STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
A SUB-PETITION OF CROWN CASTLE FOR THE MODIFICATION OF AN EXISTING WIRELESS TELECOMMUNICATIONS FACILITY AT 539 PLAINS ROAD, HADDAM, CONNECTICUT	:	SUB-PETITION NO. 1133 539 PLAINS ROAD HADDAM, CT
	:	
	:	JANUARY 26, 2023

SUB-PETITION FOR DECLARATORY RULING:
ELIGIBLE FACILITIES REQUEST FOR MODIFICATIONS
THAT WILL NOT SUBSTANTIALLY CHANGE THE
PHYSICAL DIMENSIONS OF AN EXISTING BASE STATION

I. Introduction

Pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C. § 1455(a) ("Section 6409(a)") and subsequent Orders (FCC-14-153) issued by the Federal Communications Commission ("FCC") (the "FCC Order"), Crown Castle ("Crown") hereby petitions the Connecticut Siting Council (the "Council") for a declaratory ruling ("Sub-Petition") that modifications described in more detail below to the existing wireless telecommunications facility (base-station) at 539 Plains Road in Haddam, Connecticut (the "Property") constitute an Eligible Facilities Request ("EFR") under the FCC Order.

II. Factual Background

The Property is a 13.57-acre wooded parcel located north of Plains Road and east of Turkey Hill Road in Haddam, Connecticut. The existing wireless telecommunications facility, located in the northeast portion of the Property, consists of a 180-foot self-supporting lattice tower and ground-mounted equipment within a fenced compound. The existing facility was approved by the Siting Council in July of 1986 (Docket No. 58). In October of 1999 (Petition

No. 434), the Council approved a request from Crown to install three (3) T-Mobile (Omnipoint Communications Inc.) antennas on a pipe mast extending above the top of the tower to an overall height of 189 feet above Ground level ("AGL"). Copies of the Council's Docket No. 58 Decision and Order and Petition No. 434 Staff Report are included in Attachment 1.

According to the Council's telecommunications database the tower is currently shared by Dish, with antennas at the 140-foot level; Sprint, with antennas at the 150-foot level; AT&T, with antennas at the 165-foot level; and Verizon with antennas at the 178-foot level. In an effort to accommodate T-Mobile's need for facility upgrades, Crown now intends to remove the existing 10-foot antenna mast and install a 10-foot extension of the lattice tower itself. If approved, T-Mobile would install new antennas at a centerline height of 186-feet above grade. The top of the extended lattice tower would be 190 feet AGL. In the Docket No. 58 Decision and Order, the Council approved an overall maximum height for the tower of 193 feet.

III. Proposed Facility Modifications

T-Mobile will install a three (3) RFS APXVAALL24_43_U_NA20 antennas and three (3) Ericsson 4460 B25 remote radio heads ("RRHs") on the new lattice tower mounting frame at the 186-foot level on the tower. Project Plans, including specifications for T-Mobile's antennas and equipment, are included in Attachment 2. A Structural Analysis Report and Mount Analysis Conditional Passing Report confirming that the tower extension and proposed antenna mounting system can support the proposed modifications are included in Attachment 3.

IV. Discussion

A. The Proposed Modification Will Not Cause a Substantial Change to the Physical Dimensions of the Existing Base Station

Section 6409(a) provides, in relevant part, that "a State or local government may not

deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station." Pursuant to the FCC Order, the proposed modification does not substantially change the physical dimensions of the base station if the following criteria are satisfied.

1. *The proposed facility modifications will not increase the height of the tower by more than ten (10) percent of the height.* The modifications include a 10-foot lattice tower extension, extending the tower height from 180 feet to 190 feet.

2. *The proposed facility modification will not protrude from the edge of the structure more than six (6) feet.* T-Mobile's antennas, RRHs and antenna mounting system will not protrude more than six (6) feet from the face of the lattice tower.

3. *The proposed facility does not involve installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets.* The proposed modifications do not involve any changes to existing equipment cabinets.

4. *The proposed facility does not entail any excavation or deployment outside the current site of the base station.* The proposed modifications will remain within the limits of the existing facility compound.

5. *The proposed facility does not defeat the existing concealment elements of the base station.* The existing facility does not maintain any concealment elements and none are proposed as a part of these modifications.

6. *The proposed facility complies with conditions associated with the prior approval of construction or modification of the base station.* The proposed modifications are in

compliance with the Council's Docket No. 58 and Petition No. 434 approvals.

B. FCC Compliance

Included in Attachment 4 is a Radio Frequency Emissions Report confirming that the Plains Road facility, with the proposed modifications, will operate within the FCC safety standards for radio frequency emissions.

C. Notice to the Town, Property Owner and Abutting Landowners

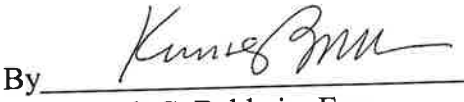
On January 26, 2023 a copy of this Sub-Petition was sent to Haddam First Selectman, Robert McGarry; Bill Warner, Haddam's Town Planner; and 539 Plains Road LLC, the owner of the Property. Copies of the letters sent to First Selectman McGarry, Mr. Warner and 539 Plains Road LLC are included in Attachment 5. A copy of this Sub-Petition was also sent to the owners of land that abuts the Property. A sample abutter's letter and the list of those abutting landowners who were sent notice and a copy of this filing is included in Attachment 6.

V. Conclusion

Based on the information provided above, Crown respectfully submits that the proposed modification of the existing Plains Road Facility constitutes an "eligible facilities request" under Section 6409(a) and the FCC Order.

Respectfully submitted,

CROWN CASTLE

By 

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597
(860) 275-8200
Its Attorneys

ATTACHMENT 1

DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND AND MIDDLESEX COUNTIES.

CONNECTICUT SITING COUNCIL

July 11, 1986.

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need as provided by Section 16-50k of the General Statutes of Connecticut (CGS) be issued to the Hartford Cellular Company for the construction, maintenance, and operation of cellular mobile phone telecommunication towers and associated equipment in the towns of Glastonbury, Haddam, Hartford, Portland, Rocky Hill, Somers, Vernon, Windsor, and Willington subject to the conditions below.

1) The proposed Bloomfield and Middlefield sites are rejected without prejudice.

2) The antennas on the Glastonbury tower shall be mounted no higher than the 180' level of this existing tower.

3) The Portland and Rocky Hill towers shall be monopoles.

4) The towers shall be no taller than necessary to provide the proposed service, and in no event shall exceed total heights, including antennas, of

a) 193' at the Haddam site;

b) 173' at the Portland site;

c) 153' at the Rocky Hill site;

d) 173' at the Somers site;

e) 173' at the Vernon site;

f) 153' at the Willington site;

g) 173' at the Windsor site.

5) The Hartford site receive antennas shall be mounted below the top of the high point of the building to preclude visibility.

6) Any future actions requiring the removal of the existing Glastonbury tower to be shared by the certificate holder shall also apply to the equipment mounted on that tower by the certificate holder, regardless of that equipment's status under Chapter 277a of the CGS.

7) The certificate holder shall submit a development and management (D&M) plan for the Haddam, Portland, Rocky Hill, Somers, Vernon and Windsor sites pursuant to Sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies (RSA), except that irrelevant items in Section 16-50j-76 need only be identified as such. In addition to the requirements of Section 16-50j-76, the D&M plan shall provide plans for evergreen screening around the fenced perimeter at the Haddam, Somers, Vernon, and Windsor sites. The D&M plan shall include a proposal for painting the approved monopole structures to blend with the sky. The D&M plan must be approved prior to facility construction. Any changes to specifications in the D&M plan must be approved by the Council prior to facility operation.

8) All certified facilities shall be constructed, operated, and maintained as specified in the Council's record and in the

site plan required by order number 7.

9) The certificate holder shall comply with any future radiofrequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this decison shall continue to be in compliance with such standards.

10) The certificate holder shall permit public or private entities to share space on the towers approved herein, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. In addition to complying with Section 16-50j-73 of the RSA, the certificate holder shall notify the Council of the addition of any equipment to any approved tower.

11) A fence not lower than 8' shall surround each tower and associated equipment.

12) Unless necessary to comply with order 13, no lights shall be installed on any of these towers.

13) The facilities' construction and any future tower sharing shall be in accordance with all applicable federal, state, and municipal laws and regulations. Shared uses by entities not subject to jurisdiction pursuant to Section 16-50k of the CGS shall be subject to all applicable federal, state, and municipal laws and regulations.

14) Construction activities shall take place during daylight working hours.

15) This decision and order shall be void and the towers and associate equipment shall be dismantled and removed, or reapplication for any new use shall be made to the Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction.

16) This decision and order shall be void if all construction authorized herein is not completed within three years of the issuance of this decision, or within three years of the completion of any appeal if appeal of this decision is taken, unless otherwise approved by the Council.

Pursuant to CGS Section 16-50p, we hereby direct that a copy of the decision and order shall be served on each person listed below. A notice of the issuance shall be published in the Hartford Courant, Middletown Press, Manchester Journal Inquirer, and the Willimantic Chronicle.

The parties to the proceeding are:

Metro Mobile (applicant)
5 Eversley Avenue
Norwalk, Connecticut 06855
ATTN: Armand Mascioli
General Manager

Howard L. Slater, Esq. (its attorneys)
Scott A. Gursky, Esq.
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
111 Pearl Street
Hartford, Connecticut 06103

Richard Rubin, Esq.
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D. C. 20036

Mr. William Wamester
1225 Randolph Road
Middletown, Connecticut 06457

The Southern New England Telephone Company
227 Church Street
New Haven, Connecticut 06506
ATTN: Peter J. Tyrrell, Esq.

Mr. James W. Tilney

represented by:
Patricia A. Ayars
Samuel Baily, Jr.
Robinson & Cole
One Commercial Plaza
Hartford, CT. 06103-3597

Mr. Samuel DuBosar, Chairman
Bessie Bennett, Esq.
Town Plan & Zoning Commission
P.O. Box 337
Bloomfield, Connecticut 06002

Town of Somers

represented by:

Mr. Robert F. Peters
Town Counsel
Tatoian, Devline, Peters
& Davis
11 South Road
P.O. Box 415
Somers, CT. 06071

Town of Haddam
represented by:

Lucy R. Petrella
Chairperson
Town Office Building
Route 9A
P.O. Box 87
Haddam, CT. 06438

Midstate Regional Planning Agency

represented by:

Thomas M.Gilligan
Regional Planner
P.O. Box 139
Middletown, CT. 06457

Dr. Donald P. LaSalle
Director
Talcott Mountain Science Center
Montevideo Road
Avon, Connecticut 06001

Barnard Tilson
Secretary
Avon Planning and Zoning
60 West Main Street
Avon, Connecticut 06001

(service waived)

Alden Giddings
33 Privelege Road
Bloomfield, Connecticut 06002

Town of Bloomfield

represented by:

Joseph M.Suggs, Jr.
Deputy Mayor
Town Hall
880 Bloomfield Avenue
P.O. Box 337
Bloomfield, CT. 06002
(service waived)

Town of Middlefield

represented by:

David Silverstone, Esq.
Silverstone & Koontz
37 Lewis Street
Hartford, CT. 06103

with a copy to:

Geoffrey Colegrove
Midstate Regional Planning Agency
100 DeKoven Drive
Middletown, CT. 06457

Zoning Commission
Town of Somers

represented by:

Joseph A. Paradis
Chairman
Town Hall
600 Main Street
P.O. Box 803
Somers, CT. 06071

Barbara Sirwilo, Secretary (service waived)
Planning & Zoning Commission
Town of Rocky Hill
600 Old Main Street
P.O. Box 657
Rocky Hill, Connecticut 06067

H. Robert Goodrich (service waived)
Goodrich Lane
Portland, Connecticut 06480

The Honorable Richard P. Antonetti
State Representative (service waived)
5 Sachem Circle
Meriden, Connecticut 06450

John Hevrin
R.D. #1 - Plains Road
Haddam, Connecticut 06438

Norman and Darlene Manning (represented by)

Elizabeth Allen, Esq.
P.O. Box 467
Higganum, CT. 06441
(service waived)

C E R T I F I C A T I O N

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 11th day of July, 1986.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Absent
Commissioner John Downey Designee: Patricia Shea	Yes
Commissioner Stanley Pac Designee: Christopher Cooper	Yes
Owen L. Clark	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Yes
Pamela B. Katz	Absent
William H. Smith	Yes
Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, July 11, 1986
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

Christopher S. Wood, Executive Director
Connecticut Siting Council

Petition No. 434
Docket 58
(Alternately, EM-CROWN-061-990927)
Crown Atlantic Company LLC
Staff Report
October 21, 1999

On October 8, 1999, Connecticut Siting Council (Council) Chairman Mortimer A. Gelston and Council staff Steve Levine conducted a field review of Crown Atlantic Company's (Crown) Turkey Hill communications tower in Haddam. Crown proposes to modify the tower to permit use by Omnipoint Communications, Inc. (Omnipoint), and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification. Crown submits that the proposed modification will not have a substantial adverse environmental effect, but instead will reduce the unnecessary proliferation of telecommunications towers by utilizing an existing structure, and qualifies for an order of tower sharing pursuant to C.G.S. § 16-50aa.

The Turkey Hill tower is a 180-foot-tall lattice tower. In 1986, the Council approved a maximum height of 193 feet, *including antennas, in Docket 58.* According to a verbal communication from Crown's attorney in this matter, 13-foot antennas were originally mounted on this tower to a height of 193 feet, but were removed in the early 1990's. The tower presently supports antennas owned by Bell Atlantic Mobile, Springwich Cellular, and Sprint. The Council recently approved additional shared use of the tower by Nextel Communications. An engineering study submitted by Crown indicates the tower is capable of supporting all of these antennas and the proposed Omnipoint antennas as well.

Omnipoint would install three panel-type antennas in an accelerator unit mounted on a mast extending above the 180-foot top of the existing tower. The Omnipoint antennas would extend to a height of 189 feet above grade, four feet under the maximum height approved by the Council in 1986. Omnipoint's antennas would be held in place by a 4-inch diameter, 3-foot-long extension pipe mounted to the top of the tower. The antennas themselves are 19 inches in diameter and rise an additional six feet above the pipe to a total height of 189 feet. Omnipoint also plans to install a 5 x 7-foot equipment cabinet within existing fencing at the base of the tower.

The proposed antennas and associated equipment will not increase the noise levels at the existing site, under normal operating conditions, by six decibels or more. The worst case power density for the telecommunications operations at the site has been calculated to be 13.3% of the applicable standard for uncontrolled environments, including a contribution of 0.5% by Omnipoint. Crown asserts that the proposed installation will not cause a substantial adverse environmental effect, and for this reason would not require a Certificate.

Crown has given separate prior notice of this work as an exempt modification under R.C.S.A. § 16-50j-72(b)(2). See EM-CROWN-061-990927. This item was tabled at the October 8, 1999 Council meeting due to concerns that the pipe might be considered part of the tower, thereby increasing tower height and disqualifying this installation as an exempt modification. Crown would withdraw the Petition from further consideration if the Council chooses to acknowledge the addition of Omnipoint's antennas on the Turkey Hill tower as an exempt modification.

ATTACHMENT 2

T-Mobile

T-MOBILE SITE NUMBER: CT11235A
T-MOBILE SITE NAME: HADDAM/RT 9
SITE TYPE: SELF-SUPPORT TOWER W/10'-0" EXTENSION (REPLACEMENT OF 10' PIPE @ TOP)
TOWER HEIGHT: 180'-0"

BUSINESS UNIT #: 806478
SITE ADDRESS: 539 PLAINS RD HADDAM, CT 06438
COUNTY: MIDDLESEX
JURISDICTION: CONNECTICUT SITING COUNCIL

T-MOBILE L600 SITE CONFIGURATION: 67E998E OUTDOOR

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	HRT 080 953381
SITE ADDRESS:	539 PLAINS RD HADDAM, CT 06438
COUNTY:	MIDDLESEX
MAP/PARCEL #:	63 022 2
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.443056°
LONGITUDE:	-72.506222°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	514 FT
CURRENT ZONING:	R-2A
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	539 PLAINS RD LLC 444 ROUTE 312 BREWSTER, NY 10509
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER CO 1-800-286-2000
TELCO PROVIDER:	LIGHTTOWER 1-855-91-FIBER

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 MARVIN PHILLIPS MARVIN.PHILLIPS@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065
	TRICIA PELON - PROJECT MANAGER TRICIA.PELON@CROWNCASTLE.COM
	JASON D'AMICO - CONSTRUCTION MANAGER JASON.DAMICO@CROWNCASTLE.COM

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	OVERALL SITE PLAN
C-1.2	SITE PLAN & ENLARGED SITE PLAN
C-2.1	EXISTING ELEVATION
C-2.2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
ATTACHED	MOUNT SPECS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR FULL SIZE. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

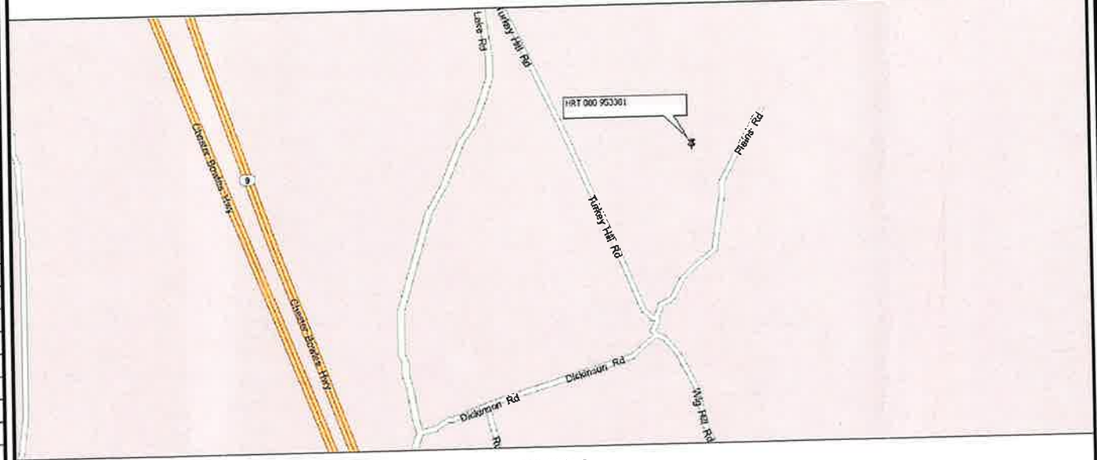
TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (6) 1-1/4" COAX CABLES
- REMOVE EXISTING MOUNT
- INSTALL (3) ANTENNAS
- INSTALL (6) RADIOS
- INSTALL (1) HYBRID CABLE
- INSTALL (3) SITEPRO1 - VFA-12HD SECTOR FRAMES W/ (2) 2"STD 10'-0" LONG MOUNTING PIPES PER MOUNT (6 MOUNTING PIPES TOTAL)

GROUND SCOPE OF WORK:
- REMOVE (6) RUS01 B2
- REMOVE (1) BB6630
- INSTALL (1) RP 6651
- INSTALL (1) PSU 4813 VR4A (KIT)

INSTALLER NOTE:
NO PROPOSED LOADING TO BE ADDED UNTIL TOWER MODIFICATIONS ARE INSTALLED PER TOWER MODIFICATION DESIGN BY B+T GROUP DATED JULY 18, 2022.

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2022 CONNECTICUT SBC
MECHANICAL	2022 CONNECTICUT SBC
ELECTRICAL	2022 CONNECTICUT SBC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS DATED:	B+T GROUP 12/8/22
MOUNT ANALYSIS DATED:	B+T GROUP 12/14/22
RFDS REVISION: DATED:	5 10/13/22
ORDER ID: REVISION:	608636 4

INSTALLER NOTE:
NO PROPOSED LOADING TO BE ADDED UNTIL MOUNT SWAP IS COMPLETE. CONTRACTOR TO INSTALL MOUNT PER MANUFACTURER'S SPECIFICATIONS.

CALL CONNECTICUT ONE CALL (800) 922-4455 CBYD.COM CALL 2 WORKING DAYS BEFORE YOU DIG! 811

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1
REVISION: 4

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT: THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER .... 40 ksi
   #5 BARS AND LARGER .... 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH .... 3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 BARS AND LARGER .... 2"
   #5 BARS AND SMALLER .... 1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
   SLAB AND WALLS .... 3/4"
   BEAMS AND COLUMNS .... 1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE		
SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T · · Mobile · · ·
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

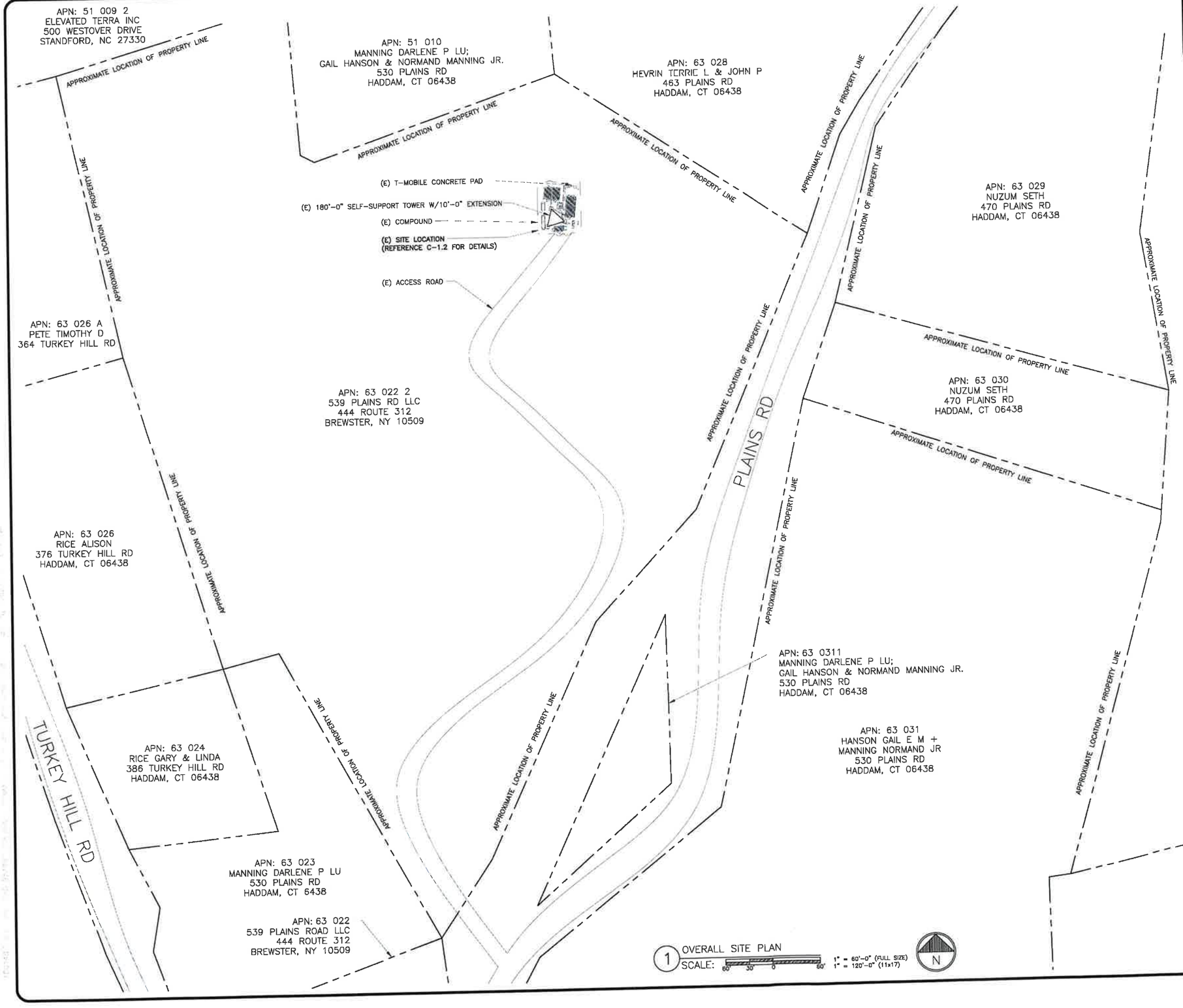
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **T-2**
REVISION: **4**



SITE PLAN DISCLAIMER:

PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM GOOGLE MAPS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET.

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.bltgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

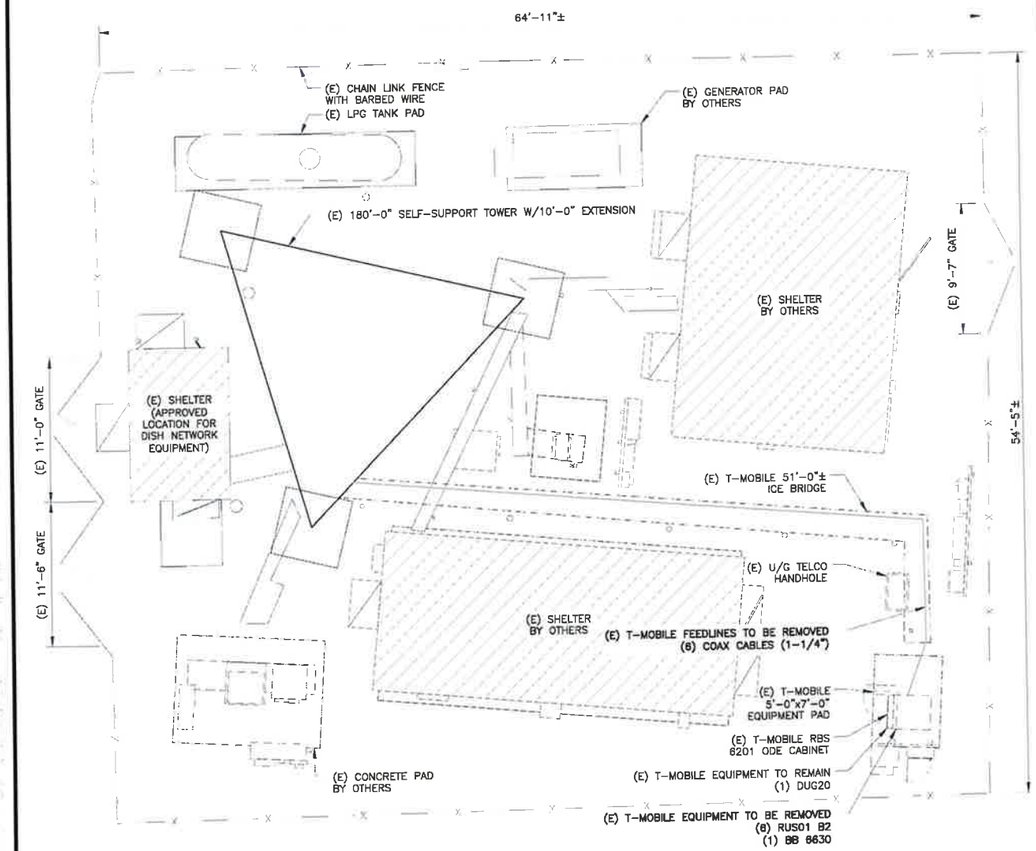
1/19/23

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

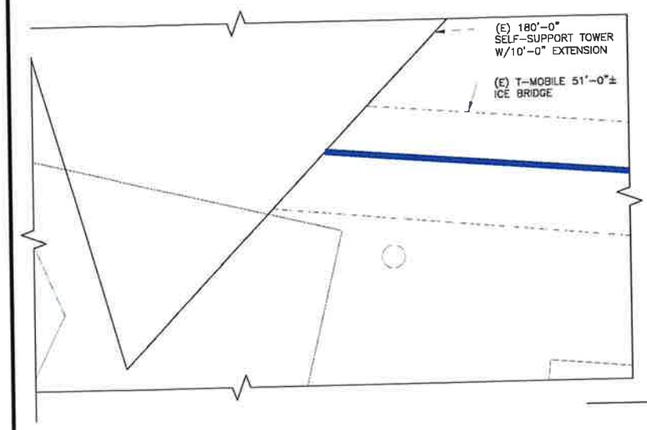
SHEET NUMBER: C-1.1

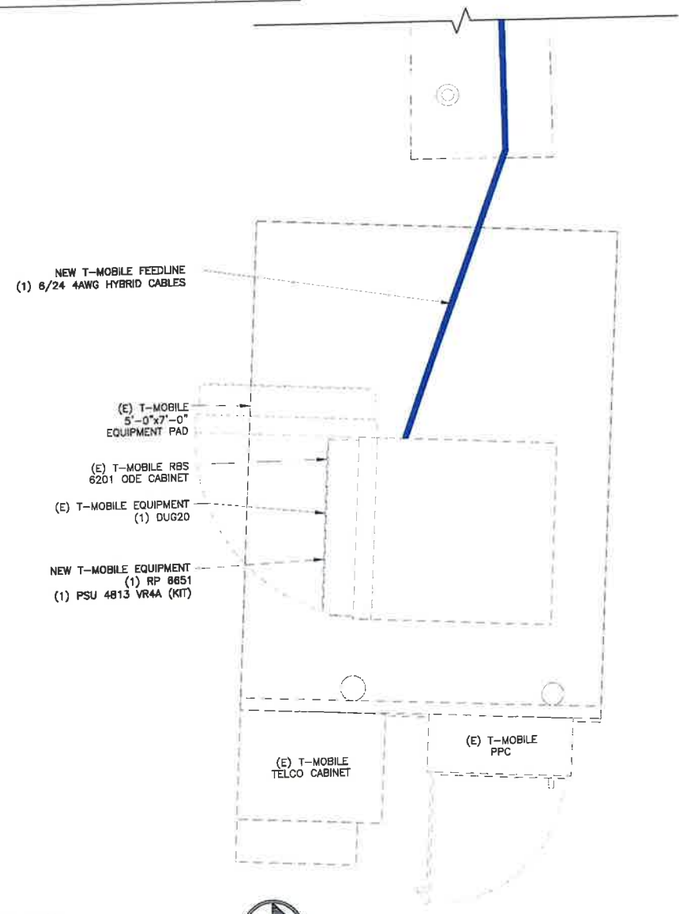
REVISION: 4



1 SITE PLAN
SCALE: 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N





2 ENLARGED SITE PLAN
SCALE: 1"=1'-0" (FULL SIZE) 1/2"=1'-0" (11x17)

N

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

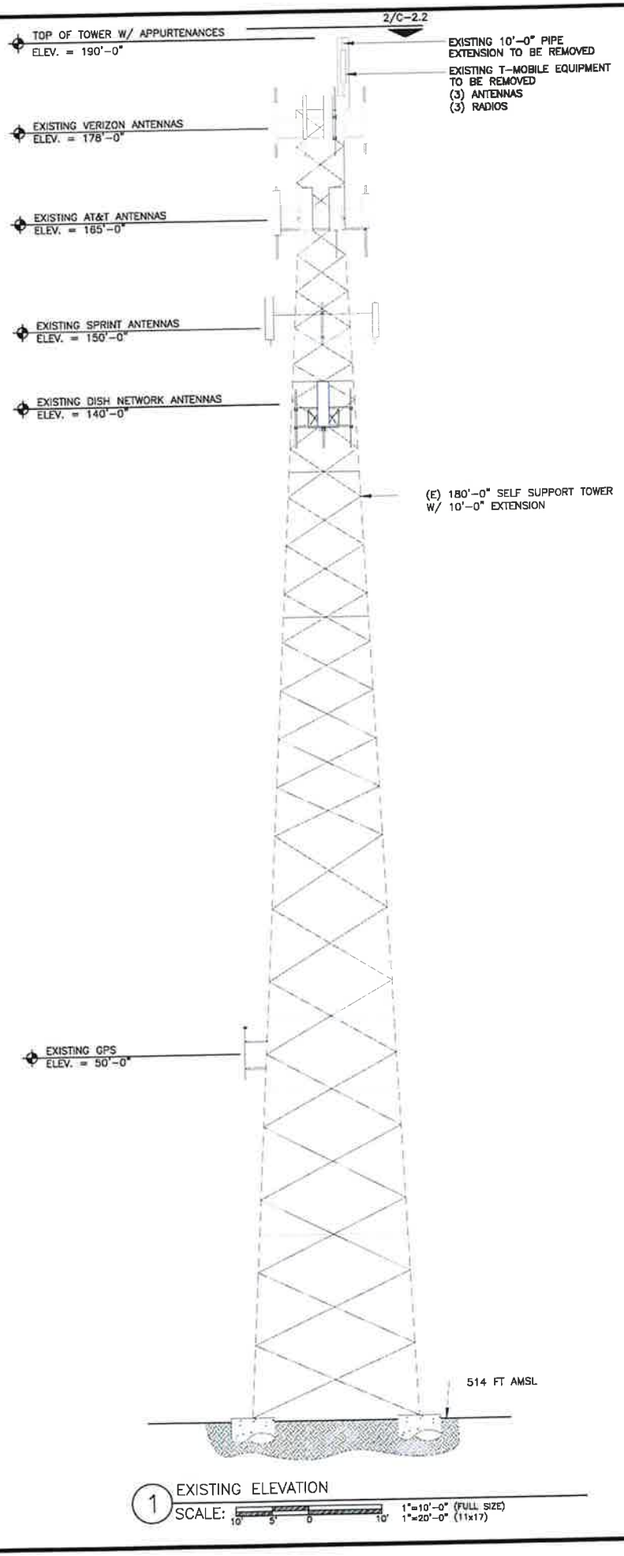
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: C-1.2
REVISION: 4



1 EXISTING ELEVATION
SCALE: 10' 5' 0 10' 1"=10'-0" (FULL SIZE) 1"=20'-0" (11x17)

2 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

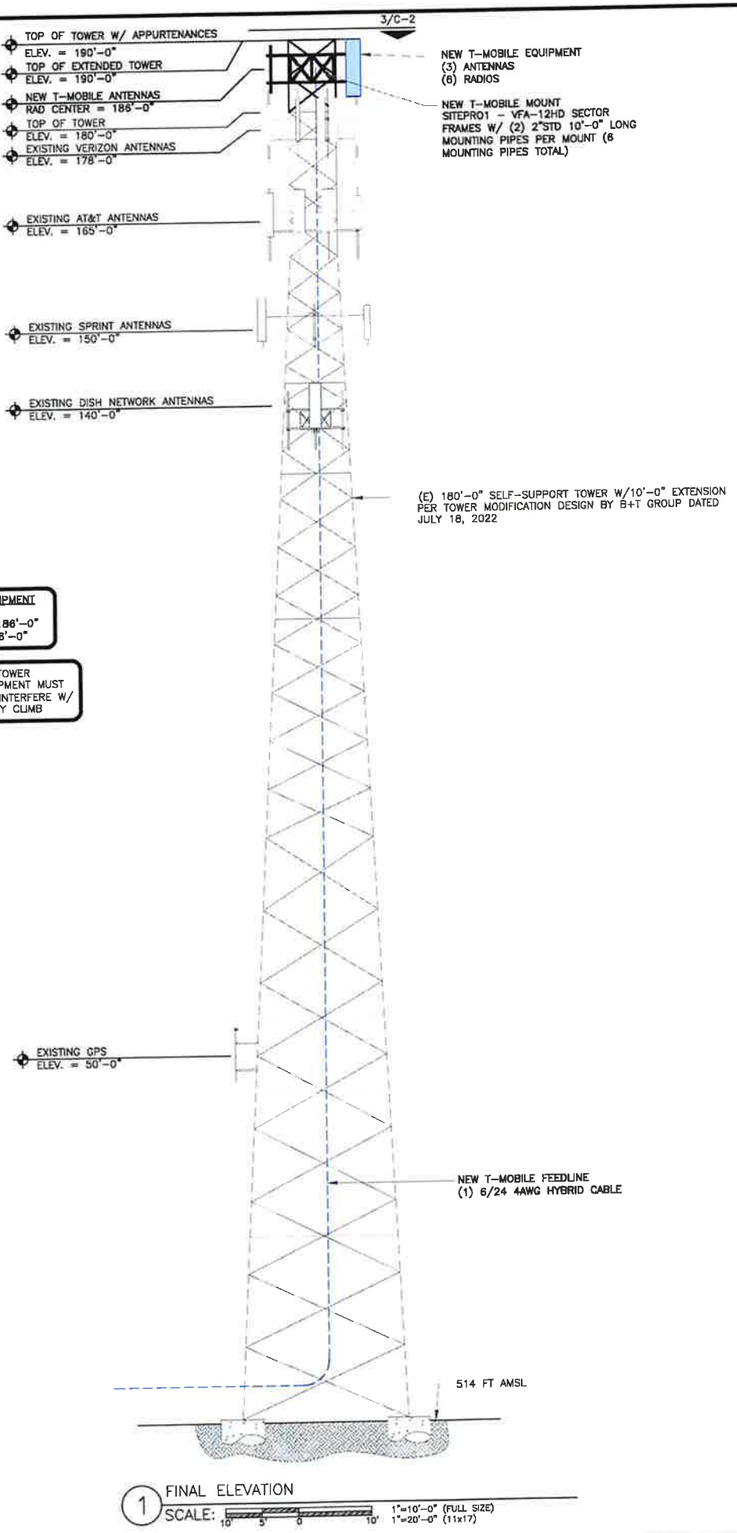
EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

SHEET NUMBER: C-2.1
REVISION: 4



T-MOBILE EQUIPMENT

ANTENNA CL: 186'-0"
MOUNT CL: 186'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

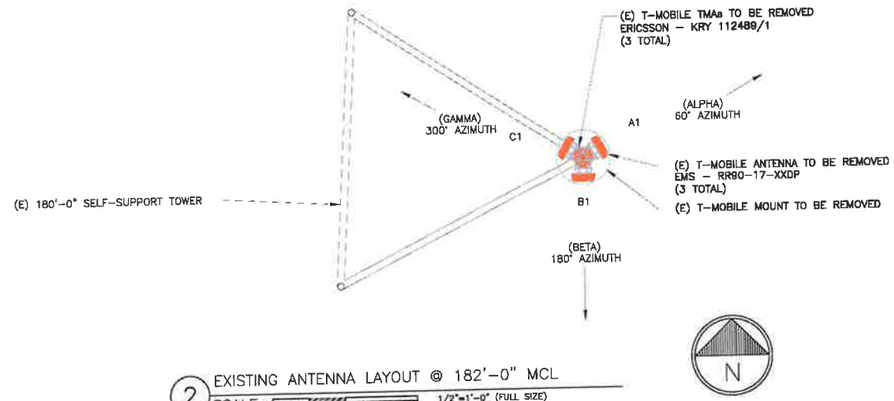
1 FINAL ELEVATION
SCALE: 10' 5' 0 10' 1"=10'-0" (FULL SIZE) 1"=20'-0" (11x17)

INSTALLER NOTE:

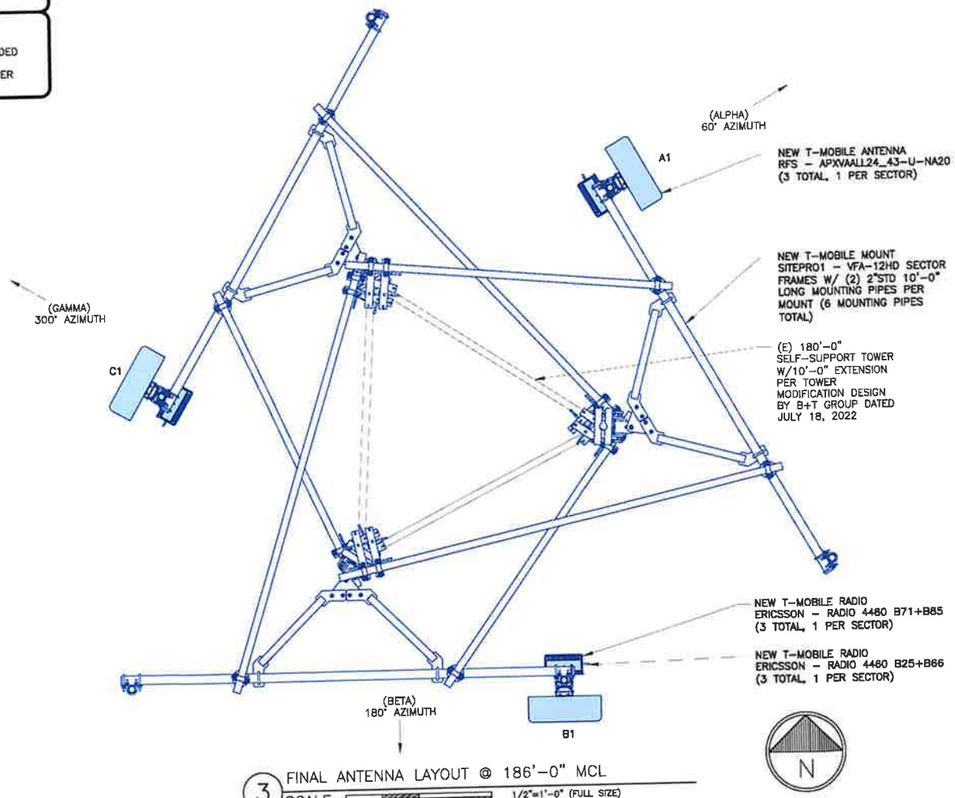
NO PROPOSED LOADING TO BE ADDED UNTIL TOWER MODIFICATIONS ARE INSTALLED PER TOWER MODIFICATION DESIGN BY B+T GROUP DATED JULY 18, 2022.

INSTALLER NOTE:

NO PROPOSED LOADING TO BE ADDED UNTIL MOUNT SWAP IS COMPLETE. CONTRACTOR TO INSTALL MOUNT PER MANUFACTURER'S SPECIFICATIONS.



2 EXISTING ANTENNA LAYOUT @ 182'-0" MCL
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)



3 FINAL ANTENNA LAYOUT @ 186'-0" MCL
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

SHEET NUMBER: C-2.2
REVISION: 4

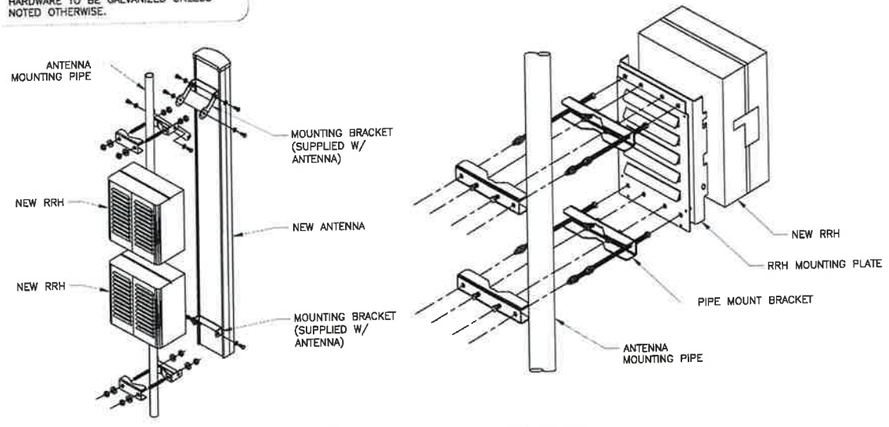
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	FEEDLINE TYPE
ALPHA	A1	L700/L600/N600; G1900/L2100/ L1900	RFS	APXVAALL24_43-U-NA20	80°	0°	2°/2°/2°/ 2°	186'-0"	(1) ERICSSON - RADIO 4480 (1) ERICSSON - RADIO 4480 B2/B25 B66	(1) 6/24 4AWG HYBRID TRUNK (100M±)
BETA	B1	L700/L600/N600; G1900/L2100/ L1900	RFS	APXVAALL24_43-U-NA20	180°	0°	2°/2°/2°/ 2°	186'-0"	(1) ERICSSON - RADIO 4480 (1) ERICSSON - RADIO 4480 B2/B25 B66	
GAMMA	C1	L700/L600/N600; G1900/L2100/ L1900	RFS	APXVAALL24_43-U-NA20	300°	0°	2°/2°/2°/ 2°	186'-0"	(1) ERICSSON - RADIO 4480 (1) ERICSSON - RADIO 4480 B2/B25 B66	

1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

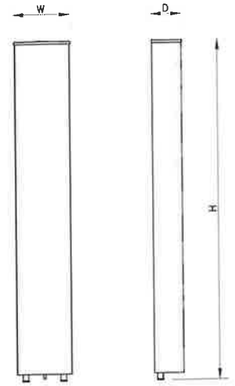
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

3/19/23

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

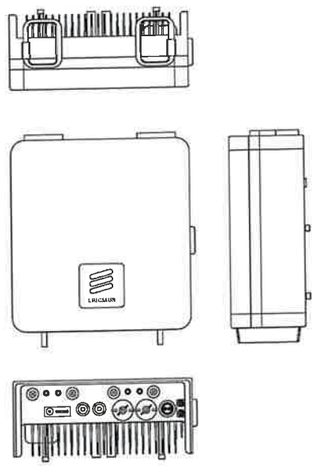
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: C-3
REVISION: 4



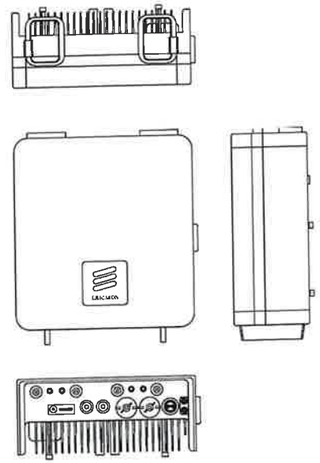
ANTENNA SPECS	
MANUFACTURER	RFS/CELWAVE
MODEL #	APXVAALL24_43-U-NA20
WIDTH	24.0"
DEPTH	8.50"
HEIGHT	95.90"
WEIGHT	149.90 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4460 B25 + B66
WIDTH	15.1"
DEPTH	11.9"
HEIGHT	17"
WEIGHT	109 LBS

2 RRU SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4480 B71 + B85
WIDTH	15.7"
DEPTH	7.5"
HEIGHT	22.0"
WEIGHT	81.0 LBS

3 RRU SPECS
SCALE: NOT TO SCALE

4 NOT USED
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

7 NOT USED
SCALE: NOT TO SCALE

8 NOT USED
SCALE: NOT TO SCALE

T··Mobile···
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.bigrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: C-4
REVISION: 4

NOTES:

1. PANEL SCHEDULE PENDING FIELD VERIFICATION.

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
RBS 6201 ODE	2	100A	1	2	20A	1	GFI
			3	4	20A	1	FIBER
			5	6			
			7	8			
			9	10			
			11	12			
			13	14			
			15	16			
			17	18			
			19	20			
			21	22			
			23	24			

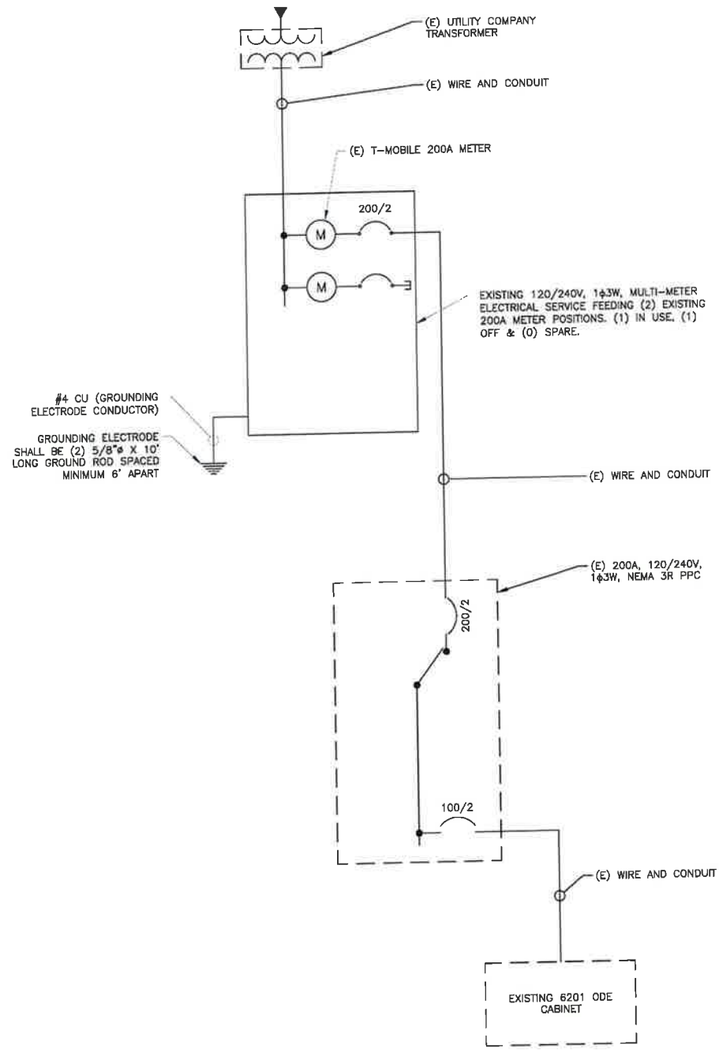
RATED VOLTAGE: ■120/240 □_____ 1 PHASE, 3 WIRE	BRANCH POLES: □12 ■24 □30 □42	APPROVED MF'RS
RATED AMPS: □100 ■200 □400 □_____	CABINET: ■SURFACE □FLUSH	NEMA □1 ■3R □4X
□MAIN LUGS ONLY MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR	■KEYED DOOR LATCH
□FUSED ■CIRCUIT BREAKER BRANCH DEVICES	□_____ TO BE GFCI BREAKERS	FULL NEUTRAL BUS GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL		

REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS AND PHOTOS

1 FINAL T-MOBILE PANEL DETAIL
SCALE: NOT TO SCALE

NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, OR XHHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

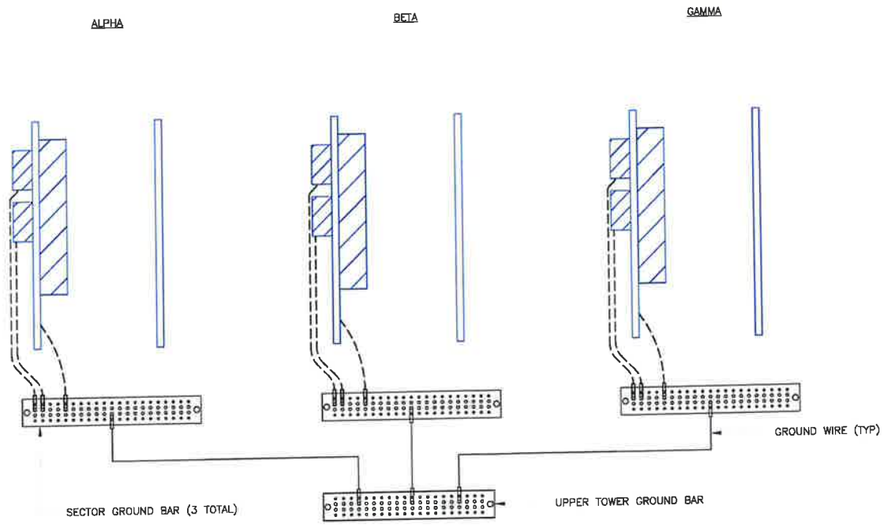
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
E-1	4



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE

3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP

1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

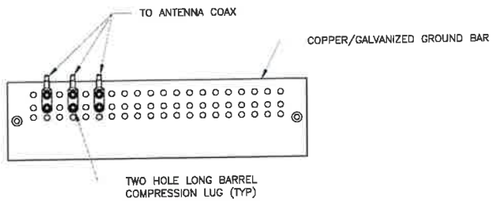
STATE OF CONNECTICUT
No. 29985
LICENSED
PROFESSIONAL ENGINEER
1/19/23

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: G-1

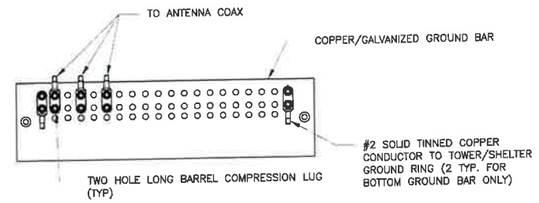
REVISION: 4



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

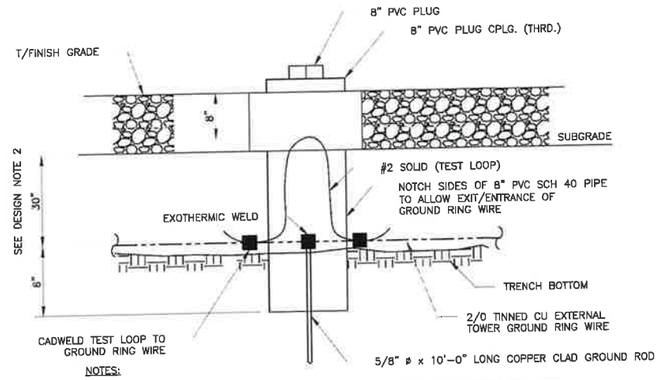
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

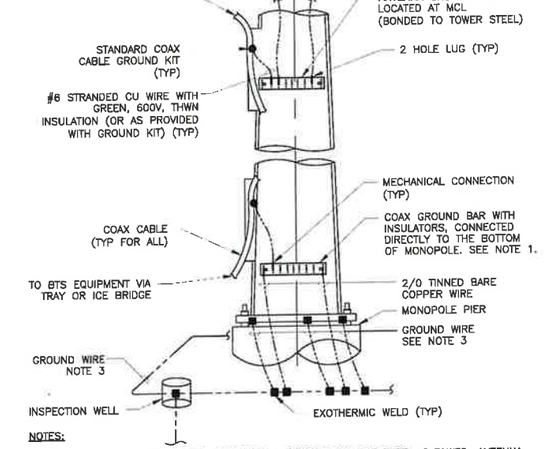
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

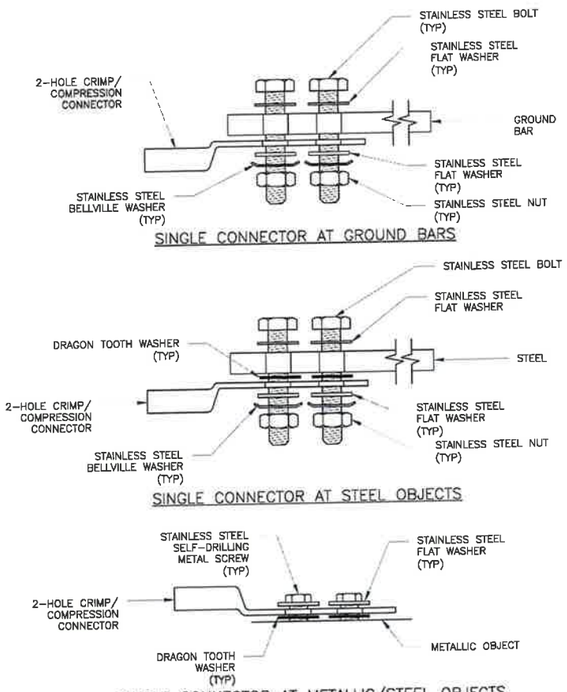
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



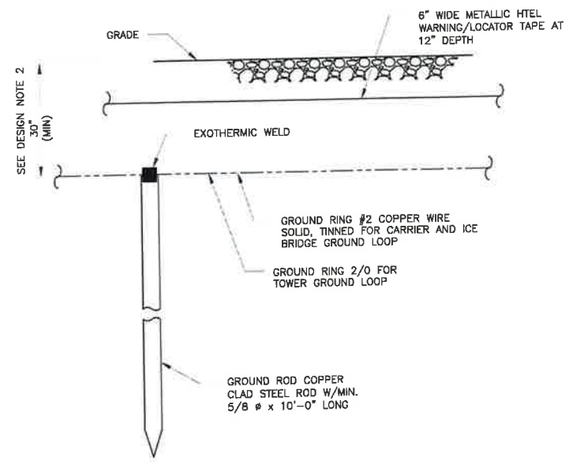
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.bigrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

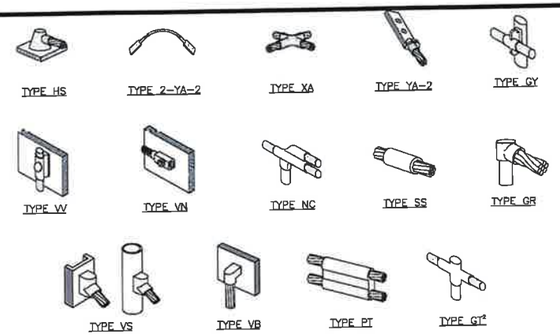
EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/20/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

SHEET NUMBER: G-2
REVISION: 4

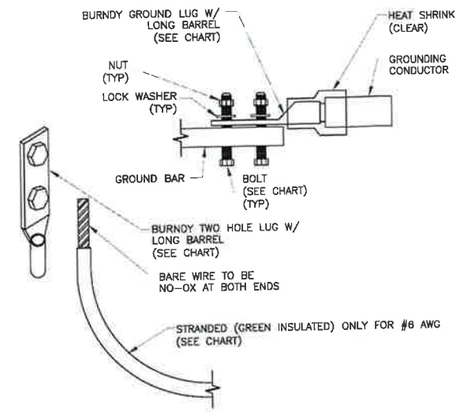


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

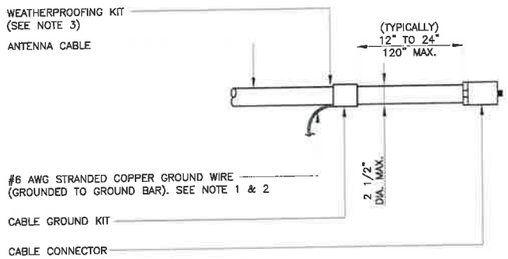
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

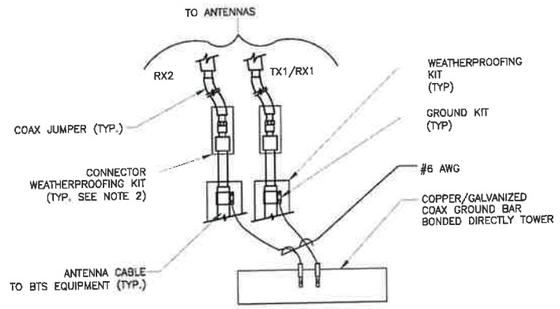
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

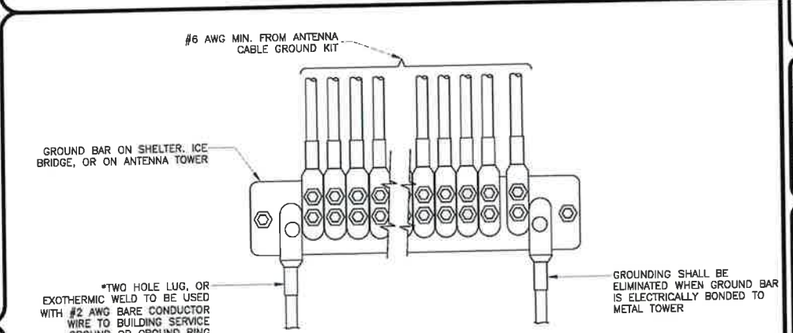
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



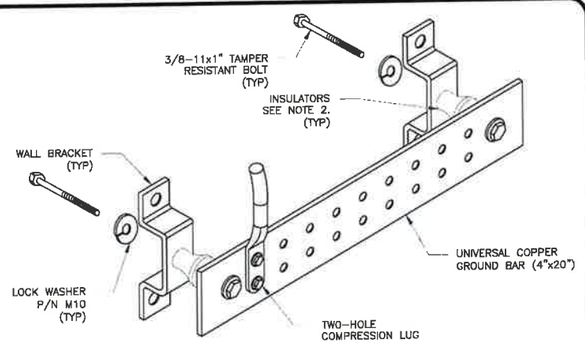
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



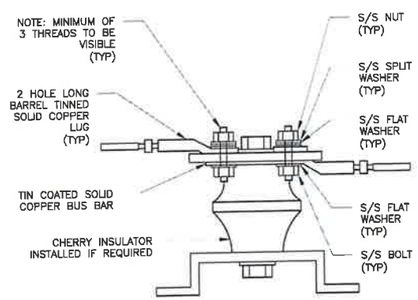
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



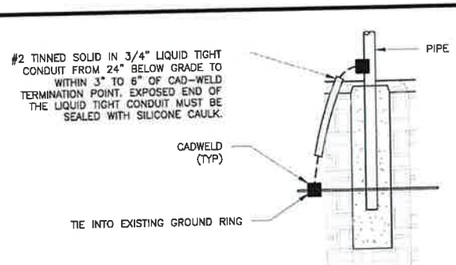
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CT11235A

BU #: **806478**
HRT 080 953381

539 PLAINS RD
HADDAM, CT 06438

EXISTING
180'-0" SELF-SUPPORT TOWER
W/10'-0" EXTENSION

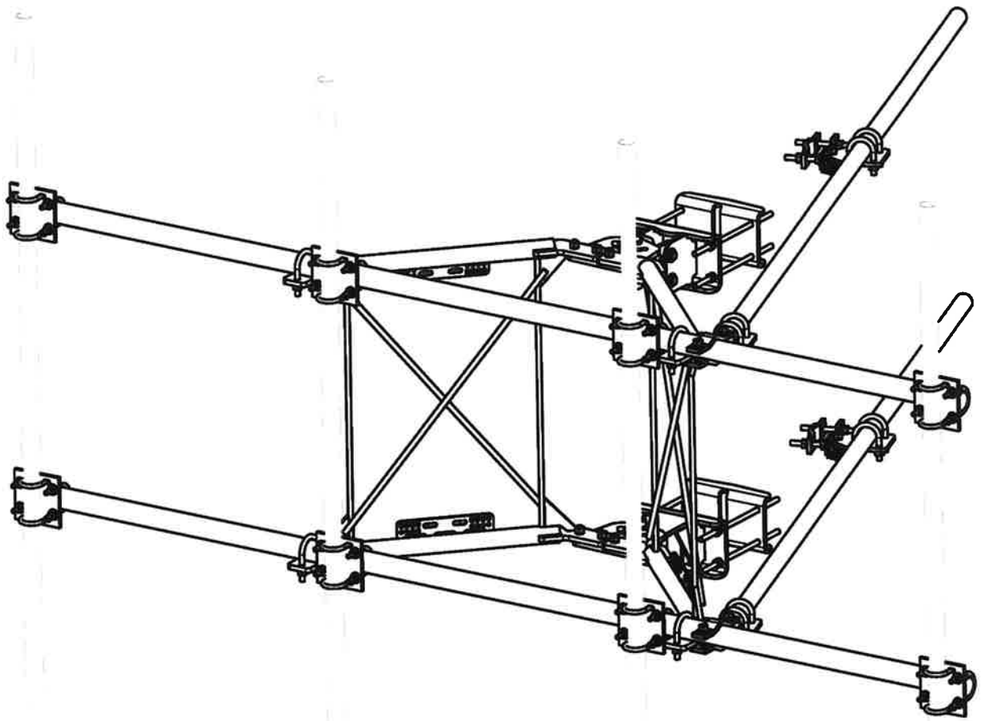
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/22	LR	CONSTRUCTION	LR
1	12/28/22	TDG	CONSTRUCTION	CV
2	1/10/23	TDG	CONSTRUCTION	CV
3	1/16/23	TDG	CONSTRUCTION	CV
4	1/19/23	TDG	CONSTRUCTION	CV

MTS ENGINEERING P.L.L.C.
BER:2386985
Expires 3/31/23

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT

SHEET NUMBER: G-3
REVISION: 4



PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	X-VFAW	SUPPORT ARM		71.41	142.81
2	1	X-HDCAMTBW	CLAMP WELDMENT FOR BCAM-HD		33.86	33.86
3	1	X-MHTPHD	MULTI-HOLE TAPER PLATE WELDMENT		36.24	36.24
4	2	X-VFAPL4	VFA-HD PIVOT PLATE	12 in	15.88	31.77
5	2	X-LCBP4	BENT BACKING PLATE	13 in	19.00	38.01
6	1	X-HDCAMSS	ANGLE ADJUSTMENT WELDMENT FOR BCAM-HD		16.39	16.39
7	4	X-SPTB	SLIDING PIPE TIE BACK PLATE	5 1/2 in	5.87	23.49
8	1	X-HDCAMSP	POSITIONING PLATE WELDMENT FOR BCAM-HD		2.58	2.58
9	4	X-TBCA	TIE BACK CLIP ANGLE		2.01	8.02
10	8	SCX2	CROSSOVER PLATE	7 in	4.80	38.37
11	4	MCP	CLAMP HALF 1/2" THICK, 11-5/8" LONG	12 1/16 in	3.59	14.37
12	8	DCP	1/2" THICK, 5-3/4" CNTER TO CENTER CLAMP HALF	8 1/8 in	2.36	18.90
13	2	P2126	2-3/8" X 126" (2" SCH. 40) GALVANIZED PIPE	126 in	40.75	81.50
14	2	P30150	2-7/8" X 150" (2-1/2" SCH. 40) GALVANIZED PIPE	150 in	76.94	153.87
15	4	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	1.92
16	4	G34FW	3/4" HDG USS FLATWASHER		0.06	0.24
17	4	G34LW	3/4" HDG LOCKWASHER		0.04	0.17
18	4	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	0.85
19	8	G58R-18	5/8" x 18" THREADED ROD (HDG.)	18 in	0.40	3.19
20	4	G58R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	4.18
21	4	G58R-8	5/8" x 8" THREADED ROD (HDG.)		0.70	2.79
22	4	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	4.60
23	8	X-UB5258	5/8" X 2-5/8" X 4-1/2" X 2" U-BOLT (HDG.)		1.00	8.00
24	2	G5807	5/8" x 7" HDG HEX BOLT GR5 FULL THREAD	7 in	0.70	1.41
25	1	G5806	5/8" x 6" HDG HEX BOLT GR5 FULL THREAD	6 in	0.62	0.62
26	8	G5804	5/8" x 4" HDG HEX BOLT GR5		0.44	3.55
27	4	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.08
28	8	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	2.50
29	25	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	1.76
30	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
31	71	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	9.22
32	32	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	23.64
33	16	X-UB1212	1/2" X 2" X 3" X 1-1/4" U-BOLT (HDG.)		0.60	9.56
34	64	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	2.18
35	64	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.89
36	64	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.58
					TOTAL WT. #	738.06

REVISION HISTORY

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

CPD NO.

DRAWN BY
CEK 1/25/2017

ENG. APPROVAL

CLASS 81 | SUB 02

DRAWING USAGE
CUSTOMER

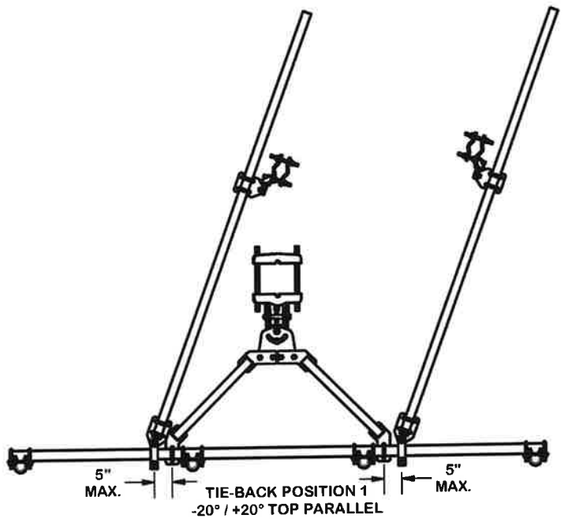
CHECKED BY
BMC 12/13/2017

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

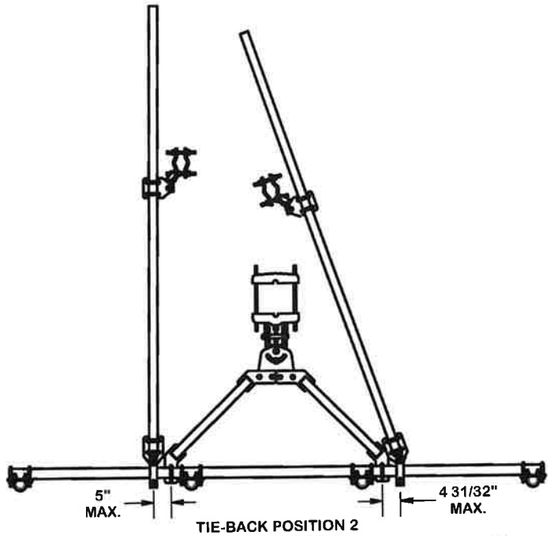
PART NO.
VFA12-HD

DWG. NO.
VFA12-HD

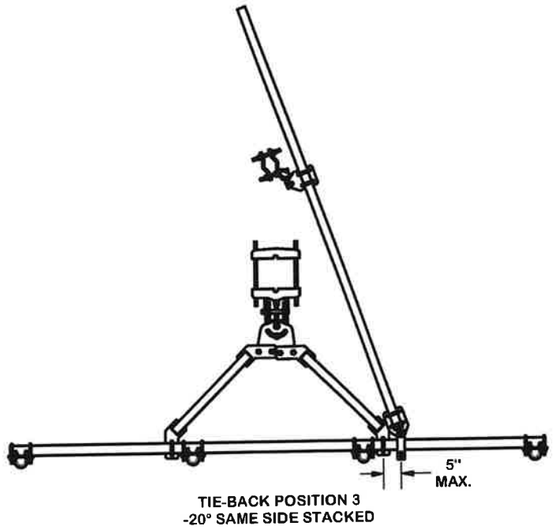
TIE-BACK POSITIONS



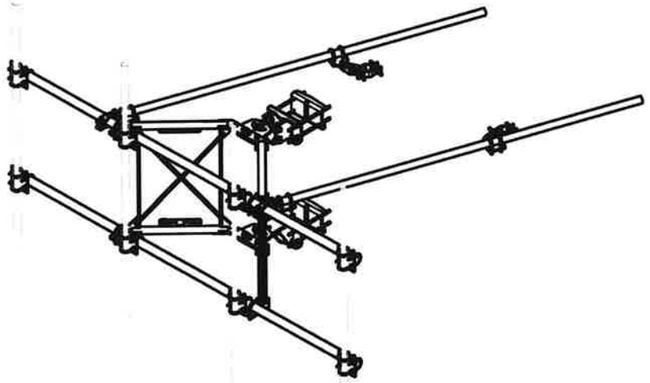
TIE-BACK POSITION 1
-20° / +20° TOP PARALLEL

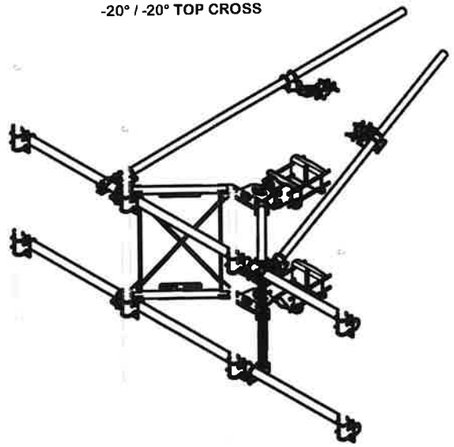


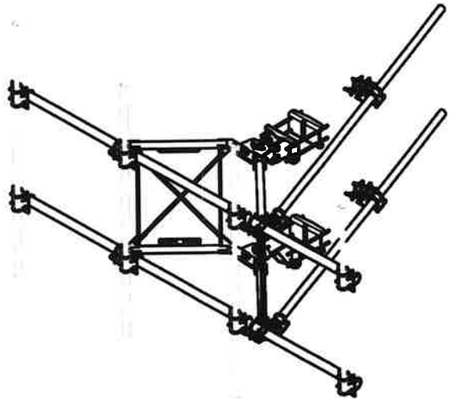
TIE-BACK POSITION 2
-20° / -20° TOP CROSS



TIE-BACK POSITION 3
-20° SAME SIDE STACKED







REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
	REVISION HISTORY			
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

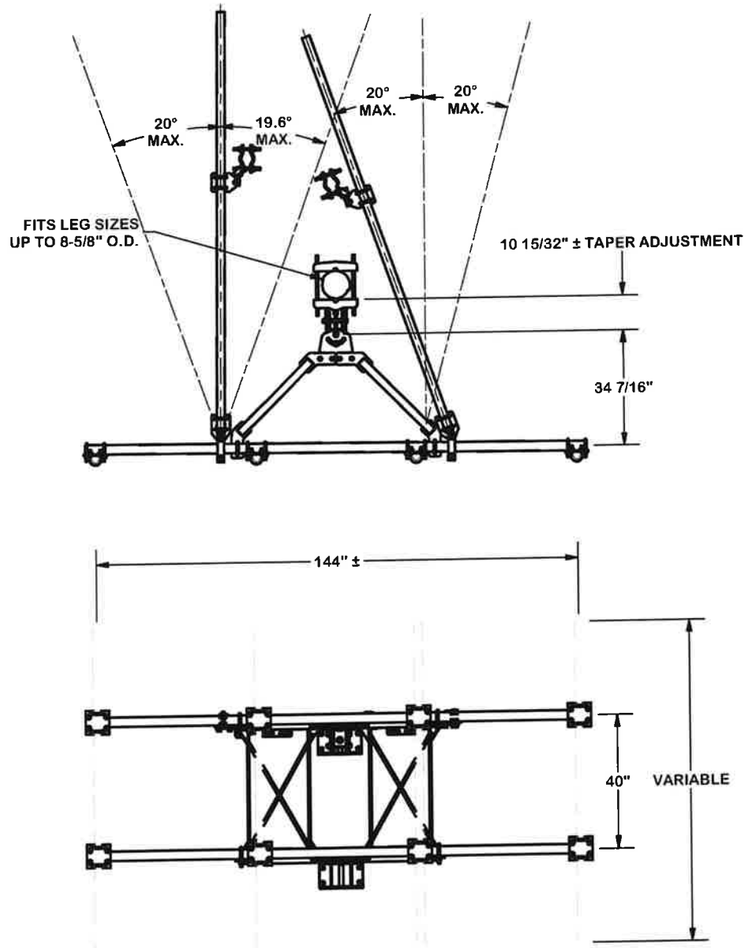
TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

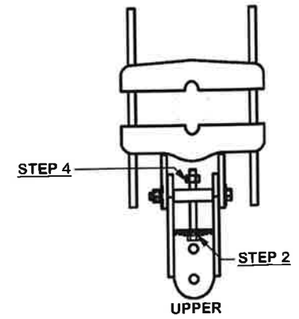
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81 / 02	CUSTOMER	BMC 12/13/2017	VFA12-HD

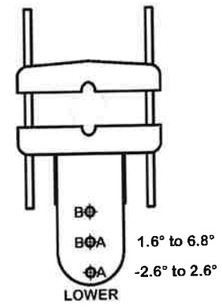
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

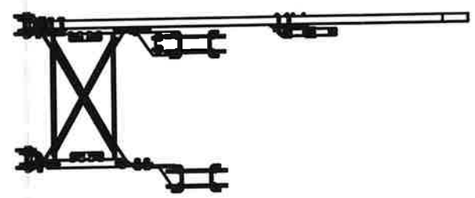


ANGLE CALIBRATING PROCEDURE:

1. MEASURE TOWER TAPER AND PICK LOWER BRACKET HOLE:
   - HOLE A = -2.6° TO 2.6°
   - HOLE B = 1.6° TO 6.8°
2. USE CALIBRATING BOLT TO ADJUST FRAME TO DESIRED TAPER
3. TORQUE LOCKING BOLTS TO 100 ft.-lbs.
4. ADVANCE LOCKING NUT TO POSITIONING PLATE, THEN TIGHTEN.







REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

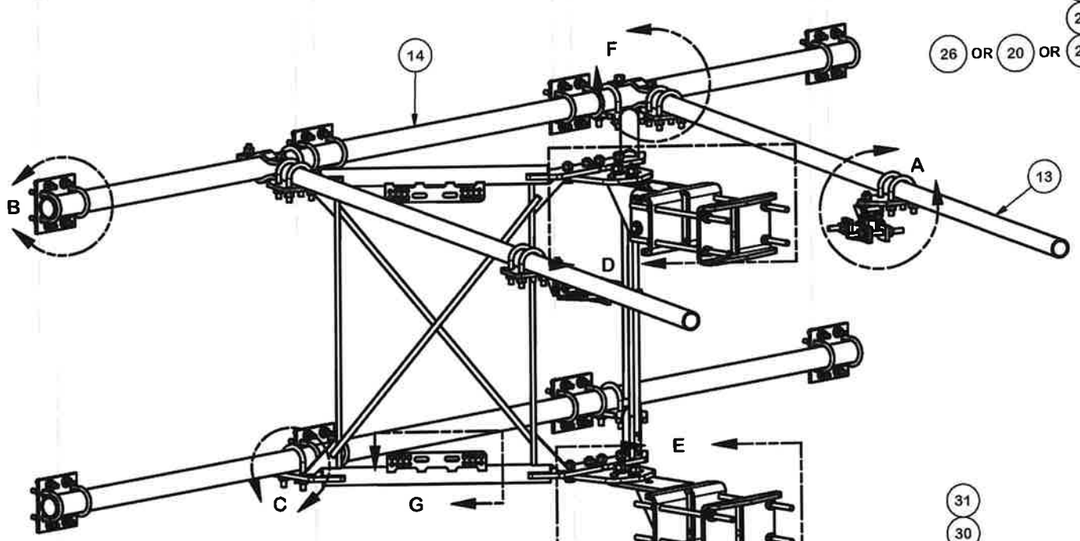
TOLERANCE NOTES

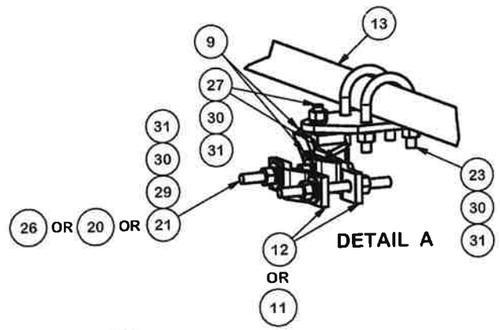
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

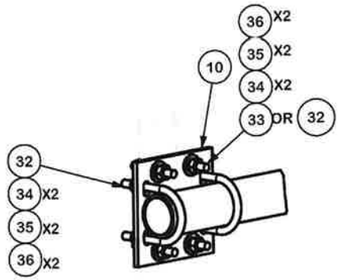
DESCRIPTION: 12' 6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS

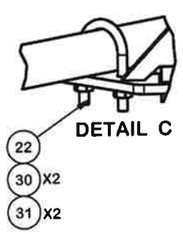
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81 / 02	CUSTOMER	BMC 12/13/2017	VFA12-HD

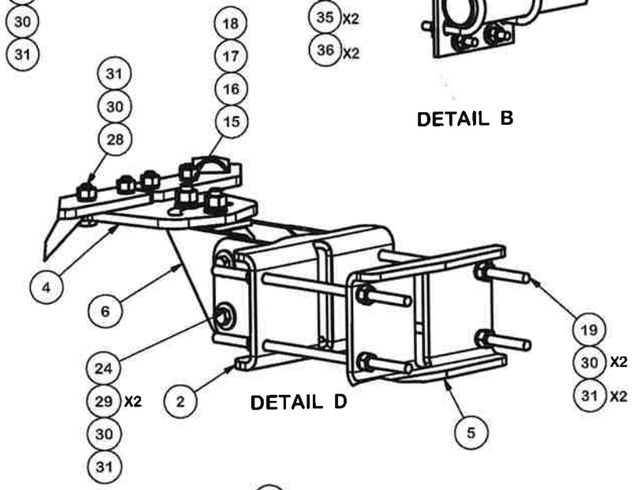
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

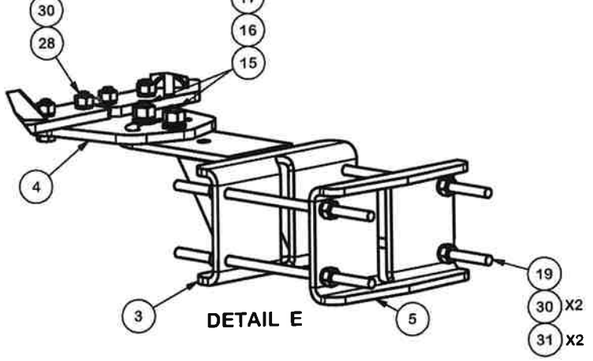


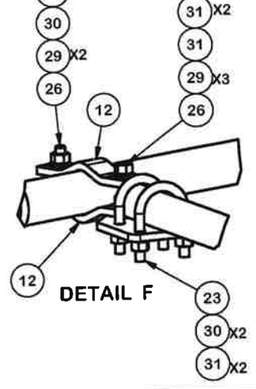


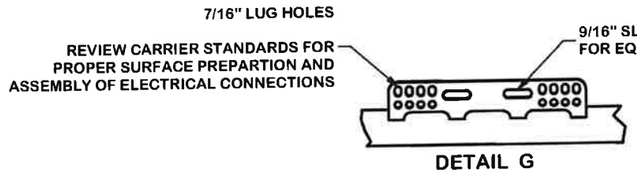












REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

REVISION HISTORY

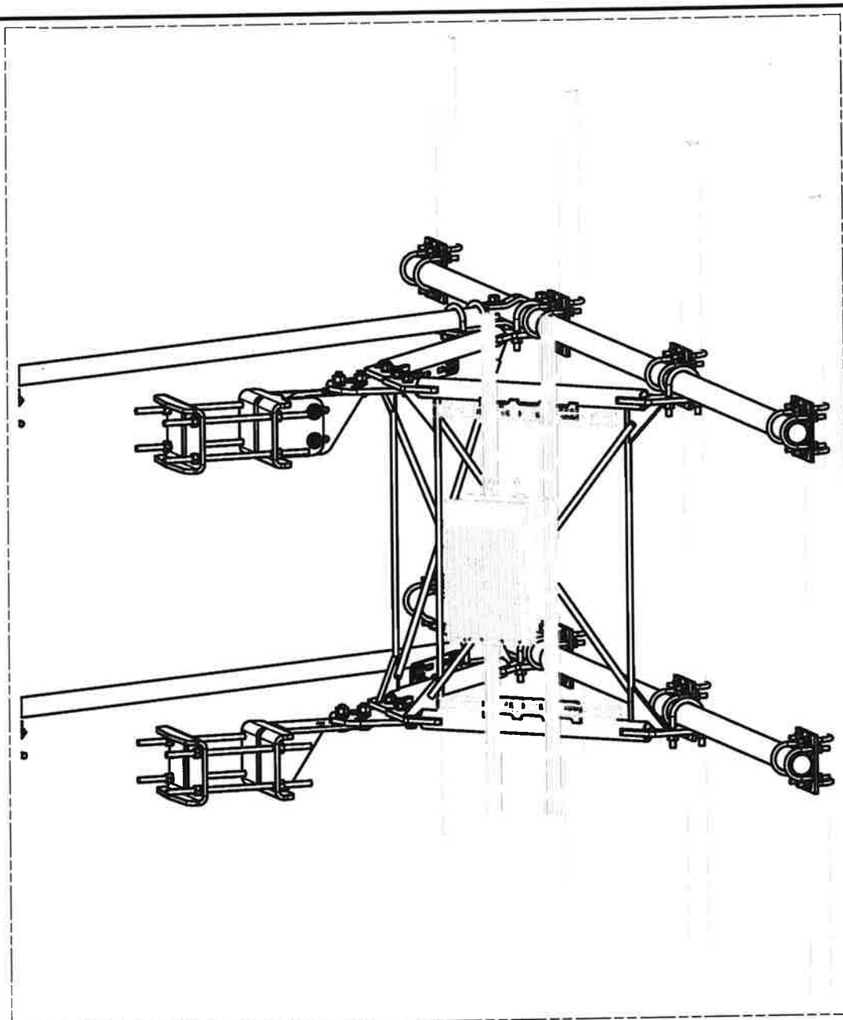
TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

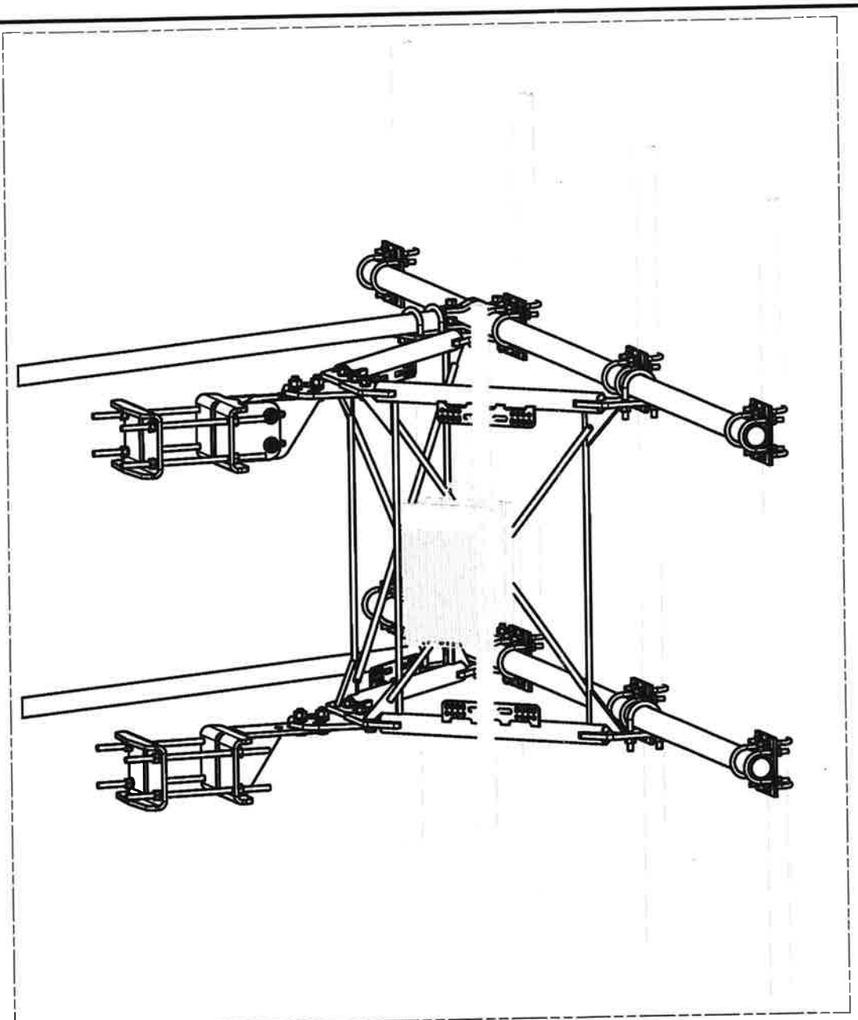
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CEK 1/25/2017		VFA12-HD
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81 / 02	CUSTOMER	BMC 12/13/2017	VFA12-HD

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX



UNISTRUT AND HARDWARE
SOLD SEPARATELY.

REQUIRES 3/8" HARDWARE



EQUIPMENT PIPE AND HARDWARE
SOLD SEPARATELY.

REQUIRES 1/2" HARDWARE
AND 2-3/8" TO 4-1/2" O.D. PIPE

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
	REVISION HISTORY			
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
12' 6" HEAVY DUTY
V-FRAME ASSEMBLY
WITH TWO STIFF ARMS

SITE PRO 1
A valmont COMPANY

Engineering Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	CEK 1/25/2017		VFA12-HD	5 OF 5
CLASS 81 / SUB 02	DRAWING USAGE: CUSTOMER	CHECKED BY: BMC 12/13/2017	DWG. NO.: VFA12-HD	

PRODUCT DATASHEET

APXVAALL24_43-U-NA20

8-Ports, X-Pol, Panel Antenna, 2.4m, 2x 617-894/2x 1695-2690 MHz 65deg, Integrated RET

FEATURES / BENEFITS

- MIMO 4x4 in low-band and mid-band
- Integrated and fieldreplaceable RET
- ACU model number: x2 ACU-A20-SR, ACU HW 05
- Compliant with AISG V2.0 and 3GPP
- AISG jumper cable included
- Mechanical down tilt kit included

Technical features

ELECTRICAL SPECIFICATIONS

Electrical Specification Header		Low Band Arrays (617-894 MHz) Ports 1-4		
Frequency Band	MHz	617-698	698-806	806-894
Gain	dBi	15.8	16.0	16.1
Azimuth Beamwidth 3dB	Deg	65 +/-2	64 +/-2	62 +/-5
Elevation Beamwidth 3dB	Deg	9.9 +/-1	8.6 +/-.8	7.5 +/-.5
Cross-Pol at Boresight	dB	17	19	17
F/B at 180 Copolar	dB	30	30	32
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	16	16	14
VSWR	-	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14
Cross Polar Isolation	dB	25	25	25
3rd Order PIM 2 x 46dBm	dBc	-153	-153	-153
Maximum CW Power per Port	Watt	400	400	400
Gain Over All Tilts	dBi	15.2 +/- .6	15.5 +/- .5	15.7 +/- .4
Cross-Pol over Sector	dB	4	4	6
F/B at +/-30 Total Power	dB	17	19	23
Upper Side Lobe Peak to +20	dB	16	16	14

APXVAALL24_43-U-NA20

8-Ports, X-Pol, Panel Antenna, 2.4m, 2x 617-894/2x 1695-2690 MHz 65deg, Integrated RET

ELECTRICAL SPECIFICATIONS

Electrical Specification Header		Mid Band Arrays (1695-2690 MHz) Ports 5-8			
Frequency Band	MHz	1695-1780	1850-1990	1995-2200	2200-2690
Gain	dBi	18.2	18.7	19.1	18.7
Azimuth Beamwidth 3dB	Deg	67 +/-5	65 +/-4	66 +/-8	61 +/-6
Elevation Beamwidth 3dB	Deg	6.0 +/- .2	5.0 +/-.5	4.5 +/-.3	4.0 +/-.3
Cross-Pol at Boresight	dB	22	18	14	18
F/B at 180 Copolar	dB	31	30	29	27
Electrical Downtilt	Deg	2 to 12	2 to 12	2 to 12	2 to 12
First Upper Side Lobe	dB	15	15	15	14
VSWR	-	1.5:1	1.5:1	1.5:1	1.5:1
Return Loss	dB	-14	-14	-14	-14
Cross Polar Isolation	dB	25	25	25	25
3rd Order PIM 2 x 46dBm	dBc	-153	-153	-153	-153
Maximum CW Power per Port	Watt	300	300	300	300
Gain Over All Tilts	dBi	17.5 +/- .6	17.9 +/- .6	18.5 +/- .5	17.8 +/- .6
Cross-Pol over Sector	dB	8	8	8	2
F/B at +/-30 Total Power	dB	25	23	22	19
Upper Side Lobe Peak to +20	dB	14	14	14	13

ELECTRICAL SPECIFICATIONS

Impedance	Ohm	50
Polarization	Deg	+/- 45

MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2435 x 610 x 225 (95.9 x 24 x 8.9)
Weight (Antenna Only)	kg (lb)	54 (119)
Weight (Mounting Hardware only)	kg (lb)	7.5 (16.5)
Packing size- HxWxD	mm (in)	2645 x 735 x 285 (104.1 x 28.9 x 11.2)
Shipping Weight	kg (lb)	70 (154)
Connector type		8 x 4.3-10 female at bottom
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	240 (150)
Wind Load @Rated Wind Front	N	1428
Wind Load @Rated Wind Side	N	434
Wind Load @Rated Wind Rear	N	1476

ORDERING INFORMATION

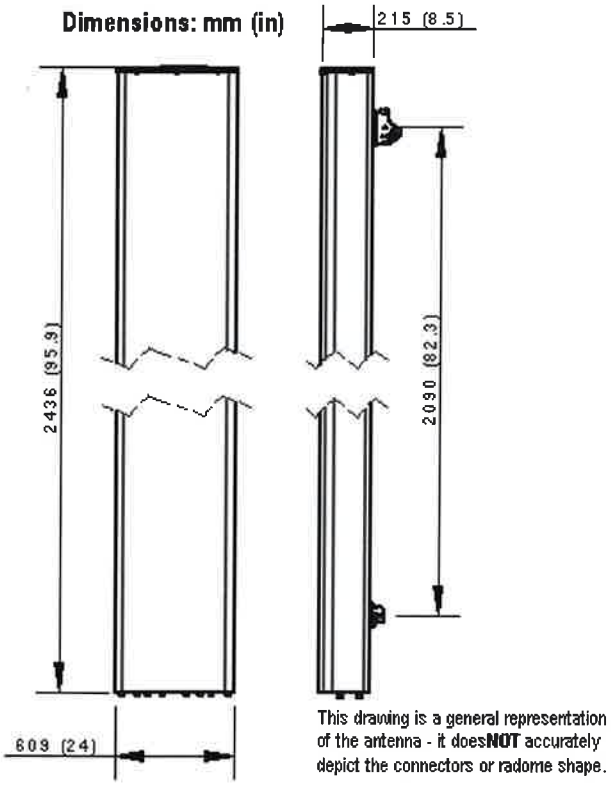
Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAALL24_43-U-NA20	ACU-A20-SR Field Replace RET included (2)	APM40-5E Beam tilt kit & APM40-E10T (included)	60-120mm	70 Kg (154 lb)

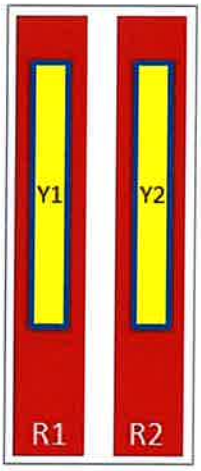
APXVAALL24_43-U-NA20

8-Ports, X-Pol, Panel Antenna, 2.4m, 2x 617-894/2x 1695-2690 MHz 65deg, Integrated RET

Port	Array	Frequency	RET	AISG RET UID
1	R1	617-894	R1	RFxxxxxxxxxx-2R1
2		617-894		
3	R2	617-894		
4		617-894		
5	Y1	1695-2690	Y1	RFxxxxxxxxxx-2Y1
6		1695-2690		
7	Y2	1695-2690		
8		1695-2690		

RET Information		
Frequency	617-894	1695-2690
Model	ACU-A20-SR	ACU-A20-SR
Location	Semi-internal	Semi-Internal
Field Replaceable	Yes	Yes
Quantity	1	1
RET ID	R1	Y1





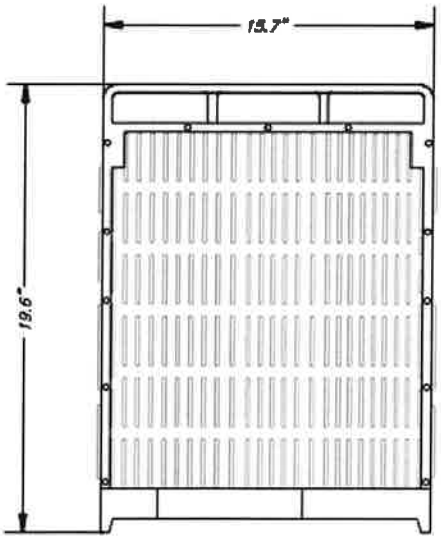
External Document Links

APM40_Series_Installation_Instructions

Notes

- All electrical parameters are compliant with BASTA NGMN 11.1 requirements.
- For additional mounting information please click "External Document Links".

- **Radiating patterns:** Request pattern files

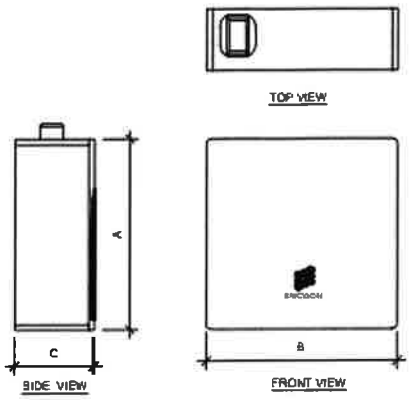


MODEL #:	ERICSSON RADIO 4460
DIMENSIONS:	19.6"H X 15.7"W X 12.1"D
WEIGHT:	109 LBS

RADIO 4460 DETAIL

N.T.S.

Appurtenance Name		Existing / Proposed	Weight (lb)	Height (in)	Width (in)	Depth (in)	Type
ERICSSON	Radio 4460 B25+B6	Proposed	75	17.9	13.2	10.4	Flat



2 RRU SPECIFICATIONS
FOR ILLUSTRATIVE PURPOSES ONLY - NOT TO SCALE

RRU SPECIFICATIONS				
RRU MODEL	A	B	C	WEIGHT (LBS)
RADIO 4480 B71+B85	21.8"	15.4"	7.5"	93

Radio 4480 B2/25&B4/66

Regional **Connect**

- Dual band, Supports WCDMA, LTE and NR
- Up to 4TX/4RX per band
- Up to 4x60W per band
- Up to 4x80W total without fan
- Up to 4x100W total with fan
- G, W, L, NR, NB-IoT with GSM in mixed mode
- 2x 2.5/4.9/9.8/10.1 Gbps CPRI
- 26.5 liter 32 kg
- -48 VDC 3-wire or 2-wire
- AISG TMA & RET support via RS-485 or RF connectors
- 2 external alarm
- Optional fan for increased site flexibility and increased output power
- Convectional cooling
- IP 65, -40 to +55°C

ATTACHMENT 3

Date: **December 08, 2022**

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate** **Site Number:**	 CT11235A
Crown Castle Designation:	**BU Number:** **Site Name:** **JDE Job Number:** **Work Order Number:** **Order Number:**	806478 HRT 080 953381 709215 2187621 608636 Rev. 4
Engineering Firm Designation:	**B+T Group Project Number:**	100140.021.01.0001
Site Data:	**539 Plains Rd, Haddam, Middlesex County, CT** **Latitude *41° 26' 35"*, Longitude *-72° 30' 22.4"*** **180 Foot - Self-Support Tower w/ 10' Proposed Extension**	

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

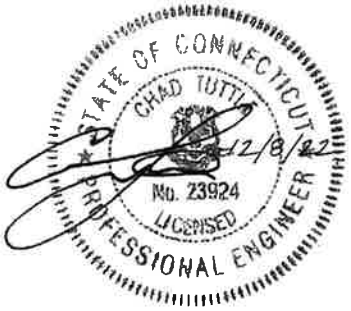
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Proposed Equipment Configuration with Proposed Modifications **Sufficient Capacity – 89.5%**

This analysis utilizes an ultimate 3-second gust wind speed of 122 mph as required by the 2022 Connecticut State Building Code, 2021 IBC and 2020 NEC. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Mahsa Abdeveis

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 02/01/2023



Chad E. Tuttle, P.E.

tnxTower Report - version 8.1.1.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft. self-support tower designed by ROHN. A proposed 10-ft tower extension has been considered in this analysis, bringing the total tower height to 190 ft. The tower has been modified multiple times to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	122 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
186.0	186.0	3	Ericsson	RADIO 4460 B2/B25 B66_TMO	1	1-5/8
		3	Ericsson	Radio 4480_TMOV2		
		3	RFS Celwave	APXVAALL24_43-U-NA20_TMO		
		3	Site Pro 1	VFA12-HD Sector Mount		

Table 2 - Carrier Equipment to Be Removed

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
182.0	186.0	1	--	19" Accelerator	6	1-5/8
		3	Ems Wireless	RR90-17-02DP		
	179.0	3	Ericsson	KRY 112 489/1		
	174.0	1	--	15' x 4" Mount Pipe		

Table 3 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
178.0	179.0	6	Antel	LPA-80080/6CF	8	1-5/8
		3	Commscope	CBC78T-DS-43-2X		
		6	Commscope	JAHH-65B-R3B		
		3	Samsung Telecom.	RFV01U-D1A		
		3	Samsung Telecom.	RFV01U-D2A		
		3	VZW	Sub6 Antenna - VZS01		
	178.0	1	RFS Celwave	DB-B1-6C-8AB-0Z		
		1	RFS Celwave	DB-T1-6Z-8AB-0Z		
		3	--	96" Long x P2 1/2" Mount Pipe		
		1	--	Sector Mount [SM 511-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
	173.8	3	--	VZWSMART-SFK3		
165.0	167.0	3	CCI Antennas	DMP65R-BU8D	12 4 2 2	1-1/4 3/4 7/16 3/8
		3	CCI Antennas	OPA65R-BU6D		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 32 B30		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14		
		3	Powerwave Tech.	7770.00		
		6	Powerwave Tech.	LGP21401		
		3	Quintel Tech.	QS66512-2		
		3	Raycap	DC6-48-60-18-8F		
	165.0	1	--	Sector Mount [SM 505-3]		
150.0	150.0	3	Alcatel Lucent	PCS 1900MHZ 4X45W-65MHZ	4	1-1/4
		6	Alcatel Lucent	RRH2X50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		3	Commscope	NNVV-65B-R4		
		3	RFS Celwave	APXVTM14-ALU-I20		
		1	--	Sector Mount [SM 502-3]		
138.0	140.0	3	Fujitsu	TA08025-B604	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	JMA Wireless	MX08FRO665-21		
		1	Raycap	RDIDC-9181-PF-48		
	138.0	1	Commscope	MTC3975083 (3)		
50.0	50.0	1	GPS	GPS_A	1	1/2
		1	--	Side Arm Mount [SO 305-1]		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	1067089	CCI Sites
Modification Details	1004663	CCI Sites
Tower Modification Drawing	1274944	CCI Sites
Post Modification Inspection	2393878	CCI Sites
Tower Modification Drawing	5864073	CCI Sites
Post Modification Inspection	6011748	CCI Sites
Tower Modification Drawing	10476211	CCI Sites
Foundation Drawing	300985	CCI Sites
Foundation Mapping	300985	CCI Sites
Geotech Report	1240448	CCI Sites
Crown CAD Package	Date: 09/05/2022	CCI Sites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the reinforced leg sections. These calculations are presented in Appendix C.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the - TIA-222 standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) The modification designed by B+T Group (Project No. 100140.020.01, dated 07/18/2022) document No. 10476211 considered as installed in this analysis.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	190 - 180	Leg	P2STD	1	-4.194	50.591	9.3	Pass
T2	180 - 160	Leg	ROHN 2 STD	21	-34.581	38.684	89.4	Pass
T3	160 - 155	Leg	ROHN 2.5 EH	57	-43.758	78.151	56.0	Pass
T4	155 - 150	Leg	ROHN 2.5 EH	65	-52.064	78.148	66.6	Pass
T5	150 - 145	Leg	ROHN 2.5 EH	74	-61.631	78.149	78.9	Pass
T6	145 - 140	Leg	ROHN 2.5 EH	83	-71.068	98.081	72.5	Pass
T7	140 - 133.333	Leg	ROHN 3 EH	95	-81.817	99.059	82.6	Pass
T8	133.333 - 126.667	Leg	ROHN 3 EH	104	-94.264	129.274	72.9	Pass
T9	126.667 - 120	Leg	ROHN 3 EH	116	-105.260	139.089	75.7	Pass
T10	120 - 113.333	Leg	ROHN 3.5 EH	128	-116.946	161.556	72.4	Pass
T11	113.333 - 106.667	Leg	ROHN 3.5 EH	140	-127.297	161.594	78.8	Pass
T12	106.667 - 100	Leg	BT100140- Rohn 3.5EH w/ 2" SR	152	-138.587	244.582	56.7	Pass
T13	100 - 80	Leg	BT100140- Rohn 4EH w/ 2" SR	161	-168.647	286.747	58.8	Pass
T14	80 - 60	Leg	BT100140- Rohn 5EH w/ 2" SR (60-80)	182	-195.684	319.408	61.3	Pass
T15	60 - 40	Leg	BT100140- Rohn 5EH w/ 2" SR (40-60)	197	-222.524	400.743	55.5	Pass
T16	40 - 30	Leg	BT100140- Rohn 6EHS w/ 2" SR (30-40)	218	-237.931	373.300	63.7	Pass
T17	30 - 20	Leg	BT100140- Rohn 6EHS w/ 2" SR (20-30)	227	-250.410	439.396	57.0	Pass
T18	20 - 0	Leg	BT100140- Rohn 6EH w/ 2" SR	239	-278.858	437.361	63.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	190 - 180	Diagonal	L2x2x1/4	7	-1.173	20.752	5.7	Pass
T2	180 - 160	Diagonal	L2x2x1/4	28	-5.267	21.921	24.0	Pass
T3	160 - 155	Diagonal	L1 3/4x1 3/4x3/16	60	-4.270	8.960	47.7	Pass
T4	155 - 150	Diagonal	L1 3/4x1 3/4x3/16	69	-4.092	8.115	50.4	Pass
T5	150 - 145	Diagonal	L2x2x1/4	78	-5.105	14.435	35.4	Pass
T6	145 - 140	Diagonal	2L1 3/4x1 3/4x3/16x3/16	87	-4.864	10.763	45.2	Pass
T7	140 - 133.333	Diagonal	2L2x2x3/16x1/2	99	-5.976	34.333	17.4	Pass
T8	133.333 - 126.667	Diagonal	2L2x2x3/16x1/2	108	-6.087	31.258	19.5	Pass
T9	126.667 - 120	Diagonal	2L2x2x3/16x1/2	120	-6.475	29.165	22.2	Pass
T10	120 - 113.333	Diagonal	2L2 1/2x2 1/2x3/16x1/2	132	-6.338	43.852	14.5	Pass
T11	113.333 - 106.667	Diagonal	2L2 1/2x2 1/2x3/16x1/2	144	-6.778	41.968	16.1	Pass
T12	106.667 - 100	Diagonal	2L2 1/2x2 1/2x3/16x1/2	156	-5.958	41.098	14.5	Pass
T13	100 - 80	Diagonal	2L3x3x3/16x1/2	165	-6.604	48.925	13.5	Pass
T14	80 - 60	Diagonal	2L3x3x3/16x1/4	186	-7.927	36.097	22.0	Pass
T15	60 - 40	Diagonal	2L3x3x1/4x1/4	201	-9.319	41.581	22.4	Pass
T16	40 - 30	Diagonal	2L3 1/2x3 1/2x1/4x1/4	222	-8.582	60.389	14.2	Pass
T17	30 - 20	Diagonal	2L3 1/2x3 1/2x1/4x1/4	231	-10.514	54.955	19.1	Pass
T18	20 - 0	Diagonal	L4x4x1/4	243	-9.790	20.932	46.8	Pass
T6	145 - 140	Secondary Horizontal	L2x2x1/4	91	-1.233	18.245	6.8	Pass
T8	133.333 - 126.667	Secondary Horizontal	L2x2x1/4	112	-1.635	13.793	11.9	Pass
T9	126.667 - 120	Secondary Horizontal	L2 1/2x2 1/2x1/4	124	-1.826	23.886	7.6	Pass
T10	120 - 113.333	Secondary Horizontal	L2 1/2x2 1/2x1/4	136	-2.028	21.189	9.6	Pass
T11	113.333 - 106.667	Secondary Horizontal	L2 1/2x2 1/2x1/4	148	-2.208	18.713	11.8	Pass
T15	60 - 40	Secondary Horizontal	L3x3x1/4	205	-3.859	13.215	29.2	Pass
T17	30 - 20	Secondary Horizontal	L3 1/2x3 1/2x1/4	235	-4.343	17.337	25.0	Pass
T1	190 - 180	Top Girt	L2x2x1/4	5	-0.378	8.005	4.7	Pass
T2	180 - 160	Top Girt	L2x2x1/8	23	-0.599	4.273	14.0	Pass
							Summary	
						Leg (T2)	89.4	Pass
						Diagonal (T4)	50.4	Pass
						Secondary Horizontal (T15)	29.2	Pass
						Top Girt (T2)	14.0	Pass
						Bolt Checks	70.5	Pass
						Rating =	89.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Redundant Connections	120-126.7	19.0	Pass
1,2	Anchor Rods	Base	89.5	Pass
1,2	Anchor Rod Brackets	Base	69.6	Pass
1,2	Base Foundation (Structure)	Base	27.3	Pass
1,2	Base Foundation (Soil Interaction)	Base	77.5	Pass

Structure Rating (max from all components) =	89.5%

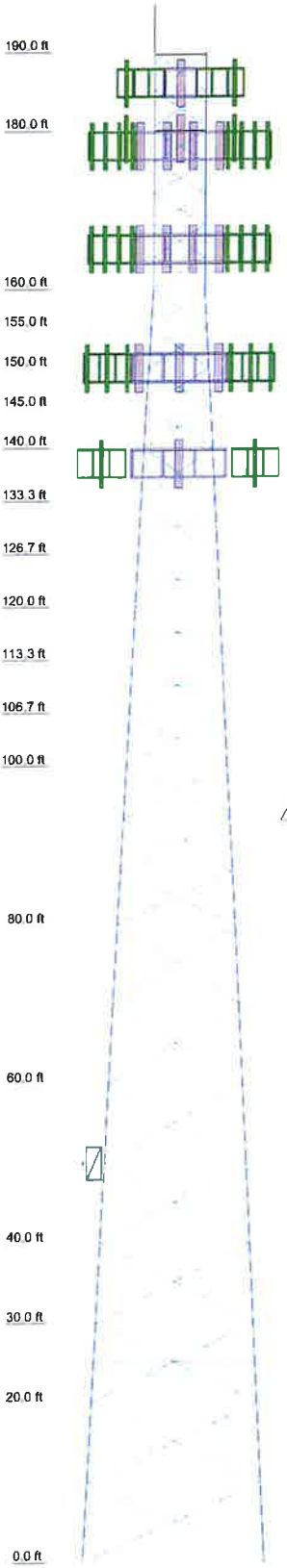
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration once the proposed modifications by B+T Group (Project No. 100140.020.01, dated 07/18/2022) document No. 10476211 are installed.

APPENDIX A

TNXTOWER OUTPUT



Section		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
Legs		P2STD	ROHN 2 STD		ROHN 2.5 EH				ROHN 3 EH			ROHN 3.5 EH									
Leg Grade														A572-50							
Diagonals	L4x4x1/4	L2x2x1/4		L2x2x1/4				N.A.		2L2x2x3/16x1/2			2L2 1/2x2 1/2x3/16x1/2		2L3x3x3/16x1/4	2L3x3x1/4x1/4		2L3 1/2x3 1/2x1/4x1/4			
Diagonal Grade			A572-50			K	J	I	H		A36		A	B	C	D	E	F	G	H	I
Top Girts		L2x2x1/4		L2x2x1/8				N.A.						N.A.							
Sec. Horizontals	N.A.											L2 1/2x2 1/2x1/4				L3x3x1/4	N.A.	L	N.A.	N.A.	N.A.
Face Width (ft)	22.8646	6.52083												12.6771	14.7708	16.7708	18.8542	19.8594	20.8646		
# Panels @ (ft)		2 @ 4.58333		5 @ 4		4 @ 5						9 @ 6.66667					8 @ 10				
Weight (K)	30.4																				

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	BT100140- Rohn 3.5EH w/ 2" SR	G	BT100140- Rohn 6EH w/ 2" SR
B	BT100140- Rohn 4EH w/ 2" SR	H	L1 3/4x1 3/4x3/16
C	BT100140- Rohn 5EH w/ 2" SR (60-80)	I	L2x2x1/4
D	BT100140- Rohn 5EH w/ 2" SR (40-60)	J	2L1 3/4x1 3/4x3/16x3/16
E	BT100140- Rohn 6EHS w/ 2" SR (30-40)	K	A572-50
F	BT100140- Rohn 6EHS w/ 2" SR (20-30)	L	L3 1/2x3 1/2x1/4

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B 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'
8. TIA-222-H Annex S
9. TOWER RATING: 89.4%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 286 K
SHEAR: 29 K

UPLIFT: -232 K
SHEAR: 25 K

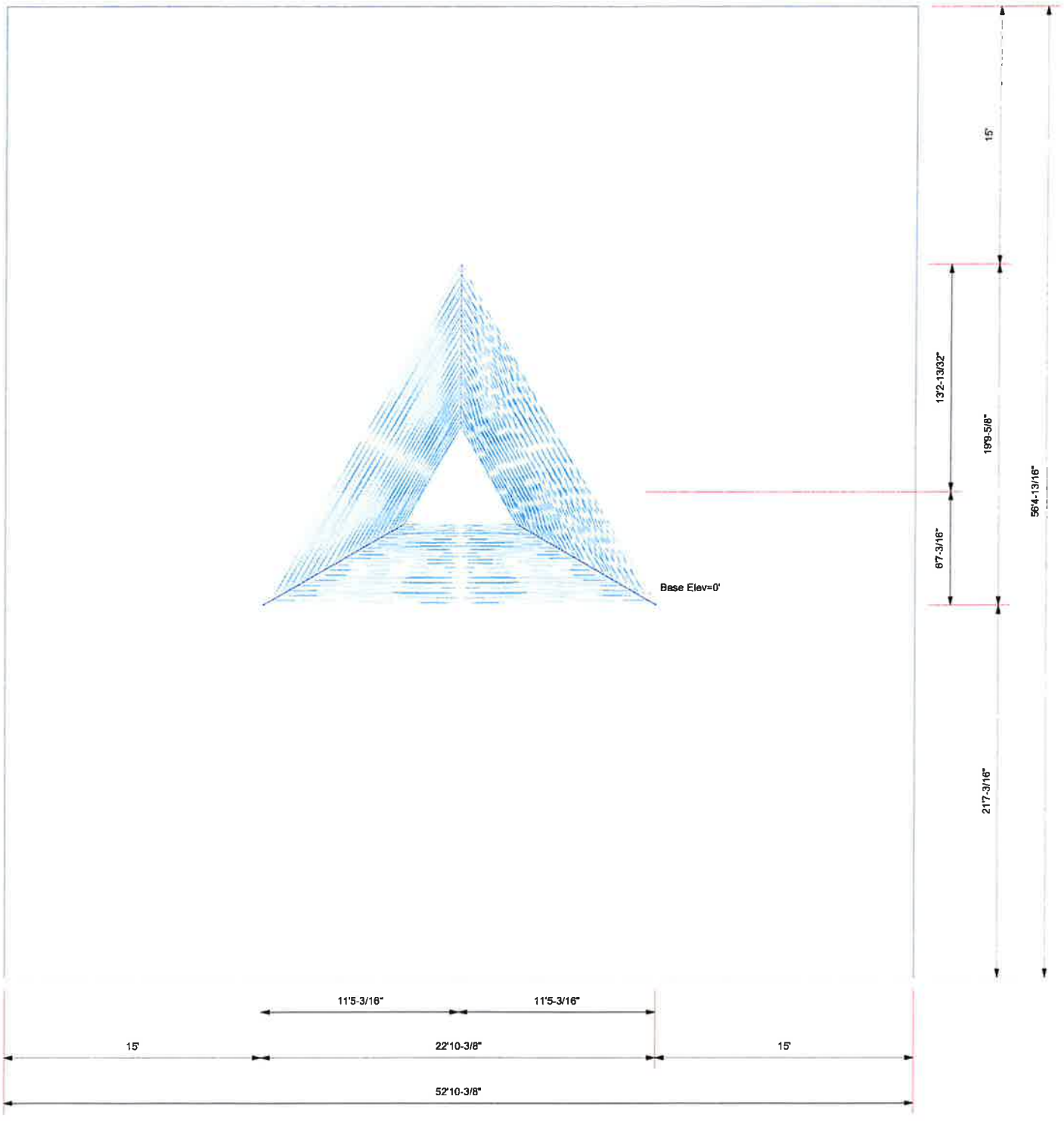
AXIAL 129 K
SHEAR 11 K *MOMENT 1323 kip-ft*
TORQUE 12 kip-ft
50 mph WIND - 1.000 in ICE

AXIAL 72 K
SHEAR 47 K *MOMENT 5180 kip-ft*
TORQUE 53 kip-ft
REACTIONS - 122 mph WIND

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 100140.021.01.0001 - HRT 080 953381, CT (BU# 80647			
Project:			
Client: Crown Castle	Drawn by: Sahana	App'd:	
Code: TIA-222-H	Date: 12/08/22	Scale: NTS	
Path:		Dwg No. E-1	

Plot Plan
Total Area - 0.07 Acres

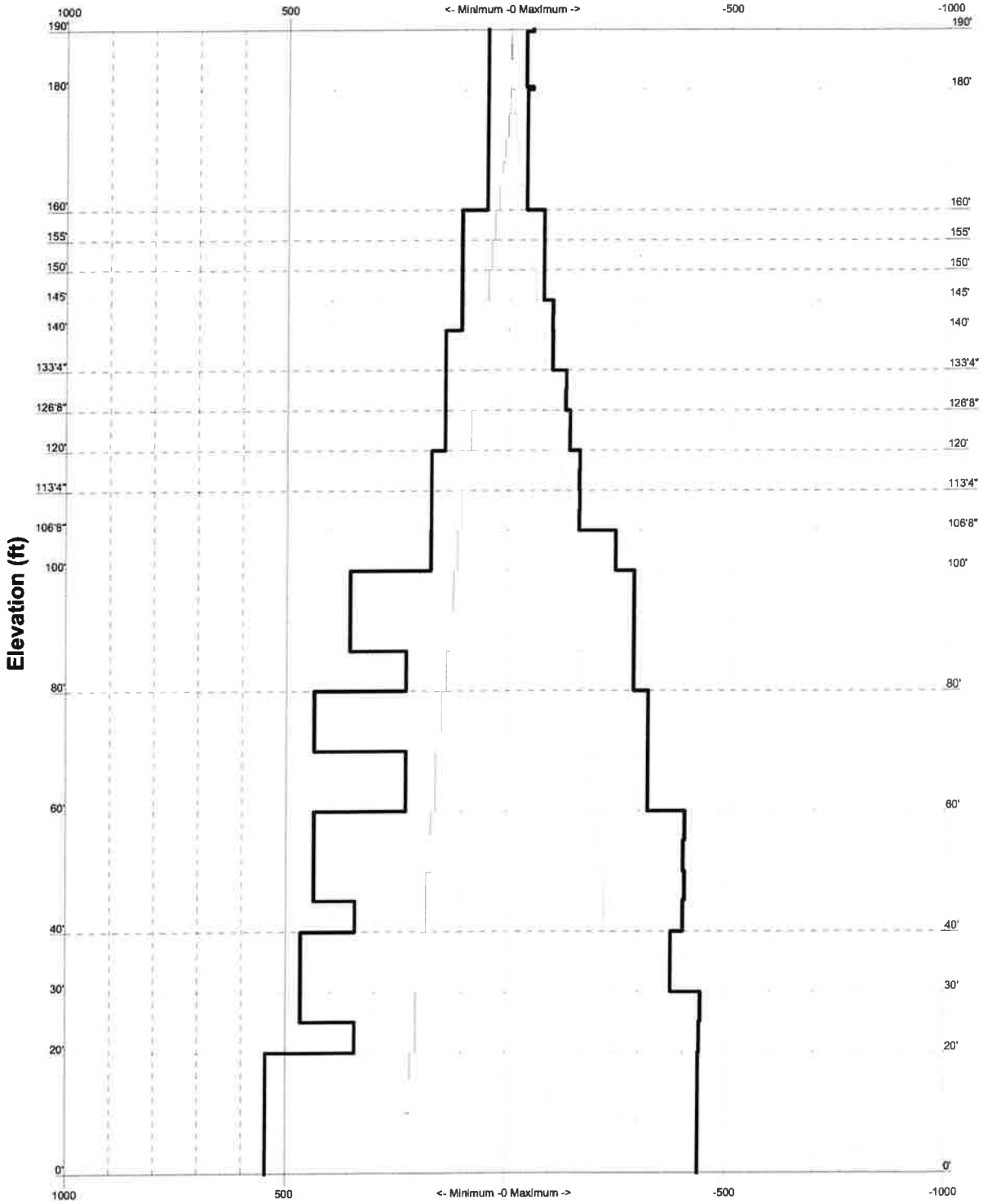


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 100140.021.01.0001 - HRT 080 953381, CT (BU# 80647			
Project:			
Client: Crown Castle	Drawn by: Sahana	App'd:	
Code: TIA-222-H	Date: 12/08/22	Scale: NTS	
Path:		Dwg No E-2	

TIA-222-H - 122 mph/50 mph 1.000 in Ice Exposure B

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



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

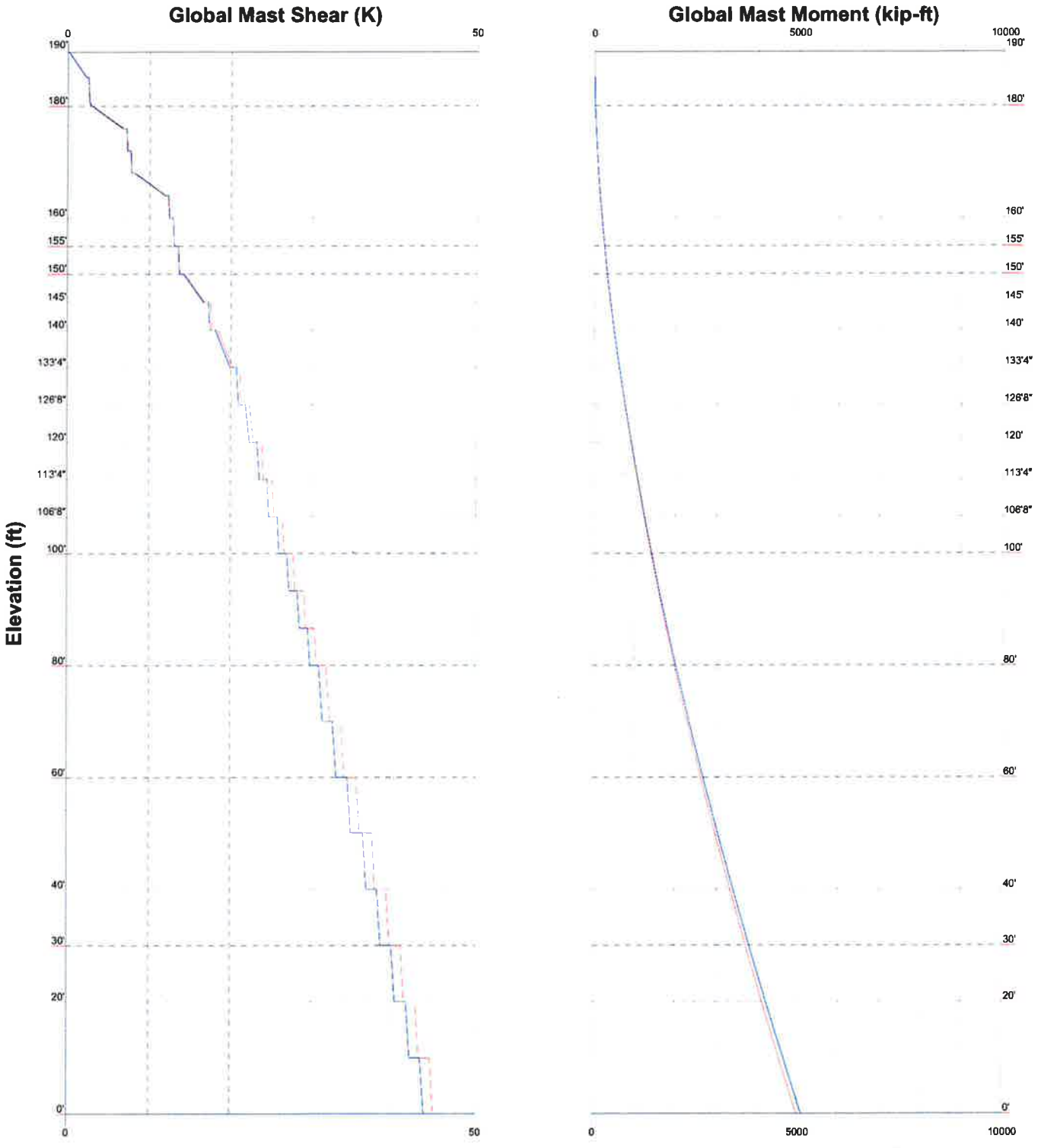
Job: 100140.021.01.0001 - HRT 080 953381, CT (BU# 80647			
Project:			
Client: Crown Castle	Drawn by: Sahana	App'd.	
Code: TIA-222-H	Date: 12/08/22	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-H - 122 mph/50 mph 1.000 in Ice Exposure B

Vx Vz

Maximum Values

Mx Mz

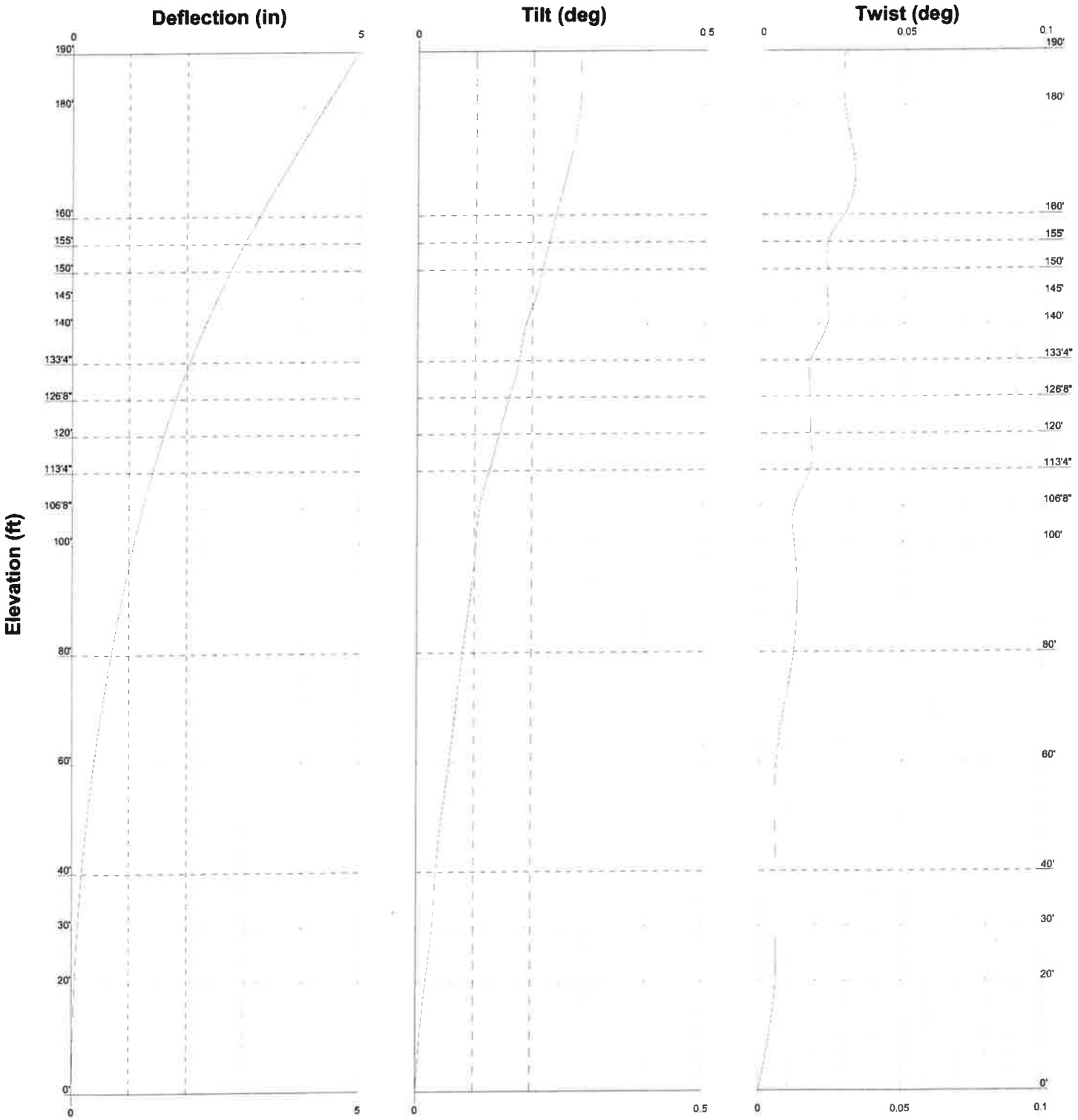


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 100140.021.01.0001 - HRT 080 953381, CT (BU# 80647			
Project:			
Client: Crown Castle	Drawn by: Sahana	App'd:	
Code: TIA-222-H	Date: 12/08/22	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-H - Service - 60 mph

Maximum Values

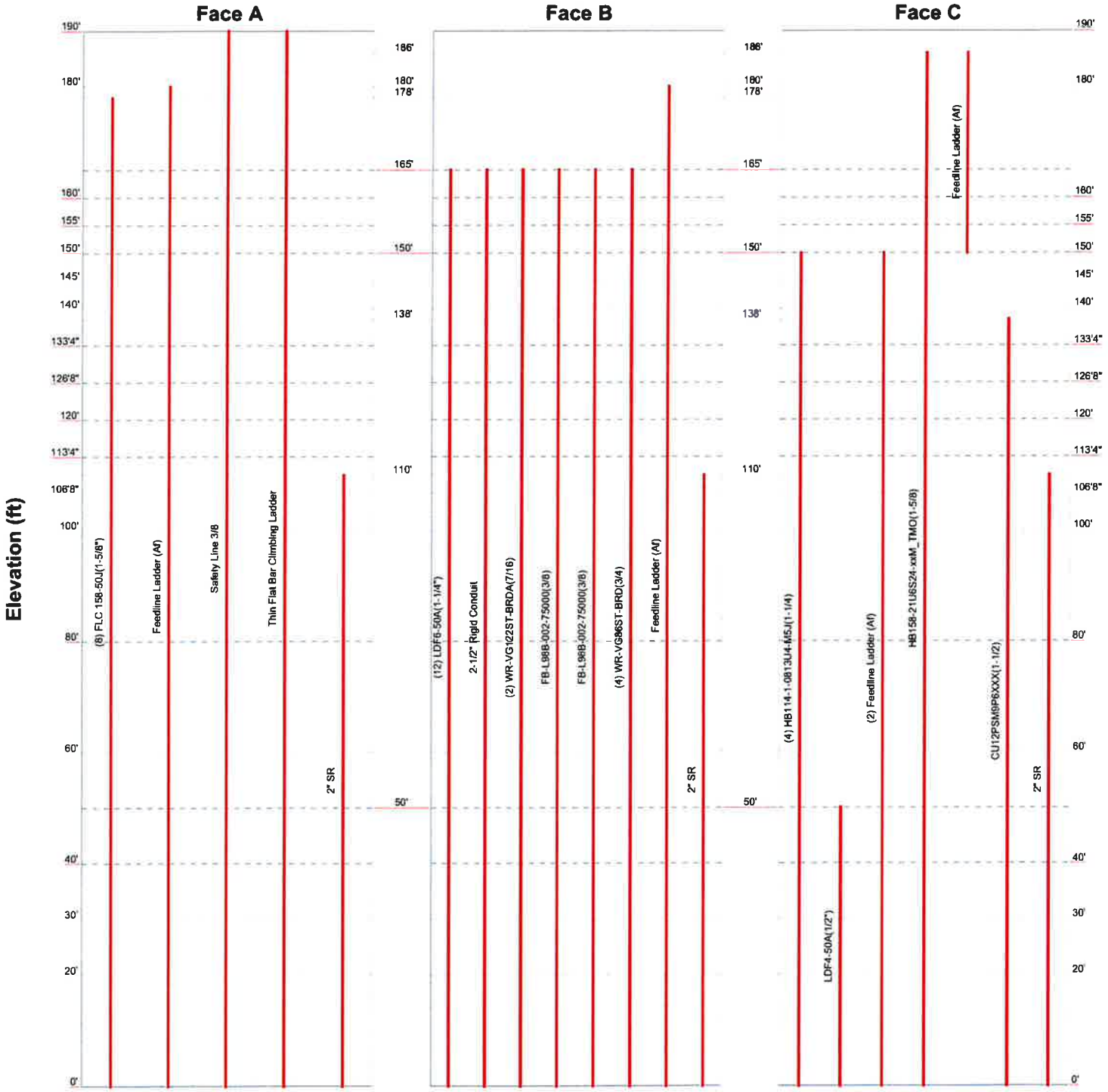


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 100140.021.01.0001 - HRT 080 953381, CT (BU# 80647		
Project:		
Client: Crown Castle	Drawn by: Sahana	App'd:
Code: TIA-222-H	Date: 12/08/22	Scale: NTS
Path:		Dwg No. E-5

Feed Line Distribution Chart
0' - 190'

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



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 100140.021.01.0001 - HRT 080 953381, CT (BU# 80647			
Project:			
Client: Crown Castle	Drawn by: Sahana	App'd:	
Code: TIA-222-H	Date: 12/08/22	Scale: NTS	
Path:		Dwg No. E-7	

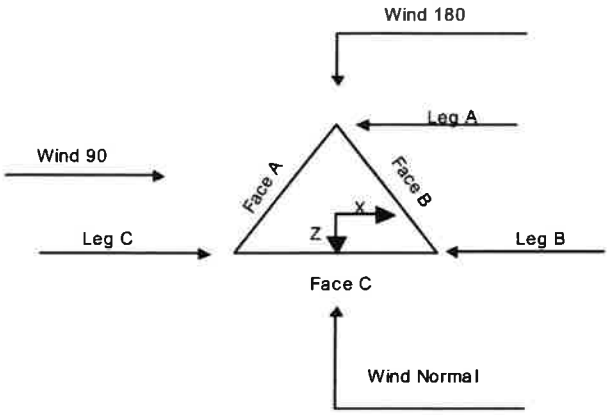
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 190' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 6'6-1/4" at the top and 22'10-3/8" at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Tower base elevation above sea level: 504'.
Basic wind speed of 122 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0'.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{cs}(F_w) = 0.95$, $K_{cs}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
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



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	190'-180'			6'6-1/4"	1	10'
T2	180'-160'			6'6-1/4"	1	20'
T3	160'-155'			6'6-3/4"	1	5'
T4	155'-150'			7'13/16"	1	5'
T5	150'-145'			7'6-31/32"	1	5'
T6	145'-140'			8'1-3/32"	1	5'
T7	140'-133'4"			8'7-1/4"	1	6'8"
T8	133'4"-126'8"			9'3-3/8"	1	6'8"
T9	126'8"-120'			9'11-1/2"	1	6'8"
T10	120'-113'4"			10'7-5/8"	1	6'8"
T11	113'4"-106'8"			11'3-25/32"	1	6'8"
T12	106'8"-100'			11'11-31/32"	1	6'8"
T13	100'-80'			12'8-1/8"	1	20'
T14	80'-60'			14'9-1/4"	1	20'
T15	60'-40'			16'9-1/4"	1	20'
T16	40'-30'			18'10-1/4"	1	10'
T17	30'-20'			19'10-5/16"	1	10'
T18	20'-0'			20'10-3/8"	1	20'

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	190'-180'	4'7"	X Brace	No	No	4.500	5.500
T2	180'-160'	4'	X Brace	No	No	0.000	0.000
T3	160'-155'	5'	X Brace	No	No	0.000	0.000
T4	155'-150'	5'	X Brace	No	No	0.000	0.000
T5	150'-145'	5'	X Brace	No	No	0.000	0.000
T6	145'-140'	5'	X Brace	No	Yes	0.000	0.000
T7	140'-133'4"	6'8"	X Brace	No	No	0.000	0.000
T8	133'4"-126'8"	6'8"	X Brace	No	Yes	0.000	0.000
T9	126'8"-120'	6'8"	X Brace	No	Yes	0.000	0.000
T10	120'-113'4"	6'8"	X Brace	No	Yes	0.000	0.000
T11	113'4"-106'8"	6'8"	X Brace	No	Yes	0.000	0.000
T12	106'8"-100'	6'8"	X Brace	No	No	0.000	0.000
T13	100'-80'	6'8"	X Brace	No	No	0.000	0.000
T14	80'-60'	10'	X Brace	No	No	0.000	0.000
T15	60'-40'	10'	X Brace	No	Yes	0.000	0.000
T16	40'-30'	10'	X Brace	No	No	0.000	0.000
T17	30'-20'	10'	X Brace	No	Yes	0.000	0.000
T18	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 190'-180'	Pipe	P2STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A572-50 (50 ksi)
T2 180'-160'	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A572-50 (50 ksi)
T3 160'-155'	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T4 155'-150'	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T5 150'-145'	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A572-50 (50 ksi)
T6 145'-140'	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Double Equal Angle	2L1 3/4x1 3/4x3/16x3/16	A36 (36 ksi)
T7 140'-133'4"	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Double Equal Angle	2L2x2x3/16x1/2	A36 (36 ksi)
T8 133'4"-126'8"	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Double Equal Angle	2L2x2x3/16x1/2	A36 (36 ksi)
T9 126'8"-120'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Double Equal Angle	2L2x2x3/16x1/2	A36 (36 ksi)
T10 120'-113'4"	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x1/2	A36 (36 ksi)
T11 113'4"-106'8"	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x1/2	A36 (36 ksi)
T12 106'8"-100'	Arbitrary Shape	BT100140- Rohn 3.5EH w/ 2" SR	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x1/2	A36 (36 ksi)
T13 100'-80'	Arbitrary Shape	BT100140- Rohn 4EH w/ 2" SR	A572-50 (50 ksi)	Double Equal Angle	2L3x3x3/16x1/2	A36 (36 ksi)
T14 80'-60'	Arbitrary Shape	BT100140- Rohn 5EH w/ 2" SR (60-80)	A572-50 (50 ksi)	Double Equal Angle	2L3x3x3/16x1/4	A36 (36 ksi)
T15 60'-40'	Arbitrary Shape	BT100140- Rohn 5EH w/ 2" SR (40-60)	A572-50 (50 ksi)	Double Equal Angle	2L3x3x1/4x1/4	A572-50 (50 ksi)
T16 40'-30'	Arbitrary Shape	BT100140- Rohn 6EHS w/ 2" SR (30-40)	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T17 30'-20'	Arbitrary Shape	BT100140- Rohn 6EHS w/ 2" SR (20-30)	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x1/4	A572-50 (50 ksi)
T18 20'-0'	Arbitrary Shape	BT100140- Rohn 6EH w/ 2" SR	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A572-50 (50 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 190'-180'	Single Angle	L2x2x1/4	A572-50 (50 ksi)	Flat Bar		A36 (36 ksi)
T2 180'-160'	Single Angle	L2x2x1/8	A36 (36 ksi)	Flat Bar		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T6 145'-140'	Equal Angle	L2x2x1/4	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T8 133'4"-126'8"	Equal Angle	L2x2x1/4	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T9 126'8"-120'	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T10 120'-113'4"	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T11 113'4"-106'8"	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T15 60'-40'	Equal Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T17 30'-20'	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 190'-180'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 180'-160'	0.000	0.188	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
T3 160'-155'	0.000	0.188	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 155'-150'	0.000	0.188	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 150'-145'	0.000	0.188	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 145'-140'	0.000	0.188	A36 (36 ksi)	1.03	1	1.05	58.500	Mid-Pt	Mid-Pt
T7 140'-133'4"	0.000	0.500	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 133'4"-126'8"	0.000	0.500	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 126'8"-120'	0.000	0.500	A36 (36 ksi)	1.1	1	1.1	Mid-Pt	Mid-Pt	Mid-Pt
T10 120'-113'4"	0.000	0.500	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T11 113'4"-106'8"	0.000	0.500	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T12 106'8"-100'	0.000	0.500	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T13 100'-80'	0.000	0.500	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T14 80'-60'	0.000	0.250	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T15 60'-40'	0.000	0.250	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T16 40'-30'	0.000	0.250	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T17 30'-20'	0.000	0.250	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T18 20'-0'	0.000	0.500	A36 (36 ksi)	1.1	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 190'-180'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 180'-160'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 160'-155'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 155'-150'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 150'-145'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 145'-140'	No	No	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1	1
T7 140'-133'4"	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T8	No	No	1	1		1		1		1		1		1		1	
133'4"-126'8"				1		1		1		1		1		0.5		1	
T9	No	No	0.5	1		1		1		1		1		1		1	
126'8"-120'				1		1		1		1		1		0.5		1	
T10	No	No	1	1		1		1		1		1		1		1	
120'-113'4"				1		1		1		1		1		0.5		1	
T11	No	No	1	1		1		1		1		1		1		1	
113'4"-106'8"				1		1		1		1		1		0.5		1	
T12	Yes	No	0.78	1		1		1		1		1		1		1	
106'8"-100'				1		1		1		1		1		1		1	
T13 100'-80'	Yes	No	0.8	1		1		1		1		1		1		1	
				1		1		1		1		1		1		1	
T14 80'-60'	Yes	No	0.83	1		1		1		1		1		1		1	
				1		1		1		1		1		1		1	
T15 60'-40'	No	No	0.85	1		1		1		1		1		1		1	
				1		1		1		1		1		0.5		1	
T16 40'-30'	Yes	No	0.85	1		1		1		1		1		1		1	
				1		1		1		1		1		1		1	
T17 30'-20'	No	No	0.85	1		1		1		1		1		1		1	
				1		1		1		1		1		0.5		1	
T18 20'-0'	Yes	No	0.865	1		1		1		1		1		1		1	
				1		1		1		1		1		1		1	

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 190'-180'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180'-160'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 160'-155'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 155'-150'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 150'-145'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 145'-140'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 140'-133'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 133'4"-126'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 126'8"-120'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 120'-113'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 113'4"-106'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 106'8"-100'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T13 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T14 80'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T15 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T16 40'-30'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

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
T17 30'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T18 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 190'-180'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180'-160'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 160'-155'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 155'-150'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 150'-145'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 145'-140'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 140'-133'4"	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 133'4"-126'8"	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 126'8"-120'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 120'-113'4"	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 113'4"-106'8"	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 106'8"-100'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T13 100'-80'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T14 80'-60'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T15 60'-40'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T16 40'-30'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T17 30'-20'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T18 20'-0'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 190'-180'	Flange	0.625 A325N	4	0.500 A325N	1	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 180'-160'	Flange	0.625 A325N	4	0.500 A325X	1	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 160'-155'	Flange	0.750 A325N	0	0.500 A325N	1	0.500 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 155'-150'	Flange	0.750 A325N	0	0.500 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 150'-145'	Flange	0.750 A325N	0	0.500 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0

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.
T6 145'-140'	Flange	0.750 A325N	4	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	1
T7 140'-133'4"	Flange	0.875 A325N	0	0.500 A325N	2	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T8 133'4"-126'8"	Flange	0.875 A325N	0	0.500 A325N	2	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325X	1
T9 126'8"-120'	Flange	0.875 A325N	4	0.500 A325N	2	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	1
T10 120'-113'4"	Flange	0.875 A325N	0	0.500 A325N	2	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	1
T11 113'4"-106'8"	Flange	0.875 A325N	0	0.500 A325N	2	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	1
T12 106'8"-100'	Flange	0.875 A325N	4	0.500 A325N	2	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T13 100'-80'	Flange	1.000 A325N	4	0.500 A325N	2	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T14 80'-60'	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T15 60'-40'	Flange	1.000 A325N	6	0.625 A325N	1	0.625 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	1
T16 40'-30'	Flange	1.000 A325N	0	0.625 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T17 30'-20'	Flange	1.000 A325N	6	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	1
T18 20'-0'	Flange	1.000 A449	0	0.625 A325N	2	0.625 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
FLC 158-50J(1-5/8")	A	No	No	Ar (CaAa)	178' - 0'	0.000	0.39	8	6	0.850 0.750	2.015		0.001
Feedline Ladder (Af) *	A	No	No	Af (CaAa)	180' - 0'	0.000	0.385	1	1	3.000	3.000		0.008
LDF6-50A(1-1/4")	B	No	No	Ar (CaAa)	165' - 0'	0.000	-0.4	12	6	0.500	1.550		0.001
2-1/2" Rigid Conduit	B	No	No	Ar (CaAa)	165' - 0'	0.000	-0.36	1	1	0.850 0.750	2.500		0.003
WR-VG122ST-BRDA(7/16)	B	No	No	Ar (CaAa)	165' - 0'	0.000	-0.36	2	2	0.500	0.460		0.000
FB-L98B-002-75000(3/8)	B	No	No	Ar (CaAa)	165' - 0'	0.000	-0.36	1	1	0.500	0.394		0.000
FB-L98B-002-75000(3/8)	B	No	No	Ar (CaAa)	165' - 0'	2.500	-0.37	1	1	0.394	0.394		0.000
WR-VG86ST-BRD(3/4)	B	No	No	Ar (CaAa)	165' - 0'	0.000	-0.37	4	2	0.500	0.795		0.001
Feedline Ladder (Af)	B	No	No	Af (CaAa)	180' - 0'	0.000	-0.39	1	1	3.000	3.000		0.008

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*													
HB114-1-0813U4-M5J(1-1/4)	C	No	No	Ar (CaAa)	150' - 0'	0.000	-0.37	4	4	0.850 0.750	1.540		0.001
LDF4-50A(1/2")	C	No	No	Ar (CaAa)	50' - 0'	0.000	-0.35	1	1	0.630	0.630		0.000
Feedline Ladder (Af)	C	No	No	Af (CaAa)	150' - 0'	-0.750	-0.42	2	1	3.000	3.000		0.008
*													
HB158-21U6S24-xxM_TMO (1-5/8)	C	No	No	Ar (CaAa)	186' - 0'	-1.000	-0.38	1	1	0.850 0.750	1.996		0.003
Feedline Ladder (Af)	C	No	No	Af (CaAa)	186' - 150'	-0.750	-0.41	1	1	3.000	3.000		0.008
*													
CU12PSM9P6XXX(1-1/2)	C	No	No	Ar (CaAa)	138' - 0'	0.000	-0.395	1	1	0.850 0.750	1.600		0.002
*													
Safety Line 3/8	A	No	No	Ar (CaAa)	190' - 0'	0.000	0.02	1	1	0.375	0.375		0.000
Thin Flat Bar Climbing Ladder	A	No	No	Af (CaAa)	190' - 0'	0.000	0	1	1	2.000	2.000		0.004
*													
2" SR	A	No	No	Ar (CaAa)	110' - 0'	0.000	0.5	1	1	2.000	2.000		0.000
2" SR	B	No	No	Ar (CaAa)	110' - 0'	0.000	0.5	1	1	2.000	2.000		0.000
2" SR	C	No	No	Ar (CaAa)	110' - 0'	0.000	0.5	1	1	2.000	2.000		0.000
*													

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 klf
*								

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	190'-180'	A	0.000	0.000	3.708	0.000	0.042
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	4.198	0.000	0.065
T2	180'-160'	A	0.000	0.000	46.433	0.000	0.385
		B	0.000	0.000	22.994	0.000	0.236
		C	0.000	0.000	13.992	0.000	0.218
T3	160'-155'	A	0.000	0.000	12.414	0.000	0.100
		B	0.000	0.000	15.494	0.000	0.110

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
		C	0.000	0.000	3.498	0.000	0.055
T4	155'-150'	A	0.000	0.000	12.414	0.000	0.100
		B	0.000	0.000	15.494	0.000	0.110
		C	0.000	0.000	3.498	0.000	0.055
T5	150'-145'	A	0.000	0.000	12.414	0.000	0.100
		B	0.000	0.000	15.494	0.000	0.110
		C	0.000	0.000	9.078	0.000	0.121
T6	145'-140'	A	0.000	0.000	12.414	0.000	0.100
		B	0.000	0.000	15.494	0.000	0.110
		C	0.000	0.000	9.078	0.000	0.121
T7	140'-133'4"	A	0.000	0.000	16.552	0.000	0.133
		B	0.000	0.000	20.658	0.000	0.147
		C	0.000	0.000	12.851	0.000	0.172
T8	133'4"-126'8"	A	0.000	0.000	16.552	0.000	0.133
		B	0.000	0.000	20.658	0.000	0.147
		C	0.000	0.000	13.171	0.000	0.176
T9	126'8"-120'	A	0.000	0.000	16.552	0.000	0.133
		B	0.000	0.000	20.658	0.000	0.147
		C	0.000	0.000	13.171	0.000	0.176
T10	120'-113'4"	A	0.000	0.000	16.552	0.000	0.133
		B	0.000	0.000	20.658	0.000	0.147
		C	0.000	0.000	13.171	0.000	0.176
T11	113'4"-106'8"	A	0.000	0.000	17.219	0.000	0.133
		B	0.000	0.000	21.325	0.000	0.147
		C	0.000	0.000	13.837	0.000	0.176
T12	106'8"-100'	A	0.000	0.000	17.886	0.000	0.133
		B	0.000	0.000	21.992	0.000	0.147
		C	0.000	0.000	14.504	0.000	0.176
T13	100'-80'	A	0.000	0.000	53.657	0.000	0.400
		B	0.000	0.000	65.975	0.000	0.441
		C	0.000	0.000	43.512	0.000	0.529
T14	80'-60'	A	0.000	0.000	53.657	0.000	0.400
		B	0.000	0.000	65.975	0.000	0.441
		C	0.000	0.000	43.512	0.000	0.529
T15	60'-40'	A	0.000	0.000	53.657	0.000	0.400
		B	0.000	0.000	65.975	0.000	0.441
		C	0.000	0.000	44.142	0.000	0.530
T16	40'-30'	A	0.000	0.000	26.828	0.000	0.200
		B	0.000	0.000	32.987	0.000	0.221
		C	0.000	0.000	22.386	0.000	0.266
T17	30'-20'	A	0.000	0.000	26.828	0.000	0.200
		B	0.000	0.000	32.987	0.000	0.221
		C	0.000	0.000	22.386	0.000	0.266
T18	20'-0'	A	0.000	0.000	53.657	0.000	0.400
		B	0.000	0.000	65.975	0.000	0.441
		C	0.000	0.000	44.772	0.000	0.532

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	190'-180'	A	1.010	0.000	0.000	7.748	0.000	0.106
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	6.621	0.000	0.125
T2	180'-160'	A	1.001	0.000	0.000	73.436	0.000	1.072
		B		0.000	0.000	34.217	0.000	0.537
		C		0.000	0.000	22.003	0.000	0.414

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T3	160'-155'	A	0.994	0.000	0.000	19.546	0.000	0.282
		B		0.000	0.000	23.643	0.000	0.318
		C		0.000	0.000	5.486	0.000	0.103
T4	155'-150'	A	0.991	0.000	0.000	19.532	0.000	0.282
		B		0.000	0.000	23.614	0.000	0.317
		C		0.000	0.000	5.479	0.000	0.103
T5	150'-145'	A	0.987	0.000	0.000	19.516	0.000	0.281
		B		0.000	0.000	23.584	0.000	0.316
		C		0.000	0.000	15.990	0.000	0.252
T6	145'-140'	A	0.984	0.000	0.000	19.501	0.000	0.281
		B		0.000	0.000	23.553	0.000	0.316
		C		0.000	0.000	15.974	0.000	0.252
T7	140'-133'4"	A	0.980	0.000	0.000	25.976	0.000	0.373
		B		0.000	0.000	31.354	0.000	0.420
		C		0.000	0.000	22.935	0.000	0.360
T8	133'4"-126'8"	A	0.975	0.000	0.000	25.946	0.000	0.372
		B		0.000	0.000	31.294	0.000	0.418
		C		0.000	0.000	23.611	0.000	0.370
T9	126'8"-120'	A	0.970	0.000	0.000	25.914	0.000	0.371
		B		0.000	0.000	31.232	0.000	0.417
		C		0.000	0.000	23.573	0.000	0.369
T10	120'-113'4"	A	0.964	0.000	0.000	25.881	0.000	0.370
		B		0.000	0.000	31.166	0.000	0.415
		C		0.000	0.000	23.533	0.000	0.368
T11	113'4"-106'8"	A	0.959	0.000	0.000	27.152	0.000	0.380
		B		0.000	0.000	32.403	0.000	0.425
		C		0.000	0.000	24.796	0.000	0.378
T12	106'8"-100'	A	0.953	0.000	0.000	28.414	0.000	0.390
		B		0.000	0.000	33.628	0.000	0.435
		C		0.000	0.000	26.050	0.000	0.388
T13	100'-80'	A	0.940	0.000	0.000	84.948	0.000	1.160
		B		0.000	0.000	100.354	0.000	1.293
		C		0.000	0.000	77.806	0.000	1.154
T14	80'-60'	A	0.916	0.000	0.000	84.425	0.000	1.143
		B		0.000	0.000	99.409	0.000	1.272
		C		0.000	0.000	77.192	0.000	1.136
T15	60'-40'	A	0.886	0.000	0.000	83.746	0.000	1.120
		B		0.000	0.000	98.180	0.000	1.245
		C		0.000	0.000	78.798	0.000	1.131
T16	40'-30'	A	0.855	0.000	0.000	41.525	0.000	0.548
		B		0.000	0.000	48.461	0.000	0.609
		C		0.000	0.000	40.130	0.000	0.562
T17	30'-20'	A	0.827	0.000	0.000	41.208	0.000	0.538
		B		0.000	0.000	47.888	0.000	0.596
		C		0.000	0.000	39.702	0.000	0.551
T18	20'-0'	A	0.754	0.000	0.000	80.796	0.000	1.022
		B		0.000	0.000	92.846	0.000	1.131
		C		0.000	0.000	77.216	0.000	1.046

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	190'-180'	1.078	0.869	0.637	0.552
T2	180'-160'	1.213	-13.077	1.285	-11.913
T3	160'-155'	1.884	-19.186	2.025	-17.778

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T4	155'-150'	1.990	-20.259	2.135	-18.759
T5	150'-145'	4.389	-16.388	5.448	-15.309
T6	145'-140'	4.218	-16.088	5.291	-15.021
T7	140'-133'4"	5.471	-17.900	6.862	-16.496
T8	133'4"-126'8"	5.395	-17.257	6.932	-15.911
T9	126'8"-120'	5.372	-17.415	7.062	-16.322
T10	120'-113'4"	5.346	-17.499	7.166	-16.648
T11	113'4"-106'8"	5.392	-17.733	7.188	-16.745
T12	106'8"-100'	6.050	-19.565	7.877	-18.200
T13	100'-80'	6.004	-19.769	8.067	-18.833
T14	80'-60'	7.230	-23.448	9.503	-22.018
T15	60'-40'	6.897	-22.420	9.594	-21.258
T16	40'-30'	7.948	-24.863	11.132	-23.191
T17	30'-20'	6.944	-22.367	10.073	-21.430
T18	20'-0'	8.021	-25.516	11.436	-24.399

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	21	HB158-21U6S24-xxM_TMO (1-5/8)	180.00 - 186.00	0.6000	0.6000
T1	23	Feedline Ladder (Af)	180.00 - 186.00	0.6000	0.6000
T1	27	Safety Line 3/8	180.00 - 190.00	0.6000	0.6000
T1	28	Thin Flat Bar Climbing Ladder	180.00 - 190.00	0.6000	0.6000
T2	3	FLC 158-50J(1-5/8")	160.00 - 178.00	0.6000	0.6000
T2	4	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	6	LDF6-50A(1-1/4")	160.00 - 165.00	0.6000	0.6000
T2	7	2-1/2" Rigid Conduit	160.00 - 165.00	0.6000	0.6000
T2	8	WR-VG122ST-BRDA(7/16)	160.00 - 165.00	0.0000	0.0000
T2	9	FB-L98B-002-75000(3/8)	160.00 - 165.00	0.0000	0.0000
T2	10	FB-L98B-002-75000(3/8)	160.00 - 165.00	0.6000	0.6000
T2	11	WR-VG86ST-BRD(3/4)	160.00 - 165.00	0.6000	0.6000
T2	12	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	21	HB158-21U6S24-xxM_TMO (1-5/8)	160.00 - 180.00	0.6000	0.6000
T2	23	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	27	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T2	28	Thin Flat Bar Climbing Ladder	160.00 - 180.00	0.6000	0.6000
T3	3	FLC 158-50J(1-5/8")	155.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	4	Feedline Ladder (Af)	160.00 155.00 - 160.00	0.6000	0.6000
T3	6	LDF6-50A(1-1/4")	155.00 - 160.00	0.6000	0.6000
T3	7	2-1/2" Rigid Conduit	155.00 - 160.00	0.6000	0.6000
T3	8	WR-VG122ST-BRDA(7/16)	155.00 - 160.00	0.0000	0.0000
T3	9	FB-L98B-002-75000(3/8)	155.00 - 160.00	0.0000	0.0000
T3	10	FB-L98B-002-75000(3/8)	155.00 - 160.00	0.6000	0.6000
T3	11	WR-VG86ST-BRD(3/4)	155.00 - 160.00	0.6000	0.6000
T3	12	Feedline Ladder (Af)	155.00 - 160.00	0.6000	0.6000
T3	21	HB158-21U6S24-xxM_TMO (1-5/8)	155.00 - 160.00	0.6000	0.6000
T3	23	Feedline Ladder (Af)	155.00 - 160.00	0.6000	0.6000
T3	27	Safety Line 3/8	155.00 - 160.00	0.6000	0.6000
T3	28	Thin Flat Bar Climbing Ladder	155.00 - 160.00	0.6000	0.6000
T4	3	FLC 158-50J(1-5/8")	150.00 - 155.00	0.6000	0.6000
T4	4	Feedline Ladder (Af)	150.00 - 155.00	0.6000	0.6000
T4	6	LDF6-50A(1-1/4")	150.00 - 155.00	0.6000	0.6000
T4	7	2-1/2" Rigid Conduit	150.00 - 155.00	0.6000	0.6000
T4	8	WR-VG122ST-BRDA(7/16)	150.00 - 155.00	0.0000	0.0000
T4	9	FB-L98B-002-75000(3/8)	150.00 - 155.00	0.0000	0.0000
T4	10	FB-L98B-002-75000(3/8)	150.00 - 155.00	0.6000	0.6000
T4	11	WR-VG86ST-BRD(3/4)	150.00 - 155.00	0.6000	0.6000
T4	12	Feedline Ladder (Af)	150.00 - 155.00	0.6000	0.6000
T4	21	HB158-21U6S24-xxM_TMO (1-5/8)	150.00 - 155.00	0.6000	0.6000
T4	23	Feedline Ladder (Af)	150.00 - 155.00	0.6000	0.6000
T4	27	Safety Line 3/8	150.00 - 155.00	0.6000	0.6000
T4	28	Thin Flat Bar Climbing Ladder	150.00 - 155.00	0.6000	0.6000
T5	3	FLC 158-50J(1-5/8")	145.00 - 150.00	0.6000	0.6000
T5	4	Feedline Ladder (Af)	145.00 - 150.00	0.6000	0.6000
T5	6	LDF6-50A(1-1/4")	145.00 - 150.00	0.6000	0.6000
T5	7	2-1/2" Rigid Conduit	145.00 - 150.00	0.6000	0.6000
T5	8	WR-VG122ST-BRDA(7/16)	145.00 - 150.00	0.0000	0.0000
T5	9	FB-L98B-002-75000(3/8)	145.00 -	0.0000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	10	FB-L98B-002-75000(3/8)	145.00 - 150.00	0.6000	0.6000
T5	11	WR-VG86ST-BRD(3/4)	145.00 - 150.00	0.6000	0.6000
T5	12	Feedline Ladder (Af)	145.00 - 150.00	0.6000	0.6000
T5	14	HB114-1-0813U4-M5J(1-1/4)	145.00 - 150.00	0.6000	0.6000
T5	17	Feedline Ladder (Af)	145.00 - 150.00	0.6000	0.6000
T5	21	HB158-21U6S24-xxM_TMO (1-5/8)	145.00 - 150.00	0.6000	0.6000
T5	27	Safety Line 3/8	145.00 - 150.00	0.6000	0.6000
T5	28	Thin Flat Bar Climbing Ladder	145.00 - 150.00	0.6000	0.6000
T6	3	FLC 158-50J(1-5/8")	140.00 - 145.00	0.6000	0.6000
T6	4	Feedline Ladder (Af)	140.00 - 145.00	0.6000	0.6000
T6	6	LDF6-50A(1-1/4")	140.00 - 145.00	0.6000	0.6000
T6	7	2-1/2" Rigid Conduit	140.00 - 145.00	0.6000	0.6000
T6	8	WR-VG122ST-BRDA(7/16)	140.00 - 145.00	0.0000	0.0000
T6	9	FB-L98B-002-75000(3/8)	140.00 - 145.00	0.0000	0.0000
T6	10	FB-L98B-002-75000(3/8)	140.00 - 145.00	0.6000	0.6000
T6	11	WR-VG86ST-BRD(3/4)	140.00 - 145.00	0.6000	0.6000
T6	12	Feedline Ladder (Af)	140.00 - 145.00	0.6000	0.6000
T6	14	HB114-1-0813U4-M5J(1-1/4)	140.00 - 145.00	0.6000	0.6000
T6	17	Feedline Ladder (Af)	140.00 - 145.00	0.6000	0.6000
T6	21	HB158-21U6S24-xxM_TMO (1-5/8)	140.00 - 145.00	0.6000	0.6000
T6	27	Safety Line 3/8	140.00 - 145.00	0.6000	0.6000
T6	28	Thin Flat Bar Climbing Ladder	140.00 - 145.00	0.6000	0.6000
T7	3	FLC 158-50J(1-5/8")	133.33 - 140.00	0.6000	0.6000
T7	4	Feedline Ladder (Af)	133.33 - 140.00	0.6000	0.6000
T7	6	LDF6-50A(1-1/4")	133.33 - 140.00	0.6000	0.6000
T7	7	2-1/2" Rigid Conduit	133.33 - 140.00	0.6000	0.6000
T7	8	WR-VG122ST-BRDA(7/16)	133.33 - 140.00	0.0000	0.0000
T7	9	FB-L98B-002-75000(3/8)	133.33 - 140.00	0.0000	0.0000
T7	10	FB-L98B-002-75000(3/8)	133.33 - 140.00	0.6000	0.6000
T7	11	WR-VG86ST-BRD(3/4)	133.33 - 140.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	133.33 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	14	HB114-1-0813U4-M5J(1-1/4)	133.33 - 140.00	0.6000	0.6000
T7	17	Feedline Ladder (Af)	133.33 - 140.00	0.6000	0.6000
T7	21	HB158-21U6S24-xxM_TMO (1-5/8)	133.33 - 140.00	0.6000	0.6000
T7	25	CU12PSM9P6XXX(1-1/2)	133.33 - 138.00	0.6000	0.6000
T7	27	Safety Line 3/8	133.33 - 140.00	0.6000	0.6000
T7	28	Thin Flat Bar Climbing Ladder	133.33 - 140.00	0.6000	0.6000
T8	3	FLC 158-50J(1-5/8")	126.67 - 133.33	0.6000	0.6000
T8	4	Feedline Ladder (Af)	126.67 - 133.33	0.6000	0.6000
T8	6	LDF6-50A(1-1/4")	126.67 - 133.33	0.6000	0.6000
T8	7	2-1/2" Rigid Conduit	126.67 - 133.33	0.6000	0.6000
T8	8	WR-VG122ST-BRDA(7/16)	126.67 - 133.33	0.0000	0.0000
T8	9	FB-L98B-002-75000(3/8)	126.67 - 133.33	0.0000	0.0000
T8	10	FB-L98B-002-75000(3/8)	126.67 - 133.33	0.6000	0.6000
T8	11	WR-VG86ST-BRD(3/4)	126.67 - 133.33	0.6000	0.6000
T8	12	Feedline Ladder (Af)	126.67 - 133.33	0.6000	0.6000
T8	14	HB114-1-0813U4-M5J(1-1/4)	126.67 - 133.33	0.6000	0.6000
T8	17	Feedline Ladder (Af)	126.67 - 133.33	0.6000	0.6000
T8	21	HB158-21U6S24-xxM_TMO (1-5/8)	126.67 - 133.33	0.6000	0.6000
T8	25	CU12PSM9P6XXX(1-1/2)	126.67 - 133.33	0.6000	0.6000
T8	27	Safety Line 3/8	126.67 - 133.33	0.6000	0.6000
T8	28	Thin Flat Bar Climbing Ladder	126.67 - 133.33	0.6000	0.6000
T9	3	FLC 158-50J(1-5/8")	120.00 - 126.67	0.6000	0.6000
T9	4	Feedline Ladder (Af)	120.00 - 126.67	0.6000	0.6000
T9	6	LDF6-50A(1-1/4")	120.00 - 126.67	0.6000	0.6000
T9	7	2-1/2" Rigid Conduit	120.00 - 126.67	0.6000	0.6000
T9	8	WR-VG122ST-BRDA(7/16)	120.00 - 126.67	0.0000	0.0000
T9	9	FB-L98B-002-75000(3/8)	120.00 - 126.67	0.0000	0.0000
T9	10	FB-L98B-002-75000(3/8)	120.00 - 126.67	0.6000	0.6000
T9	11	WR-VG86ST-BRD(3/4)	120.00 - 126.67	0.6000	0.6000
T9	12	Feedline Ladder (Af)	120.00 - 126.67	0.6000	0.6000
T9	14	HB114-1-0813U4-M5J(1-1/4	120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	17	Feedline Ladder (Af)	120.00 - 126.67	0.6000	0.6000
T9	21	HB158-21U6S24-xxM_TMO (1-5/8)	120.00 - 126.67	0.6000	0.6000
T9	25	CU12PSM9P6XXX(1-1/2)	120.00 - 126.67	0.6000	0.6000
T9	27	Safety Line 3/8	120.00 - 126.67	0.6000	0.6000
T9	28	Thin Flat Bar Climbing Ladder	120.00 - 126.67	0.6000	0.6000
T10	3	FLC 158-50J(1-5/8")	113.33 - 120.00	0.6000	0.6000
T10	4	Feedline Ladder (Af)	113.33 - 120.00	0.6000	0.6000
T10	6	LDF6-50A(1-1/4")	113.33 - 120.00	0.6000	0.6000
T10	7	2-1/2" Rigid Conduit	113.33 - 120.00	0.6000	0.6000
T10	8	WR-VG122ST-BRDA(7/16)	113.33 - 120.00	0.0000	0.0000
T10	9	FB-L98B-002-75000(3/8)	113.33 - 120.00	0.0000	0.0000
T10	10	FB-L98B-002-75000(3/8)	113.33 - 120.00	0.6000	0.6000
T10	11	WR-VG86ST-BRD(3/4)	113.33 - 120.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	113.33 - 120.00	0.6000	0.6000
T10	14	HB114-1-0813U4-M5J(1-1/4)	113.33 - 120.00	0.6000	0.6000
T10	17	Feedline Ladder (Af)	113.33 - 120.00	0.6000	0.6000
T10	21	HB158-21U6S24-xxM_TMO (1-5/8)	113.33 - 120.00	0.6000	0.6000
T10	25	CU12PSM9P6XXX(1-1/2)	113.33 - 120.00	0.6000	0.6000
T10	27	Safety Line 3/8	113.33 - 120.00	0.6000	0.6000
T10	28	Thin Flat Bar Climbing Ladder	113.33 - 120.00	0.6000	0.6000
T11	3	FLC 158-50J(1-5/8")	106.67 - 113.33	0.6000	0.6000
T11	4	Feedline Ladder (Af)	106.67 - 113.33	0.6000	0.6000
T11	6	LDF6-50A(1-1/4")	106.67 - 113.33	0.6000	0.6000
T11	7	2-1/2" Rigid Conduit	106.67 - 113.33	0.6000	0.6000
T11	8	WR-VG122ST-BRDA(7/16)	106.67 - 113.33	0.0000	0.0000
T11	9	FB-L98B-002-75000(3/8)	106.67 - 113.33	0.0000	0.0000
T11	10	FB-L98B-002-75000(3/8)	106.67 - 113.33	0.6000	0.6000
T11	11	WR-VG86ST-BRD(3/4)	106.67 - 113.33	0.6000	0.6000
T11	12	Feedline Ladder (Af)	106.67 - 113.33	0.6000	0.6000
T11	14	HB114-1-0813U4-M5J(1-1/4)	106.67 - 113.33	0.6000	0.6000
T11	17	Feedline Ladder (Af)	106.67 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	21	HB158-21U6S24-xxM_TMO (1-5/8)	106.67 - 113.33	0.6000	0.6000
T11	25	CU12PSM9P6XXX(1-1/2)	106.67 - 113.33	0.6000	0.6000
T11	27	Safety Line 3/8	106.67 - 113.33	0.6000	0.6000
T11	28	Thin Flat Bar Climbing Ladder	106.67 - 113.33	0.6000	0.6000
T11	30	2" SR	106.67 - 110.00	0.6000	0.6000
T11	31	2" SR	106.67 - 110.00	0.6000	0.6000
T11	32	2" SR	106.67 - 110.00	0.6000	0.6000
T12	3	FLC 158-50J(1-5/8")	100.00 - 106.67	0.6000	0.6000
T12	4	Feedline Ladder (Af)	100.00 - 106.67	0.6000	0.6000
T12	6	LDF6-50A(1-1/4")	100.00 - 106.67	0.6000	0.6000
T12	7	2-1/2" Rigid Conduit	100.00 - 106.67	0.6000	0.6000
T12	8	WR-VG122ST-BRDA(7/16)	100.00 - 106.67	0.0000	0.0000
T12	9	FB-L98B-002-75000(3/8)	100.00 - 106.67	0.0000	0.0000
T12	10	FB-L98B-002-75000(3/8)	100.00 - 106.67	0.6000	0.6000
T12	11	WR-VG86ST-BRD(3/4)	100.00 - 106.67	0.6000	0.6000
T12	12	Feedline Ladder (Af)	100.00 - 106.67	0.6000	0.6000
T12	14	HB114-1-0813U4-M5J(1-1/4)	100.00 - 106.67	0.6000	0.6000
T12	17	Feedline Ladder (Af)	100.00 - 106.67	0.6000	0.6000
T12	21	HB158-21U6S24-xxM_TMO (1-5/8)	100.00 - 106.67	0.6000	0.6000
T12	25	CU12PSM9P6XXX(1-1/2)	100.00 - 106.67	0.6000	0.6000
T12	27	Safety Line 3/8	100.00 - 106.67	0.6000	0.6000
T12	28	Thin Flat Bar Climbing Ladder	100.00 - 106.67	0.6000	0.6000
T12	30	2" SR	100.00 - 106.67	0.6000	0.6000
T12	31	2" SR	100.00 - 106.67	0.6000	0.6000
T12	32	2" SR	100.00 - 106.67	0.6000	0.6000
T13	3	FLC 158-50J(1-5/8")	80.00 - 100.00	0.6000	0.6000
T13	4	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T13	6	LDF6-50A(1-1/4")	80.00 - 100.00	0.6000	0.6000
T13	7	2-1/2" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T13	8	WR-VG122ST-BRDA(7/16)	80.00 - 100.00	0.0000	0.0000
T13	9	FB-L98B-002-75000(3/8)	80.00 - 100.00	0.0000	0.0000
T13	10	FB-L98B-002-75000(3/8)	80.00 - 100.00	0.6000	0.6000
T13	11	WR-VG86ST-BRD(3/4)	80.00 - 100.00	0.6000	0.6000
T13	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T13	14	HB114-1-0813U4-M5J(1-1/4)	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T13	17	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T13	21	HB158-21U6S24-xxM_TMO (1-5/8)	80.00 - 100.00	0.6000	0.6000
T13	25	CU12PSM9P6XXX(1-1/2)	80.00 - 100.00	0.6000	0.6000
T13	27	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T13	28	Thin Flat Bar Climbing Ladder	80.00 - 100.00	0.6000	0.6000
T13	30	2" SR	80.00 - 100.00	0.6000	0.6000
T13	31	2" SR	80.00 - 100.00	0.6000	0.6000
T13	32	2" SR	80.00 - 100.00	0.6000	0.6000
T14	3	FLC 158-50J(1-5/8")	60.00 - 80.00	0.6000	0.6000
T14	4	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T14	6	LDF6-50A(1-1/4")	60.00 - 80.00	0.6000	0.6000
T14	7	2-1/2" Rigid Conduit	60.00 - 80.00	0.6000	0.6000
T14	8	WR-VG122ST-BRDA(7/16)	60.00 - 80.00	0.0000	0.0000
T14	9	FB-L98B-002-75000(3/8)	60.00 - 80.00	0.0000	0.0000
T14	10	FB-L98B-002-75000(3/8)	60.00 - 80.00	0.6000	0.6000
T14	11	WR-VG86ST-BRD(3/4)	60.00 - 80.00	0.6000	0.6000
T14	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T14	14	HB114-1-0813U4-M5J(1-1/4)	60.00 - 80.00	0.6000	0.6000
T14	17	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T14	21	HB158-21U6S24-xxM_TMO (1-5/8)	60.00 - 80.00	0.6000	0.6000
T14	25	CU12PSM9P6XXX(1-1/2)	60.00 - 80.00	0.6000	0.6000
T14	27	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T14	28	Thin Flat Bar Climbing Ladder	60.00 - 80.00	0.6000	0.6000
T14	30	2" SR	60.00 - 80.00	0.6000	0.6000
T14	31	2" SR	60.00 - 80.00	0.6000	0.6000
T14	32	2" SR	60.00 - 80.00	0.6000	0.6000
T15	3	FLC 158-50J(1-5/8")	40.00 - 60.00	0.6000	0.6000
T15	4	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T15	6	LDF6-50A(1-1/4")	40.00 - 60.00	0.6000	0.6000
T15	7	2-1/2" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T15	8	WR-VG122ST-BRDA(7/16)	40.00 - 60.00	0.0000	0.0000
T15	9	FB-L98B-002-75000(3/8)	40.00 - 60.00	0.0000	0.0000
T15	10	FB-L98B-002-75000(3/8)	40.00 - 60.00	0.6000	0.6000
T15	11	WR-VG86ST-BRD(3/4)	40.00 - 60.00	0.6000	0.6000
T15	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T15	14	HB114-1-0813U4-M5J(1-1/4)	40.00 - 60.00	0.6000	0.6000
T15	16	LDF4-50A(1/2")	40.00 - 50.00	0.6000	0.6000
T15	17	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T15	21	HB158-21U6S24-xxM_TMO (1-5/8)	40.00 - 60.00	0.6000	0.6000
T15	25	CU12PSM9P6XXX(1-1/2)	40.00 - 60.00	0.6000	0.6000
T15	27	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T15	28	Thin Flat Bar Climbing Ladder	40.00 - 60.00	0.6000	0.6000
T15	30	2" SR	40.00 - 60.00	0.6000	0.6000
T15	31	2" SR	40.00 - 60.00	0.6000	0.6000
T15	32	2" SR	40.00 - 60.00	0.6000	0.6000
T16	3	FLC 158-50J(1-5/8")	30.00 - 40.00	0.6000	0.6000
T16	4	Feedline Ladder (Af)	30.00 - 40.00	0.6000	0.6000
T16	6	LDF6-50A(1-1/4")	30.00 - 40.00	0.6000	0.6000
T16	7	2-1/2" Rigid Conduit	30.00 - 40.00	0.6000	0.6000
T16	8	WR-VG122ST-BRDA(7/16)	30.00 - 40.00	0.0000	0.0000
T16	9	FB-L98B-002-75000(3/8)	30.00 - 40.00	0.0000	0.0000
T16	10	FB-L98B-002-75000(3/8)	30.00 - 40.00	0.6000	0.6000
T16	11	WR-VG86ST-BRD(3/4)	30.00 - 40.00	0.6000	0.6000
T16	12	Feedline Ladder (Af)	30.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T16	14	HB114-1-0813U4-M5J(1-1/4)	30.00 - 40.00	0.6000	0.6000
T16	16	LDF4-50A(1/2")	30.00 - 40.00	0.6000	0.6000
T16	17	Feedline Ladder (Af)	30.00 - 40.00	0.6000	0.6000
T16	21	HB158-21U6S24-xxM_TMO (1-5/8)	30.00 - 40.00	0.6000	0.6000
T16	25	CU12PSM9P6XXX(1-1/2)	30.00 - 40.00	0.6000	0.6000
T16	27	Safety Line 3/8	30.00 - 40.00	0.6000	0.6000
T16	28	Thin Flat Bar Climbing Ladder	30.00 - 40.00	0.6000	0.6000
T16	30	2" SR	30.00 - 40.00	0.6000	0.6000
T16	31	2" SR	30.00 - 40.00	0.6000	0.6000
T16	32	2" SR	30.00 - 40.00	0.6000	0.6000
T17	3	FLC 158-50J(1-5/8")	20.00 - 30.00	0.6000	0.6000
T17	4	Feedline Ladder (Af)	20.00 - 30.00	0.6000	0.6000
T17	6	LDF6-50A(1-1/4")	20.00 - 30.00	0.6000	0.6000
T17	7	2-1/2" Rigid Conduit	20.00 - 30.00	0.6000	0.6000
T17	8	WR-VG122ST-BRDA(7/16)	20.00 - 30.00	0.0000	0.0000
T17	9	FB-L98B-002-75000(3/8)	20.00 - 30.00	0.0000	0.0000
T17	10	FB-L98B-002-75000(3/8)	20.00 - 30.00	0.6000	0.6000
T17	11	WR-VG86ST-BRD(3/4)	20.00 - 30.00	0.6000	0.6000
T17	12	Feedline Ladder (Af)	20.00 - 30.00	0.6000	0.6000
T17	14	HB114-1-0813U4-M5J(1-1/4)	20.00 - 30.00	0.6000	0.6000
T17	16	LDF4-50A(1/2")	20.00 - 30.00	0.6000	0.6000
T17	17	Feedline Ladder (Af)	20.00 - 30.00	0.6000	0.6000
T17	21	HB158-21U6S24-xxM_TMO (1-5/8)	20.00 - 30.00	0.6000	0.6000
T17	25	CU12PSM9P6XXX(1-1/2)	20.00 - 30.00	0.6000	0.6000
T17	27	Safety Line 3/8	20.00 - 30.00	0.6000	0.6000
T17	28	Thin Flat Bar Climbing Ladder	20.00 - 30.00	0.6000	0.6000
T17	30	2" SR	20.00 - 30.00	0.6000	0.6000
T17	31	2" SR	20.00 - 30.00	0.6000	0.6000
T17	32	2" SR	20.00 - 30.00	0.6000	0.6000
T18	3	FLC 158-50J(1-5/8")	0.00 - 20.00	0.6000	0.6000
T18	4	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T18	6	LDF6-50A(1-1/4")	0.00 - 20.00	0.6000	0.6000
T18	7	2-1/2" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T18	8	WR-VG122ST-BRDA(7/16)	0.00 - 20.00	0.0000	0.0000
T18	9	FB-L98B-002-75000(3/8)	0.00 - 20.00	0.0000	0.0000
T18	10	FB-L98B-002-75000(3/8)	0.00 - 20.00	0.6000	0.6000
T18	11	WR-VG86ST-BRD(3/4)	0.00 - 20.00	0.6000	0.6000
T18	12	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T18	14	HB114-1-0813U4-M5J(1-1/4)	0.00 - 20.00	0.6000	0.6000
T18	16	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T18	17	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T18	21	HB158-21U6S24-xxM_TMO (1-5/8)	0.00 - 20.00	0.6000	0.6000
T18	25	CU12PSM9P6XXX(1-1/2)	0.00 - 20.00	0.6000	0.6000
T18	27	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T18	28	Thin Flat Bar Climbing Ladder	0.00 - 20.00	0.6000	0.6000
T18	30	2" SR	0.00 - 20.00	0.6000	0.6000
T18	31	2" SR	0.00 - 20.00	0.6000	0.6000
T18	32	2" SR	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

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
Lightning Rod 5/8" x 6'	C	From Leg	0.000 0' 3'	0.000	190'	No Ice 1/2" Ice 1" Ice	0.375 0.989 1.619	0.375 0.989 1.619	0.006 0.010 0.019
*									
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	14.694 15.455 16.230	6.873 7.554 8.247	0.183 0.311 0.453
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	14.694 15.455 16.230	6.873 7.554 8.247	0.183 0.311 0.453
APXVAALL24_43-U-NA20 _TMO w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	14.694 15.455 16.230	6.873 7.554 8.247	0.183 0.311 0.453
Radio 4480_TMOV2	A	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.878 3.091 3.312	1.397 1.558 1.727	0.081 0.103 0.128
Radio 4480_TMOV2	B	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.878 3.091 3.312	1.397 1.558 1.727	0.081 0.103 0.128
Radio 4480_TMOV2	C	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.878 3.091 3.312	1.397 1.558 1.727	0.081 0.103 0.128
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.139 2.321 2.511	1.686 1.850 2.022	0.109 0.131 0.156
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.139 2.321 2.511	1.686 1.850 2.022	0.109 0.131 0.156
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.139 2.321 2.511	1.686 1.850 2.022	0.109 0.131 0.156
10' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.375 3.403 4.448	2.375 3.403 4.448	0.037 0.054 0.079
10' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.375 3.403 4.448	2.375 3.403 4.448	0.037 0.054 0.079
10' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	2.375 3.403 4.448	2.375 3.403 4.448	0.037 0.054 0.079
VFA12-HD	A	From Leg	2.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	13.200 19.500 25.800	9.200 14.600 19.500	0.658 0.804 1.015
VFA12-HD	B	From Leg	2.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	13.200 19.500 25.800	9.200 14.600 19.500	0.658 0.804 1.015
VFA12-HD	C	From Leg	2.000 0' 0'	0.000	186'	No Ice 1/2" Ice 1" Ice	13.200 19.500 25.800	9.200 14.600 19.500	0.658 0.804 1.015
*									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	3.015 3.569	7.800 8.422	0.058 0.119

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1'			1" Ice	4.137	9.057	0.190
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	3.015 3.569	7.800 8.422	0.058 0.119
			1'			1" Ice	4.137	9.057	0.190
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	3.015 3.569	7.800 8.422	0.058 0.119
			1'			1" Ice	4.137	9.057	0.190
DB-B1-6C-8AB-0Z	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	4.800 5.070	2.000 2.193	0.044 0.080
			0'			1" Ice	5.348	2.393	0.120
DB-T1-6Z-8AB-0Z	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	4.800 5.070	2.000 2.193	0.044 0.080
			0'			1" Ice	5.348	2.393	0.120
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	5.504 5.972	4.384 4.837	0.096 0.169
			1'			1" Ice	6.451	5.301	0.254
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	5.504 5.972	4.384 4.837	0.096 0.169
			1'			1" Ice	6.451	5.301	0.254
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	5.504 5.972	4.384 4.837	0.096 0.169
			1'			1" Ice	6.451	5.301	0.254
Sub6 Antenna - VZS01	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	4.700 4.988	1.844 2.067	0.087 0.116
			1'			1" Ice	5.284	2.297	0.150
Sub6 Antenna - VZS01	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	4.700 4.988	1.844 2.067	0.087 0.116
			1'			1" Ice	5.284	2.297	0.150
Sub6 Antenna - VZS01	C	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	4.700 4.988	1.844 2.067	0.087 0.116
			1'			1" Ice	5.284	2.297	0.150
RFV01U-D1A	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	1.875 2.045	1.250 1.393	0.084 0.103
			1'			1" Ice	2.223	1.543	0.124
RFV01U-D1A	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	1.875 2.045	1.250 1.393	0.084 0.103
			1'			1" Ice	2.223	1.543	0.124
RFV01U-D1A	C	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	1.875 2.045	1.250 1.393	0.084 0.103
			1'			1" Ice	2.223	1.543	0.124
RFV01U-D2A	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	1.875 2.045	1.013 1.145	0.070 0.087
			1'			1" Ice	2.223	1.284	0.106
RFV01U-D2A	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	1.875 2.045	1.013 1.145	0.070 0.087
			1'			1" Ice	2.223	1.284	0.106
RFV01U-D2A	C	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	1.875 2.045	1.013 1.145	0.070 0.087
			1'			1" Ice	2.223	1.284	0.106
CBC78T-DS-43-2X	A	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	0.368 0.446	0.512 0.605	0.021 0.027
			1'			1" Ice	0.531	0.705	0.035
CBC78T-DS-43-2X	B	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	0.368 0.446	0.512 0.605	0.021 0.027
			1'			1" Ice	0.531	0.705	0.035
CBC78T-DS-43-2X	C	From Leg	4.000 0'	0.000	178'	No Ice 1/2" Ice	0.368 0.446	0.512 0.605	0.021 0.027

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
			1'			1" Ice	0.531	0.705	0.035
8'x2 1/2" Pipe Mount	A	From Leg	4.000 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice	2.300 3.132 3.620	2.300 3.132 3.620	0.041 0.057 0.080
8'x2 1/2" Pipe Mount	B	From Leg	4.000 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice	2.300 3.132 3.620	2.300 3.132 3.620	0.041 0.057 0.080
8'x2 1/2" Pipe Mount	C	From Leg	4.000 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice	2.300 3.132 3.620	2.300 3.132 3.620	0.041 0.057 0.080
(2) L 2 1/2x2 1/2x1/4x8'	A	From Leg	4.000 0' -4'2"	0.000	178'	No Ice 1/2" Ice 1" Ice	2.000 2.551 3.109	0.007 0.025 0.051	0.062 0.074 0.092
(2) L 2 1/2x2 1/2x1/4x8'	B	From Leg	4.000 0' -4'2"	0.000	178'	No Ice 1/2" Ice 1" Ice	2.000 2.551 3.109	0.007 0.025 0.051	0.062 0.074 0.092
(2) L 2 1/2x2 1/2x1/4x8'	C	From Leg	4.000 0' -4'2"	0.000	178'	No Ice 1/2" Ice 1" Ice	2.000 2.551 3.109	0.007 0.025 0.051	0.062 0.074 0.092
Sector Mount [SM 511-3]	C	None		0.000	178'	No Ice 1/2" Ice 1" Ice	41.210 58.100 74.620	41.210 58.100 74.620	2.466 3.171 4.086
*									
7770.00 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	3.385 3.746 4.117	2.323 2.664 3.016	0.055 0.098 0.149
7770.00 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	3.385 3.746 4.117	2.323 2.664 3.016	0.055 0.098 0.149
7770.00 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	3.385 3.746 4.117	2.323 2.664 3.016	0.055 0.098 0.149
DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	15.886 16.815 17.760	7.889 8.735 9.597	0.139 0.252 0.380
DMP65R-BU8D w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	15.886 16.815 17.760	7.889 8.735 9.597	0.139 0.252 0.380
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	15.886 16.815 17.760	7.889 8.735 9.597	0.139 0.252 0.380
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	12.248 12.998 13.764	6.047 6.710 7.388	0.089 0.176 0.275
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	12.248 12.998 13.764	6.047 6.710 7.388	0.089 0.176 0.275
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	12.248 12.998 13.764	6.047 6.710 7.388	0.089 0.176 0.275
QS66512-2 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	4.035 4.421 4.816	4.181 4.569 4.966	0.137 0.206 0.287
QS66512-2 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	165'	No Ice 1/2" Ice 1" Ice	4.035 4.421 4.816	4.181 4.569 4.966	0.137 0.206 0.287
QS66512-2 w/ Mount Pipe	C	From Leg	4.000	0.000	165'	No Ice	4.035	4.181	0.137

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			1/2" Ice	4.421	4.569	0.206
			2'			1" Ice	4.816	4.966	0.287
(2) LGP21401	A	From Leg	4.000	0.000	165'	No Ice	1.104	0.207	0.014
			0'			1/2" Ice	1.239	0.274	0.021
			2'			1" Ice	1.381	0.348	0.030
(2) LGP21401	B	From Leg	4.000	0.000	165'	No Ice	1.104	0.207	0.014
			0'			1/2" Ice	1.239	0.274	0.021
			2'			1" Ice	1.381	0.348	0.030
(2) LGP21401	C	From Leg	4.000	0.000	165'	No Ice	1.104	0.207	0.014
			0'			1/2" Ice	1.239	0.274	0.021
			2'			1" Ice	1.381	0.348	0.030
RRUS 4449 B5/B12	A	From Leg	4.000	0.000	165'	No Ice	1.968	1.408	0.071
			0'			1/2" Ice	2.144	1.564	0.090
			2'			1" Ice	2.328	1.727	0.111
RRUS 4449 B5/B12	B	From Leg	4.000	0.000	165'	No Ice	1.968	1.408	0.071
			0'			1/2" Ice	2.144	1.564	0.090
			2'			1" Ice	2.328	1.727	0.111
RRUS 4449 B5/B12	C	From Leg	4.000	0.000	165'	No Ice	1.968	1.408	0.071
			0'			1/2" Ice	2.144	1.564	0.090
			2'			1" Ice	2.328	1.727	0.111
RRUS 4478 B14	A	From Leg	4.000	0.000	165'	No Ice	1.843	1.059	0.060
			0'			1/2" Ice	2.012	1.197	0.076
			2'			1" Ice	2.190	1.342	0.094
RRUS 4478 B14	B	From Leg	4.000	0.000	165'	No Ice	1.843	1.059	0.060
			0'			1/2" Ice	2.012	1.197	0.076
			2'			1" Ice	2.190	1.342	0.094
RRUS 4478 B14	C	From Leg	4.000	0.000	165'	No Ice	1.843	1.059	0.060
			0'			1/2" Ice	2.012	1.197	0.076
			2'			1" Ice	2.190	1.342	0.094
DC6-48-60-18-8F	A	From Leg	1.000	0.000	165'	No Ice	1.212	1.212	0.033
			0'			1/2" Ice	1.892	1.892	0.055
			2'			1" Ice	2.105	2.105	0.080
DC6-48-60-18-8F	B	From Leg	1.000	0.000	165'	No Ice	1.212	1.212	0.033
			0'			1/2" Ice	1.892	1.892	0.055
			2'			1" Ice	2.105	2.105	0.080
DC6-48-60-18-8F	C	From Leg	1.000	0.000	165'	No Ice	1.212	1.212	0.033
			0'			1/2" Ice	1.892	1.892	0.055
			2'			1" Ice	2.105	2.105	0.080
RRUS 32 B30	A	From Leg	4.000	0.000	165'	No Ice	2.692	1.573	0.060
			0'			1/2" Ice	2.912	1.756	0.080
			2'			1" Ice	3.138	1.945	0.104
RRUS 32 B30	B	From Leg	4.000	0.000	165'	No Ice	2.692	1.573	0.060
			0'			1/2" Ice	2.912	1.756	0.080
			2'			1" Ice	3.138	1.945	0.104
RRUS 32 B30	C	From Leg	4.000	0.000	165'	No Ice	2.692	1.573	0.060
			0'			1/2" Ice	2.912	1.756	0.080
			2'			1" Ice	3.138	1.945	0.104
RRUS 32 B2	A	From Leg	4.000	0.000	165'	No Ice	2.731	1.668	0.053
			0'			1/2" Ice	2.953	1.855	0.074
			2'			1" Ice	3.182	2.049	0.098
RRUS 32 B2	B	From Leg	4.000	0.000	165'	No Ice	2.731	1.668	0.053
			0'			1/2" Ice	2.953	1.855	0.074
			2'			1" Ice	3.182	2.049	0.098
RRUS 32 B2	C	From Leg	4.000	0.000	165'	No Ice	2.731	1.668	0.053
			0'			1/2" Ice	2.953	1.855	0.074
			2'			1" Ice	3.182	2.049	0.098
Sector Mount [SM 505-3]	C	None		0.000	165'	No Ice	31.660	31.660	1.725

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
						1/2" Ice	44.640	44.640	2.356
						1" Ice	57.440	57.440	3.189
*									
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	4.091 4.480 4.880	2.862 3.229 3.607	0.077 0.127 0.185
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	4.091 4.480 4.880	2.862 3.229 3.607	0.077 0.127 0.185
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	4.091 4.480 4.880	2.862 3.229 3.607	0.077 0.127 0.185
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	7.550 8.040 8.530	4.230 4.670 5.120	0.110 0.197 0.296
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	7.550 8.040 8.530	4.230 4.670 5.120	0.110 0.197 0.296
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	7.550 8.040 8.530	4.230 4.670 5.120	0.110 0.197 0.296
TD-RRH8X20-25	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8X20-25	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8X20-25	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
(2) RRH2X50-800	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	1.701 1.864 2.035	1.282 1.428 1.580	0.053 0.070 0.090
(2) RRH2X50-800	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	1.701 1.864 2.035	1.282 1.428 1.580	0.053 0.070 0.090
(2) RRH2X50-800	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	1.701 1.864 2.035	1.282 1.428 1.580	0.053 0.070 0.090
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	2.313 2.517 2.728	2.229 2.431 2.641	0.060 0.083 0.109
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	2.313 2.517 2.728	2.229 2.431 2.641	0.060 0.083 0.109
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	2.313 2.517 2.728	2.229 2.431 2.641	0.060 0.083 0.109
10'-11" horizontal x 3" Pipe Mount	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	3.600 4.830 6.080	0.030 0.070 0.130	0.088 0.114 0.148
10'-11" horizontal x 3" Pipe Mount	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	3.600 4.830 6.080	0.030 0.070 0.130	0.088 0.114 0.148
10'-11" horizontal x 3" Pipe Mount	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	3.600 4.830 6.080	0.030 0.070 0.130	0.088 0.114 0.148

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
6' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
6' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	150'	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
Sector Mount [SM 502-3]	C	None		0.000	150'	No Ice 1/2" Ice 1" Ice	29.820 42.210 54.430	29.820 42.210 54.430	1.673 2.266 3.052
*									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	8.009 8.518 9.038	4.233 4.689 5.156	0.108 0.194 0.292
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	8.009 8.518 9.038	4.233 4.689 5.156	0.108 0.194 0.292
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	8.009 8.518 9.038	4.233 4.689 5.156	0.108 0.194 0.292
TA08025-B604	A	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B604	B	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B604	C	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B605	A	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
TA08025-B605	B	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
TA08025-B605	C	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
RDIDC-9181-PF-48	A	From Leg	4.000 0' 2'	0.000	138'	No Ice 1/2" Ice 1" Ice	2.012 2.189 2.373	1.168 1.311 1.461	0.022 0.040 0.060
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	138'	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
Commscope MTC3975083 (3)	C	None		0.000	138'	No Ice 1/2" Ice 1" Ice	23.850 34.120 44.390	23.850 34.120 44.390	1.260 1.803 2.345
*									
*									

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
GPS_A	C	From Leg	3.000	0.000	50'	No Ice	0.255	0.255	0.001
			0'			1/2" Ice	0.320	0.320	0.005
			0'			1" Ice	0.393	0.393	0.010
Side Arm Mount [SO 305-1]	C	From Leg	1.500	0.000	50'	No Ice	0.530	1.520	0.030
			0'			1/2" Ice	0.780	2.070	0.044
			0'			1" Ice	1.060	2.660	0.064
*									
(4) L2x2x1/4 (RD)	A	From Leg	0.500	0.000	126'8" - 120'	No Ice	0.944	0.005	0.016
			0'			1/2" Ice	1.273	0.021	0.022
			0'			1" Ice	1.610	0.044	0.032
(4) L2x2x1/4 (RD)	B	From Leg	0.500	0.000	126'8" - 120'	No Ice	0.944	0.005	0.016
			0'			1/2" Ice	1.273	0.021	0.022
			0'			1" Ice	1.610	0.044	0.032
(4) L2x2x1/4 (RD)	C	From Leg	0.500	0.000	126'8" - 120'	No Ice	0.944	0.005	0.016
			0'			1/2" Ice	1.273	0.021	0.022
			0'			1" Ice	1.610	0.044	0.032
(4) L2x2x1/4 (RH)	A	From Leg	0.500	0.000	126'8" - 120'	No Ice	0.825	0.005	0.014
			0'			1/2" Ice	1.115	0.021	0.019
			0'			1" Ice	1.412	0.044	0.028
(4) L2x2x1/4 (RH)	B	From Leg	0.500	0.000	126'8" - 120'	No Ice	0.825	0.005	0.014
			0'			1/2" Ice	1.115	0.021	0.019
			0'			1" Ice	1.412	0.044	0.028
(4) L2x2x1/4 (RH)	C	From Leg	0.500	0.000	126'8" - 120'	No Ice	0.825	0.005	0.014
			0'			1/2" Ice	1.115	0.021	0.019
			0'			1" Ice	1.412	0.044	0.028
*									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	190 - 180	Leg	Max Tension	15	1.450	-0.010	0.022
			Max. Compression	10	-4.222	-0.507	-0.309
			Max. Mx	20	-3.778	0.535	-0.082
			Max. My	2	-4.181	0.011	0.593
			Max. Vy	18	-1.231	0.510	-0.296
			Max. Vx	2	-1.415	0.011	0.593
		Diagonal	Max Tension	9	1.111	0.000	0.000
			Max. Compression	20	-1.173	0.000	0.000
			Max. Mx	28	0.112	0.018	-0.000
			Max. My	8	1.099	0.010	-0.004
			Max. Vy	28	-0.019	0.018	-0.000
			Max. Vx	8	-0.001	0.006	-0.004
		Top Girt	Max Tension	7	0.298	0.000	0.000
			Max. Compression	18	-0.378	0.000	0.000
			Max. Mx	26	-0.072	-0.047	0.000
			Max. Vy	26	0.029	0.000	0.000
T2	180 - 160	Leg	Max Tension	23	24.123	-0.402	-0.012
			Max. Compression	2	-34.581	-0.054	-0.003
			Max. Mx	22	2.467	0.783	-0.014
			Max. My	20	-3.501	-0.001	0.862
			Max. Vy	6	0.955	-0.406	0.008
			Max. Vx	8	-0.991	-0.013	0.441
		Diagonal	Max Tension	13	5.033	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	24	-5.267	0.000	0.000
			Max. Mx	10	4.215	0.048	-0.000
			Max. My	24	-2.953	0.001	-0.004
			Max. Vy	27	-0.024	0.039	0.000
			Max. Vx	24	0.001	0.000	0.000
		Top Girt	Max Tension	29	0.206	0.000	0.000
			Max. Compression	1	0.000	0.000	0.000
			Max. Mx	26	0.191	-0.036	0.000
			Max. My	26	0.186	0.000	0.000
			Max. Vy	26	-0.022	0.000	0.000
			Max. Vx	26	-0.000	0.000	0.000
T3	160 - 155	Leg	Max Tension	23	32.767	0.081	-0.022
			Max. Compression	2	-43.758	0.083	-0.003
			Max. Mx	14	30.412	-0.111	0.003
			Max. My	8	-6.089	-0.016	0.192
			Max. Vy	14	0.066	-0.111	0.003
			Max. Vx	8	-0.124	-0.016	0.192
		Diagonal	Max Tension	13	4.101	0.000	0.000
			Max. Compression	12	-4.270	0.000	0.000
			Max. Mx	27	0.623	0.016	-0.002
			Max. My	10	-3.969	-0.008	0.002
			Max. Vy	27	-0.015	0.016	-0.002
			Max. Vx	37	0.001	0.000	0.000
T4	155 - 150	Leg	Max Tension	23	40.272	-0.104	-0.032
			Max. Compression	10	-52.064	0.134	0.033
			Max. Mx	10	-52.064	0.134	0.033
			Max. My	8	-6.371	-0.016	0.192
			Max. Vy	18	-0.036	0.134	-0.025
			Max. Vx	8	0.096	-0.016	0.192
		Diagonal	Max Tension	12	4.201	0.000	0.000
			Max. Compression	13	-4.092	0.000	0.000
			Max. Mx	27	0.925	0.020	0.002
			Max. My	20	3.552	0.017	-0.002
			Max. Vy	27	-0.017	0.020	0.002
			Max. Vx	36	0.001	0.000	0.000
T5	150 - 145	Leg	Max Tension	23	47.262	-0.110	-0.034
			Max. Compression	10	-61.631	-0.030	0.024
			Max. Mx	10	-61.567	0.134	0.033
			Max. My	8	-7.917	-0.029	0.229
			Max. Vy	18	0.059	0.134	-0.025
			Max. Vx	8	-0.096	-0.029	0.229
		Diagonal	Max Tension	13	4.885	0.000	0.000
			Max. Compression	12	-5.105	0.000	0.000
			Max. Mx	10	3.382	0.034	0.001
			Max. My	22	-4.346	-0.010	-0.004
			Max. Vy	27	-0.023	0.030	0.002
			Max. Vx	31	-0.001	0.000	0.000
T6	145 - 140	Leg	Max Tension	23	55.636	-0.017	-0.026
			Max. Compression	10	-71.068	0.304	0.044
			Max. Mx	14	51.897	-0.405	0.012
			Max. My	8	-8.415	-0.053	0.502
			Max. Vy	10	-0.141	0.284	-0.007
			Max. Vx	8	-0.285	-0.053	0.502
		Diagonal	Max Tension	12	5.018	0.000	0.000
			Max. Compression	13	-4.864	0.011	-0.001
			Max. Mx	10	4.682	-0.043	0.003
			Max. My	10	-4.444	0.013	-0.010
			Max. Vy	27	0.030	-0.039	0.006
			Max. Vx	10	-0.002	0.000	0.000
		Secondary Horizontal	Max Tension	24	0.392	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	25	-0.317	0.000	0.000
			Max. Mx	35	0.153	0.019	0.001
			Max. My	22	0.005	0.010	0.007
			Max. Vy	35	0.022	0.019	0.001
			Max. Vx	22	-0.002	0.000	0.000
T7	140 - 133.333	Leg	Max Tension	23	64.652	-0.387	-0.047
			Max. Compression	10	-81.817	0.157	0.049
			Max. Mx	14	60.679	0.487	0.012
			Max. My	8	-9.586	-0.062	0.571
			Max. Vy	14	-0.457	-0.405	0.012
			Max. Vx	20	-0.452	-0.053	-0.500
		Diagonal	Max Tension	13	5.772	0.000	0.000
			Max. Compression	12	-5.976	0.000	0.000
			Max. Mx	10	3.829	-0.057	-0.002
			Max. My	22	-5.080	0.001	0.013
			Max. Vy	27	0.037	-0.054	-0.004
			Max. Vx	10	0.003	0.000	0.000
T8	133.333 - 126.667	Leg	Max Tension	23	75.296	-0.254	-0.053
			Max. Compression	10	-94.264	-0.557	0.016
			Max. Mx	10	-94.203	0.710	-0.002
			Max. My	8	-10.003	-0.062	0.571
			Max. Vy	10	0.386	0.710	-0.002
			Max. Vx	8	0.287	-0.062	0.571
		Diagonal	Max Tension	12	6.051	0.000	0.000
			Max. Compression	12	-6.087	0.000	0.000
			Max. Mx	10	5.656	-0.064	0.004
			Max. My	10	-5.728	0.016	-0.016
			Max. Vy	27	0.040	-0.060	0.010
			Max. Vx	10	-0.003	0.000	0.000
		Secondary Horizontal	Max Tension	22	0.557	0.000	0.000
			Max. Compression	11	-0.456	0.008	0.005
			Max. Mx	31	0.172	0.026	0.001
			Max. My	10	0.357	0.009	-0.010
			Max. Vy	31	-0.026	0.026	0.001
			Max. Vx	10	-0.002	0.009	-0.010
T9	126.667 - 120	Leg	Max Tension	23	85.228	0.348	-0.024
			Max. Compression	10	-105.260	-0.614	0.023
			Max. Mx	10	-105.156	0.901	0.003
			Max. My	8	-10.702	-0.119	0.552
			Max. Vy	10	-0.486	0.901	0.003
			Max. Vx	8	0.271	-0.117	0.524
		Diagonal	Max Tension	13	6.014	-0.047	-0.005
			Max. Compression	10	-6.475	0.000	0.000
			Max. Mx	10	4.989	-0.069	0.009
			Max. My	10	3.623	-0.068	-0.019
			Max. Vy	27	0.043	-0.067	-0.011
			Max. Vx	10	0.004	0.000	0.000
		Secondary Horizontal	Max Tension	8	0.686	0.020	-0.013
			Max. Compression	9	-0.558	0.013	0.015
			Max. Mx	31	0.144	0.039	0.003
			Max. My	22	-0.427	0.021	0.015
			Max. Vy	31	-0.035	0.039	0.003
			Max. Vx	22	0.003	0.000	0.000
T10	120 - 113.333	Leg	Max Tension	23	95.254	0.401	-0.030
			Max. Compression	10	-116.946	-0.814	0.016
			Max. Mx	10	-116.875	1.188	0.001
			Max. My	8	-11.401	-0.152	0.715
			Max. Vy	10	0.603	1.188	0.001

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	8	-0.324	-0.152	0.715
		Diagonal	Max Tension	13	6.183	-0.072	-0.011
			Max. Compression	12	-6.338	0.000	0.000
			Max. Mx	10	5.578	-0.101	0.002
			Max. My	10	-6.099	0.030	-0.025
			Max. Vy	27	0.055	-0.091	0.013
			Max. Vx	10	-0.005	0.000	0.000
		Secondary Horizontal	Max Tension	8	0.862	0.016	-0.011
			Max. Compression	9	-0.701	0.017	0.012
			Max. Mx	32	0.111	0.040	0.003
			Max. My	22	-0.507	0.023	0.013
			Max. Vy	32	-0.036	0.040	0.003
			Max. Vx	22	0.003	0.000	0.000
T11	113.333 - 106.667	Leg	Max Tension	23	104.408	0.539	-0.026
			Max. Compression	10	-127.297	-0.548	0.031
			Max. Mx	10	-127.272	1.157	-0.001
			Max. My	8	-11.655	-0.152	0.715
			Max. Vy	10	-0.628	1.157	-0.001
			Max. Vx	8	0.304	-0.152	0.715
		Diagonal	Max Tension	13	6.182	-0.075	-0.001
			Max. Compression	10	-6.778	0.000	0.000
			Max. Mx	10	5.159	-0.108	0.009
			Max. My	10	3.608	-0.108	-0.023
			Max. Vy	27	0.059	-0.101	-0.014
			Max. Vx	10	0.004	0.000	0.000
		Secondary Horizontal	Max Tension	8	0.780	0.024	-0.010
			Max. Compression	9	-0.620	0.015	0.012
			Max. Mx	30	0.260	0.047	0.001
			Max. My	8	-0.597	0.020	0.012
			Max. Vy	30	-0.038	0.047	0.001
			Max. Vx	8	-0.003	0.000	0.000
T12	106.667 - 100	Leg	Max Tension	23	113.843	0.316	-0.036
			Max. Compression	10	-138.587	4.102	0.052
			Max. Mx	10	-138.587	4.102	0.052
			Max. My	8	-12.409	-0.130	0.361
			Max. Vy	10	-0.734	4.102	0.052
			Max. Vx	8	0.118	-0.130	0.361
		Diagonal	Max Tension	12	6.032	0.000	0.000
			Max. Compression	12	-5.958	0.000	0.000
			Max. Mx	27	1.370	-0.094	-0.011
			Max. My	8	4.565	-0.069	-0.017
			Max. Vy	29	-0.061	-0.090	0.011
			Max. Vx	30	0.004	0.000	0.000
T13	100 - 80	Leg	Max Tension	7	138.973	-2.943	0.022
			Max. Compression	10	-168.647	2.921	0.065
			Max. Mx	10	-148.228	4.102	0.052
			Max. My	8	-14.863	-0.027	0.405
			Max. Vy	18	0.339	4.049	-0.031
			Max. Vx	8	-0.126	-0.027	0.405
		Diagonal	Max Tension	12	6.700	0.000	0.000
			Max. Compression	12	-6.604	0.000	0.000
			Max. Mx	27	1.382	-0.139	0.016
			Max. My	10	-6.126	-0.041	-0.026
			Max. Vy	29	-0.083	-0.136	-0.017
			Max. Vx	37	-0.005	0.000	0.000
T14	80 - 60	Leg	Max Tension	7	161.523	-3.219	0.058
			Max. Compression	10	-195.684	1.318	0.086
			Max. Mx	11	-191.316	3.260	0.094

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-16.957	-0.257	0.691
			Max. Vy	18	0.261	3.205	-0.055
			Max. Vx	8	-0.150	-0.050	0.564
		Diagonal	Max Tension	12	7.939	0.000	0.000
			Max. Compression	12	-7.927	0.000	0.000
			Max. Mx	29	1.471	-0.184	0.022
			Max. My	10	-7.692	-0.029	-0.027
			Max. Vy	29	-0.091	-0.184	0.022
			Max. Vx	30	0.005	0.000	0.000
T15	60 - 40	Leg	Max Tension	7	183.338	2.396	0.026
			Max. Compression	10	-222.524	1.411	0.069
			Max. Mx	10	-208.224	9.572	-0.010
			Max. My	8	-17.872	-0.775	0.904
			Max. Vy	10	-2.776	9.547	-0.008
			Max. Vx	8	0.291	-0.775	0.904
		Diagonal	Max Tension	13	8.533	-0.150	0.005
			Max. Compression	10	-9.788	0.000	0.000
			Max. Mx	29	1.091	-0.254	-0.035
			Max. My	31	-2.735	-0.226	-0.040
			Max. Vy	29	-0.118	-0.254	-0.035
			Max. Vx	31	-0.007	0.000	0.000
		Secondary Horizontal	Max Tension	10	2.563	0.060	-0.000
			Max. Compression	23	-1.962	0.000	0.000
			Max. Mx	32	0.331	0.121	0.010
			Max. My	8	-1.816	0.059	0.012
			Max. Vy	32	-0.067	0.121	0.010
			Max. Vx	30	-0.003	0.000	0.000
T16	40 - 30	Leg	Max Tension	7	195.208	-2.103	0.044
			Max. Compression	10	-237.931	1.102	0.054
			Max. Mx	37	17.647	-2.317	-0.030
			Max. My	8	-20.889	-0.186	0.967
			Max. Vy	33	-0.366	-2.295	0.013
			Max. Vx	8	-0.143	-0.186	0.967
		Diagonal	Max Tension	12	8.493	0.000	0.000
			Max. Compression	12	-8.582	0.000	0.000
			Max. Mx	29	0.536	-0.335	-0.040
			Max. My	37	-2.632	-0.301	0.043
			Max. Vy	29	-0.144	-0.335	-0.040
			Max. Vx	37	-0.008	0.000	0.000
T17	30 - 20	Leg	Max Tension	7	204.981	-1.366	0.037
			Max. Compression	10	-250.410	-0.478	-0.032
			Max. Mx	10	-250.346	10.296	-0.002
			Max. My	8	-21.643	-0.186	0.967
			Max. Vy	27	2.302	-6.949	0.007
			Max. Vx	8	0.259	-0.186	0.967
		Diagonal	Max Tension	13	9.196	-0.223	0.018
			Max. Compression	10	-10.514	0.000	0.000
			Max. Mx	27	2.011	-0.332	-0.048
			Max. My	31	1.695	-0.331	-0.052
			Max. Vy	29	-0.147	-0.332	0.045
			Max. Vx	31	0.008	0.000	0.000
		Secondary Horizontal	Max Tension	10	2.374	0.092	-0.000
			Max. Compression	23	-1.842	0.000	0.000
			Max. Mx	30	1.236	0.162	0.011
			Max. My	8	-1.643	0.089	0.015
			Max. Vy	30	-0.082	0.162	0.011
			Max. Vx	30	-0.003	0.000	0.000
T18	20 - 0	Leg	Max Tension	7	227.245	-3.688	0.060
			Max. Compression	10	-278.858	0.000	-0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	27	-101.258	9.555	-0.001
			Max. My	8	-23.971	-0.213	1.371
			Max. Vy	27	-1.663	-6.949	0.007
			Max. Vx	8	-0.254	-0.213	1.371
		Diagonal	Max Tension	13	9.180	0.000	0.000
			Max. Compression	10	-9.790	0.000	0.000
			Max. Mx	29	-1.212	0.273	0.028
			Max. My	30	5.480	0.179	0.034
			Max. Vy	29	0.100	0.273	0.028
			Max. Vx	30	-0.005	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	282.494	25.124	-15.358
	Max. H_x	18	282.494	25.124	-15.358
	Max. H_z	7	-232.447	-20.932	12.913
	Min. Vert	7	-232.447	-20.932	12.913
	Min. H_x	7	-232.447	-20.932	12.913
	Min. H_z	18	282.494	25.124	-15.358
Leg B	Max. Vert	10	285.523	-24.900	-15.791
	Max. H_x	23	-231.146	20.668	13.275
	Max. H_z	23	-231.146	20.668	13.275
	Min. Vert	23	-231.146	20.668	13.275
	Min. H_x	10	285.523	-24.900	-15.791
	Min. H_z	10	285.523	-24.900	-15.791
Leg A	Max. Vert	2	275.631	0.396	28.100
	Max. H_x	20	25.931	4.857	1.961
	Max. H_z	2	275.631	0.396	28.100
	Min. Vert	15	-218.902	-0.355	-23.138
	Min. H_x	9	18.953	-4.816	1.429
	Min. H_z	15	-218.902	-0.355	-23.138

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	59.819	0.000	-0.000	-28.390	-23.575	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	71.783	-0.038	-44.328	-4984.049	-22.677	14.693
0.9 Dead+1.0 Wind 0 deg - No Ice	53.837	-0.038	-44.328	-4975.532	-15.605	14.693
1.2 Dead+1.0 Wind 30 deg - No Ice	71.783	21.392	-37.144	-4208.489	-2430.592	-2.119
0.9 Dead+1.0 Wind 30 deg - No Ice	53.837	21.392	-37.144	-4199.972	-2423.519	-2.119
1.2 Dead+1.0 Wind 60 deg - No Ice	71.783	38.123	-22.020	-2498.538	-4294.591	-28.731
0.9 Dead+1.0 Wind 60 deg - No Ice	53.837	38.123	-22.020	-2490.021	-4287.519	-28.731

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 90 deg - No Ice	71.783	45.474	0.038	-28.455	-5098.391	-53.384
0.9 Dead+1.0 Wind 90 deg - No Ice	53.837	45.474	0.038	-19.938	-5091.318	-53.384
1.2 Dead+1.0 Wind 120 deg - No Ice	71.783	40.451	23.408	2558.017	-4504.400	-47.017
0.9 Dead+1.0 Wind 120 deg - No Ice	53.837	40.451	23.408	2566.533	-4497.328	-47.017
1.2 Dead+1.0 Wind 150 deg - No Ice	71.783	21.861	37.880	4225.198	-2486.058	-33.734
0.9 Dead+1.0 Wind 150 deg - No Ice	53.837	21.861	37.880	4233.715	-2478.986	-33.734
1.2 Dead+1.0 Wind 180 deg - No Ice	71.783	0.038	41.565	4681.381	-33.902	-14.693
0.9 Dead+1.0 Wind 180 deg - No Ice	53.837	0.038	41.565	4689.898	-26.830	-14.693
1.2 Dead+1.0 Wind 210 deg - No Ice	71.783	-21.392	37.144	4140.353	2374.013	2.119
0.9 Dead+1.0 Wind 210 deg - No Ice	53.837	-21.392	37.144	4148.870	2381.085	2.119
1.2 Dead+1.0 Wind 240 deg - No Ice	71.783	-40.516	23.401	2547.669	4441.123	28.731
0.9 Dead+1.0 Wind 240 deg - No Ice	53.837	-40.516	23.401	2556.186	4448.195	28.731
1.2 Dead+1.0 Wind 270 deg - No Ice	71.783	-45.474	-0.038	-39.680	5041.812	53.384
0.9 Dead+1.0 Wind 270 deg - No Ice	53.837	-45.474	-0.038	-31.163	5048.884	53.384
1.2 Dead+1.0 Wind 300 deg - No Ice	71.783	-38.058	-22.026	-2508.886	4244.710	47.017
0.9 Dead+1.0 Wind 300 deg - No Ice	53.837	-38.058	-22.026	-2500.369	4251.783	47.017
1.2 Dead+1.0 Wind 330 deg - No Ice	71.783	-21.861	-37.880	-4293.334	2429.479	33.734
0.9 Dead+1.0 Wind 330 deg - No Ice	53.837	-21.861	-37.880	-4284.817	2436.551	33.734
1.2 Dead+1.0 Ice+1.0 Temp	129.081	0.000	-0.000	-95.001	-50.834	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	129.081	-0.007	-10.836	-1321.615	-49.802	4.730
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	129.081	5.264	-9.136	-1135.833	-650.328	-0.043
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	129.081	9.234	-5.333	-702.053	-1101.865	-6.678
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	129.081	10.969	0.007	-93.969	-1293.964	-11.908
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	129.081	9.748	5.638	540.379	-1148.867	-12.069
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	129.081	5.360	9.286	962.687	-661.252	-8.617
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	129.081	0.007	10.416	1096.803	-51.866	-4.730
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	129.081	-5.264	9.136	945.830	548.659	0.043
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	129.081	-9.598	5.543	529.455	1030.341	6.678
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	129.081	-10.969	-0.007	-96.033	1192.295	11.908
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	129.081	-9.384	-5.428	-712.977	1017.053	12.069
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	129.081	-5.360	-9.286	-1152.690	559.583	8.617

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg - Service	59.819	-0.010	-11.367	-1292.591	-22.146	3.741
Dead+Wind 30 deg - Service	59.819	5.487	-9.527	-1094.606	-637.169	-0.539
Dead+Wind 60 deg - Service	59.819	9.776	-5.647	-657.812	-1113.184	-7.315
Dead+Wind 90 deg - Service	59.819	11.659	0.010	-26.961	-1318.358	-13.591
Dead+Wind 120 deg - Service	59.819	10.369	6.000	633.523	-1166.601	-11.970
Dead+Wind 150 deg - Service	59.819	5.606	9.715	1059.428	-651.290	-8.589
Dead+Wind 180 deg - Service	59.819	0.010	10.664	1176.099	-25.003	-3.741
Dead+Wind 210 deg - Service	59.819	-5.487	9.527	1037.826	590.020	0.539
Dead+Wind 240 deg - Service	59.819	-10.386	5.999	630.888	1117.747	7.315
Dead+Wind 270 deg - Service	59.819	-11.659	-0.010	-29.819	1271.209	13.591
Dead+Wind 300 deg - Service	59.819	-9.760	-5.648	-660.446	1067.740	11.970
Dead+Wind 330 deg - Service	59.819	-5.606	-9.715	-1116.207	604.141	8.589

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	0.000	-59.819	0.000	-0.000	59.819	0.000	0.000%
2	-0.038	-71.783	-44.328	0.038	71.783	44.328	0.000%
3	-0.038	-53.837	-44.328	0.038	53.837	44.328	0.000%
4	21.392	-71.783	-37.144	-21.392	71.783	37.144	0.000%
5	21.392	-53.837	-37.144	-21.392	53.837	37.144	0.000%
6	38.123	-71.783	-22.020	-38.123	71.783	22.020	0.000%
7	38.123	-53.837	-22.020	-38.123	53.837	22.020	0.000%
8	45.474	-71.783	0.038	-45.474	71.783	-0.038	0.000%
9	45.474	-53.837	0.038	-45.474	53.837	-0.038	0.000%
10	40.451	-71.783	23.408	-40.451	71.783	-23.408	0.000%
11	40.451	-53.837	23.408	-40.451	53.837	-23.408	0.000%
12	21.860	-71.783	37.880	-21.861	71.783	-37.880	0.000%
13	21.860	-53.837	37.880	-21.861	53.837	-37.880	0.000%
14	0.038	-71.783	41.565	-0.038	71.783	-41.565	0.000%
15	0.038	-53.837	41.565	-0.038	53.837	-41.565	0.000%
16	-21.392	-71.783	37.144	21.392	71.783	-37.144	0.000%
17	-21.392	-53.837	37.144	21.392	53.837	-37.144	0.000%
18	-40.516	-71.783	23.401	40.516	71.783	-23.401	0.000%
19	-40.516	-53.837	23.401	40.516	53.837	-23.401	0.000%
20	-45.474	-71.783	-0.038	45.474	71.783	0.038	0.000%
21	-45.474	-53.837	-0.038	45.474	53.837	0.038	0.000%
22	-38.058	-71.783	-22.026	38.058	71.783	22.026	0.000%
23	-38.058	-53.837	-22.026	38.058	53.837	22.026	0.000%
24	-21.860	-71.783	-37.880	21.861	71.783	37.880	0.000%
25	-21.860	-53.837	-37.880	21.861	53.837	37.880	0.000%
26	0.000	-129.081	0.000	-0.000	129.081	0.000	0.000%
27	-0.007	-129.081	-10.836	0.007	129.081	10.836	0.000%
28	5.264	-129.081	-9.136	-5.264	129.081	9.136	0.000%
29	9.234	-129.081	-5.333	-9.234	129.081	5.333	0.000%
30	10.969	-129.081	0.007	-10.969	129.081	-0.007	0.000%
31	9.748	-129.081	5.638	-9.748	129.081	-5.638	0.000%
32	5.360	-129.081	9.286	-5.360	129.081	-9.286	0.000%
33	0.007	-129.081	10.416	-0.007	129.081	-10.416	0.000%
34	-5.264	-129.081	9.136	5.264	129.081	-9.136	0.000%
35	-9.598	-129.081	5.543	9.598	129.081	-5.543	0.000%
36	-10.969	-129.081	-0.007	10.969	129.081	0.007	0.000%
37	-9.384	-129.081	-5.428	9.384	129.081	5.428	0.000%
38	-5.360	-129.081	-9.286	5.360	129.081	9.286	0.000%
39	-0.010	-59.819	-11.367	0.010	59.819	11.367	0.000%
40	5.487	-59.819	-9.527	-5.487	59.819	9.527	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
41	9.776	-59.819	-5.647	-9.776	59.819	5.647	0.000%
42	11.659	-59.819	0.010	-11.659	59.819	-0.010	0.000%
43	10.369	-59.819	6.000	-10.369	59.819	-6.000	0.000%
44	5.606	-59.819	9.715	-5.606	59.819	-9.715	0.000%
45	0.010	-59.819	10.664	-0.010	59.819	-10.664	0.000%
46	-5.487	-59.819	9.527	5.487	59.819	-9.527	0.000%
47	-10.386	-59.819	5.999	10.386	59.819	-5.999	0.000%
48	-11.659	-59.819	-0.010	11.659	59.819	0.010	0.000%
49	-9.760	-59.819	-5.648	9.760	59.819	5.648	0.000%
50	-5.606	-59.819	-9.715	5.606	59.819	9.715	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	4.959	43	0.280	0.028
T2	180 - 160	4.376	43	0.279	0.028
T3	160 - 155	3.246	43	0.240	0.026
T4	155 - 150	2.992	43	0.230	0.024
T5	150 - 145	2.751	43	0.218	0.023
T6	145 - 140	2.523	43	0.205	0.021
T7	140 - 133.333	2.311	43	0.191	0.020
T8	133.333 - 126.667	2.049	43	0.175	0.019
T9	126.667 - 120	1.810	43	0.159	0.018
T10	120 - 113.333	1.595	43	0.141	0.016
T11	113.333 - 106.667	1.404	43	0.126	0.015
T12	106.667 - 100	1.234	43	0.110	0.014
T13	100 - 80	1.082	43	0.102	0.013
T14	80 - 60	0.690	43	0.078	0.010
T15	60 - 40	0.392	43	0.057	0.007
T16	40 - 30	0.182	43	0.037	0.005
T17	30 - 20	0.110	43	0.027	0.004
T18	20 - 0	0.059	43	0.017	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190'	Lightning Rod 5/8" x 6'	43	4.959	0.280	0.028	442805
186'	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	43	4.726	0.281	0.028	442805
178'	(2) LPA-80080/6CF w/ Mount Pipe	43	4.259	0.277	0.028	359555
165'	7770.00 w/ Mount Pipe	43	3.515	0.252	0.027	23893
150'	APXVTM14-ALU-I20 w/ Mount Pipe	43	2.751	0.218	0.023	21949
138'	MX08FRO665-21 w/ Mount Pipe	43	2.230	0.186	0.020	23314
126'8"	(4) L2x2x1/4 (RD)	43	1.810	0.159	0.018	21623
123'4"	(4) L2x2x1/4 (RD)	43	1.700	0.150	0.017	22227
120'	(4) L2x2x1/4 (RD)	43	1.595	0.141	0.016	23092
50'	GPS_A	43	0.276	0.047	0.006	55177

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	190 - 180	19.415	10	1.097	0.109
T2	180 - 160	17.133	10	1.093	0.110
T3	160 - 155	12.703	10	0.942	0.102
T4	155 - 150	11.709	10	0.901	0.096
T5	150 - 145	10.762	10	0.855	0.089
T6	145 - 140	9.869	10	0.804	0.084
T7	140 - 133.333	9.039	10	0.747	0.080
T8	133.333 - 126.667	8.014	10	0.687	0.075
T9	126.667 - 120	7.078	10	0.621	0.069
T10	120 - 113.333	6.238	10	0.552	0.064
T11	113.333 - 106.667	5.488	10	0.493	0.059
T12	106.667 - 100	4.825	10	0.431	0.055
T13	100 - 80	4.228	10	0.398	0.050
T14	80 - 60	2.697	10	0.304	0.039
T15	60 - 40	1.529	10	0.224	0.028
T16	40 - 30	0.711	10	0.143	0.019
T17	30 - 20	0.428	10	0.104	0.016
T18	20 - 0	0.229	10	0.066	0.012

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190'	Lightning Rod 5/8" x 6'	10	19.415	1.097	0.109	117517
186'	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	10	18.503	1.100	0.109	117517
178'	(2) LPA-80080/6CF w/ Mount Pipe	10	16.675	1.085	0.110	98311
165'	7770.00 w/ Mount Pipe	10	13.756	0.986	0.106	6261
150'	APXVTM14-ALU-I20 w/ Mount Pipe	10	10.762	0.855	0.089	5680
138'	MX08FRO665-21 w/ Mount Pipe	10	8.723	0.728	0.078	6016
126'8"	(4) L2x2x1/4 (RD)	10	7.078	0.621	0.069	5549
123'4"	(4) L2x2x1/4 (RD)	10	6.646	0.586	0.067	5687
120'	(4) L2x2x1/4 (RD)	10	6.238	0.552	0.064	5894
50'	GPS_A	10	1.078	0.184	0.023	14107

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	190	Leg	A325N	0.625	4	0.363	20.340	0.018 ✔	1.05	Bolt Tension

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
		Diagonal	A325N	0.500	1	1.173	8.836	0.133 ✓	1.05	Bolt Shear
		Top Girt	A325N	0.500	1	0.378	8.836	0.043 ✓	1.05	Bolt Shear
T2	180	Leg	A325N	0.625	4	6.031	20.340	0.296 ✓	1.05	Bolt Tension
		Diagonal	A325X	0.500	1	5.033	7.504	0.671 ✓	1.05	Gusset Bearing
		Top Girt	A325N	0.500	1	0.599	4.133	0.145 ✓	1.05	Member Bearing
T3	160	Diagonal	A325N	0.500	1	4.101	6.199	0.662 ✓	1.05	Member Bearing
T4	155	Diagonal	A325N	0.500	1	4.201	6.199	0.678 ✓	1.05	Member Bearing
T5	150	Diagonal	A325X	0.500	1	4.885	7.504	0.651 ✓	1.05	Gusset Bearing
T6	145	Leg	A325N	0.750	4	13.901	30.101	0.462 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.500	1	5.018	7.504	0.669 ✓	1.05	Gusset Bearing
		Secondary Horizontal	A325X	0.625	1	1.233	7.178	0.172 ✓	1.05	Gusset Bearing
T7	140	Diagonal	A325N	0.500	2	2.886	11.011	0.262 ✓	1.05	Member Block Shear
T8	133.333	Diagonal	A325N	0.500	2	3.026	11.011	0.275 ✓	1.05	Member Block Shear
		Secondary Horizontal	A325X	0.625	1	1.635	12.492	0.131 ✓	1.05	Member Block Shear
T9	126.667	Leg	A325N	0.875	4	21.270	41.556	0.512 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.500	2	3.007	11.011	0.273 ✓	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.625	1	1.826	10.440	0.175 ✓	1.05	Member Bearing
T10	120	Diagonal	A325N	0.500	2	3.092	13.050	0.237 ✓	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.625	1	2.028	10.440	0.194 ✓	1.05	Member Bearing
T11	113.333	Diagonal	A325N	0.500	2	3.091	13.050	0.237 ✓	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.625	1	2.208	10.440	0.211 ✓	1.05	Member Bearing
T12	106.667	Leg	A325N	0.875	4	28.461	41.556	0.685 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.500	2	3.016	13.050	0.231 ✓	1.05	Member Block Shear
T13	100	Leg	A325N	1.000	4	34.743	54.517	0.637 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.500	2	3.350	14.070	0.238 ✓	1.05	Member Block Shear
T14	80	Leg	A325N	1.000	4	40.381	54.517	0.741 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	7.939	13.920	0.570 ✓	1.05	Gusset Bearing
T15	60	Leg	A325N	1.000	6	30.502	54.517	0.559 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	8.533	13.920	0.613 ✓	1.05	Gusset Bearing
		Secondary Horizontal	A325N	0.625	1	3.859	10.440	0.370 ✓	1.05	Member Bearing
T16	40	Diagonal	A325N	0.625	1	8.493	13.920	0.610 ✓	1.05	Gusset Bearing
T17	30	Leg	A325N	1.000	6	34.113	54.517	0.626 ✓	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	9.196	13.920	0.661 ✓	1.05	Gusset Bearing
		Secondary Horizontal	A325N	0.625	1	4.343	10.440	0.416 ✓	1.05	Member Bearing
T18	20	Diagonal	A325N	0.625	2	4.895	13.806	0.355 ✓	1.05	Bolt Shear

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

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	190 - 180	P2STD	10'	4'7"	69.9 K=1.00	1.075	-3.042	33.837	0.090 [1] ✓
T2	180 - 160	ROHN 2 STD	20'	4'	61.0 K=1.00	1.075	-34.581	36.842	0.939 [1] ✓
T3	160 - 155	ROHN 2.5 EH	5'3/32"	5'3/32"	65.0 K=1.00	2.254	-43.758	74.429	0.588 [1] ✓
T4	155 - 150	ROHN 2.5 EH	5'3/32"	5'3/32"	65.0 K=1.00	2.254	-52.064	74.427	0.700 [1] ✓
T5	150 - 145	ROHN 2.5 EH	5'3/32"	5'3/32"	65.0 K=1.00	2.254	-61.631	74.427	0.828 [1] ✓
T6	145 - 140	ROHN 2.5 EH	5'3/32"	2'6-31/32"	33.5 K=1.00	2.254	-71.068	93.410	0.761 [1] ✓
T7	140 - 133.333	ROHN 3 EH	6'8-1/8"	6'8-1/8"	70.5 K=1.00	3.016	-81.817	94.342	0.867 [1] ✓
T8	133.333 - 126.667	ROHN 3 EH	6'8-1/8"	3'5-15/32"	36.5 K=1.00	3.016	-94.264	123.118	0.766 [1] ✓
T9	126.667 - 120	ROHN 3 EH	6'8-1/8"	3'5-3/8"	18.2 K=0.50	3.016	-105.260	132.466	0.795 [1] ✓
T10	120 - 113.333	ROHN 3.5 EH	6'8-1/8"	3'5-5/16"	31.6 K=1.00	3.678	-116.946	153.863	0.760 [1] ✓
T11	113.333 - 106.667	ROHN 3.5 EH	6'8-1/8"	3'5-1/4"	31.6 K=1.00	3.678	-127.297	153.899	0.827 [1] ✓
T12	106.667 - 100	BT100140- Rohn 3.5EH w/ 2" SR	6'8-1/8"	6'8-1/8"	61.4 K=0.78	6.820	-138.587	232.935	0.595 [1] ✓
T13	100 - 80	BT100140- Rohn 4EH w/ 2" SR	20'7/16"	6'8-5/32"	54.6 K=0.80	7.549	-168.647	273.092	0.618 [1] ✓
T14	80 - 60	BT100140- Rohn 5EH w/ 2" SR (60-80)	20'13/32"	10'7/32"	65.5 K=0.83	9.253	-195.684	304.198	0.643 [1] ✓
T15	60 - 40	BT100140- Rohn 5EH w/ 2" SR (40-60)	20'7/16"	5'1-13/16"	34.5 K=0.85	9.253	-222.524	381.660	0.583 [1] ✓
T16	40 - 30	BT100140- Rohn 6EHS w/ 2" SR (30-40)	10'7/32"	10'7/32"	55.0 K=0.85	9.855	-237.931	355.524	0.669 [1] ✓
T17	30 - 20	BT100140- Rohn 6EHS w/ 2" SR (20-30)	10'7/32"	5'1-19/32"	28.2 K=0.85	9.855	-250.410	418.472	0.598 [1] ✓
T18	20 - 0	BT100140- Rohn 6EH w/ 2" SR	20'13/32"	10'7/32"	55.0 K=0.87	11.547	-278.858	416.534	0.669 [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	190 - 180	L2x2x1/4	7'11-5/8"	3'9-1/8"	116.6 K=1.01	0.938	-1.173	19.764	0.059 [1] ✔
T2	180 - 160	L2x2x1/4	7'8-3/16"	3'7-15/32"	113.4 K=1.02	0.938	-5.267	20.877	0.252 [1] ✔
T3	160 - 155	L1 3/4x1 3/4x3/16	8'5-7/16"	4'1-9/16"	144.3 K=1.00	0.621	-4.270	8.534	0.500 [1] ✔
T4	155 - 150	L1 3/4x1 3/4x3/16	8'10-7/16"	4'4-3/32"	151.7 K=1.00	0.621	-4.092	7.728	0.529 [1] ✔
T5	150 - 145	L2x2x1/4	9'3-9/16"	4'6-5/8"	139.7 K=1.00	0.938	-5.105	13.748	0.371 [1] ✔
T6	145 - 140	2L1 3/4x1 3/4x3/16x3/16	9'8-25/32"	4'10-1/2"	185.2 K=1.00	1.242	-4.864	10.250	0.475 [1] ✔
T7	140 - 133.333	2L 'a' > 28.068 in - 87 2L2x2x3/16x1/2	11'1-7/8"	5'5-9/32"	105.8 K=1.00	1.430	-5.976	32.698	0.183 [1] ✔
T8	133.333 - 126.667	2L 'a' > 31.235 in - 99 2L2x2x3/16x1/2	11'8-15/32"	5'10-9/16"	114.3 K=1.00	1.430	-6.087	29.769	0.204 [1] ✔
T9	126.667 - 120	2L 'a' > 33.766 in - 108 2L2x2x3/16x1/2	12'3-7/32"	6'1-15/16"	119.8 K=1.00	1.430	-6.475	27.776	0.233 [1] ✔
T10	120 - 113.333	2L 'a' > 35.377 in - 120 2L2 1/2x2 1/2x3/16x1/2	12'10-1/8"	6'5-3/32"	100.2 K=1.00	1.805	-6.338	41.764	0.152 [1] ✔
T11	113.333 - 106.667	2L 'a' > 36.772 in - 132 2L2 1/2x2 1/2x3/16x1/2	13'5-5/32"	6'8-5/8"	104.8 K=1.00	1.805	-6.778	39.969	0.170 [1] ✔
T12	106.667 - 100	2L 'a' > 38.454 in - 144 2L2 1/2x2 1/2x3/16x1/2	14'5/16"	6'10-3/16"	106.8 K=1.00	1.805	-5.958	39.141	0.152 [1] ✔
T13	100 - 80	2L 'a' > 39.199 in - 156 2L3x3x3/16x1/2	15'10-21/32"	7'9-5/32"	101.9 K=1.00	2.180	-6.604	46.595	0.142 [1] ✔
T14	80 - 60	2L 'a' > 44.357 in - 165 2L3x3x3/16x1/4	19'1-3/16"	9'5-7/16"	127.6 K=1.00	2.180	-7.927	34.378	0.231 [1] ✔
T15	60 - 40	2L 'a' > 54.001 in - 186 2L3x3x1/4x1/4	20'10-5/8"	10'5-11/16"	141.5 K=1.00	2.875	-9.319	39.600	0.235 [1] ✔
T16	40 - 30	2L 'a' > 60.029 in - 201 2L3 1/2x3 1/2x1/4x1/4	21'9-15/32"	10'8-31/32"	125.0 K=1.00	3.375	-8.582	57.513	0.149 [1] ✔
T17	30 - 20	2L 'a' > 61.473 in - 222 2L3 1/2x3 1/2x1/4x1/4	22'8-1/4"	11'3-25/32"	131.6 K=1.00	3.375	-10.514	52.338	0.201 [1] ✔
T18	20 - 0	2L 'a' > 64.727 in - 231 L4x4x1/4	24'6"	12'9/32"	166.9 K=0.92	1.940	-9.790	19.935	0.491 [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

Secondary 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 $\frac{P_u}{\phi P_n}$
T6	145 - 140	L2x2x1/4	8'4-3/32"	4'19/32"	124.3 K=1.00	0.938	-1.233	17.377	0.071 [1] ✔
T8	133.333 - 126.667	L2x2x1/4	9'7-9/32"	4'7-29/32"	143.0 K=1.00	0.938	-1.635	13.136	0.124 [1] ✔
T9	126.667 - 120	L2 1/2x2 1/2x1/4	10'3-7/16"	4'11-31/32"	122.1 K=1.00	1.190	-1.826	22.748	0.080 [1] ✔
T10	120 - 113.333	L2 1/2x2 1/2x1/4	10'11-19/32"	5'3-25/32"	129.9 K=1.00	1.190	-2.028	20.180	0.101 [1] ✔
T11	113.333 - 106.667	L2 1/2x2 1/2x1/4	11'7-3/4"	5'7-7/8"	138.2 K=1.00	1.190	-2.208	17.822	0.124 [1] ✔
T15	60 - 40	L3x3x1/4	18'3-13/16"	8'11-1/8"	181.0 K=1.00	1.440	-3.859	12.586	0.307 [1] ✔
T17	30 - 20	L3 1/2x3 1/2x1/4	20'4-3/16"	9'10-25/32"	171.2 K=1.00	1.690	-4.343	16.511	0.263 [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	190 - 180	L2x2x1/4	6'6-1/4"	6'1-3/8"	187.7 K=1.00	0.938	-0.378	7.624	0.050 [1] ✔
T2	180 - 160	L2x2x1/8	6'6-1/4"	6'1-3/8"	184.6 K=1.00	0.484	-0.599	4.070	0.147 [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	190 - 180	P2STD	10'	5-1/2"	7.0	1.075	1.450	48.354	0.030 [1]
T2	180 - 160	ROHN 2 STD	20'	4'	61.0	1.075	24.123	48.354	0.499 [1]
T3	160 - 155	ROHN 2.5 EH	5'3/32"	5'3/32"	65.0	2.254	32.767	101.409	0.323 [1]
T4	155 - 150	ROHN 2.5 EH	5'3/32"	5'3/32"	65.0	2.254	40.272	101.409	0.397 [1]
T5	150 - 145	ROHN 2.5 EH	5'3/32"	5'3/32"	65.0	2.254	47.262	101.409	0.466 [1]
T6	145 - 140	ROHN 2.5 EH	5'3/32"	2'5-1/8"	31.5	2.254	55.636	101.409	0.549 [1]
T7	140 - 133.333	ROHN 3 EH	6'8-1/8"	6'8-1/8"	70.5	3.016	64.652	135.717	0.476 [1]
T8	133.333 - 126.667	ROHN 3 EH	6'8-1/8"	3'2-21/32"	34.0	3.016	75.296	135.717	0.555 [1]
T9	126.667 - 120	ROHN 3 EH	6'8-1/8"	3'2-3/4"	34.1	3.016	85.228	135.717	0.628 [1]
T10	120 - 113.333	ROHN 3.5 EH	6'8-1/8"	3'2-27/32"	29.7	3.678	95.254	165.529	0.575 [1]
T11	113.333 - 106.667	ROHN 3.5 EH	6'8-1/8"	3'2-29/32"	29.8	3.678	104.408	165.529	0.631 [1]
T12	106.667 - 100	BT100140- Rohn 3.5EH w/ 2" SR	6'8-1/8"	6'8-1/8"	78.7	6.820	113.843	306.900	0.371 [1]
T13	100 - 80	BT100140- Rohn 4EH w/ 2" SR	20'7/16"	6'8-5/32"	68.3	7.549	138.973	339.705	0.409 [1]
T14	80 - 60	BT100140- Rohn 5EH w/ 2" SR (60-80)	20'13/32"	10'7/32"	78.9	9.253	161.523	416.385	0.388 [1]
T15	60 - 40	BT100140- Rohn 5EH w/ 2" SR (40-60)	20'7/16"	4'10-13/32"	38.4	9.253	183.308	416.385	0.440 [1]
T16	40 - 30	BT100140- Rohn 6EHS w/ 2" SR (30-40)	10'7/32"	10'7/32"	64.7	9.855	195.208	443.471	0.440 [1]
T17	30 - 20	BT100140- Rohn 6EHS w/ 2" SR (20-30)	10'7/32"	4'10-5/8"	31.5	9.855	204.981	443.471	0.462 [1]
T18	20 - 0	BT100140- Rohn 6EH w/ 2" SR	20'13/32"	10'7/32"	63.6	11.547	227.245	519.615	0.437 [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	190 - 180	L2x2x1/4	7'11-5/8"	3'9-1/8"	76.1	0.586	1.111	28.583	0.039 [1]
T2	180 - 160	L2x2x1/4	7'8-3/16"	3'7-15/32"	73.4	0.586	5.033	28.583	0.176 [1]
T3	160 - 155	L1 3/4x1 3/4x3/16	8'5-7/16"	4'1-9/16"	94.6	0.378	4.101	16.440	0.249 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	155 - 150	L1 3/4x1 3/4x3/16	8'10-7/16"	4'4-3/32"	99.3	0.378	4.201	16.440	0.256 [1]
T5	150 - 145	L2x2x1/4	9'3-9/16"	4'6-5/8"	91.8	0.586	4.885	28.583	0.171 [1]
T6	145 - 140	2L1 3/4x1 3/4x3/16x3/16	9'8-25/32"	4'10-1/2"	109.0	0.756	5.018	32.880	0.153 [1]
T7	140 - 133.333	2L 'a' > 28.068 in - 88 2L2x2x3/16x1/2	11'1-7/8"	5'5-9/32"	109.0	0.896	5.772	38.997	0.148 [1]
T8	133.333 - 126.667	2L 'a' > 31.235 in - 100 2L2x2x3/16x1/2	11'8-15/32"	5'10-9/16"	114.3	0.896	6.051	38.997	0.155 [1]
T9	126.667 - 120	2L 'a' > 33.766 in - 109 2L2x2x3/16x1/2	12'3-7/32"	6'1-15/16"	119.8	0.896	6.014	38.997	0.154 [1]
T10	120 - 113.333	2L 'a' > 35.377 in - 121 2L2 1/2x2 1/2x3/16x1/2	12'10-1/8"	6'5-3/32"	99.1	1.178	6.183	51.231	0.121 [1]
T11	113.333 - 106.667	2L 'a' > 36.772 in - 133 2L2 1/2x2 1/2x3/16x1/2	13'5-5/32"	6'8-5/8"	103.6	1.178	6.182	51.231	0.121 [1]
T12	106.667 - 100	2L 'a' > 38.454 in - 145 2L2 1/2x2 1/2x3/16x1/2	14'5/16"	6'10-3/16"	108.2	1.178	6.032	51.231	0.118 [1]
T13	100 - 80	2L 'a' > 39.199 in - 157 2L3x3x3/16x1/2	15'10-21/32"	7'9-5/32"	101.3	1.459	6.700	63.466	0.106 [1]
T14	80 - 60	2L 'a' > 44.357 in - 166 2L3x3x3/16x1/4	19'1-3/16"	9'5-7/16"	122.3	1.424	7.939	61.937	0.128 [1]
T15	60 - 40	2L 'a' > 54.001 in - 187 2L3x3x1/4x1/4	19'11-23/32"	10'5/16"	129.3	1.875	8.533	91.406	0.093 [1]
T16	40 - 30	2L 'a' > 57.451 in - 211 2L3 1/2x3 1/2x1/4x1/4	21'9-15/32"	10'8-31/32"	119.5	2.250	8.493	109.688	0.077 [1]
T17	30 - 20	2L 'a' > 61.473 in - 223 2L3 1/2x3 1/2x1/4x1/4	22'8-1/4"	11'3-25/32"	124.4	2.250	9.196	109.688	0.084 [1]
T18	20 - 0	2L 'a' > 64.727 in - 232 L4x4x1/4	24'6"	12'9/32"	117.3	1.314	9.180	64.076	0.143 [1]

[1] P_u / ϕP_n controls

Secondary 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 $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T6	145 - 140	L2x2x1/4	8'4-3/32"	4'19/32"	159.6	0.563	1.233	27.440	0.045 [1] ✓
T8	133.333 - 126.667	L2x2x1/4	9'7-9/32"	4'7-29/32"	183.6	0.563	1.635	27.440	0.060 [1] ✓
T9	126.667 - 120	L2 1/2x2 1/2x1/4	10'3-7/16"	4'11-31/32"	156.0	0.752	1.826	32.707	0.056 [1] ✓
T10	120 - 113.333	L2 1/2x2 1/2x1/4	10'11-19/32"	5'3-25/32"	165.9	0.752	2.028	32.707	0.062 [1] ✓
T11	113.333 - 106.667	L2 1/2x2 1/2x1/4	11'7-3/4"	5'7-7/8"	176.5	0.752	2.208	32.707	0.068 [1] ✓
T15	60 - 40	L3x3x1/4	17'3-5/16"	8'4-7/8"	216.9	0.939	3.859	40.863	0.094 [1] ✓
T17	30 - 20	L3 1/2x3 1/2x1/4	20'4-3/16"	9'10-25/32"	218.0	1.127	4.343	49.019	0.089 [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	190 - 180	L2x2x1/4	6'6-1/4"	6'1-3/8"	124.6	0.586	0.298	28.583	0.010 [1] ✓
T2	180 - 160	L2x2x1/8	6'6-1/4"	6'1-3/8"	121.2	0.305	0.599	13.254	0.045 [1] ✓

[1] P_u / ϕP_n controls

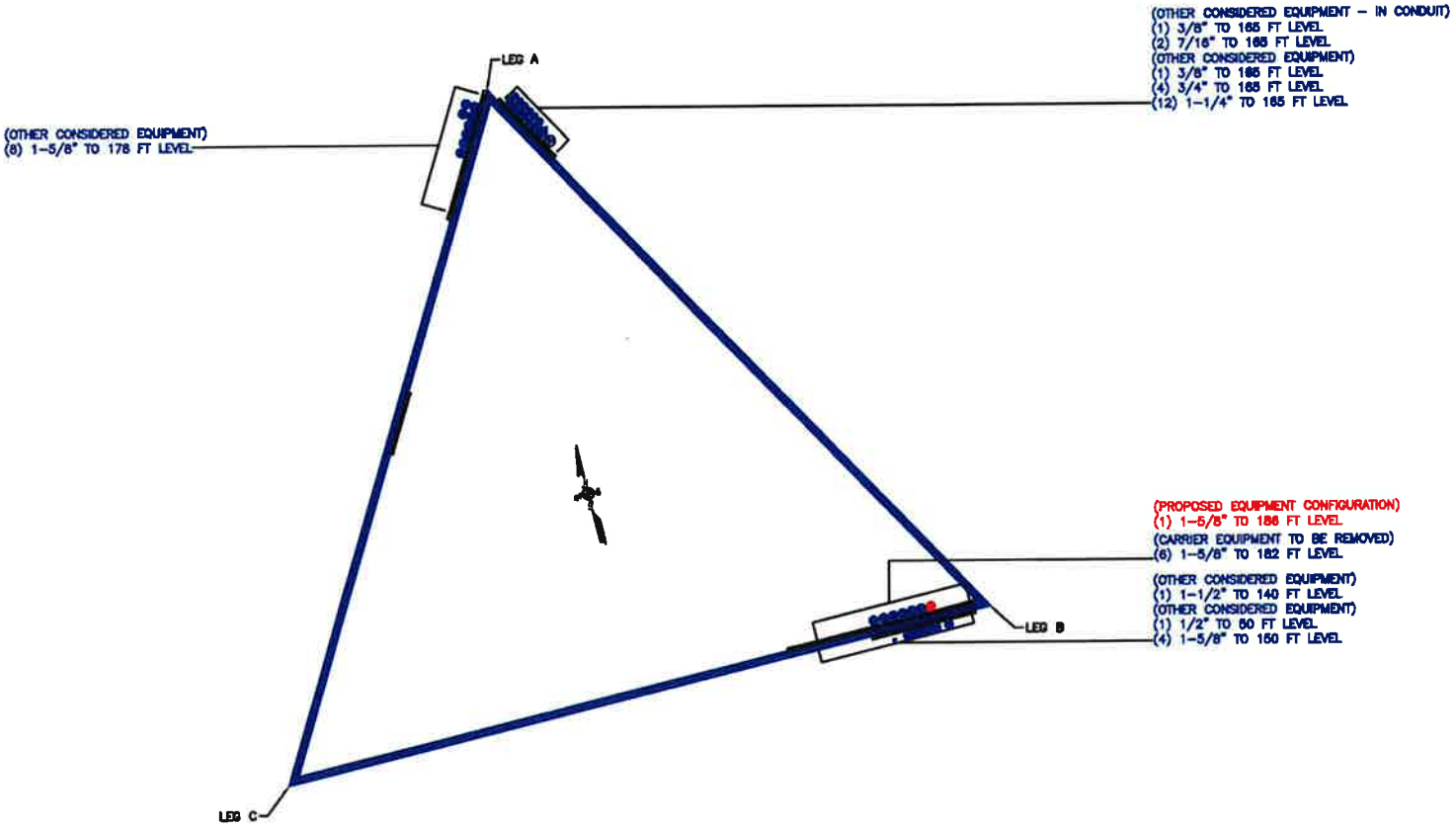
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	190 - 180	Leg	P2STD	1	-4.194	50.591	9.3	Pass
T2	180 - 160	Leg	ROHN 2 STD	21	-34.581	38.684	89.4	Pass
T3	160 - 155	Leg	ROHN 2.5 EH	57	-43.758	78.151	56.0	Pass
T4	155 - 150	Leg	ROHN 2.5 EH	65	-52.064	78.148	66.6	Pass
T5	150 - 145	Leg	ROHN 2.5 EH	74	-61.631	78.149	78.9	Pass
T6	145 - 140	Leg	ROHN 2.5 EH	83	-71.068	98.081	72.5	Pass
T7	140 - 133.333	Leg	ROHN 3 EH	95	-81.817	99.059	82.6	Pass
T8	133.333 - 126.667	Leg	ROHN 3 EH	104	-94.264	129.274	72.9	Pass
T9	126.667 - 120	Leg	ROHN 3 EH	116	-105.260	139.089	75.7	Pass
T10	120 - 113.333	Leg	ROHN 3.5 EH	128	-116.946	161.556	72.4	Pass
T11	113.333 - 106.667	Leg	ROHN 3.5 EH	140	-127.297	161.594	78.8	Pass
T12	106.667 - 100	Leg	BT100140- Rohn 3.5EH w/ 2" SR	152	-138.587	244.582	56.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T13	100 - 80	Leg	BT100140- Rohn 4EH w/ 2" SR	161	-168.647	286.747	58.8	Pass
T14	80 - 60	Leg	BT100140- Rohn 5EH w/ 2" SR (60-80)	182	-195.684	319.408	61.3	Pass
T15	60 - 40	Leg	BT100140- Rohn 5EH w/ 2" SR (40-60)	197	-222.524	400.743	55.5	Pass
T16	40 - 30	Leg	BT100140- Rohn 6EHS w/ 2" SR (30-40)	218	-237.931	373.300	63.7	Pass
T17	30 - 20	Leg	BT100140- Rohn 6EHS w/ 2" SR (20-30)	227	-250.410	439.396	57.0	Pass
T18	20 - 0	Leg	BT100140- Rohn 6EH w/ 2" SR	239	-278.858	437.361	63.8	Pass
T1	190 - 180	Diagonal	L2x2x1/4	7	-1.173	20.752	5.7	Pass
T2	180 - 160	Diagonal	L2x2x1/4	28	-5.267	21.921	24.0	Pass
T3	160 - 155	Diagonal	L1 3/4x1 3/4x3/16	60	-4.270	8.960	47.7	Pass
T4	155 - 150	Diagonal	L1 3/4x1 3/4x3/16	69	-4.092	8.115	50.4	Pass
T5	150 - 145	Diagonal	L2x2x1/4	78	-5.105	14.435	35.4	Pass
T6	145 - 140	Diagonal	2L1 3/4x1 3/4x3/16x3/16	87	-4.864	10.763	45.2	Pass
T7	140 - 133.333	Diagonal	2L2x2x3/16x1/2	99	-5.976	34.333	17.4	Pass
T8	133.333 - 126.667	Diagonal	2L2x2x3/16x1/2	108	-6.087	31.258	19.5	Pass
T9	126.667 - 120	Diagonal	2L2x2x3/16x1/2	120	-6.475	29.165	22.2	Pass
T10	120 - 113.333	Diagonal	2L2 1/2x2 1/2x3/16x1/2	132	-6.338	43.852	14.5	Pass
T11	113.333 - 106.667	Diagonal	2L2 1/2x2 1/2x3/16x1/2	144	-6.778	41.968	16.1	Pass
T12	106.667 - 100	Diagonal	2L2 1/2x2 1/2x3/16x1/2	156	-5.958	41.098	14.5	Pass
T13	100 - 80	Diagonal	2L3x3x3/16x1/2	165	-6.604	48.925	13.5	Pass
T14	80 - 60	Diagonal	2L3x3x3/16x1/4	186	-7.927	36.097	22.0	Pass
T15	60 - 40	Diagonal	2L3x3x1/4x1/4	201	-9.319	41.581	22.4	Pass
T16	40 - 30	Diagonal	2L3 1/2x3 1/2x1/4x1/4	222	-8.582	60.389	14.2	Pass
T17	30 - 20	Diagonal	2L3 1/2x3 1/2x1/4x1/4	231	-10.514	54.955	19.1	Pass
T18	20 - 0	Diagonal	L4x4x1/4	243	-9.790	20.932	46.8	Pass
T6	145 - 140	Secondary Horizontal	L2x2x1/4	91	-1.233	18.245	6.8	Pass
T8	133.333 - 126.667	Secondary Horizontal	L2x2x1/4	112	-1.635	13.793	11.9	Pass
T9	126.667 - 120	Secondary Horizontal	L2 1/2x2 1/2x1/4	124	-1.826	23.886	7.6	Pass
T10	120 - 113.333	Secondary Horizontal	L2 1/2x2 1/2x1/4	136	-2.028	21.189	9.6	Pass
T11	113.333 - 106.667	Secondary Horizontal	L2 1/2x2 1/2x1/4	148	-2.208	18.713	11.8	Pass
T15	60 - 40	Secondary Horizontal	L3x3x1/4	205	-3.859	13.215	29.2	Pass
T17	30 - 20	Secondary Horizontal	L3 1/2x3 1/2x1/4	235	-4.343	17.337	25.0	Pass
T1	190 - 180	Top Girt	L2x2x1/4	5	-0.378	8.005	4.7	Pass
T2	180 - 160	Top Girt	L2x2x1/8	23	-0.599	4.273	14.0	Pass
							Summary	
						Leg (T2)	89.4	Pass
						Diagonal (T4)	50.4	Pass
						Secondary Horizontal (T15)	29.2	Pass
						Top Girt (T2)	14.0	Pass
						Bolt Checks	70.5	Pass
						RATING =	**89.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT – IN CONDUIT)
(1) 3/8" TO 165 FT LEVEL
(2) 7/16" TO 165 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 165 FT LEVEL
(4) 3/4" TO 165 FT LEVEL
(12) 1-1/4" TO 165 FT LEVEL
LEG A
(OTHER CONSIDERED EQUIPMENT)
(8) 1-5/8" TO 178 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-5/8" TO 186 FT LEVEL
(CARRIER EQUIPMENT TO BE REMOVED)
(6) 1-5/8" TO 182 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-1/2" TO 140 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 60 FT LEVEL
(4) 1-5/8" TO 150 FT LEVEL
LEG B
LEG C

APPENDIX C

ADDITIONAL CALCULATIONS

PROJECT	**100140.021.01.0001 - HRT 080 953381, CT**
SUBJECT	**Bolted Angle Connection Analysis**
DATE	**12-08-22** PAGE 1 OF 1

v2.5.0

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

TIA-222 Rev.	H
Apply TIA-222-H Section 15.5?	Yes

Max Rating	19.0%

	Elevation (ft)	Component	Angle			Bolt						Coping Dimensions (In)						Tens. Load (k)	Comp. Load (k)	Tens. Capacity (k)	Comp. Capacity (k)	Rating	Limit State
			Qty	Size	Grade	Qty	Size	Grade	Edge Dist. (in)	Gage (in)	Pitch (in)	Coping	A	B	C	D	E						
1	120 - 126.7	Redundant Horizontal	1	L2X2X1/4	A36	1	5/8	A325N	Auto Calc	Auto Calc		Allowable						1.82	1.82	9.11	13.81	19.0%	Tension - Mbr. Block Shear
2	120 - 126.7	Redundant Diagonal	1	L2X2X1/4	A36	1	5/8	A325N	Auto Calc	Auto Calc		Allowable						1.11	1.18	9.11	13.81	11.6%	Tension - Mbr. Block Shear

PROJECT **100140.021.01.0001 - HRT 080 953381, CT**

SUBJECT **Reinforced Tower Legs**

DATE **12-08-22**

v3.4.2

B+T GRP
1717 S Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Tower Information	
TIA-222 Rev.	H
Apply TIA-222-H Section 15.5	Yes

Calculation Type	Original Member		Modification				BP & Angle?	Section Geometry															Leg Capacity								Results
								Custom Area Input			Custom MOIxx Input			Custom MOIyy Input																	
	Elevation (ft)	Leg Type	Type	Analysis Method	Intermediate Connection	Leg Crushing?		Area$_{LEG}$ (in^2)	Area$_{WEB}$ (in^2)	Area$_{Gusset}$ (in^2)	I_{xx} (in^4)	I_{WEB} (in^4)	I_{Gusset} (in^4)	I_{LEG} (in^4)	I_{WEB} (in^4)	I_{Gusset} (in^4)	Leg Comp Load Pu (k)	Leg Fy (ksi)	Reinf Fy (ksi)	L (in)	a (in)	Gap (in)	K Leg	K Mod	K Comp	Custom h (in)	Fe (ksi)	Fcr (ksi)	Φ	Leg Crushing Capacity (k)	Reinf Leg Tension Yield Capacity (k)	Reinf Leg Comp Capacity (k)	Original Leg Capacity (k)	Spacing Req	Leg Load Final Rating	
Analysis	100-110 7	Custom	Custom	Parallel	Pinned	No	No	3 69	3 14	6 82	6 3	0 8	144 3	6 3	0 8	7 1	138 59	50	105	80 1	36 0	0 0	1 0	1 00	1 0		11 1456	9 8	0 90		462 8	233 0	126 0	Exceeded @ 4 13	56 7%	Passing
Analysis	80-100	Custom	Custom	Parallel	Pinned	No	No	4 41	3 14	7 55	9 6	0 8	167 3	9 6	0 8	10 4	168 65	50	105	80 7	36 0	0 0	1 0	1 00	1 0		11 1369	9 8	0 90		495 2	273 9	159 9	Exceeded @ 4 23	58 6%	Passing
Analysis	60-80	Custom	Custom	Parallel	Pinned	No	No	6 11	3 14	9 25	20 7	0 8	220 0	20 7	0 8	21 5	195 68	50	105	120 2	36 0	0.0	1 0	1 00	1 0		4 951	4 3	0 90		571 8	304 6	201 2	Exceeded @ 2 92	64 2%	Passing
Analysis	40 60	Custom	Custom	Parallel	Pinned	No	No	6 11	3 14	9 25	20 7	0 8	220 0	20 7	0 8	21 5	222 52	50	105	61 8	36 0	0 0	1 0	1 00	1 0		18 7727	16 4	0 90		571 8	383 4	253 2	Exceeded @ 5 68	55 3%	Passing
Analysis	20-40	Custom	Custom	Parallel	Pinned	No	No	6 71	3.14	9 85	33 2	0 8	261 6	33 2	0 8	34 0	237 93	50	105	120 2	36.0	0 0	1 0	1 00	1 0		4 951	4 3	0.90		599 0	358 3	244 0	Exceeded @ 3 09	63 3%	Passing
Analysis	20 30	Custom	Custom	Parallel	Pinned	No	No	6 71	3 14	9 85	33 2	0 8	261 6	33 2	0 8	34 0	250 41	50	105	61 6	36 0	0 0	1 0	1 00	1 0		18 8614	16 5	0 90		599 0	419 3	285 6	Exceeded @ 6 02	56 9%	Passing
Analysis	0 20	Custom	Custom	Parallel	Pinned	No	No	8 40	3 14	11 55	40 5	0 8	284 5	40 5	0 8	41 3	278 86	50	105	120 7	36 0	0 0	1 0	1 00	1 0		4 951	4 3	0 90		674 9	417 3	303 6	Exceeded @ 2 97	63 6%	Passing

Anchor Rod Check for Self Supporting Towers

v8.4.4

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119

Site Data	
BU#:	806478
Site Name:	HRT 080 953381, CT
Order #:	608636 Rev. 4
TIA Rev.	H
Apply TIA-222-H Section 15.5	Yes
Seismic Design Category:	B
No. of Mods:	1
Grout Present:	No

Leg Base Reactions			
		Wind/Ice	
Download, Pu:		286.0	kips
Download Shear, Vu:		29.0	kips
Uplift, Pu:		232.0	kips
Uplift Shear, Vu:		25.0	kips

Anchor Rod Data				
	Existing	New 1		
Qty:	6	2		
Diam:	1	1		in
Rod Material:	A449 (1/4 to 1 Incl.)	A193 Gr B7		
l_{ar}	1.50	3.50		in
Do Mods Resist Shear?		No		
Strength (Fu):	120	125		ksi
Yield (Fy):	92	105		ksi
Gross Area (Ag):	4.71	1.57		in^2
Net Area (An):	3.64	1.21		in^2

Anchor Rod Calculations			
	Existing	New 1	
Put (k):	29.00	29.0	
ϕRnt (k):	54.54	56.8	
Puc (k):	35.75	35.8	
ϕRnc (k):	65.03	74.2	
ϕRnb (k):	64.58	71.1	
Uplift Vu (k):	4.17	0.0	
Download Vu (k):	4.83	0.0	
ϕRnv (k):	35.34	36.8	
ϕRnvc (k):	29.26	33.4	
Uplift Mu (k-in):	4.06	0.0	
Download Mu (k-in):	4.71	0.0	
ϕMn (k-in):	13.01	14.8	
Anchor Rod Stress Ratio:	**0.939**	**0.510**	

Anchor Rod Rating: 89.5% Pass

Eccentric Load Calculations		
e=	0	in

PROJECT	**100140.021.01.0001 - HRT 080 953381, CT**
SUBJECT	**Anchor Rod Bracket Analysis**
DATE	**12-08-22**
v4.6.1	

TIA-222 Rev.	H
Apply TIA-222-H Section 15.5?	Yes

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Analysis Criteria	
Design/Analysis	Analysis
Load Type	Current Load
Current load	29 kips
AR Capacity	74.2 kips

Tower Type	Self Support

Manufacturers Tower Prop.	
Leg Thickness	0.432 in
Leg Grade	A572-50
Fy	50 ksi
Fu	65 ksi
Base Plate Gr.	A36
Fy	36 ksi
Fu	58 ksi

Post-Installed Adhesive AR Mod.	
ARB Type	Welded
Size	1 in
Grade	A193 Gr B7
Fy	105 ksi
Fu	125 ksi

Anchor Rod Bracket Analysis Checks		
Tube Bearing	46.4%	-
Tube Compression	69.6%	-
Gusset Shear	10.5%	-
Gusset Flexure	13.7%	-
Welds: Gusset to Tower and BP	11.1%	-
Welds: Gusset to Tube	9.2%	-
Welds: Geometry	N/A	
Tower Punching	12.2%	-
Tube Punching	4.0%	-
Utilization	**69.6%**	

Bracket Properties

Gusset		Pipe/Tube		Weld - Gusset to Pipe/Tube	
Thickness	0.5 in	Size	L.25 SCh 80 Pipe	FEXX	70 ksi
Width at Tube	5.1875 in	Total Length	18 in	Weld Type	Double Fillet
Height at Leg	18 in	Length above Gusset	0 in	Fillet Size	3/8 in
Height at Tube	18 in	Length below Gusset	0 in		
Grade	A572-50	Grade	A500 Grade C (Square)		
Fy	50 ksi	Fy	50 ksi		
Fu	65 ksi	Fu	62 ksi		

Weld - Gusset to Tower		Weld - Gusset to Base Plate	
FEXX	70 ksi	Weld Type	Floating
Weld Type	CJP - Single Bevel		
Fillet Size	7/16 in		
Bevel Depth	7/16 in		

Pier and Pad Foundation

BU # :	806478
Site Name:	HRT 080 953381, C
App. Number:	608636 Rev. 4

TIA-222 Revision:	H
Tower Type:	Self Support

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	286	kips
Compression Shear, Vu_comp:	29	kips
Uplift, P_{uplift}:	232	kips
Uplift Shear, V_{u_uplift}:	25	kips
Tower Height, H:	190	ft
Base Face Width, BW:	22.8646	ft
BP Dist. Above Fdn, bp_{dist}:	2.5	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, dpier:	5	ft
Ext. Above Grade, E:	0.33333333	ft
Pier Rebar Size, Sc:	8	
Pier Rebar Quantity, mc:	18	
Pier Tie/Spiral Size, St:	3	
Pier Tie/Spiral Quantity, mt:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, D:	9.66666667	ft
Pad Width, W_1:	7.33333333	ft
Pad Thickness, T:	2	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	9	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	4	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, Fy:	60	ksi
Concrete Compressive Strength, F'c:	3	ksi
Dry Concrete Density, δc:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	122	pcf
Ultimate Net Bearing, Qnet:	30.000	ksf
Cohesion, Cu:	0.000	ksf
Friction Angle, φ:	32	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.4	
Neglected Depth, N:	3.33	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, gw:	N/A	ft

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Uplift (kips)	284.92	232.00	77.5%	Pass
Lateral (Sliding) (kips)	73.30	25.00	32.5%	Pass
Bearing Pressure (ksf)	23.38	6.95	28.3%	Pass
*Pier Flexure (Comp.) (kip*ft)*	2032.03	232.00	10.9%	Pass
*Pier Flexure (Tension) (kip*ft)*	1191.70	200.00	16.0%	Pass
Pier Compression (kip)	8751.60	322.00	3.5%	Pass
*Pad Flexure (kip*ft)*	337.92	27.28	7.7%	Pass
Pad Shear - 1-way (kips)	139.60	0.00	0.0%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.016	9.1%	Pass
*Flexural 2-way (Comp) (kip*ft)*	675.84	139.20	19.6%	Pass
Pad Shear - 2-way (Uplift) (ksi)	0.164	0.047	27.3%	Pass
*Flexural 2-way (Tension) (kip*ft)*	675.84	120.00	16.9%	Pass

*Rating per TIA-222-H Section 15.5

0.5% min steel assumed

0.18% min steel assumed

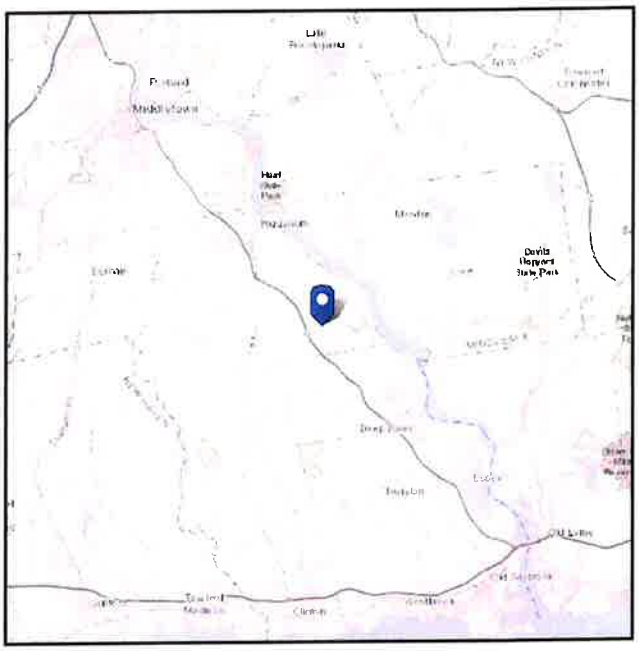
Structural Rating*:	27.3%
Soil Rating*:	77.5%

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 41.443056
Longitude: -72.506222
Elevation: 504.12 ft (NAVD 88)



Wind

Results:

Wind Speed	122 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	94 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: Wed Dec 07 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.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

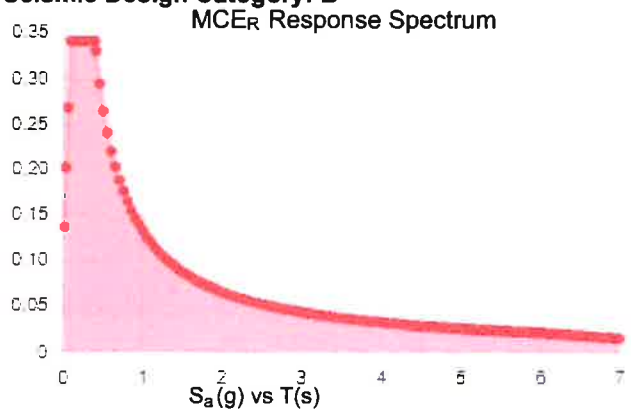
D - Stiff Soil

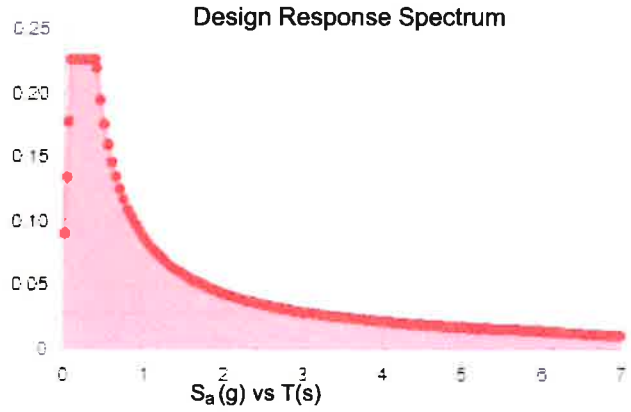
Site Soil Class:

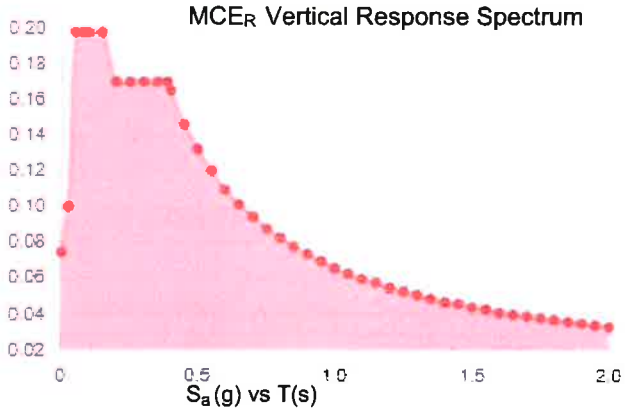
Results:

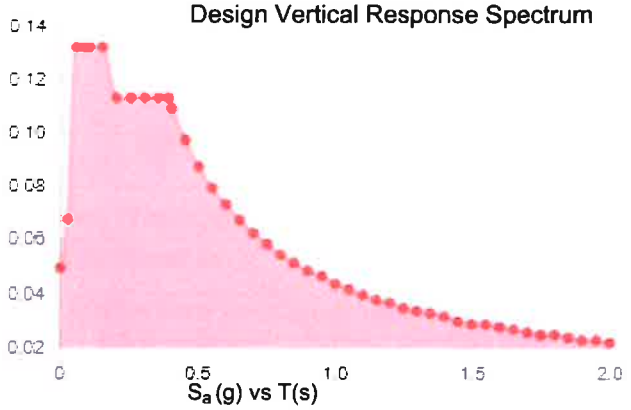
S_S :	0.214	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.12
F_v :	2.4	PGA_M :	0.187
S_{MS} :	0.342	F_{PGA} :	1.56
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.228	C_v :	0.727

Seismic Design Category: B









Data Accessed: **Wed Dec 07 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.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

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:	Wed Dec 07 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.

Date: December 14, 2022

MTS Engineering, P.L.L.C.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
towersupport@btgrp.com

Subject:	**Mount Analysis - Conditional Passing Report**	
Carrier Designation:	**T-Mobile Equipment Co-Locate**	
	Carrier Site Number:	CT11235A
	Carrier Site Name:	Haddam/Rt 9
Crown Castle Designation:	**BU Number:**	806478
	Site Name:	HRT 080 953381
	JDE Job Number:	709215
	Order Number:	608636, Rev. 4
Engineering Firm Designation:	**Report Designation:**	100140.022.01.0001
Site Data:	**539 Plains Rd, Haddam, CT, Middlesex County, 06438** **Latitude 41° 26' 35.00" Longitude -72° 30' 22.40"**	
Structure Information:	**Tower Height & Type:**	**190 ft. Self-Support Tower**
	Mount Elevation:	**186 ft.**
	Mount Type:	**12.5 ft. Sector Mount**

We are pleased to submit this **"Mount Analysis - Conditional Passing Report"** to determine the structural integrity of *T-Mobile*'s antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level to be:

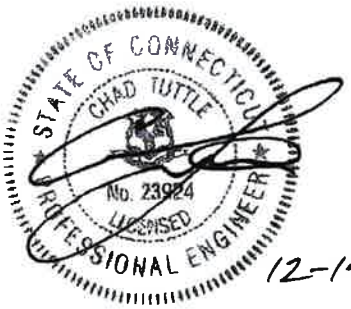
Sector Mount (typical) **Sufficient**
***Sufficient upon completion of the recommendations listed in the Section 4.1 of this report.**

This analysis utilizes an ultimate 3-second gust wind speed of 122 mph as required by the 2022 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Chris Guidry

Respectfully submitted by: MTS Engineering, P.L.L.C.
COA: PEC.0001564 Expires: 02/01/2023

Chad E. Tuttle, P.E.



12-14-22

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 3- sector 12.5' Sector Mount, designed by SitePro1 (Part# VFA12-HD)

2) ANALYSIS CRITERIA

Building Code:	2022 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	122 mph
Exposure Category:	B
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.214
Seismic S_1:	0.055
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 – Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Qty.	Manufacturer	Model / Type	Mount / Modification Details
186	186	3	RFS/Celwave	APXVAALL24_43-U-NA20_TMO	12.5 ft. Sector Mount
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO	
		3	Ericsson	Radio 4480_TMOV2	

Table 2 – Documents Provided

Document	Remarks	Reference	Source
CCI Order	Proposed Loading	Date: 04/20/2022	Crown Castle
RFDS		Date: 03/31/2022	
CD's By MTS Engineering, P.L.L.C.		Date: 11/08/2022	On File
Manufacturer Drawings	SitePro1 (Part# VFA12-HD)	Date: 12/13/2017	SitePro1

3) ANALYSIS PROCEDURE

3.1) Analysis Method

RISA-3D (Version 20.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed by MTS Engineering, P.L.L.C., was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Mount Analysis* (Revision E). In addition, this analysis is in accordance with OTHER SOW.

Manufacturers drawing were used to create the model.

3.2) Assumptions

1. The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design, TIA Standards, and/or manufacturer's specifications.
2. The configuration of antennas, mounts, and other appurtenances are as specified in Table-1.
3. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected members unless otherwise specified in this report.
4. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.
   The following assumptions have been included in the analysis of the mount:

Component	Section	Length	Note
Proposed Mount Pipe	2" Std. Pipe	10'-0"	In Pos.1 & Pos.4

5. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
6. Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
7. The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
8. The following material grades were assumed (Unless Noted Otherwise):
   (a) Connection Bolts : ASTM A325
   (b) Steel Pipe : ASTM A53 (GR. 35)
   (c) HSS (Round) : ASTM 500 (GR. B-42)
   (d) HSS (Rectangular) : ASTM 500 (GR. B-46)
   (e) Channel : ASTM A36 (GR. 36)
   (f) Steel Solid Rod : ASTM A36 (GR. 36)
   (g) Steel Plate : ASTM A36 (GR. 36)
   (h) Steel Angle : ASTM A36 (GR. 36)
   (i) UNISTRUT : ASTM A570 (GR. 33)

This analysis may be affected if any assumptions are not valid or have been made in error. MTS Engineering, P.L.L.C. should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Sector Mount)

Notes	Component	Centerline (ft.)	Critical Member	% Capacity	Pass / Fail
1,2	Main Horizontals	186	1	61.3	Pass
	Support Arm		21	37.7	Pass
	Connection Plates		19	40.3	Pass
	Verticals		31	80.7	Pass
	Diagonals		35	30.6	Pass
	Mount Pipes		41	51.4	Pass
	Tiebacks		44	9.3	Pass
3	Mount to Tower Connection		--	11.1	Pass

Structure Rating (max from all components) =	80.7%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical
3) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity reported.

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity[3] (lb)	Notes
61	Proposed	1637.49	Leg	P2STD	758.86	2
62	Proposed	739.96	Leg	P2STD	758.86	2

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

4.1) Recommendations

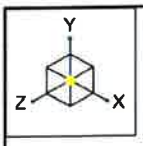
The proposed mount has sufficient capacity to support the proposed loading configuration. In order for the results of this analysis to be considered valid, the mount listed below shall be installed.

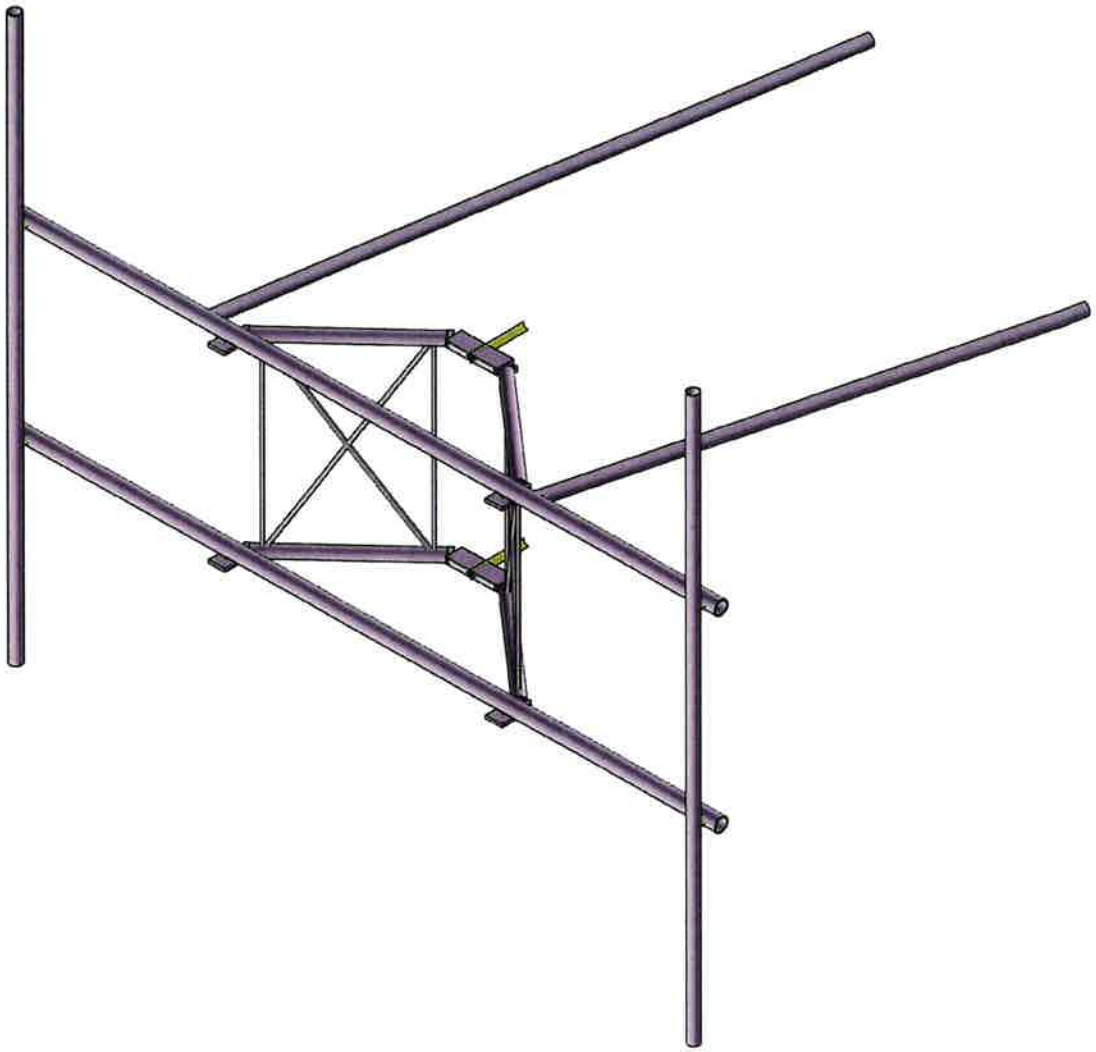
1. SitePro1 Part #VFA12-HD.

No structural modifications are required at this time.

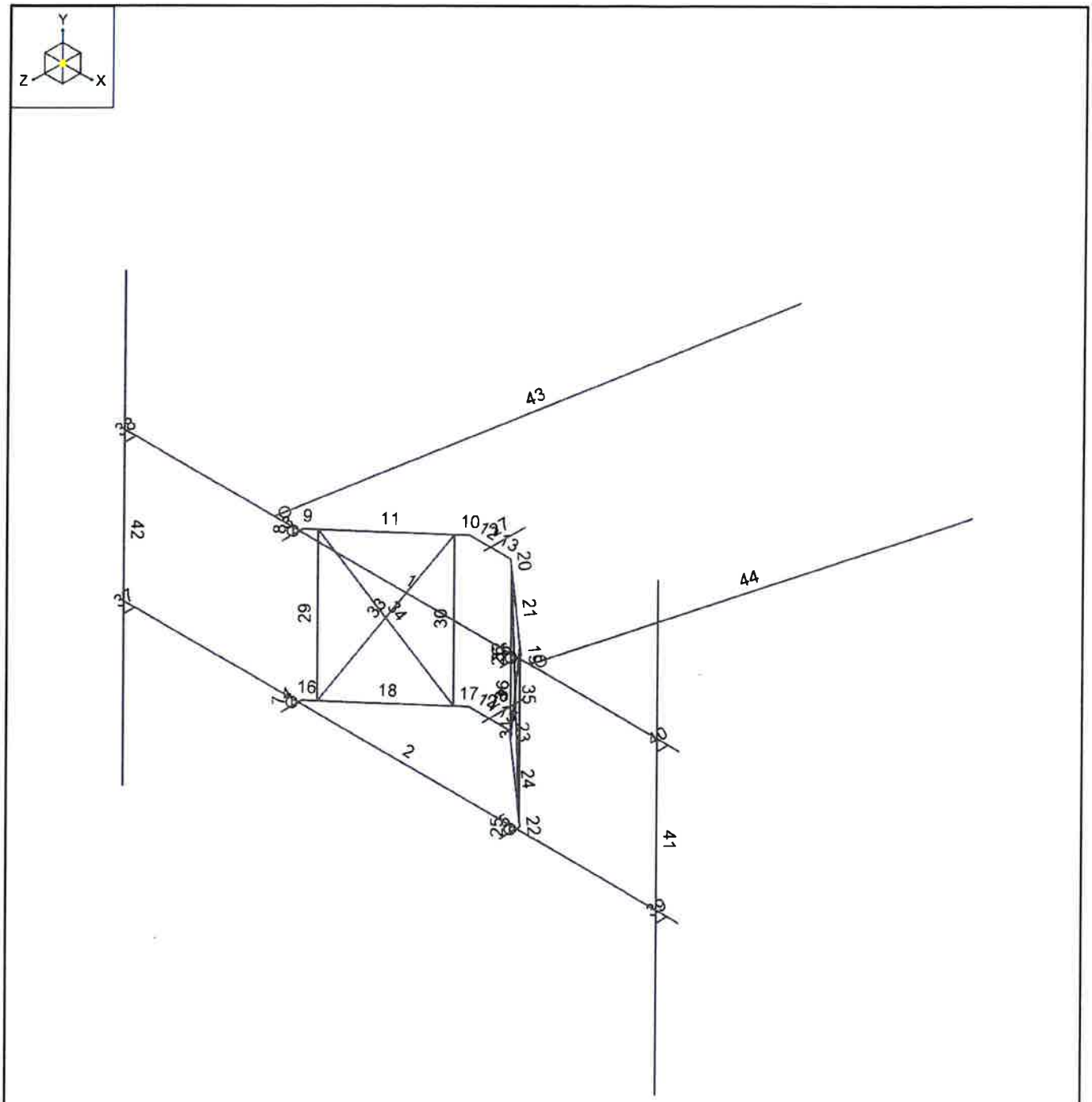
APPENDIX A

WIRE FRAME AND RENDERED MODELS

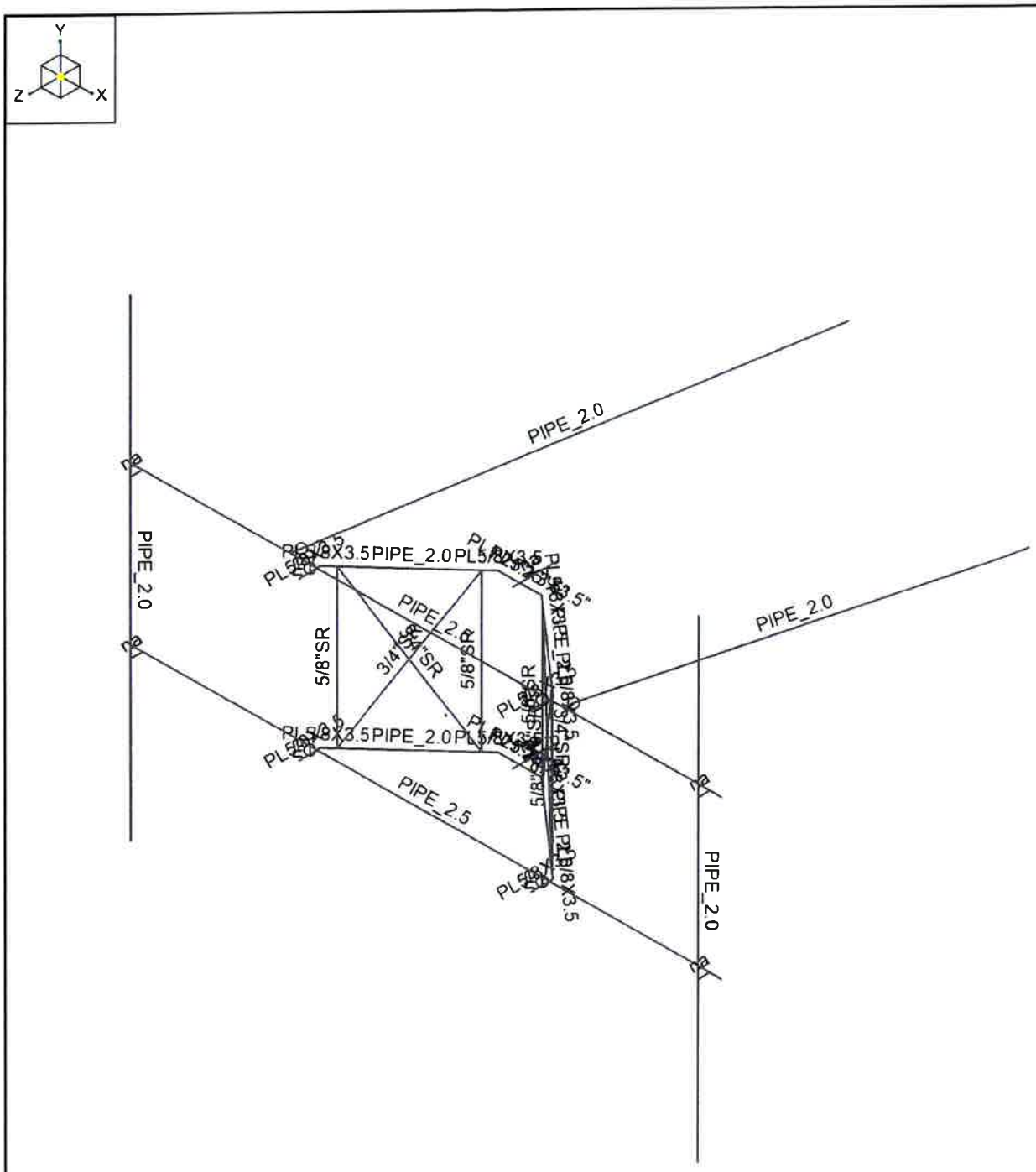




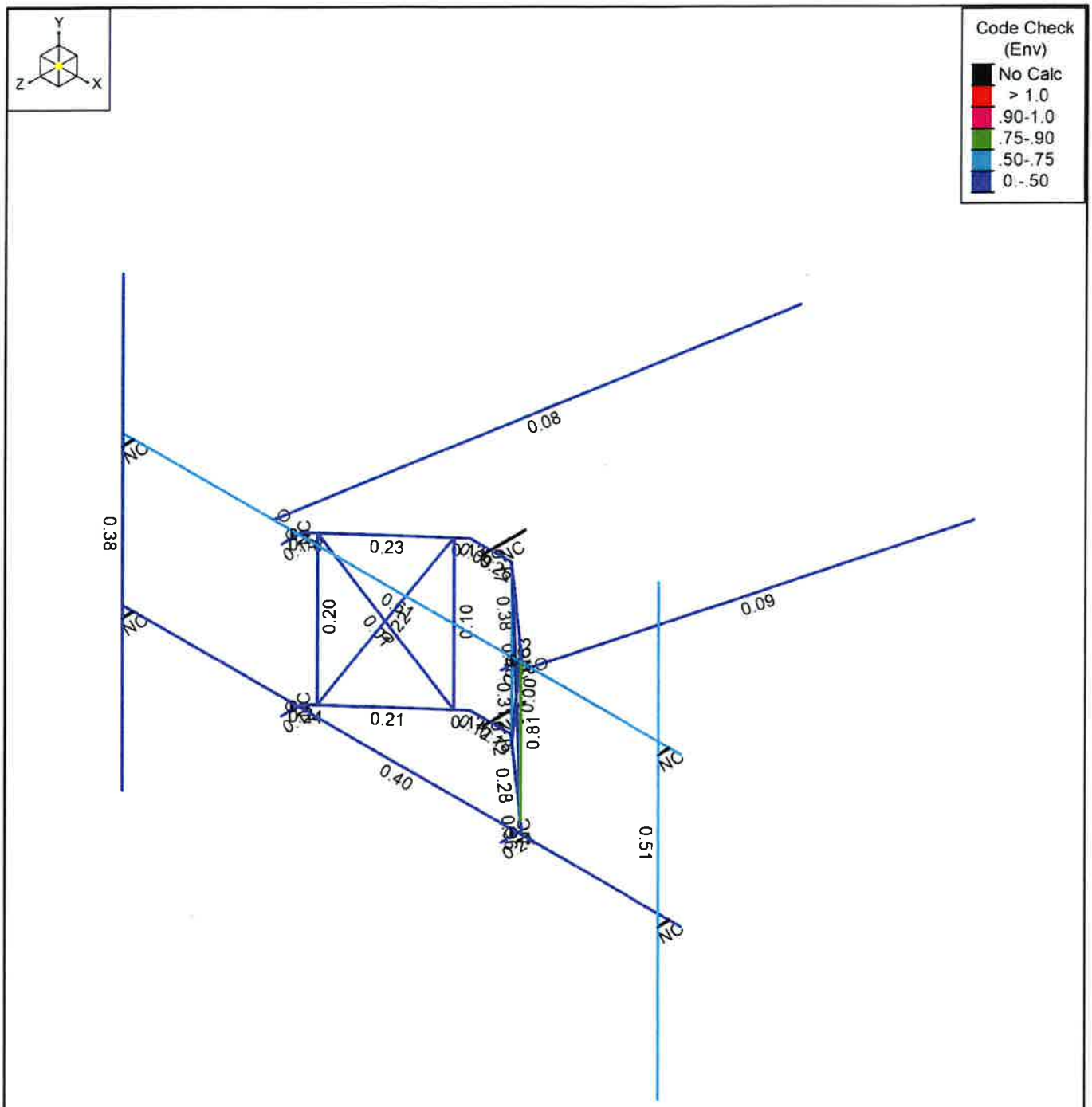
MTS Engineering, P.L.L.C.	806478 - HRT 080 953381	SK-1
AP		Dec 09, 2022
100140.022.01.0001		100140_022_01_0001_HRT 080 9...



MTS Engineering, P.L.L.C.	806478 - HRT 080 953381	SK-2
AP		Dec 09, 2022
100140.022.01.0001		100140_022_01_0001_HRT 080 9...

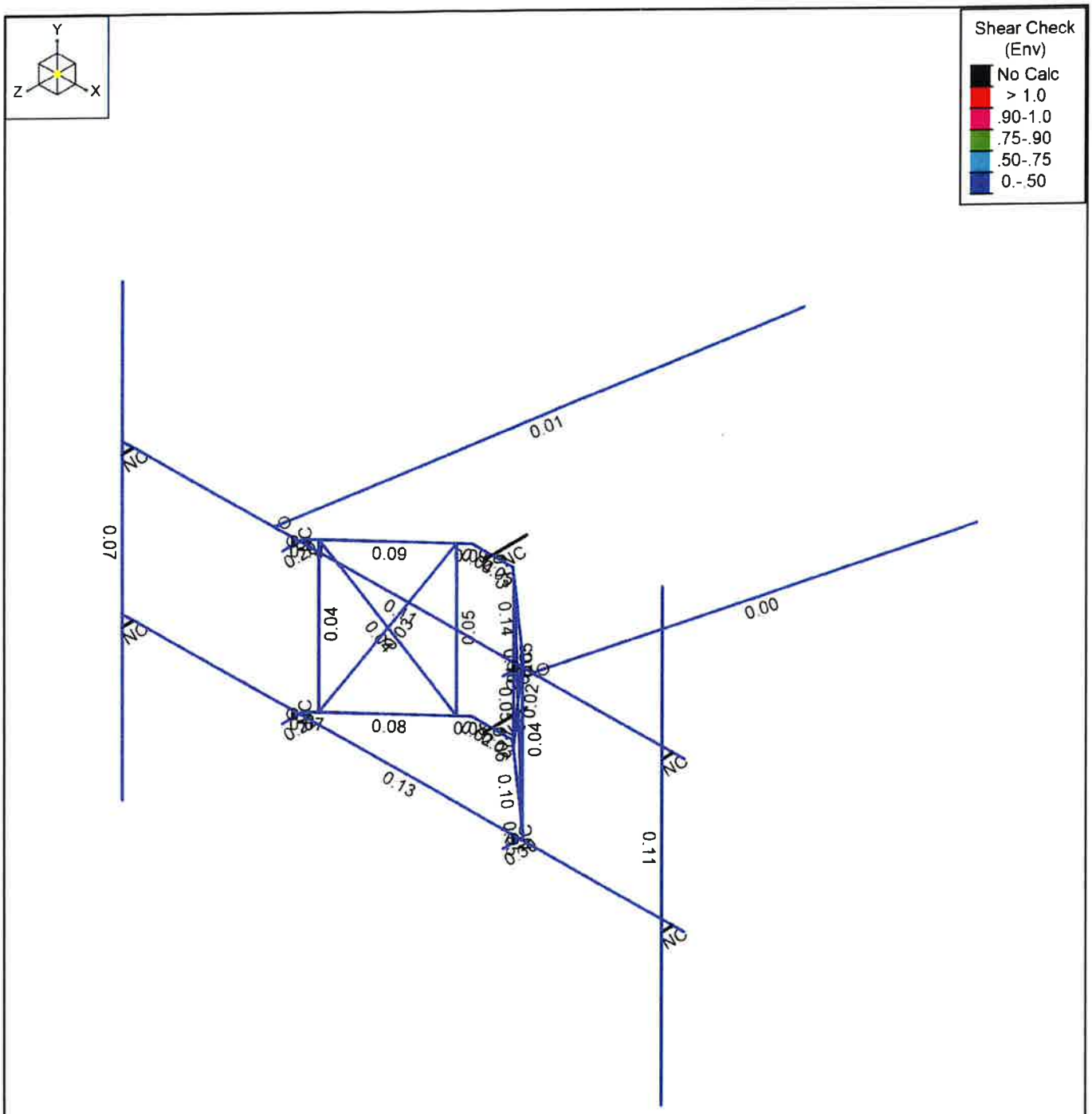


MTS Engineering, P.L.L.C.	806478 - HRT 080 953381	SK-3
AP		Dec 09, 2022
100140.022.01.0001		100140_022_01_0001_HRT 080 9...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

MTS Engineering, P.L.L.C.	806478 - HRT 080 953381	SK-4
AP		Dec 09, 2022
100140.022.01.0001		100140_022_01_0001_HRT 080 9...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

MTS Engineering, P.L.L.C.	806478 - HRT 080 953381	SK-5
AP		Dec 09, 2022
100140.022.01.0001		100140_022_01_0001_HRT 080 9...

APPENDIX B

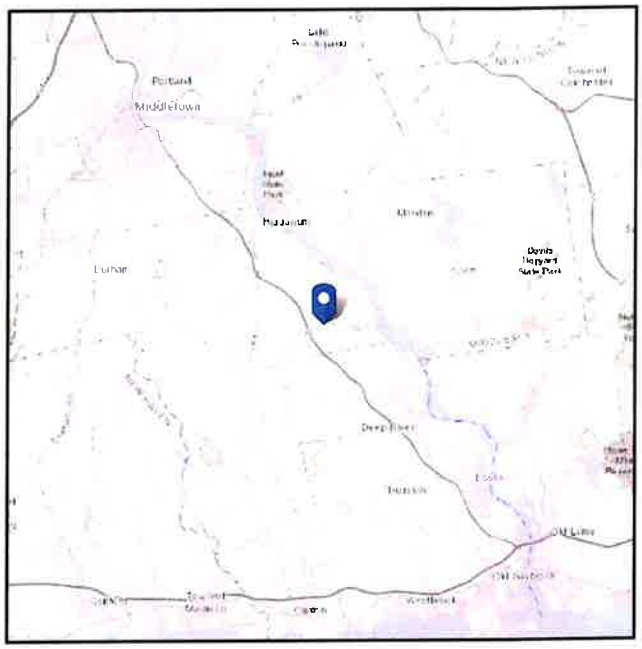
SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 41.443056
Longitude: -72.506222
Elevation: 504.12 ft (NAVD 88)



Wind

Results:

Wind Speed	122 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	94 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: Fri Dec 09 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.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

D - Default (see Section 11.4.3)

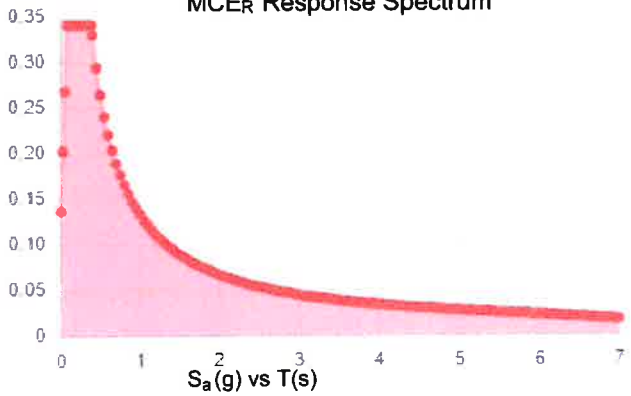
Site Soil Class:

Results:

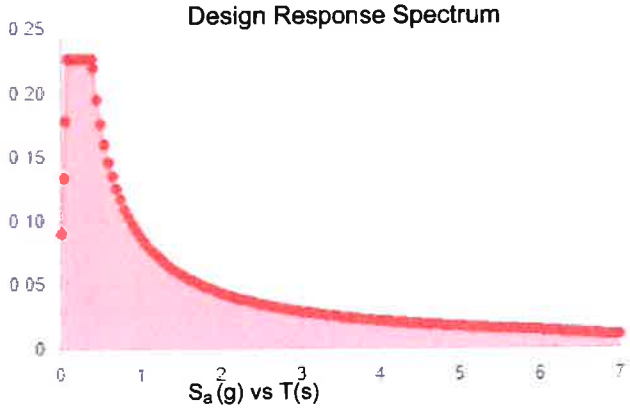
S_S :	0.214	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.12
F_v :	2.4	PGA_M :	0.187
S_{MS} :	0.342	F_{PGA} :	1.56
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.228	C_v :	0.727

Seismic Design Category: B

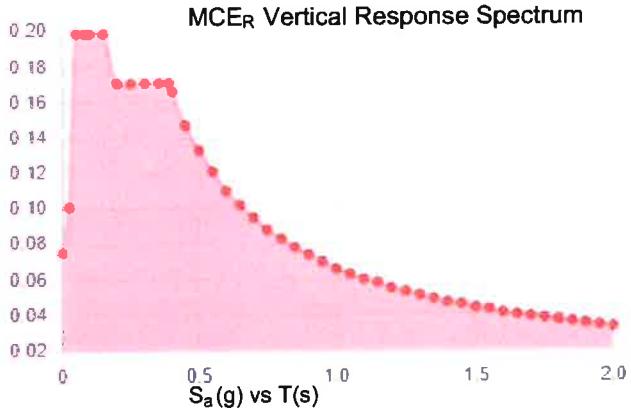
MCE$_R$ Response Spectrum



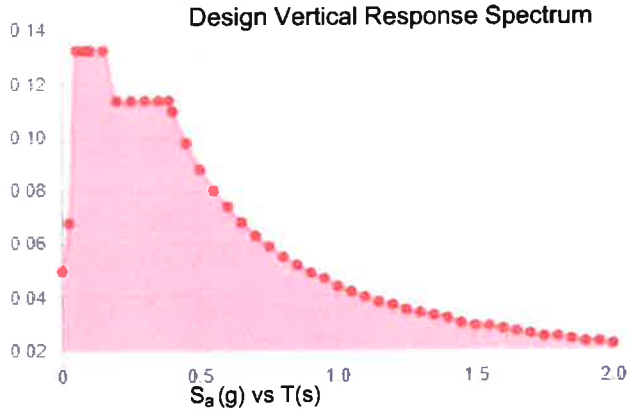
Design Response Spectrum



MCE$_R$ Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: **Fri Dec 09 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.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

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:	Fri Dec 09 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.

PROJECT	**100140.022.01.0001 - HRT 080 95338 KSC**
SUBJECT	**Sector Mount Analysis**
DATE	**12-09-22**

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

B+T GRP

Tower Type		:	SST		
Ground Elevation	z_s	:	504	ft	[ASCE7 Hazard Tool]
Tower Height		:	190.00	ft	
Mount Elevation		:	186.00	ft	
Antenna Elevation		:	186.00	ft	
Crest Height		:	0	ft	
Risk Category		:	II		[Table 2-1]
Exposure Category		:	B		[Sec. 2.6.5.1.2]
Topography Category		:	1.00		[Sec. 2.6.6.2]
Wind Velocity	V	:	122	mph	[ASCE7 Hazard Tool]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]
Base Ice thickness	t_i	:	1.00	in	[ASCE7 Hazard Tool]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]
	S_S	:	0.21		
	S_1	:	0.06		
	S_{DS}	:	0.23		
	S_{D1}	:	0.09		
Gust Factor	G_h	:	1.00		[Sec. 16.6]
Pressure Coefficient	K_z	:	1.18		[Sec. 2.6.5.2]
Topography Facto	K_{zt}	:	1.00		[Sec. 2.6.6]
Elevation Factor	K_e	:	0.98		[Sec. 2.6.8]
Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Design Ice Thickness	t_{iz}	:	1.19	in	[Sec. 2.6.10]
Importance Factor	I_e	:	1		[Table 2-3]
Response Coefficient	C_s	:	0.114		[Sec. 2.7.7.1]
Amplification	A_s	:	2.915789		[Sec. 16.7]
	q_z	:	41.94	psf	

PROJECT	**100140.022.01.0001 - HRT 080 95338 KSC**
SUBJECT	**Sector Mount Analysis**
DATE	**12-09-22**

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

B+T GRP

Manufacturer	Model	Qty	Height (in^2)	Width (in^2)	Depth (in^2)	Weight (lbs)	C_AA_A (N) (ft^2)	C_AA_A (T) (ft^2)	C_AA_A (N) Ice (ft^2)	C_AA_A (T) Ice (ft^2)	$F_{A(N)}$ (k)	$F_{A(T)}$ (k)	$F_{A(N)}$ Ice (k)	$F_{A(T)}$ Ice (k)
RFS/CELWAVE	›XVAALL24_43-U-NA20_TM	0.5	95.9	24.0	8.5	149.9	7.34	2.66	8.11	3.34	0.31	0.11	0.06	0.02
RFS/CELWAVE	›XVAALL24_43-U-NA20_TM	0.5					7.34	2.66	8.11	3.34	0.31	0.11	0.06	0.02
ERICSSON	Radio 4480_TMOV2	1	22.0	15.7	7.5	81.0	2.88	1.40	3.67	2.04	0.11	0.05	0.02	0.01
ERICSSON	\DIO 4460 B2/B25 B66_TM	1	17.0	15.1	11.9	109.0	2.14	1.69	2.82	2.31	0.08	0.06	0.01	0.01

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	1	6.25	0.145833	3.622	
2	2	-6.25	0.145833	3.622	
3	3	6.25	-3.1875	3.622	
4	4	-6.25	-3.1875	3.622	
5	5	-2.458333	0.145833	3.622	
6	6	-2.458333	-3.1875	3.622	
7	7	2.458333	-3.1875	3.622	
8	8	2.458333	0.145833	3.622	
9	9	0	0	0.872	
10	10	-2.458333	0	3.622	
11	11	-2.458333	-3.333334	3.622	
12	12	2.458333	-3.333334	3.622	
13	13	2.458333	0	3.622	
14	14	-2.458333	0	3.856375	
15	15	-2.458333	-3.333334	3.856375	
16	16	2.458333	-3.333334	3.856375	
17	17	2.458333	0	3.856375	
18	18	-2.458333	0	3.398042	
19	19	-2.458333	-3.333334	3.398042	
20	20	2.458333	-3.333334	3.398042	
21	21	2.458333	0	3.398042	
22	22	0	-3.333334	0.872	
23	23	0	0	1.788667	
24	24	0	-3.333334	1.788667	
25	25	0	0	1.642833	
26	26	0	-3.333334	1.642833	
27	27	0.458333	0	1.642833	
28	28	0.458333	-3.333334	1.642833	
29	29	-0.458333	0	1.642833	
30	30	-0.458333	-3.333334	1.642833	
31	31	-0.518814	0	1.695912	
32	32	-2.397829	0	3.344943	
33	33	-0.518814	-3.333334	1.695912	
34	34	-2.397829	-3.333334	3.344943	
35	35	0.518814	0	1.695912	
36	36	2.397829	0	3.344943	
37	37	0.518814	-3.333334	1.695912	
38	38	2.397829	-3.333334	3.344943	
39	39	-2.272561	0	3.235007	
40	40	-2.272561	-3.333334	3.235007	
41	41	-0.644082	0	1.805847	
42	42	-0.644082	-3.333334	1.805847	
43	43	2.272561	0	3.235007	
44	44	2.272561	-3.333334	3.235007	
45	45	0.644082	0	1.805847	
46	46	0.644082	-3.333334	1.805847	
47	47	-6	0.145833	3.622	
48	48	-6	-3.1875	3.622	
49	49	6	0.145833	3.622	
50	50	6	-3.1875	3.622	
51	51	-6	0.145833	3.872	
52	52	-6	-3.1875	3.872	
53	53	6	0.145833	3.872	
54	54	6	-3.1875	3.872	
55	55	-6	3.479166	3.872	

Node Coordinates (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
56	56	6	3.479166	3.872	
57	57	-6	-6.520834	3.872	
58	58	6	-6.520834	3.872	
59	59	-2.875	0.145833	3.622	
60	60	2.875	0.145833	3.622	
61	61	4.995246	0.145833	-4.191509	
62	62	-1.13233	0.145833	-6.421764	
63	63	0	0	0	
64	64	4.995246	0	-4.191509	
65	65	-1.13233	0	-6.421764	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	22	Reaction	Reaction	Reaction	Reaction	Reaction
2	9	Reaction	Reaction	Reaction	Reaction	Reaction
3	62	Reaction	Reaction	Reaction		
4	61	Reaction	Reaction	Reaction		

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e^{5}°F^{-1}]	Density [k/ft^{3}]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in^{2}]	Iyy [in^{4}]	Izz [in^{4}]	J [in^{4}]
1	MF-H1	PIPE 2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
2	SF-H1	PIPE 2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
3	MF-CP1	PL5/8X3.5	Beam	RECT	A36 Gr.36	Typical	2.205	0.073	2.251	0.259
4	MF-CP2	PL1.25"X3.5"	Beam	RECT	A36 Gr.36	Typical	4.375	0.57	4.466	1.767
5	SF-V1	5/8"SR	Column	BAR	A36 Gr.36	Typical	0.307	0.007	0.007	0.015
6	SF-D1	3/4"SR	VBrace	BAR	A36 Gr.36	Typical	0.442	0.016	0.016	0.031
7	MF-P1	PIPE 2.0	Column	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
8	Tieback	PIPE 2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	1	1	2		MF-H1	Beam	Pipe	A53 Gr.B	Typical
2	2	3	4		MF-H1	Beam	Pipe	A53 Gr.B	Typical
3	3	14	18	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
4	4	15	19	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
5	5	16	20	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
6	6	17	21	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
7	7	11	6		RIGID	None	None	RIGID	Typical
8	8	10	5		RIGID	None	None	RIGID	Typical
9	9	18	32	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
10	10	31	29	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
11	11	32	31		SF-H1	Beam	Pipe	A53 Gr.B	Typical
12	12	29	25	90	MF-CP2	Beam	RECT	A36 Gr.36	Typical
13	13	25	27	90	MF-CP2	Beam	RECT	A36 Gr.36	Typical
14	14	30	26	90	MF-CP2	Beam	RECT	A36 Gr.36	Typical
15	15	26	28	90	MF-CP2	Beam	RECT	A36 Gr.36	Typical
16	16	19	34	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
17	17	33	30	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
18	18	34	33		SF-H1	Beam	Pipe	A53 Gr.B	Typical
19	19	21	36	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
20	20	35	27	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
21	21	36	35		SF-H1	Beam	Pipe	A53 Gr.B	Typical
22	22	20	38	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
23	23	37	28	90	MF-CP1	Beam	RECT	A36 Gr.36	Typical
24	24	38	37		SF-H1	Beam	Pipe	A53 Gr.B	Typical
25	25	12	7		RIGID	None	None	RIGID	Typical
26	26	13	8		RIGID	None	None	RIGID	Typical
27	27	23	9		RIGID	None	None	RIGID	Typical
28	28	24	22		RIGID	None	None	RIGID	Typical
29	29	40	39		SF-V1	Column	BAR	A36 Gr.36	Typical
30	30	42	41		SF-V1	Column	BAR	A36 Gr.36	Typical
31	31	44	43		SF-V1	Column	BAR	A36 Gr.36	Typical
32	32	46	45		SF-V1	Column	BAR	A36 Gr.36	Typical
33	33	40	41		SF-D1	VBrace	BAR	A36 Gr.36	Typical
34	34	39	42		SF-D1	VBrace	BAR	A36 Gr.36	Typical
35	35	45	44		SF-D1	VBrace	BAR	A36 Gr.36	Typical
36	36	46	43		SF-D1	VBrace	BAR	A36 Gr.36	Typical
37	37	52	48		RIGID	None	None	RIGID	Typical
38	38	51	47		RIGID	None	None	RIGID	Typical
39	39	54	50		RIGID	None	None	RIGID	Typical
40	40	53	49		RIGID	None	None	RIGID	Typical
41	41	56	58		MF-P1	Column	Pipe	A53 Gr.B	Typical
42	42	55	57		MF-P1	Column	Pipe	A53 Gr.B	Typical
43	43	59	62		Tieback	Beam	Pipe	A53 Gr.B	Typical
44	44	60	61		Tieback	Beam	Pipe	A53 Gr.B	Typical

Member Advanced Data

	Label	I Release	J Release	T/C Only	Physical	Deflection Ratio Options	Seismic DR
1	1				Yes	N/A	None
2	2				Yes	N/A	None
3	3				Yes	N/A	None
4	4				Yes	N/A	None
5	5				Yes	N/A	None
6	6				Yes	N/A	None
7	7		OOOOXO		Yes	** NA **	None
8	8		OOOOXO		Yes	** NA **	None
9	9				Yes	N/A	None
10	10				Yes	N/A	None
11	11				Yes	N/A	None
12	12				Yes	N/A	None
13	13				Yes	N/A	None
14	14				Yes	N/A	None
15	15				Yes	N/A	None
16	16				Yes	N/A	None
17	17				Yes	N/A	None

Member Advanced Data (Continued)

	Label	I Release	J Release	T/C Only	Physical	Deflection Ratio Options	Seismic DR
18	18				Yes	Default	None
19	19				Yes	N/A	None
20	20				Yes	N/A	None
21	21				Yes	N/A	None
22	22				Yes	N/A	None
23	23				Yes	N/A	None
24	24				Yes	N/A	None
25	25		OOOOXO		Yes	** NA **	None
26	26		OOOOXO		Yes	** NA **	None
27	27				Yes	** NA **	None
28	28				Yes	** NA **	None
29	29				Yes	** NA **	None
30	30				Yes	** NA **	None
31	31				Yes	** NA **	None
32	32				Yes	** NA **	None
33	33				Yes	** NA **	None
34	34			Euler Buckling	Yes	** NA **	None
35	35				Yes	** NA **	None
36	36			Euler Buckling	Yes	** NA **	None
37	37				Yes	** NA **	None
38	38				Yes	** NA **	None
39	39				Yes	** NA **	None
40	40				Yes	** NA **	None
41	41				Yes	** NA **	None
42	42				Yes	** NA **	None
43	43	BenPIN			Yes	Default	None
44	44	BenPIN			Yes	Default	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	1	MF-H1	12.5			Lbyy	N/A	N/A	Lateral
2	2	MF-H1	12.5			Lbyy	N/A	N/A	Lateral
3	3	MF-CP1	0.458			Lbyy	N/A	N/A	Lateral
4	4	MF-CP1	0.458			Lbyy	N/A	N/A	Lateral
5	5	MF-CP1	0.458			Lbyy	N/A	N/A	Lateral
6	6	MF-CP1	0.458			Lbyy	N/A	N/A	Lateral
7	9	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
8	10	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
9	11	SF-H1	2.5			Lbyy	N/A	N/A	Lateral
10	12	MF-CP2	0.458			Lbyy	N/A	N/A	Lateral
11	13	MF-CP2	0.458			Lbyy	N/A	N/A	Lateral
12	14	MF-CP2	0.458			Lbyy	N/A	N/A	Lateral
13	15	MF-CP2	0.458			Lbyy	N/A	N/A	Lateral
14	16	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
15	17	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
16	18	SF-H1	2.5			Lbyy	N/A	N/A	Lateral
17	19	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
18	20	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
19	21	SF-H1	2.5			Lbyy	N/A	N/A	Lateral
20	22	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
21	23	MF-CP1	0.08			Lbyy	N/A	N/A	Lateral
22	24	SF-H1	2.5			Lbyy	N/A	N/A	Lateral
23	29	SF-V1	3.333	2.5	2.5	Lbyy	N/A	N/A	Lateral
24	30	SF-V1	3.333	2.5	2.5	Lbyy	N/A	N/A	Lateral
25	31	SF-V1	3.333	2.5	2.5	Lbyy	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
26	32	SF-V1	3.333	2.5	2.5	Lbyy	N/A	N/A	Lateral
27	33	SF-D1	3.976			Lbyy	N/A	N/A	Lateral
28	34	SF-D1	3.976			Lbyy	N/A	N/A	Lateral
29	35	SF-D1	3.976			Lbyy	N/A	N/A	Lateral
30	36	SF-D1	3.976			Lbyy	N/A	N/A	Lateral
31	41	MF-P1	10			Lbyy	N/A	N/A	Lateral
32	42	MF-P1	10			Lbyy	N/A	N/A	Lateral
33	43	Tieback	10.194			Lbyy	N/A	N/A	Lateral
34	44	Tieback	8.096			Lbyy	N/A	N/A	Lateral

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	Y	-0.075	%15
2	41	Y	-0.075	%85
3	41	Y	-0.081	%20
4	41	Y	-0.109	%50
5	41	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	Z	-0.308	%15
2	41	Z	-0.308	%85
3	41	Z	-0.109	%20
4	41	Z	-0.081	%50
5	41	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	X	-0.112	%15
2	41	X	-0.112	%85
3	41	X	-0.052	%20
4	41	X	-0.064	%50
5	41	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	Z	-0.057	%15
2	41	Z	-0.057	%85
3	41	Z	-0.018	%20
4	41	Z	-0.014	%50
5	41	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	X	-0.024	%15
2	41	X	-0.024	%85
3	41	X	-0.009	%20
4	41	X	-0.011	%50
5	41	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	Z	-0.019	%15
2	41	Z	-0.019	%85
3	41	Z	-0.007	%20
4	41	Z	-0.005	%50
5	41	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	X	-0.007	%15
2	41	X	-0.007	%85
3	41	X	-0.003	%20
4	41	X	-0.004	%50
5	41	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	Y	-0.191	%15
2	41	Y	-0.191	%85
3	41	Y	-0.05	%20
4	41	Y	-0.042	%50
5	41	Y	0	0

Member Point Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	Z	-0.05	%15
2	41	Z	-0.05	%85
3	41	Z	-0.027	%20
4	41	Z	-0.036	%50
5	41	Z	0	0

Member Point Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	41	X	-0.05	%15
2	41	X	-0.05	%85
3	41	X	-0.027	%20
4	41	X	-0.036	%50
5	41	X	0	0

Member Point Loads (BLC 15 : Maint LL 1)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	11	Y	-0.25	%50

Member Point Loads (BLC 16 : Maint LL 2)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	18	Y	-0.25	%50

Member Point Loads (BLC 17 : Maint LL 3)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	21	Y	-0.25	%50

Member Point Loads (BLC 18 : Maint LL 4)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	24	Y	-0.25	%50

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.011	-0.011	0	%100
2	2	Z	-0.011	-0.011	0	%100
3	3	Z	-0.003	-0.003	0	%100
4	4	Z	-0.003	-0.003	0	%100
5	5	Z	-0.003	-0.003	0	%100
6	6	Z	-0.003	-0.003	0	%100
7	9	Z	-0.002	-0.002	0	%100
8	10	Z	-0.002	-0.002	0	%100
9	11	Z	-0.007	-0.007	0	%100
10	12	Z	-0.005	-0.005	0	%100
11	13	Z	-0.005	-0.005	0	%100
12	14	Z	-0.005	-0.005	0	%100
13	15	Z	-0.005	-0.005	0	%100
14	16	Z	-0.002	-0.002	0	%100
15	17	Z	-0.002	-0.002	0	%100
16	18	Z	-0.007	-0.007	0	%100
17	19	Z	-0.002	-0.002	0	%100
18	20	Z	-0.002	-0.002	0	%100
19	21	Z	-0.007	-0.007	0	%100
20	22	Z	-0.002	-0.002	0	%100
21	23	Z	-0.002	-0.002	0	%100
22	24	Z	-0.007	-0.007	0	%100
23	29	Z	-0.002	-0.002	0	%100
24	30	Z	-0.002	-0.002	0	%100
25	31	Z	-0.002	-0.002	0	%100
26	32	Z	-0.002	-0.002	0	%100
27	33	Z	-0.003	-0.003	0	%100
28	34	Z	-0.003	-0.003	0	%100
29	35	Z	-0.003	-0.003	0	%100
30	36	Z	-0.003	-0.003	0	%100
31	41	Z	-0.009	-0.009	0	%100
32	42	Z	-0.009	-0.009	0	%100
33	43	Z	-0.009	-0.009	0	%100
34	44	Z	-0.009	-0.009	0	%100

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.011	-0.011	0	%100
2	2	X	-0.011	-0.011	0	%100
3	3	X	-0.003	-0.003	0	%100
4	4	X	-0.003	-0.003	0	%100
5	5	X	-0.003	-0.003	0	%100
6	6	X	-0.003	-0.003	0	%100

Member Distributed Loads (BLC 3 : 90 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
7	9	X	-0.002	-0.002	0	%100
8	10	X	-0.002	-0.002	0	%100
9	11	X	-0.007	-0.007	0	%100
10	12	X	-0.005	-0.005	0	%100
11	13	X	-0.005	-0.005	0	%100
12	14	X	-0.005	-0.005	0	%100
13	15	X	-0.005	-0.005	0	%100
14	16	X	-0.002	-0.002	0	%100
15	17	X	-0.002	-0.002	0	%100
16	18	X	-0.007	-0.007	0	%100
17	19	X	-0.002	-0.002	0	%100
18	20	X	-0.002	-0.002	0	%100
19	21	X	-0.007	-0.007	0	%100
20	22	X	-0.002	-0.002	0	%100
21	23	X	-0.002	-0.002	0	%100
22	24	X	-0.007	-0.007	0	%100
23	29	X	-0.002	-0.002	0	%100
24	30	X	-0.002	-0.002	0	%100
25	31	X	-0.002	-0.002	0	%100
26	32	X	-0.002	-0.002	0	%100
27	33	X	-0.003	-0.003	0	%100
28	34	X	-0.003	-0.003	0	%100
29	35	X	-0.003	-0.003	0	%100
30	36	X	-0.003	-0.003	0	%100
31	41	X	-0.009	-0.009	0	%100
32	42	X	-0.009	-0.009	0	%100
33	43	X	-0.009	-0.009	0	%100
34	44	X	-0.009	-0.009	0	%100

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.002	-0.002	0	%100
2	2	Z	-0.002	-0.002	0	%100
3	3	Z	-0.003	-0.003	0	%100
4	4	Z	-0.003	-0.003	0	%100
5	5	Z	-0.003	-0.003	0	%100
6	6	Z	-0.003	-0.003	0	%100
7	9	Z	-0.007	-0.007	0	%100
8	10	Z	-0.007	-0.007	0	%100
9	11	Z	-0.002	-0.002	0	%100
10	12	Z	-0.004	-0.004	0	%100
11	13	Z	-0.004	-0.004	0	%100
12	14	Z	-0.004	-0.004	0	%100
13	15	Z	-0.004	-0.004	0	%100
14	16	Z	-0.007	-0.007	0	%100
15	17	Z	-0.007	-0.007	0	%100
16	18	Z	-0.002	-0.002	0	%100
17	19	Z	-0.007	-0.007	0	%100
18	20	Z	-0.007	-0.007	0	%100
19	21	Z	-0.002	-0.002	0	%100
20	22	Z	-0.007	-0.007	0	%100
21	23	Z	-0.007	-0.007	0	%100
22	24	Z	-0.002	-0.002	0	%100
23	29	Z	-0.002	-0.002	0	%100
24	30	Z	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 4 : 0 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
25	31	Z	-0.002	-0.002	0	%100
26	32	Z	-0.002	-0.002	0	%100
27	33	Z	-0.002	-0.002	0	%100
28	34	Z	-0.002	-0.002	0	%100
29	35	Z	-0.002	-0.002	0	%100
30	36	Z	-0.002	-0.002	0	%100
31	41	Z	-0.002	-0.002	0	%100
32	42	Z	-0.002	-0.002	0	%100
33	43	Z	-0.002	-0.002	0	%100
34	44	Z	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.002	-0.002	0	%100
2	2	X	-0.002	-0.002	0	%100
3	3	X	-0.003	-0.003	0	%100
4	4	X	-0.003	-0.003	0	%100
5	5	X	-0.003	-0.003	0	%100
6	6	X	-0.003	-0.003	0	%100
7	9	X	-0.007	-0.007	0	%100
8	10	X	-0.007	-0.007	0	%100
9	11	X	-0.002	-0.002	0	%100
10	12	X	-0.004	-0.004	0	%100
11	13	X	-0.004	-0.004	0	%100
12	14	X	-0.004	-0.004	0	%100
13	15	X	-0.004	-0.004	0	%100
14	16	X	-0.007	-0.007	0	%100
15	17	X	-0.007	-0.007	0	%100
16	18	X	-0.002	-0.002	0	%100
17	19	X	-0.007	-0.007	0	%100
18	20	X	-0.007	-0.007	0	%100
19	21	X	-0.002	-0.002	0	%100
20	22	X	-0.007	-0.007	0	%100
21	23	X	-0.007	-0.007	0	%100
22	24	X	-0.002	-0.002	0	%100
23	29	X	-0.002	-0.002	0	%100
24	30	X	-0.002	-0.002	0	%100
25	31	X	-0.002	-0.002	0	%100
26	32	X	-0.002	-0.002	0	%100
27	33	X	-0.002	-0.002	0	%100
28	34	X	-0.002	-0.002	0	%100
29	35	X	-0.002	-0.002	0	%100
30	36	X	-0.002	-0.002	0	%100
31	41	X	-0.002	-0.002	0	%100
32	42	X	-0.002	-0.002	0	%100
33	43	X	-0.002	-0.002	0	%100
34	44	X	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.0003	-0.0003	0	%100
2	2	Z	-0.0003	-0.0003	0	%100
3	3	Z	-0.0002	-0.0002	0	%100

Member Distributed Loads (BLC 6 : 0 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
4	4	Z	-0.0002	-0.0002	0	%100
5	5	Z	-0.0002	-0.0002	0	%100
6	6	Z	-0.0002	-0.0002	0	%100
7	9	Z	-0.0001	-0.0001	0	%100
8	10	Z	-0.0001	-0.0001	0	%100
9	11	Z	-0.0003	-0.0003	0	%100
10	12	Z	-0.0003	-0.0003	0	%100
11	13	Z	-0.0003	-0.0003	0	%100
12	14	Z	-0.0003	-0.0003	0	%100
13	15	Z	-0.0003	-0.0003	0	%100
14	16	Z	-0.0001	-0.0001	0	%100
15	17	Z	-0.0001	-0.0001	0	%100
16	18	Z	-0.0003	-0.0003	0	%100
17	19	Z	-0.0001	-0.0001	0	%100
18	20	Z	-0.0001	-0.0001	0	%100
19	21	Z	-0.0003	-0.0003	0	%100
20	22	Z	-0.0001	-0.0001	0	%100
21	23	Z	-0.0001	-0.0001	0	%100
22	24	Z	-0.0003	-0.0003	0	%100
23	29	Z	-0.0001	-0.0001	0	%100
24	30	Z	-0.0001	-0.0001	0	%100
25	31	Z	-0.0001	-0.0001	0	%100
26	32	Z	-0.0001	-0.0001	0	%100
27	33	Z	-0.0001	-0.0001	0	%100
28	34	Z	-0.0001	-0.0001	0	%100
29	35	Z	-0.0001	-0.0001	0	%100
30	36	Z	-0.0001	-0.0001	0	%100
31	41	Z	-0.0003	-0.0003	0	%100
32	42	Z	-0.0003	-0.0003	0	%100
33	43	Z	-0.0003	-0.0003	0	%100
34	44	Z	-0.0003	-0.0003	0	%100

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.0003	-0.0003	0	%100
2	2	X	-0.0003	-0.0003	0	%100
3	3	X	-0.0002	-0.0002	0	%100
4	4	X	-0.0002	-0.0002	0	%100
5	5	X	-0.0002	-0.0002	0	%100
6	6	X	-0.0002	-0.0002	0	%100
7	9	X	-0.0001	-0.0001	0	%100
8	10	X	-0.0001	-0.0001	0	%100
9	11	X	-0.0003	-0.0003	0	%100
10	12	X	-0.0003	-0.0003	0	%100
11	13	X	-0.0003	-0.0003	0	%100
12	14	X	-0.0003	-0.0003	0	%100
13	15	X	-0.0003	-0.0003	0	%100
14	16	X	-0.0001	-0.0001	0	%100
15	17	X	-0.0001	-0.0001	0	%100
16	18	X	-0.0003	-0.0003	0	%100
17	19	X	-0.0001	-0.0001	0	%100
18	20	X	-0.0001	-0.0001	0	%100
19	21	X	-0.0003	-0.0003	0	%100
20	22	X	-0.0001	-0.0001	0	%100
21	23	X	-0.0001	-0.0001	0	%100

Member Distributed Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
22	24	X	-0.0003	-0.0003	0	%100
23	29	X	-0.0001	-0.0001	0	%100
24	30	X	-0.0001	-0.0001	0	%100
25	31	X	-0.0001	-0.0001	0	%100
26	32	X	-0.0001	-0.0001	0	%100
27	33	X	-0.0001	-0.0001	0	%100
28	34	X	-0.0001	-0.0001	0	%100
29	35	X	-0.0001	-0.0001	0	%100
30	36	X	-0.0001	-0.0001	0	%100
31	41	X	-0.0003	-0.0003	0	%100
32	42	X	-0.0003	-0.0003	0	%100
33	43	X	-0.0003	-0.0003	0	%100
34	44	X	-0.0003	-0.0003	0	%100

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Y	-0.006	-0.006	0	%100
2	2	Y	-0.006	-0.006	0	%100
3	3	Y	-0.007	-0.007	0	%100
4	4	Y	-0.007	-0.007	0	%100
5	5	Y	-0.007	-0.007	0	%100
6	6	Y	-0.007	-0.007	0	%100
7	9	Y	-0.007	-0.007	0	%100
8	10	Y	-0.007	-0.007	0	%100
9	11	Y	-0.005	-0.005	0	%100
10	12	Y	-0.007	-0.007	0	%100
11	13	Y	-0.007	-0.007	0	%100
12	14	Y	-0.007	-0.007	0	%100
13	15	Y	-0.007	-0.007	0	%100
14	16	Y	-0.007	-0.007	0	%100
15	17	Y	-0.007	-0.007	0	%100
16	18	Y	-0.005	-0.005	0	%100
17	19	Y	-0.007	-0.007	0	%100
18	20	Y	-0.007	-0.007	0	%100
19	21	Y	-0.005	-0.005	0	%100
20	22	Y	-0.007	-0.007	0	%100
21	23	Y	-0.007	-0.007	0	%100
22	24	Y	-0.005	-0.005	0	%100
23	29	Y	-0.003	-0.003	0	%100
24	30	Y	-0.003	-0.003	0	%100
25	31	Y	-0.003	-0.003	0	%100
26	32	Y	-0.003	-0.003	0	%100
27	33	Y	-0.003	-0.003	0	%100
28	34	Y	-0.003	-0.003	0	%100
29	35	Y	-0.003	-0.003	0	%100
30	36	Y	-0.003	-0.003	0	%100
31	41	Y	-0.005	-0.005	0	%100
32	42	Y	-0.005	-0.005	0	%100
33	43	Y	-0.005	-0.005	0	%100
34	44	Y	-0.005	-0.005	0	%100

Member Distributed Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.002	-0.002	0	%100
2	2	Z	-0.002	-0.002	0	%100
3	3	Z	-0.002	-0.002	0	%100
4	4	Z	-0.002	-0.002	0	%100
5	5	Z	-0.002	-0.002	0	%100
6	6	Z	-0.002	-0.002	0	%100
7	9	Z	-0.002	-0.002	0	%100
8	10	Z	-0.002	-0.002	0	%100
9	11	Z	-0.001	-0.001	0	%100
10	12	Z	-0.004	-0.004	0	%100
11	13	Z	-0.004	-0.004	0	%100
12	14	Z	-0.004	-0.004	0	%100
13	15	Z	-0.004	-0.004	0	%100
14	16	Z	-0.002	-0.002	0	%100
15	17	Z	-0.002	-0.002	0	%100
16	18	Z	-0.001	-0.001	0	%100
17	19	Z	-0.002	-0.002	0	%100
18	20	Z	-0.002	-0.002	0	%100
19	21	Z	-0.001	-0.001	0	%100
20	22	Z	-0.002	-0.002	0	%100
21	23	Z	-0.002	-0.002	0	%100
22	24	Z	-0.001	-0.001	0	%100
23	29	Z	-0.0006	-0.0006	0	%100
24	30	Z	-0.0006	-0.0006	0	%100
25	31	Z	-0.0006	-0.0006	0	%100
26	32	Z	-0.0006	-0.0006	0	%100
27	33	Z	-0.0008	-0.0008	0	%100
28	34	Z	-0.0008	-0.0008	0	%100
29	35	Z	-0.0008	-0.0008	0	%100
30	36	Z	-0.0008	-0.0008	0	%100
31	41	Z	-0.001	-0.001	0	%100
32	42	Z	-0.001	-0.001	0	%100
33	43	Z	-0.001	-0.001	0	%100
34	44	Z	-0.001	-0.001	0	%100

Member Distributed Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.002	-0.002	0	%100
2	2	X	-0.002	-0.002	0	%100
3	3	X	-0.002	-0.002	0	%100
4	4	X	-0.002	-0.002	0	%100
5	5	X	-0.002	-0.002	0	%100
6	6	X	-0.002	-0.002	0	%100
7	9	X	-0.002	-0.002	0	%100
8	10	X	-0.002	-0.002	0	%100
9	11	X	-0.001	-0.001	0	%100
10	12	X	-0.004	-0.004	0	%100
11	13	X	-0.004	-0.004	0	%100
12	14	X	-0.004	-0.004	0	%100
13	15	X	-0.004	-0.004	0	%100
14	16	X	-0.002	-0.002	0	%100
15	17	X	-0.002	-0.002	0	%100
16	18	X	-0.001	-0.001	0	%100
17	19	X	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 10 : 90 Seismic) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
18	20	X	-0.002	-0.002	0	%100
19	21	X	-0.001	-0.001	0	%100
20	22	X	-0.002	-0.002	0	%100
21	23	X	-0.002	-0.002	0	%100
22	24	X	-0.001	-0.001	0	%100
23	29	X	-0.0006	-0.0006	0	%100
24	30	X	-0.0006	-0.0006	0	%100
25	31	X	-0.0006	-0.0006	0	%100
26	32	X	-0.0006	-0.0006	0	%100
27	33	X	-0.0008	-0.0008	0	%100
28	34	X	-0.0008	-0.0008	0	%100
29	35	X	-0.0008	-0.0008	0	%100
30	36	X	-0.0008	-0.0008	0	%100
31	41	X	-0.001	-0.001	0	%100
32	42	X	-0.001	-0.001	0	%100
33	43	X	-0.001	-0.001	0	%100
34	44	X	-0.001	-0.001	0	%100

Node Loads and Enforced Displacements (BLC 11 : Live Load a)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	48	L	Y	-0.5

Node Loads and Enforced Displacements (BLC 12 : Live Load b)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	50	L	Y	-0.5

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	Dead	DL	-1		5	
2	0 Wind - No Ice	WLZ			5	34
3	90 Wind - No Ice	WLX			5	34
4	0 Wind - Ice	WLZ			5	34
5	90 Wind - Ice	WLX			5	34
6	0 Wind - Service	WLZ			5	34
7	90 Wind - Service	WLX			5	34
8	Ice	OL1			5	34
9	0 Seismic	ELZ			5	34
10	90 Seismic	ELX			5	34
11	Live Load a	LL		1		
12	Live Load b	LL		1		
13	Live Load c	LL				
14	Live Load d	LL				
15	Maint LL 1	LL			1	
16	Maint LL 2	LL			1	
17	Maint LL 3	LL			1	
18	Maint LL 4	LL			1	
19	Maint LL 5	LL				
20	Maint LL 6	LL				
21	Maint LL 7	LL				
22	Maint LL 8	LL				
23	Maint LL 9	LL				
24	Maint LL 10	LL				

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
25	Maint LL 11	LL				
26	Maint LL 12	LL				
27	Maint LL 13	LL				
28	Maint LL 14	LL				
29	Maint LL 15	LL				

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4 Dead	Yes	Y	1	1.4						
2	1.2 D + 1.0 - 0 W	Yes	Y	1	1.2	2	1				
3	1.2 D + 1.0 - 30 W	Yes	Y	1	1.2	2	0.866	3	0.5		
4	1.2 D + 1.0 - 60 W	Yes	Y	1	1.2	3	0.866	2	0.5		
5	1.2 D + 1.0 - 90 W	Yes	Y	1	1.2	3	1				
6	1.2 D + 1.0 - 120 W	Yes	Y	1	1.2	3	0.866	2	-0.5		
7	1.2 D + 1.0 - 150 W	Yes	Y	1	1.2	2	-0.866	3	0.5		
8	1.2 D + 1.0 - 180 W	Yes	Y	1	1.2	2	-1				
9	1.2 D + 1.0 - 210 W	Yes	Y	1	1.2	2	-0.866	3	-0.5		
10	1.2 D + 1.0 - 240 W	Yes	Y	1	1.2	3	-0.866	2	-0.5		
11	1.2 D + 1.0 - 270 W	Yes	Y	1	1.2	3	-1				
12	1.2 D + 1.0 - 300 W	Yes	Y	1	1.2	3	-0.866	2	0.5		
13	1.2 D + 1.0 - 330 W	Yes	Y	1	1.2	2	0.866	3	-0.5		
14	1.2 D + 1.0 - 0 W/Ice	Yes	Y	1	1.2	4	1			8	1
15	1.2 D + 1.0 - 30 W/Ice	Yes	Y	1	1.2	4	0.866	5	0.5	8	1
16	1.2 D + 1.0 - 60 W/Ice	Yes	Y	1	1.2	5	0.866	4	0.5	8	1
17	1.2 D + 1.0 - 90 W/Ice	Yes	Y	1	1.2	5	1			8	1
18	1.2 D + 1.0 - 120 W/Ice	Yes	Y	1	1.2	5	0.866	4	-0.5	8	1
19	1.2 D + 1.0 - 150 W/Ice	Yes	Y	1	1.2	4	-0.866	5	0.5	8	1
20	1.2 D + 1.0 - 180 W/Ice	Yes	Y	1	1.2	4	-1			8	1
21	1.2 D + 1.0 - 210 W/Ice	Yes	Y	1	1.2	4	-0.866	5	-0.5	8	1
22	1.2 D + 1.0 - 240 W/Ice	Yes	Y	1	1.2	5	-0.866	4	-0.5	8	1
23	1.2 D + 1.0 - 270 W/Ice	Yes	Y	1	1.2	5	-1			8	1
24	1.2 D + 1.0 - 300 W/Ice	Yes	Y	1	1.2	5	-0.866	4	0.5	8	1
25	1.2 D + 1.0 - 330 W/Ice	Yes	Y	1	1.2	4	0.866	5	-0.5	8	1
26	1.2 D + 1.0 E - 0	Yes	Y	1	1.2	9	1				
27	1.2 D + 1.0 E - 30	Yes	Y	1	1.2	9	0.866	10	0.5		
28	1.2 D + 1.0 E - 60	Yes	Y	1	1.2	10	0.866	9	0.5		
29	1.2 D + 1.0 E - 90	Yes	Y	1	1.2	10	1				
30	1.2 D + 1.0 E - 120	Yes	Y	1	1.2	10	0.866	9	-0.5		
31	1.2 D + 1.0 E - 150	Yes	Y	1	1.2	9	-0.866	10	0.5		
32	1.2 D + 1.0 E - 180	Yes	Y	1	1.2	9	-1				
33	1.2 D + 1.0 E - 210	Yes	Y	1	1.2	9	-0.866	10	-0.5		
34	1.2 D + 1.0 E - 240	Yes	Y	1	1.2	10	-0.866	9	-0.5		
35	1.2 D + 1.0 E - 270	Yes	Y	1	1.2	10	-1				
36	1.2 D + 1.0 E - 300	Yes	Y	1	1.2	10	-0.866	9	0.5		
37	1.2 D + 1.0 E - 330	Yes	Y	1	1.2	9	0.866	10	-0.5		
38	1.2 D + 1.5 LL a + Service - 0 W	Yes	Y	1	1.2	6	1			11	1.5
39	1.2 D + 1.5 LL a + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	11	1.5
40	1.2 D + 1.5 LL a + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	11	1.5
41	1.2 D + 1.5 LL a + Service - 90 W	Yes	Y	1	1.2	7	1			11	1.5
42	1.2 D + 1.5 LL a + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	11	1.5
43	1.2 D + 1.5 LL a + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	11	1.5
44	1.2 D + 1.5 LL a + Service - 180 W	Yes	Y	1	1.2	6	-1			11	1.5
45	1.2 D + 1.5 LL a + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	11	1.5
46	1.2 D + 1.5 LL a + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	11	1.5
47	1.2 D + 1.5 LL a + Service - 270 W	Yes	Y	1	1.2	7	-1			11	1.5

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
48	1.2 D + 1.5 LL a + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	11	1.5
49	1.2 D + 1.5 LL a + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	11	1.5
50	1.2 D + 1.5 LL b + Service - 0 W	Yes	Y	1	1.2	6	1			12	1.5
51	1.2 D + 1.5 LL b + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	12	1.5
52	1.2 D + 1.5 LL b + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	12	1.5
53	1.2 D + 1.5 LL b + Service - 90 W	Yes	Y	1	1.2	7	1			12	1.5
54	1.2 D + 1.5 LL b + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	12	1.5
55	1.2 D + 1.5 LL b + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	12	1.5
56	1.2 D + 1.5 LL b + Service - 180 W	Yes	Y	1	1.2	6	-1			12	1.5
57	1.2 D + 1.5 LL b + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	12	1.5
58	1.2 D + 1.5 LL b + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	12	1.5
59	1.2 D + 1.5 LL b + Service - 270 W	Yes	Y	1	1.2	7	-1			12	1.5
60	1.2 D + 1.5 LL b + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	12	1.5
61	1.2 D + 1.5 LL b + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	12	1.5
62	1.2 D + 1.5 LL c + Service - 0 W	Yes	Y	1	1.2	6	1			13	1.5
63	1.2 D + 1.5 LL c + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	13	1.5
64	1.2 D + 1.5 LL c + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	13	1.5
65	1.2 D + 1.5 LL c + Service - 90 W	Yes	Y	1	1.2	7	1			13	1.5
66	1.2 D + 1.5 LL c + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	13	1.5
67	1.2 D + 1.5 LL c + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	13	1.5
68	1.2 D + 1.5 LL c + Service - 180 W	Yes	Y	1	1.2	6	-1			13	1.5
69	1.2 D + 1.5 LL c + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	13	1.5
70	1.2 D + 1.5 LL c + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	13	1.5
71	1.2 D + 1.5 LL c + Service - 270 W	Yes	Y	1	1.2	7	-1			13	1.5
72	1.2 D + 1.5 LL c + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	13	1.5
73	1.2 D + 1.5 LL c + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	13	1.5
74	1.2 D + 1.5 LL d + Service - 0 W	Yes	Y	1	1.2	6	1			14	1.5
75	1.2 D + 1.5 LL d + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	14	1.5
76	1.2 D + 1.5 LL d + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	14	1.5
77	1.2 D + 1.5 LL d + Service - 90 W	Yes	Y	1	1.2	7	1			14	1.5
78	1.2 D + 1.5 LL d + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	14	1.5
79	1.2 D + 1.5 LL d + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	14	1.5
80	1.2 D + 1.5 LL d + Service - 180 W	Yes	Y	1	1.2	6	-1			14	1.5
81	1.2 D + 1.5 LL d + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	14	1.5
82	1.2 D + 1.5 LL d + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	14	1.5
83	1.2 D + 1.5 LL d + Service - 270 W	Yes	Y	1	1.2	7	-1			14	1.5
84	1.2 D + 1.5 LL d + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	14	1.5
85	1.2 D + 1.5 LL d + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	14	1.5
86	1.2 D + 1.5 LL Maint (1)	Yes	Y	1	1.2					15	1.5
87	1.2 D + 1.5 LL Maint (2)	Yes	Y	1	1.2					16	1.5
88	1.2 D + 1.5 LL Maint (3)	Yes	Y	1	1.2					17	1.5
89	1.2 D + 1.5 LL Maint (4)	Yes	Y	1	1.2					18	1.5
90	1.2 D + 1.5 LL Maint (5)	Yes	Y	1	1.2					19	1.5
91	1.2 D + 1.5 LL Maint (6)	Yes	Y	1	1.2					20	1.5
92	1.2 D + 1.5 LL Maint (7)	Yes	Y	1	1.2					21	1.5
93	1.2 D + 1.5 LL Maint (8)	Yes	Y	1	1.2					22	1.5
94	1.2 D + 1.5 LL Maint (9)	Yes	Y	1	1.2					23	1.5
95	1.2 D + 1.5 LL Maint (10)	Yes	Y	1	1.2					24	1.5
96	1.2 D + 1.5 LL Maint (11)	Yes	Y	1	1.2					25	1.5
97	1.2 D + 1.5 LL Maint (12)	Yes	Y	1	1.2					26	1.5
98	1.2 D + 1.5 LL Maint (13)	Yes	Y	1	1.2					27	1.5
99	1.2 D + 1.5 LL Maint (14)	Yes	Y	1	1.2					28	1.5
100	1.2 D + 1.5 LL Maint (15)	Yes	Y	1	1.2					29	1.5

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	22	max	1.729	52	0.864	44	1.127	14	-0.271	2	0	100	0.475	55
2		min	-0.51	46	0.375	2	-0.126	8	-0.645	44	0	1	-0.197	49
3	9	max	0.274	40	1.115	15	0.312	7	-0.216	8	0	100	0.763	55
4		min	-1.851	58	0.348	8	-0.605	13	-0.885	14	0	1	-0.194	49
5	62	max	0.126	49	0.047	15	0.15	5	0	100	0	100	0	100
6		min	0.02	5	0.021	58	-0.729	48	0	1	0	1	0	1
7	61	max	0.437	7	0.038	19	1.316	13	0	100	0	100	0	100
8		min	-0.367	13	0.017	2	-1.578	7	0	1	0	1	0	1
9	Totals:	max	1.117	5	1.857	14	1.583	2						
10		min	-1.117	11	0.874	8	-1.583	8						

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	1	PIPE 2.5	0.613	3.385	8	0.106	3.385		6	14.559	50.715	3.596	3.596	1	H1-1b
2	2	PIPE 2.5	0.399	3.776	51	0.126	3.776		7	14.559	50.715	3.596	3.596	1	H1-1b
3	3	PL5/8X3.5	0.152	0.458	9	0.199	0.239	y	39	68.084	71.442	0.938	5.209	2.432	H1-1b
4	4	PL5/8X3.5	0.124	0.239	8	0.216	0.458	y	48	68.084	71.442	0.938	5.209	2.446	H1-1b
5	5	PL5/8X3.5	0.24	0.458	8	0.296	0.458	y	56	68.084	71.442	0.938	5.209	2.435	H1-1b
6	6	PL5/8X3.5	0.265	0.458	13	0.311	0.239	y	61	68.084	71.442	0.938	5.209	2.289	H1-1b
7	9	PL5/8X3.5	0.18	0.08	38	0.139	0.003	y	57	71.336	71.442	0.938	5.209	1.032	H1-1b
8	10	PL5/8X3.5	0.134	0.08	8	0.088	0.08	y	48	71.336	71.442	0.938	5.209	1.019	H1-1b
9	11	PIPE 2.0	0.227	2.5	8	0.089	0.156		46	29.81	32.13	1.872	1.872	1	H1-1b
10	12	PL1.25"X3.5"	0.091	0.458	38	0.036	0	y	57	140.027	141.75	3.691	10.336	1.001	H1-1b
11	13	PL1.25"X3.5"	0.26	0	59	0.046	0.458	y	60	140.027	141.75	3.691	10.336	1.337	H1-1b
12	14	PL1.25"X3.5"	0.118	0.458	48	0.018	0.458	y	56	140.027	141.75	3.691	10.336	1.626	H1-1b
13	15	PL1.25"X3.5"	0.183	0	55	0.03	0.458	y	18	140.027	141.75	3.691	10.336	1.43	H1-1b
14	16	PL5/8X3.5	0.237	0.08	38	0.069	0.08	y	58	71.336	71.442	0.938	5.209	1.016	H1-1b
15	17	PL5/8X3.5	0.12	0.08	53	0.082	0	y	7	71.336	71.442	0.938	5.209	1.015	H1-1b
16	18	PIPE 2.0	0.211	0	2	0.076	2.5		49	29.81	32.13	1.872	1.872	1	H1-1b
17	19	PL5/8X3.5	0.403	0.08	50	0.104	0.08	y	42	71.336	71.442	0.938	5.209	1.07	H1-1b
18	20	PL5/8X3.5	0.173	0.08	56	0.134	0	y	7	71.336	71.442	0.938	5.209	1.014	H1-1b
19	21	PIPE 2.0	0.377	0	2	0.135	2.5		55	29.81	32.13	1.872	1.872	1	H1-1b
20	22	PL5/8X3.5	0.363	0.08	56	0.055	0	y	9	71.336	71.442	0.938	5.209	1.092	H1-1b
21	23	PL5/8X3.5	0.116	0.08	55	0.064	0	y	6	71.336	71.442	0.938	5.209	1.013	H1-1b
22	24	PIPE 2.0	0.283	0.182	57	0.1	0.156		57	29.81	32.13	1.872	1.872	1	H1-1b
23	29	5/8"SR	0.203	0	7	0.038	0		7	1.88	9.94	0.104	0.104	1	H1-1b
24	30	5/8"SR	0.1	0	8	0.052	0		7	1.88	9.94	0.104	0.104	1	H1-1b
25	31	5/8"SR	0.807	3.333	55	0.036	3.333		7	1.88	9.94	0.104	0.104	1	H1-1a
26	32	5/8"SR	0.534	0	56	0.054	3.333		7	1.88	9.94	0.104	0.104	1	H1-1a
27	33	3/4"SR	0.22	3.976	55	0.034	0		7	1.542	14.314	0.179	0.179	1	H1-1b
28	34	3/4"SR	0.015	0	55	0.042	3.976		7	1.542	14.314	0.179	0.179	1	H1-1b*
29	35	3/4"SR	0.306	0	55	0.051	0		8	1.542	14.314	0.179	0.179	1	H1-1a
30	36	3/4"SR	0	3.976	100	0.024	3.976		6	1.542	14.314	0.179	0.179	1	H1-1a
31	41	PIPE 2.0	0.514	3.333	58	0.107	3.333		8	9.837	32.13	1.872	1.872	1	H1-1b
32	42	PIPE 2.0	0.384	3.333	43	0.068	3.333		43	9.837	32.13	1.872	1.872	1	H1-1b
33	43	PIPE 2.0	0.077	5.097	11	0.005	10.194		11	9.466	32.13	1.872	1.872	1	H1-1b
34	44	PIPE 2.0	0.093	8.096	13	0.004	8.096		4	14.642	32.13	1.872	1.872	1	H1-1b*

APPENDIX D

ADDITIONAL CALCUATIONS

PROJECT	**100140.022.01.0001 - HRT 080 9533**				**SR**
SUBJECT	**Sector Mount Analysis**				
DATE	**12/09/22**	PAGE	1	OF	1

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

B+T GRP

[REF: AISC 360-05]

Reactions at Bolted Connection

Tension	:	1.127	k
Vertical Shear	:	0.864	k
Horizontal Shear	:	1.729	k
Torsion	:	0.475	k.ft
Moment from Horizontal Forces	:	0	k.ft
Moment from Vertical Forces	:	0.645	k.ft

Bolt Parameters

Bolt Grade	:	A325	
Bolt Diameter	:	0.625	in
Nominal Bolt Area	:	0.307	in^2
Bolt spacing, Horizontal	:	6	in
Bolt spacing, Vertical	:	6	in
Bolt edge distance, plate height	:	1.5	in
Bolt edge distance, plate width	:	1.5	in
Total Number of Bolts	:	4	bolts

Summary of Forces

Shear Resultant Force	:	1.93	k
Force from Horz. Moment	:	0.00	k
Force from Vert. Moment	:	1.17	k
Shear Load / Bolt	:	0.48	k
Tension Load / Bolt	:	0.28	k
Resultant from Moments / Bolt	:	0.58	k

Bolt Checks

Nominal Tensile Stress, F_{nt}	:	90.00	ksi	[AISC Table J3.2]
Available Tensile Stress, ΦR_{nt}	:	20.72	k/bolt	[Eq. J3-1]
Unity Check, Bolt Tension	:	**4.18%**		**OKAY**
Nominal Shear Stress, F_{nv}	:	48.00	ksi	[AISC Table J3.2]
Available Shear Stress, ΦR_{nv}	:	11.05	k/bolt	[Eq. J3-1]
Unity Check, Bolt Shear	:	**6.92%**		**OKAY**
Unity Check, Combined	:	**11.10%**		**OKAY**
Available Bearing Strength, ΦR_n	:	34.66	k/bolt	
Unity Check, Bolt Bearing	:	**1.39%**		**OKAY**

ATTACHMENT 4

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: CT11235A

Haddam/Rt 9
539 Plains Road
Haddam, Connecticut 06438

January 12, 2023

EBI Project Number: 6223000132

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**1.23%**

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

EBI Consulting

environmental | engineering | due diligence

January 12, 2023

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

Emissions Analysis for Site: CT11235A - Haddam/Rt 9

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **539 Plains Road** in **Haddam, 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 539 Plains Road in Haddam, Connecticut using the equipment information listed below. Modeling of the antennas and associated equipment was completed using RoofMaster™ software, which is a widely-used predictive modeling program that has been developed to predict RF power density values for rooftop and tower telecommunications sites produced by vertical collinear antennas that are typically used in the cellular, PCS, paging and other communications services. Using the computational methods set forth in Federal Communications (FCC) Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65), RoofMaster™ calculates predicted power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

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, telecommunications equipment was modeled using the following assumptions:

1) 1 LTE channel (600 MHz Band) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 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) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 1 LTE channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 120/160 Watts per Channel.

5) 1 LTE channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 120/160 Watts per Channel.

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

7) For the following calculations, the sample point was the top of a 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.

8) The antennas used in this modeling are the RFS APXVAALL24_43-U-NA20 02DT 600 for the 600 MHz / 600 MHz / 600 MHz / 700 MHz / 1900 MHz channel(s) in Sector A, the RFS APXVAALL24_43-U-NA20 02DT 600 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s) in Sector B, the RFS APXVAALL24_43-U-NA20 02DT 600 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative

estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is 186 feet above ground level (AGL).

10) Emissions values for additional carriers were calculated in Far Field utilizing the antenna models provided in the structural analysis.

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

EBI Consulting

environmental | engineering | due diligence

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXVAALL24_43-U-NA20 02DT 600	Make / Model:	RFS APXVAALL24_43-U-NA20 02DT 600	Make / Model:	RFS APXVAALL24_43-U-NA20 02DT 600
Frequency Bands:	600 MHz / 600 MHz / 600 MHz / 700 MHz / 1900 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 16.45 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.65 dBd / 15.45 dBd / 16.45 dBd
Height (AGL):	186 feet	Height (AGL):	186 feet	Height (AGL):	186 feet
Channel Count:	5	Channel Count:	5	Channel Count:	5
Total TX Power (W):	480.00 Watts	Total TX Power (W):	480.00 Watts	Total TX Power (W):	480.00 Watts
ERP (W):	13,869.37	ERP (W):	13,869.37	ERP (W):	13,869.37
Antenna A1 MPE %:	1.99%	Antenna B1 MPE %:	1.99%	Antenna C1 MPE %:	1.99%

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

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Combined Sectors):	0.04%
Verizon	0.65%
AT&T	0.13%
T-Mobile (Existing)	0.09%
Dish	0.32%
Site Total MPE % :	1.23%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	0.04%
T-Mobile Sector B Total:	0.04%
T-Mobile Sector C Total:	0.04%
T-Mobile Total MPE % :	0.04%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 600 MHz LTE	1	689.5408364	186	0.765123467	600 MHz LTE	400.0	0.19%
T-Mobile 600 MHz NR	1	1379.081673	186	1.530246935	600 MHz NR	400.0	0.38%
T-Mobile 700 MHz LTE	1	810.1398427	186	0.898941691	700 MHz LTE	467.0	0.19%
T-Mobile 1900 MHz LTE	1	4865.416041	186	5.398728828	1900 MHz LTE	1000.0	0.54%
T-Mobile 2100 MHz LTE	1	6125.195893	186	6.796596913	2100 MHz LTE	1000.0	0.68%
						T-Mobile Total:	**0.04%**

• NOTE: Total T-Mobile MPE values reflect all T-Mobile antennas as reported by RoofMaster™ combined modeling.
• 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:	0.04%
Sector B:	0.04%
Sector C:	0.04%
T-Mobile Maximum MPE % (Sector A):	0.04%
T-Mobile Combined Sectors MPE %:	0.04%
Site Total:	1.23%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **1.23%** 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 or documents available on the Connecticut Siting Council website.

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.

ATTACHMENT 5

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts
and New York

January 26, 2023

Via Certificate of Mailing

Robert McGarry, First Selectman
Town of Haddam
30 Field Park Drive
Haddam, CT 06438

Re: **Proposed Modifications to a Telecommunications Facility at 539 Plains Road in Haddam, Connecticut**

Dear Mr. McGarry:

This firm represents Crown Castle ("Crown"). Today, Crown filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to extend the existing lattice tower at 539 Plains Road from 180 feet to 190 feet to accommodate T-Mobile's need for improved wireless service in Haddam.

As presented in the Sub-Petition, the proposed facility modification constitutes an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-153). A copy of the Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Sub-Petition.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.

26297213-v1

Robinson+Cole

Please contact me if you have any questions regarding this proposal.

Sincerely,

Kenneth C. Baldwin

Attachment

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts
and New York

January 26, 2023

Via Certificate of Mailing

Bill Warner, Town Planner
Town of Haddam
30 Field Park Drive
Haddam, CT 06438

Re: **Proposed Modifications to a Telecommunications Facility at 539 Plains Road in Haddam, Connecticut**

Dear Mr. Warner:

This firm represents Crown Castle ("Crown"). Today, Crown filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to extend the existing lattice tower at 539 Plains Road from 180 feet to 190 feet to accommodate T-Mobile's need for improved wireless service in Haddam.

As presented in the Sub-Petition, the proposed facility modification constitutes an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-153). A copy of the Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Sub-Petition.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.

Please contact me if you have any questions regarding this proposal.

Sincerely,

Kenneth C. Baldwin

Attachment

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts
and New York

January 26, 2023

Via Certificate of Mailing

539 Plains Road LLC
444 Route 312
Brewster, NY 10509

Re: **Proposed Modifications to a Telecommunications Facility at 539 Plains Road in Haddam, Connecticut**

Dear Sir or Madam:

This firm represents Crown Castle ("Crown"). Today, Crown filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to extend the existing lattice tower at 539 Plains Road from 180 feet to 190 feet to accommodate T-Mobile's need for improved wireless service in Haddam.

As presented in the Sub-Petition, the proposed facility modification constitutes an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-153). A copy of the Sub-Petition is attached for your review. Landowners whose property abuts the Property were also sent notice of this filing along with a copy of the Sub-Petition.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.

26297329-v1

Robinson+Cole

Please contact me if you have any questions regarding this proposal.

Sincerely,

Kenneth C. Baldwin

Attachment

ATTACHMENT 6

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts
and New York

January 26, 2023

Via Certificate of Mailing

«Name_and_Address»

Re: **Proposed Telecommunications Facility at 539 Plains Road in Haddam, Connecticut**

Dear «Salutation»:

This firm represents Crown Castle ("Crown"). Today, Crown filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to extend the existing lattice tower at 539 Plains Road from 180 feet to 190 feet to accommodate T-Mobile's need for improved wireless service in Haddam.

As presented in the Sub-Petition, the proposed facility improvements at the Property constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-153). A copy of the Sub-Petition is attached for your review.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the Sub-Petition.

This notice is being sent to you because you are listed as an owner of land that abuts the Property. If you have any questions regarding the Sub-Petition, the Council's process for reviewing the Sub-Petition or the details of the filing itself, please feel free to contact me at the number listed above. You may also contact the Council directly at 860-827-2935.

Sincerely,

Kenneth C. Baldwin

Attachment

CROWN CASTLE INTERNATIONAL CORP. AND T-MOBILE

ABUTTING PROPERTY OWNERS

539 PLAINS ROAD
HADDAM, CONNECTICUT

	Property Address	Owner's and Mailing Address
1.	Plains Road	Elevated Terra Inc 500 Westover Drive Sanford, NC 27330
2.	Plains Road	Darlene P. Manning, Gail Hanson and Normand Manning, Jr. 530 Plains Road Haddam, CT 06438
3.	463 Plains Road	John P. Terrie Hevrin 463 Plains Road Haddam, CT 06438
4.	470 Plains Road	Sean Nuzum 470 Plains Road Haddam, CT 06438
5.	496 Plains Road	Sean Nuzum 470 Plains Road Haddam, CT 06438
6.	530 Plains Road	Gail Hansen and Normand Manning, Jr. 530 Plains Road Haddam, CT 06438
7.	Plains Road	Darlene P. Manning, Gail Hansen and Normand Manning, Jr. 530 Plains Road Haddam, CT 06438
8.	539 Plains Road	539 Plains Road LLC 444 Route 312 Brewster, NY 10509

	Property Address	Owner's and Mailing Address
9.	Turkey Hill Road	Darlene P. Manning, Gail Hansen and Normand Manning 530 Plains Road Haddam, CT 06438
10.	386 Turkey Hill Road	Gary and Linda Rice 386 Turkey Hill Road Haddam, CT 06438
11.	376 Turkey Hill Road	Alison Rice 376 Turkey Hill Road Haddam, CT 06438
12.	364 Turkey Hill Road	Timothy Pepe 364 Turkey Hill Road Haddam, CT 06438