0.00	0.00	0.00	0.00
CCISeismic (2) 1 5/8" Hybrid Cable From 0 to 73.25 (0ft to19ft)	10.25	0.00	0.0000	0.00	0.00	0.00	0.00

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
Roof	D	From Face	0.00	0.0000	74.00	No Ice	40.00	40.00	1.45
			0.00			1/2" Ice	40.80	40.80	2.70
			35.00			1" Ice	41.60	41.00	3.95
(3) 20'Øx 10' SSV Water Tower Sections	D	From Face	0.00	0.0000	74.00	No Ice	402.00	402.00	3.05
			0.00			1/2" Ice	403.70	403.70	7.45
			15.92			1" Ice	405.40	405.40	11.85
20'Ø Ring Platform	D	From Face	0.00	0.0000	74.00	No Ice	0.00	0.00	2.35
			0.00			1/2" Ice	0.00	0.00	2.35
			30.92			1" Ice	0.00	0.00	2.35
20'Ø Ring Platform	D	From Face	0.00	0.0000	74.00	No Ice	0.00	0.00	2.35
			0.00			1/2" Ice	0.00	0.00	2.35
			20.92			1" Ice	0.00	0.00	2.35
20'Ø Ring Platform	D	From Face	0.00	0.0000	74.00	No Ice	0.00	0.00	2.35
			0.00			1/2" Ice	0.00	0.00	2.35
			10.92			1" Ice	0.00	0.00	2.35
21' Main Platform Deck	D	From Face	0.00	0.0000	74.00	No Ice	28.00	28.00	6.05
			0.00			1/2" Ice	31.63	31.63	6.65
			0.00			1" Ice	35.26	35.26	7.25
*									
Top Tower Section	D	From Face	0.00	0.0000	74.00	No Ice	0.00	0.00	3.85
			0.00			1/2" Ice	0.00	0.00	3.85
			15.46			1" Ice	0.00	0.00	3.85
*									
6' x 24"Ø STD Pipe (Below	D	From Face	0.00	0.0000	74.00 - 0.75	No Ice	65.93	65.93	0.00

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
Water Tower)			0.00			1/2" Ice	68.67	68.67	0.00
			0.00			1" Ice	71.41	71.41	0.00
*									
Coax in Top Tower Weight	D	From Face	0.00	0.0000	74.00	No Ice	0.00	0.00	0.55
			0.00			1/2" Ice	0.00	0.00	0.55
			13.00			1" Ice	0.00	0.00	0.55
Climb Ladder	D	From Face	0.00	0.0000	74.00	No Ice	0.00	0.00	0.11
			0.00			1/2" Ice	0.00	0.00	0.11
			15.46			1" Ice	0.00	0.00	0.11
*									
(3)	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.09
AM-X-CD-14-65-00T-RET		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.09
w/10' Mount Pipe		ce	26.00			1" Ice	0.00	0.00	0.09
(ATT)									
(3)	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.09
AM-X-CD-14-65-00T-RET		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.09
w/10' Mount Pipe		g	26.00			1" Ice	0.00	0.00	0.09
(ATT)									
(3)	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.09
AM-X-CD-14-65-00T-RET		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.09
w/10' Mount Pipe		g	26.00			1" Ice	0.00	0.00	0.09
(ATT)									
(4) RRU (20.04 x 15.08 x	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.04
6.65)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.04
(ATT)		ce	26.00			1" Ice	0.00	0.00	0.04
(4) RRU (20.04 x 15.08 x	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.04
6.65)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.04
(ATT)		g	26.00			1" Ice	0.00	0.00	0.04
(4) RRU (20.04 x 15.08 x	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.04
6.65)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.04
(ATT)		g	26.00			1" Ice	0.00	0.00	0.04
(2) RRU (18.2 x 25.0 x 6.7)	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.06
(ATT)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.06
		ce	26.00			1" Ice	0.00	0.00	0.06
(2) RRU (18.2 x 25.0 x 6.7)	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.06
(ATT)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.06
		g	26.00			1" Ice	0.00	0.00	0.06
(2) RRU (18.2 x 25.0 x 6.7)	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.06
(ATT)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.06
		g	26.00			1" Ice	0.00	0.00	0.06
OVP (23.5 x 9.7)	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.02
(ATT)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.02
		ce	26.00			1" Ice	0.00	0.00	0.02
OVP (23.5 x 9.7)	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.02
(ATT)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.02
		g	26.00			1" Ice	0.00	0.00	0.02
OVP (23.5 x 9.7)	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.02
(ATT)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.02
		g	26.00			1" Ice	0.00	0.00	0.02
10'x2" Pipe Mount	B	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.04
(ATT)		Centroid-Fa	0.00			1/2" Ice	0.00	0.00	0.05
		ce	26.00			1" Ice	0.00	0.00	0.05
10'x2" Pipe Mount	C	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.04
(ATT)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.05
		g	26.00			1" Ice	0.00	0.00	0.05
10'x2" Pipe Mount	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.04
(ATT)		Centroid-Le	0.00			1/2" Ice	0.00	0.00	0.05

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
*		g	26.00			1" Ice	0.00	0.00	0.05
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.14 0.14 0.14
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.14 0.14 0.14
MT6407-77A w/RRU w/10' Mount Pipe (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.14 0.14 0.14
(2) JAHH-65B-R3B (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
(2) JAHH-65B-R3B (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
(2) JAHH-65B-R3B (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.06 0.06 0.06
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES) (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
(2) LPA-80063/6CF w/10' Mount Pipe (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
B2/B66A RRH-BR049 (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.10 0.10 0.10
B2/B66A RRH-BR049 (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.10 0.10 0.10
B2/B66A RRH-BR049 (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.10 0.10 0.10
B5/B13 RRH BR04C (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.07 0.07 0.07
B5/B13 RRH BR04C (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.07 0.07 0.07
B5/B13 RRH BR04C	D	From	4.50	0.0000	74.00	No Ice	0.00	0.00	0.07

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
(Verizon)		Centroid-Leg	0.00 16.00			1/2" Ice 1" Ice	0.00 0.00	0.00 0.00	0.07 0.07
FDJ85020Q4-S1 (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
FDJ85020Q4-S1 (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
FDJ85020Q4-S1 (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
OVP-6 (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
OVP-6 (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
OVP Junction Box (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.02 0.02 0.02
RRH 4X30-4T4R-B13 (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.03 0.03 0.03
RRH 4X30-4T4R-B13 (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.03 0.03 0.03
RRH 4X30-4T4R-B13 (Verizon)	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.03 0.03 0.03
10'x2" Pipe Mount (Verizon)	B	From Centroid-Face	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.04 0.04
10'x2" Pipe Mount (Verizon)	C	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.04 0.04
10'x2" Pipe Mount (Verizon) *	D	From Centroid-Leg	4.50 0.00 16.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.04 0.04 0.04
AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	B	From Centroid-Face	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.15 0.15 0.15
AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	C	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.15 0.15 0.15
AIR21 KRC118023 B2A B4P w/10' Mount Pipe (T-Mobile)	D	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.15 0.15 0.15
AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	B	From Centroid-Face	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.15 0.15 0.15
AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	C	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.15 0.15 0.15
AIR21 KRC11803 B4P B2A w/10' Mount Pipe (T-Mobile)	D	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.15 0.15 0.15

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
APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	B	From Centroid-Face	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.11 0.11 0.11
APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	C	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.11 0.11 0.11
APXVAALL24_43-U-NA20 w/10' Mount Pipe (T-Mobile)	D	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.11 0.11 0.11
4480 B71/B85 (T-Mobile)	B	From Centroid-Face	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
4480 B71/B85 (T-Mobile)	C	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08
4480 B71/B85 (T-Mobile)	D	From Centroid-Leg	4.50 0.00 6.00	0.0000	74.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.08 0.08 0.08

Tower Pressures - No Ice

G_H = 0.850 (base tower), 1.350 (upper structure)

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
L1 80.00-74.00	77.00	1.369	44	12.000	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
					D	0.000	0.000		0.00	0.000	0.000
T1 74.00-56.50	65.25	1.33	43	244.517	A	46.314	0.000	14.631	31.59	0.000	0.000
					B	46.314	0.000		31.59	0.000	0.000
					C	46.314	0.000		31.59	0.000	0.000
					D	46.314	0.000		31.59	0.000	0.000
T2 56.50-38.50	47.50	1.259	41	288.198	A	45.435	0.000	15.049	33.12	0.000	0.000
					B	45.435	0.000		33.12	0.000	0.000
					C	45.435	0.000		33.12	0.000	0.000
					D	45.435	0.000		33.12	0.000	0.000
T3 38.50-19.75	29.13	1.156	37	341.347	A	52.070	0.000	18.812	36.13	0.000	0.000
					B	52.070	0.000		36.13	0.000	0.000
					C	52.070	0.000		36.13	0.000	0.000
					D	52.070	0.000		36.13	0.000	0.000
T4 19.75-0.75	10.25	1.03	33	387.086	A	54.429	0.000	19.063	35.02	0.000	0.000
					B	54.429	0.000		35.02	0.000	0.000
					C	54.429	0.000		35.02	0.000	0.000
					D	54.429	0.000		35.02	0.000	0.000

Tower Pressure - With Ice

G_H = 0.850 (base tower), 1.350 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	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
L1 80.00-74.00	77.00	1.369	7	1.0884	13.088	A	0.000	0.000	0.000	0.00	0.000	0.000
						B	0.000	0.000		0.00	0.000	0.000
						C	0.000	0.000		0.00	0.000	0.000
						D	0.000	0.000		0.00	0.000	0.000
T1 74.00-56.50	65.25	1.33	7	1.0705	247.645	A	46.314	16.214	20.897	33.42	0.000	0.000
						B	46.314	16.214		33.42	0.000	0.000
						C	46.314	16.214		33.42	0.000	0.000
						D	46.314	16.214		33.42	0.000	0.000
T2 56.50-38.50	47.50	1.259	7	1.0371	291.315	A	45.435	16.824	21.292	34.20	0.000	0.000
						B	45.435	16.824		34.20	0.000	0.000
						C	45.435	16.824		34.20	0.000	0.000
						D	45.435	16.824		34.20	0.000	0.000
T3 38.50-19.75	29.13	1.156	6	0.9876	344.438	A	52.070	17.214	25.004	36.09	0.000	0.000
						B	52.070	17.214		36.09	0.000	0.000
						C	52.070	17.214		36.09	0.000	0.000
						D	52.070	17.214		36.09	0.000	0.000
T4 19.75-0.75	10.25	1.03	6	0.8897	389.908	A	54.429	16.207	24.716	34.99	0.000	0.000
						B	54.429	16.207		34.99	0.000	0.000
						C	54.429	16.207		34.99	0.000	0.000
						D	54.429	16.207		34.99	0.000	0.000

Tower Pressure - Service

G_H = 0.850 (base tower), 1.350 (upper structure)

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
L1 80.00-74.00	77.00	1.369	11	12.000	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
					D	0.000	0.000		0.00	0.000	0.000
T1 74.00-56.50	65.25	1.33	10	244.517	A	46.314	0.000	14.631	31.59	0.000	0.000
					B	46.314	0.000		31.59	0.000	0.000
					C	46.314	0.000		31.59	0.000	0.000
					D	46.314	0.000		31.59	0.000	0.000
T2 56.50-38.50	47.50	1.259	10	288.198	A	45.435	0.000	15.049	33.12	0.000	0.000
					B	45.435	0.000		33.12	0.000	0.000
					C	45.435	0.000		33.12	0.000	0.000
					D	45.435	0.000		33.12	0.000	0.000
T3 38.50-19.75	29.13	1.156	9	341.347	A	52.070	0.000	18.812	36.13	0.000	0.000
					B	52.070	0.000		36.13	0.000	0.000
					C	52.070	0.000		36.13	0.000	0.000
					D	52.070	0.000		36.13	0.000	0.000
T4 19.75-0.75	10.25	1.03	8	387.086	A	54.429	0.000	19.063	35.02	0.000	0.000
					B	54.429	0.000		35.02	0.000	0.000
					C	54.429	0.000		35.02	0.000	0.000
					D	54.429	0.000		35.02	0.000	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
L1	0.00	0.57	A	0	0.45	44	1	1	0.000	0.00	0.00	D
80.00-74.00			B	0	0.45		1	1	0.000			
			C	0	0.45		1	1	0.000			
			D	0	0.45		1	1	0.000			
T1	0.66	7.35	A	0.189	3.026	43	1	1	46.314	5.89	336.70	D
74.00-56.50			B	0.189	3.026		1	1	46.314			
			C	0.189	3.026		1	1	46.314			
			D	0.189	3.026		1	1	46.314			
T2	0.68	5.85	A	0.158	3.169	41	1	1	45.435	5.73	318.32	D
56.50-38.50			B	0.158	3.169		1	1	45.435			
			C	0.158	3.169		1	1	45.435			
			D	0.158	3.169		1	1	45.435			
T3	0.71	6.51	A	0.153	3.193	37	1	1	52.070	6.00	319.93	D
38.50-19.75			B	0.153	3.193		1	1	52.070			
			C	0.153	3.193		1	1	52.070			
			D	0.153	3.193		1	1	52.070			
T4 19.75-0.75	0.72	6.75	A	0.141	3.249	33	1	1	54.429	5.65	297.50	D
			B	0.141	3.249		1	1	54.429			
			C	0.141	3.249		1	1	54.429			
			D	0.141	3.249		1	1	54.429			
Sum Weight:	2.77	27.05						OTM	871.83 kip-ft	23.27		

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
L1	0.00	0.57	A	0	0.45	44	1	1	0.000	0.00	0.00	D
80.00-74.00			B	0	0.45		1	1	0.000			
			C	0	0.45		1	1	0.000			
			D	0	0.45		1	1	0.000			
T1	0.66	7.35	A	0.189	3.026	43	1.142	1.142	52.893	6.62	378.30	D
74.00-56.50			B	0.189	3.026		1.142	1.142	52.893			
			C	0.189	3.026		1.142	1.142	52.893			
			D	0.189	3.026		1.142	1.142	52.893			
T2	0.68	5.85	A	0.158	3.169	41	1.118	1.118	50.807	6.32	351.05	D
56.50-38.50			B	0.158	3.169		1.118	1.118	50.807			
			C	0.158	3.169		1.118	1.118	50.807			
			D	0.158	3.169		1.118	1.118	50.807			
T3	0.71	6.51	A	0.153	3.193	37	1.114	1.114	58.027	6.60	352.17	D
38.50-19.75			B	0.153	3.193		1.114	1.114	58.027			
			C	0.153	3.193		1.114	1.114	58.027			
			D	0.153	3.193		1.114	1.114	58.027			
T4 19.75-0.75	0.72	6.75	A	0.141	3.249	33	1.105	1.105	60.169	6.18	325.29	D
			B	0.141	3.249		1.105	1.105	60.169			
			C	0.141	3.249		1.105	1.105	60.169			
			D	0.141	3.249		1.105	1.105	60.169			

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
Sum Weight:	2.77	27.05						OTM	968.49 kip-ft	25.72		

Tower Forces - With 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
L1	0.00	0.77	A	0	1.1	7	1	1	0.000	0.00	0.00	D
80.00-74.00			B	0	1.1		1	1	0.000			
			C	0	1.1		1	1	0.000			
			D	0	1.1		1	1	0.000			
T1	0.54	11.69	A	0.252	2.765	7	1	1	55.739	1.12	63.73	D
74.00-56.50			B	0.252	2.765		1	1	55.739			
			C	0.252	2.765		1	1	55.739			
			D	0.252	2.765		1	1	55.739			
T2	0.56	9.98	A	0.214	2.922	7	1	1	55.076	1.10	61.05	D
56.50-38.50			B	0.214	2.922		1	1	55.076			
			C	0.214	2.922		1	1	55.076			
			D	0.214	2.922		1	1	55.076			
T3	0.58	10.83	A	0.201	2.975	6	1	1	61.899	1.14	60.74	D
38.50-19.75			B	0.201	2.975		1	1	61.899			
			C	0.201	2.975		1	1	61.899			
			D	0.201	2.975		1	1	61.899			
T4 19.75-0.75	0.59	10.79	A	0.181	3.062	6	1	1	63.634	1.07	56.12	D
			B	0.181	3.062		1	1	63.634			
			C	0.181	3.062		1	1	63.634			
			D	0.181	3.062		1	1	63.634			
Sum Weight:	2.27	44.08						OTM	165.75 kip-ft	4.42		

Tower Forces - With 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
L1	0.00	0.77	A	0	1.1	7	1	1	0.000	0.00	0.00	D
80.00-74.00			B	0	1.1		1	1	0.000			
			C	0	1.1		1	1	0.000			
			D	0	1.1		1	1	0.000			
T1	0.54	11.69	A	0.252	2.765	7	1.189	1.189	66.295	1.29	73.97	D
74.00-56.50			B	0.252	2.765		1.189	1.189	66.295			
			C	0.252	2.765		1.189	1.189	66.295			
			D	0.252	2.765		1.189	1.189	66.295			
T2	0.56	9.98	A	0.214	2.922	7	1.16	1.16	63.904	1.25	69.38	D
56.50-38.50			B	0.214	2.922		1.16	1.16	63.904			
			C	0.214	2.922		1.16	1.16	63.904			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			D	0.214	2.922		1.16	1.16	63.904			
T3	0.58	10.83	A	0.201	2.975	6	1.151	1.151	71.237	1.29	68.65	D
38.50-19.75			B	0.201	2.975		1.151	1.151	71.237			
			C	0.201	2.975		1.151	1.151	71.237			
			D	0.201	2.975		1.151	1.151	71.237			
T4 19.75-0.75	0.59	10.79	A	0.181	3.062	6	1.136	1.136	72.280	1.19	62.75	D
			B	0.181	3.062		1.136	1.136	72.280			
			C	0.181	3.062		1.136	1.136	72.280			
			D	0.181	3.062		1.136	1.136	72.280			
Sum Weight:	2.27	44.08						OTM	189.73 kip-ft	5.02		

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 ft²	F K	w plf	Ctrl. Face
L1	0.00	0.57	A	0	0.45	11	1	1	0.000	0.00	0.00	D
80.00-74.00			B	0	0.45		1	1	0.000			
			C	0	0.45		1	1	0.000			
			D	0	0.45		1	1	0.000			
T1	0.66	7.35	A	0.189	3.026	10	1	1	46.314	1.43	81.44	D
74.00-56.50			B	0.189	3.026		1	1	46.314			
			C	0.189	3.026		1	1	46.314			
			D	0.189	3.026		1	1	46.314			
T2	0.68	5.85	A	0.158	3.169	10	1	1	45.435	1.39	76.99	D
56.50-38.50			B	0.158	3.169		1	1	45.435			
			C	0.158	3.169		1	1	45.435			
			D	0.158	3.169		1	1	45.435			
T3	0.71	6.51	A	0.153	3.193	9	1	1	52.070	1.45	77.38	D
38.50-19.75			B	0.153	3.193		1	1	52.070			
			C	0.153	3.193		1	1	52.070			
			D	0.153	3.193		1	1	52.070			
T4 19.75-0.75	0.72	6.75	A	0.141	3.249	8	1	1	54.429	1.37	71.96	D
			B	0.141	3.249		1	1	54.429			
			C	0.141	3.249		1	1	54.429			
			D	0.141	3.249		1	1	54.429			
Sum Weight:	2.77	27.05						OTM	210.87 kip-ft	5.63		

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 ft²	F K	w plf	Ctrl. Face
L1	0.00	0.57	A	0	0.45	11	1	1	0.000	0.00	0.00	D
80.00-74.00			B	0	0.45		1	1	0.000			

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
			C	0	0.45		1	1	0.000			
			D	0	0.45		1	1	0.000			
T1	0.66	7.35	A	0.189	3.026	10	1.142	1.142	52.893	1.60	91.50	D
74.00-56.50			B	0.189	3.026		1.142	1.142	52.893			
			C	0.189	3.026		1.142	1.142	52.893			
			D	0.189	3.026		1.142	1.142	52.893			
T2	0.68	5.85	A	0.158	3.169	10	1.118	1.118	50.807	1.53	84.91	D
56.50-38.50			B	0.158	3.169		1.118	1.118	50.807			
			C	0.158	3.169		1.118	1.118	50.807			
			D	0.158	3.169		1.118	1.118	50.807			
T3	0.71	6.51	A	0.153	3.193	9	1.114	1.114	58.027	1.60	85.18	D
38.50-19.75			B	0.153	3.193		1.114	1.114	58.027			
			C	0.153	3.193		1.114	1.114	58.027			
			D	0.153	3.193		1.114	1.114	58.027			
T4 19.75-0.75	0.72	6.75	A	0.141	3.249	8	1.105	1.105	60.169	1.49	78.68	D
			B	0.141	3.249		1.105	1.105	60.169			
			C	0.141	3.249		1.105	1.105	60.169			
			D	0.141	3.249		1.105	1.105	60.169			
Sum Weight:	2.77	27.05						OTM	234.25 kip-ft	6.22		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	5.44					
Bracing Weight	21.59					
Total Member Self-Weight	27.03			25.68	0.00	
Gusset Weight	0.02					
Total Weight	57.66			25.68	0.00	
Wind 0 deg - No Ice		0.00	-53.73	-3479.03	0.00	0.00
Wind 45 deg - No Ice		39.73	-39.73	-2520.87	-2546.56	32.95
Wind 90 deg - No Ice		53.73	0.00	25.68	-3504.71	46.60
Wind 135 deg - No Ice		39.73	39.73	2572.24	-2546.56	32.95
Wind 180 deg - No Ice		0.00	53.73	3530.40	0.00	0.00
Wind 225 deg - No Ice		-39.73	39.73	2572.24	2546.56	-32.95
Wind 270 deg - No Ice		-53.73	0.00	25.68	3504.71	-46.60
Wind 315 deg - No Ice		-39.73	-39.73	-2520.87	2546.56	-32.95
Member Ice	17.03					
Gusset Ice	0.02					
Total Weight Ice	87.89			39.56	0.00	
Wind 0 deg - Ice		0.00	-9.67	-578.72	0.00	0.00
Wind 45 deg - Ice		7.26	-7.27	-414.58	-453.53	5.79
Wind 90 deg - Ice		9.67	0.00	39.56	-617.41	8.19
Wind 135 deg - Ice		7.26	7.27	493.70	-453.53	5.79
Wind 180 deg - Ice		0.00	9.67	657.84	0.00	0.00
Wind 225 deg - Ice		-7.26	7.27	493.70	453.53	-5.79
Wind 270 deg - Ice		-9.67	0.00	39.56	617.41	-8.19
Wind 315 deg - Ice		-7.26	-7.27	-414.58	453.53	-5.79
Total Weight	57.66			25.68	0.00	
Wind 0 deg - Service		0.00	-13.00	-822.00	0.00	0.00
Wind 45 deg - Service		9.61	-9.61	-590.25	-615.94	7.97

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 90 deg - Service		13.00	0.00	25.68	-847.69	11.27
Wind 135 deg - Service		9.61	9.61	641.62	-615.94	7.97
Wind 180 deg - Service		0.00	13.00	873.37	0.00	0.00
Wind 225 deg - Service		-9.61	9.61	641.62	615.94	-7.97
Wind 270 deg - Service		-13.00	0.00	25.68	847.69	-11.27
Wind 315 deg - Service		-9.61	-9.61	-590.25	615.94	-7.97
Seismic Vertical	1.38					
Seismic Horizontal 0 deg		0.00	-2.30	-147.75	0.00	0.00
Seismic Horizontal 45 deg		1.63	-1.63	-104.47	-104.47	0.00
Seismic Horizontal 90 deg		2.30	0.00	0.00	-147.75	0.00
Seismic Horizontal 135 deg		1.63	1.63	104.47	-104.47	0.00
Seismic Horizontal 180 deg		0.00	2.30	147.75	0.00	0.00
Seismic Horizontal 225 deg		-1.63	1.63	104.47	104.47	0.00
Seismic Horizontal 270 deg		-2.30	0.00	0.00	147.75	0.00
Seismic Horizontal 315 deg		-1.63	-1.63	-104.47	104.47	0.00

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 45 deg - No Ice
5	0.9 Dead+1.0 Wind 45 deg - No Ice
6	1.2 Dead+1.0 Wind 90 deg - No Ice
7	0.9 Dead+1.0 Wind 90 deg - No Ice
8	1.2 Dead+1.0 Wind 135 deg - No Ice
9	0.9 Dead+1.0 Wind 135 deg - No Ice
10	1.2 Dead+1.0 Wind 180 deg - No Ice
11	0.9 Dead+1.0 Wind 180 deg - No Ice
12	1.2 Dead+1.0 Wind 225 deg - No Ice
13	0.9 Dead+1.0 Wind 225 deg - No Ice
14	1.2 Dead+1.0 Wind 270 deg - No Ice
15	0.9 Dead+1.0 Wind 270 deg - No Ice
16	1.2 Dead+1.0 Wind 315 deg - No Ice
17	0.9 Dead+1.0 Wind 315 deg - No Ice
18	1.2 Dead+1.0 Ice+1.0 Temp
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 45 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 135 deg - Service
31	Dead+Wind 180 deg - Service
32	Dead+Wind 225 deg - Service
33	Dead+Wind 270 deg - Service
34	Dead+Wind 315 deg - Service
35	1.2 Dead+1.0 Ev+1.0 Eh 0 deg
36	0.9 Dead-1.0 Ev+1.0 Eh 0 deg

Comb. No.	Description
37	1.2 Dead+1.0 Ev+1.0 Eh 45 deg
38	0.9 Dead-1.0 Ev+1.0 Eh 45 deg
39	1.2 Dead+1.0 Ev+1.0 Eh 90 deg
40	0.9 Dead-1.0 Ev+1.0 Eh 90 deg
41	1.2 Dead+1.0 Ev+1.0 Eh 135 deg
42	0.9 Dead-1.0 Ev+1.0 Eh 135 deg
43	1.2 Dead+1.0 Ev+1.0 Eh 180 deg
44	0.9 Dead-1.0 Ev+1.0 Eh 180 deg
45	1.2 Dead+1.0 Ev+1.0 Eh 225 deg
46	0.9 Dead-1.0 Ev+1.0 Eh 225 deg
47	1.2 Dead+1.0 Ev+1.0 Eh 270 deg
48	0.9 Dead-1.0 Ev+1.0 Eh 270 deg
49	1.2 Dead+1.0 Ev+1.0 Eh 315 deg
50	0.9 Dead-1.0 Ev+1.0 Eh 315 deg

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
L1	80 - 74	Pole	Max Tension	18	0.05	0.00	0.00
			Max. Compression	35	-0.68	0.00	0.00
			Max. Mx	14	-0.68	0.00	-0.00
			Max. My	10	-0.68	0.00	-0.00
			Max. Vy	14	-0.00	0.00	-0.00
			Max. Vx	10	0.00	0.00	-0.00
T1	74 - 56.5	Leg	Max Tension	13	25.57	-1.41	0.13
			Max. Compression	8	-36.04	1.38	-0.13
			Max. Mx	12	24.32	-1.42	0.13
			Max. My	12	-6.79	-0.03	1.41
			Max. Vy	16	-5.81	-0.00	0.00
			Max. Vx	8	-7.91	0.00	-0.00
		Diagonal	Max Tension	13	12.14	0.00	0.00
			Max. Compression	12	-16.99	0.00	0.00
			Max. Mx	8	11.35	0.32	0.03
			Max. My	25	-6.10	0.23	0.11
			Max. Vy	22	0.13	0.30	0.10
			Max. Vx	21	0.02	0.00	0.00
		Top Girt	Max Tension	10	4.73	0.00	0.00
			Max. Compression	10	-4.52	0.00	0.00
			Max. Mx	18	0.38	1.56	0.00
			Max. My	21	-0.13	0.00	-0.09
			Max. Vy	18	-0.50	0.00	0.00
			Max. Vx	21	-0.03	0.00	0.00
		Pole Socket	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-2.57	0.00	0.02
			Max. Mx	14	-2.57	-0.09	0.00
			Max. My	10	-2.57	0.00	0.09
			Max. Vy	14	0.01	0.00	-0.00
			Max. Vx	10	-0.01	0.00	-0.00
		Pole Socket Support	Max Tension	22	1.80	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
T2	56.5 - 38.5	Leg	Max Tension	9	45.37	-1.41	-0.13
			Max. Compression	12	-58.61	0.05	0.05
			Max. Mx	12	43.76	-1.42	0.13
			Max. My	12	-8.30	-0.03	1.41
			Max. Vy	12	-0.37	-1.42	0.13
			Max. Vx	4	-0.36	-0.03	-1.40
		Diagonal	Max Tension	9	14.70	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. Compression	12	-19.23	0.00	0.00
			Max. Mx	12	-3.16	0.43	0.07
			Max. My	22	-6.79	0.27	-0.13
			Max. Vy	24	0.14	0.37	-0.11
			Max. Vx	24	-0.02	0.00	0.00
		Top Girt	Max Tension	10	15.93	0.00	0.00
			Max. Compression	11	-10.61	0.00	0.00
			Max. Mx	18	4.79	-0.72	0.00
			Max. My	21	3.67	0.00	0.04
			Max. Vy	18	-0.20	0.00	0.00
			Max. Vx	21	-0.01	0.00	0.00
		Pole Socket	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-4.51	0.00	0.02
			Max. Mx	6	-4.51	0.13	0.00
			Max. My	10	-4.51	0.00	0.13
			Max. Vy	6	-0.00	0.09	0.00
			Max. Vx	10	-0.00	0.00	0.09
T3	38.5 - 19.75	Leg	Max Tension	9	67.20	-0.38	-0.07
			Max. Compression	8	-83.41	5.93	-0.31
			Max. Mx	8	-83.41	5.93	-0.31
			Max. My	4	-10.62	0.20	-2.95
			Max. Vy	8	-0.63	5.93	-0.31
			Max. Vx	4	0.48	0.20	-2.95
		Diagonal	Max Tension	9	15.70	0.00	0.00
			Max. Compression	12	-19.92	0.00	0.00
			Max. Mx	12	-3.52	0.49	0.10
			Max. My	21	-6.02	0.38	-0.15
			Max. Vy	24	0.16	0.45	-0.13
			Max. Vx	25	-0.02	0.00	0.00
		Top Girt	Max Tension	10	18.70	0.00	0.00
			Max. Compression	11	-13.41	0.00	0.00
			Max. Mx	18	4.91	-0.92	0.00
			Max. My	21	4.10	0.00	0.05
			Max. Vy	18	-0.22	0.00	0.00
			Max. Vx	21	-0.01	0.00	0.00
		Pole Socket	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-6.53	0.00	0.02
			Max. Mx	6	-4.51	0.13	0.00
			Max. My	10	-4.51	0.00	0.13
			Max. Vy	6	0.00	0.10	0.00
			Max. Vx	10	0.00	0.00	0.10
T4	19.75 - 0.75	Leg	Max Tension	13	112.98	11.95	-0.47
			Max. Compression	12	-138.52	0.00	0.00
			Max. Mx	12	-138.50	-16.68	-0.70
			Max. My	16	-16.42	-0.86	-5.23
			Max. Vy	12	-16.64	0.00	0.00
			Max. Vx	16	-5.23	0.00	0.00
		Diagonal	Max Tension	13	14.37	0.00	0.00
			Max. Compression	16	-15.65	0.00	0.00
			Max. Mx	12	12.74	0.60	0.03
			Max. My	6	-13.75	-0.04	-0.18
			Max. Vy	24	0.16	0.38	0.12
			Max. Vx	21	0.02	0.00	0.00
		Top Girt	Max Tension	10	15.88	0.00	0.00
			Max. Compression	11	-12.12	0.00	0.00
			Max. Mx	18	1.62	-1.12	0.00
			Max. My	21	1.11	0.00	0.06
			Max. Vy	18	0.24	0.00	0.00
			Max. Vx	21	-0.01	0.00	0.00
		Pole Socket	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-8.58	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	6	-6.53	0.10	0.00
			Max. My	10	-6.53	0.00	0.10
			Max. Vy	6	0.01	0.00	0.00
			Max. Vx	10	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	12	137.17	18.43	-17.59
	Max. H_x	12	137.17	18.43	-17.59
	Max. H_z	5	-110.25	-16.17	15.42
	Min. Vert	5	-110.25	-16.17	15.42
	Min. H_x	5	-110.25	-16.17	15.42
	Min. H_z	12	137.17	18.43	-17.59
Leg C	Max. Vert	8	137.17	-18.43	-17.59
	Max. H_x	17	-110.25	16.17	15.42
	Max. H_z	17	-110.25	16.17	15.42
	Min. Vert	17	-110.25	16.17	15.42
	Min. H_x	8	137.17	-18.43	-17.59
	Min. H_z	8	137.17	-18.43	-17.59
Leg B	Max. Vert	4	135.71	-17.52	18.35
	Max. H_x	13	-111.36	15.49	-16.24
	Max. H_z	4	135.71	-17.52	18.35
	Min. Vert	13	-111.36	15.49	-16.24
	Min. H_x	4	135.71	-17.52	18.35
	Min. H_z	13	-111.36	15.49	-16.24
Leg A	Max. Vert	16	135.71	17.52	18.35
	Max. H_x	16	135.71	17.52	18.35
	Max. H_z	16	135.71	17.52	18.35
	Min. Vert	9	-111.36	-15.49	-16.24
	Min. H_x	9	-111.36	-15.49	-16.24
	Min. H_z	9	-111.36	-15.49	-16.24
Pole	Max. Vert	23	8.58	0.00	0.00
	Max. H_x	6	8.58	0.01	0.00
	Max. H_z	10	8.58	0.00	0.01
	Max. M_x	10	0.00	0.00	0.01
	Max. M_z	12	0.00	-0.01	0.01
	Max. Torsion	14	0.00	-0.01	0.00
	Min. Vert	40	6.43	0.00	0.00
	Min. H_x	14	8.58	-0.01	0.00
	Min. H_z	2	8.58	0.00	-0.01
	Min. M_x	14	0.00	-0.01	0.00
	Min. M_z	8	0.00	0.01	0.01
	Min. Torsion	6	-0.00	0.01	0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	57.66	0.00	0.00	25.70	0.00	0.00

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
1.2 Dead+1.0 Wind 0 deg - No Ice	69.19	0.00	-53.73	-3481.81	0.00	0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	51.90	0.00	-53.73	-3487.97	0.00	0.00
1.2 Dead+1.0 Wind 45 deg - No Ice	69.19	39.73	-39.73	-2521.58	-2552.41	32.98
0.9 Dead+1.0 Wind 45 deg - No Ice	51.90	39.73	-39.73	-2528.17	-2551.26	32.97
1.2 Dead+1.0 Wind 90 deg - No Ice	69.19	53.73	0.00	30.82	-3512.69	46.65
0.9 Dead+1.0 Wind 90 deg - No Ice	51.90	53.73	0.00	23.09	-3511.11	46.63
1.2 Dead+1.0 Wind 135 deg - No Ice	69.19	39.73	39.73	2583.28	-2552.46	32.98
0.9 Dead+1.0 Wind 135 deg - No Ice	51.90	39.73	39.73	2574.40	-2551.31	32.97
1.2 Dead+1.0 Wind 180 deg - No Ice	69.19	0.00	53.73	3543.56	0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	51.90	0.00	53.73	3534.25	0.00	0.00
1.2 Dead+1.0 Wind 225 deg - No Ice	69.19	-39.73	39.73	2583.28	2552.46	-32.98
0.9 Dead+1.0 Wind 225 deg - No Ice	51.90	-39.73	39.73	2574.40	2551.31	-32.97
1.2 Dead+1.0 Wind 270 deg - No Ice	69.19	-53.73	0.00	30.82	3512.69	-46.65
0.9 Dead+1.0 Wind 270 deg - No Ice	51.90	-53.73	0.00	23.09	3511.11	-46.63
1.2 Dead+1.0 Wind 315 deg - No Ice	69.19	-39.73	-39.73	-2521.58	2552.41	-32.98
0.9 Dead+1.0 Wind 315 deg - No Ice	51.90	-39.73	-39.73	-2528.17	2551.26	-32.97
1.2 Dead+1.0 Ice+1.0 Temp	97.20	0.00	0.00	44.72	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	97.20	0.00	-9.67	-575.14	0.00	0.00
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	97.20	7.26	-7.27	-410.57	-454.76	5.80
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	97.20	9.67	0.00	44.82	-619.07	8.20
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	97.20	7.26	7.27	500.18	-454.76	5.79
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	97.20	0.00	9.67	664.74	0.00	0.00
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	97.20	-7.26	7.27	500.18	454.76	-5.79
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	97.20	-9.67	0.00	44.82	619.07	-8.20
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	97.20	-7.26	-7.27	-410.57	454.76	-5.80
Dead+Wind 0 deg - Service	57.66	0.00	-13.00	-823.64	0.00	0.00
Dead+Wind 45 deg - Service	57.66	9.61	-9.61	-591.42	-617.14	7.97
Dead+Wind 90 deg - Service	57.66	13.00	0.00	25.72	-849.36	11.29
Dead+Wind 135 deg - Service	57.66	9.61	9.61	642.86	-617.15	7.98
Dead+Wind 180 deg - Service	57.66	0.00	13.00	875.08	0.00	0.00
Dead+Wind 225 deg - Service	57.66	-9.61	9.61	642.86	617.15	-7.98
Dead+Wind 270 deg - Service	57.66	-13.00	0.00	25.72	849.36	-11.29
Dead+Wind 315 deg - Service	57.66	-9.61	-9.61	-591.42	617.14	-7.97
1.2 Dead+1.0 Ev+1.0 Eh 0 deg	70.58	0.00	-2.30	-117.03	0.00	0.00
0.9 Dead-1.0 Ev+1.0 Eh 0 deg	50.51	0.00	-2.30	-124.71	0.00	0.00
1.2 Dead+1.0 Ev+1.0 Eh 45 deg	70.58	1.63	-1.63	-73.72	-104.56	0.00
0.9 Dead-1.0 Ev+1.0 Eh 45 deg	50.51	1.63	-1.63	-81.41	-104.53	-0.00

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
1.2 Dead+1.0 Ev+1.0 Eh 90 deg	70.58	2.30	0.00	30.84	-147.89	0.01
0.9 Dead-1.0 Ev+1.0 Eh 90 deg	50.51	2.30	0.00	23.12	-147.84	0.01
1.2 Dead+1.0 Ev+1.0 Eh 135 deg	70.58	1.63	1.63	135.46	-104.60	0.00
0.9 Dead-1.0 Ev+1.0 Eh 135 deg	50.51	1.63	1.63	127.68	-104.54	-0.00
1.2 Dead+1.0 Ev+1.0 Eh 180 deg	70.58	0.00	2.30	178.80	0.00	0.00
0.9 Dead-1.0 Ev+1.0 Eh 180 deg	50.51	0.00	2.30	170.99	0.00	0.00
1.2 Dead+1.0 Ev+1.0 Eh 225 deg	70.58	-1.63	1.63	135.46	104.60	-0.00
0.9 Dead-1.0 Ev+1.0 Eh 225 deg	50.51	-1.63	1.63	127.68	104.54	0.00
1.2 Dead+1.0 Ev+1.0 Eh 270 deg	70.58	-2.30	0.00	30.84	147.89	-0.01
0.9 Dead-1.0 Ev+1.0 Eh 270 deg	50.51	-2.30	0.00	23.12	147.84	-0.01
1.2 Dead+1.0 Ev+1.0 Eh 315 deg	70.58	-1.63	-1.63	-73.72	104.56	-0.00
0.9 Dead-1.0 Ev+1.0 Eh 315 deg	50.51	-1.63	-1.63	-81.41	104.53	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-57.66	0.00	0.00	57.66	-0.00	0.000%
2	0.00	-69.19	-53.73	0.00	69.19	53.73	0.000%
3	0.00	-51.89	-53.73	0.00	51.90	53.73	0.000%
4	39.73	-69.19	-39.73	-39.73	69.19	39.73	0.001%
5	39.73	-51.89	-39.73	-39.73	51.90	39.73	0.001%
6	53.73	-69.19	0.00	-53.73	69.19	-0.00	0.000%
7	53.73	-51.89	0.00	-53.73	51.90	-0.00	0.000%
8	39.73	-69.19	39.73	-39.73	69.19	-39.73	0.001%
9	39.73	-51.89	39.73	-39.73	51.90	-39.73	0.001%
10	0.00	-69.19	53.73	0.00	69.19	-53.73	0.000%
11	0.00	-51.89	53.73	0.00	51.90	-53.73	0.000%
12	-39.73	-69.19	39.73	39.73	69.19	-39.73	0.001%
13	-39.73	-51.89	39.73	39.73	51.90	-39.73	0.001%
14	-53.73	-69.19	0.00	53.73	69.19	-0.00	0.000%
15	-53.73	-51.89	0.00	53.73	51.90	-0.00	0.000%
16	-39.73	-69.19	-39.73	39.73	69.19	39.73	0.001%
17	-39.73	-51.89	-39.73	39.73	51.90	39.73	0.001%
18	0.00	-97.20	0.00	0.00	97.20	0.00	0.000%
19	0.00	-97.20	-9.67	0.00	97.20	9.67	0.000%
20	7.26	-97.20	-7.27	-7.26	97.20	7.27	0.000%
21	9.67	-97.20	0.00	-9.67	97.20	-0.00	0.000%
22	7.26	-97.20	7.27	-7.26	97.20	-7.27	0.000%
23	0.00	-97.20	9.67	0.00	97.20	-9.67	0.000%
24	-7.26	-97.20	7.27	7.26	97.20	-7.27	0.000%
25	-9.67	-97.20	0.00	9.67	97.20	-0.00	0.000%
26	-7.26	-97.20	-7.27	7.26	97.20	7.27	0.000%
27	0.00	-57.66	-13.00	0.00	57.66	13.00	0.000%
28	9.61	-57.66	-9.61	-9.61	57.66	9.61	0.000%
29	13.00	-57.66	0.00	-13.00	57.66	-0.00	0.000%
30	9.61	-57.66	9.61	-9.61	57.66	-9.61	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
31	0.00	-57.66	13.00	0.00	57.66	-13.00	0.000%
32	-9.61	-57.66	9.61	9.61	57.66	-9.61	0.000%
33	-13.00	-57.66	0.00	13.00	57.66	-0.00	0.000%
34	-9.61	-57.66	-9.61	9.61	57.66	9.61	0.000%
35	0.00	-70.58	-2.30	0.00	70.58	2.30	0.000%
36	0.00	-50.51	-2.30	0.00	50.51	2.30	0.000%
37	1.63	-70.58	-1.63	-1.63	70.58	1.63	0.000%
38	1.63	-50.51	-1.63	-1.63	50.51	1.63	0.000%
39	2.30	-70.58	0.00	-2.30	70.58	0.00	0.000%
40	2.30	-50.51	0.00	-2.30	50.51	-0.00	0.000%
41	1.63	-70.58	1.63	-1.63	70.58	-1.63	0.000%
42	1.63	-50.51	1.63	-1.63	50.51	-1.63	0.000%
43	0.00	-70.58	2.30	0.00	70.58	-2.30	0.000%
44	0.00	-50.51	2.30	0.00	50.51	-2.30	0.000%
45	-1.63	-70.58	1.63	1.63	70.58	-1.63	0.000%
46	-1.63	-50.51	1.63	1.63	50.51	-1.63	0.000%
47	-2.30	-70.58	0.00	2.30	70.58	0.00	0.000%
48	-2.30	-50.51	0.00	2.30	50.51	-0.00	0.000%
49	-1.63	-70.58	-1.63	1.63	70.58	1.63	0.000%
50	-1.63	-50.51	-1.63	1.63	50.51	1.63	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	4	0.00000001	0.00002470
3	Yes	4	0.00000001	0.00002278
4	Yes	4	0.00000001	0.00007060
5	Yes	4	0.00000001	0.00006673
6	Yes	4	0.00000001	0.00002522
7	Yes	4	0.00000001	0.00002321
8	Yes	4	0.00000001	0.00007173
9	Yes	4	0.00000001	0.00006757
10	Yes	4	0.00000001	0.00002515
11	Yes	4	0.00000001	0.00002311
12	Yes	4	0.00000001	0.00007173
13	Yes	4	0.00000001	0.00006757
14	Yes	4	0.00000001	0.00002522
15	Yes	4	0.00000001	0.00002321
16	Yes	4	0.00000001	0.00007060
17	Yes	4	0.00000001	0.00006673
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001

32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	80 - 74	0.421	32	0.0253	0.0000
T1	74 - 56.5	0.389	32	0.0380	0.0028
T2	56.5 - 38.5	0.253	32	0.0315	0.0022
T3	38.5 - 19.75	0.142	32	0.0221	0.0017
T4	19.75 - 0.75	0.064	32	0.0120	0.0013

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
91.00	L1 Ice Weight Offset (6'x24"Ø STD Pipe)	32	0.421	0.0253	0.0000	41318
74.00	Roof	32	0.389	0.0380	0.0028	38000
68.77	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.353	0.0414	0.0037	55254
65.25	CCISeismic Tower Section 1	32	0.325	0.0400	0.0035	127912
63.54	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.310	0.0386	0.0033	356097
58.30	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.267	0.0333	0.0025	85219
53.07	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.228	0.0288	0.0019	62827
47.84	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.193	0.0258	0.0016	74963
47.50	CCISeismic Tower Section 2	32	0.191	0.0257	0.0016	75947
42.61	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.163	0.0237	0.0016	93616
37.38	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.136	0.0217	0.0017	117809
32.14	6' x 24"Ø STD Pipe (Below Water	32	0.112	0.0192	0.0017	144503

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Tower)					
29.13	CCISeismic Tower Section 3	32	0.100	0.0176	0.0016	163093
26.91	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.091	0.0163	0.0015	180093
21.68	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.071	0.0132	0.0013	238200
16.45	6' x 24"Ø STD Pipe (Below Water Tower)	32	0.052	0.0100	0.0011	328606
11.21	6' x 24"Ø STD Pipe (Below Water Tower)	28	0.034	0.0067	0.0007	493266
10.25	CCISeismic Tower Section 4	28	0.031	0.0061	0.0007	543333
5.98	6' x 24"Ø STD Pipe (Below Water Tower)	28	0.017	0.0034	0.0004	986537
0.75	6' x 24"Ø STD Pipe (Below Water Tower)	0	0.000	0.0000	0.0000	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	80 - 74	1.711	12	0.1027	0.0000
T1	74 - 56.5	1.581	12	0.1510	0.0118
T2	56.5 - 38.5	1.032	12	0.1268	0.0091
T3	38.5 - 19.75	0.582	12	0.0896	0.0070
T4	19.75 - 0.75	0.264	12	0.0489	0.0052

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
91.00	L1 Ice Weight Offset (6'x24"Ø STD Pipe)	12	1.711	0.1027	0.0000	10654
74.00	Roof	12	1.581	0.1510	0.0118	9797
68.77	6' x 24"Ø STD Pipe (Below Water Tower)	8	1.434	0.1637	0.0153	14207
65.25	CCISeismic Tower Section 1	12	1.321	0.1586	0.0146	32602
63.54	6' x 24"Ø STD Pipe (Below Water Tower)	12	1.264	0.1535	0.0138	87770
58.30	6' x 24"Ø STD Pipe (Below Water Tower)	12	1.090	0.1336	0.0103	22277
53.07	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.930	0.1161	0.0077	16274
47.84	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.790	0.1046	0.0068	19182
47.50	CCISeismic Tower Section 2	12	0.782	0.1039	0.0068	19415
42.61	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.668	0.0960	0.0068	23248
37.38	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.560	0.0877	0.0070	28948
32.14	6' x 24"Ø STD Pipe (Below Water	12	0.463	0.0777	0.0069	36447

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Tower)					
29.13	CCISeismic Tower Section 3	12	0.411	0.0712	0.0067	41903
26.91	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.374	0.0662	0.0064	47043
21.68	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.293	0.0537	0.0056	65818
16.45	6' x 24"Ø STD Pipe (Below Water Tower)	12	0.216	0.0406	0.0045	94236
11.21	6' x 24"Ø STD Pipe (Below Water Tower)	16	0.143	0.0273	0.0031	141572
10.25	CCISeismic Tower Section 4	16	0.129	0.0248	0.0028	155942
5.98	6' x 24"Ø STD Pipe (Below Water Tower)	16	0.071	0.0137	0.0016	283143
0.75	6' x 24"Ø STD Pipe (Below Water Tower)	0	0.000	0.0000	0.0000	296289

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	74	Diagonal	A325X	0.7500	2	8.50	24.85	0.342 ✔	1	Bolt Shear
		Top Girt	A325X	0.6250	3	1.58	17.26	0.091 ✔	1	Bolt Shear
T2	56.5	Leg	A325N	0.6250	4	11.34	20.34	0.558 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	2	9.61	24.85	0.387 ✔	1	Bolt Shear
		Top Girt	A325X	0.7500	2	7.96	20.93	0.380 ✔	1	Member Bearing
T3	38.5	Diagonal	A325X	0.7500	2	9.96	24.85	0.401 ✔	1	Bolt Shear
		Top Girt	A325X	0.7500	2	9.35	20.93	0.447 ✔	1	Member Bearing
T4	19.75	Diagonal	A325X	0.7500	2	7.18	20.93	0.343 ✔	1	Member Bearing
		Top Girt	A325X	0.7500	2	7.94	20.93	0.379 ✔	1	Member Bearing

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	80 - 74 (1)	P24x3/8<ERW>	6.00	0.00	0.0	25.9130	-0.68	1055.70	0.001 [1]
T1	74 - 56.5 (70)	P24x3/8<ERW>	17.50	0.00	25.1 K=1.00	25.9130	-2.57	1015.59	0.003
T2	56.5 - 38.5 (71)	P24x3/8<ERW>	18.00	0.00	25.8 K=1.00	25.9130	-4.51	1013.32	0.004

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	38.5 - 19.75 (72)	P24x3/8<ERW>	18.75	0.00	26.9 K=1.00	25.9130	-6.53	1009.79	0.006
T4	19.75 - 0.75 (73)	P24x3/8<ERW>	19.00	0.00	27.3 K=1.00	25.9130	-8.58	1008.59	0.009 [1]

[1] P_u / ϕP_n controls

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	80 - 74 (1)	P24x3/8<ERW>	0.00	619.22	0.000	0.00	619.22	0.000
T1	74 - 56.5 (70)	P24x3/8<ERW>	0.09	619.22	0.000	0.00	619.22	0.000
T2	56.5 - 38.5 (71)	P24x3/8<ERW>	0.13	619.22	0.000	0.00	619.22	0.000
T3	38.5 - 19.75 (72)	P24x3/8<ERW>	0.10	619.22	0.000	0.00	619.22	0.000
T4	19.75 - 0.75 (73)	P24x3/8<ERW>	0.00	619.22	0.000	0.00	619.22	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	80 - 74 (1)	P24x3/8<ERW>	0.00	293.85	0.000	0.00	611.03	0.000
T1	74 - 56.5 (70)	P24x3/8<ERW>	0.01	293.85	0.000	0.00	611.03	0.000
T2	56.5 - 38.5 (71)	P24x3/8<ERW>	0.00	293.85	0.000	0.00	611.03	0.000
T3	38.5 - 19.75 (72)	P24x3/8<ERW>	0.00	293.85	0.000	0.00	611.03	0.000
T4	19.75 - 0.75 (73)	P24x3/8<ERW>	0.00	293.85	0.000	0.00	611.03	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	80 - 74 (1)	0.001	0.000	0.000	0.000	0.000	0.001 [1] ✔	1.000	4.8.2 ✔
T1	74 - 56.5 (70)	0.003	0.000	0.000	0.000	0.000	0.003 ✔	1.000	4.8.2 ✔
T2	56.5 - 38.5 (71)	0.004	0.000	0.000	0.000	0.000	0.005 ✔	1.000	4.8.2 ✔
T3	38.5 - 19.75	0.006	0.000	0.000	0.000	0.000	0.007	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T4	(72) 19.75 - 0.75 (73)	0.009	0.000	0.000	0.000	0.000	0.009 [1]	1.000	4.8.2

[1] $P_u / \phi P_n$ controls

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 $P_u/\phi P_n$
T1	74 - 56.5	HSS5x5x1/4	17.56	17.56	109.2 K=1.00	4.3000	-36.05	78.18	0.461 [1]
T2	56.5 - 38.5	HSS5x5x1/4	18.06	18.06	112.3 K=1.00	4.3000	-58.61	74.93	0.782 [1]
T3	38.5 - 19.75	HSS6x6x1/4	18.81	18.81	96.5 K=1.00	5.2400	-83.41	111.84	0.746 [1]
T4	19.75 - 0.75	HSS6x6x1/4	19.06	18.06	92.6 K=1.00	5.2400	-117.02	116.96	1.000 [1]
		4.8.1 (1.00 CR) - 50							

[1] $P_u / \phi P_n$ controls

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $M_{ux}/\phi M_{nx}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $M_{uy}/\phi M_{ny}$
T1	74 - 56.5	HSS5x5x1/4	0.00	23.97	0.000	0.00	23.97	0.000
T2	56.5 - 38.5	HSS5x5x1/4	0.00	23.97	0.000	0.00	23.97	0.000
T3	38.5 - 19.75	HSS6x6x1/4	0.00	35.28	0.000	0.00	35.28	0.000
T4	19.75 - 0.75	HSS6x6x1/4	0.00	35.28	0.000	0.00	35.28	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	74 - 56.5	HSS5x5x1/4	0.461	0.000	0.000	0.461 [1]	1.000	4.8.1
T2	56.5 - 38.5	HSS5x5x1/4	0.782	0.000	0.000	0.782 [1]	1.000	4.8.1

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T3	38.5 - 19.75	HSS6x6x1/4	0.746	0.000	0.000	0.746 [1] ✔	1.000	4.8.1 ✔
T4	19.75 - 0.75	HSS6x6x1/4	1.000	0.000	0.000	1.000 [1] ✘	1.000	4.8.1 ✘

[1] P_u / ϕP_n controls

Diagonal 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	74 - 56.5	L6x6x5/16	22.16	11.33	115.0 K=1.01	3.6500	-16.99	70.31	0.242 [1] ✔
T2	56.5 - 38.5	L6x6x5/16	23.84	12.16	121.3 K=1.00	3.6500	-19.23	66.35	0.290 [1] ✔
T3	38.5 - 19.75	L6x6x5/16	25.81	13.10	128.4 K=0.98	3.6500	-19.92	61.61	0.323 [1] ✔
T4	19.75 - 0.75	L6x6x5/16	26.79	13.53	131.7 K=0.97	3.6500	-15.65	59.33	0.264 [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	74 - 56.5	W10x49	12.55	12.13	57.3 K=1.00	14.4000	-4.52	392.44	0.012 [1] ✔
T2	56.5 - 38.5	L6x6x5/16	14.56	13.69	130.4 K=0.95	3.6500	-10.61	60.25	0.176 [1] ✔
T3	38.5 - 19.75	L6x6x5/16	16.63	15.67	142.6 K=0.91	3.6500	-13.41	51.40	0.261 [1] ✔
T4	19.75 - 0.75	L6x6x5/16	18.78	17.82	155.8 K=0.87	3.6500	-12.12	43.03	0.282 [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 $\frac{P_u}{\phi P_n}$
T1	74 - 56.5	HSS5x5x1/4	17.56	17.56	109.2	4.3000	25.57	162.54	0.157 [1]
T2	56.5 - 38.5	HSS5x5x1/4	18.06	18.06	112.3	4.3000	45.37	162.54	0.279 [1]
T3	38.5 - 19.75	HSS6x6x1/4	18.81	18.81	96.5	5.2400	67.20	198.07	0.339 [1]
T4	19.75 - 0.75	HSS6x6x1/4	19.06	1.00	5.1	5.2400	112.98	198.07	0.570 [1]

[1] P_u / ϕP_n controls

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	74 - 56.5	HSS5x5x1/4	0.00	23.97	0.000	0.00	23.97	0.000
T2	56.5 - 38.5	HSS5x5x1/4	0.00	23.97	0.000	0.00	23.97	0.000
T3	38.5 - 19.75	HSS6x6x1/4	0.00	35.28	0.000	0.00	35.28	0.000
T4	19.75 - 0.75	HSS6x6x1/4	0.00	35.28	0.000	0.00	35.28	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	74 - 56.5	HSS5x5x1/4	0.157	0.000	0.000	0.157 [1] ✔	1.000	4.8.1 ✔
T2	56.5 - 38.5	HSS5x5x1/4	0.279	0.000	0.000	0.279 [1] ✔	1.000	4.8.1 ✔
T3	38.5 - 19.75	HSS6x6x1/4	0.339	0.000	0.000	0.339 [1] ✔	1.000	4.8.1 ✔
T4	19.75 - 0.75	HSS6x6x1/4	0.570	0.000	0.000	0.570 [1] ✔	1.000	4.8.1 ✔

[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	74 - 56.5	L6x6x5/16	22.16	11.33	73.4	2.5324	12.14	110.16	0.110 [1] ✔
T2	56.5 - 38.5	L6x6x5/16	23.84	12.16	78.7	2.5324	14.70	110.16	0.133 [1] ✔
T3	38.5 - 19.75	L6x6x5/16	25.81	13.10	84.6	2.5324	15.70	110.16	0.143 [1] ✔
T4	19.75 - 0.75	L6x6x5/16	26.79	13.53	87.3	2.5324	14.37	110.16	0.130 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
									✔

[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 $\frac{P_u}{\phi P_n}$
T1	74 - 56.5	W10x49	12.55	12.13	57.3	10.6088	4.73	461.48	0.010 [1] ✔
T2	56.5 - 38.5	L6x6x5/16	14.56	13.69	89.8	2.5324	15.93	110.16	0.145 [1] ✔
T3	38.5 - 19.75	L6x6x5/16	16.63	15.67	102.4	2.5324	18.70	110.16	0.170 [1] ✔
T4	19.75 - 0.75	L6x6x5/16	18.78	17.82	116.1	2.5324	15.88	110.16	0.144 [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
L1	80 - 74	Pole	P24x3/8<ERW>	1	-0.68	1055.70	0.1	Pass
T1	74 - 56.5	Leg	HSS5x5x1/4	2	-36.05	78.18	46.1	Pass
		Diagonal	L6x6x5/16	10	-16.99	70.31	24.2	Pass
		Top Girt	W10x49	8	-4.52	392.44	1.2	Pass
		Pole Socket	P24x3/8<ERW>	70	-2.57	1015.59	0.3	Pass
T2	56.5 - 38.5	Leg	HSS5x5x1/4	18	-58.61	74.93	78.2	Pass
		Diagonal	L6x6x5/16	26	-19.23	66.35	29.0	Pass
		Top Girt	L6x6x5/16	24	-10.61	60.25	17.6	Pass
		Pole Socket	P24x3/8<ERW>	71	-4.51	1013.32	0.5	Pass
T3	38.5 - 19.75	Leg	HSS6x6x1/4	34	-83.41	111.84	74.6	Pass
		Diagonal	L6x6x5/16	43	-19.92	61.61	32.3	Pass
		Top Girt	L6x6x5/16	40	-13.41	51.40	26.1	Pass
		Pole Socket	P24x3/8<ERW>	72	-6.53	1009.79	0.7	Pass
T4	19.75 - 0.75	Leg	HSS6x6x1/4	50	-117.02	116.96	100.0	Acceptable
		Diagonal	L6x6x5/16	61	-15.65	59.33	26.4	Pass
		Top Girt	L6x6x5/16	56	-12.12	43.03	28.2	Pass
		Pole Socket	P24x3/8<ERW>	73	-8.58	1008.59	0.9	Pass
							Summary	
						Pole (L1)	0.1	Pass
						Leg (T4)	100.0	Acceptable
						Diagonal (T3)	32.3	Pass
						Top Girt (T4)	28.2	Pass
						Pole Socket (T4)	0.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						Bolt Checks	55.8	Pass
						RATING =	**100.0**	**Acceptable**

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: B - Rock

Elevation: 44.78 ft (NAVD 88)
Latitude: 41.2664
Longitude: -72.7333

Wind

Results:

Wind Speed	122 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	93 Vmph
100-year MRI	100 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Mon Mar 14 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

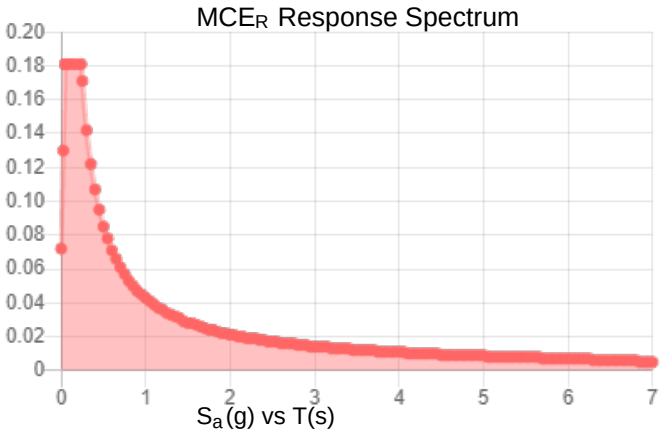
Seismic

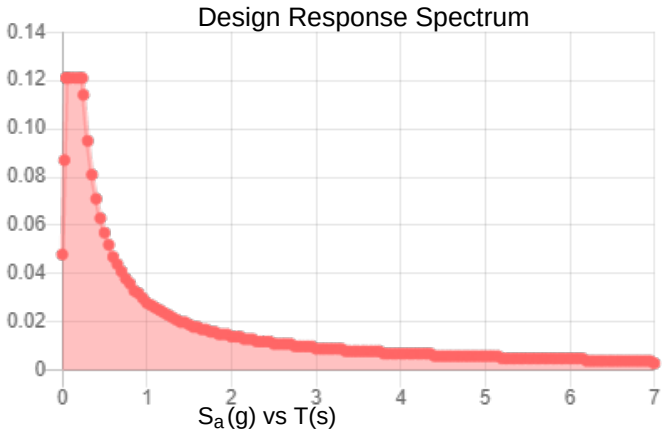
Site Soil Class: B - Rock

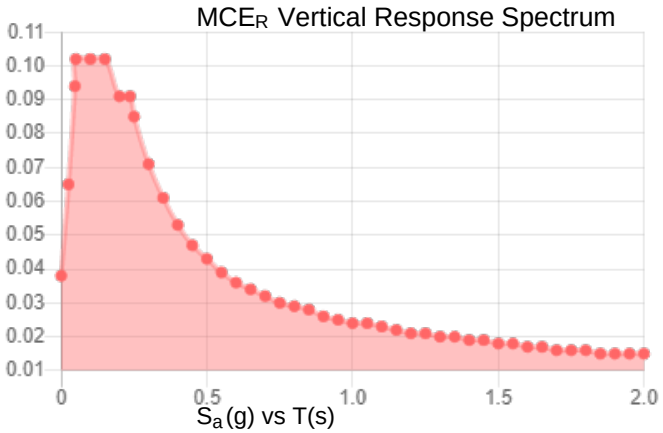
Results:

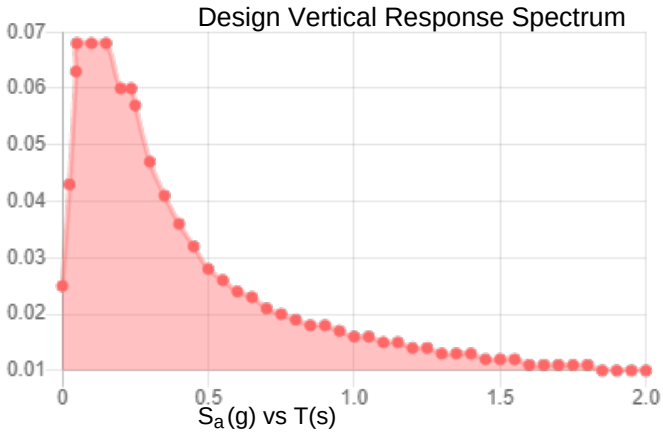
S_S :	0.201	S_{D1} :	0.028
S_1 :	0.053	T_L :	6
F_a :	0.9	PGA :	0.112
F_v :	0.8	PGA_M :	0.101
S_{MS} :	0.181	F_{PGA} :	0.9
S_{M1} :	0.043	I_e :	1
S_{DS} :	0.121	C_v :	0.701

Seismic Design Category A









Data Accessed: **Mon Mar 14 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Mar 14 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.


28241_Branford South
Exposure D
>1.0 mi over Surface Roughness D
Legend
1.0 mi over Roughness D
2180'
41.2664, -72.7333
Wind
41.2664, -72.7333
Google Earth
N
5000 ft

Site Name:	Branford South
Site Number:	28241
Engineering Number:	REV01
Engineer:	NDW
Date:	3/24/2022

Item	CaAa	Ice	Weight	Ice
Roof	40.02	40.79	1450	2700
(3) 20'Øx 10' SSV Water Tower Sections	402.00	403.68	3050	7450
20'Ø Ring Platform	0	0	2350	2350
21' Main Platform Deck	28.00	31.63	6050	6650

Actual Tower Height
104.917 ft

			Top Tower			**Full Tower**			**Base Tower**			**Base Tower - Sesmic**						
			Base Elev (ft)		74.00	Base Elev (ft)		0.75	Base Elev (ft)		0.75	Base Elev (ft)		0.75				
			TNX Height (ft)		30.92	TNX Height (ft)		104.17	TNX Height (ft)		79.25	TNX Height (ft)		73.25				
Actual Elevation		Item	Elevation			Elevation			Elevation			Elevation						
From	To		V Offset	From	To	V Offset	From	To	V Offset	From	To	V Offset	From	To	CaAa	Ice	Weight	Ice
104.92	109.00	Roof	1.3	30.92	30.92	1.3	104.17	104.17	35.00	73.25	73.25	35.00	73.25	73.25	40	40.8	1450	2700
74.92	104.92	(3) 20'Øx 10' SSV Water Tower Sections	0	0.92	30.92	0	74.17	104.17	15.92	73.25	73.25	15.92	73.25	73.25	402.0	403.7	3050	7450
104.92	104.92	20'Ø Ring Platform	0	30.92	30.92	0	104.17	104.17	30.92	73.25	73.25	30.92	73.25	73.25	0.0	0.0	2350	2350
94.92	94.92	20'Ø Ring Platform	0	20.92	20.92	0	94.17	94.17	20.92	73.25	73.25	20.92	73.25	73.25	0.0	0.0	2350	2350
84.92	84.92	20'Ø Ring Platform	0	10.92	10.92	0	84.17	84.17	10.92	73.25	73.25	10.92	73.25	73.25	0.0	0.0	2350	2350
74.00	74.00	21' Main Platform Deck	-	-	-	0	73.25	73.25	0.00	73.25	73.25	0.00	73.25	73.25	28.0	31.6	6050	6650
74.00	104.92	Top Tower Section	-	-	-	-	-	-	15.46	73.25	73.25	15.46	73.25	73.25	0.00	0.00	3854	3854
74.00	80.00	6' x 24"Ø STD Pipe (Inside Water Tower)	-	-	-	3	73.25	73.25	-	-	-	3	73.25	73.25	0.00	0.00	568	568
0.00	74	6' x 24"Ø STD Pipe (Below Water Tower)	-	-	-	-	-	-	0	0.00	73.25	-	-	-	65.93	68.67	0	0
			-	-	-	0	0.00	73.25	-	-	-	0	0.00	73.25	65.93	68.67	6459	7555
74.00	100	Coax in Top Tower Weight	-	-	-	-	-	-	13	73.25	73.25	13	73.25	73.25	0.00	0.00	547	547
74.00	104.92	Climb Ladder	-	-	-	-	-	-	15.46	73.25	73.25	15.46	73.25	73.25	0.00	0.00	111	111
Under User Forces																		
74.00	104.92	L1 Ice Weight Offset (SST LP Section)	0	15.46	15.46	0	88.71	88.71	-	-	-	-	-	-	0.00	0.00	0.00	-3929.45
74.00	108.00	L1 Ice Weight Offset (6'x24"Ø STD Pipe)	-	-	-	-	-	-	0	90.25	90.25	-	-	-	0.00	0.00	0.00	-200.17
Equipment CLs																		
100	100	AT&T	0	26.00	26.00	0	99.25	99.25	26	73.25	73.25	26	73.25	73.25				
90	90	VzW	0	16.00	16.00	0	89.25	89.25	16	73.25	73.25	16	73.25	73.25				
80	80	TMO	0	6.00	6.00	0	79.25	79.25	6	73.25	73.25	6	73.25	73.25				
Equipment Supported By Platform Below It																		
100	100	AT&T	5.08	20.92	20.92	5.08	94.17	94.17	-	-	-	-	-	-				
90	90	VzW	5.08	10.92	10.92	5.08	84.17	84.17	-	-	-	-	-	-				
80	80	TMO	6.00	0.00	0.00	6.00	73.25	73.25	-	-	-	-	-	-				

Site Name:	Branford South
Site Number:	28241
Engineering Number:	REV01
Engineer:	NDW
Date:	3/24/2022

Roof

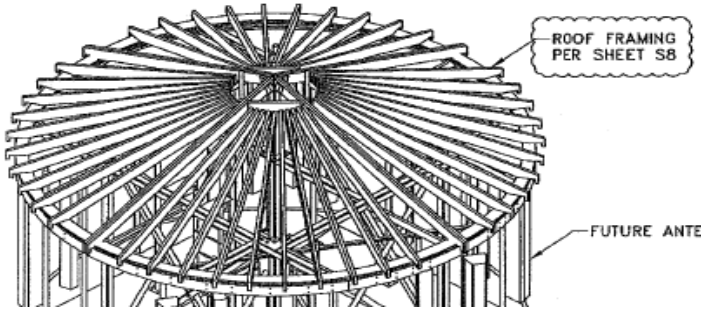
Material Weights				
	Ø (ft)	Area (ft^2)	psf	Weight
OSB Nailer	20	15.7	10.02	157

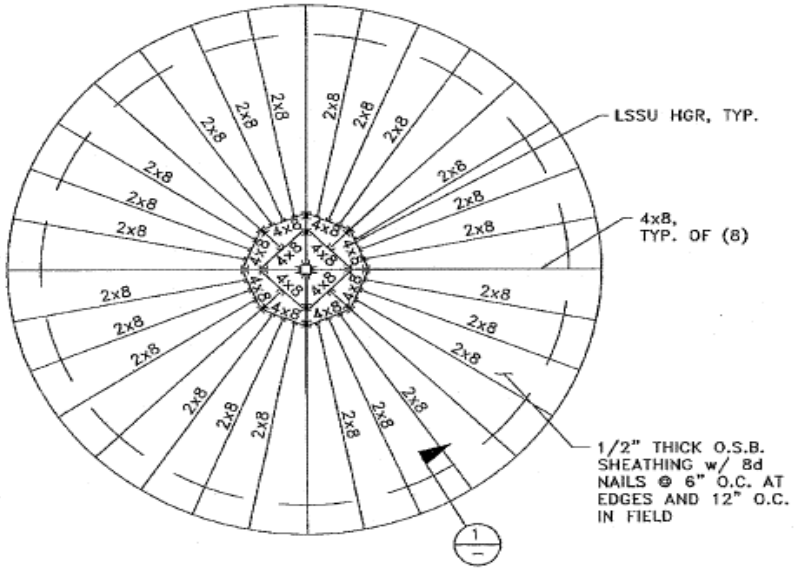
	#	Length (ft)	plf	Weight
HSS 4x4x1/4	1	4.4	11.5	51
4x8 (Wood)	4	10	6.0	240
2x8 (Wood)	24	10	2.6	614

	#	Area (ft^2)	psf	Weight
Roofing	1	180	2	360

Miscl (+5%)	71
Total	**1493 lbs**

CaAa & Ice	wo/ ice	w/ 1/2" ice
Height (in.) =	**49**	**49.5**
Eq Cone Height (in.) =	**32.7**	**33.2**
Cylinder Diameter (in.) =	**252**	**253**
Aspect Ratio =	7.714	7.714
Coef. C_A =	0.7	0.7
C_A x A_A (sq. ft.) =	**40.02**	**40.79**
Weight (lb.) =	**1493**	**2728**





ROOF FRAMING PLAN

Site Name: Branford South
Site Number: 28241
ıgineering Number: REV01
Engineer: NDW
Date: 3/24/2022

20'Ø Ring Platform

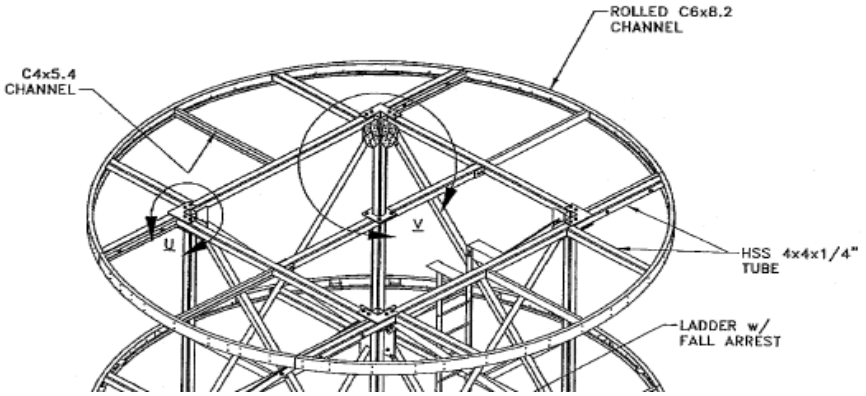
Material Weights				
	Ø (ft)	Length (ft)	plf	Weight
C6x8.2	20	62.8	8.2	515

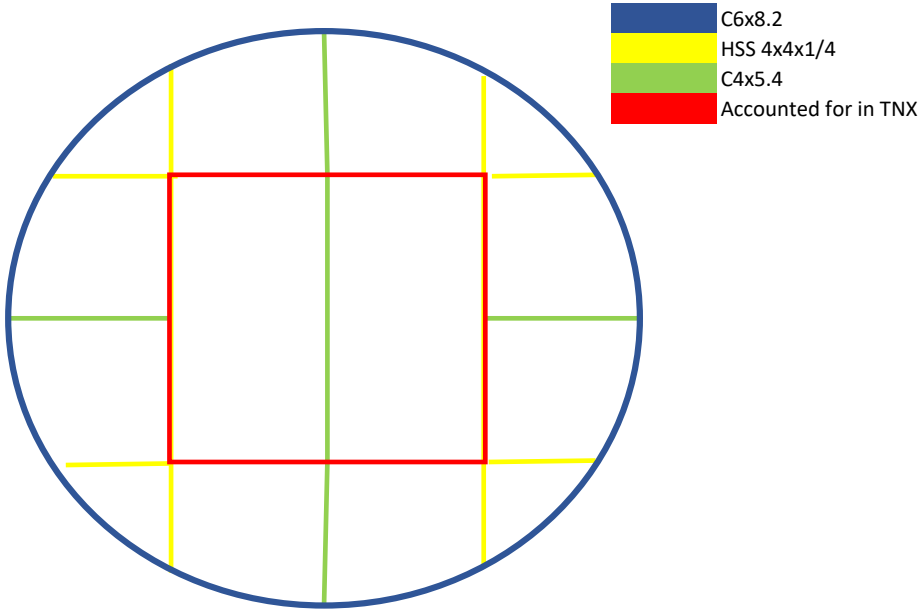
	#	Length (ft)	plf	Weight
HSS 4x4x1/4	8	4.4	11.5	408
	1	9	11.5	104
C4x5.4	4	5.5	5.4	119

	#	Area (ft^2)	psf	Weight
1"x1/8" Grating	2	70.2	5	702
	2	42.4	5	424

Miscl Bolts & Plates (+10%)	115

Total	**2385**	**lbs**





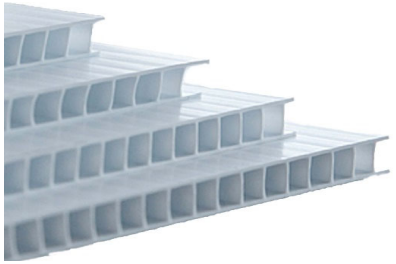
Site Name:	Branford South
Site Number:	28241
Engineering Number:	REV01
Engineer:	NDW
Date:	3/24/2022

(3) 20'Øx 10' SSV Water Tower Sections

Cylinder Length (ft.) =	10.00
Cylinder Diameter (ft.) =	20

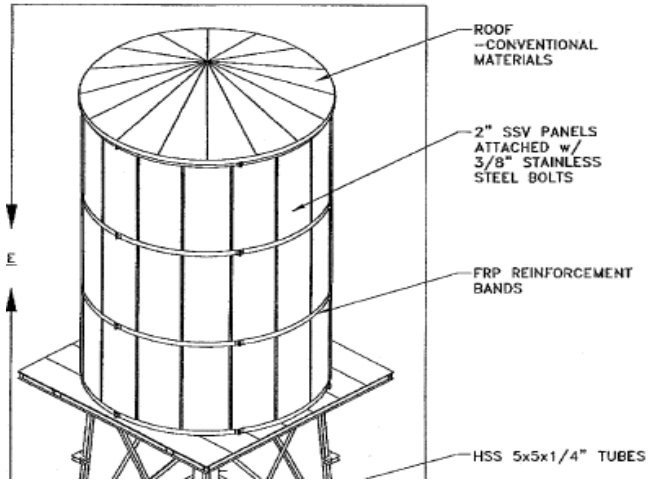
Item	#	Weight/Panel	Weight
2" Corrugated SSV Panels (4'x10')	16	58.7	939

	L	W	T	#	pcf	Weight
Face/Back	120	48	0.125	2	44	36.7
Ribs	120	1.75	0.125	25	44	16.7
					Miscl (+10%)	5.3
					Weight/Panel	58.7



	Ø (ft)	Length (ft)	plf	Weight
FRP Reinforcement Band	20.5	64.4	1.26	81

Total	1021
(x3)	**3062 lbs**



CaAa & Ice		
	wo/ ice	**w/ 1/2" ice**
Cylinder Length (in.) =	**360**	**360**
Cylinder Diameter (in.) =	**240**	**241**
Aspect Ratio =	1.500	1.500
Coef. C_A (Subcritical) =	0.7	0.7
C_A x A_A (sq. ft.) =	**402.00**	**403.68**
Weight (lb.) =	**3062**	**7469**

Site Name: Branford South
Site Number: 28241
Engineering Number: REV01
Engineer: NDW
Date: 3/24/2022

21' Main Platform Deck

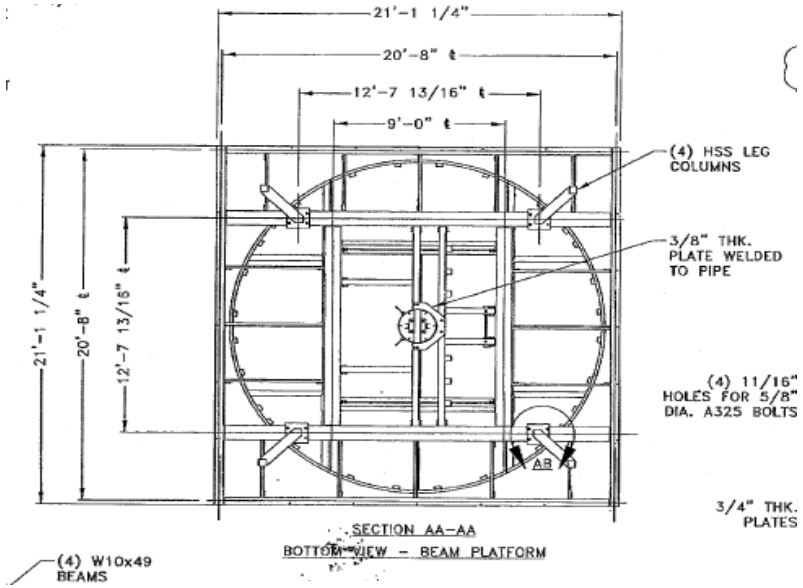
Material Weights				
	Ø (ft)	Length (ft)	plf	Weight
C6x8.2	20	62.8	8.2	515

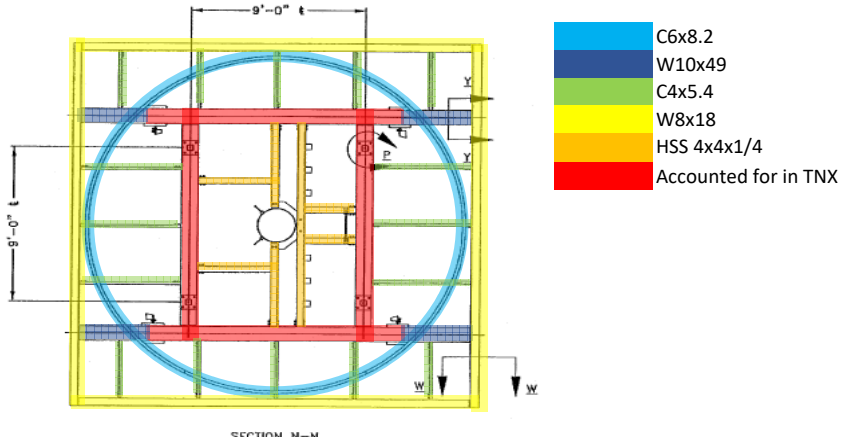
	#	Length (ft)	plf	Weight
W10x49	4	4.00	49	784
W8x18	4	20	18	1440
C4x5.4	10	4	5.4	216
	6	5.83	5.4	189
HSS 4x4x1/4	1	12.7	11.5	145
	2	5.3	11.5	122
	2	4.5	11.5	104
	2	3.5	11.5	81

	#	Area (ft^2)	psf	Weight
1"x1/8" Grating	1	423	5	2115

Miscl Bolts & Plates (+10%)		360
Total	**6071**	**lbs**

CaAa & Ice		
	wo/ ice	**w/ 1/2" ice**
Height (in.) =	8	9
Width (in.) =	252	253
Thickness (in.) =	252	253
Aspect Ratio =	31.500	28.111
Coef. C_A =	2.000	2.000
C_A x A_A (sq. ft.) =	**28.00**	**31.63**
Weight (lb.) =	**6071**	**6678**





Site Name: Branford South
Site Number: 28241
Engineering Number: REV01
Engineer: NDW
Date: 3/24/2022

Ice weight offsets for ice on L1 tower sections inside the water tower

Full Tower

	Section Elevation ft	*Self Weight lb*
No Ice	L1 104.92-74.00	3854.44
Ice	L1 104.92-74.00	7783.89

L1 Ice Weight Offset (SST LP Section) -3929.45 lbs

Top Tower

	Section Elevation ft	*Self Weight lb*
No Ice	T1 104.92-74.00	3854.44
Ice	T1 104.92-74.00	7783.89

L1 Ice Weight Offset (SST LP Section) -3929.45 lbs

Base Tower

	Section Elevation ft	*Self Weight lb*
No Ice	L1 74.50-74.00	568.26
Ice	L1 74.50-74.00	768.43

L1 Ice Weight Offset (6'x24"Ø STD Pipe) -200.17 lbs

Monopole Flange Plate Connection

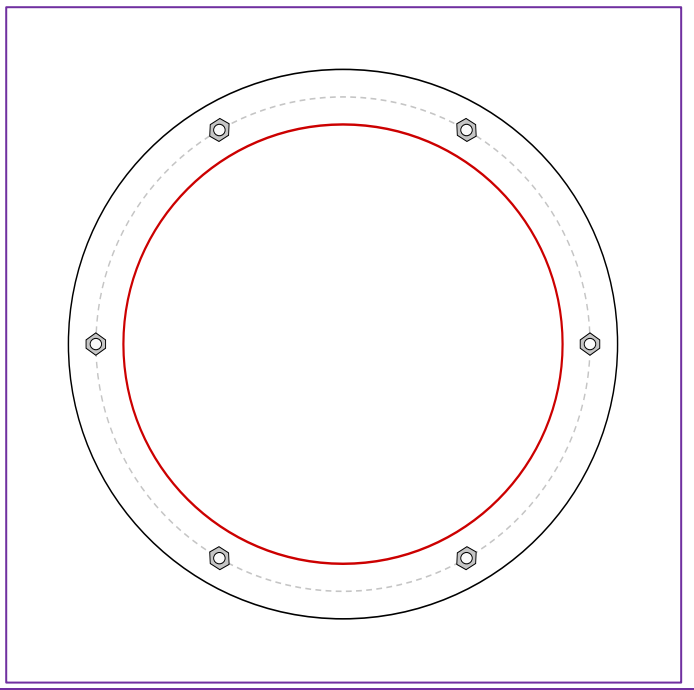
Elevation = 40 ft.

BU #	28241
Site Name	Branford South
Order #	REV01

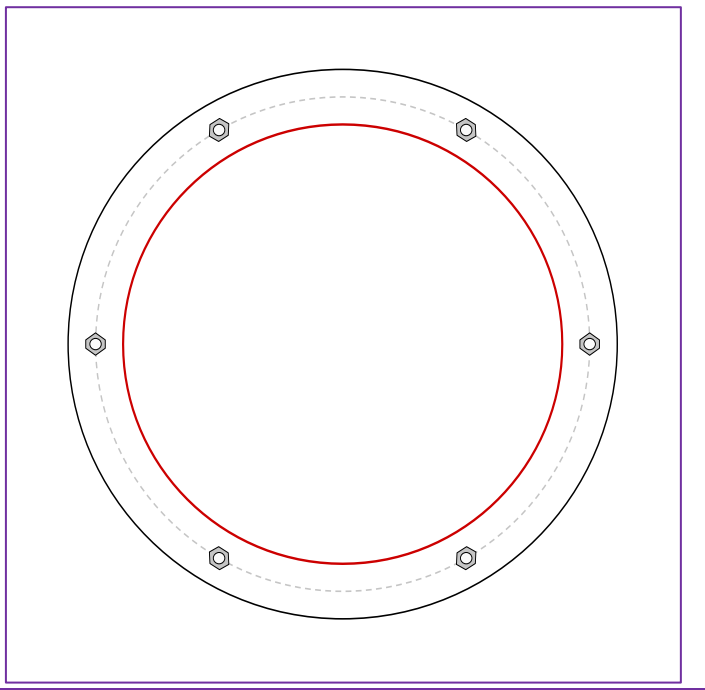
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	0.13
Axial Force (kips)	4.51
Shear Force (kips)	0.00

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(6) 5/8" ø bolts (A325 X; Fy=92 ksi, Fu=120 ksi) on 27" BC

Top Plate Data

30" OD x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Bottom Plate Data

30" OD x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	0.00	
Allowable (kips)	20.34	
Stress Rating:	**0.0%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	0.68	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**1.5%**	**Pass**
Tension Side Stress Rating:	**0.0%**	**Pass**

Bottom Plate Capacity

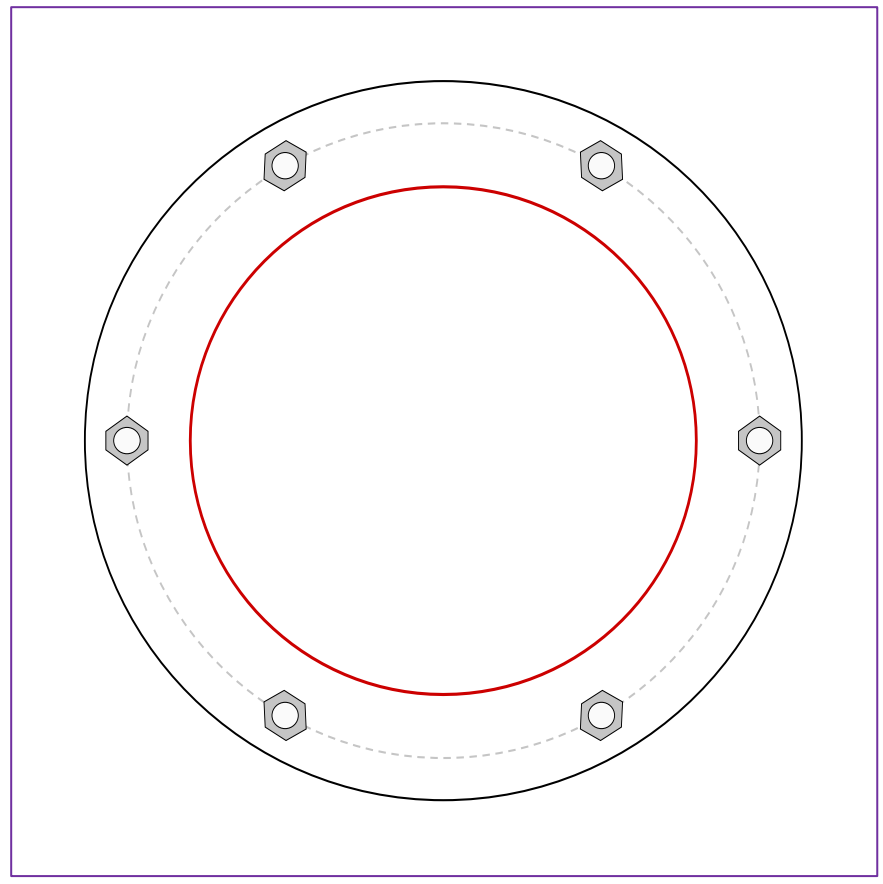
Max Stress (ksi):	0.68	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**1.5%**	**Pass**
Tension Side Stress Rating:	**0.0%**	**Pass**

Monopole Base Plate Connection

Site Info	
BU #	28241
Site Name	Branford South
Order #	REV01

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	0.00
Axial Force (kips)	8.58
Shear Force (kips)	0.00



Connection Properties

Anchor Rod Data

(6) 1-1/4" ø bolts (F1554-55 N; Fy=55 ksi, Fu=75 ksi) on 30" BC

Base Plate Data

34" OD x 1" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 1.43	ϕPn_c = 60.75	**Stress Rating**
Vu = 0	ϕVn = 27.34	**2.4%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	0.95	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**2.1%**	**Pass**

Self Support Anchor Rod Capacity

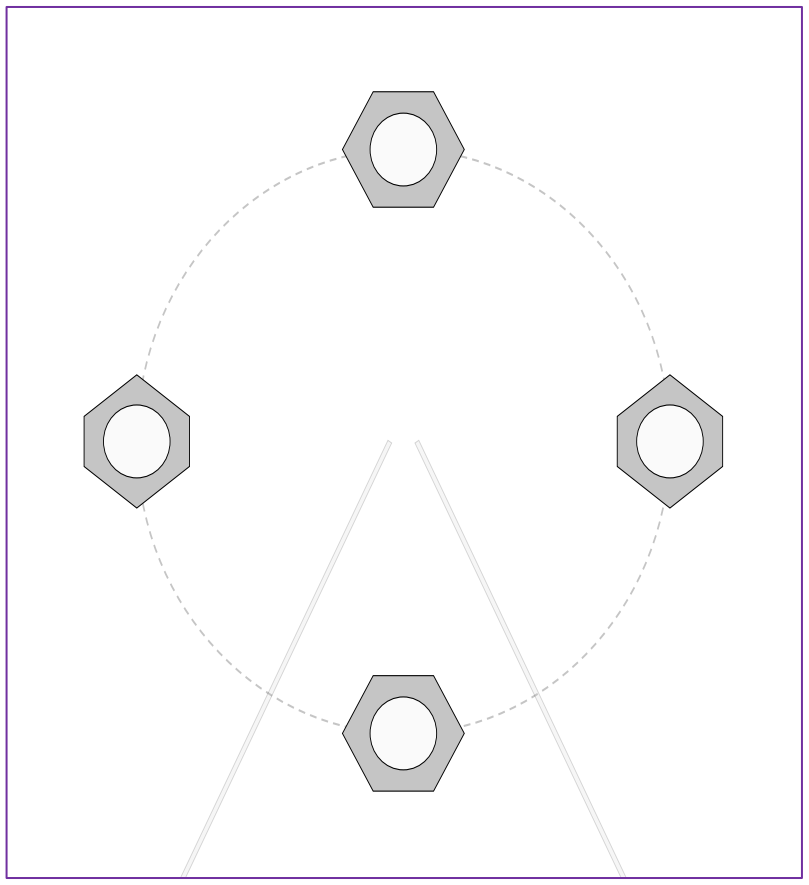
Site Info	
Site Number	28241
Site Name	Branford South

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	0.5

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	137.17	111.36
Shear Force (kips)	25.48	22.45

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(4) 1-1/2" ø bolts (F1554-55 N; Fy=55 ksi, Fu=75 ksi)

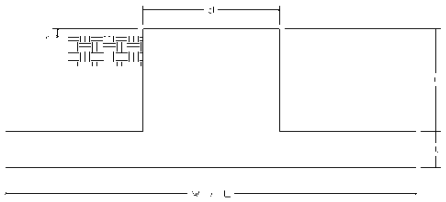
l_{ar} (in): 0.5

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 27.84	ϕPn_t = 79.31	**Stress Rating**
Vu = 5.61	ϕVn = 49.7	**35.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Site Name:	Branford South
Site Number:	28241
Engineering Number:	REV01
Engineer:	NDW
Date:	03/24/22
Tower Type:	SST w/4 Legs



Design Loads (Factored) - Analysis per TIA-222-H Standards

Design / Analysis / Mapping:	Analysis				
Compression/Leg:	137.2	k	Concrete Strength (f'_c):	4000	psi
Uplift/Leg:	111.4	k	Pad Tension Steel Depth:	32.00	in
Shear/Leg:	25.5	k			
Total Shear:	56.2	k	ϕ_{Shear}:	0.75	
Moment:	3631.6	k-ft	$\phi_{Flexure\ /\ Tension}$:	0.90	
Tower + Appurtenance Weight:	69.2	k	$\phi_{Compression:}$	0.65	
Depth to Base of Foundation (l + t - h):	9.00	ft	β:	0.85	
Diameter of Pier (d):	3.00	ft	Bottom Pad Rebar Size #:	5	
Height of Pier above Ground (h):	0.50		# of Bottom Pad Rebar:	26.00	
Width of Pad (W):	26.00	ft	Pad Bottom Steel Area:	8.06	in^2
Length of Pad (L):	26.00	ft	Pad Steel F_y:	60000	psi
Thickness of Pad (t):	3.00	ft	Top Pad Rebar Size #:	5	
Tower Leg Center to Center:	20.96	ft	# of Top Pad Rebar:	26	
Number of Tower Legs:	4.0	(1 if MP or GT)	Pad Top Steel Area:	8.06	in^2
Tower Center from Mat Center:	0.00	ft	Pier Rebar Size #:	8	
Depth Below Ground Surface to Water Table:	99.00	ft	Pier Steel Area (Single Bar):	0.79	in^2
Unit Weight of Concrete:	150.0	pcf	# of Pier Rebar:	6	
Unit Weight of Soil Above Water Table:	130.0	pcf	Pier Steel F_y:	60000	psi
Unit Weight of Water:	62.4	pcf	Pier Cage Diameter:	28.0	in
Unit Weight of Soil Below Water Table:	65.0	pcf	Rebar Strain Limit:	0.008	
Friction Angle of Uplift:	15.0	Degrees	Steel Elastic Modulus:	29000	ksi
Ultimate Coefficient of Shear Friction:	0.70		Tie Rebar Size #:	4	
Ultimate Compressive Bearing Pressure:	60000.0	psf	Tie Steel Area (Single Bar):	0.20	in^2
Ultimate Passive Pressure on Pad Face:	0.0	psf	Tie Spacing:	6	in
$\phi_{Soil\ and\ Concrete\ Weight}$:	0.9		Tie Steel F_y:	40000	psi
ϕ_{Soil}:	0.75				

Overturning Moment Usage

Design OTM:	4165.3	k-ft
OTM Resistance:	11352.3	k-ft
Design OTM / OTM Resistance:	0.37	Result: OK

Soil Bearing Pressure Usage

Net Bearing Pressure:	2151	psf
Factored Nominal Bearing Pressure:	45000	psf
Net Bearing Pressure/Factored Nominal Bearing Pressure:	0.05	Result: OK
Load Direction Controling Design Bearing Pressure:	Diagonal to Pad Edge	

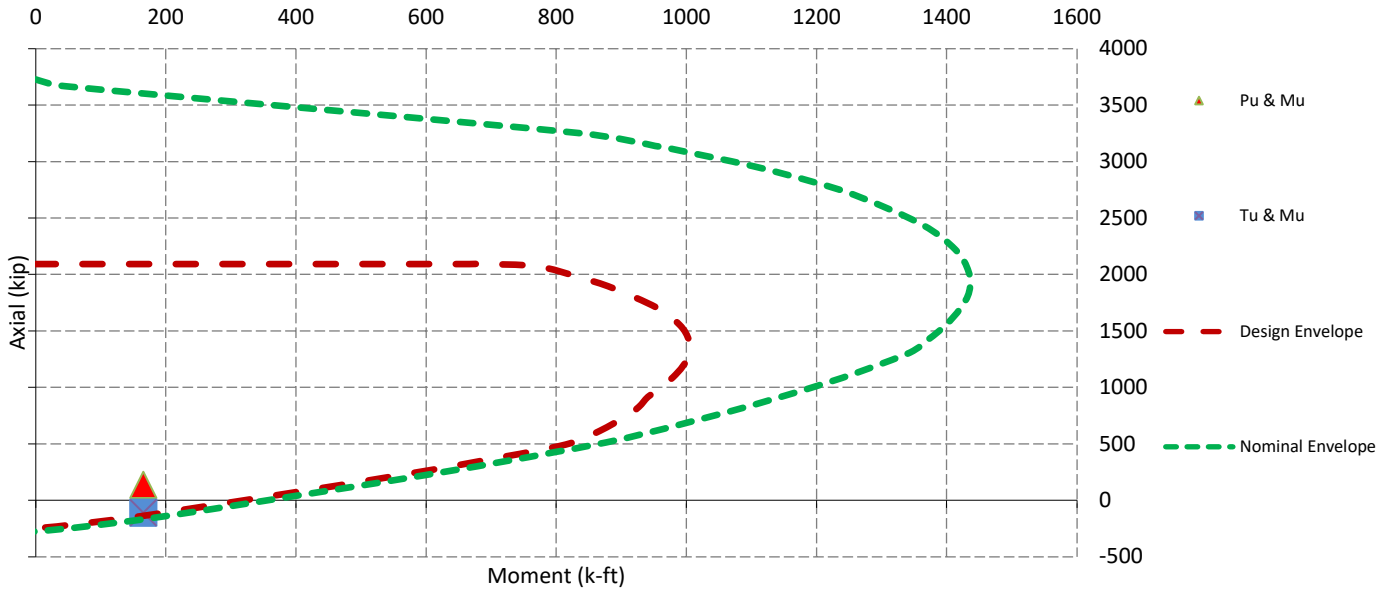
Sliding Factor of Safety

Total Factored Sliding Resistance:	469.7	k
Sliding Design / Sliding Resistance:	0.12	Result: OK

One Way Shear, Flexual Capacity, and Punching Shear

Factored One Way Shear (V_u):	74.1	k
One Way Shear Capacity (ϕV_c):	947.2	k - ACI11.3.1.1
V_u / ϕV_c:	0.08	Result: OK
Load Direction Controling Shear Capacity:	Parallel to Pad Edge	
Lower Steel Pad Factored Moment (M_u):	392.1	k-ft
Lower Steel Pad Moment Capacity (ϕM_n):	1153.6	k-ft - ACI10.3
M_u / ϕM_n:	0.34	Result: OK
Load Direction Controling Flexural Capacity:	Parallel to Pad Edge	
Upper Steel Pad Factored Moment (M_u):	287.5	k-ft
Upper Steel Pad Moment Capacity (ϕM_n):	1153.6	k-ft
M_u / ϕM_n:	0.25	Result: OK
Lower Pad Flexural Reinforcement Ratio:	0.0008	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Upper Pad Flexural Reinforcement Ratio:	0.0008	OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Lower Pad Reinforcement Spacing:	12	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Upper Pad Reinforcement Spacing:	12	in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Factored Punching Shear (V_u):	111.4	k
Nominal Punching Shear Capacity ($\phi_c V_n$):	1297.1	k - ACI11.12.2.1
V_u / ϕV_c:	0.09	Result: OK
Factored Moment in Pier (M_u):	165.6	k-ft
Pier Moment Capacity (ϕM_n):	298.6	k-ft
M_u / ϕM_n:	0.55	Result: OK
Factored Shear in Pier (V_u):	37.5	k
Pier Shear Capacity (ϕV_n):	91.3	k
V_u / ϕV_c:	0.41	Result: OK
Pier Shear Reinforcement Ratio:	0.0020	No Ties Necessary for Shear - ACI11.5.6.1
Factored Tension in Pier (T_u):	111.4	k
Pier Tension Capacity (ϕT_n):	256.0	k
T_u / ϕT_n:	0.44	Result: OK
Factored Compression in Pier (P_u):	137.2	k
Pier Compression Capacity (ϕP_n):	1791.2	k - ACI10.3.6.2
P_u / ϕP_n:	0.08	Result: OK
Pier Compression Reinforcement Ratio:	0.005	OK - Reinforcement Ratio Met - ACI10.9.1 & 10.8.4
$M_u/\phi_B M_n + T_u/\phi_T T_n$:	0.99	Result: OK

Nominal and Design Moment Capacity and Factored Design Loads



BU:	28241	Structure:	
WO:	Branford South		
Order:	REV01_Base	Rev:	H

Location

	Decimal Degrees		Deg	Min	Sec
Lat:	41.266400	+	41	15	59.04
Long:	-72.733300	-	72	43	59.88

Code and Site Parameters

Seismic Design Code:	TIA-222-H-1	
Site Soil:	B	Rock
Risk Category:	II	

USGS Seismic Reference			
	S_S:	0.2010	g
	S_1:	0.0530	g
	T_L:	6	s

Seismic Design Category Determination

Importance Factor, I_e:	1	
Acceleration-based site coefficient, F_a:	0.9000	
Velocity-based site coefficient, F_v:	0.8000	
Design spectral response acceleration short period, S_{DS}:	0.1206	g
Design spectral response acceleration 1 s period, S_{D1}:	0.0283	g
T_s:	0.2344	
Seismic Design Category Based on S_{DS}:	A	
Seismic Design Category Based on S_{D1}:	A	
Seismic Design Category Based on S_1:	N/A	
Controlling Seismic Design Category:	A	

BU:	28241	Structure:	
WO:	Branford South		
Order:	REV01_Base	Rev:	H

Tower Details

Tower Type:	Self-Support		
Height, h:	73.25	ft	
Effective Seismic Weight, W:	57.26	kips	
Amplification Factor, A_s:	1.0		2.7.8.1

Seismic Base Shear

Response Modification Factor, R:	3		
w_a:	16.7572	ft	
w_0:	20.9635	ft	
W_1:	45.1717	kips	
Weight of Structure and Appurtenances within top 5%, W_2:	29.7571	kips	
K_f:	4540	ft	
F_a:	11.0091	hz	
Approximate Fundamental Period Self-Support, T_a:	0.0908	s	2.7.7.1.3.2
Seismic Response Coefficient, C_s	0.0402		2.7.7.1.1
Seismic Response Coefficient Max 1, C_{smax}	0.1037		2.7.7.1.1
Seismic Response Coefficient Max 2, C_{smax}	N/A		2.7.7.1.1
Seismic Response Coefficient Min 1, C_{smin}	0.0300		2.7.7.1.1
Seismic Response Coefficient Min 2, C_{smin}	N/A		2.7.7.1.1
Controlling Seismic Response Coefficient, C_{sc}	0.0402		
Seismic Base Shear, V	2.302	kips	2.7.7.1.1

Vertical Distribution Factors

Period Related Exponent, k:	1.000
Sum of $w_i h_i^k$	3163.36

Tower Section Loads								
Section Number	**Length**	**Top Height**	**Mid Height, h_x**	**Section Weight, w_x**	**$w_x h_x^k$**	**C_{vx}**	**F_{xh}**	**F_{xv}**
1	17.50	73.25	64.50	5.6950	367.33	0.1161	0.2673	0.1374
2	18.00	55.75	46.75	4.1546	194.23	0.0614	0.1413	0.1002
3	18.75	37.75	28.38	4.7380	134.44	0.0425	0.0978	0.1143
4	19.00	19.00	9.50	5.0323	47.81	0.0151	0.0348	0.1214
			Sum	19.6199	743.80			

Discrete Loads						
Name	h_x	w_x	$w_x h_x^k$	C_{vx}	F_{xh}	F_{xv}
Roof	73.25	1.4500	106.21	0.0336	0.0773	0.0350
(3) 20'Øx 10' SSV Water Tower Sections	73.25	3.0500	223.41	0.0706	0.1626	0.0736
20'Ø Ring Platform	73.25	2.3500	172.14	0.0544	0.1252	0.0567
20'Ø Ring Platform	73.25	2.3500	172.14	0.0544	0.1252	0.0567
20'Ø Ring Platform	73.25	2.3500	172.14	0.0544	0.1252	0.0567
21' Main Platform Deck	73.25	6.0500	443.16	0.1401	0.3224	0.1459
Top Tower Section	73.25	3.8540	282.31	0.0892	0.2054	0.0930
6' x 24"Ø STD Pipe (Inside Water Tower)	73.25	0.5680	41.61	0.0132	0.0303	0.0137
6' x 24"Ø STD Pipe (Below Water Tower)	36.63	6.4590	236.56	0.0748	0.1721	0.1558
Coax in Top Tower Weight	73.25	0.5470	40.07	0.0127	0.0292	0.0132
Climb Ladder	73.25	0.1110	8.13	0.0026	0.0059	0.0027
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe	73.25	0.2829	20.72	0.0066	0.0151	0.0068
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe	73.25	0.2829	20.72	0.0066	0.0151	0.0068
(3) AM-X-CD-14-65-00T-RET w/10' Mount Pipe	73.25	0.2829	20.72	0.0066	0.0151	0.0068
(4) RRU (20.04 x 15.08 x 6.65)	73.25	0.1764	12.92	0.0041	0.0094	0.0043
(4) RRU (20.04 x 15.08 x 6.65)	73.25	0.1764	12.92	0.0041	0.0094	0.0043
(4) RRU (20.04 x 15.08 x 6.65)	73.25	0.1764	12.92	0.0041	0.0094	0.0043
(2) RRU (18.2 x 25.0 x 6.7)	73.25	0.1100	8.06	0.0025	0.0059	0.0027
(2) RRU (18.2 x 25.0 x 6.7)	73.25	0.1100	8.06	0.0025	0.0059	0.0027
(2) RRU (18.2 x 25.0 x 6.7)	73.25	0.1100	8.06	0.0025	0.0059	0.0027
OVP (23.5 x 9.7)	73.25	0.0200	1.47	0.0005	0.0011	0.0005
OVP (23.5 x 9.7)	73.25	0.0200	1.47	0.0005	0.0011	0.0005
OVP (23.5 x 9.7)	73.25	0.0200	1.47	0.0005	0.0011	0.0005
10'x2" Pipe Mount	73.25	0.0365	2.68	0.0008	0.0019	0.0009
10'x2" Pipe Mount	73.25	0.0365	2.68	0.0008	0.0019	0.0009
10'x2" Pipe Mount	73.25	0.0365	2.68	0.0008	0.0019	0.0009
MT6407-77A w/RRU w/10' Mount Pipe	73.25	0.1450	10.62	0.0034	0.0077	0.0035
MT6407-77A w/RRU w/10' Mount Pipe	73.25	0.1450	10.62	0.0034	0.0077	0.0035
MT6407-77A w/RRU w/10' Mount Pipe	73.25	0.1450	10.62	0.0034	0.0077	0.0035
(2) JAHH-65B-R3B	73.25	0.1288	9.43	0.0030	0.0069	0.0031
(2) JAHH-65B-R3B	73.25	0.1288	9.43	0.0030	0.0069	0.0031
(2) JAHH-65B-R3B	73.25	0.1288	9.43	0.0030	0.0069	0.0031
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES)	73.25	0.0835	6.11	0.0019	0.0044	0.0020
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES)	73.25	0.0835	6.11	0.0019	0.0044	0.0020
Commscope Side By Side (BSAMNT-SBS-1-2) w/10' Mount Pipe (SES)	73.25	0.0835	6.11	0.0019	0.0044	0.0020
(2) LPA-80063/6CF w/10' Mount Pipe	73.25	0.1698	12.44	0.0039	0.0090	0.0041
(2) LPA-80063/6CF w/10' Mount Pipe	73.25	0.1698	12.44	0.0039	0.0090	0.0041
(2) LPA-80063/6CF w/10' Mount Pipe	73.25	0.1698	12.44	0.0039	0.0090	0.0041
B2/B66A RRH-BR049	73.25	0.0975	7.14	0.0023	0.0052	0.0024
B2/B66A RRH-BR049	73.25	0.0975	7.14	0.0023	0.0052	0.0024
B2/B66A RRH-BR049	73.25	0.0975	7.14	0.0023	0.0052	0.0024
B5/B13 RRH BR04C	73.25	0.0703	5.15	0.0016	0.0037	0.0017
B5/B13 RRH BR04C	73.25	0.0703	5.15	0.0016	0.0037	0.0017
B5/B13 RRH BR04C	73.25	0.0703	5.15	0.0016	0.0037	0.0017
FDJ85020Q4-S1	73.25	0.0236	1.73	0.0005	0.0013	0.0006
FDJ85020Q4-S1	73.25	0.0236	1.73	0.0005	0.0013	0.0006
FDJ85020Q4-S1	73.25	0.0236	1.73	0.0005	0.0013	0.0006
OVP-6	73.25	0.0200	1.47	0.0005	0.0011	0.0005
OVP-6	73.25	0.0200	1.47	0.0005	0.0011	0.0005
OVP Junction Box	73.25	0.0200	1.47	0.0005	0.0011	0.0005
RRH 4X30-4T4R-B13	73.25	0.0326	2.39	0.0008	0.0017	0.0008
RRH 4X30-4T4R-B13	73.25	0.0326	2.39	0.0008	0.0017	0.0008
RRH 4X30-4T4R-B13	73.25	0.0326	2.39	0.0008	0.0017	0.0008
10'x2" Pipe Mount	73.25	0.0365	2.68	0.0008	0.0019	0.0009
10'x2" Pipe Mount	73.25	0.0365	2.68	0.0008	0.0019	0.0009
10'x2" Pipe Mount	73.25	0.0365	2.68	0.0008	0.0019	0.0009
AIR21 KRC118023 B2A B4P w/10' Mount Pipe	73.25	0.1459	10.69	0.0034	0.0078	0.0035
AIR21 KRC118023 B2A B4P w/10' Mount Pipe	73.25	0.1459	10.69	0.0034	0.0078	0.0035
AIR21 KRC118023 B2A B4P w/10' Mount Pipe	73.25	0.1459	10.69	0.0034	0.0078	0.0035
AIR21 KRC11803 B4P B2A w/10' Mount Pipe	73.25	0.1459	10.69	0.0034	0.0078	0.0035
AIR21 KRC11803 B4P B2A w/10' Mount Pipe	73.25	0.1459	10.69	0.0034	0.0078	0.0035
AIR21 KRC11803 B4P B2A w/10' Mount Pipe	73.25	0.1459	10.69	0.0034	0.0078	0.0035
APXVAALL24_43-U-NA20 w/10' Mount Pipe	73.25	0.1136	8.32	0.0026	0.0061	0.0027
APXVAALL24_43-U-NA20 w/10' Mount Pipe	73.25	0.1136	8.32	0.0026	0.0061	0.0027
APXVAALL24_43-U-NA20 w/10' Mount Pipe	73.25	0.1136	8.32	0.0026	0.0061	0.0027
4480 B71/B85	73.25	0.0772	5.65	0.0018	0.0041	0.0019
4480 B71/B85	73.25	0.0772	5.65	0.0018	0.0041	0.0019
4480 B71/B85	73.25	0.0772	5.65	0.0018	0.0041	0.0019
Sum		34.8868	2318.90			

Linear Loads								
Name	Start Height	End Height	h_x	w_x	$w_x h_x^k$	C_{vx}	F_{xh}	F_{xv}
(4) 1 5/8" DC Lines From 0 to 73.25	55.75	73.25	64.50	0.1246	8.04	0.0025	0.0058	0.0030
(4) 1 5/8" DC Lines From 0 to 73.25	37.75	55.75	46.75	0.1282	5.99	0.0019	0.0044	0.0031
(4) 1 5/8" DC Lines From 0 to 73.25	19.00	37.75	28.38	0.1335	3.79	0.0012	0.0028	0.0032
(4) 1 5/8" DC Lines From 0 to 73.25	0.00	19.00	9.50	0.1353	1.29	0.0004	0.0009	0.0033
(2) 3/8" Fiber From 0 to 73.25	55.75	73.25	64.50	0.0021	0.14	0.0000	0.0001	0.0001
(2) 3/8" Fiber From 0 to 73.25	37.75	55.75	46.75	0.0022	0.10	0.0000	0.0001	0.0001
(2) 3/8" Fiber From 0 to 73.25	19.00	37.75	28.38	0.0023	0.06	0.0000	0.0000	0.0001
(2) 3/8" Fiber From 0 to 73.25	0.00	19.00	9.50	0.0023	0.02	0.0000	0.0000	0.0001
(6) 1 5/8" Coax From 0 to 73.25	55.75	73.25	64.50	0.1092	7.04	0.0022	0.0051	0.0026
(6) 1 5/8" Coax From 0 to 73.25	37.75	55.75	46.75	0.1123	5.25	0.0017	0.0038	0.0027
(6) 1 5/8" Coax From 0 to 73.25	19.00	37.75	28.38	0.1170	3.32	0.0010	0.0024	0.0028
(6) 1 5/8" Coax From 0 to 73.25	0.00	19.00	9.50	0.1186	1.13	0.0004	0.0008	0.0029
(2) 6x12 Hybrid From 0 to 73.25	55.75	73.25	64.50	0.0595	3.84	0.0012	0.0028	0.0014
(2) 6x12 Hybrid From 0 to 73.25	37.75	55.75	46.75	0.0612	2.86	0.0009	0.0021	0.0015
(2) 6x12 Hybrid From 0 to 73.25	19.00	37.75	28.38	0.0638	1.81	0.0006	0.0013	0.0015
(2) 6x12 Hybrid From 0 to 73.25	0.00	19.00	9.50	0.0646	0.61	0.0002	0.0004	0.0016
(6) 1 5/8" Coax From 0 to 73.25	55.75	73.25	64.50	0.1092	7.04	0.0022	0.0051	0.0026
(6) 1 5/8" Coax From 0 to 73.25	37.75	55.75	46.75	0.1123	5.25	0.0017	0.0038	0.0027
(6) 1 5/8" Coax From 0 to 73.25	19.00	37.75	28.38	0.1170	3.32	0.0010	0.0024	0.0028
(6) 1 5/8" Coax From 0 to 73.25	0.00	19.00	9.50	0.1186	1.13	0.0004	0.0008	0.0029
Hybrid Cable From 0 to 73.25	55.75	73.25	64.50	0.0312	2.01	0.0006	0.0015	0.0008
Hybrid Cable From 0 to 73.25	37.75	55.75	46.75	0.0320	1.50	0.0005	0.0011	0.0008
Hybrid Cable From 0 to 73.25	19.00	37.75	28.38	0.0334	0.95	0.0003	0.0007	0.0008
Hybrid Cable From 0 to 73.25	0.00	19.00	9.50	0.0338	0.32	0.0001	0.0002	0.0008
(6) 1 5/8" Coax From 0 to 73.25	55.75	73.25	64.50	0.1092	7.04	0.0022	0.0051	0.0026
(6) 1 5/8" Coax From 0 to 73.25	37.75	55.75	46.75	0.1123	5.25	0.0017	0.0038	0.0027
(6) 1 5/8" Coax From 0 to 73.25	19.00	37.75	28.38	0.1170	3.32	0.0010	0.0024	0.0028
(6) 1 5/8" Coax From 0 to 73.25	0.00	19.00	9.50	0.1186	1.13	0.0004	0.0008	0.0029
1 5/8" Hybrid Cable From 0 to 73.25	55.75	73.25	64.50	0.0312	2.01	0.0006	0.0015	0.0008
1 5/8" Hybrid Cable From 0 to 73.25	37.75	55.75	46.75	0.0320	1.50	0.0005	0.0011	0.0008
1 5/8" Hybrid Cable From 0 to 73.25	19.00	37.75	28.38	0.0334	0.95	0.0003	0.0007	0.0008
1 5/8" Hybrid Cable From 0 to 73.25	0.00	19.00	9.50	0.0338	0.32	0.0001	0.0002	0.0008
1 5/8" Fiber From 0 to 73.25	55.75	73.25	64.50	0.0182	1.17	0.0004	0.0009	0.0004
1 5/8" Fiber From 0 to 73.25	37.75	55.75	46.75	0.0187	0.88	0.0003	0.0006	0.0005
1 5/8" Fiber From 0 to 73.25	19.00	37.75	28.38	0.0195	0.55	0.0002	0.0004	0.0005
1 5/8" Fiber From 0 to 73.25	0.00	19.00	9.50	0.0198	0.19	0.0001	0.0001	0.0005
(2) 1 5/8" Hybrid Cable From 0 to 73.25	55.75	73.25	64.50	0.0623	4.02	0.0013	0.0029	0.0015
(2) 1 5/8" Hybrid Cable From 0 to 73.25	37.75	55.75	46.75	0.0641	3.00	0.0009	0.0022	0.0015
(2) 1 5/8" Hybrid Cable From 0 to 73.25	19.00	37.75	28.38	0.0668	1.89	0.0006	0.0014	0.0016
(2) 1 5/8" Hybrid Cable From 0 to 73.25	0.00	19.00	9.50	0.0676	0.64	0.0002	0.0005	0.0016
			Sum	2.7483	100.66			

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

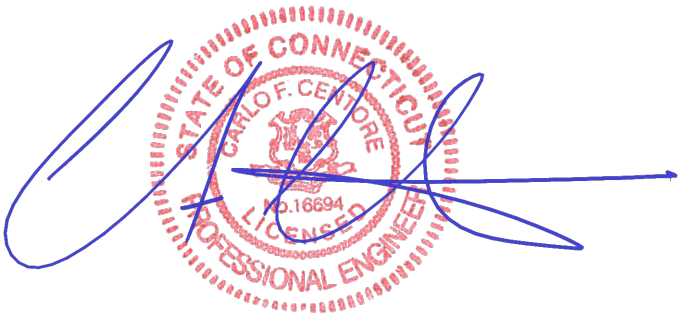
T-Mobile Site #: CTNH804C

723 Leetes Island Road
Branford, CT

Centek Project No. 21022.39

Date: January 12, 2022

Max Stress Ratio =84.4%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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CENTEK engineering

Centered on Solutions℠

January 13, 2022

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Antenna Mount Structural Analysis
T-Mobile – Site Ref: CTHA506A
723 Leetes Island Road
Branford, CT 06405

Centek Project No. 21022.39

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above-referenced site. The purpose of the review was to determine the structural adequacy of the three (3) proposed antenna masts, Pipe 2.0 STD, and six (6) existing antenna masts, Pipe 2.0 STD as detailed on the Centek Engineering construction drawings entitled "T-Mobile, Amtrak Branford 4, 723 Leetes Island Road, Branford, CT" issued 11/24/2021 (Rev. A). The proposed antennas are located within an existing RF transparent water tank and are not susceptible to wind load. For this application, a nominal lateral load of 200 lbs. was considered at mid-height of the proposed mast, along with the weight of the equipment being supported.

Each of the following equipment configurations is mounted to a pipe mast and supported to an internal platform at the each of the Alpha, Beta and Gamma sectors within the RF transparent tank structure (proposed equipment is highlighted in **bold** text):

(1) Ericsson AIR21 B2A - B4P panel antennas
(1) Ericsson AIR21 B2P - B4A panel antennas
(1) RFS APXVAALL24_43-U-NA20 panel antennas + (1) Ericsson 4480 B71+B85 RRU's

The pipe mast and the supporting platform were analyzed and found to comply with the 2015 International Building Code and 2018 Connecticut State Building Code modifications.

Based on our review of the installation, it is our opinion that **the proposed and existing antenna masts have sufficient capacity**. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No.16694
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

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: Loads of Equipment & Lateral Load

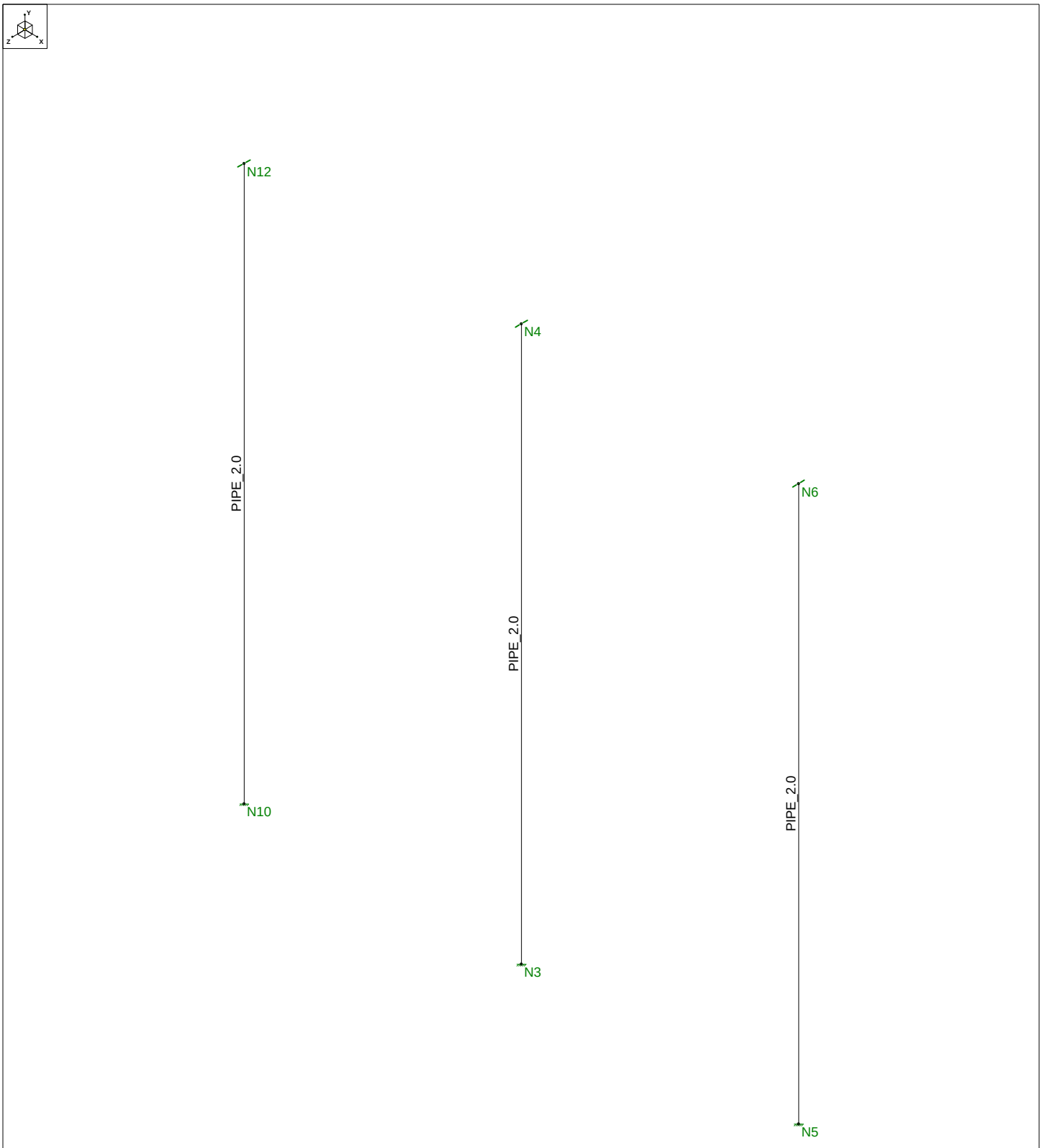
Location: Branford, CT

Rev. 0: 01/13/2022

Prepared by: F.J.P Checked by: C.F.C.
Job No. 21022.39

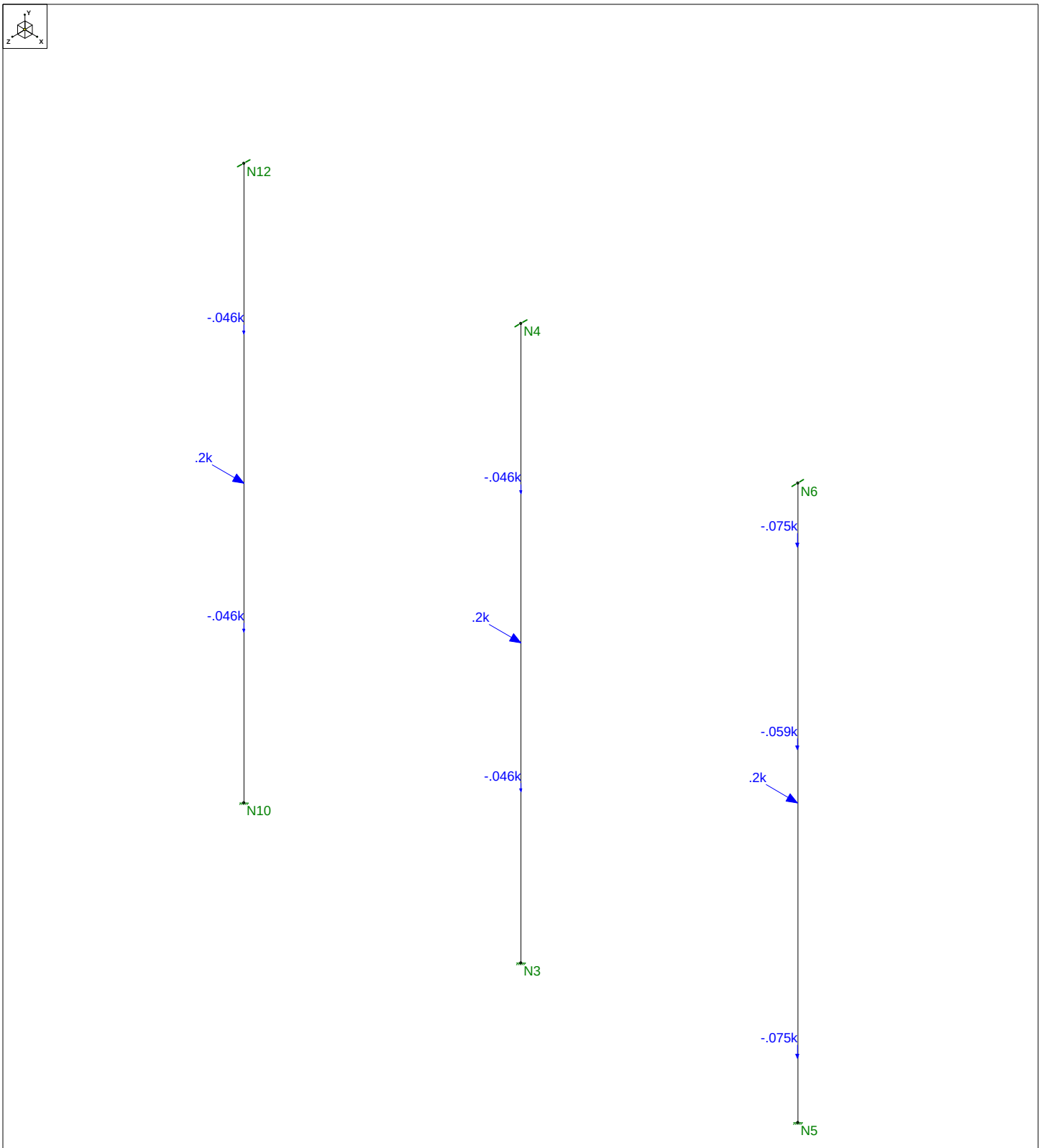
Loads

Ericsson AIR21 B2A - B4P	91.5 lbs
Ericsson AIR21 B2P - B4A	91.5 lbs
RFS - APXVAALL24_43-U-NA20	150 lbs
Ericsson 4480 b71+b85	59.5 lbs
Lateral Force	200 lbs (nominal)



Envelope Only Solution

Centek Engineering		
FJP	CTNH804C - Mount	Jan 13, 2022 at 3:03 PM
21022.39	Member Framing	CTNH804C_AMA.r3d



Loads: LC 2, IBC 16-9
Envelope Only Solution

Centek Engineering		
FJP	CTNH804C - Mount	Jan 13, 2022 at 3:03 PM
21022.39	Critical Load Combination	CTNH804C_AMA.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Grade B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design Li...	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	(P) Antenna Mast PIPE 2....	PIPE_2.0	Column	None	A53 Grade B	Typical	1.02	.627	.627	1.25
2	(E) Antenna Mast Pipe 2.0 ...	PIPE_2.0	Column	None	A53 Grade B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	PS.1	(E) Antenn...	10	3	3	Lbyy						Lateral
2	PS.2	(E) Antenn...	10	3	3	Lbyy						Lateral
3	PS.3	(P) Antenn...	10	4	4	Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
1	PS.1	N12	N10			(E) Antenna Mast Pipe 2.0 STD	Colu...	None	A53 Gr...	Typical
2	PS.2	N4	N3			(E) Antenna Mast Pipe 2.0 STD	Colu...	None	A53 Gr...	Typical
3	PS.3	N6	N5			(P) Antenna Mast PIPE 2.0 STD	Colu...	None	A53 Gr...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N10	0	-8	-0.	0	
2	N12	0	2	-0.	0	
3	N3	5	-8	-0.	0	
4	N4	5	2	-0.	0	
5	N5	10	-8	-0.	0	
6	N6	10	2	-0.	0	

Joint Boundary Conditions

	Joint 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	N10	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N12			Reaction			
5	N4			Reaction			
6	N6			Reaction			

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	Y	-.046	2.667
2	PS.1	Y	-.046	7.333
3	PS.2	Y	-.046	2.667
4	PS.2	Y	-.046	7.333
5	PS.3	Y	-.075	1
6	PS.3	Y	-.075	9
7	PS.3	Y	-.059	4.167

Member Point Loads (BLC 3 : Live Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	X	.2	%50
2	PS.2	X	.2	%50
3	PS.3	X	.2	%50

Member Distributed Loads

Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,ksf]	Start Location[f...End Location[ft...
No Data to Print ...				

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	J...	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL		-1						
2	Dead Load	DL					7			
3	Live Load	LL					3			

Load Combinations

	Description	Solve	PDelta	...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	IBC 16-8	Yes	Y		DL	1																		
2	IBC 16-9	Yes	Y		DL	1	LL	1	L...	1														

Envelope Joint Reactions

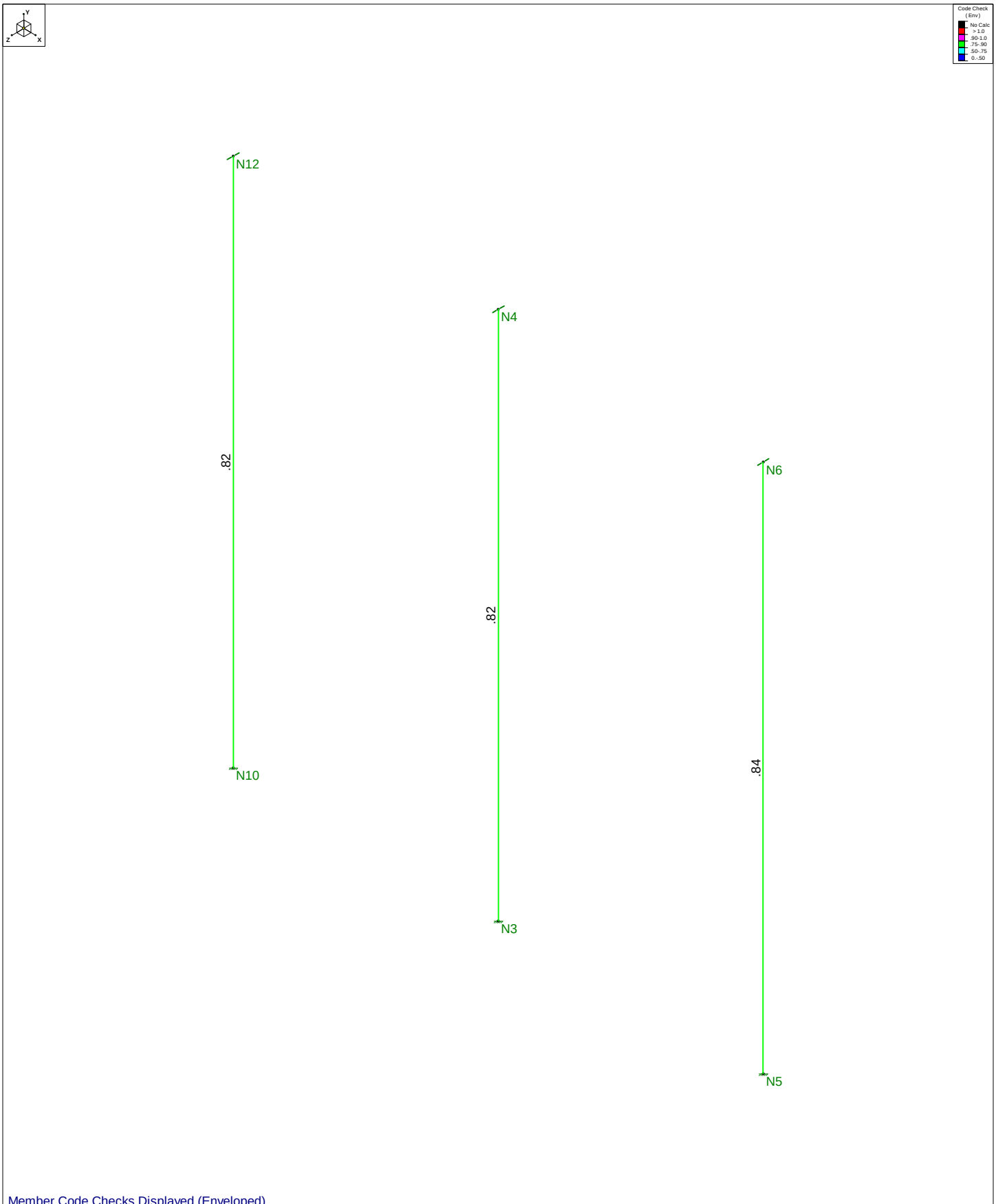
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N10	max	0	1	.127	2	0	2	0	2	0	2	1.022	2
2		min	-.2	2	.127	1	0	1	0	1	0	1	0	1
3	N3	max	0	1	.127	2	0	2	0	2	0	2	1.022	2
4		min	-.2	2	.127	1	0	1	0	1	0	1	0	1
5	N5	max	0	1	.244	2	0	2	0	2	0	2	1.043	2
6		min	-.2	2	.244	1	0	1	0	1	0	1	0	1
7	N12	max	0	2	0	2	0	2	0	2	0	2	0	2
8		min	0	1	0	1	0	1	0	1	0	1	0	1
9	N4	max	0	2	0	2	0	2	0	2	0	2	0	2
10		min	0	1	0	1	0	1	0	1	0	1	0	1
11	N6	max	0	2	0	2	0	2	0	2	0	2	0	2
12		min	0	1	0	1	0	1	0	1	0	1	0	1
13	Totals:	max	0	1	.498	2	0	2						
14		min	-.6	2	.498	1	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N10	max	0	2	0	2	0	2	0	2	0	2	0	2
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N12	max	2.562	2	0	2	0	2	0	2	0	2	0	1
4		min	0	1	0	1	0	1	0	1	0	1	-2.582e-2	2
5	N3	max	0	2	0	2	0	2	0	2	0	2	0	2
6		min	0	1	0	1	0	1	0	1	0	1	0	1
7	N4	max	2.562	2	0	2	0	2	0	2	0	2	0	1
8		min	0	1	0	1	0	1	0	1	0	1	-2.582e-2	2
9	N5	max	0	2	0	2	0	2	0	2	0	2	0	2
10		min	0	1	0	1	0	1	0	1	0	1	0	1
11	N6	max	2.647	2	0	2	0	2	0	2	0	2	0	1
12		min	0	1	0	1	0	1	0	1	0	1	-2.687e-2	2

Envelope AISC 14th(360-10): ASD Steel Code Checks

	Me...	Sha...	Code C...	Lo...	LC	Shea...	Loc...	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/o...	Mnzz/o...	Cb	Eqn
1	PS.1	PIP...	.824	10	2	.032	5		2	19.191	21.377	1.245	1.245	3.068	H1-1b
2	PS.2	PIP...	.824	10	2	.032	5		2	19.191	21.377	1.245	1.245	3.068	H1-1b
3	PS.3	PIP...	.844	10	2	.032	5		2	17.646	21.377	1.245	1.245	3.016	H1-1b



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering		
FJP	CTNH804C - Mount	Jan 13, 2022 at 3:03 PM
21022.39	Member Unity Check	CTNH804C_AMA.r3d

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: Proposed Connection to Host Structure

Location: Branford, CT

Rev. 0: 01/13/2022

Prepared by: F.J.P; Checked by: T.J.L.
Job No. 21007.39

Properties of Bar Grating

Bar Height=	$h := 1\ in$	(Tower Concealment Drawings, prepared by Stealth First in Concealment, Job# VZ12-00120W-33R0)
Bar Width=	$b := \frac{1}{8}\ in$	(Tower Concealment Drawings, prepared by Stealth First in Concealment, Job# VZ12-00120W-33R0)
Bar Separation=	$sep := 1\ in + \frac{3}{16}\ in = 1.188\ in$	(McNichols - Grating Catalog)
Grating Capacity=	$BarCapacity := 316\ lbf$	(McNichols - Grating Catalog)

Bar Grating Check

Reaction at Antenna Mast= $Reaction@BarGrating := 244\ lbf$ (Risa 3D)

Stress at Bars= $\frac{Reaction@BarGrating}{BarCapacity} = 77.2\%$

$Condition1 := \text{if}\left(\frac{Reaction@BarGrating}{BarCapacity} \le 1, \text{“OK”}, \text{“No Good”}\right) = \text{“OK”}$

$Condition1 = \text{“OK”}$

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 1 - Site Information

Site ID: CTNH804C
Status: Draft
Version: 4
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 11/9/2021 10:38:47 AM
Last Modified By: RKane1@tmobileusa.onmicrosoft.com

Site Name: Amtrak_Branford4
Site Class: Watertank
Site Type: Structure Non Building
Plan Year: 2022
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Verizon Wireless

Latitude: 41.26638611
Longitude: -72.73333330
Address: 723 Leets Island Rd
City, State: Branford, CT
Region: NORTHEAST

RAN Template: 67D92C Outdoor			AL Template: 67D92DBL_1xAIR+1OP (U19 Market)	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 6	**TMA Count:** 0	**RRU Count:** 3

Section 2 - Existing Template Images

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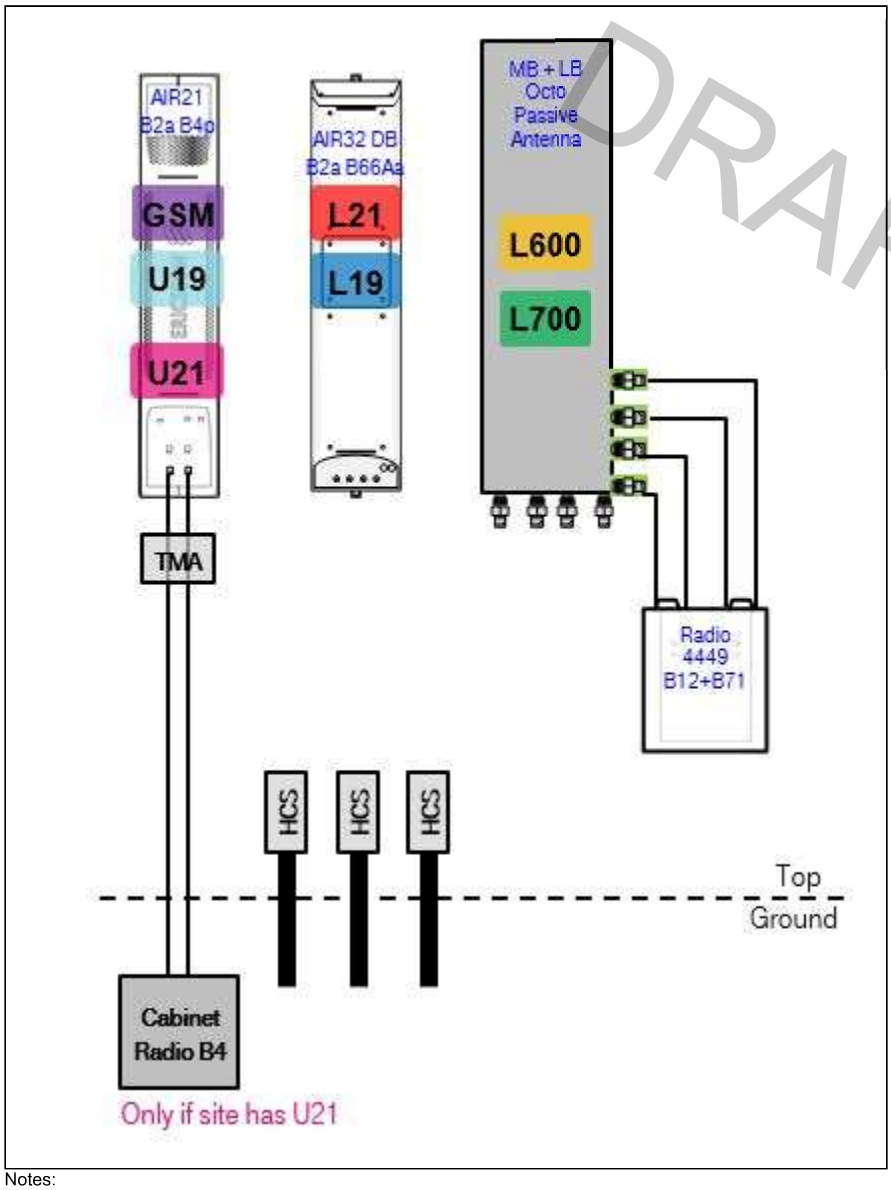
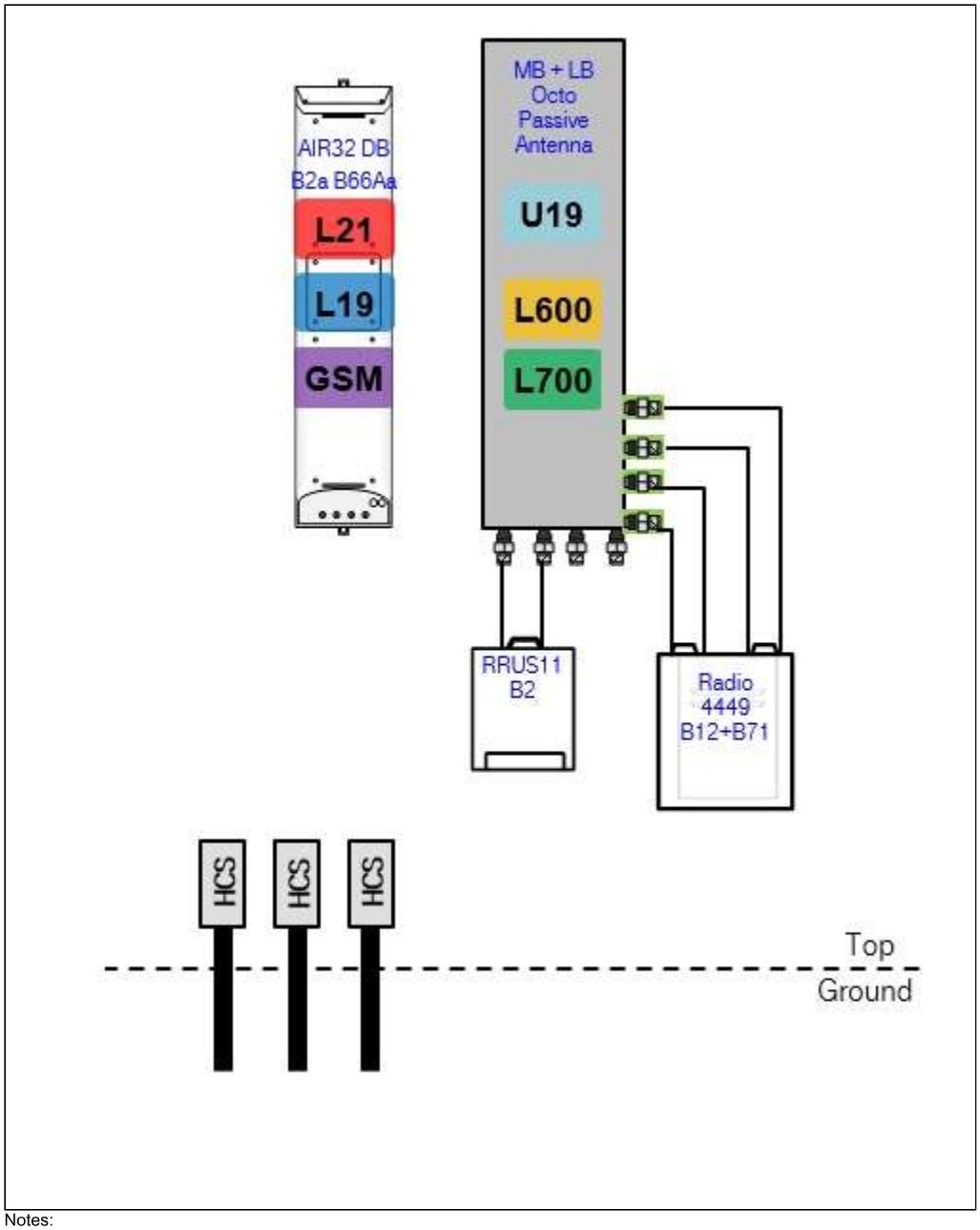
Section 3 - Proposed Template Images

67D92DB_2xAIR+1OP.JPG



Notes:

67D92DBL_1xAIR+1OP (U19 Market).jpg


AIR32 DB
B2a B66Aa
L21
L19
GSM
MB + LB
Octo
Passive
Antenna
U19
L600
L700
RRUS11
B2
Radio
4449
B12+B71
HCS
HCS
HCS
Top
Ground

Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 92C Outdoor

Enclosure	1	2
Enclosure Type	RBS 6102	Tower Top Mount (Ericsson)
Baseband	DUW30 (U1900 (DECOMMISSIONED)); DUW30 (U2100); DUG20 (G1900); DUS41 (L1900, L2100)	
Hybrid Cable System		Ericsson 9x18 HCS *Select Length*
Multiplexer	XMU	
Radio	RU22 (x 6) (U2100)	

Proposed RAN Equipment

Template: 67D92C Outdoor

Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment (Ericsson)
Baseband	DUW30; DUG20 (G1900); BB 6648 (L2100, L1900, L700, L600, N600)	
Hybrid Cable System		Ericsson Hybrid Trunk 6/24 4AWG 100m (x 3)
Radio	RU22 (x 6)	

RAN Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 6 - A&L Equipment

Existing Template: 92C_2xAIR
Proposed Template: 67D92DBL_1xAIR+1OP (U19 Market)

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	0		0	
M. Tilt	0		0	
Height	80		80	
Ports	**P1**	**P2**	**P3**	**P4**
Active Tech.	L1900, G1900	U2100	L2100	
Dark Tech.				
Restricted Tech.				
Decomm. Tech.	U1900			
E. Tilt	2	2	2	
Cables		Generic Feeder Coax - 125 ft. **(x2)**		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)		
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2		3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	0		0		0			
M. Tilt	0		0		0			
Height	80		80		80			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Active Tech.	L1900 G1900	U2100	L2100		L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.	U1900							
E. Tilt	2	2	2		5	5		
Cables		Generic Feeder Coax - 125 ft. **(x2)**			Fiber Jumper **(x4)**	SHARED Fiber Jumper **(x4)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	120		120	
M. Tilt	0		0	
Height	80		80	
Ports	P1	P2	P3	P4
Active Tech.	L1900 G1900	U2100	L2100	
Dark Tech.				
Restricted Tech.				
Decomm. Tech.	U1900			
E. Tilt				
Cables		Generic Feeder Coax - 125 ft. **(x2)**		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)		
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2		3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	120		120		120			
M. Tilt	0		0		0			
Height	80		80		80			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L1900 G1900	U2100	L2100		L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.	U1900							
E. Tilt	2	2	2		5	5		
Cables		Generic Feeder Coax - 125 ft. **(x2)**			Fiber Jumper **(x4)**	SHARED Fiber Jumper **(x4)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	270		270	
M. Tilt	0		0	
Height	80		80	
Ports	P1	P2	P3	P4
Active Tech.	L1900 G1900	U2100	L2100	
Dark Tech.				
Restricted Tech.				
Decomm. Tech.	U1900			
E. Tilt				
Cables		Generic Feeder Coax - 125 ft. **(x2)**		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)		
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2		3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	270		270		270			
M. Tilt	0		0		0			
Height	80		80		80			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L1900 G1900	U2100	L2100		L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.	U1900							
E. Tilt	2	2	2		5	5		
Cables		Generic Feeder Coax - 125 ft. **(x2)**			Fiber Jumper **(x4)**			
TMAs								
Diplexers / Combiners								
Radio					Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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

Proposed Power Systems Equipment

Table of Contents

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 1 - Site Information

Site ID: CTNH804C
Status: Draft
Version: 4
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 11/9/2021 10:38:47 AM
Last Modified By: RKane1@tmobileusa.onmicrosoft.com

Site Name: Amtrak_Branford4
Site Class: Watertank
Site Type: Structure Non Building
Plan Year: 2022
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Verizon Wireless

Latitude: 41.26638611
Longitude: -72.73333330
Address: 723 Leets Island Rd
City, State: Branford, CT
Region: NORTHEAST

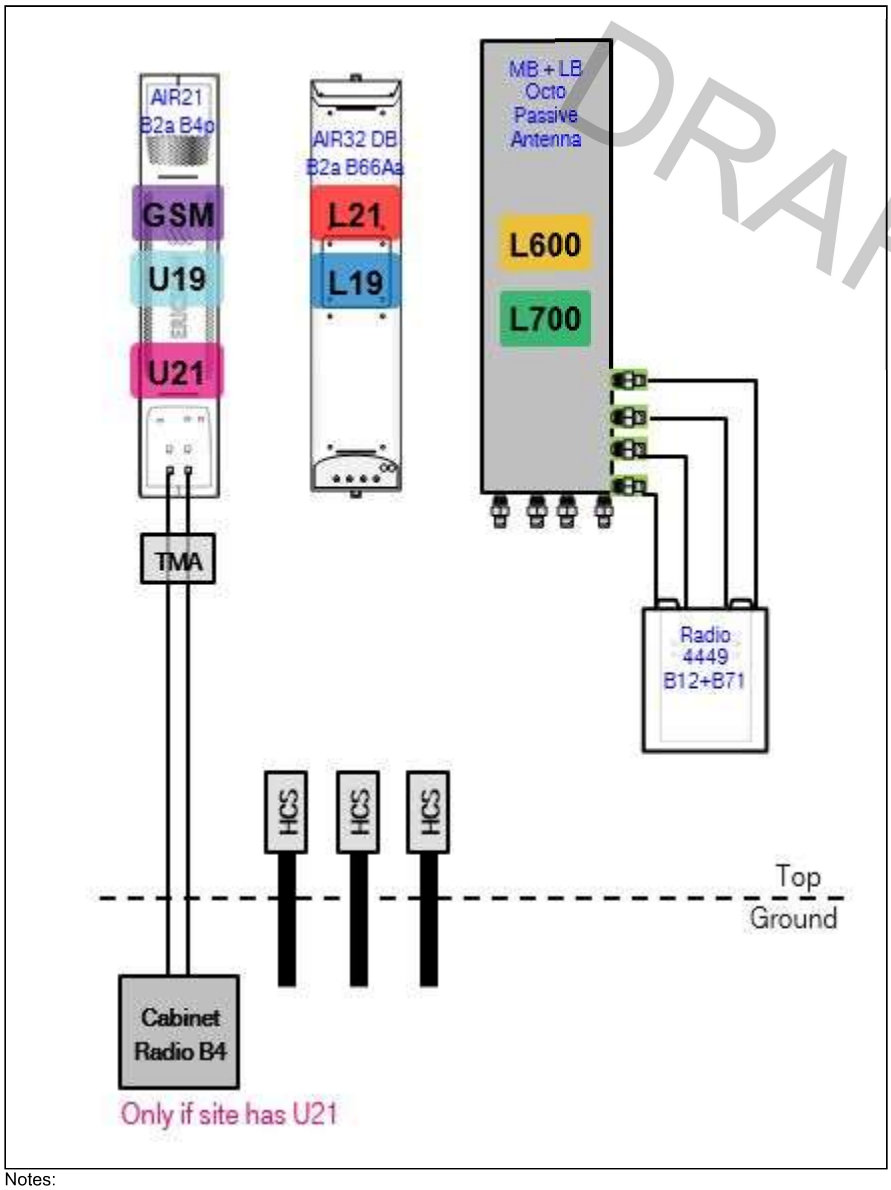
RAN Template: 67D92C Outdoor			AL Template: 67D92DBL_1xAIR+1OP (U19 Market)	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 6	**TMA Count:** 0	**RRU Count:** 3

Section 2 - Existing Template Images

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

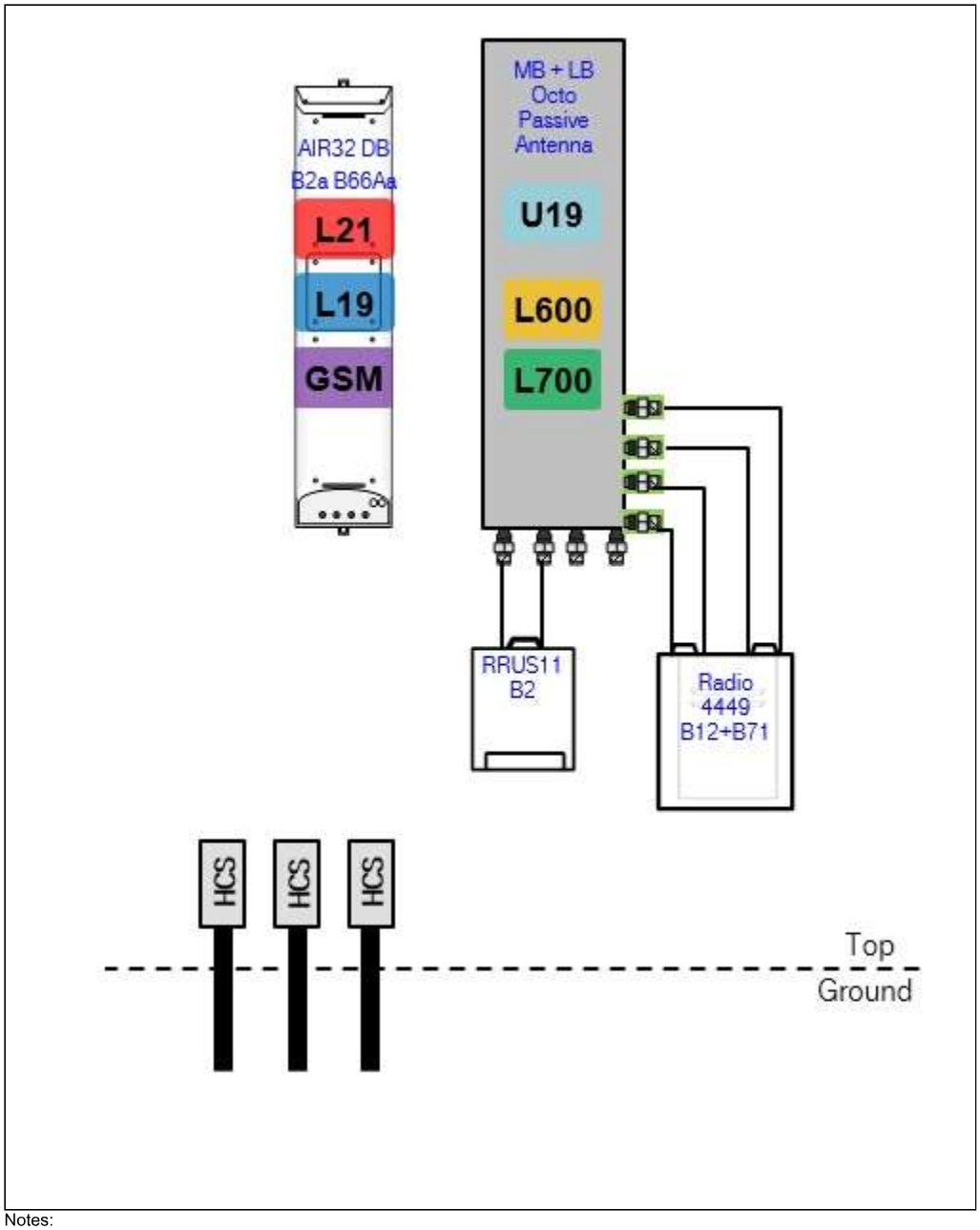
Section 3 - Proposed Template Images

67D92DB_2xAIR+1OP.JPG



Notes:

67D92DBL_1xAIR+1OP (U19 Market).jpg


AIR32 DB
B2a B66Aa
L21
L19
GSM
MB + LB
Octo
Passive
Antenna
U19
L600
L700
RRUS11
B2
Radio
4449
B12+B71
HCS
HCS
HCS
Top
Ground

Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 92C Outdoor

Enclosure	1	2
Enclosure Type	RBS 6102	Tower Top Mount (Ericsson)
Baseband	DUW30 (U1900 (DECOMMISSIONED)); DUW30 (U2100); DUG20 (G1900); DUS41 (L1900, L2100)	
Hybrid Cable System		Ericsson 9x18 HCS *Select Length*
Multiplexer	XMU	
Radio	RU22 (x 6) (U2100)	

Proposed RAN Equipment

Template: 67D92C Outdoor

Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment (Ericsson)
Baseband	DUW30; DUG20 (G1900); BB 6648 (L2100, L1900, L700, L600, N600)	
Hybrid Cable System		Ericsson Hybrid Trunk 6/24 4AWG 100m (x 3)
Radio	RU22 (x 6)	

RAN Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 6 - A&L Equipment

Existing Template: 92C_2xAIR
Proposed Template: 67D92DBL_1xAIR+1OP (U19 Market)

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	0		0	
M. Tilt	0		0	
Height	80		80	
Ports	**P1**	**P2**	**P3**	**P4**
Active Tech.	L1900, G1900	U2100	L2100	
Dark Tech.				
Restricted Tech.				
Decomm. Tech.	U1900			
E. Tilt	2	2	2	
Cables		Generic Feeder Coax - 125 ft. **(x2)**		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)		
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2		3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	0		0		0			
M. Tilt	0		0		0			
Height	80		80		80			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Active Tech.	L1900 G1900	U2100	L2100		L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.	U1900							
E. Tilt	2	2	2		5	5		
Cables		Generic Feeder Coax - 125 ft. **(x2)**			Fiber Jumper **(x4)**	SHARED Fiber Jumper **(x4)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	120		120	
M. Tilt	0		0	
Height	80		80	
Ports	P1	P2	P3	P4
Active Tech.	L1900 G1900	U2100	L2100	
Dark Tech.				
Restricted Tech.				
Decomm. Tech.	U1900			
E. Tilt				
Cables		Generic Feeder Coax - 125 ft. **(x2)**		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)		
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2		3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	120		120		120			
M. Tilt	0		0		0			
Height	80		80		80			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L1900 G1900	U2100	L2100		L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.	U1900							
E. Tilt	2	2	2		5	5		
Cables		Generic Feeder Coax - 125 ft. **(x2)**			Fiber Jumper **(x4)**	SHARED Fiber Jumper **(x4)**		
TMAs								
Diplexers / Combiners								
Radio					Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	270		270	
M. Tilt	0		0	
Height	80		80	
Ports	P1	P2	P3	P4
Active Tech.	L1900 G1900	U2100	L2100	
Dark Tech.				
Restricted Tech.				
Decomm. Tech.	U1900			
E. Tilt				
Cables		Generic Feeder Coax - 125 ft. **(x2)**		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)		
Diplexers / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1		2		3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		RFS - APXVAALL24_43-U-NA20 (Octo)			
Azimuth	270		270		270			
M. Tilt	0		0		0			
Height	80		80		80			
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L1900 G1900	U2100	L2100		L700 L600 N600	L700 L600 N600		
Dark Tech.								
Restricted Tech.								
Decomm. Tech.	U1900							
E. Tilt	2	2	2		5	5		
Cables		Generic Feeder Coax - 125 ft. **(x2)**			Fiber Jumper **(x4)**			
TMAs								
Diplexers / Combiners								
Radio					Radio 4480 B71+B85 (At Antenna)	SHARED Radio 4480 B71+B85 (At Antenna)		
Sector Equipment								

Unconnected Equipment:

Scope of Work:

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

RAN Template:	A&L Template:
67D92C Outdoor	67D92DBL_1xAIR+1OP (U19 Market)

CTNH804C_L600_4_draft

Print Name: Standard
PORs: L600_L600 Coverage

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

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

Proposed Power Systems Equipment

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: CTNH804C

Amtrak_Branford4
723 Leetes Island South
Branford, Connecticut 06405

April 22, 2022

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**41.51%**

April 22, 2022

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

Emissions Analysis for Site: CTNH804C - Amtrak_Branford4

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **723 Leetes Island South** in **Branford, 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 723 Leetes Island South in Branford, 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 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) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 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.

6) 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.

7) 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.

8) 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.

9) 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.

10) The antennas used in this modeling are the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 21 for the 2100 MHz channel(s), the RFS APXVAALL2443-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s) in Sector A, the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 21 for the 2100 MHz channel(s), the RFS APXVAALL2443-U-NA20 for the 600 MHz / 600 MHz / 700 MHz channel(s) in Sector B, the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 21 for the 2100 MHz channel(s), the RFS APXVAALL2443-U-NA20 for the 600 MHz / 600 MHz / 700 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.

11) The antenna mounting height centerline of the proposed antennas is 80 feet above ground level (AGL).

12) 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.

13) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.35 dBd
Height (AGL):	80 feet	Height (AGL):	80 feet	Height (AGL):	80 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	300.00 Watts	Total TX Power (W):	300.00 Watts	Total TX Power (W):	300.00 Watts
ERP (W):	10,283.03	ERP (W):	10,283.03	ERP (W):	10,283.03
Antenna A1 MPE %:	**6.75%**	Antenna B1 MPE %:	**6.75%**	Antenna C1 MPE %:	**6.75%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.35 dBd	Gain:	15.35 dBd	Gain:	15.35 dBd
Height (AGL):	80 feet	Height (AGL):	80 feet	Height (AGL):	80 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120.00 Watts	Total TX Power (W):	120.00 Watts	Total TX Power (W):	120.00 Watts
ERP (W):	4,113.21	ERP (W):	4,113.21	ERP (W):	4,113.21
Antenna A2 MPE %:	**2.70%**	Antenna B2 MPE %:	**2.70%**	Antenna C2 MPE %:	**2.70%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAALL2443-U-NA20	Make / Model:	RFS APXVAALL2443-U-NA20	Make / Model:	RFS APXVAALL2443-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):	80 feet	Height (AGL):	80 feet	Height (AGL):	80 feet
Channel Count:	5	Channel Count:	5	Channel Count:	5
Total TX Power (W):	200.00 Watts	Total TX Power (W):	200.00 Watts	Total TX Power (W):	200.00 Watts
ERP (W):	4,151.83	ERP (W):	4,151.83	ERP (W):	4,151.83
Antenna A3 MPE %:	**6.49%**	Antenna B3 MPE %:	**6.49%**	Antenna C3 MPE %:	**6.49%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	15.94%
Verizon	23.82%
AT&T	1.75%
Site Total MPE % :	41.51%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	15.94%
T-Mobile Sector B Total:	15.94%
T-Mobile Sector C Total:	15.94%
Site Total MPE % :	41.51%

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 1900 MHz GSM	4	1028.30	80.0	27.00	1900 MHz GSM	1000	2.70%
T-Mobile 1900 MHz LTE	2	2056.61	80.0	27.00	1900 MHz LTE	1000	2.70%
T-Mobile 2100 MHz UMTS	2	1028.30	80.0	13.50	2100 MHz UMTS	1000	1.35%
T-Mobile 2100 MHz LTE	2	2056.61	80.0	27.00	2100 MHz LTE	1000	2.70%
T-Mobile 600 MHz LTE	2	591.73	80.0	7.77	600 MHz LTE	400	1.94%
T-Mobile 600 MHz NR	1	1577.94	80.0	10.36	600 MHz NR	400	2.59%
T-Mobile 700 MHz LTE	2	695.22	80.0	9.13	700 MHz LTE	467	1.95%
						Total:	**15.94%**

• 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:	15.94%
Sector B:	15.94%
Sector C:	15.94%
T-Mobile Maximum MPE % (Sector A):	15.94%
Site Total:	41.51%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.51%** 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.