Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts
and New York

September 13, 2022

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
I-84 and South Street, Middlebury, Connecticut

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a wireless telecommunications facility at the above-referenced property address (the "Property"). The Cellco facility consists of antennas and remote radio heads attached to a Connecticut State Police ("CSP") tower and associated equipment on the ground near the base of the tower. The Siting Council ("Council") approved a request of the CSP in April of 1991 to replace/rebuild the then existing tower adjacent to I-84. Cellco's use of the tower was approved by the Council in November of 2015 (PE1133-VER-20151006). Copies of the Council's 1991 tower replacement approval and PE1133-VER-20151006 approval are included in Attachment 1.

Cellco now intends to modify its facility by removing four (4) existing antennas and installing four (4) MX06FRO660-03 antennas and two (2) MT6407-77A antennas on the existing antenna mounts. Cellco also intends to replace four (4) remote radio heads ("RRHs") with four (4) new RRHs behind its antennas. A set of project plans showing Cellco's proposed facility modifications and new antennas and RRHs specifications are included in Attachment 2.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Middlebury's Chief Elected Official and Land Use Officer.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be installed on Cellco's existing antenna mounts.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

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

4. The installation of Cellco's new antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 3. The modified facility will be capable of providing Cellco's 5G wireless service.

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

6. According to the attached Structural Analysis ("SA") and Mount Analysis ("MA"), the existing tower, tower foundation and antenna mounts , with certain modifications, can support Cellco's proposed modifications. Copies of the SA and MA are included in Attachment 4.

A copy of the parcel map and Property owner information is included in Attachment 5. A Certificate of Mailing verifying that this filing was sent to municipal officials and the property owner is included in Attachment 6.

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Edward St. John, Middlebury First Selectman
Curtis Bosco, Zoning Enforcement Officer
State of Connecticut, Department of Emergency Services & Public Protection, Property Owner
Alex Tyurin, Verizon Wireless

ATTACHMENT 1

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

136 Main Street, Suite 401
New Britain, Connecticut 06051
Phone: 827-7682

April 2, 1991

Captain Ronald P. Mikulka
Commanding Officer
Telecommunications Section
294 Colony Street
Meriden, CT 06450

RE: Department of Public Safety Division of State Police notice of intent to replace an existing telecommunications tower and associated equipment along I-84, Middlebury, Connecticut, as an exempt modification.

Dear Captain Mikulka:

At a meeting held on April 1, 1991, the Connecticut Siting Council acknowledged your notice of intent to replace an existing telecommunications tower and associated equipment located along I-84 in Middlebury, Connecticut, as an exempt modification pursuant to Section 16-50j-73 of the Regulations of State Agencies (RSA).

The proposed modifications are to be implemented as specified in your notice dated March 13, 1991, and addendums of March 18, 1991 and March 27, 1991. As proposed, the modifications are in compliance with the exception criteria specified in RSA 16-50j-72 as a replacement of an existing telecommunications tower with changes to the facility site that do not increase the tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary 6 decibels, and add radio frequency sending or receiving capability which increases the total radio frequency electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to Section 22a-162 of the Connecticut General Statutes.

The Council is pleased to note that the shared use of an existing tower serves the Council's long-term goal of protecting the public interest by avoiding proliferation of additional tower structures.

Please notify the Council upon completion of construction.

Very truly yours,

Gloria Dibble Pond

Gloria Dibble Pond
Chairperson

GDP/cp
5227E

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

www.ct.gov/csc

November 13, 2015

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **PE1133-VER-20151006** – Cellco Partnership d/b/a Verizon Wireless sub-petition for a declaratory ruling for approval of an eligible facility request for modifications to an existing telecommunications facility located along Interstate 84, Middlebury, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby approves your Eligible Facilities Request (EFR) to install antennas and associated equipment at the above-referenced facility pursuant to the Federal Communications Commission Wireless Infrastructure Report and Order, with the following conditions:

- Modifications shall be made in accordance with the structural analysis report prepared by AECOM dated July 10, 2015 and stamped by Richard Sambor;
- Within 45 days following completion of the equipment installation, Cellco shall provide documentation certified by a Professional Engineer that its installation complied with the recommendations of the structural analysis;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by the Petitioner shall be removed within 60 days of the date the antenna ceased to function;
- The validity of this action shall expire one year from the date of this letter; and
- The Petitioner may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the EFR dated October 5, 2015.

Thank you for your attention and cooperation.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/RM

c: The Honorable Edward St. John, First Selectman, Town of Middlebury
Ollie LeDuc, Building Official, Town of Middlebury

S:\PETITIONS\1101-\1133\3_Subpetitions_ByTown\Middlebury\Interstate 84-decision.docx

ATTACHMENT 2

verizon

WIRELESS COMMUNICATIONS FACILITY

MIDDLEBURY I-84 CT
I-84 AND SOUTH STREET
MIDDLEBURY, CT 06762

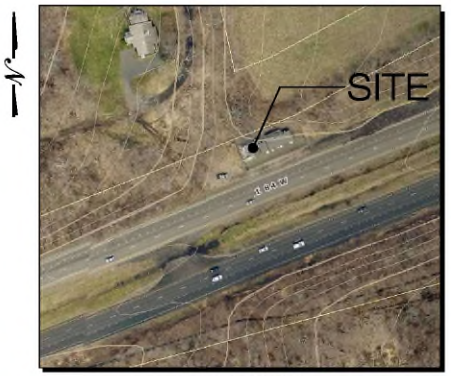
DRAWING INDEX

SITE DIRECTIONS

START: 20 ALEXANDER DRIVE
WALLINGFORD, CONNECTICUT 06492

END: I-84 AND SOUTH STREET
MIDDLEBURY, CT 06762

1.	HEAD SOUTH TOWARDS ALEXANDER DRIVE	279 FT
2.	SLIGHT RIGHT TOWARDS ALEXANDER DRIVE	289 FT
3.	TURN RIGHT TOWARDS ALEXANDER DRIVE	167 FT
4.	TURN RIGHT ONTO ALEXANDER DRIVE	0.3 MI
5.	TURN RIGHT ONTO BARNES INDUSTRIAL RD S	0.1 MI
6.	TURN LEFT AT THE FIRST CROSS STREET ONTO CT-68 W	0.4 MI
7.	TURN RIGHT ONTO N. COLONY RD	0.3 MI
8.	TURN RIGHT TO MERGE ONTO CT-15 N TOWARD HARTFORD	0.5 MI
9.	CONTINUE ONTO CT-15 N	3.1 MI
10.	TAKE EXIT 68 W TO I-691 W TOWARD MERIDEN/WATERBURY	7.9 MI
11.	USE THE LEFT 2 LANES TO TAKE EXIT. 1 FOR I-84 W TOWARD WATERBURY/ DANBURY	1.0 MI
12.	MERGE ONTO I-84 (DESTINATION WILL BE ON THE RIGHT)	12.8 MI



LOCATION MAP
SCALE: 1" = 2000'-0"

SITE INFORMATION

VZ SITE NAME: MIDDLEBURY I-84 CT
VZ PROJ FUZE I.D.: 16244626
VZ LOCATION CODE: 468946
VZ PROJECT CODE: 20202198934
LOCATION: I-84 AND SOUTH STREET
MIDDLEBURY, CT 06762

PROJECT SCOPE: REFER TO NOTES ON C-1 FOR SCOPE OF WORK.

MAP/BLOCK/LOT: N/A

ZONING DISTRICT: N/A

LATITUDE: 41° 30' 49.0" N (41.5136111° N)

LONGITUDE: 73° 07' 28.0" W (73.1244444° W)

SITE COORDINATES AND GROUND ELEVATION OBTAINED FROM RFDS PROVIDED BY VERIZON WIRELESS MARKED REV5 DATED 05/24/22

GROUND ELEVATION: 763'± AMSL

PROPERTY OWNER: STATE OF CONNECTICUT DOT
2800 BERLIN TURNPIKE
P.O. BOX 317546, NEWINGTON, CT

APPLICANT: CELLCO PARTNERSHIP
d/b/a VERIZON WIRELESS
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

LEGAL/REGULATORY COUNSEL: ROBINSON & COLE, LLP
KENNETH C. BALDWIN, ESQ.
280 TRUMBULL STREET
HARTFORD, CT 06103

ENGINEER CONTACT: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385
(860) 663-1697

VERIZON SMART TOOL PROJECT # 10163461

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	01/27/21	FOR REVIEW: JRM
1	01/29/21	FOR REVIEW: JRM
2	02/17/21	PER CLIENT COMMENTS: JRM
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4	09/24/22	FOR FILING: JRM
5	09/07/22	FOR FILING: JRM
6		

STATE OF CONNECTICUT
MICHAEL TRODDEN
33313
LICENSED
PROFESSIONAL ENGINEER

DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311
WATERFORD, CT 06385

OWNER: STATE OF CONNECTICUT DOT, C/O ANDREW E. BECKER
ADDRESS: 2800 BERLIN TURNPIKE P.O. BOX 317546, NEWINGTON, CT

MIDDLEBURY I-84 CT

SITE ADDRESS: I-84 AND SOUTH STREET MIDDLEBURY, CT 06762

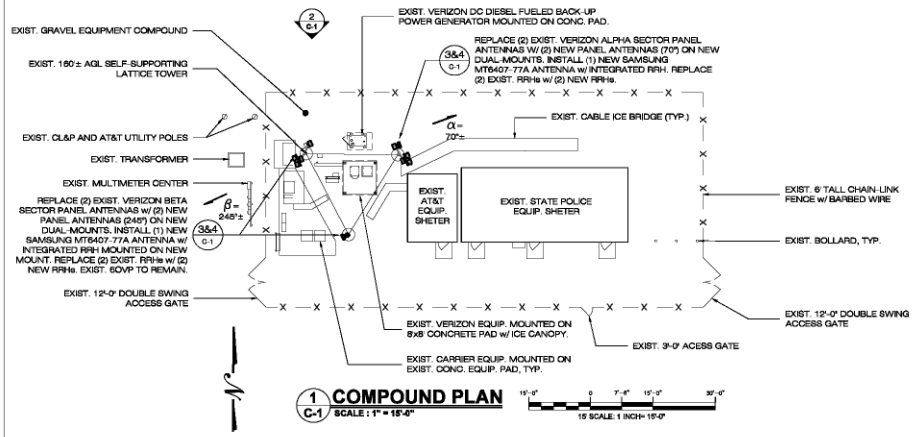
APT FILING NUMBER: CT141_11870

DRAWN BY: DRA
DATE: 01/29/21 CHECKED BY: JRM

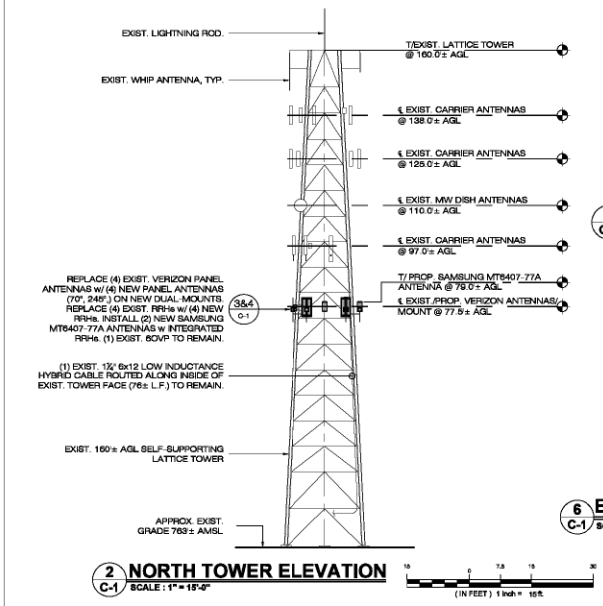
VZ PROJECT CODE: 20202198934
VZ LOCATION CODE: 468946
VZ FUZE ID: 16244626

SHEET TITLE:
TITLE SHEET

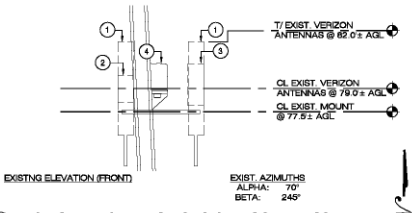
SHEET NUMBER:
T-1



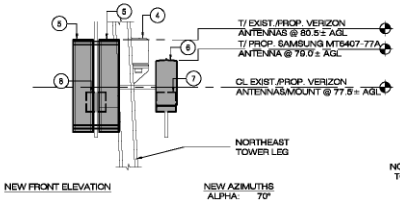
1 COMPOUND PLAN
C-1 SCALE : 1" = 15'-0"



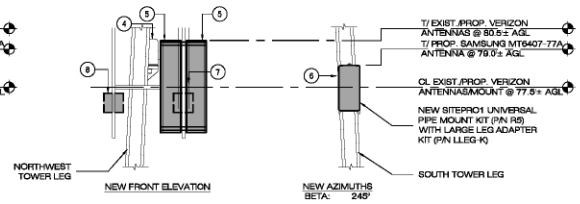
2 NORTH TOWER ELEVATION
C-1 SCALE : 1" = 15'-0"



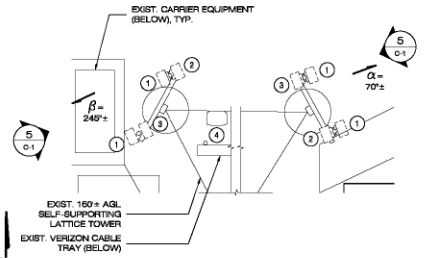
5 EQUIP. MOUNTING CONFIG. (EXIST.)
C-1 SCALE : ¾" = 1'-0"



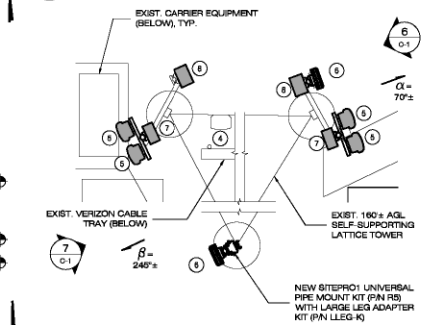
6 EQUIP. MOUNTING CONFIG. (NEW) - ALPHA
C-1 SCALE : ¾" = 1'-0"



7 EQUIP. MOUNTING CONFIG. (NEW) - BETA
C-1 SCALE : ¾" = 1'-0"



3 EQUIP. CONFIGURATION PLAN (EXIST.)
C-1 SCALE : ¾" = 1'-0"



4 EQUIP. CONFIGURATION PLAN (NEW)
C-1 SCALE : ¾" = 1'-0"

NOTES:

1. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY AECOM (60666990/ 60657751, SMK-007, REV3/ VZ5-228, REV2) DATED 07/02/21 AVAILABLE UNDER SEPARATE COVER.
2. REFER TO MOUNT REANALYSIS-PMI REPORT PREPARED BY MASER CONSULTING, C.T., PROJECT #20777338A MARKED REV1, DATED 08/30/22 AVAILABLE UNDER SEPARATE COVER.
3. BASE MAPPING FROM FIELD MEASUREMENTS TAKEN BY ALL-POINTS TECHNOLOGY CORPORATION, P.C. ON 12/15/20.
4. PROJECT SCOPE INCLUDES THE FOLLOWING:
   - REPLACEMENT OF FOUR (4) EXIST. PANEL ANTENNAS w/ FOUR (4) NEW PANEL ANTENNAS ON DUAL-MOUNTS.
   - INSTALLATION OF (2) NEW SAMSUNG MT6407-77A ANTENNAS w/ INTEGRATED RRHs.
   - INSTALLATION OF NEW ANTENNA MOUNT.
   - REPLACEMENT OF FOUR (4) EXIST. RRHs w/ FOUR (4) NEW DUAL BAND RRHs.
   - REMOVAL OF ALL UN-USED COAXIAL CABLE FEED-LINES.
5. ALL EXPOSED STEEL AND HARDWARE TO BE HOT DIP GALV. (HDG). PAINT TO MATCH EXIST. (WHERE APPLICABLE)
6. CAP & WEATHERPROOF ALL UN-USED CABLE ENTRY PORTS (WHERE APPLICABLE).
7. MOUNT & GROUND ALL NEW EQUIPMENT IN ACCORDANCE WITH NEC (NFPA-70), NESC AND MANUFACTURERS SPECIFICATION.
8. SECURE ALL NEW ANTENNA CABLES PER MANUFACTURER RECOMMENDATIONS.
9. BOND NEW ANTENNA MOUNTING PIPES TO ANTENNA SECTOR GROUND BAR W/ # 2 AWG, BCW, (WHERE APPLICABLE).
10. CONTRACTOR SHALL INSTALL NEW SIDE-BY-SIDE & DUAL-MOUNT BRACKETS PER ANTENNA MOUNT MANUFACTURER RECOMMENDATIONS, INCLUDING VERIFICATION OF MINIMUM PIPE MAST DIAMETER REQUIRED TO INSTALL NEW MOUNT BRACKETS. CONTRACTOR SHALL NOTIFY ENGINEER OF RECORD SHOULD EXIST. PIPE MASTS REQUIRE REPLACEMENT TO SUPPORT THE NEW MOUNT BRACKETS.
11. ANTENNA CONFIGURATIONS SHOWN HEREIN ARE FRONT ELEVATIONS. (UNLESS NOTED OTHERWISE).
12. ANTENNA SPACING DIMENSIONS ARE TO THE CENTER OF THE EXIST. ANTENNA AND PROP. ANTENNA FACE.
13. REFER TO THE FINAL RFDS PROVIDED BY VERIZON FOR THE LATEST INFORMATION REGARDING EQUIPMENT MODELS, REQUIRED CABLING & DOWN-TILT INFORMATION.
14. COORDINATE ALL LSUB6 COLOR MATCHING (WHERE APPLICABLE) W/ LSUB6 MANUFACTURER INSTALLATION REQUIREMENTS, VERIZON CONSTRUCTION MANAGER & OWNER.
15. PAINT ALL NEW NON LSUB6 ANTENNAS & APPURTENANCES TO MATCH EXIST. STRUCTURE (WHERE APPLICABLE) COORDINATE W/ VERIZON CONSTRUCTION MANAGER & BUILDING OWNER.

GENERAL ABBREVIATION LIST:

ABP	ABOVE BASE PLATE
AGL	ABOVE GROUND LEVEL
AMSL	ABOVE MEAN SEA LEVEL
AWS	ADVANCED WIRELESS SERVICE
HDG	HOT DIP GALVANIZED
OVP	OVER VOLTAGE PROTECTION
RRH	REMOTE RADIO HEAD
V.I.F.	VERIFY IN FIELD
W.P.	WORK POINT
A.F.R.	ABOVE FINISH ROOF

SCOPE OF WORK (ALL) SECTORS

1. EXIST. ANTENNA (TO BE REPLACED) MODEL: ANDREW SBNHH-1D65B
2. EXIST. RRH (TO BE REPLACED) MODEL: NOKIA B13 RRH 4x30-700
3. EXIST. RRH (TO BE REPLACED) MODEL: NOKIA B4 2x50W AWS RRH
4. EXIST. 6 OVP (TO BE REMAIN) MODEL: RAYCAP RRFDC3315-PF-48 (V.I.F.)
5. NEW ANTENNA MODEL: JMA MX06FRO660-03 MOUNTED ON NEW JMA DUAL MOUNT (P/N 91900314-02)
6. NEW ANTENNA SAMSUNG MT6407-77A ANTENNA w/ INTEGRATED RRH
7. NEW DUAL BAND RRH MODEL: SAMSUNG B13/B5 RRH-BR04C (RFV01U-D2A)
8. NEW DUAL BAND RRH MODEL: SAMSUNG B66/B2A RRH-BR049 (RFV01U-D1A)

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
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567 VAUXHALL STREET EXTENSION - SUITE 311
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STATE OF CONNECTICUT · MICHAEL TRODDEN · 33313 · LICENSED PROFESSIONAL ENGINEER

DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

OWNER: STATE OF CONNECTICUT DOT, C/O ANDREW E. BECKER
ADDRESS: 3920 BERLIN TURNPIKE P.O. BOX 317546, NEWINGTON, CT

MIDDLEBURY I-84 CT

SITE ADDRESS: I-84 AND SOUTH STREET MIDDLEBURY, CT 06762

APT FILING NUMBER: CT141_11870

DRAWN BY: DRA
DATE: 01/29/21 CHECKED BY: JRM

VZ PROJECT CODE: 20202198934
VZ LOCATION CODE: 468946
VZ FUZE ID: 16244628

SHEET TITLE:
COMPOUND PLAN, NORTH TOWER ELEVATION, EQUIP. CONFIG. PLANS, ELEVATIONS & NOTES

SHEET NUMBER:
C-1

EQUIPMENT DATA

EQUIPMENT SPECIFICATIONS

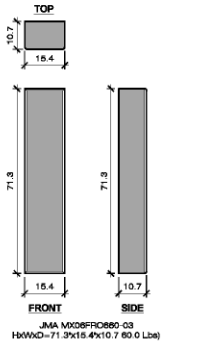
SECTOR	ANTENNA MAKE/MODEL	QTY	AZIMUTH	EQUIPMENT STATUS	HEIGHT (IN)	WIDTH (IN)	DEPTH (IN)	WEIGHT (LBS)
ALPHA	SAMSUNG MT6407-77A	1	70°	NEW	35.1 (3)	16.1 (3)	5.51 (3)	67.1 (3)(4)(5)
	700/850/1900/2100: JMA MX06FRO660-03	1	70°	NEW	71.3	15.4	10.7	60.0 (5)
	700/850/1900/2100: JMA MX06FRO660-03	1	70°	NEW	71.3	15.4	10.7	60.0 (5)
BETA	SAMSUNG MT6407-77A	1	245°	NEW	35.1 (3)	16.1 (3)	5.51 (3)	67.1 (3)(4)(5)
	700/850/1900/2100: JMA MX06FRO660-03	1	245°	NEW	71.3	15.4	10.7	60.0 (5)
	700/850/1900/2100: JMA MX06FRO660-03	1	245°	NEW	71.3	15.4	10.7	60.0 (5)
GAMMA	APPURTENANCE MAKE/MODEL							
	SAMSUNG B2/B66A RRH-BR049 (RFV01U-D1A)	2	-	NEW	14.9	14.9	10.04	97.5
	SAMSUNG B5/B13 RRH-BR04C (RFV01U-D2A)	2	-	NEW	14.9	14.9	8.14	82.0
	RAYCAP RRFDC-3315-PF-48	1	-	ETR	28.9	15.73	10.25	32

(1) ETR DENOTES EXIST. TO REMAIN
(2) WEIGHT WITHOUT MOUNTING BRACKET.
(3) ANTENNA DATA BASED ON LATEST VERIZON RFDS.
(4) EQUIPMENT CONFIGURATION INDICATED ABOVE VIEWED FROM BEHIND.
(5) NOT TO EXCEED

BILL OF MATERIALS

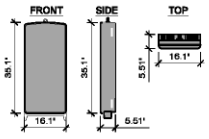
		QUANTITY	LENGTH	COMMENTS
1	700/850/1900/2100	4		(JMA MX06FRO660-03) MOUNTED W/ NEW JMA DUAL MOUNT (P/N 91900314-02)
2	LS6 ANTENNA w/ INTEGRATED RRH	2		(SAMSUNG MT6407-77A) MOUNTED TO EXIST. PIPE MAST
3	1/2" JUMPER CABLE	32	15 FT	ROUTE FROM RRH TO ANTENNAS
4	ANTENNA LINK CABLES	4	15 FT	ROUTE FROM UPPER OVP TO ANTENNAS
5	ANTENNA POWER CABLES	2	15 FT	PROPRIETARY POWER CABLE FROM UPPER OVP TO ANTENNAS
6	AWS/PCS RRH	2		SAMSUNG B2/B66 RRH-BR049 (RFV01U-D1A) MOUNTED TO EXIST. PIPE MAST
7	700/850 RRH	2		SAMSUNG B5/B13 RRH-BR04C (RFV01U-D2A) MOUNTED TO EXIST. PIPE MAST
8	RRH CABLES	4	15M	PROPRIETARY POWER & FIBER CABLES

NOTES:
1. INFORMATION SHOWN HEREON IS FOR USE BY VERIZON EQUIPMENT OPERATIONS.
2. INFORMATION IS BASED ON LATEST VERIZON RFDS.
3. * DENOTES EQUIPMENT DESIGNATED "FOR LEASING ONLY" (WHERE APPLICABLE)
4. INSTALL ALARM BOARDS AT ALL OVPs WHERE REQUIRED. COORDINATE w/ VERIZON EQUIPMENT ENGINEERING.
5. INSTALL LIP-CONVERTER(S) LOCATED AT BASE OVPs WHERE REQUIRED. COORDINATE w/ VERIZON EQUIPMENT ENGINEERING AS NECESSARY.
6. COORDINATE ANTENNA CABLING REQUIREMENTS WITH VERIZON ENGINEERING.
7. CONTRACTOR SHALL INSTALL NEW SIDE-BY-SIDE & DUAL-MOUNT BRACKETS PER ANTENNA MOUNT MANUFACTURER RECOMMENDATIONS, INCLUDING VERIFICATION OF MINIMUM PIPE MAST DIAMETER REQUIRED TO INSTALL NEW MOUNT BRACKETS. CONTRACTOR SHALL NOTIFY ENGINEER OF RECORD SHOULD EXIST. PIPE MAST REQUIRE REPLACEMENT TO SUPPORT THE NEW MOUNT BRACKETS.



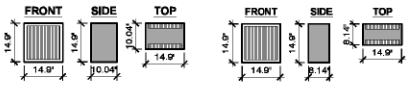
JMA MX06FRO660-03
HxWxD=71.3"x15.4"x10.7 60.0 Lbs)

2 B-1 NEW ANTENNA DETAIL
SCALE : ½" = 1'-0"



SAMSUNG MT6407-77A ANTENNA
HxWxD=35.1"x16.1"x5.51"
WT=67.1 Lbs
(NOT TO EXCEED)

3 B-1 NEW ANTENNA DETAIL
SCALE : ½" = 1'-0"

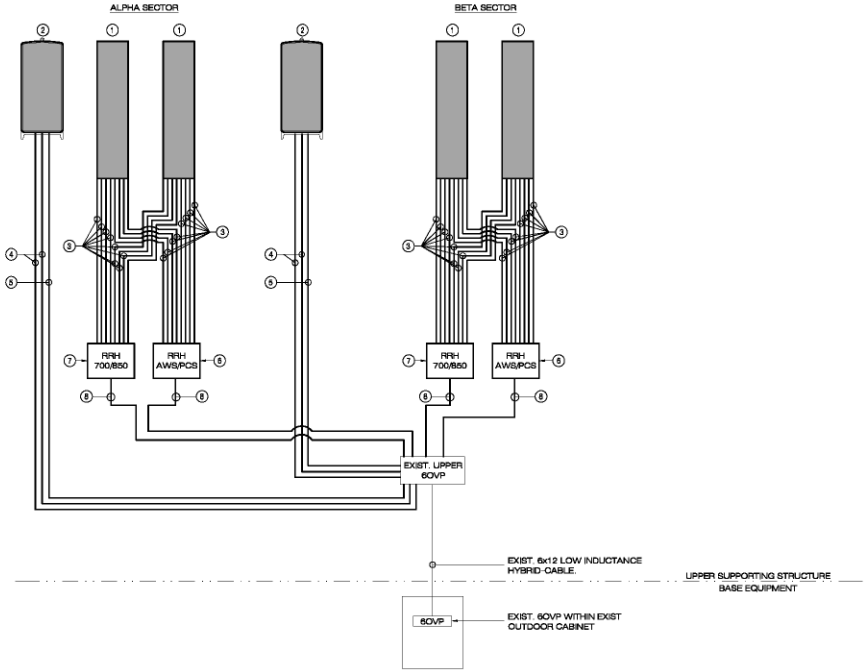


SAMSUNG DUAL HIGH BAND B2/B66A
RRH-BR049 (RFV01U-D1A)
RRH POS/AWS
REMOTE RADIO HEAD (RRH)
HxWxD=14.9"x14.9"x10.04" (97.5 Lbs)

SAMSUNG DUAL HIGH BAND B5/B13
RRH-BR04C (RFV01U-D2A)
RRH 850/700
REMOTE RADIO HEAD (RRH)
HxWxD=14.9"x14.9"x8.14" (82.0 Lbs)

NOTE: WEIGHTS INCLUDE SOLAR SHIELD & MOUNTING BRACKET

4 B-1 RRH EQUIPMENT DETAILS
SCALE : ½" = 1'-0"



1 B-1 PLUMBING DIAGRAM
SCALE : ½" = 1'-0"

NOTE: EQUIPMENT CONFIGURATION AS VIEWED FROM BEHIND.

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	01/27/21	FOR REVIEW: JRM
1	01/29/21	FOR REVIEW: JRM
2	02/17/21	PER CLIENT COMMENTS: JRM
3	02/19/21	PER CLIENT COMMENTS: JRM
4	09/24/22	FOR FILING: JRM
5	09/07/22	FOR FILING: JRM
6		

STATE OF CONNECTICUT
MICHAEL TRODDEN
33313
LICENSED
PROFESSIONAL ENGINEER

DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

OWNER: STATE OF CONNECTICUT DOT, C/O ANDREW E. BECKER
ADDRESS: 3500 BERLIN TURNPIKE P.O. BOX 317546, NEWINGTON, CT

MIDDLEBURY I-84 CT

SITE ADDRESS: I-84 AND SOUTH STREET MIDDLEBURY, CT 06762

APT FILING NUMBER: CT141_11870

DRAWN BY: DRA
DATE: 01/28/21 CHECKED BY: JRM

VZ PROJECT CODE: 20202196934
VZ LOCATION CODE: 468946
VZ FUZE ID: 16244629

SHEET TITLE:
RF BILL OF MATERIALS, EQUIPMENT SPECIFICATIONS & DETAILS

SHEET NUMBER:
B-1

DESIGN BASIS:

GOVERNING CODES/DESIGN STANDARDS:

2015 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE 2018 CONNECTICUT STATE BUILDING CODE
ASCE 7-10
TIA-222-H (TOWER)

01 GENERAL:

ABBREVIATIONS USED IN THESE SPECIFICATIONS INCLUDE THE FOLLOWING:

ACI	AMERICAN CONCRETE INSTITUTE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AWS	AMERICAN WELDING SOCIETY
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN STANDARDS AND TESTING METHODS
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
ICC-ES	INTERNATIONAL CODE COUNCIL EVALUATION SERVICE
TIA	TELECOMMUNICATIONS INDUSTRY ASSOCIATION
UL	UNDERWRITERS LABORATORIES
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

EVERY INDIVIDUAL TRADE, DISCIPLINE, AND CONTRACTOR SHALL INCLUDE THESE GENERAL SPECIFICATIONS.

THE ENGINEER IS NOT RESPONSIBLE FOR NOR A GUARANTOR OF THE INSTALLING CONTRACTORS WORK, ADEQUACY OF ANY SITE COMPONENT, SUPERVISION OF ANY WORK, AND SAFETY IN, ON, OR ABOUT THE WORK SITE.

ANY REFERENCE HEREIN TO AN OR EQUAL ITEM, THAT EQUAL ITEM SHALL BE PRE-APPROVED BY THE CONSTRUCTION MANAGER BEFORE INSTALLATION.

ALL TRADES SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES AND OTHER WORK AND CONDITIONS AS APNEWRIATE OR REQUIRED TO AVOID CONFLICTS. RESOLVE AND COORDINATE ALL CONFLICTS WITH ALL AFFECTED WORK AND SITE OPERATIONS. COORDINATION WITH THE SITE SHALL BE WITH THE OWNER, OR OWNERS SPECIFIED REPRESENTATIVE, FOR EVERYTHING RELATED TO THE INSTALLATION OF THIS PROJECT.

ALL WORK SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE EDITIONS OF ALL APPLICABLE CODES AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION (AHJ). WHERE A CONFLICT EXISTS BETWEEN CODES, PLANS, SPECIFICATIONS, AND/OR AHJ, THE MORE STRINGENT AUTHORITY SHALL APPLY. WHERE CONFLICT EXISTS BETWEEN PLANS AND SPECIFICATIONS, PLAN SHALL APPLY. WHERE CONFLICT EXISTS BETWEEN PLAN SHEETS, CONSTRUCTION MANAGER SHALL BE CONSULTED PRIOR TO COMMENCING ANY WORK.

CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND NEWERLY OPERATIVE AND USABLE SYSTEM THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.

CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, INSTALLATIONS, AND EQUIPMENT IN THE FIELD PRIOR TO BID, FABRICATION, AND INSTALLATION OF ANY WORK.

CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED FOR INSPECTIONS PRIOR TO CLOSING PENETRATIONS AND OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

CONTRACTOR SHALL VISIT THE SITE TO MANAGE AND GAIN APPROVAL FOR ALL TENANT DISRUPTIONS, POWER OUTAGES, WORK SCHEDULES, DEFINITION OF WORK AREA AND WORK STORAGE, NEWER BUILDING/SITE ACCESS, NOISE AND CLEANLINESS REQUIREMENTS WITH THE BUILDING/SITE MANAGEMENT PRIOR TO ALL WORK. ANY DISRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE IMPLEMENTED ONLY UPON WRITTEN APPROVAL OF THE OWNER.

THE CONTRACTOR SHALL SAFEGUARD AGAINST CREATING ANY HAZARD AFFECTING TENANT EGRESS OR COMPROMISING SITE SECURITY MEASURES.

PRIOR TO ALL BELOW-GRADE WORK AND ANY SURFACE WORK IN A NEW AREA FOR STRUCTURES OR VEHICLES, CONTRACTOR SHALL ENGAGE A MARKOUT SERVICE TO IDENTIFY ANY UNDERGROUND STRUCTURES, CONDUITS, AND PIPELINES IN THE AREA. ALL EXISTING SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UNDERGROUND UTILITIES IDENTIFIED OR ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN DIGGING OR EXCAVATING IN ANY MANNER AROUND OR NEAR SUCH UTILITIES. CONTRACTOR IS RESPONSIBLE FOR REPAIRS, REPLACEMENT, AND ALL DAMAGES DUE TO DAMAGE OF UTILITIES BY HIS OPERATIONS.

ALL EXISTING AND NEW EQUIPMENT AND MATERIAL LOCATIONS, ROUTING, ORIENTATION, MOUNTING, SPECIFICATIONS AND GENERAL INSTALLED CHARACTERISTICS SHALL BE CONSIDERED DIAGRAMMATIC ON THE PLANS. EXACT CONDITIONS SHALL BE DETERMINED IN THE FIELD PRIOR TO ANY INSTALLATION. ANY DIFFERENCES THAT MAY CAUSE SCHEDULE, COST, OR QUALITY SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER OR ENGINEER PRIOR TO ANY WORK.

ALL REFERENCES HEREIN TO VERIFICATION OF ANY CONDITION OF SITE, FIELD, PLANS, OR SPECIFICATIONS PRIOR TO ANY WORK SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR. ANY AND ALL ADDITIONS, MODIFICATIONS, CHANGES, REPAIR, OR DEMOLITION AS A RESULT OF FAILURE TO BRING ANY EXISTING CONDITION NEWERLY TO THE ATTENTION OF THE OWNER OR ENGINEER SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR WITHOUT DELAY, COST, OR CHANGES IN QUALITY.

ALL NOTES THIS SHEET SHALL APPLY UNLESS SPECIFICALLY NOTED OTHERWISE ON THE INCLUDED DRAWINGS OR IN SEPARATE PROJECT SPECIFICATIONS AS APPLICABLE. ALL SPECIFICATIONS SHALL BE CONSIDERED REQUIRED UNLESS APPROVED EQUAL BY THE OWNER, CONSTRUCTION MANAGER, OR ENGINEER AS APPLICABLE.

THE WORDS "PROVIDE" OR "INSTALL" SHALL MEAN FURNISH AND INSTALL.

CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING AS REQUIRED FOR THE INSTALLATION OF HIS WORK. ANY PATCHING SHALL MATCH EXISTING SURROUNDING AREA IN ALL RESPECTS. ALL REMOVED MATERIAL SHALL BE REMOVED FROM THE PREMISES DAILY IN AN APPROVED SAFE MANNER.

ALL SURPLUS MATERIAL SHALL BE REMOVED FROM THE SITE PROMPTLY WHEN DEEMED TO BE SURPLUS.

EVERY CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF HIS WORK AND NEWLY INSTALLED OR EXISTING WORK, INCLUDING PROTECTION OF THE SITE, ALL STRUCTURES, AND ALL OCCUPANTS. FURNISH, INSTALL, MAINTAIN, AND REMOVE AS APNEWRIATE, ALL APNEWRIATE BARRIERS, SAFETY GUARDS, SIGNAGE, AND SECURITY AS REQUIRED.

EVERY CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR RESPECTIVE FEES, PERMITS, INSPECTIONS, TESTING, CERTIFICATES, AND ALL MANAGEMENT OF SAME REQUIRED FOR COMPLETION OF AND LEGAL OCCUPANCY OF THE FINISHED PROJECT.

ALL CONTRACTORS SHALL PROVIDE ALL NECESSARY TOOLS, FIXTURES, SERVICES, MATERIALS, JOB AIDS, AND PERSONNEL REQUIRED FOR THE EXECUTION OF THEIR WORK.

EACH CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP BY THEM TO BE FREE OF DEFECTS AND MAINTAINED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE INSTALLATION BY THE OWNER AND ENGINEER.

ALL WORK SHALL BE PERFORMED BY LICENSED CONTRACTORS IN THE TRADE HAVING JURISDICTION.

ANY DEVIATION, MODIFICATION, ADDITION, OR CHANGE IN DESIGN SHALL NOT BE MADE WITHOUT WRITTEN APPROVAL OF THE OWNER OR ENGINEER.

ALL CONTRACTORS SHALL SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT AND MATERIALS TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION AND INSTALLATION, AND SHALL NOT PROCEED UNTIL ENGINEER APPROVAL IN WRITING IS RETURNED. EACH CONTRACTOR SHALL MAINTAIN ON JOB SITE A COMPLETE SET OF SHOP DRAWINGS WITH ANY DEVIATIONS FROM THE ORIGINAL DESIGN SHALL BE NOTED.

ALL MATERIALS AND EQUIPMENT SHALL BE NEW, WITHOUT BLEMISH OR DEFECT, AND SUITABLE AND LISTED FOR THE INSTALLATION AND SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS OR SPECIFICATIONS. ALL ITEMS OF EQUIPMENT OR MATERIAL THAT ARE OF ONE GENERIC TYPE SHALL BE ONE MANUFACTURER THROUGHOUT.

ALL MATERIALS, EQUIPMENT, TOOLS, AND ITEMS UNDER THE CONTRACTORS RESPONSIBILITY ON THE JOBSITE SHALL BE ADEQUATELY SECURED, MAINTAINED, AND PROTECTED, SO AS NOT TO BECOME DAMAGED OR CREATE ANY HAZARD TO PERSONNEL OR NEWERTY.

THE CONTRACTORS HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY THE OWNER.

CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR ALL OF HIS CREW AND INSURE THAT EVERY CREW MEMBER FOLLOWS SAVE WORK PRACTICES. SAFETY TRAINING SHALL INCLUDE, BUT NOT BE LIMITED TO, FALL PROTECTION, CONFINED SPACE ENTRY, ELECTRICAL SAFETY, AND TRENCHING/EXCAVATION SAFETY WHERE SUCH WORK IS EXECUTED OR ENCOUNTERED.

ALL TEMPORARY WORK REQUIRED OR SPECIFIED AS A PART OF THIS WORK, SHALL MEET ALL OF THE SAME REQUIREMENTS AS PERMANENT INSTALLATIONS, SHALL MEET ALL APPLICABLE CODE REQUIREMENTS, AND SHALL BE COMPLETELY REMOVED AFTER ITS PURPOSES HAVE BEEN SERVED.

ANY EXISTING UTILITY, SERVICE, STRUCTURE, EQUIPMENT, OR FIXTURE OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER.

IF ASBESTOS IS ENCOUNTERED DURING WORK EXECUTION, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER AND CEASE ALL ACTIVITIES IN AFFECTED AREAS UNTIL NOTIFIED BY THE CONSTRUCTION TO RESUME OPERATIONS.

EXIST. ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.

05 STEEL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

MATERIALS:

WIDE FLANGE	ASTM A992, GR 50
TUBING	ASTM A500, GR B
PIPE	ASTM A53, GR B
BOLTS	ASTM A325
GRATING	TYPE GW-2 (1-1/8"x3/16" BARS)
EXISTING METALS	ASTM A36

PROVIDE CERTIFICATION THAT WELDERS TO BE USED IN WORK ARE LICENSED AND HAVE SATISFACTORILY PASSED AWS QUALIFICATION TEST UNDER THE PROVISIONS OF APPENDIX D, PARTS II AND III OF THE AWS CODE FOR WELDING IN BUILDING CONSTRUCTION.

ALL BUILDING CONNECTION POINTS TO BE CENTERED ON EXISTING STRUCTURAL BEARING POINTS AND THE LOCATIONS ARE TO BE VERIFIED IN FIELD PRIOR TO THE FABRICATION OF STEEL.

DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF AISC SPECIFICATION FOR *"THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS"*.

NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIAMETER GALVANIZED ASTM A 307 BOLTS UNLESS OTHERWISE NOTED.

ALL STEEL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS WITH A COATING WEIGHT OF 2 OZ/SF.

ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE EXPOSED TO WEATHER SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE."

DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY TOUCHING UP ALL DAMAGED GALVANIZED STEEL WITH COLD ZINC, "GALVANOX", "DRY GALV", OR "ZINC IT", IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH UP DAMAGED NON-GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW. FIELD CUTTING OF STRUCTURAL STEEL IS NOT PERMITTED EXCEPT WITH THE PRIOR APPROVAL OF THE ENGINEER.

CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

THE STEEL STRUCTURE SHALL BE DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.

ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.

TOWER MANUFACTURERS DESIGNS SHALL PREVAIL FOR TOWER.

CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC *"MANUAL OF STEEL CONSTRUCTION"*. CONNECTIONS SHALL BE PROVIDED TO CONFORM TO THE REQUIREMENTS OF TYPE 2 CONSTRUCTION.

STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE MINIMUM 3/4" DIAMETER AND EACH CONNECTION SHALL HAVE MINIMUM TWO BOLTS. LOCK WASHERS ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES. IF TENSION CONTROL BOLTS ARE USED, CONNECTIONS SHALL BE DESIGNED FOR SLIP CRITICAL BOLT ALLOWABLE LOAD VALUES.

DESIGN CONNECTIONS AT BEAM ENDS FOR 10 KIPS (MIN).

ALL U-BOLTED CONNECTIONS SHALL BE COMPLETED WITH DOUBLE NUTS OR A LOCK WASHER.

CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS *"STANDARD QUALIFICATION PROCEDURES"*. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND SHALL CONFORM TO AISC AND D1.1. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE LARGER OF 1/4" FILLET OR MINIMUM SIZE PER TABLE J2.4 IN THE AISC *"MANUAL OF STEEL CONSTRUCTION"*. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED. SEE NOTE REGARDING DAMAGED GALVANIZED SURFACES.

ALL ARC AND GAS WELDING SHALL BE DONE BY A LICENSED AND CERTIFIED WELDER IN ACCORDANCE WITH AWS.

SEAL ALL PENETRATIONS AND SEAMS BETWEEN MASONRY AND STEEL WITH DOW CORNING 790 SILICONE BUILDING SEALANT OR EQUAL.

26 ELECTRICAL:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

ALL ELECTRICAL CONDUCTORS:

- INSULATION SHALL BE MINIMUM 600V TYPE THHN, THWN-2, OR XHHW.
- BRANCH CIRCUIT CONDUCTORS SHALL BE SOFT DRAWN 98% MINIMUM CONDUCTIVITY NEWERLY REFINED COPPER.
- FEEDER CIRCUIT CONDUCTORS SHALL BE EITHER COPPER OR ALUMINUM OF THE APNEWRIATE SIZE FOR THE APPLICATION, OR AS SPECIFICALLY NOTED.
- PERMANENTLY LABEL, OR TAG ALL CONDUCTORS WITH THEIR CIRCUIT DESIGNATION AT ALL TERMINATION ENDS, SPLICES, AND VISIBLE AS PASS-THROUGH IN ALL ENCLOSURES.

ALL CONDUIT, RACEWAY, WIREWAYS, DUCTS, ETC. SHALL BE LISTED AND SUITABLE FOR THE APPLICATION. ONLY THE FOLLOWING CONDUITS AS APPROVED AND LISTED FOR THE APPLICATION SHALL BE ACCEPTABLE:

- ELECTRICAL METALLIC TUBING (EMT).
- COMPRESSION COUPLINGS AND CONNECTORS ONLY MADE UP WRENCH TIGHT.
- FLEXIBLE METAL CONDUIT (FMC) AND LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC).
- FINAL CONNECTIONS TO VIBRATING OR ADJUSTABLE EQUIPMENT INCLUDING, BUT NOT LIMITED TO, LIGHT FIXTURES, HVAC UNITS, TRANSFORMERS, MOTORS, ETC. OR WHERE EQUIPMENT IS PLACED UPON SLAB ON-GRADE.
- RIGID GALVANIZED STEEL (RGS).
- ALL FITTINGS, CONNECTORS, AND COUPLINGS SHALL BE THREADED MADE UP WRENCH TIGHT.
- RIGID POLYVINYL CHLORIDE (PVC) SCHEDULE 40 OR SCHEDULE 80.
- MAY BE USED FOR SERVICES, EXTERIOR, BELOW GRADE, AND WET LOCATIONS.
- SHALL NOT BE USED IN CONCRETE SLABS NOR EXPOSED WITHIN A BUILDING OR STRUCTURE.
- METAL-CLAD CABLE (MC).
- CONCEALED INSTALLATIONS ONLY.
- WITHIN A DUCT WITH SMOOTH OR CORRUGATED METAL JACKET AND NO OUTER COVERING OVER THE METAL JACKET.

IN FINISHED SPACES, ALL CONDUITS SHALL BE CONCEALED EXCEPT TO MAKE A FINAL CONNECTION TO EQUIPMENT NOT MOUNTED IN OR AGAINST FINISH MATERIAL.

ALL FEEDER AND BRANCH CIRCUITS SHALL HAVE A SEPARATE NEWERLY SIZED AND MARKED GROUNDING CONDUCTOR, PER APPLICABLE CODES, THAT BONDS ALL ENCLOSURES, BOXES, ETC. CONDUIT SHALL NOT BE USED AS A GROUNDING OR BONDING CONDUCTOR.

IF EXISTING ELECTRIC SERVICE IS TO REMAIN, CONTRACTOR SHALL BE VERIFY THAT IT MEETS PROJECT REQUIREMENTS WITHOUT MODIFICATION. IF IT IS TO BE ADDED OR REPLACED AS A PART OF THIS WORK, CONTRACTOR SHALL ORDER FROM, COORDINATE WITH, AND GAIN APPROVAL FROM THE ELECTRICAL UTILITY. ALL ELECTRICAL EQUIPMENT SHALL BE AS SPECIFIED AND AS APPROVED BY THE LOCAL UTILITY WHERE APPLICABLE.

ALL EQUIPMENT, ENCLOSURES, ETC. SHALL BE SUITABLE FOR THE INSTALLED ENVIRONMENT, MINIMUM NEMA 3R FOR ALL EXTERIOR INSTALLATIONS.

WIRING DEVICES SHALL BE SPECIFICATION GRADE AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED. COLOR SHALL BE IVORY. ALL DEVICES AND COVER PLATES SHALL BE OF THE SAME MANUFACTURER.

ALL FIRE-RATED PENETRATIONS SHALL BE SEALED USING A SUITABLE AND LISTED FIRE SEALING DEVICE OR GROUT THAT WILL MAINTAIN THE FIRE RATING OF THE STRUCTURE PENETRATED.

PROVIDE PERMANENTLY AFFIXED ENGRAVED NAMEPLATES FOR ALL CODE REQUIRED LABELING AND ON ALL PANELS, METERING, DISCONNECTS, AND ELECTRICAL EQUIPMENT THAT IDENTIFIES EQUIPMENT SERVED, ELECTRICAL SOURCE WITH CIRCUIT IDENTIFICATION, AND VOLTAGES WITHIN.

ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL FINAL TERMINATIONS TO ALL EQUIPMENT.

ALL ELECTRICAL APPURTENANCES THAT ARE DISCONNECTED SHALL BE COMPLETELY REMOVED WITH EXISTING STRUCTURES TO REMAIN, REPAIRED, FINISHED, FILLED, PAINTED, ETC. ALL PANEL SCHEDULES, EQUIPMENT LABELING, AND CODE-REQUIRED LABELING, SHALL BE VERIFIED AND NEWERLY COMPLETED TO MATCH THE INSTALLATION.

26 GROUNDING:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

GROUND ALL SYSTEMS AND EQUIPMENT IN ACCORDANCE WITH BEST INDUSTRY PRACTICE, THE REQUIREMENTS OF THE NFPA 70 NATIONAL ELECTRICAL CODE (NEC), AND ALL OTHER APPLICABLE CODES AND REGULATIONS.

ALL GROUNDING ELECTRODES PRESENT AT EACH SERVICE LOCATION SHALL BE BONDED TOGETHER TO FORM THE GROUNDING ELECTRODE SYSTEM.

ALL EQUIPMENT ENCLOSURES, DEVICES, AND CONDUITS SHALL BE GROUNDED BY THE INSTALLATION OF A SEPARATE GROUNDING CONDUCTOR FOR ALL FEEDER AND BRANCH CIRCUITS THAT IS SIZED PER CODE OR IS OF THE SIZE INDICATED ON THE DRAWINGS, SHALL BE CONTINUOUS IN LENGTH, AND SHALL BE BONDED TO EACH ENCLOSURE PASSED THROUGH. CONDUIT SHALL NOT BE USED AS A GROUNDING OR BONDING WIRE OR CIRCUIT.

BOND ALL METALLIC CONDUITS TOGETHER THAT ARE CONNECTED TO NON-METALLIC ENCLOSURES, IN-GROUND BOXES, AND TO AN ENCLOSURE WHERE A GROUND BUS IS SPECIFIED OR SUPPLIED. ACCOMPLISH THIS BOND WITH GROUNDING CONDUCTORS MINIMUM SIZED TO THE LARGEST GROUNDING CONDUCTOR PRESENT IN THE ENCLOSURE CONNECTED TO A GROUNDING TYPE BUSHING EQUALLY SIZED OR MAXIMUM GROUND WIRE ACCOMMODATION AVAILABLE IN STANDARD MANUFACTURE FOR THE CONDUIT SIZE, WHICHEVER IS LESS.

EQUIPMENT GROUNDING AND LOAD SIDE BONDING CONDUCTORS SHALL BE SIZED PER THE CIRCUITS OVER-CURRENT PROTECTIVE DEVICE (OCPD) SIZE. WHERE THE UNGROUNDED CONDUCTORS ARE INCREASED IN SIZE ABOVE THE STANDARD FOR THE CIRCUITS OCPD, INCREASE THE GROUNDING CONDUCTOR NEWORTIONATELY TO THE CROSS-SECTIONAL AREA OF THE UNGROUNDED CONDUCTORS.

SERVICE MAIN BONDING JUMPERS AND GROUNDING ELECTRODE CONDUCTORS SHALL BE SIZED AND INSTALLED PER THE MINIMUM OF ALL APPLICABLE CODES AND REGULATIONS.

26 LIGHTNING PROTECTION:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS AND THE GROUNDING SPECIFICATIONS HEREIN.

THE LIGHTNING PROTECTION GROUNDING SYSTEM (LPGS) SHALL CONSIST OF BONDING ALL EQUIPMENT AND CONDUCTIVE STRUCTURES TO LOCALIZED SINGLE-POINT GROUNDING CONNECTIONS (TYPICALLY GROUND BARS) WHICH ARE BONDED TOGETHER AND TO AN IN-GROUND SYSTEM. IF THE LPGS IS ON A BUILDING, IT SHALL BE EFFECTIVELY BONDED TO THE ELECTRICAL SERVICE MAIN BONDING JUMPER AND TO ADDITIONAL IN-GROUND ELECTRODES AS MAY BE REQUIRED OR INDICATED. IF THE LPGS IS ON A DEDICATED COMMUNICATION SITE, ALL EQUIPMENT AREAS AND TOWERS SHALL EACH HAVE THEIR OWN IN-GROUND RING WITH EVERY RING BONDED TOGETHER, AND ALL CONDUCTIVE STRUCTURES IN CLOSE PROXIMITY (FENCES, ICE BRIDGES, ISOLATED EQUIPMENT, ETC.) ALSO BONDED TO PROVIDE A COMMON ELECTRICAL EQUIPOTENTIAL SYSTEM FOR ALL CONDUCTIVE ELEMENTS AND STRUCTURES.

CONDUCTORS:

- MIN #2 AWG SOLID BARE TINNED COPPER (SBTC) FOR ALL IN-GROUND CONDUCTORS.
- MIN #2 AWG COPPER GREEN STRANDED FOR BONDING STRUCTURES, AND FOR INTER-SYSTEM BONDING OF INDIVIDUAL ELEMENTS SUCH AS GROUND BAR TO GROUND BAR.
- MIN #6 AWG COPPER GREEN STRANDED OR ALL EQUIPMENT BONDING.
- INSTALL ALL IN-GROUND CONDUCTORS IN THE SAME HORIZONTAL PLANE OR IN A DOWNWARD DIRECTION AWAY FROM THE TOWER AND EQUIPMENT AREAS.
- AVOID LONG RUNS. MAKE DIRECT RUNS AS MUCH AS POSSIBLE.
- PLACE THROUGH NON-METALLIC SLEEVES WHEN PASSING THROUGH FLOORS, WALLS, CEILINGS, AND SIMILAR STRUCTURES.
- MAKE ALL CONNECTIONS IN CONTACT WITH EARTH WITH EXOTHERMIC WELDING. MAKE ALL OTHER CONNECTIONS WITH EXOTHERMIC WELDING, IRREVERSIBLE COMPRESSION CONNECTORS, OR LISTED COMPRESSION TWO-HOLE LUGS.
- INSTALL ALL CONDUCTORS WITH A MINIMUM 18 INCH BEND RADIUS AND NO BEND LONGER THAN A 90 DEGREE ARC. ALL BENDS SHALL BE HORIZONTAL, OR DOWNWARD TOWARDS EARTH.
- ALL CONDUCTORS PASSING FROM ABOVE-GROUND TO IN-GROUND CONNECTIONS, WHERE EXPOSED, SHALL BE COVERED AND PROTECTED WITH A NON-METALLIC CONDUIT SEALED AT BOTH ENDS.
- IF 2 OR MORE IN-GROUND CONDUCTOS ARE IN THE SAME PATH (2 RINGS OVERLAPPING, BONDING FOLLOWING ANOTHER RING OR RADIAL, OR SIMILAR), COMBINE WITH A SHARED SINGLE CONDUCTOR.

EQUIPMENT AND TOWER GROUND RINGS SHALL BE:

- BONDED TO ANY CONDUCTIVE OBJECT OR STRUCTURE WITHIN 5 FEET OF EQUIPMENT GROUND RINGS AND WITHIN 20 FEET OF TOWER GROUND RINGS.
- INSTALLED MINIMUM 18 INCHES FROM FOUNDATIONS, FOOTINGS, AND SIMILAR.

INSTALL ALL IN-GROUND RINGS, RADIALS, BONDS CONNECTING THEM, AND ALL SIMILAR GROUNDING:

- MIN 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE, WHICHEVER IS GREATER DEPTH.
- MIN 2 FEET FROM FOUNDATIONS, FOOTINGS, OTHER GROUNDING SYSTEMS, AND SIMILAR STRUCTURES, EXCEPT WHEN MAKING A BOND TO ANY OF THESE STRUCTURES. DO NOT BOND TO FOUNDATION INTERNAL REINFORCEMENT.

ALL EQUIPMENT GROUPED IN A COMMON AREA, COMPOUND, STRUCTURE, OR SIMILAR SHALL BE BONDED TO A SINGLE-POINT GROUND, PREFERABLY AN ISOLATED GROUND BAR. BOND THE GROUND BAR TO THE SYSTEM WITH MINIMUM SINGLE BONDING CONDUCTOR. IF BONDING TO AN IN-GROUND RING, INSTALL 2 BONDING CONDUCTORS MINIMUM WITH EACH CONDUCTOR INSTALLED DIRECTIONALLY AWAY FROM EACH OTHER AND PARALLEL TO THE IN-GROUND CONDUCTOR, WITH NO TEE CONNECTIONS.

TOWER GROUNDING:

- EACH TOWER LEG SHALL BE BONDED TO ITS RING. SINGLE-LEGGED TOWERS, OR MONOPOLES, SHALL HAVE 2 BONDS ON OPPOSITE SIDES.
- BOND TO TOWER BASE, NOT TO VERTICAL TOWER STRUCTURE, AWAY FROM TOWER MOUNTING HARDWARE.
- EACH BOND SHALL HAVE A CORRESPONDING GROUND ROD ON THE RING.
- EACH BOND SHALL CONSIST OF 2 CONDUCTORS FROM THE TOWER TO ITS RING WITH EACH CONDUCTOR DIRECTED IN OPPOSITE DIRECTIONS WITH A PARALLEL CONNECTION ON THE RING ON OPPOSITE SIDES OF THE GROUND ROD.

EQUIPMENT AREA GROUNDING:

- COMMUNICATION AREAS ON EARTH SHALL HAVE A GROUND RING.
- BOND ALL EQUIPMENT TO A SINGLE-POINT GROUND (GROUND BAR).
- BOND THE EQIPMENT SINGLE-POINT GROUND TO THE EQUIPMENT GROUND RING WITH MINIMUM 2 CONDUCTORS DIRECTED IN OPPOSITE DIRECTIONS WITH PARALLEL CONNECTIONS ON THE RING.
- IF EQUIPMENT IS ENCLOSED IN A SHELTER:
- IF THE SHELTER IS CONSIDERED TO BE EXPOSED TO A DIRECT LIGHTNING STRIKE, INSTALL A BUILDING LIGHTNING PROTECTION SYSTEM PER APPLICABLE VERSION OF NFPA 780.
- BOND ALL FIXED CONDUCTIVE BUILDING COMPONENTS TOGETHER AND TO THE BUILDING RING GROUND AT THE CORNERS. THIS IS TYPICALLY CALLED THE HALO GROUND. DO NOT BOND EQUIPMENT TO THE HALO GROUND.
- BOND ALL EQUIPMENT TOGETHER TO A SINGLE-POINT OR INTERIOR EQUIPMENT RING GROUND (IEGR). BOND THE SINGLE-POINT OR IEGR TO THE EXTERNAL EQUIPMENT RING GROUND.
- PLACE GROUND RODS AT THE EQUIPMENT GROUND RING CORNERS.

GROUND RODS:

- SEPARATION SPACE BETWEEN ANY 2 GROUND RODS SHALL BE NO CLOSER THAN THEIR DEPTH. THIS APPLIES TO ALL RODS IN THE COMPLETE SYSTEM.
- DRIVE VERTICALLY IN UNDISTURBED SOIL WITH THE TOP AT SAME DEPTH AS THE IN-GROUND CONDUCTOR. IF NOT POSSIBLE TO INSTALL VERTICALLY, PLACE AS CLOSE TO VERTICAL AS POSSIBLE AND IN A DIRECTION AWAY FROM THE NEAREST ABOVE-GROUND CONDUCTIVE ELEMENT (TOWER, EQUIPMENT, ETC.).

RADIALS (TYP. NEW DEDICATED COMMUNICATION SITES):

- WHERE FEASIBLE WITH ENOUGH SPACE AVAILABLE, INSTALL A MINIMUM OF 4, MAXIMUM 10 RING RADIALS.
- EACH RADIALS LENGTH SHALL BE MIN 20 FT, MAX 80 FT.
- EXTEND RADIALS PERPENDICULAR FROM RINGS IN AS STRAIGHT LINE AS POSSIBLE, AWAY FROM OTHER RING GROUNDS, RADIALS, BONDS, AND SIMILAR.
- A COMMON PRACTICE IS TO PLACE 4 RADIALS FROM THE TOWER RING TO THE 4 CORNERS OF THE AVAILABLE AREA.

AT A MINIMUM, BOND ALL COMPOUND CONDUCTIVE FENCE CORNER POSTS AND GATE POSTS TO THE LPGS. PREFERABLY, INSTALL A GROUND RING THAT FOLLOWS THE FENCE LINE, BONDING ALL POSTS TO THE RING.

27 ANTENNAS & CABLES:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNT AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER. COORDINATE LENGTH OF JUMPER CABLES WITH OWNER. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH OWNER PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.

AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM / SWEEP TESTED FOR NEWER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR SHALL OBTAIN AND USE LATEST TESTING PROCEDURES FROM OWNER OR MANUFACTURER PRIOR TO BIDDING.

ANTENNA CABLES SHALL BE UNIQUELY COLOR-CODED AT THE ANTENNAS, BOTH SIDES OF EQUIPMENT SHELTER WALL, AND JUMPER CABLES AT THE EQUIPMENT.

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONNECTORS, ASSOCIATED CABLE MOUNTING AND GROUNDING HARDWARE, WALL MOUNTS, STANDOFFS, AND ALL ASSOCIATED HARDWARE TO INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURERS AND OWNERS SPECIFICATIONS.

ANTENNA CABLES SHALL BE FOAM DIELECTRIC COAXIAL CABLES AS FOLLOWS:

- BASE STATION ANTENNAS:
  - 7/8" DIAMETER FOR CABLE LENGTHS UP TO 100 FT.
  - 1-5/8" DIAMETER FOR CABLE LENGTHS GREATER THAN 100 FT.
  - GPS ANTENNAS:
  - 7/8" DIAMETER FOR CABLE LENGTHS UP TO 200 FT.
  - 1-5/8" DIAMETER FOR CABLE LENGTHS GREATER THAN 200 FT.

MINIMUM BENDING RADIUS FOR COAXIAL CABLES SHALL BE:

- 15 FT FOR 7/8" COAXIAL CABLES.
- 25 FT FOR 1-5/8" COAXIAL CABLES.

CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.

ALL EXTERIOR CABLE CONNECTIONS SHALL BE COVERED WITH A WATERPROOF SPLICING KIT.

CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.

CABLE SHALL BE FURNISHED AND INSTALLED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

27 CABLE TRAY:

THESE SPECIFICATIONS SHALL INCLUDE THE GENERAL SPECIFICATIONS HEREIN.

CABLE TRAY SHALL BE MADE OF EITHER CORROSION RESISTANT METAL OR WITH A CORROSION RESISTANT FINISH.

CABLE TRAY SHALL BE OF LADDER TRAY TYPE WITH FLAT COVER CLAMPED TO SIDE RAILS.

CABLE LADDER SHALL BE SIZED TO FIT ALL CABLES IN ACCORDANCE WITH NEC AND NEMA 11-15-84.

CABLE LADDER TRAYS SHALL BE NEMA CLASS 12A BY PW INDUSTRIES, INC. OR EQUAL.

CABLE LADDER TRAY SHALL BE SUPPORTED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

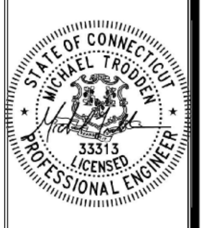
ALL WORKMANSHIP SHALL CONFORM TO THESE REQUIREMENTS AND ALL LOCAL CODES AND STANDARDS TO ENSURE SAFE AND ADEQUATE GROUNDING SYSTEM.

Cellco Partnership d/b/a
verizon
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

ALL-POINTS TECHNOLOGY CORPORATION
567 VAUXHALL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CONSTRUCTION DOCUMENTS

NO	DATE	REVISION
0	01/27/21	FOR REVIEW: JRM
1	01/29/21	FOR REVIEW: JRM
2	02/17/21	PER CLIENT COMMENTS: JRM
3	02/19/21	PER CLIENT COMMENTS: JRM
4	08/24/22	FOR FILING: JRM
5	09/07/22	FOR FILING: JRM
6		



DESIGN PROFESSIONALS OF RECORD

PROF: MICHAEL S. TRODDEN P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION, P.C.
ADD: 567 VAUXHALL STREET EXT. SUITE 311 WATERFORD, CT 06385

OWNER: STATE OF CONNECTICUT DOT, C/O ANDREW E. BECKER
ADDRESS: 2800 BERLIN TURNPIKE P.O. BOX 317546, NEWINGTON, CT

MIDDLEBURY I-84 CT

SITE ADDRESS: I-84 AND SOUTH STREET MIDDLEBURY, CT 06762

APT FILING NUMBER: CT141_11870

DRAWN BY: DRA

DATE: 01/28/21 CHECKED BY: JRM

VZ PROJECT CODE: 20202196934

VZ LOCATION CODE: 468946

VZ FUZE ID: 16244626

SHEET TITLE:

NOTES & SPECIFICATIONS

SHEET NUMBER:

N-1

SAMSUNG

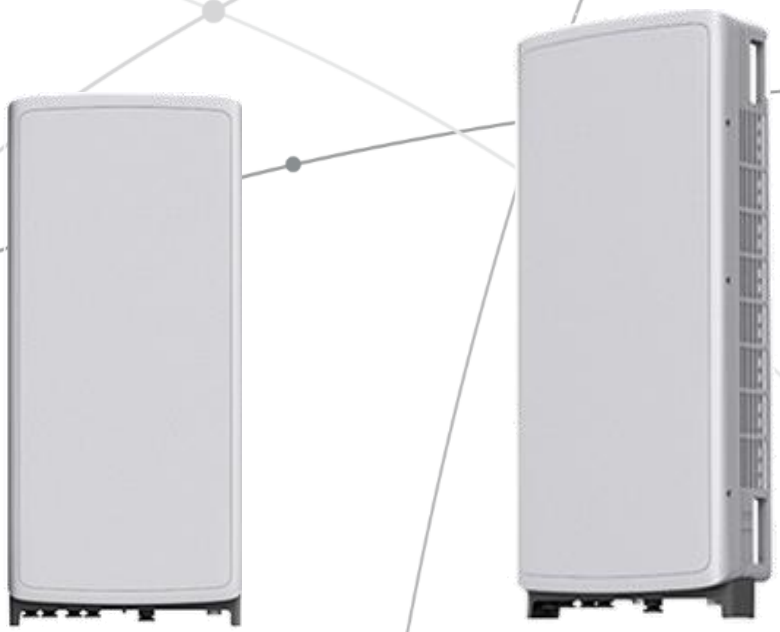
SAMSUNG

C-Band 64T64R Massive MIMO Radio

for High Capacity and Wide Coverage

Samsung C-Band 64T64R Massive MIMO Radio enables mobile operators to increase coverage range, boost data speeds and ultimately offer enriched 5G experiences to users in the U.S..

Model Code : MT6407-77A

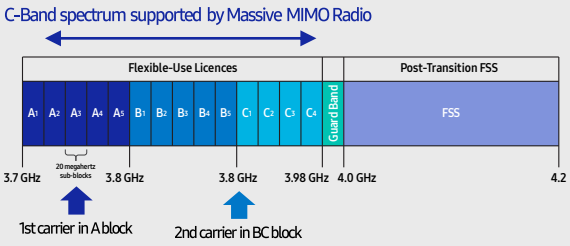


Points of Differentiation

Wide Bandwidth

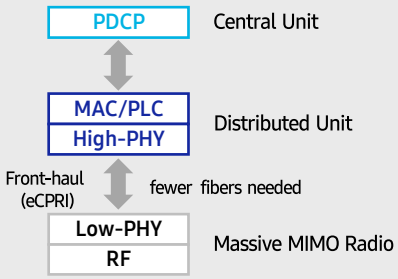
With capability to support up to 2 CC carrier configuration, Samsung C-Band massive MIMO Radio supports 200 MHz bandwidth in the C-Band spectrum.

Samsung C-Band massive MIMO Radio covers the entire C-Band 280 MHz spectrum, so it can meet the operator's needs in current A block and future B/C blocks



Future Proof Product

Samsung C-Band 64T64R Massive MIMO radio supports not only CPRI but also eCPRI as front-haul interface.
It enables operators can cut down on OPEX/CAPEX by reducing front-haul bandwidth through low layer split and using ethernet based higher efficient line.



Enhanced Performance

C-Band massive MIMO Radio creates sharp beams and extends networks' coverage on the critical mid-band spectrum using a large number of antenna elements and high output power to boost data speeds.

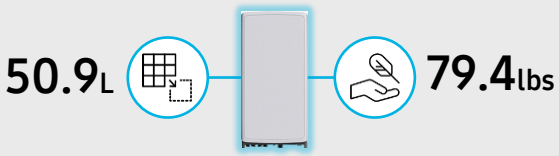
This helps operators reduce their CAPEX as they now need less products to cover the same area than before.

Furthermore, as C-Band massive MIMO Radio supports MU-MIMO(Multi-user MIMO) , it enables to increase user throughput by minimizing interference.

Well Matched Design

Samsung C-Band Massive MIMO radio utilizes 64 antennas, supports up to 280MHz bandwidth, and delivers a 200W output power. despite the above advanced performance, the Radio has a compact size of 50.9L and 79.4lbs. This makes it easy to install the Radio.

It is designed to look solid and compact, with a low profile appearance so that, when installed, harmonizes well with the surrounding environment..



Technical Specifications

Item	Specification
Tech	NR
Band	n77
Frequency Band	3700 - 3980 MHz
EIRP	78.5dBm (53.0 dBm+25.5 dBi)
IBW/OBW	280 MHz / 200 MHz
Installation	Pole/Wall
Size/ Weight	16.06 x 35.06 x 5.51 inch (50.86L)/ 79.4 lbs

SAMSUNG

About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

129 Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, Korea

SAMSUNG

Dual-Band Radio Unit
AWS/PCS (B66/B2)
RFV01U-D1A

Samsung's RFV01U-D1A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.

The RFV01U-D1A RU targets dual-band support across Band 66 (AWS) and Band 2 (PCS), making it an ideal product for broad coverage footprints across multiple common mid-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation
- Built-in Broadcast Auxiliary Services (BAS) filter ensures compliant AWS operation without impacting footprint

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
    B66: DL(2,110-2,180MHz)/UL(1,710-1,780MHz)
    B2: DL(1,930-1,990MHz)/UL(1,850-1,910MHz)
Instantaneous Bandwidth:
    70MHz(B66) + 60MHz(B2)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 255mm (36.8L)
Weight: 38.3kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

SAMSUNG

Dual-Band Radio Unit
700/850MHz (B13/B5)
RFV01U-D2A

Samsung's RFV01U-D2A is a compact remote Radio Unit (RU) designed for deployments that require flexibility in installation and rapid onlining, without compromising on coverage, capacity or operational expenses.

The RFV01U-D2A RU targets dual-band support across Band 13 (700MHz) and Band 5 (850MHz), making it an ideal product for broad coverage footprints across multiple common low-end, long-range frequencies.

The RU handles all Radio Frequency (RF) processing in a single, compact unit, and is designed to interface via CPRI with Samsung's CDU baseband offerings, in both distributed- and central-RAN configurations.

In addition to its minimal footprint and ease of installation, the RU is also designed to reduce cost of ownership through its integrated spectrum analyzer, which allows for remote RF monitoring, greatly reducing the need for on-site maintenance visits.

Features and Benefits

- Dual-band support for broad frequency coverage
- Minimal footprint reduces site costs
- Rapid, easy installation
- Flexibly deployable in any location
- Remote RF monitoring capability
- Convection cooled, silent operation

Key Technical Specifications

Duplex Type: FDD
Operating Frequencies:
B13: DL(746-756MHz)/UL(777-787MHz)
B5: DL(869-894MHz)/UL(824-849MHz)
Instantaneous Bandwidth: 10MHz(B13) + 25MHz(B5)
RF Chain: 4T4R/2T4R/2T2R
Output Power: Total 320W
DU-RU Interface: CPRI (10Gbps)
Dimensions: 380 x 380 x 207mm (29.9L)
Weight: 31.9kg
Input Power: -48V DC
Operating Temp.: -40 - 55°(w/o solar load)
Cooling: Natural convection

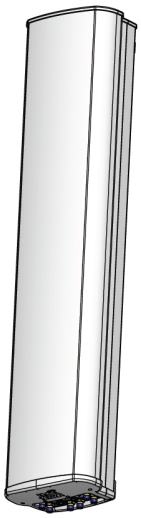
MX06FRO660-03

NWAV™ X-Pol Hex-Port Antenna

X-Pol Hex-Port 6 ft 60° Fast Roll Off antenna with independent tilt on 700 & 850 MHz:

2 ports 698-798, 824-894 MHz and 4 ports 1695-2180 MHz

- Fast Roll Off (FRO™) azimuth beam pattern improves Intra- and Inter-cell SINR
- Compatible with dual band 700/850 MHz radios with independent low band EDT without external diplexers
- Fully integrated (iRETs) with independent RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM air interface technologies
- Integrated Smart Bias-Ts reduce leasing costs

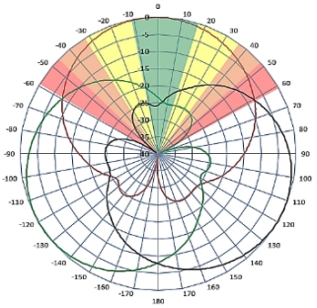


nwav

Fast Roll-Off antennas increase data throughput without compromising coverage

The horizontal beam produced by Fast Roll-Off (FRO) technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors .

Non-FRO antenna



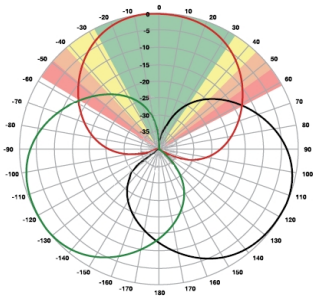
Large traditional antenna pattern overlap creates harmful interference.

JMA's FRO antenna pattern minimizes overlap, thereby minimizing interference.

LTE throughput	SINR	Speed (bps/Hz)	Speed increase	CQI
Excellent	>18	>4.5	333+%	8-10
Good	15-18	3.3-4.5	277%	6-7
Fair	10-15	2-3.3	160%	4-6
Poor	<10	<2	0%	1-3

The LTE radio automatically selects the best throughput based on measured SINR.

JMA FRO antenna



Electrical specification (minimum/maximum)	Ports 1, 2		Ports 3, 4, 5, 6		
Frequency bands, MHz	698-798	824-894	1695-1880	1850-1990	1920-2180
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	14.4	14.0	17.6	18.0	18.2
Horizontal beamwidth (HBW), degrees	60.5	53.0	55.0	55.0	55.5
Front-to-back ratio, co-polar power @180°± 30°, dB	>24	>24.0	>25.0	>25.0	>25.0
X-Pol discrimination (CPR) at boresight, dB	>15.0	>14.2	>18	>18	>15
Sector power ratio, percent	<3.5	<3.0	<3.7	<3.8	<3.6
Vertical beamwidth (VBW), degrees[1]	13.1	11.8	6.0	5.5	5.5
Electrical downtilt (EDT) range, degrees	2-14	2-14	0-9		
First upper side lobe (USLS) suppression, dB[1]	≤-15.0	≤-16.5	≤-16.0	≤-16.0	≤-16.0
Cross-polar isolation, port-to-port, dB[1]	25	25	25	25	25
Max VSWR / return loss, dB	1.5:1 / -14.0		1.5:1 / -14.0		
Max passive intermodulation (PIM), 2x20W carrier, dBc	-153		-153		
Max input power per any port, watts	300		250		
Total composite power all ports, watts	1500				

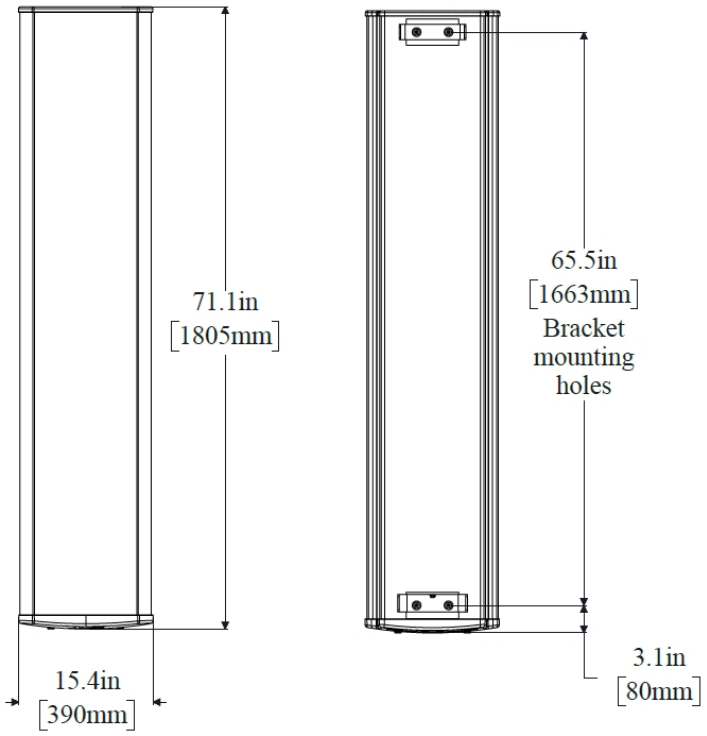
[1] Typical value over frequency and tilt

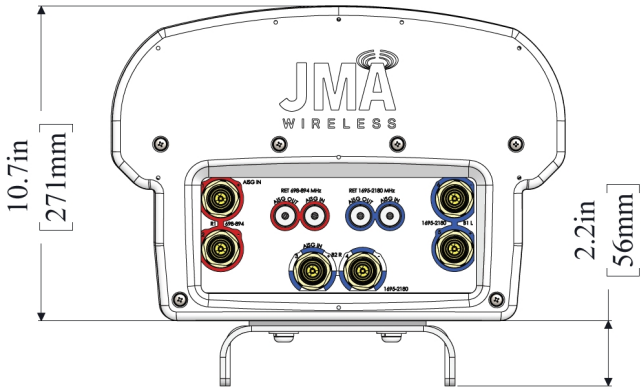
MX06FRO660-03

NWAV™ X-Pol Hex-Port Antenna

Mechanical specifications	
Dimensions height/width/depth, inches (mm)	71.3/ 15.4/ 10.7 (1811/ 392/ 273)
Shipping dimensions length/width/height, inches (mm)	82/ 20/ 15 (2083/ 508/ 381)
No. of RF input ports, connector type, and location	6 x 4.3-10 female, bottom
RF connector torque	96 lbf·in (10.85 N·m or 8 lbf·ft)
Net antenna weight, lb (kg)	60 (27.0)
Shipping weight, lb (kg)	90 (41.0)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	18 (8.18)
Range of mechanical up/down tilt	-2° to 14°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral, and rear wind loading @ 150 km/h, lbf (N)	154 (685), 73 (325), 158 (703)
Equivalent flat plate @ 100 mph and Cd=2, sq ft	2.6

Front view | **Back view** | **Bottom view**





Ordering information	
Antenna model	**Description**
MX06FRO660-03	6F X-Pol HEX FRO 60° independent tilt 700/850 RET, 4.3-10 & SBT
Optional accessories	
AISG cables	M/F cables for AISG connections
PCU-1000 RET controller	Stand-alone controller for RET control and configurations

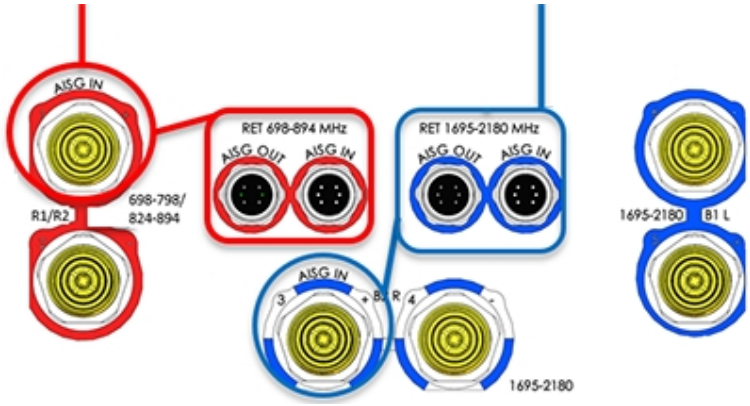
Remote electrical tilt (RET 1000) information	
RET location	Integrated into antenna
RET interface connector type	8-pin AISG connector per IEC 60130-9
RET connector torque	Min 0.5 N·m to max 1.0 N·m (hand pressure & finger tight)
RET interface connector quantity	2 pairs of AISG male/female connectors
RET interface connector location	Bottom of the antenna
Total no. of internal RETs (low bands)	2
Total no. of internal RETs (high bands)	1
RET input operating voltage, vdc	10-30
RET max power consumption, idle state, W	≤ 2.0
RET max power consumption, normal operating conditions, W	≤ 13.0
RET communication protocol	AISG 2.0 / 3GPP

RET and RF connector topology

Each RET device can be controlled either via the designated external AISG connector or RF port as shown below:

RET device	Band	RF port
R1	698-798	1-2
R2	824-894	1-2

RET device	Band	RF port
B1/B2	1695-2180	3-6

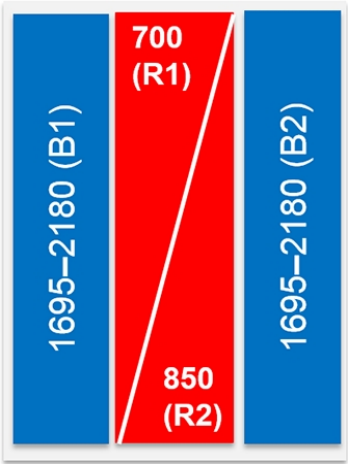


Array topology

3 sets of radiating arrays

R1/R2: 698-894 MHz
B1: 1695-2180 MHz
B2: 1695-2180 MHz

Band	RF port
1695-2180	3-4
698-894	1-2
1695-2180	5-6



ATTACHMENT 3

	General	Power	Density					
Site Name: Middlebury I-84								
Tower Height: Verizon @77.5ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**FREQ.**	**CALC. POWER DENS**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	2	414	138	850	0.017089388	0.5666667	0.003015774	
*AT&T	2	656	138	1900	0.027078836	1	0.002707884	
*AT&T	2	927	138	700	0.038265368	0.4666667	0.008199722	
*AT&T	2	667	138	850	0.027532902	0.5666667	0.004858747	
*AT&T	4	949	138	1900	0.078346999	1	0.0078347	
*AT&T	4	836	138	2300	0.06901801	1	0.006901801	
*Pocket (now MetroPCS)	3	631	90	2130	0.096479727	1	0.009647973	
*Sprint	1	438	97	850	0.019021088	0.5666667	0.003356663	
*Sprint	2	1094	97	850	0.095018585	0.5666667	0.016767986	
*Sprint	5	623	97	1900	0.135275544	1	0.013527554	
*Sprint	2	1556	97	1900	0.135145263	1	0.013514526	
*Sprint	8	640	97	2500	0.222346962	1	0.022234696	
*unidentified (from DPS)	1	330	168	42	0.004521973	0.2	0.002260986	
*unidentified (from DPS)	1	995	153	166	0.0166	0.2000	0.83%	
*unidentified (from DPS)	1	1795	150	2192	0.0311	1.0000	0.31%	
*DOT	1	100	122	47	0.0027	0.2000	0.13%	
*unidentified (from DPS)	1	71	85	460.3	0.0041	0.3069	0.13%	
*unidentified (from DPS)	1	9939	110	6700	0.3305	1.0000	3.30%	
*unidentified (from DPS)	1	5591	110	6700	0.1859	1.0000	1.86%	
*unidentified (from DPS)	1	1000	160	867.5	0.0152	0.5783	0.26%	
*T-Mobile	2	592	125	600	0.0301	0.4000	0.75%	
*T-Mobile	2	649	125	700	0.0330	0.4667	0.71%	
*T-Mobile	2	2204	125	1900	0.1119	1.0000	1.12%	
*T-Mobile	4	1102	125	1900	0.1119	1.0000	1.12%	
*T-Mobile	2	2589	125	2100	0.1315	1.0000	1.31%	
VZW 700	**4**	**638**	**77.5**	**751**	**0.0153**	**0.5007**	**3.05%**	
VZW Cellular	**4**	**638**	**77.5**	**874**	**0.0153**	**0.5827**	**2.62%**	
VZW PCS	**4**	**1462**	**77.5**	**1975**	**0.0350**	**1.0000**	**3.50%**	
VZW AWS	**4**	**1566**	**77.5**	**2120**	**0.0375**	**1.0000**	**3.75%**	
VZW CBAND	**4**	**6531**	**77.5**	**3730.08**	**0.1564**	**1.0000**	**15.64%**	
								51.89%
* Source: Siting Council								

ATTACHMENT 4

AECOM

Submitted to
Verizon Wireless
20 Alexander Drive
Wallingford, CT 06492

AT&T / Smartlink
85 Rangeway Rd.
Building #3, Suite 102
N. Billerica, MA 01862

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
July 2, 2021

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 160' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

at&t

verizonwireless

smartlink

AT&T Site ID : CTL01078
AT&T Site Name : Middlebury-2 Larkin Drive
VZW Site ID : 2954976
Site Address: Intersection of I-84 and South Street
Middlebury, Connecticut

60656990 / 60657751
SMK-007 (Rev 3) / VZ5-228 (Rev 2)

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and modification of the existing 160' self-supporting lattice tower located west of the intersection of I-84 and South Street in Middlebury, Connecticut.

The structural analysis was conducted in accordance with the 2018 Connecticut State Building Code which includes the TIA-222-H[1] Standard, 2018 International Building Code, the 2018 Connecticut State Building Code Amendments to the 2015 International Building Code, the AISC[2] Load Resistance Factor Design (LRFD), the ASCE 7[3] design Code, and the Connecticut State Police Requirements which include the TIA/EIA-222-F[4] Standard.

The antenna loading considered in the analysis consists of all the existing and proposed antennas, transmission lines and ancillary items as outlined in the Introduction Section of this Report.

The proposed Verizon, AT&T and CSP antenna installations are listed below (see note):

Proposed Appurtenances	Carrier	Antenna Center Elevation
Remove: **(2) Commscope SBNH-1D6565 Panel Antenna** **(1) AM-X-CD-16-65-00T-RET Panel Antenna** **(3) Ericsson RRUS-11 B12 RRH Units** **(3) Existing Antenna Mount Frames** **Install:** **(2) CCI DMP65R-BU8DA Panel Antennas (Alpha and Beta Sectors)** **(1) CCI DMP65R-BU6DA Panel Antennas (Gamma Sector)** **(2) CCI OPA65R-BU8DA Panel Antennas (Alpha and Beta Sectors)** **(1) CCI OPA65R-BU6DA Panel Antennas (Gamma Sector** **(3) Ericsson 4449 B5/B12 RRH Units** **(3) Ericsson 4478 B14 RRH Units** **(1) 3" Flex Conduit with (1) Fiber Optic Cable and (2) DC Cables** **(1) Raycap DC6-48-60 Distribution Units** **(3) Commscope SFG22HDX Antenna Mount Assemblies**	**AT&T (existing)** **AT&T (Proposed)**	**@ 140'** **@ 140'**
Remove **(6) Sinclair SC479-HF1LDF** **(1) OGT9-806NU** **(1) OGT9840N** **(3) 6' Side Arm Mounts** **Install** **(4) DBSpectra DS7C09P36D-D (2 Face A & 2 Face C)** **(2) Comscope SFG23HD-12-4-96 Mount Assemblies (1 Leg A & 1 Leg C)**	**CSP (Existing)** **CSP (Proposed)**	**@ 153' to 159'** **@ 160' (Top of Tower)**

Remove **(4) Andrew SBNHH-1D65B Panels (Alpha and Beta Sectors)** **(4) Remote Radio Units (Alpha and Beta Sectors)**	**Verizon (Existing)**	**77.5'**
Install **(2) JMA 91900314 Dual Mount Antenna Brackets (1 Alpha & 1 Beta)** **(4) JMA MX06FR0660 Panel Antennas (2 Alpha & 2 Beta)** **(2) Samsung MT6407-77A Panel Antennas (1 Alpha & 1 Beta)** **(2) Samsung B2/B66A RRH-BR049 RRUs (1 Alpha & 1 Beta)** **(2) Samsung B5/B13 RRH-BR04C RRUs (1 Alpha & 1 Beta)**	**Verizon (Proposed)**	**77.5'**

Note: Due to the increased size of proposed AT&T panel antennas there would be insufficient clearance to existing CSP antennas. The proposed modifications to CSP antennas will provide the required clearances.

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version H)

2. AISC = American Institute of Steel Construction (15th Edition)

3. ASCE 7 = American Society of Civil Engineers Standard 7 (2016 Edition)

4. TIA/EIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version F)

This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.
2) Tower geometry, member sizes and foundation taken from Tower and Foundation reports prepared by Stainless, Inc. project number 358807 dated December 14, 1993.
3) Soil information taken from geotechnical report prepared by Dr. Clarence Welti, P.E., P.C., dated December 17, 2012.
4) Previous structural analysis and modification performed by AECOM on behalf of Verizon Wireless, project number 60404004, signed and sealed on July 10, 2015.
5) Previous structural analysis performed by AECOM on behalf of Northwest CT Public Safety Communication Center, project number 60492507, signed and sealed on April 26, 2016.
6) Tower Mapping and Inventory of tower performed by D & K Nationwide Communications, Inc., dated March 27, 2016.
7) Previous structural analysis and evaluation performed by AECOM on behalf of Pyramid Network Services, LLC, project number 60509756.21, signed and sealed on February 19, 2017.
8) Previous structural analysis and modification performed by AECOM on behalf of AT&T and Sprint project number (60567641 / EMP-006; 60567639 / ASM-006), signed and sealed on April 9, 2018.
9) Previous structural analysis and evaluation performed by AECOM on behalf of Sprint, project number 60558618 / ASM-001, signed and sealed on February 9, 2018.

10) Tower inventory of existing antenna equipment provided by Eastern Communications Inc., via tower climb performed on June 17, 2020.

11) Proposed AT&T antenna inventory from Radio Frequency Data Sheet (RFDS), dated March 9, 2020, obtained via e-mail dated April 13, 2021.

12) Previous structural analysis and evaluation performed by AECOM on behalf of AT&T, project number 60656990 / SMK-007, signed and sealed on April 15, 2021.

13) Previous structural analysis and evaluation performed by AECOM on behalf of Verizon, project number 60657751 / VZ5-228, signed and sealed on April 21, 2021.

14) Proposed Verizon antenna inventory from Radio Frequency Data Sheet (RFDS), dated April 21, 2021, obtained via e-mail dated April 21, 2021.

15) Coax cable orientation as specified in section 6 of this report.

16) Antenna inventory as specified in Sections 2 and 6 of this report

The results of this analysis indicate that:

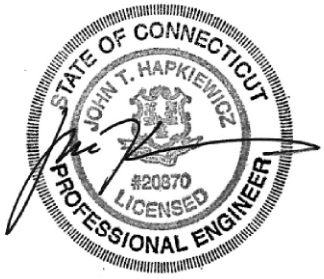
1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
2. **The modified tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the wind classification specified herein.**
3. **The modified foundation IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.**
4. The existing tower's sway (deflection) is 0.5028 degrees, and the existing tower's twist (rotation) is 0.2374 degrees. These figures combined ARE within the Connecticut State Police requirement of 0.75 degrees for combined twist (rotation) and sway (deflection) with the load classification specified herein.
5. The controlling structural capacity for all tower and foundation components for the proposed antenna loading is **94.8 %**

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the antenna, cabling and mount configuration used, as well as the physical condition of the tower members, connections and foundations. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

AECOM,



John Hapkiewicz, P.E.
Vice President, Design Manager

2. INTRODUCTION

The subject tower is located west of the intersection of I-84 and South Street in Middlebury, Connecticut. The structure is a self-supporting three-legged 160' steel tapered lattice tower manufactured by Stainless Incorporated.

The structural analysis was conducted in accordance with the following:

- 2018 International Building Code (compliant with the TIA-222-H design loads).
- 2015 International Building Code with 2018 Connecticut State Building Code Amendments for a wind speed of 101 mph (3-second gust).
- 2016 AISC Load Resistance Factor Design (LRFD)
- 2016 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-H Standard.
- Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice, analyzed under the TIA/EIA-222-F design Standard.

The inventory together with the proposed Verizon, AT&T and CSP antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Centerline Elevation***	***Cable***
4' Lightning Rod	D&K – 33 (existing)	Pipe mount above	177'	---
16' Lightning Rod Mounting Pipe	(existing)	None	168'	---
Tower Light	(existing)	None *(1.158 ECI)*	160'-6"	---
(2) DBSpectra DS7C09P36D-D (Face A) (2) DBSpectra DS7C09P36D-D (Face C)	**CSP (Proposed)**	**(2) Comscope SFG23HD-12-4-96 Mount Assemblies (1 Leg A & 1 Leg C)**	**160'**	(6) 1-5/8" (Existing) **Jumpers to TTA (Below) (Proposed)**
(1) Bird 432E-83I-01 TTA Junction Box	CSP (Existing)	Relocated to Proposed Mount	160'	(1) 1-5/8" AVA Cable (1) 1/2" Coax Cable
(1) 8-Bay 20' Dipole Antenna	D&K – 28 FBI – 3 (existing)	*Mount Shared with D&K – 30 (above)* *(2.158 ECI)*	158'	(1) 7/8" coax cable
(1) Bird TTA Unit	CSP (existing)	Leg Mounted *(3.155 ECI)*	155'	(2) 1-5/8" coax cable (1) ½" coax cable
(1) 4-Bay 20' Dipole Antenna	D&K – 27 ATF – 2 (existing)	*Mount Shared with 2.155.1 ECI* *(2.155 ECI)*	155'	(1) 7/8" coax cable
(1) Radiowaves HPD2-4.7NS (2 foot dish)	**Northwest CT Public Safety (relocated)**	**Mounted to Pipe attached to Tower Face *(3.149 ECI)***	**150'**	(2) 7/8" AVA5-50FX Heliax Andrew Virtual Air Coaxial Cables
(2) Raycap DC6-48-60-18-8F Distribution Unit	AT&T (existing)	Frame Mounted to Tower Leg	146'	*Shared with Fiber Cables (AT&T) (below)*

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(2) CCI DMP65R-BU8D Panel Antennas (A&B) (1) CCI DMP65R-BU6D Panel Antennas (C) (2) CCI OPA65R-BU8D Panel Antennas (A&B) (3) CCI OPA65R-BU6D Panel Antennas (C) (3) Ericsson 4449 B5/B12 Radio RRH Units (3) Ericsson 4478 B14 Radio Units (1) Raycap DC6 Distribution Units	**AT&T (Proposed)**	**(3) Commscope SFG23HD-12-4-96 Antenna Mount Frames**	**140'**	**(2) DC cables in Existing Flex Conduit**
(3) Powerwave 7770 (2) CCI TPA-65R-LCUUUU-H8 Panels (Alpha and Beta Sectors) (1) Quintel QS66512-3 Panel (Gamma Sector) (3) RRUS-32 RRH Units (3) RRUS-12 RRH Units (3) TT19-08BP111-001 Twin TMA Units (6) Diplexers	AT&T (existing)	*See Above Proposed Mount Assembly* *(1.140 ECI)* *(2.140 ECI)* *(3.140 ECI)*	140'	(12) 1 1/4" coax cable (1) 3" Flex Conduit with (2) Fiber Optic Cable &(4) DC cables
(1) Celwave PD1142	D&K – 11 DOT – 4 (existing)	(2) 8' Stiff-Arm Mounts *(2.124 ECI)*	124'	(1) 7/8" coax cable
(3) EMS RR90-17-XXDP Panel Antennas (3) Andrew LNX-6515DS-A1M Panel Antennas (3) Smart Bias-T Units (3) Generic TMA Units	T-Mobile (existing)	(3) Dual Standoff Arm for 2 antenna pipes (SitePro1 # DSM2) w/ (3) Horizontal Sector Stabilizer units (SitePro1 # SFS-H) *(1.125 ECI)* *(2.125 ECI)* *(3.125 ECI)*	118'	(12) 1-5/8" Coaxial Cables
(2) 6' Dishes w/ Ice Shields (@ 115' CL)	D&K – 5 & 6 CSP – 6 & 7 (existing)	(2) Dish Mounts *(2.110 ECI)* *(3.110 ECI)*	110'	(2) WEP65 coax cable
(3) RFS APXVSPP-C-20 Antennas (3) DT465B-2XR Panel Antennas (3) 2x50W 800 MHz RRH Units (3) TD-RRH8x20-25 RRH Units (3) Andrew RRH 800 MHz 2x40W (3) Panasonic RRH 1900 MHz 2x40W	Sprint (existing)	(3) Pipe Mounts attached to Tower Existing Pipe Mounts w/ (3) Commscope PM-SU35-48 Mounts *(1.96 ECI)* *(2.96 ECI)* *(3.96 ECI)*	96'	(4) Hybriflex cable (1-1/4" OD)

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) Celwave 10054-3 2'x2' Square Dish Antenna	D&K-1 CSP – 5 (existing)	1' Standoff Mounted to Vertical pipe attached to Leg *(1.85 ECI)*	85'	(1) 7/8" coax cable
(2) L-810 Side-Mounted Light Beacons (From Leg A & C)	Tower (existing)	Pipe Mounted (horizontal) *(1.83 ECI)* *(3.83 ECI)*	83'	(2) 1/2" Coaxial Cables
(1) RRFDC-3315-PF-48 Distribution Box	Verizon (existing)	(2) Antenna Mount Frames (Alpha & Beta Sectors) *(1.76 ECI)* *(2.76 ECI)* *(3.76 ECI)*	76'	(1) 1-5/8" Fiber Optic Cable (HB158-1-08U8-S8J18)
(4) JMA MX06FR0660 Panel Antennas (2 A & 2 B) **(2) Samsung MT6407-77A Panel Antennas (1 A & 1 B)** **(2) Samsung B2/B66A RRH-BR049 RRUs (1 A & 1 B)** **(2) Samsung B5/B13 RRH-BR04C RRUs (1 A & 1 B)**	**Verizon (Proposed)**	**(2) JMA 91900314 Dual Mount Antenna Brackets (1 A & 1 B)**	**77.5'**	**Shared with Above**
(1) Sinclair DSSY450SF1SNM Yagi Antenna	CSP (existing)	Pipe Mounted to Tower Face *(3-1.21 ECI)*	21'	(1) 1/2" Coaxial Cable

NOTES: Antenna ID Numbering and elevations obtained from Tower Mapping and Existing inventory via tower climb performed by D&K Nationwide Communications, Inc. on March 27, 2016, and from Eastern Communications Inc, performed on May 12, 2020 (indicated above as #.## ECI).

This structural analysis of the communications tower was performed by AECOM for AT&T and Verizon. The purpose of this analysis was to investigate the structural integrity of the existing tower and foundation for existing and proposed antenna loads in compliance with the 2018 Connecticut State Building Code. This analysis was conducted to evaluate stress on the tower and the effect forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with, the TIA-222-H–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2015 International Building Code with 2018 Connecticut State Building Code Amendments, the 2018 International Building Code (in compliance with the TIA-222-H Standard) and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD)

The structural analysis was conducted using TNX Tower version 8.0.5.0 and used the following conditions for this tower review (following the TIA-222-H Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 3 – (Tower location on top of hill – rolling wind conditions considered)
  - Crest Height used for analysis: (approximate elevations listed below)
    - Tower Base Elevation = 770 feet
    - High point (2 mile Radius) = 800 feet (Ref. Bedlam Hill)
    - Low Point (2 mile Radius) = 389 feet (Ref. Johnson School Building)
    - "H" = (Avg. of High/Low) – Base Elevation = 176 feet
- Exposure Class C – (Open Terrain with scattered obstructions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA-222-H Standard.

Basic Wind Speed:

- IBC 2018 w/ 2018 CT State Building Code Amendment:
  - (2018) IBC Section 1609.1.1 – Determination of Wind Loads – Exemption 5 "Designs using TIA-222" applies for determination of Design Wind Load obtained as "V.ult" are to be converted to "V.asd" when applying the TIA-222-G design Standard (under Section 1609.3) for Basic Wind Speed. This is internally applied within the Tower design program (tnxTower).
  - (2018) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - **V.ult = 130 mph** (3-Second Gust) Wind Design Parameter for the Town of Middlebury, Connecticut for Risk Category four (IV) for essential communications (Connecticut State Police).

LOAD CONDITION 1 = 130 MPH (3-SECOND GUST) WIND LOAD (WITHOUT ICE) + TOWER DEAD LOAD
Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **1.00 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-H and follows the same design criteria as the ASCE 7 Standard.

The below load condition implements the design requirements of the Connecticut State Police for the tower structures deflection limits with the allowable deflection limit of the combination of the tower's sway (deflection) and twist (rotation) under the TIA-222-F design Standard. This design limit required the design combined value of sway (deflection) and twist (rotation) to be under 0.75 degrees following the TIA-222-F design Standard.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Load Condition 3 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Seismic event consideration factors/values for design:

- S.s = 0.191 (2018 CT State Building Code – Location Specific Value)
- S.1 = 0.064 (2018 CT State Building Code – Location Specific Value)
- Site Classification = "D" – from Geotechnical Report
- Seismic Design Category = "C" – (2015 International Building Code)
- F.a = 1.6 (Obtained from TIA-222-G Table 2-12 Considering above conditions)
- F.v = 2.4 (Obtained from TIA-222-G Table 2-13 Considering above conditions)

NOTE: TIA-222-H Section 9.8 require S.s values to be greater than 1.0 to be applied for analysis. Due to the S.s value below this threshold, the seismic base shear calculation is omitted from this structural analysis report.

Strength Limit State Load Combinations (TIA-222-H Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. ***1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice***
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above "Dead Load Guy Assemblies" are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The "Load effects due to temperature" do not apply for structures that are self-sustaining (from the TIA-222-H Standard)

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the existing tower structure were evaluated to compare with strength design in accordance with AISC (LRFD). The results of the analysis indicated that the modified tower foundation has enough capacity to support the proposed loading conditions indicated herein. The tower foundation is considered structurally adequate with the proposed antenna loading with the wind load classifications specified in Section 3 of this report. The results of the analysis indicated that the existing tower structure HAS enough capacity to support the proposed conditions indicated herein. The existing tower structure and anchor bolts are considered structurally adequate with the proposed antenna loading with the wind load classifications specified in Section 3 of this report. Detailed analysis calculations for the proposed load condition are provided in Section 6 of this report.

The tower sway (deflection) is 0.5028 degrees and the tower twist (rotation) is 0.2374 degrees. These figures ARE within the Connecticut State Police specification of combined 0.75 degrees for sway and twist.

Tower Base Reactions:

Description	Factored Loads (TIA-222-H)
Axial Load (kips)	62
Pier Compression (kips)	466
Pier Uplift (kips)	409
Overall Overturning (kip-ft)	8865
Overall Shear (kips)	111
Shear per Leg (kips)	61

Tower Component Stress vs. Capacity Summary:

Component / (Section No.)	Critical Component Size	Controlling Elevation	Stress (% capacity)	Pass/Fail
Tower Leg (T8)	HSS 6.8750x0.40"	37.5' – 50'	90.8	Pass
Diagonal (T4)	(2)L3x2 1/2x1/4 Back to Back Angles	75' – 100'	92.0	Pass
Horizontal (T10)	L4x4x1/2	0' – 25'	81.1	Pass
Top Girt (T9)	L4x4x5/16	25' - 37.5'	73.9	Pass
Redundant Horizontal Bracing (T9)	L2x2x5/16	25' – 37.5'	35.2	Pass
Redundant Diagonal Bracing (T9)	L2x2x5/16	25' – 37.5'	67.8	Pass
Inner Bracing (T7)	L2-1/2x2x3/16	50' – 58.333'	10.6	Pass
Tower connection Bolts	(2) A325X 5/8" Bolts (Horizontal)	25'	92.0	Pass

4. FINDINGS AND EVALUATION (cont.)

Foundation Summary:

Component	Required	Computed	% Capacity	Pass/Fail
Anchor Rod Capacity (TIA-222-G – 4.9.9)	Ratio < 1.0	1.081	83.1 %	**Pass**
Global Stability (Lateral Resistance)	Ratio < 1.0	0.948	94.8 %	Pass
Bearing Pressure (TIA-222-G Conditions)	6.750 ksf max	3.055 ksf	45.3 %	Pass

Structure Rating (Maximum from all components) =	**94.8 %**	**Pass**

Maximum Deformations – Proposed Condition

ANSI/TIA-222-G Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.1263	0.2285	4.0	4.8

Tower Twist & Sway at Top (Connecticut State Police Requirements - TIA-222-F):

Description	Current	Total	Allowable
Tower Twist (degrees)	0.2374	**0.7402**	0.750
Tower Sway (degrees)	0.5028		

NOTE: Values of combined twist and sway are required to be below 0.75 degrees combined under the DESPP / CSP required loading and shall not be considered "passing" until below this limit.

5. CONCLUSIONS

The results of this analysis indicates that:

1. The existing steel tower structure IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.
2. **The modified tower anchor bolts ARE considered structurally adequate for the proposed antenna loading with the wind classification specified herein.**
3. **The modified foundation IS considered structurally adequate for the proposed antenna loading with the wind classification specified herein.**
4. The existing tower's sway (deflection) is 0.5028 degrees, and the existing tower's twist (rotation) is 0.2374 degrees. These figures combined ARE within the Connecticut State Police requirement of 0.75 degrees for combined twist (rotation) and sway (deflection) with the load classification specified herein.
5. The controlling structural capacity for all tower and foundation components for the proposed antenna loading is **94.8 %**

Limitations/Assumptions:

This report is based on the following:

1) Tower inventory as listed in this report.

2) Tower is properly installed and maintained.

3) All members are as specified in the original design documents and are in good condition.

4) All required members are in place.

5) All bolts are in place and are properly tightened.

6) Tower is in plumb condition.

7) All member protective coatings are in good condition.

8) All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

9) Foundations are in good condition without defects and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The tower owner shall refer to TIA-222-H Section 14 for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

MODIFICATION DRAWINGS SK-1 TO SK-3

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CURRENT CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS AND THE TOWER OWNER. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS INCLUDING THE CONNECTICUT STATE POLICE.
8. NO MOVEMENT, ALTERATION, OR DISCONNECTION OF CONNECTICUT STATE POLICE ANTENNAS MAY OCCUR WITHOUT THE NOTIFICATION AND APPROVAL OF THE CONNECTICUT STATE POLICE. CONTACT THE NETWORK CONTROL CENTER AT 860-865-8008.
9. TOWER REINFORCING WORK AFFECTING CRITICAL CONNECTICUT STATE POLICE ANTENNAS MAY BE REQUIRED TO BE CONDUCTED AT TIMES AS DETERMINED BY THE REQUIREMENTS OF THE CONNECTICUT STATE POLICE.
10. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MANUFACTURERS RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.
11. IT SHALL BE MANDATORY TO USE STEEL MATERIALS PLANNED FOR CONSTRUCTION THAT ARE MANUFACTURED IN THE UNITED STATES OF AMERICA. MATERIAL SPECIFICATION DOCUMENTS SHALL BE MADE AVAILABLE TO THE ENGINEER TO VERIFY STEEL FABRICATION PRIOR TO PURCHASE AND IMPLEMENTATION. DEVIATIONS FROM THIS SHALL REQUIRE EXPRESSED WRITTEN PERMISSION FROM THE ENGINEER AND CONNECTICUT STATE POLICE.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
13. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW.
14. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. SUBMIT ANY DISCREPANCIES FROM THE DRAWINGS TO THE ARCHITECT.
15. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
16. CONTRACTOR SHALL COMPLY WITH OWNER ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL/ROCK DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
17. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA.
18. DIMENSIONS OF EXISTING TOWER ARE BASED ON MANUFACTURER'S DRAWINGS PREPARED BY STAINLESS, INC., DATED DECEMBER 14, 1993, AND ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENT ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REFERENCE ONLY.
19. TOWER INVENTORY IS BASED ON INFORMATION OBTAINED FROM TOWER INVENTORY PERFORMED BY EASTERN COMMUNICATIONS ON JUNE 17, 2020.
20. CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING WORK.
21. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. NO MEMBER OF THE TOWER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM MEMBER REPLACEMENT IN A WIND.

STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL:
- LEG PIPES .....A572-50 (50 KSI)
- BEAMS, CHANNELS, PLATES ..... A36 (36 KSI)
- ANGLES..... A36 (36 KSI)

PLATE WELDED "T" BEAM..... A992 (50 KSI)

STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

UNLESS OTHERWISE NOTED, ALL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 2 SETS OF PRINTS FOR THE ENGINEER REVIEW.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME.

CONCRETE:

ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318 AND THE SPECIFICATION CAST-IN-PLACE CONCRETE.

CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI IN 28 DAYS AND SHALL CONTAIN 5%-7% AIR ENTRAINMENT.

REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.

THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

- CONCRETE CAST AGAINST EARTH.....3 IN.
- CONCRETE EXPOSED TO EARTH OR WEATHER:
  - #6 AND LARGER.....2 IN.
  - #5 AND SMALLER & WWF.....1-1/2 IN.
- CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
  - SLAB AND WALL.....3/4 IN.
  - BEAMS AND COLUMNS.....1-1/2 IN.

CONCRETE (CONTINUED)

A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

INSTALLATION OF CHEMICAL ANCHORAGES, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR ENGINEERING APPROVAL WHEN DRILLING.

COLD WEATHER PLACING SHALL BE IN ACCORDANCE WITH ACI-305.

NO CONCRETE SHALL BE PLACE ON FROZEN GROUND. UNCURED CONCRETE SHALL BE PROTECTED AGAINST FROST.

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 3/4" DIA. A325-X BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.

COMMENCEMENT OF WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS, USING E70XX ELECTRODES UNLESS OTHERWISE NOTED. WHERE WELD SIZES ARE NOT SHOWN PROVIDE THE MINIMUM SIZES PER "PREQUALIFIED WELDED JOINTS" TABLES IN AISC "MANUAL OF STEEL CONTRUCTION", 14TH EDITION.

INSPECTIONS:

SPECIAL INSPECTIONS ARE REQUIRED PER THE CODE FOR STRUCTURAL STEEL WORK.

PLEASE CONTACT AECOM @ 860-263-5819 FOR CONSTRUCTION PHASE SERVICES AND/OR SPECIAL INSPECTIONS.

VERIZON WILL SUPPLY THE SERVICES OF THE REQUIRED SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO THE TOWN OF WESTON BUILDING INSPECSTOR, STATE BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

PROJECT NO.	60657751/60656990
Designed by:	KAB
Drawn by:	KAB
Checked by:	DJR
Approved by:	JTH

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
860-529-8882

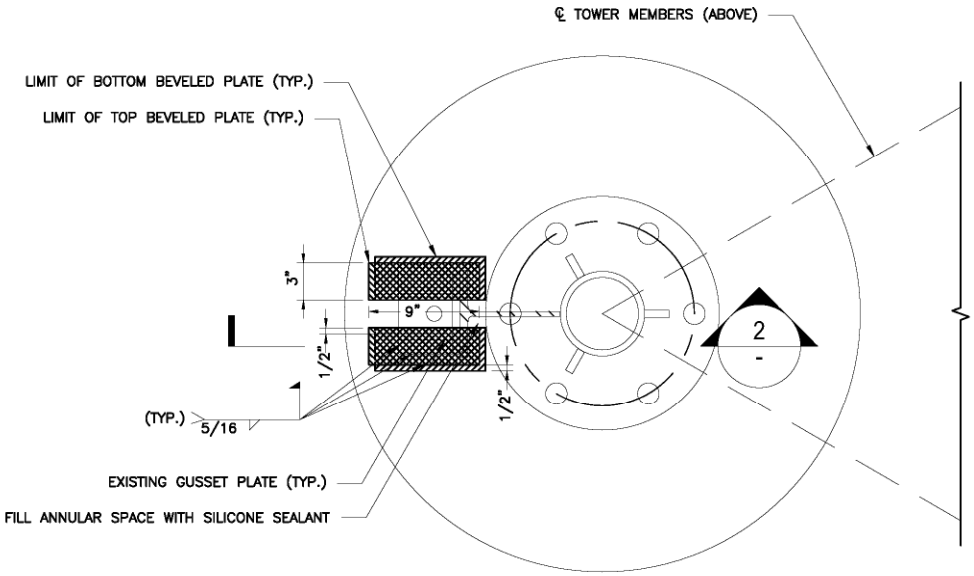
verizon wireless AT&T

CSP #20
SITE ADDRESS: INTERSECTION OF I-84 & SOUTH ST
MIDDLEBURY, CONNECTICUT

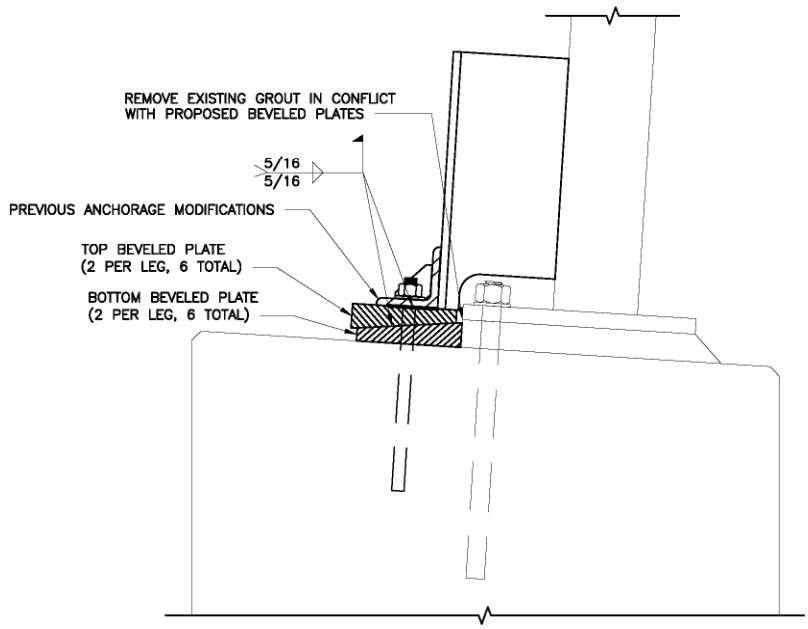
REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 07/02/21
Job No. VZ5-228 SMK-007 | File No.

Dwg. No. SK-1



1 ANCHORAGE PLAN
SCALE: 3/4" = 1'-0"



2 ANCHORAGE SECTION
SCALE: 3/4" = 1'-0"

BEVELED PLATE NOTES:
1. FIELD VERIFY EXISTING DIMENSIONS AND PROVIDE FIELD MEASUREMENTS WITH SHOP DRAWINGS.
2. BEVELED PLATE DIMENSIONS SHALL BE ADJUSTED BASED ON FIELD MEASUREMENTS.

PROJECT NO. 60657751/60656990
Designed by: KAB
Drawn by: KAB
Checked by: DJR
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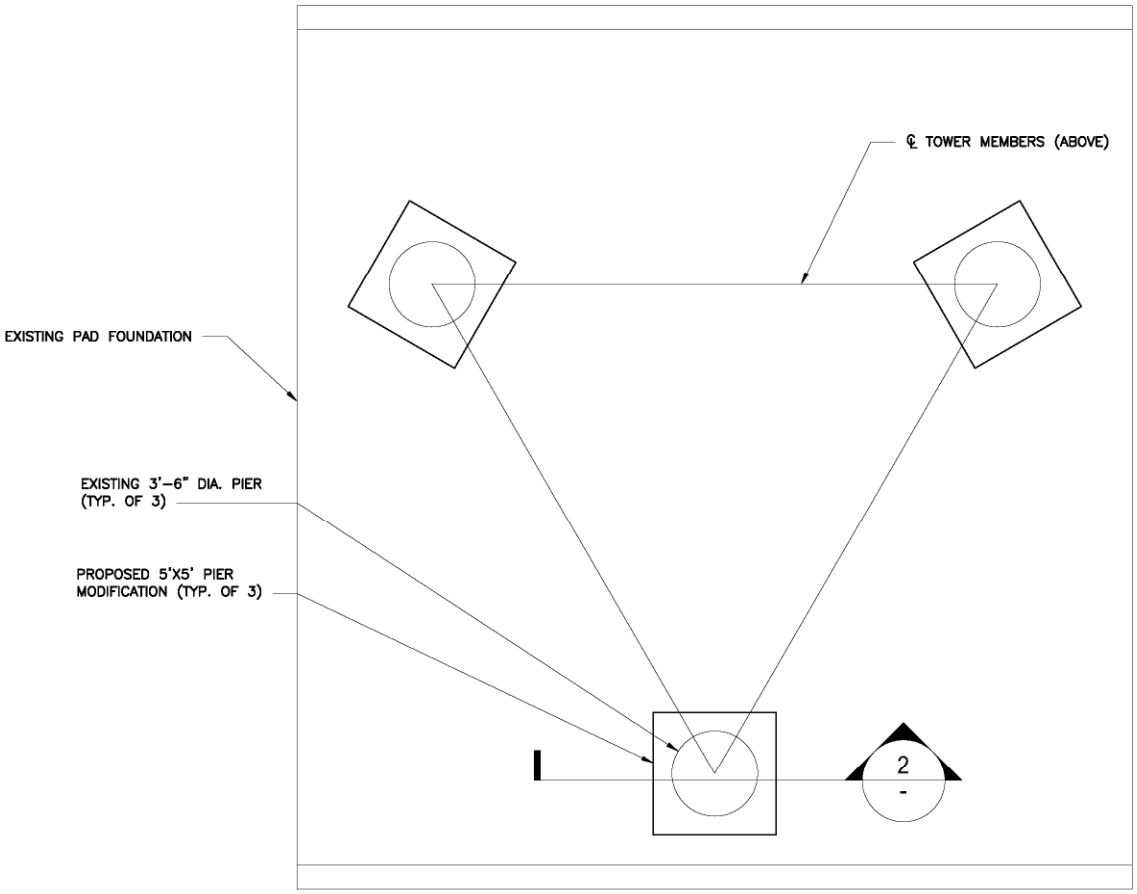
REV.	DATE:	DESCRIPTION

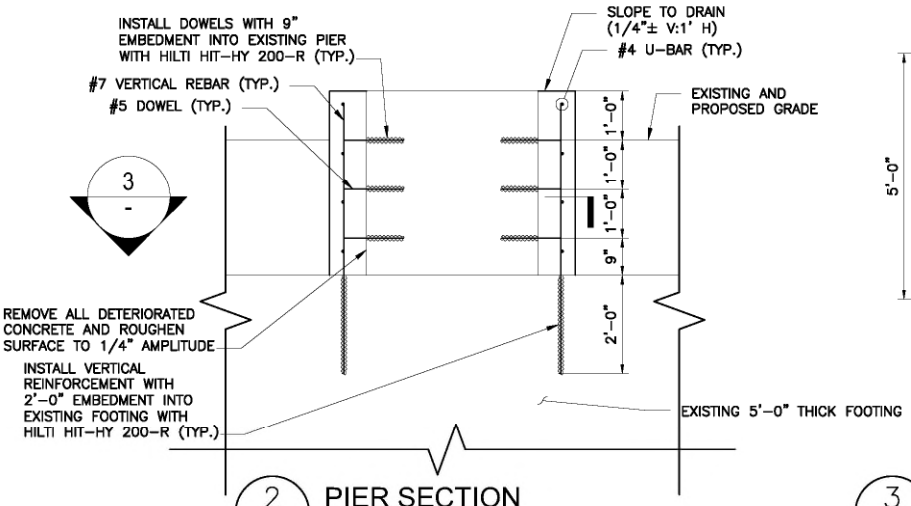
Scale: AS NOTED | Date: 07/02/21
Job No. VZ5-228 SMK-007 | File No.

Dwg. No. SK-2
Dwg. 2 of 3

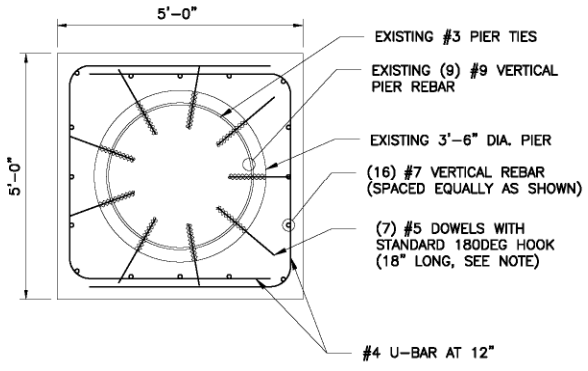


1 – FOUNDATION PLAN
SCALE: 1/8" = 1'–0"

NOTE:
LOCATIONS OF EXISTING EQUIPMENT NOT SHOWN FOR CLARITY. FIELD VERIFY LOCATIONS OF EQUIPMENT PRIOR TO CONSTRUCTION



2 – PIER SECTION
SCALE: 1/4" = 1'–0"



3 – PIER SECTION
SCALE: 1/4" = 1'–0"

NOTE:
TRIM DOWEL BARS TO MAINTAIN 3" CONCRETE COVER

PROJECT NO.	60657751/60656990
Designed by:	KAB
Drawn by:	KAB
Checked by:	DJR
Approved by:	JTH

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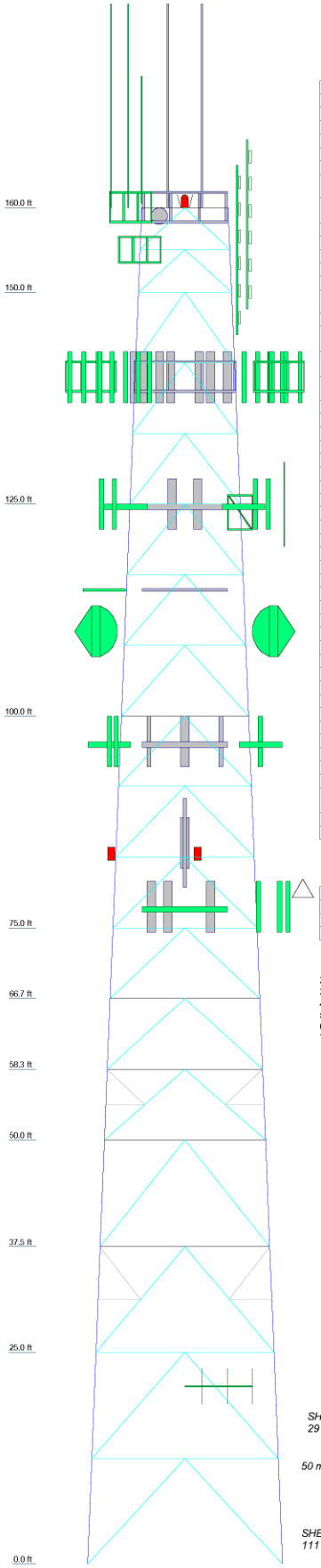
REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 07/02/21
Job No. VZ5–228 SMK–007 | File No.

Dwg. No. SK–3
Dwg. 3 of 3

TNX TOWER INPUT / OUTPUT SUMMARY



Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	HSS6.875x0.5 w/ (3) 2x5/8 Bars	HSS6.875x.4		HSS5x.4	P5x0.4 w/ (3) 1.5x5/8 Plates		P5x0.3 w/ (3) 1.5x5/8 Plates	P.5x.250		
Leg Grade	A500-50	A514-60		A572-50			A500-50			
Diagonals	2L4x3x3/8	2L3 1/2x3 1/2x5/16	2L3 1/2x2x3/8	2L3x3x5/16	2L3x2 1/2x5/16		2L3x2 1/2x1/4	2L2 1/2x2 1/2x5/16	2L2 1/2x2x3/16	
Diagonal Grade	A529-50		A36		A529-50		A36			
Top Girts	N.A.	L4x4x5/16	L4x4x1/4	L3x3x1/2	N.A.		L3x3x1/4	N.A.	L2 1/2x2 1/2x3/16	L3x3x1/4
Horizontals	L4x4x1/2	N.A.					L3x3x1/2	L3x3x5/16		L3x3x1/4
Red. Horizontals	N.A.	L2x2x5/16	N.A.	L2x2x5/16			N.A.			
Red. Diagonals	N.A.	L2x2x5/16	N.A.	L2x2x5/16			N.A.		N.A.	
Inner Bracing		L2 1/2x2 1/2x3/16								
Face Width (ft)	23	21	19	17.6667	17	15	13	11	10.2	
# Panels @ (ft)		4 @ 12.5		18.3333		12 @ 8.33333			2 @ 5	
Weight (K)	34.1	8.7	3.0	2.3	2.1	2.1	6.1	3.9	2.3	1.2

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (1.158)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	125
Lightning Rod 1/2"x4' on 15' Pole (Tower - LR)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	125
DS7C09P36D-D (CSP)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	125
DS7C09P36D-D (CSP)	160	EMS RR90-17-xx (T-Mobile)	125
DS7C09P36D-D (CSP)	160	EMS RR90-17-xx (T-Mobile)	125
DS7C09P36D-D (CSP)	160	EMS RR90-17-xx (T-Mobile)	125
Commscope SFG23HD-12-4-96 Mount Assembly (CSP)	160	LNX-6515DS-A1M Andrew Panel (T-Mobile)	125
		LNX-6515DS-A1M Andrew Panel (T-Mobile)	125
Commscope SFG23HD-12-4-96 Mount Assembly (CSP)	160	LNX-6515DS-A1M Andrew Panel (T-Mobile)	125
432E-83I-01T TTA Unit (2-3.159 - TTA)	159	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	125
HPD2-4.7 (NWCT (C-A Face))	159	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	125
DB304-A (2.158)	158	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	125
432E-83I-01T TTA Unit (3.155 - TTA Unit)	155	2' Dia 10' Omni (2.124)	124
DB228-A (2.155)	155	Pirod 6' Side Mount Standoff (1) (Mt for 2.124)	124
10' PCS Frame (1) (Mt for 2.155.1, 2.155.2 , 2.1557)	155	4'x96"x72" Ice Canopy (DNK-5)	115
		4'x96"x72" Ice Canopy (DNK-6)	115
DC6-48-60-18-8F (Squid) Suppressor (ATT)	146	6' w/ Radome (2.110)	110
Commscope SFG22 (14' Sector Frame) (ATI Proposed)	140	6' w/ Radome (3.110)	110
		TD-RRH8x20 (Sprint)	97
Commscope SFG22 (14' Sector Frame) (ATI Proposed)	140	RRH 800MHz 2x50W (Sprint)	97
		RRH 1900 MHz 2x40W (Sprint)	97
Commscope SFG22 (14' Sector Frame) (ATI Proposed)	140	RRH 800MHz 2x50W (Sprint)	97
		RRH 800MHz 2x50W (Sprint)	97
7770.00 (ATT)	140	RRH 800MHz 2x50W (Sprint)	97
CCI DMP65R-BU8D Panel (ATI Proposed)	140	RRH 800MHz 2x50W (Sprint)	97
CCI OPA65R-BU8D Panel (ATI Proposed)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-32 (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-12 (ATT)	140	TD-RRH8x20 (Sprint)	97
Radio 4449 B5/B12 RRH (ATI Proposed)	140	RRH 1900 MHz 2x40W (Sprint)	97
Radio 4478 B14 RRH (ATI Proposed)	140	RRH 1900 MHz 2x40W (Sprint)	97
TT19-08BP111-001 TMA's (ATT)	140	APXVSPP18-C-A20 (Sprint)	97
(2) LGP21401 Diplexer (ATT)	140	APXVSPP18-C-A20 (Sprint)	97
7770.00 (ATT)	140	APXVSPP18-C-A20 (Sprint)	97
CCI DMP65R-BU8D Panel (ATI Proposed)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
CCI OPA65R-BU8D Panel (ATI Proposed)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	140	RRH 800MHz 2x50W (Sprint)	97
RRUS-32 (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-12 (ATT)	140	TD-RRH8x20 (Sprint)	97
Radio 4449 B5/B12 RRH (ATI Proposed)	140	10'6"x4" Pipe Mount (Mt for 1.85)	85
Radio 4478 B14 RRH (ATI Proposed)	140	PD10054 (2x2' Square - 1.85)	85
DC6-48-60-18-8F (Squid) Suppressor (ATT)	140	L-810 Tower Side-Light Beacon (1.83)	83
TT19-08BP111-001 TMA's (ATT)	140	L-810 Tower Side-Light Beacon (3.83)	83
(2) LGP21401 Diplexer (ATT)	140	5' T-arm (VZW)	77.5
7770.00 (ATT)	140	JMA MX06FR0660-03 (VZW)	77.5
DMP65R-BU6D (ATI Proposed)	140	JMA MX06FR0660-03 (VZW)	77.5
OPA65R-BU6D (ATI Proposed)	140	JMA 2" Edge to Edge (VZW)	77.5
QS66512 (ATT)	140	JMA MX06FR0660-03 (VZW)	77.5
RRUS-32 (ATT)	140	JMA MX06FR0660-03 (VZW)	77.5
RRUS-12 (ATT)	140	JMA 2" Edge to Edge (VZW)	77.5
Radio 4449 B5/B12 RRH (ATI Proposed)	140	Samsung MT6407-77A (VZW)	77.5
Radio 4478 B14 RRH (ATI Proposed)	140	Samsung MT6407-77A (VZW)	77.5
DC6-48-60-18-8F (Squid) Suppressor (ATI Proposed)	140	(3) RRH (VZW)	77.5
		(3) RRH (VZW)	77.5
TT19-08BP111-001 TMA's (ATT)	140	5' T-arm (VZW)	77.5
(2) LGP21401 Diplexer (ATT)	140	DC6-48-60-18-8F (VZW)	77.5
		Sinclair SY450-SF1SNM Yagi (3-1.21)	21

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A514-60	60 ksi	80 ksi
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 3 with Crest Height of 176.00 ft
7. TOWER RATING: 92%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 466 K
SHEAR: 61 K

UPLIFT: -409 K
SHEAR: 55 K

AXIAL 152 K
SHEAR 29 K *MOMENT 2384 kip-ft*
TORQUE 52 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 62 K
SHEAR 111 K *MOMENT 8865 kip-ft*
TORQUE 122 kip-ft
REACTIONS - 130 mph WIND

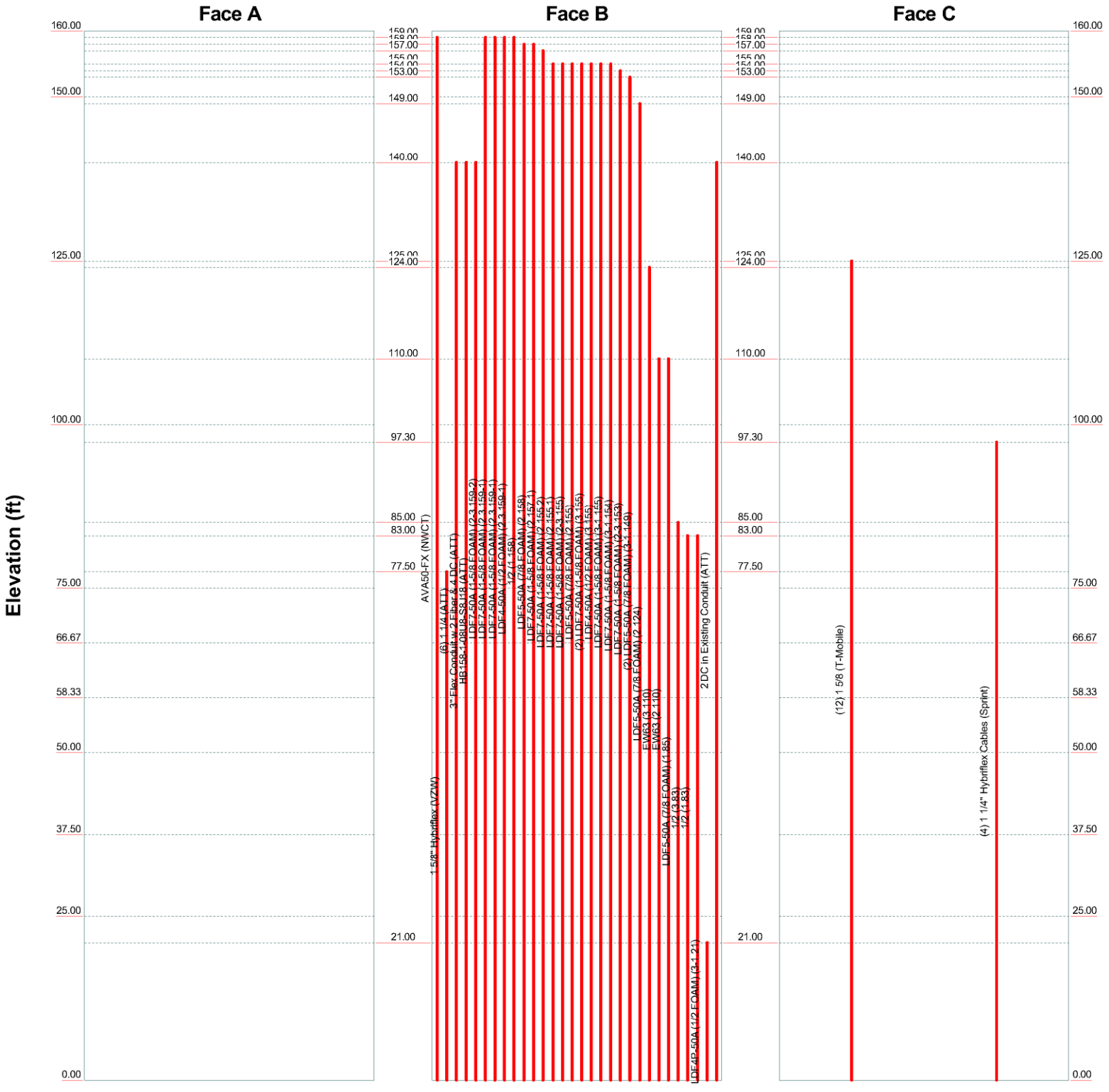
AECOM
500 Enterprise Drive
Rocky Hill, CT
Phone: (860) 529-8882
FAX:

Job:	160' Self Support Lattice - CSP #20		
Project:	Middlebury, CT		
Client:	SMK-007 / VZ5-228	Drawn by: KAB	App'd:
Code:	TIA-222-H	Date: 07/02/21	Scale: NTS
Path:			Dwg No. E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 160'

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



AECOM
500 Enterprise Drive
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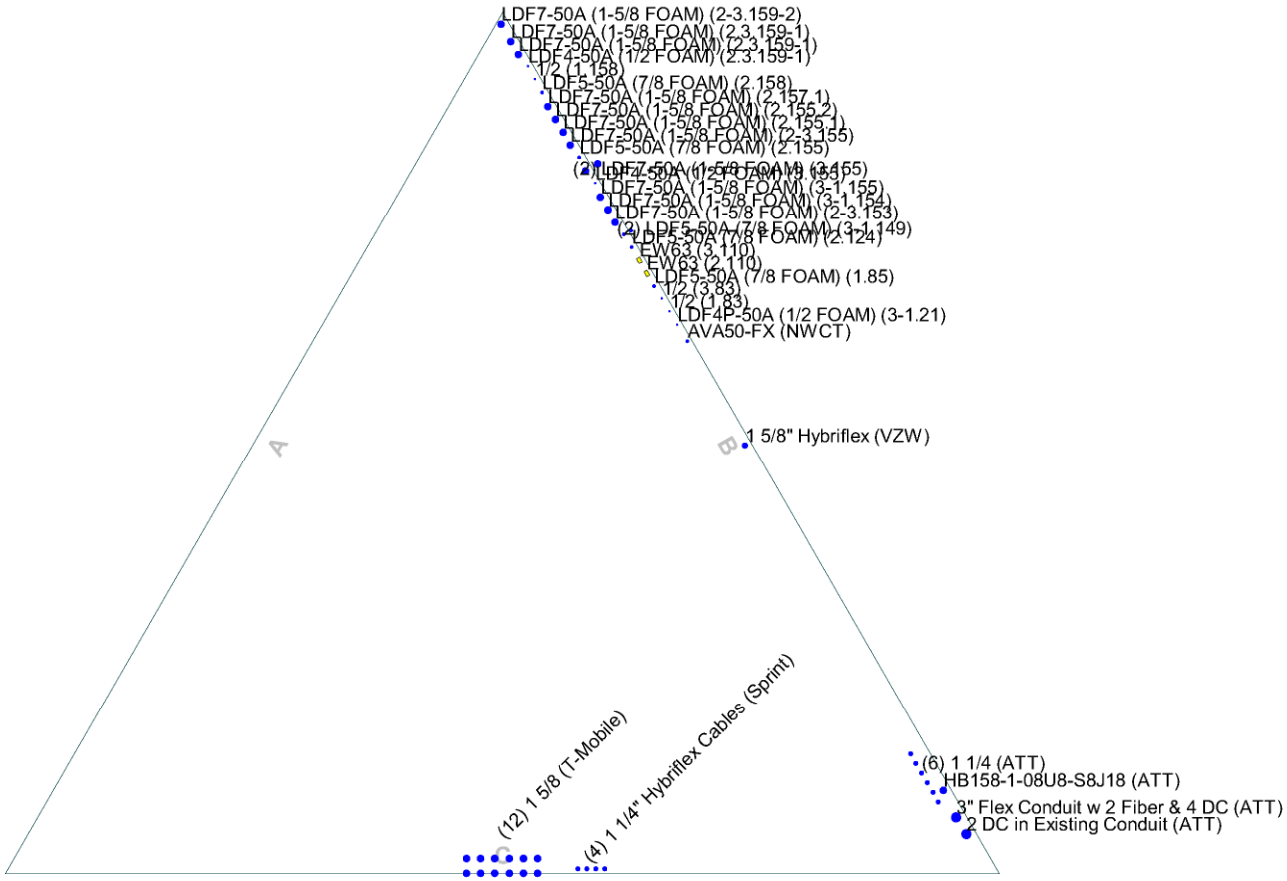
FAX:

Job:	**160' Self Support Lattice - CSP #20**		
Project:	***Middlebury, CT***		
Client: SMK-007 / VZ5-228		Drawn by: KAB	App'd:
Code: TIA-222-H		Date: 07/02/21	Scale: NTS
Path:			Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face



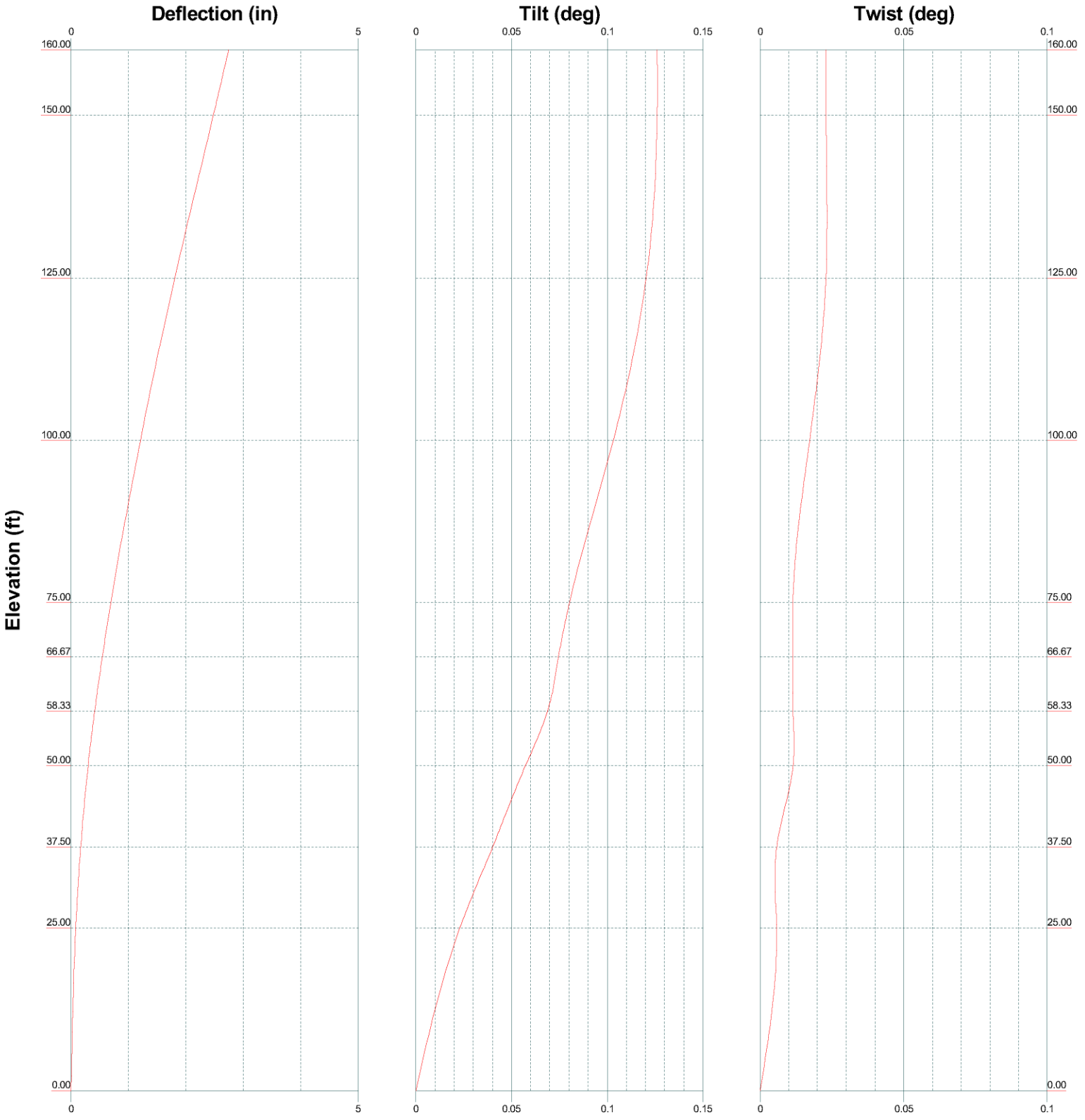
AECOM
500 Enterprise Drive
Rocky Hill, CT
Phone: (860) 529-8882
FAX:

Job:	***160' Self Support Lattice - CSP #20***		
Project:	***Middlebury, CT***		
Client: SMK-007 / VZ5-228		Drawn by: KAB	App'd:
Code: TIA-222-H		Date: 07/02/21	Scale: NTS
Path:			Dwg No. E-7

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA-222-H - Service - 60 mph

Maximum Values



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Job:	***160' Self Support Lattice - CSP #20***		
Project:	***Middlebury, CT***		
Client: SMK-007 / VZ5-228		Drawn by: KAB	App'd:
Code: TIA-222-H		Date: 07/02/21	Scale: NTS
Path:			Dwg No. E-5

TNX TOWER DETAILED OUTPUT

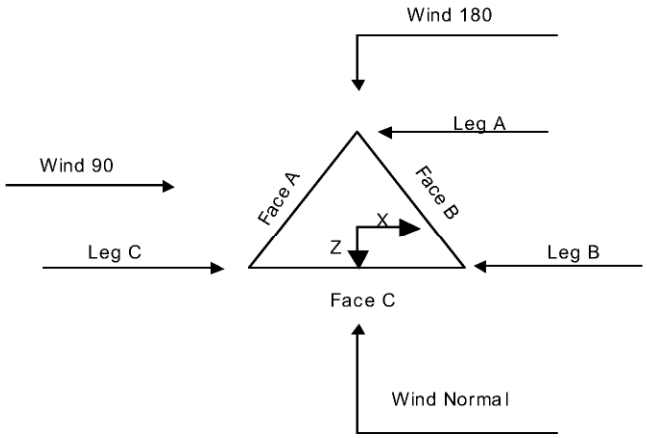
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 10.20 ft at the top and 23.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower base elevation above sea level: 0.00 ft.
Basic wind speed of 130 mph.
Risk Category III.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 3.
Crest Height: 176.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	160.00-150.00			10.20	1	10.00
T2	150.00-125.00			11.00	1	25.00
T3	125.00-100.00			13.00	1	25.00
T4	100.00-75.00			15.00	1	25.00
T5	75.00-66.67			17.00	1	8.33
T6	66.67-58.33			17.67	1	8.33
T7	58.33-50.00			18.33	1	8.33
T8	50.00-37.50			19.00	1	12.50
T9	37.50-25.00			20.00	1	12.50
T10	25.00-0.00			21.00	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	160.00-150.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	150.00-125.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	125.00-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	75.00-66.67	8.33	K Brace Down	No	Yes	0.0000	0.0000

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
T6	66.67-58.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T7	58.33-50.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T8	50.00-37.50	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	37.50-25.00	12.50	K1 Down	No	Yes	0.0000	0.0000
T10	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 160.00-150.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 150.00-125.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 125.00-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 100.00-75.00	Arbitrary Shape	P5x0.3 w/ (3) 1.5x5/8 Plates	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T5 75.00-66.67	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T6 66.67-58.33	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T7 58.33-50.00	Pipe	HSS5x.4	A514-60 (60 ksi)	Double Angle	2L3x3x5/16	A36 (36 ksi)
T8 50.00-37.50	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8	A36 (36 ksi)
T9 37.50-25.00	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A529-50 (50 ksi)
T10 25.00-0.00	Arbitrary Shape	HSS6.875x0.5 w/ (3) 2x5/8 Bars	A500-50 (50 ksi)	Double Angle	2L4x3x3/8	A529-50 (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 160.00-150.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36M-50 (50 ksi)
T4 100.00-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 66.67-58.33	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 58.33-50.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 50.00-37.50	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 37.50-25.00	Single Angle	L4x4x5/16	A529-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 160.00-150.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T2 150.00-125.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 125.00-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T4 100.00-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T5 75.00-66.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T6 66.67-58.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T7 58.33-50.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T8 50.00-37.50	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T9 37.50-25.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T10 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/2	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
T3 125.00-100.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-75.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 75.00-66.67	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 66.67-58.33	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 58.33-50.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-37.50	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 37.50-25.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 25.00-0.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T7	A36	Horizontal (1)	Equal Angle	L2x2x5/16	1
58.33-50.00	(36 ksi)	Diagonal (1)	Equal Angle	L2x2x5/16	1
T9	A36	Horizontal (1)	Equal Angle	L2x2x5/16	1
37.50-25.00	(36 ksi)	Diagonal (1)	Single Angle	L2x2x5/16	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1	0.00	0.0000	A36	1	1	1	0.0000	0.0000	36.0000
160.00-150.00			(36 ksi)						
T2	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
150.00-125.00			(36 ksi)						
T3	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
125.00-100.00			(36 ksi)						
T4	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
100.00-75.00			(36 ksi)						
T5 75.00-66.67	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T6 66.67-58.33	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T7 58.33-50.00	0.00	0.0000	A36	1	1	1.03	0.0000	36.0000	36.0000
			(36 ksi)						
T8 50.00-37.50	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T9 37.50-25.00	0.00	0.0000	A36	1	1	1.03	0.0000	36.0000	36.0000
			(36 ksi)						
T10 25.00-0.00	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	0.65	0.65	1
160.00-150.00				1	1	1	1	0.65	0.65	1
T2	Yes	Yes	1	1	1	1	1	0.65	0.65	1
150.00-125.00				1	1	1	1	0.65	0.65	1
T3	Yes	Yes	1	1	1	1	1	0.65	0.65	1
125.00-100.00				1	1	1	1	0.65	0.65	1
T4	Yes	Yes	1	1	1	1	1	0.65	0.65	1
100.00-75.00				1	1	1	1	0.65	0.65	1
T5	Yes	Yes	1	1	1	1	1	0.65	0.65	1
75.00-66.67				1	1	1	1	0.65	0.65	1
T6	Yes	Yes	1	1	1	1	1	0.65	0.65	1
66.67-58.33				1	1	1	1	0.65	0.65	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T7	Yes	Yes	1	1	1	1	1	0.65	0.65	1
58.33-50.00				1	1	1	1	0.65	0.65	1
T8	Yes	Yes	1	1	1	1	1	0.65	0.65	1
50.00-37.50				1	1	1	1	0.65	0.65	1
T9	Yes	Yes	1	1	1	1	1	0.65	0.65	1
37.50-25.00				1	1	1	1	0.65	0.65	1
T10	Yes	Yes	1	1	1	1	1	0.65	0.65	1
25.00-0.00				1	1	1	1	0.65	0.65	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
160.00-150.00														
T2	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-125.00														
T3	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
125.00-100.00														
T4	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-75.00														
T5 75.00-66.67	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 66.67-58.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 58.33-50.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-37.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 37.50-25.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 25.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Connection Offsets Diagonal Vert. Top in	Diagonal Horiz. Top in	Diagonal Vert. Bot. in	Diagonal Horiz. Bot. in	K-Bracing Vert. Top in	K-Bracing Horiz. Top in	K-Bracing Vert. Bot. in	K-Bracing Horiz. Bot. in
T1	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
160.00-150.00								
T2	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
150.00-125.00								
T3	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
125.00-100.00								

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T4 100.00-75.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 75.00-66.67	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 66.67-58.33	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 58.33-50.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 50.00-37.50	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 37.50-25.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 25.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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 160.00-150.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 150.00-125.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 125.00-100.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-75.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 75.00-66.67	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 66.67-58.33	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 58.33-50.00	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-37.50	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 37.50-25.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T10 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 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 plf
AVA50-FX (NWCT)	B	No	No	Ar (CaAa)	159.00 - 0.00	-0.5000	-0.12	1	1	1.1020	1.1020		0.29
1 5/8" Hybriflex (VZW)	B	No	No	Ar (CaAa)	77.50 - 0.00	-1.0000	0	1	1	1.6250	1.6250		1.48

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (T-Mobile)	C	No	No	Ar (CaAa)	125.00 - 0.00	-3.0000	0	12	6	1.9800	1.9800		1.04
1 1/4 (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-4.0000	0.38	6	6	1.5500	1.5500		0.66
3" Flex Conduit w 2 Fiber & 4 DC (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-1.0000	0.43	1	1	3.0000	3.0000		3.00
HB158-1-08U8-S8J18 (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-1.0000	0.4	1	1	1.9800	1.9800		1.30
1 1/4" Hybriflex Cables (Sprint) *	C	No	No	Ar (CaAa)	97.30 - 0.00	-0.5000	-0.09	4	4	1.2500	1.2500		1.13
* CSP Cables													
LDF7-50A (1-5/8 FOAM) (2-3.159-2)	B	No	No	Ar (CaAa)	159.00 - 0.00	-1.0000	-0.49	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.3.159-1)	B	No	No	Ar (CaAa)	159.00 - 0.00	-1.0000	-0.47	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.3.159-1)	B	No	No	Ar (CaAa)	159.00 - 0.00	-1.0000	-0.455	1	1	1.9800	1.9800		0.82
LDF4-50A (1/2 FOAM) (2.3.159-1)	B	No	No	Ar (CaAa)	159.00 - 0.00	-1.0000	-0.44	1	1	0.6300	0.6300		0.15
1/2 (1.158)	B	No	No	Ar (CaAa)	158.00 - 0.00	-1.0000	-0.425	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (2.158)	B	No	No	Ar (CaAa)	158.00 - 0.00	-1.0000	-0.41	1	1	1.0900	1.0900		0.33
LDF7-50A (1-5/8 FOAM) (2.157.1)	B	No	No	Ar (CaAa)	157.00 - 0.00	-1.0000	-0.395	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.155.2)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.38	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.155.1)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.365	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2-3.155)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.35	1	1	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (2.155)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.335	1	1	1.0900	1.0900		0.33
LDF7-50A (1-5/8 FOAM) (3.155)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.32	2	1	1.9800	1.9800		0.82
LDF4-50A (1/2 FOAM) (3.155)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.305	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM) (3-1.155)	B	No	No	Ar (CaAa)	155.00 - 0.00	-1.0000	-0.29	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	No	No	Ar (CaAa)	154.00 - 0.00	-1.0000	-0.275	1	1	1.9800	1.9800		0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(3-1.154) LDF7-50A (1-5/8 FOAM) (2-3.153)	B	No	No	Ar (CaAa)	153.00 - 0.00	-1.0000	-0.26	1	1	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (3-1.149)	B	No	No	Ar (CaAa)	149.00 - 0.00	-1.0000	-0.245	2	1	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (2.124)	B	No	No	Ar (CaAa)	124.00 - 0.00	-1.0000	-0.23	1	1	1.0900	1.0900		0.33
EW63 (3.110)	B	No	No	Af (CaAa)	110.00 - 0.00	-1.0000	-0.215	1	1	1.5742	1.5742		0.51
EW63 (2.110)	B	No	No	Af (CaAa)	110.00 - 0.00	-1.0000	-0.2	1	1	1.5742	1.5742		0.51
LDF5-50A (7/8 FOAM) (1.85)	B	No	No	Ar (CaAa)	85.00 - 0.00	-1.0000	-0.185	1	1	1.0900	1.0900		0.33
1/2 (3.83)	B	No	No	Ar (CaAa)	83.00 - 0.00	-1.0000	-0.17	1	1	0.5800	0.5800		0.25
1/2 (1.83)	B	No	No	Ar (CaAa)	83.00 - 0.00	-1.0000	-0.155	1	1	0.5800	0.5800		0.25
LDF4P-50A (1/2 FOAM) (3-1.21)	B	No	No	Ar (CaAa)	21.00 - 0.00	-1.0000	-0.14	1	1	0.6300	0.6300		0.15
2 DC in Existing Conduit (ATT)	B	No	No	Ar (CaAa)	140.00 - 0.00	-1.0000	0.45	1	1	3.0000	3.0000		3.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	160.00-150.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	17.813	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	102.696	0.000	0.47
		C	0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	127.489	0.000	0.60
		C	0.000	0.000	59.400	0.000	0.31
T4	100.00-75.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	137.689	0.000	0.63
		C	0.000	0.000	70.550	0.000	0.41
T5	75.00-66.67	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	48.266	0.000	0.22
		C	0.000	0.000	23.967	0.000	0.14
T6	66.67-58.33	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	48.241	0.000	0.22
		C	0.000	0.000	23.967	0.000	0.14
T7	58.33-50.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	48.218	0.000	0.22
		C	0.000	0.000	23.967	0.000	0.14
T8	50.00-37.50	A	0.000	0.000	0.000	0.000	0.00

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
		B	0.000	0.000	72.293	0.000	0.34
		C	0.000	0.000	35.950	0.000	0.21
T9	37.50-25.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	72.285	0.000	0.34
		C	0.000	0.000	35.950	0.000	0.21
T10	25.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	146.083	0.000	0.68
		C	0.000	0.000	71.900	0.000	0.42

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	160.00-150.00	A	1.427	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	52.068	0.000	0.67
		C		0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	1.428	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	292.813	0.000	3.80
		C		0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	1.432	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	356.655	0.000	4.67
		C		0.000	0.000	81.776	0.000	2.01
T4	100.00-75.00	A	1.437	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	384.868	0.000	5.02
		C		0.000	0.000	116.201	0.000	2.46
T5	75.00-66.67	A	1.441	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	137.738	0.000	1.80
		C		0.000	0.000	40.140	0.000	0.84
T6	66.67-58.33	A	1.442	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	137.789	0.000	1.80
		C		0.000	0.000	40.145	0.000	0.84
T7	58.33-50.00	A	1.441	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	137.782	0.000	1.80
		C		0.000	0.000	40.144	0.000	0.84
T8	50.00-37.50	A	1.438	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	206.446	0.000	2.69
		C		0.000	0.000	60.193	0.000	1.26
T9	37.50-25.00	A	1.427	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	205.552	0.000	2.66
		C		0.000	0.000	60.101	0.000	1.25
T10	25.00-0.00	A	1.360	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	407.806	0.000	5.10
		C		0.000	0.000	119.135	0.000	2.44

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	160.00-150.00	1.4407	-13.8300	2.4873	-21.4911
T2	150.00-125.00	11.1526	-16.9480	12.4452	-25.2632
T3	125.00-100.00	13.7157	-4.6647	15.9641	-16.0186
T4	100.00-75.00	14.7112	-4.6401	17.6366	-15.5018

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T5	75.00-66.67	16.0277	-5.4645	19.5050	-17.2616
T6	66.67-58.33	16.4624	-5.6398	20.1180	-17.8011
T7	58.33-50.00	15.7147	-5.4776	19.6855	-17.4997
T8	50.00-37.50	17.9229	-6.1833	22.1157	-19.5241
T9	37.50-25.00	17.2261	-5.9957	21.7493	-19.1802
T10	25.00-0.00	18.5724	-6.4950	23.6653	-20.5585

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	AVA50-FX	150.00 - 159.00	0.6000	0.6000
T1	13	LDF7-50A (1-5/8 FOAM)	150.00 - 159.00	0.6000	0.6000
T1	14	LDF7-50A (1-5/8 FOAM)	150.00 - 159.00	0.6000	0.6000
T1	15	LDF7-50A (1-5/8 FOAM)	150.00 - 159.00	0.6000	0.6000
T1	16	LDF4-50A (1/2 FOAM)	150.00 - 159.00	0.6000	0.6000
T1	17	1/2	150.00 - 158.00	0.6000	0.6000
T1	18	LDF5-50A (7/8 FOAM)	150.00 - 158.00	0.6000	0.6000
T1	19	LDF7-50A (1-5/8 FOAM)	150.00 - 157.00	0.6000	0.6000
T1	20	LDF7-50A (1-5/8 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	21	LDF7-50A (1-5/8 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	22	LDF7-50A (1-5/8 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	23	LDF5-50A (7/8 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	24	LDF7-50A (1-5/8 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	25	LDF4-50A (1/2 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	26	LDF7-50A (1-5/8 FOAM)	150.00 - 155.00	0.6000	0.6000
T1	27	LDF7-50A (1-5/8 FOAM)	150.00 - 154.00	0.6000	0.6000
T1	28	LDF7-50A (1-5/8 FOAM)	150.00 - 153.00	0.6000	0.6000
T2	1	AVA50-FX	125.00 - 150.00	0.6000	0.6000
T2	4	1 1/4	125.00 - 140.00	0.6000	0.6000
T2	5	3" Flex Conduit w 2 Fiber & 4 DC	125.00 - 140.00	1.0000	0.6000
T2	6	HB158-1-08U8-S8J18	125.00 - 140.00	0.6000	0.6000
T2	13	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	14	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	15	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	16	LDF4-50A (1/2 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	17	1/2	125.00 - 150.00	0.6000	0.6000
T2	18	LDF5-50A (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	19	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	20	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	21	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	22	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	23	LDF5-50A (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	24	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	25	LDF4-50A (1/2 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	26	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	27	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	28	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T2	29	LDF5-50A (7/8 FOAM)	125.00 - 149.00	0.6000	0.6000
T2	37	2 DC in Existing Conduit	125.00 - 140.00	1.0000	0.6000
T3	1	AVA50-FX	100.00 - 125.00	0.6000	0.6000
T3	3	1 5/8	100.00 - 125.00	0.6000	0.6000
T3	4	1 1/4	100.00 - 125.00	0.6000	0.6000
T3	5	3" Flex Conduit w 2 Fiber & 4 DC	100.00 - 125.00	1.0000	0.6000
T3	6	HB158-1-08U8-S8J18	100.00 - 125.00	0.6000	0.6000
T3	13	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	14	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	15	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	16	LDF4-50A (1/2 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	17	1/2	100.00 - 125.00	0.6000	0.6000
T3	18	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	19	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	20	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	21	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	22	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	23	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	24	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	25	LDF4-50A (1/2 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	26	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	27	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	28	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	29	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T3	30	LDF5-50A (7/8 FOAM)	100.00 - 124.00	0.6000	0.6000
T3	31	EW63	100.00 - 110.00	0.6000	0.6000
T3	32	EW63	100.00 - 110.00	0.6000	0.6000
T3	37	2 DC in Existing Conduit	100.00 - 125.00	1.0000	0.6000
T4	1	AVA50-FX	75.00 - 100.00	0.6000	0.6000
T4	2	1 5/8" Hybriflex	75.00 - 77.50	0.6000	0.6000
T4	3	1 5/8	75.00 - 100.00	0.6000	0.6000
T4	4	1 1/4	75.00 - 100.00	0.6000	0.6000
T4	5	3" Flex Conduit w 2 Fiber & 4 DC	75.00 - 100.00	1.0000	0.6000
T4	6	HB158-1-08U8-S8J18	75.00 - 100.00	0.6000	0.6000
T4	8	1 1/4" Hybriflex Cables	75.00 - 97.30	0.6000	0.6000
T4	13	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	14	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	15	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	16	LDF4-50A (1/2 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	17	1/2	75.00 - 100.00	0.6000	0.6000
T4	18	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	19	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	20	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	21	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	22	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	23	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	24	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	25	LDF4-50A (1/2 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	26	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	27	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	28	LDF7-50A (1-5/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	29	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	30	LDF5-50A (7/8 FOAM)	75.00 - 100.00	0.6000	0.6000
T4	31	EW63	75.00 - 100.00	0.6000	0.6000
T4	32	EW63	75.00 - 100.00	0.6000	0.6000
T4	33	LDF5-50A (7/8 FOAM)	75.00 - 85.00	0.6000	0.6000
T4	34	1/2	75.00 - 83.00	0.6000	0.6000
T4	35	1/2	75.00 - 83.00	0.6000	0.6000
T4	37	2 DC in Existing Conduit	75.00 - 100.00	1.0000	0.6000
T5	1	AVA50-FX	66.67 - 75.00	0.6000	0.6000
T5	2	1 5/8" Hybriflex	66.67 - 75.00	0.6000	0.6000
T5	3	1 5/8	66.67 - 75.00	0.6000	0.6000
T5	4	1 1/4	66.67 - 75.00	0.6000	0.6000
T5	5	3" Flex Conduit w 2 Fiber & 4 DC	66.67 - 75.00	1.0000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	6	HB158-1-08U8-S8J18	66.67 - 75.00	0.6000	0.6000
T5	8	1 1/4" Hybriflex Cables	66.67 - 75.00	0.6000	0.6000
T5	13	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	14	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	15	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	16	LDF4-50A (1/2 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	17	1/2	66.67 - 75.00	0.6000	0.6000
T5	18	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	19	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	20	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	21	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	22	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	23	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	24	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	25	LDF4-50A (1/2 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	26	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	27	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	28	LDF7-50A (1-5/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	29	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	30	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	31	EW63	66.67 - 75.00	0.6000	0.6000
T5	32	EW63	66.67 - 75.00	0.6000	0.6000
T5	33	LDF5-50A (7/8 FOAM)	66.67 - 75.00	0.6000	0.6000
T5	34	1/2	66.67 - 75.00	0.6000	0.6000
T5	35	1/2	66.67 - 75.00	0.6000	0.6000
T5	37	2 DC in Existing Conduit	66.67 - 75.00	1.0000	0.6000
T6	1	AVA50-FX	58.33 - 66.67	0.6000	0.6000
T6	2	1 5/8" Hybriflex	58.33 - 66.67	0.6000	0.6000
T6	3	1 5/8	58.33 - 66.67	0.6000	0.6000
T6	4	1 1/4	58.33 - 66.67	0.6000	0.6000
T6	5	3" Flex Conduit w 2 Fiber & 4 DC	58.33 - 66.67	1.0000	0.6000
T6	6	HB158-1-08U8-S8J18	58.33 - 66.67	0.6000	0.6000
T6	8	1 1/4" Hybriflex Cables	58.33 - 66.67	0.6000	0.6000
T6	13	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	14	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	15	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	16	LDF4-50A (1/2 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	17	1/2	58.33 - 66.67	0.6000	0.6000
T6	18	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	19	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	20	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	21	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	22	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	23	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	24	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	25	LDF4-50A (1/2 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	26	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	27	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	28	LDF7-50A (1-5/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	29	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	30	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	31	EW63	58.33 - 66.67	0.6000	0.6000
T6	32	EW63	58.33 - 66.67	0.6000	0.6000
T6	33	LDF5-50A (7/8 FOAM)	58.33 - 66.67	0.6000	0.6000
T6	34	1/2	58.33 - 66.67	0.6000	0.6000
T6	35	1/2	58.33 - 66.67	0.6000	0.6000
T6	37	2 DC in Existing Conduit	58.33 - 66.67	1.0000	0.6000
T7	1	AVA50-FX	50.00 - 58.33	0.6000	0.6000
T7	2	1 5/8" Hybriflex	50.00 - 58.33	0.6000	0.6000
T7	3	1 5/8	50.00 - 58.33	0.6000	0.6000
T7	4	1 1/4	50.00 - 58.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	5	3" Flex Conduit w 2 Fiber & 4 DC	50.00 - 58.33	1.0000	0.6000
T7	6	HB158-1-08U8-S8J18	50.00 - 58.33	0.6000	0.6000
T7	8	1 1/4" Hybriflex Cables	50.00 - 58.33	0.6000	0.6000
T7	13	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	14	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	15	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	16	LDF4-50A (1/2 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	17	1/2	50.00 - 58.33	0.6000	0.6000
T7	18	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	19	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	20	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	21	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	22	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	23	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	24	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	25	LDF4-50A (1/2 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	26	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	27	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	28	LDF7-50A (1-5/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	29	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	30	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	31	EW63	50.00 - 58.33	0.6000	0.6000
T7	32	EW63	50.00 - 58.33	0.6000	0.6000
T7	33	LDF5-50A (7/8 FOAM)	50.00 - 58.33	0.6000	0.6000
T7	34	1/2	50.00 - 58.33	0.6000	0.6000
T7	35	1/2	50.00 - 58.33	0.6000	0.6000
T7	37	2 DC in Existing Conduit	50.00 - 58.33	1.0000	0.6000
T8	1	AVA50-FX	37.50 - 50.00	0.6000	0.6000
T8	2	1 5/8" Hybriflex	37.50 - 50.00	0.6000	0.6000
T8	3	1 5/8	37.50 - 50.00	0.6000	0.6000
T8	4	1 1/4	37.50 - 50.00	0.6000	0.6000
T8	5	3" Flex Conduit w 2 Fiber & 4 DC	37.50 - 50.00	1.0000	0.6000
T8	6	HB158-1-08U8-S8J18	37.50 - 50.00	0.6000	0.6000
T8	8	1 1/4" Hybriflex Cables	37.50 - 50.00	0.6000	0.6000
T8	13	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	14	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	15	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	16	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	17	1/2	37.50 - 50.00	0.6000	0.6000
T8	18	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	19	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	20	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	21	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	22	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	23	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	24	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	25	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	26	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	27	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	28	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	29	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	30	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	31	EW63	37.50 - 50.00	0.6000	0.6000
T8	32	EW63	37.50 - 50.00	0.6000	0.6000
T8	33	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T8	34	1/2	37.50 - 50.00	0.6000	0.6000
T8	35	1/2	37.50 - 50.00	0.6000	0.6000
T8	37	2 DC in Existing Conduit	37.50 - 50.00	1.0000	0.6000
T9	1	AVA50-FX	25.00 - 37.50	0.6000	0.6000
T9	2	1 5/8" Hybriflex	25.00 - 37.50	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	3	1 5/8	25.00 - 37.50	0.6000	0.6000
T9	4	1 1/4	25.00 - 37.50	0.6000	0.6000
T9	5	3" Flex Conduit w 2 Fiber & 4 DC	25.00 - 37.50	1.0000	0.6000
T9	6	HB158-1-08U8-S8J18	25.00 - 37.50	0.6000	0.6000
T9	8	1 1/4" Hybriflex Cables	25.00 - 37.50	0.6000	0.6000
T9	13	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	14	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	15	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	16	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	17	1/2	25.00 - 37.50	0.6000	0.6000
T9	18	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	19	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	20	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	21	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	22	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	23	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	24	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	25	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	26	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	27	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	28	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	29	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	30	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	31	EW63	25.00 - 37.50	0.6000	0.6000
T9	32	EW63	25.00 - 37.50	0.6000	0.6000
T9	33	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T9	34	1/2	25.00 - 37.50	0.6000	0.6000
T9	35	1/2	25.00 - 37.50	0.6000	0.6000
T9	37	2 DC in Existing Conduit	25.00 - 37.50	1.0000	0.6000
T10	1	AVA50-FX	0.00 - 25.00	0.6000	0.6000
T10	2	1 5/8" Hybriflex	0.00 - 25.00	0.6000	0.6000
T10	3	1 5/8	0.00 - 25.00	0.6000	0.6000
T10	4	1 1/4	0.00 - 25.00	0.6000	0.6000
T10	5	3" Flex Conduit w 2 Fiber & 4 DC	0.00 - 25.00	1.0000	0.6000
T10	6	HB158-1-08U8-S8J18	0.00 - 25.00	0.6000	0.6000
T10	8	1 1/4" Hybriflex Cables	0.00 - 25.00	0.6000	0.6000
T10	13	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	14	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	15	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	16	LDF4-50A (1/2 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	17	1/2	0.00 - 25.00	0.6000	0.6000
T10	18	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	19	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	20	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	21	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	22	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	23	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	24	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	25	LDF4-50A (1/2 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	26	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	27	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	28	LDF7-50A (1-5/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	29	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	30	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	31	EW63	0.00 - 25.00	0.6000	0.6000
T10	32	EW63	0.00 - 25.00	0.6000	0.6000
T10	33	LDF5-50A (7/8 FOAM)	0.00 - 25.00	0.6000	0.6000
T10	34	1/2	0.00 - 25.00	0.6000	0.6000
T10	35	1/2	0.00 - 25.00	0.6000	0.6000
T10	36	LDF4P-50A (1/2 FOAM)	0.00 - 21.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	37	2 DC in Existing Conduit	0.00 - 25.00	1.0000	0.6000

Discrete Tower Loads

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
*									
*** Existing Carrier VZW									
5' T-arm	A	None		0.0000	77.50	No Ice	4.50	2.50	0.25
(VZW)						1/2" Ice	5.50	3.20	0.32
						1" Ice	6.50	3.90	0.38
5' T-arm	B	None		0.0000	77.50	No Ice	4.50	2.50	0.25
(VZW)						1/2" Ice	5.50	3.20	0.32
						1" Ice	6.50	3.90	0.38
DC6-48-60-18-8F	A	None		0.0000	77.50	No Ice	1.27	1.27	0.02
(VZW)						1/2" Ice	1.46	1.46	0.04
						1" Ice	1.66	1.66	0.05
*									
*** Existing Carrier Sprint									
APXVSPP18-C-A20	A	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	0.09
(Sprint)			0.00			1/2" Ice	8.81	7.66	0.15
			0.00			1" Ice	9.36	8.49	0.22
APXVSPP18-C-A20	B	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	0.09
(Sprint)			0.00			1/2" Ice	8.81	7.66	0.15
			0.00			1" Ice	9.36	8.49	0.22
APXVSPP18-C-A20	C	From Leg	0.50	0.0000	97.00	No Ice	8.26	6.71	0.09
(Sprint)			0.00			1/2" Ice	8.81	7.66	0.15
			0.00			1" Ice	9.36	8.49	0.22
DT465B-2XR-V2 Panels	A	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	0.06
(Commscope)			0.00			1/2" Ice	10.21	6.43	0.12
(Sprint)			0.00			1" Ice	10.77	6.90	0.18
DT465B-2XR-V2 Panels	B	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	0.06
(Commscope)			0.00			1/2" Ice	10.21	6.43	0.12
(Sprint)			0.00			1" Ice	10.77	6.90	0.18
DT465B-2XR-V2 Panels	C	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	0.06
(Commscope)			0.00			1/2" Ice	10.21	6.43	0.12
(Sprint)			0.00			1" Ice	10.77	6.90	0.18
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00			1" Ice	2.94	3.02	0.13
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00			1" Ice	2.94	3.02	0.13
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			-5.00			1/2" Ice	2.71	2.66	0.10
			0.00			1" Ice	2.94	3.02	0.13
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00			1" Ice	2.94	3.02	0.13
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00			1" Ice	2.94	3.02	0.13
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			-5.00			1/2" Ice	2.71	2.66	0.10
			0.00			1" Ice	2.94	3.02	0.13
TD-RRH8x20	A	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	0.07
(Sprint)			0.00			1/2" Ice	5.01	1.92	0.09
			0.00			1" Ice	5.32	2.14	0.12
TD-RRH8x20	B	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	0.07
(Sprint)			0.00			1/2" Ice	5.01	1.92	0.09
			0.00			1" Ice	5.32	2.14	0.12
TD-RRH8x20	C	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	0.07
(Sprint)			-5.00			1/2" Ice	5.01	1.92	0.09
			0.00			1" Ice	5.32	2.14	0.12
RRH 1900 MHz 2x40W	A	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	0.10
(Sprint)			0.00			1/2" Ice	2.71	3.69	0.13
			0.00			1" Ice	2.94	4.08	0.16
RRH 1900 MHz 2x40W	B	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	0.10
(Sprint)			0.00			1/2" Ice	2.71	3.69	0.13
			0.00			1" Ice	2.94	4.08	0.16
RRH 1900 MHz 2x40W	C	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	0.10
(Sprint)			-5.00			1/2" Ice	2.71	3.69	0.13
			0.00			1" Ice	2.94	4.08	0.16
PM-SU35-48 - Pipe Mount	A	From Leg	1.50	0.0000	97.00	No Ice	5.60	5.60	0.11
48"			0.00			1/2" Ice	5.99	5.99	0.16
(Sprint)			0.00			1" Ice	6.40	6.40	0.21
PM-SU35-48 - Pipe Mount	B	From Leg	1.50	0.0000	97.00	No Ice	5.60	5.60	0.11
48"			0.00			1/2" Ice	5.99	5.99	0.16
(Sprint)			0.00			1" Ice	6.40	6.40	0.21
PM-SU35-48 - Pipe Mount	C	From Leg	1.50	0.0000	97.00	No Ice	5.60	5.60	0.11
48"			0.00			1/2" Ice	5.99	5.99	0.16
(Sprint)			0.00			1" Ice	6.40	6.40	0.21
*									
DSM2 w/ additional SFS-H	A	From Leg	0.50	0.0000	125.00	No Ice	6.65	2.32	0.16
Stabilizer			0.00			1/2" Ice	8.00	2.86	0.22
(T-Mobile)			0.00			1" Ice	9.41	3.42	0.30
DSM2 w/ additional SFS-H	B	From Leg	0.50	0.0000	125.00	No Ice	6.65	2.32	0.16
Stabilizer			0.00			1/2" Ice	8.00	2.86	0.22
(T-Mobile)			0.00			1" Ice	9.41	3.42	0.30
DSM2 w/ additional SFS-H	C	From Leg	0.50	0.0000	125.00	No Ice	6.65	2.32	0.16
Stabilizer			0.00			1/2" Ice	8.00	2.86	0.22
(T-Mobile)			0.00			1" Ice	9.41	3.42	0.30
EMS RR90-17-xx	A	From Leg	3.00	0.0000	125.00	No Ice	4.36	4.36	0.02
(T-Mobile)			1.50			1/2" Ice	4.99	4.99	0.04
			0.00			1" Ice	5.62	5.62	0.06
EMS RR90-17-xx	B	From Leg	3.00	0.0000	125.00	No Ice	4.36	4.36	0.02
(T-Mobile)			1.50			1/2" Ice	4.99	4.99	0.04
			0.00			1" Ice	5.62	5.62	0.06
EMS RR90-17-xx	C	From Leg	3.00	0.0000	125.00	No Ice	4.36	4.36	0.02
(T-Mobile)			1.50			1/2" Ice	4.99	4.99	0.04
			0.00			1" Ice	5.62	5.62	0.06
LNX-6515DS-A1M Andrew	A	From Leg	3.00	0.0000	125.00	No Ice	11.58	9.74	0.08
Panel			-1.50			1/2" Ice	12.25	11.21	0.16
(T-Mobile)			0.00			1" Ice	12.92	12.62	0.26
LNX-6515DS-A1M Andrew	B	From Leg	3.00	0.0000	125.00	No Ice	11.58	9.74	0.08
Panel			-1.50			1/2" Ice	12.25	11.21	0.16
(T-Mobile)			0.00			1" Ice	12.92	12.62	0.26

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
LNX-6515DS-A1M Andrew	C	From Leg	3.00	0.0000	125.00	No Ice	11.58	9.74	0.08
Panel			-1.50			1/2" Ice	12.25	11.21	0.16
(T-Mobile)			0.00			1" Ice	12.92	12.62	0.26
Ericsson Radio 4415 B25	A	From Leg	3.00	0.0000	125.00	No Ice	1.86	0.83	0.05
RRH Unit			1.50			1/2" Ice	2.03	0.96	0.06
(T-Mobile)			0.00			1" Ice	2.20	1.09	0.08
Ericsson Radio 4415 B25	B	From Leg	3.00	0.0000	125.00	No Ice	1.86	0.83	0.05
RRH Unit			1.50			1/2" Ice	2.03	0.96	0.06
(T-Mobile)			0.00			1" Ice	2.20	1.09	0.08
Ericsson Radio 4415 B25	C	From Leg	3.00	0.0000	125.00	No Ice	1.86	0.83	0.05
RRH Unit			1.50			1/2" Ice	2.03	0.96	0.06
(T-Mobile)			0.00			1" Ice	2.20	1.09	0.08
*									
*ATT Inventory on Bottom									
(Proposed)									
*									
Sinclair SY450-SF1SNM	C	From Face	0.00	0.0000	21.00	No Ice	1.59	0.21	0.00
Yagi			0.00			1/2" Ice	1.77	0.28	0.01
(3-1.21)			0.00			1" Ice	1.95	0.35	0.02
L-810 Tower Side-Light	A	From Leg	1.50	0.0000	83.00	No Ice	0.22	0.22	0.01
Beacon			1.50			1/2" Ice	0.40	0.40	0.01
(1.83)			0.00			1" Ice	0.50	0.50	0.02
L-810 Tower Side-Light	C	From Leg	1.50	0.0000	83.00	No Ice	0.22	0.22	0.01
Beacon			-1.50			1/2" Ice	0.40	0.40	0.01
(3.83)			0.00			1" Ice	0.50	0.50	0.02
PD10054	A	From Leg	1.00	0.0000	85.00	No Ice	5.62	5.62	0.02
(2'x2' Square - 1.85)			0.00			1/2" Ice	5.90	5.90	0.02
			0.00			1" Ice	6.18	6.18	0.02
10'6"x4" Pipe Mount	A	From Leg	0.25	0.0000	85.00	No Ice	2.84	2.84	0.11
(Mt for 1.85)			0.00			1/2" Ice	5.62	5.62	0.15
			0.00			1" Ice	6.25	6.25	0.19
432E-83I-01T TTA Unit	C	From Leg	0.00	-45.0000	155.00	No Ice	2.85	0.97	0.03
(3.155 - TTA Unit)			0.00			1/2" Ice	3.06	1.11	0.04
			0.00			1" Ice	3.28	1.26	0.07
DB228-A	B	From Leg	1.00	0.0000	155.00	No Ice	7.30	7.30	0.07
(2.155)			0.00			1/2" Ice	13.14	13.14	0.09
			0.00			1" Ice	18.98	18.98	0.12
10' PCS Frame (1)	C	From Leg	0.00	0.0000	155.00	No Ice	9.00	9.00	0.25
(Mt for 2.155.1, 2.155.2 &			0.00			1/2" Ice	13.20	13.20	0.35
2.1557)			0.00			1" Ice	17.40	17.40	0.45
DB304-A	B	From Leg	2.50	0.0000	158.00	No Ice	4.85	4.85	0.04
(2.158)			0.00			1/2" Ice	8.73	8.73	0.06
			0.00			1" Ice	12.61	12.61	0.07
Flash Beacon Lighting	A	From Leg	0.00	0.0000	160.00	No Ice	2.70	2.70	0.05
(1.158)			0.00			1/2" Ice	3.10	3.10	0.07
			0.00			1" Ice	3.50	3.50	0.09
432E-83I-01T TTA Unit	C	From Face	0.00	0.0000	159.00	No Ice	2.85	0.97	0.03
(2-3.159 - TTA)			0.00			1/2" Ice	3.06	1.11	0.04
			0.00			1" Ice	3.28	1.26	0.07
* Ice Shields for Dishes									
4"x96"x72" Ice Canopy	A	From Leg	3.00	0.0000	115.00	No Ice	3.73	2.80	0.30
(DNK-5)			0.00			1/2" Ice	4.39	3.30	0.55
			0.00			1" Ice	5.05	3.80	0.81
4"x96"x72" Ice Canopy	C	From Leg	3.00	0.0000	115.00	No Ice	3.73	2.80	0.30
(DNK-6)			0.00			1/2" Ice	4.39	3.30	0.55
			0.00			1" Ice	5.05	3.80	0.81
* AT&T Equipment									

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
2020/06/23									
Commscope SFG22 (14' Sector Frame)	A	From Leg	0.50	0.0000	140.00	No Ice	10.50	2.50	0.52
			0.00			1/2" Ice	14.30	3.00	0.67
(AT&T Proposed)			0.00			1" Ice	18.10	3.50	0.82
Commscope SFG22 (14' Sector Frame)	B	From Leg	0.50	0.0000	140.00	No Ice	10.50	2.50	0.52
			0.00			1/2" Ice	14.30	3.00	0.67
(AT&T Proposed)			0.00			1" Ice	18.10	3.50	0.82
Commscope SFG22 (14' Sector Frame)	C	From Leg	0.50	0.0000	140.00	No Ice	10.50	2.50	0.52
			0.00			1/2" Ice	14.30	3.00	0.67
(AT&T Proposed)			0.00			1" Ice	18.10	3.50	0.82
7770.00	A	From Leg	3.00	0.0000	140.00	No Ice	5.90	4.01	0.05
(ATT)			-6.00			1/2" Ice	6.34	4.64	0.10
			0.00			1" Ice	6.78	5.28	0.15
CCI DMP65R-BU8D Panel	A	From Leg	3.00	0.0000	140.00	No Ice	17.87	8.12	0.11
(AT&T Proposed)			-3.00			1/2" Ice	18.50	8.72	0.21
			0.00			1" Ice	19.14	9.32	0.31
CCI OPA65R-BU8D Panel	A	From Leg	3.00	0.0000	140.00	No Ice	18.09	8.20	0.08
(AT&T Proposed)			3.00			1/2" Ice	18.72	8.79	0.18
			0.00			1" Ice	19.36	9.40	0.28
TPA-65R-LCUUUU-H8 Panel w/ RET	A	From Leg	1.50	0.0000	140.00	No Ice	13.08	10.38	0.10
			-6.00			1/2" Ice	13.81	11.79	0.20
(ATT)			0.00			1" Ice	14.54	13.05	0.31
RRUS-32	A	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	0.08
(ATT)			-5.00			1/2" Ice	4.14	2.98	0.11
			0.00			1" Ice	4.41	3.22	0.15
RRUS-12	A	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	0.06
(ATT)			-5.00			1/2" Ice	3.93	1.67	0.08
			0.00			1" Ice	4.19	1.87	0.11
Radio 4449 B5/B12 RRH	A	From Leg	1.50	0.0000	140.00	No Ice	1.66	1.16	0.08
(AT&T Proposed)			-5.00			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
Radio 4478 B14 RRH	A	From Leg	1.50	0.0000	140.00	No Ice	1.08	1.08	0.06
(AT&T Proposed)			-5.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
DC6-48-60-18-8F (Squid)	A	From Leg	0.50	0.0000	146.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(ATT)			0.00			1" Ice	1.66	1.66	0.05
TT19-08BP111-001 TMA's	A	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	0.02
(ATT)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) LGP21401 Diplexer	A	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	0.01
(ATT)			0.00			1/2" Ice	1.24	0.27	0.02
			0.00			1" Ice	1.38	0.35	0.03
7770.00	B	From Leg	3.00	0.0000	140.00	No Ice	5.90	4.01	0.05
(ATT)			-6.00			1/2" Ice	6.34	4.64	0.10
			0.00			1" Ice	6.78	5.28	0.15
CCI DMP65R-BU8D Panel	B	From Leg	3.00	0.0000	140.00	No Ice	17.87	8.12	0.11
(AT&T Proposed)			-3.00			1/2" Ice	18.50	8.72	0.21
			0.00			1" Ice	19.14	9.32	0.31
CCI OPA65R-BU8D Panel	B	From Leg	3.00	0.0000	140.00	No Ice	18.09	8.20	0.08
(AT&T Proposed)			3.00			1/2" Ice	18.72	8.79	0.18
			0.00			1" Ice	19.36	9.40	0.28
TPA-65R-LCUUUU-H8 Panel w/ RET	B	From Leg	1.50	0.0000	140.00	No Ice	13.08	10.38	0.10
			-6.00			1/2" Ice	13.81	11.79	0.20
(ATT)			0.00			1" Ice	14.54	13.05	0.31
RRUS-32	B	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	0.08
(ATT)			-5.00			1/2" Ice	4.14	2.98	0.11

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
			0.00			1" Ice	4.41	3.22	0.15
RRUS-12	B	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	0.06
(ATT)			-5.00			1/2" Ice	3.93	1.67	0.08
			0.00			1" Ice	4.19	1.87	0.11
Radio 4449 B5/B12 RRH	B	From Leg	1.50	0.0000	140.00	No Ice	1.66	1.16	0.08
(AT&T Proposed)			-5.00			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
Radio 4478 B14 RRH	B	From Leg	1.50	0.0000	140.00	No Ice	1.08	1.08	0.06
(AT&T Proposed)			-5.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
DC6-48-60-18-8F (Squid)	B	From Leg	0.50	0.0000	140.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(ATT)			0.00			1" Ice	1.66	1.66	0.05
TT19-08BP111-001 TMA's	B	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	0.02
(ATT)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) LGP21401 Diplexer	B	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	0.01
(ATT)			0.00			1/2" Ice	1.24	0.27	0.02
			0.00			1" Ice	1.38	0.35	0.03
7770.00	C	From Leg	3.00	0.0000	140.00	No Ice	5.90	4.01	0.05
(ATT)			-6.00			1/2" Ice	6.34	4.64	0.10
			0.00			1" Ice	6.78	5.28	0.15
DMP65R-BU6D	C	From Leg	3.00	0.0000	140.00	No Ice	12.71	5.62	0.10
(AT&T Proposed)			-3.00			1/2" Ice	13.21	6.07	0.17
			0.00			1" Ice	13.71	6.53	0.25
OPA65R-BU6D	C	From Leg	3.00	0.0000	140.00	No Ice	12.87	5.67	0.06
(AT&T Proposed)			3.00			1/2" Ice	13.37	6.13	0.14
			0.00			1" Ice	13.87	6.59	0.22
QS66512	C	From Leg	1.50	0.0000	140.00	No Ice	8.13	6.80	0.11
(ATT)			-6.00			1/2" Ice	8.59	7.27	0.16
			0.00			1" Ice	9.05	7.72	0.23
RRUS-32	C	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	0.08
(ATT)			-5.00			1/2" Ice	4.14	2.98	0.11
			0.00			1" Ice	4.41	3.22	0.15
RRUS-12	C	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	0.06
(ATT)			-5.00			1/2" Ice	3.93	1.67	0.08
			0.00			1" Ice	4.19	1.87	0.11
Radio 4449 B5/B12 RRH	C	From Leg	1.50	0.0000	140.00	No Ice	1.66	1.16	0.08
(AT&T Proposed)			-5.00			1/2" Ice	1.82	1.29	0.10
			0.00			1" Ice	1.98	1.44	0.11
Radio 4478 B14 RRH	C	From Leg	1.50	0.0000	140.00	No Ice	1.08	1.08	0.06
(AT&T Proposed)			-5.00			1/2" Ice	1.21	1.21	0.07
			0.00			1" Ice	1.35	1.35	0.09
DC6-48-60-18-8F (Squid)	C	From Leg	0.50	0.0000	140.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(AT&T Proposed)			0.00			1" Ice	1.66	1.66	0.05
TT19-08BP111-001 TMA's	C	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	0.02
(ATT)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) LGP21401 Diplexer	C	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	0.01
(ATT)			0.00			1/2" Ice	1.24	0.27	0.02
			0.00			1" Ice	1.38	0.35	0.03
* Tower L.R.									
Lightning Rod 1/2"x4' on 15'	C	From Leg	0.00	0.0000	160.00	No Ice	4.41	4.41	0.13
Pole			0.00			1/2" Ice	7.40	7.40	0.19
(Tower - LR)			8.00			1" Ice	9.29	9.29	0.26
2" Dia 10' Omni	B	From Leg	6.00	0.0000	124.00	No Ice	2.00	2.00	0.01

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
(2.124)			0.00			1/2" Ice	3.03	3.03	0.03
			1.00			1" Ice	4.06	4.06	0.04
Pirod 6' Side Mount Standoff	B	From Leg	0.00	0.0000	124.00	No Ice	4.97	4.97	0.07
(1)			0.00			1/2" Ice	6.12	6.12	0.13
(Mt for 2.124)			0.00			1" Ice	7.27	7.27	0.19
DS7C09P36D-D	A	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			-2.00			1/2" Ice	7.22	7.22	0.12
			12.00			1" Ice	9.67	9.67	0.17
DS7C09P36D-D	A	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			2.00			1/2" Ice	7.22	7.22	0.12
			12.00			1" Ice	9.67	9.67	0.17
DS7C09P36D-D	C	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			-2.00			1/2" Ice	7.22	7.22	0.12
			12.00			1" Ice	9.67	9.67	0.17
DS7C09P36D-D	C	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			2.00			1/2" Ice	7.22	7.22	0.12
			12.00			1" Ice	9.67	9.67	0.17
Commscope	A	From Leg	1.50	0.0000	160.00	No Ice	13.20	9.20	0.85
SFG23HD-12-4-96 Mount			0.00			1/2" Ice	19.50	14.60	0.95
Assembly			0.00			1" Ice	25.80	19.50	1.09
(CSP)									
Commscope	C	From Leg	1.50	0.0000	160.00	No Ice	13.20	9.20	0.85
SFG23HD-12-4-96 Mount			0.00			1/2" Ice	19.50	14.60	0.95
Assembly			0.00			1" Ice	25.80	19.50	1.09
(CSP)									
JMA MX06FR0660-03	A	From Leg	2.00	0.0000	77.50	No Ice	9.87	7.34	0.10
(VZW)			-4.00			1/2" Ice	10.34	7.78	0.16
			0.00			1" Ice	10.82	8.24	0.24
JMA MX06FR0660-03	A	From Leg	2.00	0.0000	77.50	No Ice	9.87	7.34	0.10
(VZW)			-2.00			1/2" Ice	10.34	7.78	0.16
			0.00			1" Ice	10.82	8.24	0.24
JMA 2" Edge to Edge	A	From Leg	2.00	0.0000	77.50	No Ice	2.30	0.15	0.02
(VZW)			-3.00			1/2" Ice	2.54	0.21	0.04
			0.00			1" Ice	2.79	0.28	0.05
JMA MX06FR0660-03	B	From Leg	2.00	0.0000	77.50	No Ice	9.87	7.34	0.10
(VZW)			-4.00			1/2" Ice	10.34	7.78	0.16
			0.00			1" Ice	10.82	8.24	0.24
JMA MX06FR0660-03	B	From Leg	2.00	0.0000	77.50	No Ice	9.87	7.34	0.10
(VZW)			-2.00			1/2" Ice	10.34	7.78	0.16
			0.00			1" Ice	10.82	8.24	0.24
JMA 2" Edge to Edge	B	From Leg	2.00	0.0000	77.50	No Ice	2.30	0.15	0.02
(VZW)			-3.00			1/2" Ice	2.54	0.21	0.04
			0.00			1" Ice	2.79	0.28	0.05
Samsung MT6407-77A	A	From Leg	2.00	0.0000	77.50	No Ice	4.70	1.84	0.09
(VZW)			3.00			1/2" Ice	4.99	2.07	0.12
			0.00			1" Ice	5.28	2.30	0.15
Samsung MT6407-77A	B	From Leg	2.00	0.0000	77.50	No Ice	4.70	1.84	0.09
(VZW)			3.00			1/2" Ice	4.99	2.07	0.12
			0.00			1" Ice	5.28	2.30	0.15
(3) RRH	A	From Leg	2.00	0.0000	77.50	No Ice	2.13	1.20	0.07
(VZW)			0.00			1/2" Ice	2.31	1.34	0.09
			0.00			1" Ice	2.50	1.49	0.11
(3) RRH	B	From Leg	2.00	0.0000	77.50	No Ice	2.13	1.20	0.07
(VZW)			0.00			1/2" Ice	2.31	1.34	0.09
			0.00			1" Ice	2.50	1.49	0.11

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
HPD2-4.7	A	Paraboloid	From	0.50	Worst		159.00	2.00	No Ice	3.14	0.03
(NWCT (C-A Face))		w/Shroud (HP)	Face	0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.68	0.06
6' w/ Radome	B	Paraboloid	From	1.00	Worst		110.00	6.00	No Ice	28.27	0.23
(2.110)		w/Radome	Leg	0.00					1/2" Ice	29.07	0.34
				0.00					1" Ice	29.86	0.45
6' w/ Radome	C	Paraboloid	From	1.00	Worst		110.00	6.00	No Ice	28.27	0.23
(3.110)		w/Radome	Leg	0.00					1/2" Ice	29.07	0.34
				0.00					1" Ice	29.86	0.45

222-H Verification Constants

Constant	Value
K_d	0.85
Ice Thickness Importance Factor	1.15
Z_g	900
α	9.5
K_{zmin}	0.85
K_c	1
K_t	0.53
f	2
K_e	1

222-H Section Verification ArRr By Element

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft²	A_r w/Ice ft²	A_rR_r ft²	A_rR_r w/Ice ft²
T1	1	P.5x.250	69.625	42.063	C	0.175	0.315	4.171	6.552	1.925	3.956
160.00-150.00											
	1	P.5x.250	69.625	42.063	A	0.175	0.315	4.171	6.552	1.925	3.956
	2	P.5x.250	69.625	42.063	C	0.175	0.315	4.171	6.552	1.925	3.956
	2	P.5x.250	69.625	42.063	B	0.175	0.315	4.171	6.552	1.925	3.956
	3	P.5x.250	69.625	42.063	B	0.175	0.315	4.171	6.552	1.925	3.956
	3	P.5x.250	69.625	42.063	A	0.175	0.315	4.171	6.552	1.925	3.956
					A		Sum:	8.342	13.103	3.849	7.912
					B			8.342	13.103	3.849	7.912
					C			8.342	13.103	3.849	7.912
T2	22	P.5x.250	70.015	42.31	C	0.13	0.236	10.428	16.384	4.599	9.530
150.00-125.00											
	22	P.5x.250	70.015	42.31	A	0.13	0.236	10.428	16.384	4.599	9.530
	23	P.5x.250	70.015	42.31	C	0.13	0.236	10.428	16.384	4.599	9.530
	23	P.5x.250	70.015	42.31	B	0.13	0.236	10.428	16.384	4.599	9.530
	24	P.5x.250	70.015	42.31	B	0.13	0.236	10.428	16.384	4.599	9.530
	24	P.5x.250	70.015	42.31	A	0.13	0.236	10.428	16.384	4.599	9.530

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
					A		Sum:	20.856	32.768	9.198	19.061
					B			20.856	32.768	9.198	19.061
					C			20.856	32.768	9.198	19.061
T3	52	P.5x.250	70.804	42.826	C	0.122	0.221	10.428	16.399	4.534	9.485
125.00-100.00											
	52	P.5x.250	70.804	42.826	A	0.122	0.221	10.428	16.399	4.534	9.485
	53	P.5x.250	70.804	42.826	C	0.122	0.221	10.428	16.399	4.534	9.485
	53	P.5x.250	70.804	42.826	B	0.122	0.221	10.428	16.399	4.534	9.485
	54	P.5x.250	70.804	42.826	B	0.122	0.221	10.428	16.399	4.534	9.485
	54	P.5x.250	70.804	42.826	A	0.122	0.221	10.428	16.399	4.534	9.485
					A		Sum:	20.856	32.798	9.067	18.970
					B			20.856	32.798	9.067	18.970
					C			20.856	32.798	9.067	18.970
T4 100.00-75.00	91	P5x0.3 w/ (3) 1.5x5/8 Plates	104.076	50.622	C	0.14	0.23	15.101	21.095	6.247	12.244
	91	P5x0.3 w/ (3) 1.5x5/8 Plates	104.076	50.622	A	0.14	0.23	15.101	21.095	6.247	12.244
	92	P5x0.3 w/ (3) 1.5x5/8 Plates	104.076	50.622	C	0.14	0.23	15.101	21.095	6.247	12.244
	92	P5x0.3 w/ (3) 1.5x5/8 Plates	104.076	50.622	B	0.14	0.23	15.101	21.095	6.247	12.244
	93	P5x0.3 w/ (3) 1.5x5/8 Plates	104.076	50.622	B	0.14	0.23	15.101	21.095	6.247	12.244
	93	P5x0.3 w/ (3) 1.5x5/8 Plates	104.076	50.622	A	0.14	0.23	15.101	21.095	6.247	12.244
					A		Sum:	30.202	42.190	12.495	24.488
					B			30.202	42.190	12.495	24.488
					C			30.202	42.190	12.495	24.488
T5 75.00-66.67	130	P5x0.4 w/ (3) 1.5x5/8 Plates	105.267	51.227	C	0.134	0.221	5.034	7.036	2.066	4.071
	130	P5x0.4 w/ (3) 1.5x5/8 Plates	105.267	51.227	A	0.134	0.221	5.034	7.036	2.066	4.071
	131	P5x0.4 w/ (3) 1.5x5/8 Plates	105.267	51.227	C	0.134	0.221	5.034	7.036	2.066	4.071
	131	P5x0.4 w/ (3) 1.5x5/8 Plates	105.267	51.227	B	0.134	0.221	5.034	7.036	2.066	4.071
	132	P5x0.4 w/ (3) 1.5x5/8 Plates	105.267	51.227	B	0.134	0.221	5.034	7.036	2.066	4.071
	132	P5x0.4 w/ (3) 1.5x5/8 Plates	105.267	51.227	A	0.134	0.221	5.034	7.036	2.066	4.071
					A		Sum:	10.067	14.073	4.133	8.141
					B			10.067	14.073	4.133	8.141
					C			10.067	14.073	4.133	8.141
T6 66.67-58.33	145	P5x0.4 w/ (3) 1.5x5/8 Plates	105.866	51.526	C	0.131	0.217	5.034	7.038	2.059	4.066
	145	P5x0.4 w/ (3) 1.5x5/8 Plates	105.866	51.526	A	0.131	0.217	5.034	7.038	2.059	4.066
	146	P5x0.4 w/ (3) 1.5x5/8 Plates	105.866	51.526	C	0.131	0.217	5.034	7.038	2.059	4.066
	146	P5x0.4 w/ (3) 1.5x5/8 Plates	105.866	51.526	B	0.131	0.217	5.034	7.038	2.059	4.066
	147	P5x0.4 w/ (3) 1.5x5/8 Plates	105.866	51.526	B	0.131	0.217	5.034	7.038	2.059	4.066
	147	P5x0.4 w/ (3) 1.5x5/8 Plates	105.866	51.526	A	0.131	0.217	5.034	7.038	2.059	4.066
					A		Sum:	10.067	14.076	4.119	8.131
					B			10.067	14.076	4.119	8.131
					C			10.067	14.076	4.119	8.131
T7 58.33-50.00	160	HSS5x.4	73.49	44.562	C	0.132	0.249	3.476	5.480	1.487	3.205
	160	HSS5x.4	73.49	44.562	A	0.132	0.249	3.476	5.480	1.487	3.205

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
	161	HSS5x.4	73.49	44.562	C	0.132	0.249	3.476	5.480	1.487	3.205
	161	HSS5x.4	73.49	44.562	B	0.132	0.249	3.476	5.480	1.487	3.205
	162	HSS5x.4	73.49	44.562	B	0.132	0.249	3.476	5.480	1.487	3.205
	162	HSS5x.4	73.49	44.562	A	0.132	0.249	3.476	5.480	1.487	3.205
					A		Sum:	6.952	10.960	2.974	6.409
					B			6.952	10.960	2.974	6.409
					C			6.952	10.960	2.974	6.409
T8 50.00-37.50	187	HSS6.875x.4	101.566	55.41	C	0.118	0.187	7.169	10.169	2.889	5.820
	187	HSS6.875x.4	101.566	55.41	A	0.118	0.187	7.169	10.169	2.889	5.820
	188	HSS6.875x.4	101.566	55.41	C	0.118	0.187	7.169	10.169	2.889	5.820
	188	HSS6.875x.4	101.566	55.41	B	0.118	0.187	7.169	10.169	2.889	5.820
	189	HSS6.875x.4	101.566	55.41	B	0.118	0.187	7.169	10.169	2.889	5.820
	189	HSS6.875x.4	101.566	55.41	A	0.118	0.187	7.169	10.169	2.889	5.820
					A		Sum:	14.338	20.338	5.779	11.639
					B			14.338	20.338	5.779	11.639
					C			14.338	20.338	5.779	11.639
T9 37.50-25.00	202	HSS6.875x.4	101.68	55.341	C	0.129	0.218	7.169	10.145	2.929	5.862
	202	HSS6.875x.4	101.68	55.341	A	0.129	0.218	7.169	10.145	2.929	5.862
	203	HSS6.875x.4	101.68	55.341	C	0.129	0.218	7.169	10.145	2.929	5.862
	203	HSS6.875x.4	101.68	55.341	B	0.129	0.218	7.169	10.145	2.929	5.862
	204	HSS6.875x.4	101.68	55.341	B	0.129	0.218	7.169	10.145	2.929	5.862
	204	HSS6.875x.4	101.68	55.341	A	0.129	0.218	7.169	10.145	2.929	5.862
					A		Sum:	14.338	20.290	5.858	11.723
					B			14.338	20.290	5.858	11.723
					C			14.338	20.290	5.858	11.723
T10 25.00-0.00	229	HSS6.875x0.5 w/ (3) 2x5/8 Bars	141.875	64.736	C	0.133	0.193	20.293	25.966	8.323	14.885
	229	HSS6.875x0.5 w/ (3) 2x5/8 Bars	141.875	64.736	A	0.133	0.193	20.293	25.966	8.323	14.885
	230	HSS6.875x0.5 w/ (3) 2x5/8 Bars	141.875	64.736	C	0.133	0.193	20.293	25.966	8.323	14.885
	230	HSS6.875x0.5 w/ (3) 2x5/8 Bars	141.875	64.736	B	0.133	0.193	20.293	25.966	8.323	14.885
	231	HSS6.875x0.5 w/ (3) 2x5/8 Bars	141.875	64.736	B	0.133	0.193	20.293	25.966	8.323	14.885
	231	HSS6.875x0.5 w/ (3) 2x5/8 Bars	141.875	64.736	A	0.133	0.193	20.293	25.966	8.323	14.885
					A		Sum:	40.587	51.933	16.645	29.769
					B			40.587	51.933	16.645	29.769
					C			40.587	51.933	16.645	29.769

222-H Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft^2
T1 160.00-150.00	155.00		1.388	5.82	1.19		61	A	0.175	3.849
								B	0.175	3.849
								C	0.175	3.849
T2 150.00-125.00	137.50		1.353	4.771	1.235		61	A	0.13	9.198
								B	0.13	9.198
								C	0.13	9.198

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T3 125.00-100.00	112.50		1.297	3.591	1.317		63	A	0.122	9.067
								B	0.122	9.067
								C	0.122	9.067
T4 100.00-75.00	87.50		1.231	2.703	1.431		65	A	0.14	12.495
								B	0.14	12.495
								C	0.14	12.495
T5 75.00-66.67	70.83		1.177	2.237	1.53		66	A	0.134	4.133
								B	0.134	4.133
								C	0.134	4.133
T6 66.67-58.33	62.50		1.146	2.034	1.589		67	A	0.131	4.119
								B	0.131	4.119
								C	0.131	4.119
T7 58.33-50.00	54.17		1.112	1.851	1.655		68	A	0.132	2.974
								B	0.132	2.974
								C	0.132	2.974
T8 50.00-37.50	43.75		1.063	1.644	1.749		68	A	0.118	5.779
								B	0.118	5.779
								C	0.118	5.779
T9 37.50-25.00	31.25		0.991	1.426	1.881		69	A	0.129	5.858
								B	0.129	5.858
								C	0.129	5.858
T10 25.00-0.00	12.50		0.85	1.153	2.131		67	A	0.133	16.645
								B	0.133	16.645
								C	0.133	16.645

222-H Section Verification Tables - Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 160.00-150.00	155.00	155.00	1.388	5.82	1.19	1.4268	9	A	0.315	14.843
								B	0.315	14.843
								C	0.315	14.843
T2 150.00-125.00	137.50	137.50	1.353	4.771	1.235	1.4279	9	A	0.236	32.056
								B	0.236	32.056
								C	0.236	32.056
T3 125.00-100.00	112.50	112.50	1.297	3.591	1.317	1.4316	9	A	0.221	33.295
								B	0.221	33.295
								C	0.221	33.295
T4 100.00-75.00	87.50	87.50	1.231	2.703	1.431	1.4371	10	A	0.23	40.146
								B	0.23	40.146
								C	0.23	40.146
T5 75.00-66.67	70.83	70.83	1.177	2.237	1.53	1.4405	10	A	0.221	13.677
								B	0.221	13.677
								C	0.221	13.677
T6 66.67-58.33	62.50	62.50	1.146	2.034	1.589	1.4415	10	A	0.217	13.825
								B	0.217	13.825
								C	0.217	13.825
T7 58.33-50.00	54.17	54.17	1.112	1.851	1.655	1.4414	10	A	0.249	15.255
								B	0.249	15.255
								C	0.249	15.255
T8 50.00-37.50	43.75	43.75	1.063	1.644	1.749	1.4384	10	A	0.187	18.435
								B	0.187	18.435
								C	0.187	18.435
T9 37.50-25.00	31.25	31.25	0.991	1.426	1.881	1.4269	10	A	0.218	22.081
								B	0.218	22.081

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	$A_r R_r$ ft²
T10 25.00-0.00	12.50	12.50	0.85	1.153	2.131	1.3600	10	C	0.218	22.081
								A	0.193	43.573
								B	0.193	43.573
								C	0.193	43.573

222-H Section Verification Tables - Service

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	$A_r R_r$ ft²
T1 160.00-150.00	155.00		1.388	5.82	1.19		13	A	0.175	3.849
								B	0.175	3.849
								C	0.175	3.849
T2 150.00-125.00	137.50		1.353	4.771	1.235		13	A	0.13	9.198
								B	0.13	9.198
								C	0.13	9.198
T3 125.00-100.00	112.50		1.297	3.591	1.317		13	A	0.122	9.067
								B	0.122	9.067
								C	0.122	9.067
T4 100.00-75.00	87.50		1.231	2.703	1.431		14	A	0.14	12.495
								B	0.14	12.495
								C	0.14	12.495
T5 75.00-66.67	70.83		1.177	2.237	1.53		14	A	0.134	4.133
								B	0.134	4.133
								C	0.134	4.133
T6 66.67-58.33	62.50		1.146	2.034	1.589		14	A	0.131	4.119
								B	0.131	4.119
								C	0.131	4.119
T7 58.33-50.00	54.17		1.112	1.851	1.655		14	A	0.132	2.974
								B	0.132	2.974
								C	0.132	2.974
T8 50.00-37.50	43.75		1.063	1.644	1.749		15	A	0.118	5.779
								B	0.118	5.779
								C	0.118	5.779
T9 37.50-25.00	31.25		0.991	1.426	1.881		15	A	0.129	5.858
								B	0.129	5.858
								C	0.129	5.858
T10 25.00-0.00	12.50		0.85	1.153	2.131		14	A	0.133	16.645
								B	0.133	16.645
								C	0.133	16.645

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	$C_A A_A$ In Face ft²	$C_A A_A$ Out Face ft²
T1	155.00	1.388	61	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
160.00-150.00					B	10.889	8.342		43.38	17.813	0.000
					C	10.889	8.342		43.38	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T2	137.50	1.353	61	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
150.00-125.00					B	19.557	20.856		51.61	102.696	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3	112.50	1.297	63	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
125.00-100.00					B	23.281	20.856		47.25	127.489	0.000
					C	23.281	20.856		47.25	59.400	0.000
T4	87.50	1.231	65	416.680	A	28.157	30.202	30.202	51.75	0.000	0.000
100.00-75.00					B	28.157	30.202		51.75	137.689	0.000
					C	28.157	30.202		51.75	70.550	0.000
T5 75.00-66.67	70.83	1.177	66	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	9.964	10.067		50.26	48.266	0.000
					C	9.964	10.067		50.26	23.967	0.000
T6 66.67-58.33	62.50	1.146	67	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000
					B	10.257	10.067		49.53	48.241	0.000
					C	10.257	10.067		49.53	23.967	0.000
T7 58.33-50.00	54.17	1.112	68	159.031	A	14.047	6.952	6.952	33.11	0.000	0.000
					B	14.047	6.952		33.11	48.218	0.000
					C	14.047	6.952		33.11	23.967	0.000
T8 50.00-37.50	43.75	1.063	68	250.917	A	15.214	14.338	14.338	48.52	0.000	0.000
					B	15.214	14.338		48.52	72.293	0.000
					C	15.214	14.338		48.52	35.950	0.000
T9 37.50-25.00	31.25	0.991	69	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	19.771	14.338		42.04	72.285	0.000
					C	19.771	14.338		42.04	35.950	0.000
T10 25.00-0.00	12.50	0.85	67	572.674	A	35.412	40.587	40.587	53.40	0.000	0.000
					B	35.412	40.587		53.40	146.083	0.000
					C	35.412	40.587		53.40	71.900	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.388	9	1.4268	112.550	A	10.889	24.583	13.103	36.94	0.000	0.000
160.00-150.00						B	10.889	24.583		36.94	52.068	0.000
						C	10.889	24.583		36.94	0.000	0.000
T2	137.50	1.353	9	1.4279	316.379	A	19.557	55.108	32.768	43.89	0.000	0.000
150.00-125.00						B	19.557	55.108		43.89	292.813	0.000
						C	19.557	55.108		43.89	0.000	0.000
T3	112.50	1.297	9	1.4316	366.395	A	23.281	57.564	32.798	40.57	0.000	0.000
125.00-100.00						B	23.281	57.564		40.57	356.655	0.000
						C	23.281	57.564		40.57	81.776	0.000
T4 100.00-75.00	87.50	1.231	10	1.4371	422.673	A	28.157	69.166	42.190	43.35	0.000	0.000
						B	28.157	69.166		43.35	384.868	0.000
						C	28.157	69.166		43.35	116.201	0.000
T5 75.00-66.67	70.83	1.177	10	1.4405	152.007	A	9.964	23.642	14.073	41.88	0.000	0.000
						B	9.964	23.642		41.88	137.738	0.000
						C	9.964	23.642		41.88	40.140	0.000
T6 66.67-58.33	62.50	1.146	10	1.4415	157.564	A	10.257	23.933	14.076	41.17	0.000	0.000
						B	10.257	23.933		41.17	137.789	0.000
						C	10.257	23.933		41.17	40.145	0.000
T7 58.33-50.00	54.17	1.112	10	1.4414	161.034	A	14.047	26.085	10.960	27.31	0.000	0.000
						B	14.047	26.085		27.31	137.782	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	14.047	26.085		27.31	40.144	0.000
T8 50.00-37.50	43.75	1.063	10	1.4384	253.916	A	15.214	32.213	20.338	42.88	0.000	0.000
						B	15.214	32.213		42.88	206.446	0.000
						C	15.214	32.213		42.88	60.193	0.000
T9 37.50-25.00	31.25	0.991	10	1.4269	266.392	A	19.771	38.215	20.290	34.99	0.000	0.000
						B	19.771	38.215		34.99	205.552	0.000
						C	19.771	38.215		34.99	60.101	0.000
T10 25.00-0.00	12.50	0.85	10	1.3600	578.346	A	35.412	76.013	51.933	46.61	0.000	0.000
						B	35.412	76.013		46.61	407.806	0.000
						C	35.412	76.013		46.61	119.135	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.388	13	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
160.00-150.00					B	10.889	8.342		43.38	17.813	0.000
					C	10.889	8.342		43.38	0.000	0.000
T2	137.50	1.353	13	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
150.00-125.00					B	19.557	20.856		51.61	102.696	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3	112.50	1.297	13	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
125.00-100.00					B	23.281	20.856		47.25	127.489	0.000
					C	23.281	20.856		47.25	59.400	0.000
T4	87.50	1.231	14	416.680	A	28.157	30.202	30.202	51.75	0.000	0.000
100.00-75.00					B	28.157	30.202		51.75	137.689	0.000
					C	28.157	30.202		51.75	70.550	0.000
T5 75.00-66.67	70.83	1.177	14	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	9.964	10.067		50.26	48.266	0.000
					C	9.964	10.067		50.26	23.967	0.000
T6 66.67-58.33	62.50	1.146	14	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000
					B	10.257	10.067		49.53	48.241	0.000
					C	10.257	10.067		49.53	23.967	0.000
T7 58.33-50.00	54.17	1.112	14	159.031	A	14.047	6.952	6.952	33.11	0.000	0.000
					B	14.047	6.952		33.11	48.218	0.000
					C	14.047	6.952		33.11	23.967	0.000
T8 50.00-37.50	43.75	1.063	15	250.917	A	15.214	14.338	14.338	48.52	0.000	0.000
					B	15.214	14.338		48.52	72.293	0.000
					C	15.214	14.338		48.52	35.950	0.000
T9 37.50-25.00	31.25	0.991	15	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	19.771	14.338		42.04	72.285	0.000
					C	19.771	14.338		42.04	35.950	0.000
T10 25.00-0.00	12.50	0.85	14	572.674	A	35.412	40.587	40.587	53.40	0.000	0.000
					B	35.412	40.587		53.40	146.083	0.000
					C	35.412	40.587		53.40	71.900	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	61	1	1	14.738	2.59	259.43	C
160.00-150.00			B	0.175	2.683		1	1	14.738			
			C	0.175	2.683		1	1	14.738			
T2	0.47	2.32	A	0.13	2.846	61	1	1	28.754	7.67	306.63	C
150.00-125.00			B	0.13	2.846		1	1	28.754			
			C	0.13	2.846		1	1	28.754			
T3	0.91	3.86	A	0.122	2.875	63	1	1	32.349	11.25	450.04	C
125.00-100.00			B	0.122	2.875		1	1	32.349			
			C	0.122	2.875		1	1	32.349			
T4	1.04	5.08	A	0.14	2.808	65	1	1	40.652	13.46	538.26	C
100.00-75.00			B	0.14	2.808		1	1	40.652			
			C	0.14	2.808		1	1	40.652			
T5	0.37	2.10	A	0.134	2.833	66	1	1	14.097	4.79	574.64	C
75.00-66.67			B	0.134	2.833		1	1	14.097			
			C	0.134	2.833		1	1	14.097			
T6	0.37	2.14	A	0.131	2.844	67	1	1	14.376	4.90	587.49	C
66.67-58.33			B	0.131	2.844		1	1	14.376			
			C	0.131	2.844		1	1	14.376			
T7	0.37	2.32	A	0.132	2.839	68	1	1	17.021	5.37	644.87	C
58.33-50.00			B	0.132	2.839		1	1	17.021			
			C	0.132	2.839		1	1	17.021			
T8	0.55	3.00	A	0.118	2.894	68	1	1	20.993	7.46	596.79	C
50.00-37.50			B	0.118	2.894		1	1	20.993			
			C	0.118	2.894		1	1	20.993			
T9	0.55	3.42	A	0.129	2.848	69	1	1	25.629	8.19	655.20	C
37.50-25.00			B	0.129	2.848		1	1	25.629			
			C	0.129	2.848		1	1	25.629			
T10	1.10	8.68	A	0.133	2.836	67	1	1	52.057	16.07	642.73	C
25.00-0.00			B	0.133	2.836		1	1	52.057			
			C	0.133	2.836		1	1	52.057			
Sum Weight:	5.79	34.11						OTM	5618.77 kip-ft	81.74		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	61	0.825	1	12.833	2.33	233.02	C
160.00-150.00			B	0.175	2.683		0.825	1	12.833			
			C	0.175	2.683		0.825	1	12.833			
T2	0.47	2.32	A	0.13	2.846	61	0.825	1	25.332	7.16	286.29	C
150.00-125.00			B	0.13	2.846		0.825	1	25.332			
			C	0.13	2.846		0.825	1	25.332			
T3	0.91	3.86	A	0.122	2.875	63	0.825	1	28.274	10.63	425.01	C
125.00-100.00			B	0.122	2.875		0.825	1	28.274			
			C	0.122	2.875		0.825	1	28.274			
T4	1.04	5.08	A	0.14	2.808	65	0.825	1	35.724	12.69	507.80	C
100.00-75.00			B	0.14	2.808		0.825	1	35.724			
			C	0.14	2.808		0.825	1	35.724			
T5	0.37	2.10	A	0.134	2.833	66	0.825	1	12.353	4.51	541.27	C
75.00-66.67			B	0.134	2.833		0.825	1	12.353			
			C	0.134	2.833		0.825	1	12.353			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	0.37	2.14	A	0.131	2.844	67	0.825	1	12.581	4.61	552.61	C
66.67-58.33			B	0.131	2.844		0.825	1	12.581			
			C	0.131	2.844		0.825	1	12.581			
T7	0.37	2.32	A	0.132	2.839	68	0.825	1	14.563	4.97	596.69	C
58.33-50.00			B	0.132	2.839		0.825	1	14.563			
			C	0.132	2.839		0.825	1	14.563			
T8	0.55	3.00	A	0.118	2.894	68	0.825	1	18.331	7.01	560.96	C
50.00-37.50			B	0.118	2.894		0.825	1	18.331			
			C	0.118	2.894		0.825	1	18.331			
T9	0.55	3.42	A	0.129	2.848	69	0.825	1	22.169	7.62	609.27	C
37.50-25.00			B	0.129	2.848		0.825	1	22.169			
			C	0.129	2.848		0.825	1	22.169			
T10	1.10	8.68	A	0.133	2.836	67	0.825	1	45.860	15.07	602.92	C
25.00-0.00			B	0.133	2.836		0.825	1	45.860			
			C	0.133	2.836		0.825	1	45.860			
Sum Weight:	5.79	34.11						OTM	5261.29 kip-ft	76.60		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	61	0.8	1	12.560	2.29	229.25	C
160.00-150.00			B	0.175	2.683		0.8	1	12.560			
			C	0.175	2.683		0.8	1	12.560			
T2	0.47	2.32	A	0.13	2.846	61	0.8	1	24.843	7.08	283.38	C
150.00-125.00			B	0.13	2.846		0.8	1	24.843			
			C	0.13	2.846		0.8	1	24.843			
T3	0.91	3.86	A	0.122	2.875	63	0.8	1	27.692	10.54	421.44	C
125.00-100.00			B	0.122	2.875		0.8	1	27.692			
			C	0.122	2.875		0.8	1	27.692			
T4	1.04	5.08	A	0.14	2.808	65	0.8	1	35.021	12.59	503.45	C
100.00-75.00			B	0.14	2.808		0.8	1	35.021			
			C	0.14	2.808		0.8	1	35.021			
T5	0.37	2.10	A	0.134	2.833	66	0.8	1	12.104	4.47	536.50	C
75.00-66.67			B	0.134	2.833		0.8	1	12.104			
			C	0.134	2.833		0.8	1	12.104			
T6	0.37	2.14	A	0.131	2.844	67	0.8	1	12.324	4.56	547.63	C
66.67-58.33			B	0.131	2.844		0.8	1	12.324			
			C	0.131	2.844		0.8	1	12.324			
T7	0.37	2.32	A	0.132	2.839	68	0.8	1	14.212	4.92	589.81	C
58.33-50.00			B	0.132	2.839		0.8	1	14.212			
			C	0.132	2.839		0.8	1	14.212			
T8	0.55	3.00	A	0.118	2.894	68	0.8	1	17.950	6.95	555.84	C
50.00-37.50			B	0.118	2.894		0.8	1	17.950			
			C	0.118	2.894		0.8	1	17.950			
T9	0.55	3.42	A	0.129	2.848	69	0.8	1	21.675	7.53	602.71	C
37.50-25.00			B	0.129	2.848		0.8	1	21.675			
			C	0.129	2.848		0.8	1	21.675			
T10	1.10	8.68	A	0.133	2.836	67	0.8	1	44.975	14.93	597.23	C
25.00-0.00			B	0.133	2.836		0.8	1	44.975			
			C	0.133	2.836		0.8	1	44.975			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.79	34.11						OTM	5210.22 kip-ft	75.86		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	61	0.85	1	13.105	2.37	236.80	C
160.00-150.00			B	0.175	2.683		0.85	1	13.105			
			C	0.175	2.683		0.85	1	13.105			
T2	0.47	2.32	A	0.13	2.846	61	0.85	1	25.821	7.23	289.19	C
150.00-125.00			B	0.13	2.846		0.85	1	25.821			
			C	0.13	2.846		0.85	1	25.821			
T3	0.91	3.86	A	0.122	2.875	63	0.85	1	28.856	10.71	428.59	C
125.00-100.00			B	0.122	2.875		0.85	1	28.856			
			C	0.122	2.875		0.85	1	28.856			
T4	1.04	5.08	A	0.14	2.808	65	0.85	1	36.428	12.80	512.15	C
100.00-75.00			B	0.14	2.808		0.85	1	36.428			
			C	0.14	2.808		0.85	1	36.428			
T5	0.37	2.10	A	0.134	2.833	66	0.85	1	12.603	4.55	546.03	C
75.00-66.67			B	0.134	2.833		0.85	1	12.603			
			C	0.134	2.833		0.85	1	12.603			
T6	0.37	2.14	A	0.131	2.844	67	0.85	1	12.837	4.65	557.60	C
66.67-58.33			B	0.131	2.844		0.85	1	12.837			
			C	0.131	2.844		0.85	1	12.837			
T7	0.37	2.32	A	0.132	2.839	68	0.85	1	14.914	5.03	603.57	C
58.33-50.00			B	0.132	2.839		0.85	1	14.914			
			C	0.132	2.839		0.85	1	14.914			
T8	0.55	3.00	A	0.118	2.894	68	0.85	1	18.711	7.08	566.08	C
50.00-37.50			B	0.118	2.894		0.85	1	18.711			
			C	0.118	2.894		0.85	1	18.711			
T9	0.55	3.42	A	0.129	2.848	69	0.85	1	22.663	7.70	615.83	C
37.50-25.00			B	0.129	2.848		0.85	1	22.663			
			C	0.129	2.848		0.85	1	22.663			
T10	1.10	8.68	A	0.133	2.836	67	0.85	1	46.745	15.22	608.60	C
25.00-0.00			B	0.133	2.836		0.85	1	46.745			
			C	0.133	2.836		0.85	1	46.745			
Sum Weight:	5.79	34.11						OTM	5312.36 kip-ft	77.33		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.67	3.12	A	0.315	2.256	9	1	1	25.732	0.68	68.23	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
160.00-150.00			B	0.315	2.256		1	1	25.732			
			C	0.315	2.256		1	1	25.732			
T2	3.80	6.17	A	0.236	2.48	9	1	1	51.613	2.35	93.85	C
150.00-125.00			B	0.236	2.48		1	1	51.613			
			C	0.236	2.48		1	1	51.613			
T3	6.69	8.65	A	0.221	2.528	9	1	1	56.577	3.21	128.34	C
125.00-100.00			B	0.221	2.528		1	1	56.577			
			C	0.221	2.528		1	1	56.577			
T4	7.47	11.43	A	0.23	2.498	10	1	1	68.303	3.84	153.45	C
100.00-75.00			B	0.23	2.498		1	1	68.303			
			C	0.23	2.498		1	1	68.303			
T5	2.63	4.31	A	0.221	2.527	10	1	1	23.641	1.39	166.35	C
75.00-66.67			B	0.221	2.527		1	1	23.641			
			C	0.221	2.527		1	1	23.641			
T6	2.64	4.40	A	0.217	2.54	10	1	1	24.082	1.41	169.73	C
66.67-58.33			B	0.217	2.54		1	1	24.082			
			C	0.217	2.54		1	1	24.082			
T7	2.64	4.85	A	0.249	2.44	10	1	1	29.302	1.52	182.06	C
58.33-50.00			B	0.249	2.44		1	1	29.302			
			C	0.249	2.44		1	1	29.302			
T8	3.94	5.94	A	0.187	2.641	10	1	1	33.649	2.14	171.18	C
50.00-37.50			B	0.187	2.641		1	1	33.649			
			C	0.187	2.641		1	1	33.649			
T9	3.91	6.97	A	0.218	2.538	10	1	1	41.851	2.29	183.13	C
37.50-25.00			B	0.218	2.538		1	1	41.851			
			C	0.218	2.538		1	1	41.851			
T10	7.54	15.93	A	0.193	2.621	10	1	1	78.985	4.38	175.28	C
25.00-0.00			B	0.193	2.621		1	1	78.985			
			C	0.193	2.621		1	1	78.985			
Sum Weight:	41.93	71.76						OTM	1613.70 kip-ft	23.20		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.67	3.12	A	0.315	2.256	9	0.825	1	23.826	0.65	64.94	C
160.00-150.00			B	0.315	2.256		0.825	1	23.826			
			C	0.315	2.256		0.825	1	23.826			
T2	3.80	6.17	A	0.236	2.48	9	0.825	1	48.191	2.28	91.23	C
150.00-125.00			B	0.236	2.48		0.825	1	48.191			
			C	0.236	2.48		0.825	1	48.191			
T3	6.69	8.65	A	0.221	2.528	9	0.825	1	52.502	3.13	125.09	C
125.00-100.00			B	0.221	2.528		0.825	1	52.502			
			C	0.221	2.528		0.825	1	52.502			
T4	7.47	11.43	A	0.23	2.498	10	0.825	1	63.376	3.74	149.44	C
100.00-75.00			B	0.23	2.498		0.825	1	63.376			
			C	0.23	2.498		0.825	1	63.376			
T5	2.63	4.31	A	0.221	2.527	10	0.825	1	21.898	1.35	161.95	C
75.00-66.67			B	0.221	2.527		0.825	1	21.898			
			C	0.221	2.527		0.825	1	21.898			
T6	2.64	4.40	A	0.217	2.54	10	0.825	1	22.287	1.38	165.12	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
66.67-58.33			B	0.217	2.54		0.825	1	22.287			
			C	0.217	2.54		0.825	1	22.287			
T7	2.64	4.85	A	0.249	2.44	10	0.825	1	26.844	1.47	175.93	C
58.33-50.00			B	0.249	2.44		0.825	1	26.844			
			C	0.249	2.44		0.825	1	26.844			
T8	3.94	5.94	A	0.187	2.641	10	0.825	1	30.987	2.08	166.35	C
50.00-37.50			B	0.187	2.641		0.825	1	30.987			
			C	0.187	2.641		0.825	1	30.987			
T9	3.91	6.97	A	0.218	2.538	10	0.825	1	38.391	2.21	177.07	C
37.50-25.00			B	0.218	2.538		0.825	1	38.391			
			C	0.218	2.538		0.825	1	38.391			
T10	7.54	15.93	A	0.193	2.621	10	0.825	1	72.788	4.25	169.84	C
25.00-0.00			B	0.193	2.621		0.825	1	72.788			
			C	0.193	2.621		0.825	1	72.788			
Sum Weight:	41.93	71.76						OTM	1567.19 kip-ft	22.52		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.67	3.12	A	0.315	2.256	9	0.8	1	23.554	0.64	64.47	C
160.00-150.00			B	0.315	2.256		0.8	1	23.554			
			C	0.315	2.256		0.8	1	23.554			
T2	3.80	6.17	A	0.236	2.48	9	0.8	1	47.702	2.27	90.85	C
150.00-125.00			B	0.236	2.48		0.8	1	47.702			
			C	0.236	2.48		0.8	1	47.702			
T3	6.69	8.65	A	0.221	2.528	9	0.8	1	51.920	3.12	124.62	C
125.00-100.00			B	0.221	2.528		0.8	1	51.920			
			C	0.221	2.528		0.8	1	51.920			
T4	7.47	11.43	A	0.23	2.498	10	0.8	1	62.672	3.72	148.87	C
100.00-75.00			B	0.23	2.498		0.8	1	62.672			
			C	0.23	2.498		0.8	1	62.672			
T5	2.63	4.31	A	0.221	2.527	10	0.8	1	21.648	1.34	161.32	C
75.00-66.67			B	0.221	2.527		0.8	1	21.648			
			C	0.221	2.527		0.8	1	21.648			
T6	2.64	4.40	A	0.217	2.54	10	0.8	1	22.031	1.37	164.46	C
66.67-58.33			B	0.217	2.54		0.8	1	22.031			
			C	0.217	2.54		0.8	1	22.031			
T7	2.64	4.85	A	0.249	2.44	10	0.8	1	26.493	1.46	175.06	C
58.33-50.00			B	0.249	2.44		0.8	1	26.493			
			C	0.249	2.44		0.8	1	26.493			
T8	3.94	5.94	A	0.187	2.641	10	0.8	1	30.606	2.07	165.66	C
50.00-37.50			B	0.187	2.641		0.8	1	30.606			
			C	0.187	2.641		0.8	1	30.606			
T9	3.91	6.97	A	0.218	2.538	10	0.8	1	37.897	2.20	176.21	C
37.50-25.00			B	0.218	2.538		0.8	1	37.897			
			C	0.218	2.538		0.8	1	37.897			
T10	7.54	15.93	A	0.193	2.621	10	0.8	1	71.903	4.23	169.06	C
25.00-0.00			B	0.193	2.621		0.8	1	71.903			
			C	0.193	2.621		0.8	1	71.903			
Sum Weight:	41.93	71.76						OTM	1560.55	22.43		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
									kip-ft			

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.67	3.12	A	0.315	2.256	9	0.85	1	24.098	0.65	65.41	C
160.00-150.00			B	0.315	2.256		0.85	1	24.098			
			C	0.315	2.256		0.85	1	24.098			
T2	3.80	6.17	A	0.236	2.48	9	0.85	1	48.680	2.29	91.60	C
150.00-125.00			B	0.236	2.48		0.85	1	48.680			
			C	0.236	2.48		0.85	1	48.680			
T3	6.69	8.65	A	0.221	2.528	9	0.85	1	53.084	3.14	125.55	C
125.00-100.00			B	0.221	2.528		0.85	1	53.084			
			C	0.221	2.528		0.85	1	53.084			
T4	7.47	11.43	A	0.23	2.498	10	0.85	1	64.080	3.75	150.01	C
100.00-75.00			B	0.23	2.498		0.85	1	64.080			
			C	0.23	2.498		0.85	1	64.080			
T5	2.63	4.31	A	0.221	2.527	10	0.85	1	22.147	1.35	162.58	C
75.00-66.67			B	0.221	2.527		0.85	1	22.147			
			C	0.221	2.527		0.85	1	22.147			
T6	2.64	4.40	A	0.217	2.54	10	0.85	1	22.543	1.38	165.78	C
66.67-58.33			B	0.217	2.54		0.85	1	22.543			
			C	0.217	2.54		0.85	1	22.543			
T7	2.64	4.85	A	0.249	2.44	10	0.85	1	27.195	1.47	176.81	C
58.33-50.00			B	0.249	2.44		0.85	1	27.195			
			C	0.249	2.44		0.85	1	27.195			
T8	3.94	5.94	A	0.187	2.641	10	0.85	1	31.367	2.09	167.04	C
50.00-37.50			B	0.187	2.641		0.85	1	31.367			
			C	0.187	2.641		0.85	1	31.367			
T9	3.91	6.97	A	0.218	2.538	10	0.85	1	38.886	2.22	177.94	C
37.50-25.00			B	0.218	2.538		0.85	1	38.886			
			C	0.218	2.538		0.85	1	38.886			
T10	7.54	15.93	A	0.193	2.621	10	0.85	1	73.673	4.27	170.61	C
25.00-0.00			B	0.193	2.621		0.85	1	73.673			
			C	0.193	2.621		0.85	1	73.673			
Sum Weight:	41.93	71.76						OTM	1573.84 kip-ft	22.62		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	13	1	1	14.738	0.55	55.26	C
160.00-150.00			B	0.175	2.683		1	1	14.738			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.175	2.683		1	1	14.738			
T2	0.47	2.32	A	0.13	2.846	13	1	1	28.754	1.63	65.32	C
150.00-125.00			B	0.13	2.846		1	1	28.754			
			C	0.13	2.846		1	1	28.754			
T3	0.91	3.86	A	0.122	2.875	13	1	1	32.349	2.40	95.87	C
125.00-100.00			B	0.122	2.875		1	1	32.349			
			C	0.122	2.875		1	1	32.349			
T4	1.04	5.08	A	0.14	2.808	14	1	1	40.652	2.87	114.66	C
100.00-75.00			B	0.14	2.808		1	1	40.652			
			C	0.14	2.808		1	1	40.652			
T5	0.37	2.10	A	0.134	2.833	14	1	1	14.097	1.02	122.41	C
75.00-66.67			B	0.134	2.833		1	1	14.097			
			C	0.134	2.833		1	1	14.097			
T6	0.37	2.14	A	0.131	2.844	14	1	1	14.376	1.04	125.15	C
66.67-58.33			B	0.131	2.844		1	1	14.376			
			C	0.131	2.844		1	1	14.376			
T7	0.37	2.32	A	0.132	2.839	14	1	1	17.021	1.14	137.37	C
58.33-50.00			B	0.132	2.839		1	1	17.021			
			C	0.132	2.839		1	1	17.021			
T8	0.55	3.00	A	0.118	2.894	15	1	1	20.993	1.59	127.13	C
50.00-37.50			B	0.118	2.894		1	1	20.993			
			C	0.118	2.894		1	1	20.993			
T9	0.55	3.42	A	0.129	2.848	15	1	1	25.629	1.74	139.57	C
37.50-25.00			B	0.129	2.848		1	1	25.629			
			C	0.129	2.848		1	1	25.629			
T10	1.10	8.68	A	0.133	2.836	14	1	1	52.057	3.42	136.91	C
25.00-0.00			B	0.133	2.836		1	1	52.057			
			C	0.133	2.836		1	1	52.057			
Sum Weight:	5.79	34.11						OTM	1196.90 kip-ft	17.41		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	13	0.825	1	12.833	0.50	49.64	C
160.00-150.00			B	0.175	2.683		0.825	1	12.833			
			C	0.175	2.683		0.825	1	12.833			
T2	0.47	2.32	A	0.13	2.846	13	0.825	1	25.332	1.52	60.98	C
150.00-125.00			B	0.13	2.846		0.825	1	25.332			
			C	0.13	2.846		0.825	1	25.332			
T3	0.91	3.86	A	0.122	2.875	13	0.825	1	28.274	2.26	90.54	C
125.00-100.00			B	0.122	2.875		0.825	1	28.274			
			C	0.122	2.875		0.825	1	28.274			
T4	1.04	5.08	A	0.14	2.808	14	0.825	1	35.724	2.70	108.17	C
100.00-75.00			B	0.14	2.808		0.825	1	35.724			
			C	0.14	2.808		0.825	1	35.724			
T5	0.37	2.10	A	0.134	2.833	14	0.825	1	12.353	0.96	115.30	C
75.00-66.67			B	0.134	2.833		0.825	1	12.353			
			C	0.134	2.833		0.825	1	12.353			
T6	0.37	2.14	A	0.131	2.844	14	0.825	1	12.581	0.98	117.72	C
66.67-58.33			B	0.131	2.844		0.825	1	12.581			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.131	2.844		0.825	1	12.581			
T7	0.37	2.32	A	0.132	2.839	14	0.825	1	14.563	1.06	127.11	C
58.33-50.00			B	0.132	2.839		0.825	1	14.563			
			C	0.132	2.839		0.825	1	14.563			
T8	0.55	3.00	A	0.118	2.894	15	0.825	1	18.331	1.49	119.49	C
50.00-37.50			B	0.118	2.894		0.825	1	18.331			
			C	0.118	2.894		0.825	1	18.331			
T9	0.55	3.42	A	0.129	2.848	15	0.825	1	22.169	1.62	129.79	C
37.50-25.00			B	0.129	2.848		0.825	1	22.169			
			C	0.129	2.848		0.825	1	22.169			
T10	1.10	8.68	A	0.133	2.836	14	0.825	1	45.860	3.21	128.43	C
25.00-0.00			B	0.133	2.836		0.825	1	45.860			
			C	0.133	2.836		0.825	1	45.860			
Sum Weight:	5.79	34.11						OTM	1120.75 kip-ft	16.32		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	13	0.8	1	12.560	0.49	48.83	C
160.00-150.00			B	0.175	2.683		0.8	1	12.560			
			C	0.175	2.683		0.8	1	12.560			
T2	0.47	2.32	A	0.13	2.846	13	0.8	1	24.843	1.51	60.36	C
150.00-125.00			B	0.13	2.846		0.8	1	24.843			
			C	0.13	2.846		0.8	1	24.843			
T3	0.91	3.86	A	0.122	2.875	13	0.8	1	27.692	2.24	89.77	C
125.00-100.00			B	0.122	2.875		0.8	1	27.692			
			C	0.122	2.875		0.8	1	27.692			
T4	1.04	5.08	A	0.14	2.808	14	0.8	1	35.021	2.68	107.24	C
100.00-75.00			B	0.14	2.808		0.8	1	35.021			
			C	0.14	2.808		0.8	1	35.021			
T5	0.37	2.10	A	0.134	2.833	14	0.8	1	12.104	0.95	114.28	C
75.00-66.67			B	0.134	2.833		0.8	1	12.104			
			C	0.134	2.833		0.8	1	12.104			
T6	0.37	2.14	A	0.131	2.844	14	0.8	1	12.324	0.97	116.66	C
66.67-58.33			B	0.131	2.844		0.8	1	12.324			
			C	0.131	2.844		0.8	1	12.324			
T7	0.37	2.32	A	0.132	2.839	14	0.8	1	14.212	1.05	125.64	C
58.33-50.00			B	0.132	2.839		0.8	1	14.212			
			C	0.132	2.839		0.8	1	14.212			
T8	0.55	3.00	A	0.118	2.894	15	0.8	1	17.950	1.48	118.40	C
50.00-37.50			B	0.118	2.894		0.8	1	17.950			
			C	0.118	2.894		0.8	1	17.950			
T9	0.55	3.42	A	0.129	2.848	15	0.8	1	21.675	1.60	128.39	C
37.50-25.00			B	0.129	2.848		0.8	1	21.675			
			C	0.129	2.848		0.8	1	21.675			
T10	1.10	8.68	A	0.133	2.836	14	0.8	1	44.975	3.18	127.22	C
25.00-0.00			B	0.133	2.836		0.8	1	44.975			
			C	0.133	2.836		0.8	1	44.975			
Sum Weight:	5.79	34.11						OTM	1109.87 kip-ft	16.16		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	13	0.85	1	13.105	0.50	50.44	C
160.00-150.00			B	0.175	2.683		0.85	1	13.105			
			C	0.175	2.683		0.85	1	13.105			
T2	0.47	2.32	A	0.13	2.846	13	0.85	1	25.821	1.54	61.60	C
150.00-125.00			B	0.13	2.846		0.85	1	25.821			
			C	0.13	2.846		0.85	1	25.821			
T3	0.91	3.86	A	0.122	2.875	13	0.85	1	28.856	2.28	91.30	C
125.00-100.00			B	0.122	2.875		0.85	1	28.856			
			C	0.122	2.875		0.85	1	28.856			
T4	1.04	5.08	A	0.14	2.808	14	0.85	1	36.428	2.73	109.10	C
100.00-75.00			B	0.14	2.808		0.85	1	36.428			
			C	0.14	2.808		0.85	1	36.428			
T5	0.37	2.10	A	0.134	2.833	14	0.85	1	12.603	0.97	116.32	C
75.00-66.67			B	0.134	2.833		0.85	1	12.603			
			C	0.134	2.833		0.85	1	12.603			
T6	0.37	2.14	A	0.131	2.844	14	0.85	1	12.837	0.99	118.78	C
66.67-58.33			B	0.131	2.844		0.85	1	12.837			
			C	0.131	2.844		0.85	1	12.837			
T7	0.37	2.32	A	0.132	2.839	14	0.85	1	14.914	1.07	128.57	C
58.33-50.00			B	0.132	2.839		0.85	1	14.914			
			C	0.132	2.839		0.85	1	14.914			
T8	0.55	3.00	A	0.118	2.894	15	0.85	1	18.711	1.51	120.58	C
50.00-37.50			B	0.118	2.894		0.85	1	18.711			
			C	0.118	2.894		0.85	1	18.711			
T9	0.55	3.42	A	0.129	2.848	15	0.85	1	22.663	1.64	131.18	C
37.50-25.00			B	0.129	2.848		0.85	1	22.663			
			C	0.129	2.848		0.85	1	22.663			
T10	1.10	8.68	A	0.133	2.836	14	0.85	1	46.745	3.24	129.64	C
25.00-0.00			B	0.133	2.836		0.85	1	46.745			
			C	0.133	2.836		0.85	1	46.745			
Sum Weight:	5.79	34.11						OTM	1131.63 kip-ft	16.47		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	11.77					
Bracing Weight	22.34					
Total Member Self-Weight	34.11			-5.71	-11.99	
Total Weight	51.56			-5.71	-11.99	
Wind 0 deg - No Ice		-0.29	-110.94	-9168.64	9.26	112.06
Wind 30 deg - No Ice		52.62	-92.11	-7665.05	-4377.13	72.47
Wind 45 deg - No Ice		74.04	-74.60	-6217.08	-6160.12	44.49

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 60 deg - No Ice		90.15	-52.28	-4364.50	-7505.44	13.47
Wind 90 deg - No Ice		105.74	0.29	15.54	-8779.08	-49.14
Wind 120 deg - No Ice		95.54	55.72	4594.15	-7880.50	-98.59
Wind 135 deg - No Ice		76.53	77.09	6380.15	-6334.62	-113.99
Wind 150 deg - No Ice		53.12	92.40	7674.88	-4413.94	-121.62
Wind 180 deg - No Ice		0.29	105.06	8748.67	-33.24	-112.06
Wind 210 deg - No Ice		-52.62	92.11	7653.63	4353.15	-72.47
Wind 225 deg - No Ice		-74.04	74.60	6205.66	6136.14	-44.49
Wind 240 deg - No Ice		-95.24	55.22	4557.35	7835.27	-13.47
Wind 270 deg - No Ice		-105.74	-0.29	-26.96	8755.10	49.14
Wind 300 deg - No Ice		-90.44	-52.78	-4401.30	7502.71	98.59
Wind 315 deg - No Ice		-74.45	-75.01	-6247.13	6166.20	113.99
Wind 330 deg - No Ice		-53.12	-92.40	-7686.30	4389.96	121.62
Member Ice	37.65					
Total Weight Ice	142.05			-76.45	-91.54	
Wind 0 deg - Ice		-0.03	-29.45	-2476.92	-90.24	37.28
Wind 30 deg - Ice		14.33	-24.98	-2120.14	-1262.56	14.11
Wind 45 deg - Ice		20.21	-20.32	-1740.03	-1743.59	0.66
Wind 60 deg - Ice		24.69	-14.31	-1248.98	-2109.60	-12.83
Wind 90 deg - Ice		28.72	0.03	-75.14	-2435.83	-36.34
Wind 120 deg - Ice		25.39	14.75	1124.92	-2156.93	-50.11
Wind 135 deg - Ice		20.54	20.64	1607.77	-1764.22	-52.06
Wind 150 deg - Ice		14.39	25.01	1968.55	-1264.81	-50.46
Wind 180 deg - Ice		0.03	28.67	2270.88	-92.84	-37.28
Wind 210 deg - Ice		-14.33	24.98	1967.25	1079.48	-14.11
Wind 225 deg - Ice		-20.21	20.32	1587.14	1560.51	-0.66
Wind 240 deg - Ice		-25.36	14.69	1122.66	1972.55	12.83
Wind 270 deg - Ice		-28.72	-0.03	-77.75	2252.76	36.34
Wind 300 deg - Ice		-24.72	-14.36	-1251.24	1927.83	50.11
Wind 315 deg - Ice		-20.26	-20.37	-1741.87	1562.35	52.06
Wind 330 deg - Ice		-14.39	-25.01	-2121.45	1081.74	50.46
Total Weight	51.56			-5.71	-11.99	
Wind 0 deg - Service		-0.06	-23.63	-1958.23	8.71	23.87
Wind 30 deg - Service		11.21	-19.62	-1637.94	-925.67	15.44
Wind 45 deg - Service		15.77	-15.89	-1329.50	-1305.48	9.48
Wind 60 deg - Service		19.20	-11.14	-934.87	-1592.05	2.87
Wind 90 deg - Service		22.52	0.06	-1.84	-1863.36	-10.47
Wind 120 deg - Service		20.35	11.87	973.49	-1671.95	-21.00
Wind 135 deg - Service		16.30	16.42	1353.94	-1342.65	-24.28
Wind 150 deg - Service		11.32	19.68	1629.74	-933.51	-25.91
Wind 180 deg - Service		0.06	22.38	1858.47	-0.34	-23.87
Wind 210 deg - Service		-11.21	19.62	1625.21	934.04	-15.44
Wind 225 deg - Service		-15.77	15.89	1316.77	1313.84	-9.48
Wind 240 deg - Service		-20.29	11.76	965.65	1675.79	-2.87
Wind 270 deg - Service		-22.52	-0.06	-10.89	1871.73	10.47
Wind 300 deg - Service		-19.27	-11.24	-942.71	1604.95	21.00
Wind 315 deg - Service		-15.86	-15.98	-1335.90	1320.25	24.28
Wind 330 deg - Service		-11.32	-19.68	-1642.47	941.88	25.91

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

Comb. No.	Description
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 45 deg - No Ice
7	0.9 Dead+1.0 Wind 45 deg - No Ice
8	1.2 Dead+1.0 Wind 60 deg - No Ice
9	0.9 Dead+1.0 Wind 60 deg - No Ice
10	1.2 Dead+1.0 Wind 90 deg - No Ice
11	0.9 Dead+1.0 Wind 90 deg - No Ice
12	1.2 Dead+1.0 Wind 120 deg - No Ice
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice
15	0.9 Dead+1.0 Wind 135 deg - No Ice
16	1.2 Dead+1.0 Wind 150 deg - No Ice
17	0.9 Dead+1.0 Wind 150 deg - No Ice
18	1.2 Dead+1.0 Wind 180 deg - No Ice
19	0.9 Dead+1.0 Wind 180 deg - No Ice
20	1.2 Dead+1.0 Wind 210 deg - No Ice
21	0.9 Dead+1.0 Wind 210 deg - No Ice
22	1.2 Dead+1.0 Wind 225 deg - No Ice
23	0.9 Dead+1.0 Wind 225 deg - No Ice
24	1.2 Dead+1.0 Wind 240 deg - No Ice
25	0.9 Dead+1.0 Wind 240 deg - No Ice
26	1.2 Dead+1.0 Wind 270 deg - No Ice
27	0.9 Dead+1.0 Wind 270 deg - No Ice
28	1.2 Dead+1.0 Wind 300 deg - No Ice
29	0.9 Dead+1.0 Wind 300 deg - No Ice
30	1.2 Dead+1.0 Wind 315 deg - No Ice
31	0.9 Dead+1.0 Wind 315 deg - No Ice
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service

Comb. No.	Description
66	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	160 - 150	Leg	Max Tension	29	2.90	-0.22	-0.04
			Max. Compression	24	-5.27	-0.38	-0.04
			Max. Mx	18	1.38	0.43	0.02
			Max. My	16	-2.20	0.01	0.37
			Max. Vy	18	-1.01	0.00	0.00
			Max. Vx	3	1.30	0.00	0.00
		Diagonal	Max Tension	5	3.07	0.00	0.00
			Max. Compression	4	-3.19	0.00	0.00
			Max. Mx	34	-0.18	0.09	0.00
			Max. My	34	-0.19	0.00	0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Horizontal	Max Tension	6	2.33	0.02	0.00
			Max. Compression	3	-2.33	0.02	0.00
			Max. Mx	48	-0.10	0.06	0.01
			Max. My	35	0.31	0.06	0.01
			Max. Vy	48	-0.05	0.06	0.01
			Max. Vx	40	0.00	0.00	0.00
		Top Girt	Max Tension	19	1.55	0.00	0.00
			Max. Compression	2	-1.63	0.02	0.00
			Max. Mx	48	-0.27	0.05	0.01
			Max. My	38	-0.07	0.05	0.01
			Max. Vy	48	0.05	0.05	0.01
			Max. Vx	38	0.00	0.00	0.00
T2	150 - 125	Leg	Max Tension	29	20.19	-0.99	-0.18
			Max. Compression	2	-28.20	0.13	-0.14
			Max. Mx	28	9.11	2.52	-0.27
			Max. My	10	-2.55	-0.07	-2.61
			Max. Vy	28	-2.64	-1.85	-0.27
			Max. Vx	10	2.72	-0.07	1.86
		Diagonal	Max Tension	17	11.11	0.00	0.00
			Max. Compression	16	-11.23	0.00	0.00
			Max. Mx	34	-0.18	0.15	0.00
			Max. My	34	-0.08	0.00	-0.01
			Max. Vy	34	-0.06	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Horizontal	Max Tension	31	6.92	0.00	0.00
			Max. Compression	14	-7.04	0.02	0.01
			Max. Mx	48	-0.42	0.07	0.02
			Max. My	38	-0.41	0.07	0.02
			Max. Vy	48	0.05	0.07	0.02
			Max. Vx	35	-0.00	0.00	0.00
T3	125 - 100	Leg	Max Tension	19	67.25	-0.70	0.09
			Max. Compression	2	-81.40	0.65	-0.13
			Max. Mx	3	-60.43	0.73	-0.09
			Max. My	8	-30.88	0.33	0.93
			Max. Vy	28	-1.27	-0.09	-0.16
			Max. Vx	20	1.44	-0.00	0.17
		Diagonal	Max Tension	17	16.72	0.00	0.00
			Max. Compression	16	-17.00	0.00	0.00
			Max. Mx	34	-0.31	0.24	0.00
			Max. My	34	-0.23	0.00	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	34	-0.09	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Horizontal	Max Tension	16	11.31	0.05	-0.00
			Max. Compression	15	-11.20	0.05	0.01
			Max. Mx	48	-0.51	0.15	0.00
			Max. My	2	0.61	-0.00	-0.03
			Max. Vy	48	0.08	0.15	0.00
			Max. Vx	2	-0.00	-0.00	-0.03
		Inner Bracing	Max Tension	3	0.01	0.00	0.00
			Max. Compression	18	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.07	0.00
			Max. Vy	34	0.04	0.00	0.00
T4	100 - 75	Leg	Max Tension	19	132.43	-0.86	0.29
			Max. Compression	2	-155.66	1.51	-0.44
			Max. Mx	8	83.03	2.69	-0.03
			Max. My	20	-8.01	-0.05	-2.73
			Max. Vy	8	-1.17	-0.66	0.04
			Max. Vx	12	-1.35	-0.88	1.78
		Diagonal	Max Tension	17	23.22	0.00	0.00
			Max. Compression	16	-23.57	0.00	0.00
			Max. Mx	34	-0.43	0.30	0.00
			Max. My	34	-0.36	0.00	-0.01
			Max. Vy	34	-0.10	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Horizontal	Max Tension	16	16.75	0.10	-0.00
			Max. Compression	17	-16.58	0.07	-0.00
			Max. Mx	38	-0.32	0.21	0.00
			Max. My	2	-0.04	0.04	-0.04
			Max. Vy	38	-0.11	0.21	0.00
			Max. Vx	2	-0.01	0.04	-0.04
		Top Girt	Max Tension	16	13.23	0.04	-0.00
			Max. Compression	15	-13.14	0.04	0.01
			Max. Mx	38	-0.37	0.13	0.01
			Max. My	2	2.14	0.02	-0.03
			Max. Vy	38	0.08	0.13	0.01
			Max. Vx	2	-0.01	0.02	-0.03
		Inner Bracing	Max Tension	15	0.23	0.00	0.00
			Max. Compression	14	-0.23	0.00	0.00
			Max. Mx	34	-0.01	-0.10	0.00
			Max. Vy	34	0.05	0.00	0.00
T5	75 - 66.6667	Leg	Max Tension	19	156.83	-1.54	0.44
			Max. Compression	2	-183.26	0.86	-0.05
			Max. Mx	28	153.00	-1.55	-0.46
			Max. My	12	74.46	-0.88	1.78
			Max. Vy	28	-0.27	-1.55	-0.46
			Max. Vx	2	-0.45	-0.88	-1.77
		Diagonal	Max Tension	17	26.21	0.00	0.00
			Max. Compression	16	-26.62	0.00	0.00
			Max. Mx	34	-0.42	0.35	0.00
			Max. My	34	-0.43	0.00	-0.01
			Max. Vy	34	-0.12	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Horizontal	Max Tension	16	19.24	0.11	-0.00
			Max. Compression	17	-19.08	0.08	-0.00
			Max. Mx	38	-0.45	0.22	0.00
			Max. My	2	3.17	0.05	-0.04
			Max. Vy	38	0.12	0.22	0.00
			Max. Vx	2	-0.01	0.05	-0.04
		Inner Bracing	Max Tension	3	0.01	0.00	0.00
			Max. Compression	18	-0.01	0.00	0.00
			Max. Mx	34	-0.01	-0.10	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	34	0.05	0.00	0.00
T6	66.6667 - 58.3333	Leg	Max Tension	19	183.93	-0.73	0.05
			Max. Compression	2	-213.19	-0.82	-0.21
			Max. Mx	24	-209.80	0.87	0.04
			Max. My	4	-10.79	-0.15	-1.79
			Max. Vy	24	0.39	0.87	0.04
			Max. Vx	2	0.44	0.18	-1.71
		Diagonal	Max Tension	17	26.85	0.00	0.00
			Max. Compression	16	-27.28	0.00	0.00
			Max. Mx	34	-0.51	0.37	0.00
			Max. My	34	-0.46	0.00	-0.01
			Max. Vy	34	0.12	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	16	20.12	0.12	-0.00
			Max. Compression	17	-19.84	0.09	-0.00
			Max. Mx	38	0.43	0.24	0.00
			Max. My	2	2.39	0.06	-0.04
			Max. Vy	38	0.12	0.24	0.00
			Max. Vx	2	0.01	0.06	-0.04
		Inner Bracing	Max Tension	17	0.34	0.00	0.00
			Max. Compression	16	-0.35	0.00	0.00
			Max. Mx	34	-0.01	-0.11	0.00
			Max. Vy	34	0.05	0.00	0.00
T7	58.3333 - 50	Leg	Max Tension	19	210.24	0.54	0.21
			Max. Compression	2	-242.40	0.01	-0.25
			Max. Mx	2	-242.30	2.93	0.16
			Max. My	4	-11.40	-0.15	-1.79
			Max. Vy	2	-0.97	2.93	0.16
			Max. Vx	4	-0.79	-0.15	-1.79
		Diagonal	Max Tension	17	27.79	0.00	0.00
			Max. Compression	16	-28.37	0.00	0.00
			Max. Mx	30	15.29	-0.28	0.01
			Max. My	38	-0.86	-0.01	-0.02
			Max. Vy	37	0.09	-0.12	-0.02
			Max. Vx	40	0.00	0.00	0.00
		Top Girt	Max Tension	16	21.05	0.13	-0.00
			Max. Compression	17	-20.94	0.10	-0.00
			Max. Mx	38	-0.50	0.27	0.00
			Max. My	2	-0.62	0.04	-0.04
			Max. Vy	38	-0.13	0.27	0.00
			Max. Vx	2	0.01	0.04	-0.04
		Redund Horz 1 Bracing	Max Tension	2	4.20	0.00	0.00
			Max. Compression	2	-4.20	0.00	0.00
			Max. Mx	34	0.63	-0.03	0.00
			Max. My	34	0.50	0.00	0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	34	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	2	2.78	0.00	0.00
			Max. Compression	2	-2.78	0.00	0.00
			Max. Mx	34	0.42	-0.04	0.00
			Max. My	34	0.33	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Inner Bracing	Max Tension	33	0.36	0.00	0.00
			Max. Compression	32	-0.37	0.00	0.00
			Max. Mx	34	-0.01	-0.12	0.00
			Max. Vy	34	0.05	0.00	0.00
T8	50 - 37.5	Leg	Max Tension	19	238.58	-0.16	0.26

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-274.00	-0.90	-0.40
			Max. Mx	2	-274.00	-1.37	-0.40
			Max. My	4	-12.78	-0.18	-2.63
			Max. Vy	25	0.35	0.05	0.04
			Max. Vx	2	0.49	0.17	-2.55
		Diagonal	Max Tension	17	35.62	0.00	0.00
			Max. Compression	16	-36.14	0.00	0.00
			Max. Mx	34	-0.43	0.67	0.00
			Max. My	34	-0.49	0.00	-0.02
			Max. Vy	34	-0.17	0.00	0.00
			Max. Vx	34	0.01	0.00	0.00
		Top Girt	Max Tension	16	22.51	0.10	-0.00
			Max. Compression	17	-22.17	0.08	-0.00
			Max. Mx	38	0.44	0.30	0.01
			Max. My	2	3.16	-0.04	-0.07
			Max. Vy	38	0.13	0.30	0.01
			Max. Vx	2	-0.01	-0.04	-0.07
		Inner Bracing	Max Tension	17	0.38	0.00	0.00
			Max. Compression	16	-0.39	0.00	0.00
			Max. Mx	34	-0.01	-0.14	0.00
			Max. Vy	34	0.06	0.00	0.00
T9	37.5 - 25	Leg	Max Tension	19	277.89	0.60	0.41
			Max. Compression	2	-317.84	-3.10	-0.47
			Max. Mx	2	-317.63	7.51	0.32
			Max. My	4	-14.20	-0.34	-3.34
			Max. Vy	2	1.84	7.51	0.32
			Max. Vx	4	1.04	-0.34	-3.34
		Diagonal	Max Tension	17	37.73	-0.31	0.01
			Max. Compression	32	-38.46	0.00	0.00
			Max. Mx	30	20.85	-0.47	0.02
			Max. My	35	-1.40	-0.18	0.03
			Max. Vy	37	-0.11	-0.21	-0.03
			Max. Vx	48	0.01	0.00	0.00
		Top Girt	Max Tension	16	24.06	0.14	-0.00
			Max. Compression	17	-23.97	0.11	-0.00
			Max. Mx	38	-0.59	0.37	0.01
			Max. My	2	-0.82	-0.04	-0.08
			Max. Vy	38	-0.15	0.37	0.01
			Max. Vx	2	-0.01	-0.04	-0.08
		Redund Horz 1 Bracing	Max Tension	2	5.51	0.00	0.00
			Max. Compression	2	-5.51	0.00	0.00
			Max. Mx	34	0.75	-0.04	0.00
			Max. My	34	0.59	0.00	0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	2	4.33	0.00	0.00
			Max. Compression	2	-4.33	0.00	0.00
			Max. Mx	34	0.59	-0.06	0.00
			Max. My	34	0.47	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Inner Bracing	Max Tension	17	0.41	0.00	0.00
			Max. Compression	16	-0.42	0.00	0.00
			Max. Mx	34	-0.01	-0.16	0.00
			Max. Vy	34	0.06	0.00	0.00
T10	25 - 0	Leg	Max Tension	19	365.15	-3.57	0.36
			Max. Compression	2	-416.46	0.00	0.00
			Max. Mx	2	-367.92	3.89	-0.35
			Max. My	4	-15.06	-0.34	-3.34

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	2	-0.92	3.89	-0.35
			Max. Vx	2	-0.67	-1.90	-2.36
		Diagonal	Max Tension	33	40.79	0.00	0.00
			Max. Compression	32	-41.53	0.00	0.00
			Max. Mx	34	-0.73	0.88	0.00
			Max. My	34	-0.38	0.00	0.03
			Max. Vy	34	-0.21	0.00	0.00
			Max. Vx	34	-0.01	0.00	0.00
		Horizontal	Max Tension	16	27.97	0.25	-0.01
			Max. Compression	33	-27.58	0.00	0.00
			Max. Mx	38	-0.29	0.50	0.01
			Max. My	2	-1.09	0.07	-0.08
			Max. Vy	38	-0.19	0.50	0.01
			Max. Vx	2	0.01	0.05	-0.08
		Inner Bracing	Max Tension	3	0.01	0.00	0.00
			Max. Compression	18	-0.02	0.00	0.00
			Max. Mx	34	-0.01	-0.18	0.00
			Max. Vy	34	0.06	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	460.27	52.48	-29.93
	Max. H_x	24	460.27	52.48	-29.93
	Max. H_z	7	-394.23	-45.04	28.84
	Min. Vert	9	-405.81	-47.73	27.19
	Min. H_x	9	-405.81	-47.73	27.19
	Min. H_z	22	428.92	47.10	-30.02
Leg B	Max. Vert	12	463.37	-51.30	-32.54
	Max. H_x	29	-406.72	46.54	29.78
	Max. H_z	33	-355.63	36.99	32.88
	Min. Vert	29	-406.72	46.54	29.78
	Min. H_x	12	463.37	-51.30	-32.54
	Min. H_z	14	441.78	-46.62	-34.49
Leg A	Max. Vert	2	465.70	2.86	60.90
	Max. H_x	26	22.03	14.98	1.53
	Max. H_z	2	465.70	2.86	60.90
	Min. Vert	19	-409.24	-2.84	-55.39
	Min. H_x	11	14.66	-14.97	0.87
	Min. H_z	19	-409.24	-2.84	-55.39

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	51.56	0.00	0.00	-5.71	-11.99	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	61.87	-0.29	-110.94	-8865.29	6.86	112.06
0.9 Dead+1.0 Wind 0 deg - No Ice	46.40	-0.29	-110.94	-8863.57	10.46	112.06

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 30 deg - No Ice	61.87	52.62	-92.11	-7412.17	-4232.87	72.47
0.9 Dead+1.0 Wind 30 deg - No Ice	46.40	52.62	-92.11	-7410.46	-4229.27	72.47
1.2 Dead+1.0 Wind 45 deg - No Ice	61.87	74.04	-74.60	-6012.13	-5956.43	44.49
0.9 Dead+1.0 Wind 45 deg - No Ice	46.40	74.04	-74.60	-6010.41	-5952.83	44.49
1.2 Dead+1.0 Wind 60 deg - No Ice	61.87	90.15	-52.28	-4220.84	-7257.03	13.47
0.9 Dead+1.0 Wind 60 deg - No Ice	46.40	90.15	-52.28	-4219.13	-7253.44	13.47
1.2 Dead+1.0 Wind 90 deg - No Ice	61.87	105.74	0.29	14.40	-8488.16	-49.14
0.9 Dead+1.0 Wind 90 deg - No Ice	46.40	105.74	0.29	16.11	-8484.56	-49.14
1.2 Dead+1.0 Wind 120 deg - No Ice	61.87	95.54	55.72	4440.77	-7619.20	-98.59
0.9 Dead+1.0 Wind 120 deg - No Ice	46.40	95.54	55.72	4442.48	-7615.60	-98.59
1.2 Dead+1.0 Wind 135 deg - No Ice	61.87	76.53	77.09	6167.65	-6125.66	-113.99
0.9 Dead+1.0 Wind 135 deg - No Ice	46.40	76.53	77.09	6169.36	-6122.06	-113.99
1.2 Dead+1.0 Wind 150 deg - No Ice	61.87	53.12	92.40	7419.72	-4269.68	-121.62
0.9 Dead+1.0 Wind 150 deg - No Ice	46.40	53.12	92.40	7421.43	-4266.08	-121.62
1.2 Dead+1.0 Wind 180 deg - No Ice	61.87	0.29	105.06	8457.93	-35.64	-112.06
0.9 Dead+1.0 Wind 180 deg - No Ice	46.40	0.29	105.06	8459.64	-32.04	-112.06
1.2 Dead+1.0 Wind 210 deg - No Ice	61.87	-52.62	92.11	7398.47	4204.09	-72.47
0.9 Dead+1.0 Wind 210 deg - No Ice	46.40	-52.62	92.11	7400.18	4207.69	-72.47
1.2 Dead+1.0 Wind 225 deg - No Ice	61.87	-74.04	74.60	5998.42	5927.65	-44.49
0.9 Dead+1.0 Wind 225 deg - No Ice	46.40	-74.04	74.60	6000.13	5931.25	-44.49
1.2 Dead+1.0 Wind 240 deg - No Ice	61.87	-95.24	55.22	4403.96	7569.17	-13.47
0.9 Dead+1.0 Wind 240 deg - No Ice	46.40	-95.24	55.22	4405.67	7572.77	-13.47
1.2 Dead+1.0 Wind 270 deg - No Ice	61.87	-105.74	-0.29	-28.10	8459.38	49.14
0.9 Dead+1.0 Wind 270 deg - No Ice	46.40	-105.74	-0.29	-26.39	8462.98	49.14
1.2 Dead+1.0 Wind 300 deg - No Ice	61.87	-90.44	-52.78	-4257.65	7249.51	98.59
0.9 Dead+1.0 Wind 300 deg - No Ice	46.40	-90.44	-52.78	-4255.93	7253.10	98.59
1.2 Dead+1.0 Wind 315 deg - No Ice	61.87	-74.45	-75.01	-6042.18	5957.70	113.99
0.9 Dead+1.0 Wind 315 deg - No Ice	46.40	-74.45	-75.01	-6040.46	5961.30	113.99
1.2 Dead+1.0 Wind 330 deg - No Ice	61.87	-53.12	-92.40	-7433.42	4240.90	121.62
0.9 Dead+1.0 Wind 330 deg - No Ice	46.40	-53.12	-92.40	-7431.71	4244.50	121.62
1.2 Dead+1.0 Ice	152.36	0.00	-0.00	-77.59	-93.94	-0.00

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	152.36	-0.03	-29.45	-2382.35	-92.63	37.28
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	152.36	14.33	-24.98	-2039.85	-1217.94	14.11
1.2 Dead+1.0 Wind 45 deg+1.0 Ice	152.36	20.21	-20.32	-1674.88	-1679.69	0.66
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	152.36	24.69	-14.31	-1203.38	-2031.05	-12.83
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	152.36	28.72	0.03	-76.28	-2344.20	-36.34
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	152.36	25.39	14.75	1075.92	-2076.44	-50.11
1.2 Dead+1.0 Wind 135 deg+1.0 Ice	152.36	20.54	20.64	1539.55	-1699.53	-52.06
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	152.36	14.39	25.01	1885.98	-1220.20	-50.46
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	152.36	0.03	28.67	2176.26	-95.24	-37.28
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	152.36	-14.33	24.98	1884.67	1030.07	-14.11
1.2 Dead+1.0 Wind 225 deg+1.0 Ice	152.36	-20.21	20.32	1519.70	1491.82	-0.66
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	152.36	-25.36	14.69	1073.67	1887.26	12.83
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	152.36	-28.72	-0.03	-78.89	2156.32	36.34
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	152.36	-24.72	-14.36	-1205.64	1844.47	50.11
1.2 Dead+1.0 Wind 315 deg+1.0 Ice	152.36	-20.26	-20.37	-1676.72	1493.66	52.06
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	152.36	-14.39	-25.01	-2041.15	1032.32	50.46
Dead+Wind 0 deg - Service	51.56	-0.06	-23.63	-1892.71	-7.46	23.87
Dead+Wind 30 deg - Service	51.56	11.21	-19.62	-1583.18	-910.60	15.44
Dead+Wind 45 deg - Service	51.56	15.77	-15.89	-1284.94	-1277.75	9.48
Dead+Wind 60 deg - Service	51.56	19.20	-11.14	-903.37	-1554.80	2.87
Dead+Wind 90 deg - Service	51.56	22.52	0.06	-1.18	-1817.05	-10.47
Dead+Wind 120 deg - Service	51.56	20.35	11.87	941.71	-1631.95	-21.00
Dead+Wind 135 deg - Service	51.56	16.30	16.42	1309.57	-1313.80	-24.28
Dead+Wind 150 deg - Service	51.56	11.32	19.68	1576.28	-918.44	-25.91
Dead+Wind 180 deg - Service	51.56	0.06	22.38	1797.44	-16.52	-23.87
Dead+Wind 210 deg - Service	51.56	-11.21	19.62	1571.75	886.62	-15.44
Dead+Wind 225 deg - Service	51.56	-15.77	15.89	1273.52	1253.77	-9.48
Dead+Wind 240 deg - Service	51.56	-20.29	11.76	933.87	1603.44	-2.87
Dead+Wind 270 deg - Service	51.56	-22.52	-0.06	-10.24	1793.07	10.47
Dead+Wind 300 deg - Service	51.56	-19.27	-11.24	-911.21	1535.35	21.00
Dead+Wind 315 deg - Service	51.56	-15.86	-15.98	-1291.34	1260.17	24.28
Dead+Wind 330 deg - Service	51.56	-11.32	-19.68	-1587.70	894.46	25.91

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-51.56	0.00	0.00	51.56	0.00	0.000%
2	-0.29	-61.87	-110.94	0.29	61.87	110.94	0.000%
3	-0.29	-46.40	-110.94	0.29	46.40	110.94	0.000%
4	52.62	-61.87	-92.11	-52.62	61.87	92.11	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
5	52.62	-46.40	-92.11	-52.62	46.40	92.11	0.000%
6	74.04	-61.87	-74.60	-74.04	61.87	74.60	0.000%
7	74.04	-46.40	-74.60	-74.04	46.40	74.60	0.000%
8	90.15	-61.87	-52.28	-90.15	61.87	52.28	0.000%
9	90.15	-46.40	-52.28	-90.15	46.40	52.28	0.000%
10	105.74	-61.87	0.29	-105.74	61.87	-0.29	0.000%
11	105.74	-46.40	0.29	-105.74	46.40	-0.29	0.000%
12	95.54	-61.87	55.72	-95.54	61.87	-55.72	0.000%
13	95.54	-46.40	55.72	-95.54	46.40	-55.72	0.000%
14	76.53	-61.87	77.09	-76.53	61.87	-77.09	0.000%
15	76.53	-46.40	77.09	-76.53	46.40	-77.09	0.000%
16	53.12	-61.87	92.40	-53.12	61.87	-92.40	0.000%
17	53.12	-46.40	92.40	-53.12	46.40	-92.40	0.000%
18	0.29	-61.87	105.06	-0.29	61.87	-105.06	0.000%
19	0.29	-46.40	105.06	-0.29	46.40	-105.06	0.000%
20	-52.62	-61.87	92.11	52.62	61.87	-92.11	0.000%
21	-52.62	-46.40	92.11	52.62	46.40	-92.11	0.000%
22	-74.04	-61.87	74.60	74.04	61.87	-74.60	0.000%
23	-74.04	-46.40	74.60	74.04	46.40	-74.60	0.000%
24	-95.24	-61.87	55.22	95.24	61.87	-55.22	0.000%
25	-95.24	-46.40	55.22	95.24	46.40	-55.22	0.000%
26	-105.74	-61.87	-0.29	105.74	61.87	0.29	0.000%
27	-105.74	-46.40	-0.29	105.74	46.40	0.29	0.000%
28	-90.44	-61.87	-52.78	90.44	61.87	52.78	0.000%
29	-90.44	-46.40	-52.78	90.44	46.40	52.78	0.000%
30	-74.45	-61.87	-75.01	74.45	61.87	75.01	0.000%
31	-74.45	-46.40	-75.01	74.45	46.40	75.01	0.000%
32	-53.12	-61.87	-92.40	53.12	61.87	92.40	0.000%
33	-53.12	-46.40	-92.40	53.12	46.40	92.40	0.000%
34	0.00	-152.36	0.00	0.00	152.36	0.00	0.000%
35	-0.03	-152.36	-29.45	0.03	152.36	29.45	0.000%
36	14.33	-152.36	-24.98	-14.33	152.36	24.98	0.000%
37	20.21	-152.36	-20.32	-20.21	152.36	20.32	0.000%
38	24.69	-152.36	-14.31	-24.69	152.36	14.31	0.000%
39	28.72	-152.36	0.03	-28.72	152.36	-0.03	0.000%
40	25.39	-152.36	14.75	-25.39	152.36	-14.75	0.000%
41	20.54	-152.36	20.64	-20.54	152.36	-20.64	0.000%
42	14.39	-152.36	25.01	-14.39	152.36	-25.01	0.000%
43	0.03	-152.36	28.67	-0.03	152.36	-28.67	0.000%
44	-14.33	-152.36	24.98	14.33	152.36	-24.98	0.000%
45	-20.21	-152.36	20.32	20.21	152.36	-20.32	0.000%
46	-25.36	-152.36	14.69	25.36	152.36	-14.69	0.000%
47	-28.72	-152.36	-0.03	28.72	152.36	0.03	0.000%
48	-24.72	-152.36	-14.36	24.72	152.36	14.36	0.000%
49	-20.26	-152.36	-20.37	20.26	152.36	20.37	0.000%
50	-14.39	-152.36	-25.01	14.39	152.36	25.01	0.000%
51	-0.06	-51.56	-23.63	0.06	51.56	23.63	0.000%
52	11.21	-51.56	-19.62	-11.21	51.56	19.62	0.000%
53	15.77	-51.56	-15.89	-15.77	51.56	15.89	0.000%
54	19.20	-51.56	-11.14	-19.20	51.56	11.14	0.000%
55	22.52	-51.56	0.06	-22.52	51.56	-0.06	0.000%
56	20.35	-51.56	11.87	-20.35	51.56	-11.87	0.000%
57	16.30	-51.56	16.42	-16.30	51.56	-16.42	0.000%
58	11.32	-51.56	19.68	-11.32	51.56	-19.68	0.000%
59	0.06	-51.56	22.38	-0.06	51.56	-22.38	0.000%
60	-11.21	-51.56	19.62	11.21	51.56	-19.62	0.000%
61	-15.77	-51.56	15.89	15.77	51.56	-15.89	0.000%
62	-20.29	-51.56	11.76	20.29	51.56	-11.76	0.000%
63	-22.52	-51.56	-0.06	22.52	51.56	0.06	0.000%
64	-19.27	-51.56	-11.24	19.27	51.56	11.24	0.000%
65	-15.86	-51.56	-15.98	15.86	51.56	15.98	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
66	-11.32	-51.56	-19.68	11.32	51.56	19.68	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	2.742	51	0.1263	0.0218
T2	150 - 125	2.476	51	0.1256	0.0223
T3	125 - 100	1.804	51	0.1203	0.0207
T4	100 - 75	1.205	51	0.1006	0.0180
T5	75 - 66.6667	0.690	51	0.0824	0.0142
T6	66.6667 - 58.3333	0.542	51	0.0755	0.0125
T7	58.3333 - 50	0.408	51	0.0678	0.0108
T8	50 - 37.5	0.295	51	0.0549	0.0092
T9	37.5 - 25	0.166	51	0.0400	0.0067
T10	25 - 0	0.078	51	0.0234	0.0041

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Flash Beacon Lighting	51	2.742	0.1263	0.0218	218944
159.00	HPD2-4.7	51	2.716	0.1262	0.0218	218944
158.00	DB304-A	51	2.689	0.1261	0.0219	218944
155.00	432E-83I-01T TTA Unit	51	2.609	0.1259	0.0221	218944
146.00	DC6-48-60-18-8F (Squid) Suppressor	51	2.367	0.1253	0.0222	177391
140.00	Commscope SFG22 (14' Sector Frame)	51	2.204	0.1248	0.0219	447071
125.00	DSM2 w/ additional SFS-H Stabilizer	51	1.804	0.1203	0.0207	75529
124.00	2" Dia 10' Omni	51	1.778	0.1197	0.0206	74287
115.00	4"x96"x72" Ice Canopy	51	1.553	0.1133	0.0197	82516
110.00	6' w/ Radome	51	1.434	0.1091	0.0191	89861
97.00	APXVSPP18-C-A20	51	1.138	0.0982	0.0176	99373
85.00	PD10054	51	0.884	0.0897	0.0159	73562
83.00	L-810 Tower Side-Light Beacon	51	0.844	0.0883	0.0156	70488
77.50	5' T-arm	51	0.737	0.0843	0.0147	63615
21.00	Sinclair SY450-SF1SNM Yagi	51	0.058	0.0187	0.0034	52287

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	12.791	2	0.5844	0.1022

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T2	150 - 125	11.555	2	0.5824	0.1047
T3	125 - 100	8.427	2	0.5598	0.0971
T4	100 - 75	5.634	2	0.4693	0.0843
T5	75 - 66.6667	3.231	2	0.3845	0.0666
T6	66.6667 - 58.3333	2.540	2	0.3527	0.0588
T7	58.3333 - 50	1.909	2	0.3168	0.0509
T8	50 - 37.5	1.384	2	0.2565	0.0432
T9	37.5 - 25	0.777	2	0.1869	0.0314
T10	25 - 0	0.364	2	0.1097	0.0195

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Flash Beacon Lighting	2	12.791	0.5844	0.1022	54414
159.00	HPD2-4.7	2	12.668	0.5842	0.1026	54414
158.00	DB304-A	2	12.545	0.5840	0.1029	54414
155.00	432E-83I-01T TTA Unit	2	12.175	0.5834	0.1039	54414
146.00	DC6-48-60-18-8F (Squid) Suppressor	2	11.052	0.5817	0.1044	47752
140.00	Commscope SFG22 (14' Sector Frame)	2	10.293	0.5796	0.1028	169090
125.00	DSM2 w/ additional SFS-H Stabilizer	2	8.427	0.5598	0.0971	16472
124.00	2" Dia 10' Omni	2	8.307	0.5573	0.0966	16186
115.00	4"x96"x72" Ice Canopy	2	7.261	0.5282	0.0923	17914
110.00	6' w/ Radome	2	6.704	0.5088	0.0897	19468
97.00	APXVSPP18-C-A20	2	5.324	0.4585	0.0826	21406
85.00	PD10054	2	4.137	0.4188	0.0747	15831
83.00	L-810 Tower Side-Light Beacon	2	3.949	0.4123	0.0732	15167
77.50	5' T-arm	2	3.449	0.3936	0.0688	13685
21.00	Sinclair SY450-SF1SNM Yagi	2	0.273	0.0875	0.0160	11167

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	160	Leg	A325X	0.7500	6	0.47	30.10	0.016 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	3.07	17.94	0.171 ✓	1	Member Block Shear
		Horizontal	A325X	0.6250	2	1.17	10.26	0.114 ✓	1	Member Block Shear
		Top Girt	A325N	0.6250	2	0.77	10.26	0.075 ✓	1	Member Block Shear
T2	150	Leg	A325X	0.7500	6	3.36	30.10	0.112 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	11.11	17.94	0.619 ✓	1	Member Block Shear
		Horizontal	A325X	0.6250	2	3.46	7.19	0.481 ✓	1	Member Block

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
T3	125	Leg	A325X	0.7500	6	11.21	30.10	0.372 ✓	1	Shear Bolt Tension
		Diagonal	A325N	0.7500	1	16.72	29.91	0.559 ✓	1	Member Block Shear
		Horizontal	A325X	0.6250	2	5.65	12.83	0.441 ✓	1	Member Block Shear
T4	100	Leg	A325X	0.7500	6	22.07	30.10	0.733 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	23.22	25.23	0.920 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	8.38	17.26	0.485 ✓	1	Bolt Shear
T5	75	Leg	A325X	0.8750	6	26.14	41.56	0.629 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	26.21	35.34	0.741 ✓	1	Member Bearing
		Horizontal	A325X	0.6250	2	9.62	17.26	0.558 ✓	1	Bolt Shear
T6	66.6667	Leg	A325X	0.8750	6	30.66	41.56	0.738 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	26.85	35.34	0.760 ✓	1	Member Bearing
		Top Girt	A325X	0.6250	2	10.06	17.26	0.583 ✓	1	Bolt Shear
T7	58.3333	Leg	A325X	0.8750	6	35.02	41.56	0.843 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	27.79	31.54	0.881 ✓	1	Member Bearing
		Top Girt	A325X	0.6250	2	10.52	17.26	0.610 ✓	1	Bolt Shear
T8	50	Leg	A325X	1.0000	8	29.82	54.52	0.547 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	35.62	48.81	0.730 ✓	1	Member Block Shear
T9	37.5	Leg	A325X	1.0000	8	34.70	54.52	0.636 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	37.73	45.70	0.825 ✓	1	Member Block Shear
		Top Girt	A325X	0.6250	2	12.03	16.28	0.739 ✓	1	Member Block Shear
T10	25	Leg	A325X	1.0000	8	45.64	54.52	0.837 ✓	1	Bolt Tension
		Diagonal	A325N	1.0000	1	40.79	54.84	0.744 ✓	1	Member Block Shear
		Horizontal	A325X	0.6250	2	13.99	17.26	0.811 ✓	1	Bolt Shear

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	160 - 150	P.5x.250	10.01	5.01	35.7 K=1.00	3.7306	-5.27	152.93	0.034 [1] ✓
T2	150 - 125	P.5x.250	25.03	8.34	59.5 K=1.00	3.7306	-28.20	129.56	0.218 [1] ✓
T3	125 - 100	P.5x.250	25.03	8.34	59.5	3.7306	-81.40	129.56	0.628 [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	100 - 75	P5x0.3 w/ (3) 1.5x5/8 Plates	25.03	8.34	51.4 K=1.00	7.2544	-155.66	269.04	0.579 [1]
T5	75 - 66.6667	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2 K=1.00	8.6530	-183.26	316.53	0.579 [1]
T6	66.6667 - 58.3333	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2 K=1.00	8.6530	-213.19	316.53	0.674 [1]
T7	58.3333 - 50	HSS5x.4	8.34	4.17	30.7 K=1.00	5.7805	-242.40	287.44	0.843 [1]
T8	50 - 37.5	HSS6.875x.4	12.51	12.51	65.5 K=1.00	8.1367	-274.00	301.66	0.908 [1]
T9	37.5 - 25	HSS6.875x.4	12.51	6.26	32.7 K=1.00	8.1367	-317.85	399.96	0.795 [1]
T10	25 - 0	HSS6.875x0.5 w/ (3) 2x5/8 Bars	25.03	12.51	58.7 K=1.00	13.1229	-416.46	459.19	0.907 [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	160 - 150	2L2 1/2x2x3/16	7.43	6.88	104.5 K=1.00	1.6200	-3.19	38.28	0.083 [1]
T2	150 - 125	2L2 1/2x2x3/16	10.57	9.96	151.3 K=1.00	1.6200	-11.23	20.25	0.554 [1]
T3	125 - 100	2L2 1/2x2 1/2x5/16	11.21	10.63	167.6 K=1.00	2.9300	-17.00	29.84	0.570 [1]
T4	100 - 75	2L3x2 1/2x1/4	11.91	11.21	142.4 K=1.00	2.6300	-23.57	37.14	0.635 [1]
T5	75 - 66.6667	2L3x2 1/2x5/16	12.15	11.46	146.8 K=1.00	3.2422	-26.62	43.06	0.618 [1]
T6	66.6667 - 58.3333	2L3x2 1/2x5/16	12.39	11.71	150.0 K=1.00	3.2422	-27.28	41.23	0.662 [1]
T7	58.3333 - 50	2L3x3x5/16	12.64	12.09	115.1 K=1.00	3.5500	-28.37	74.52	0.381 [1]
T8	50 - 37.5	2L3 1/2x3x3/8	16.01	15.22	167.5 K=1.00	4.5900	-36.14	46.80	0.772 [1]
T9	37.5 - 25	2L3 1/2x3 1/2x5/16	16.33	15.55	126.9 K=1.00	4.1800	-38.46	74.26	0.518 [1]
T10	25 - 0	2L4x3x3/8	16.99	16.06	163.3 K=1.00	4.9700	-41.53	53.36	0.778 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	L3x3x1/4	10.60	5.09	93.5 K=0.91	1.4400	-2.33	37.58	0.062 [1] ✔
T2	150 - 125	L2 1/2x2 1/2x3/16	12.33	5.96	106.9 K=0.74	0.9020	-7.04	20.79	0.338 [1] ✔
T3	125 - 100	L3x3x5/16	14.33	6.96	106.1 K=0.75	1.7800	-11.20	41.41	0.270 [1] ✔
T4	100 - 75	L3x3x1/2	16.33	7.86	112.5 K=0.70	2.7500	-16.57	59.59	0.278 [1] ✔
T5	75 - 66.6667	L3x3x1/2	17.00	8.20	114.7 K=0.68	2.7500	-19.08	58.01	0.329 [1] ✔
T10	25 - 0	L4x4x1/2	22.00	10.59	112.8 K=0.69	3.7500	-27.58	80.95	0.341 [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	160 - 150	L3x3x1/4	10.20	4.69	107.6 K=1.13	1.4400	-1.63	32.98	0.049 [1] ✔
T4	100 - 75	L3x3x1/4	15.00	7.20	139.8 K=0.96	1.4400	-13.14	21.09	0.623 [1] ✔
T6	66.6667 - 58.3333	L3x3x1/2	17.67	8.33	159.1 K=0.93	2.7500	-19.84	31.10	0.638 [1] ✔
T7	58.3333 - 50	L3x3x1/2	18.33	8.76	165.8 K=0.92	2.7500	-20.94	28.64	0.731 [1] ✔
T8	50 - 37.5	L4x4x1/4	19.00	9.21	134.6 K=0.97	1.9400	-22.17	30.66	0.723 [1] ✔
T9	37.5 - 25	L4x4x5/16	20.00	9.52	138.6 K=0.96	2.4000	-23.97	35.76	0.670 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	4.58	4.38	134.6 K=1.00	1.1500	-4.20	18.16	0.231 [1] ✔
T9	37.5 - 25	L2x2x5/16	5.00	4.71	145.0 K=1.00	1.1500	-5.51	15.65	0.352 [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

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	6.07	5.79	178.0 K=1.00	1.1500	-2.78	10.38	0.268 [1] ✔
T9	37.5 - 25	L2x2x5/16	7.85	7.38	227.0 K=1.00	1.1500	-4.33	6.39	0.678 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T3	125 - 100	L2 1/2x2x3/16	7.17	7.17	201.4 K=1.00	0.8090	-0.01	5.71	0.002 [1] ✔
T4	100 - 75	L2 1/2x2x3/16	7.50	7.50	210.8 K=1.00	0.8090	-0.23	5.21	0.044 [1] ✔
T5	75 - 66.6667	L2 1/2x2x3/16	8.50	8.50	238.9 K=1.00	0.8090	-0.01	4.06	0.003 [1] ✔
T6	66.6667 - 58.3333	L2 1/2x2x3/16	8.83	8.83	248.2 K=1.00	0.8090	-0.35	3.76	0.093 [1] ✔
T7	58.3333 - 50	L2 1/2x2x3/16	9.17	9.17	257.6 K=1.00	0.8090	-0.37	3.49	0.106 [1] ✔
		KL/R > 250 (C) - 185							
T8	50 - 37.5	L2 1/2x2 1/2x3/16	9.50	9.50	230.3 K=1.00	0.9020	-0.39	4.87	0.081 [1] ✔
T9	37.5 - 25	L2 1/2x2 1/2x3/16	10.00	10.00	242.4 K=1.00	0.9020	-0.42	4.39	0.096 [1] ✔
T10	25 - 0	L2 1/2x2 1/2x3/16	11.00	11.00	266.7 K=1.00	0.9020	-0.02	3.63	0.006 [1] ✔
		KL/R > 250 (C) - 242							

[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	160 - 150	P.5x.250	10.01	5.01	35.7	3.7306	2.84	167.88	0.017 [1] ✔
T2	150 - 125	P.5x.250	25.03	8.34	59.5	3.7306	20.19	167.88	0.120 [1] ✔
T3	125 - 100	P.5x.250	25.03	8.34	59.5	3.7306	67.25	167.88	0.401 [1] ✔
T4	100 - 75	P5x0.3 w/ (3) 1.5x5/8 Plates	25.03	8.34	51.4	7.2544	132.43	326.45	0.406 [1] ✔
T5	75 - 66.6667	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2	8.6530	156.83	389.38	0.403 [1] ✔
T6	66.6667 - 58.3333	P5x0.4 w/ (3) 1.5x5/8 Plates	8.34	8.34	53.2	8.6530	183.93	389.38	0.472 [1] ✔
T7	58.3333 - 50	HSS5x.4	8.34	4.17	30.7	5.7805	210.24	312.15	0.674 [1] ✔
T8	50 - 37.5	HSS6.875x.4	12.51	12.51	65.5	8.1367	238.58	439.38	0.543 [1] ✔
T9	37.5 - 25	HSS6.875x.4	12.51	6.26	32.7	8.1367	277.89	439.38	0.632 [1] ✔
T10	25 - 0	HSS6.875x0.5 w/ (3) 2x5/8 Bars	25.03	12.51	58.7	13.1229	365.15	590.53	0.618 [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	160 - 150	2L2 1/2x2x3/16	7.43	6.88	108.6	0.9689	3.07	42.15	0.073 [1] ✔
T2	150 - 125	2L2 1/2x2x3/16	10.57	9.96	155.4	0.9689	11.11	42.15	0.264 [1] ✔
T3	125 - 100	2L2 1/2x2 1/2x5/16	11.21	10.63	171.9	1.7873	16.72	77.75	0.215 [1] ✔
T4	100 - 75	2L3x2 1/2x1/4	11.91	11.21	145.8	1.6444	23.22	71.53	0.325 [1] ✔
T5	75 - 66.6667	2L3x2 1/2x5/16	12.15	11.46	150.3	2.0215	26.21	98.55	0.266 [1] ✔
T6	66.6667 - 58.3333	2L3x2 1/2x5/16	12.39	11.71	153.5	2.0215	26.85	98.55	0.272 [1] ✔
T7	58.3333 - 50	2L3x3x5/16	12.64	12.09	117.7	2.2523	27.79	97.98	0.284 [1] ✔
T8	50 - 37.5	2L3 1/2x3x3/8	16.01	15.22	171.2	2.8097	35.62	122.22	0.291 [1] ✔
T9	37.5 - 25	2L3 1/2x3 1/2x5/16	16.33	15.55	129.6	2.6077	37.73	127.12	0.297 [1] ✔
T10	25 - 0	2L4x3x3/8	16.99	16.06	166.7	3.0947	40.79	150.87	0.270 [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

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	160 - 150	L3x3x1/4	10.60	5.09	98.5	0.9394	2.33	40.86	0.057 [1]
T2	150 - 125	L2 1/2x2 1/2x3/16	12.33	5.96	137.9	0.5710	6.92	24.84	0.279 [1]
T3	125 - 100	L3x3x5/16	14.33	6.96	90.6	1.1592	11.31	50.43	0.224 [1]
T4	100 - 75	L3x3x1/2	16.33	7.86	105.1	1.7813	16.75	77.48	0.216 [1]
T5	75 - 66.6667	L3x3x1/2	17.00	8.20	109.6	1.7813	19.24	77.48	0.248 [1]
T10	25 - 0	L4x4x1/2	22.00	10.59	104.2	2.5313	27.97	110.11	0.254 [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	160 - 150	L3x3x1/4	10.20	4.69	94.7	0.9394	1.55	40.86	0.038 [1]
T4	100 - 75	L3x3x1/4	15.00	7.20	92.9	1.4400	13.23	46.66	0.284 [1]
T6	66.6667 - 58.3333	L3x3x1/2	17.67	8.33	114.0	1.7813	20.12	77.48	0.260 [1]
T7	58.3333 - 50	L3x3x1/2	18.33	8.76	119.7	1.7813	21.05	77.48	0.272 [1]
T8	50 - 37.5	L4x4x1/4	19.00	9.21	88.4	1.9400	22.51	62.86	0.358 [1]
T9	37.5 - 25	L4x4x5/16	20.00	9.52	94.0	1.6242	24.06	79.18	0.304 [1]

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	4.58	4.38	87.4	1.1500	4.20	37.26	0.113 [1] ✔
T9	37.5 - 25	L2x2x5/16	5.00	4.71	94.1	1.1500	5.51	37.26	0.148 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T7	58.3333 - 50	L2x2x5/16	6.07	5.79	115.5	1.1500	2.78	37.26	0.075 [1] ✔
T9	37.5 - 25	L2x2x5/16	7.85	7.38	147.3	1.1500	4.33	37.26	0.116 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T3	125 - 100	L2 1/2x2x3/16	7.17	7.17	143.4	0.8090	0.01	26.21	0.000 [1] ✔
T4	100 - 75	L2 1/2x2x3/16	7.50	7.50	150.1	0.8090	0.23	26.21	0.009 [1] ✔
T5	75 - 66.6667	L2 1/2x2x3/16	8.50	8.50	170.1	0.8090	0.01	26.21	0.000 [1] ✔
T6	66.6667 - 58.3333	L2 1/2x2x3/16	8.83	8.83	176.7	0.8090	0.34	26.21	0.013 [1] ✔
T7	58.3333 - 50	L2 1/2x2x3/16	9.17	9.17	183.4	0.8090	0.36	26.21	0.014 [1] ✔
T8	50 - 37.5	L2 1/2x2 1/2x3/16	9.50	9.50	146.5	0.9020	0.38	29.22	0.013 [1] ✔
T9	37.5 - 25	L2 1/2x2 1/2x3/16	10.00	10.00	154.2	0.9020	0.41	29.22	0.014 [1] ✔
T10	25 - 0	L2 1/2x2 1/2x3/16	10.50	10.50	162.0	0.9020	0.01	29.22	0.000 [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	160 - 150	Leg	P.5x.250	1	-5.27	152.93	3.4	Pass
		Leg	P.5x.250	2	-3.36	152.93	2.2	Pass
		Leg	P.5x.250	3	-4.94	152.93	3.2	Pass
T2	150 - 125	Leg	P.5x.250	22	-27.76	129.56	21.4	Pass
		Leg	P.5x.250	23	-26.15	129.56	20.2	Pass
		Leg	P.5x.250	24	-28.20	129.56	21.8	Pass
T3	125 - 100	Leg	P.5x.250	52	-80.42	129.56	62.1	Pass
		Leg	P.5x.250	53	-79.11	129.56	61.1	Pass
		Leg	P.5x.250	54	-81.40	129.56	62.8	Pass
T4	100 - 75	Leg	P5x0.3 w/ (3) 1.5x5/8 Plates	91	-153.13	269.04	56.9 72.6 (b)	Pass
		Leg	P5x0.3 w/ (3) 1.5x5/8 Plates	92	-153.19	269.04	56.9 72.7 (b)	Pass
		Leg	P5x0.3 w/ (3) 1.5x5/8 Plates	93	-155.66	269.04	57.9 73.3 (b)	Pass
T5	75 - 66.6667	Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	130	-180.53	316.53	57.0 62.5 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	131	-180.81	316.53	57.1 62.4 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	132	-183.26	316.53	57.9 62.9 (b)	Pass
T6	66.6667 - 58.3333	Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	145	-210.05	316.53	66.4 73.2 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	146	-210.76	316.53	66.6 73.2 (b)	Pass
		Leg	P5x0.4 w/ (3) 1.5x5/8 Plates	147	-213.19	316.53	67.4 73.8 (b)	Pass
T7	58.3333 - 50	Leg	HSS5x.4	160	-238.93	287.44	83.1 83.6 (b)	Pass
		Leg	HSS5x.4	161	-240.01	287.44	83.5 83.6 (b)	Pass
		Leg	HSS5x.4	162	-242.40	287.44	84.3	Pass
T8	50 - 37.5	Leg	HSS6.875x.4	187	-270.15	301.66	89.6	Pass
		Leg	HSS6.875x.4	188	-271.66	301.66	90.1	Pass
		Leg	HSS6.875x.4	189	-274.00	301.66	90.8	Pass
T9	37.5 - 25	Leg	HSS6.875x.4	202	-313.58	399.96	78.4	Pass
		Leg	HSS6.875x.4	203	-315.58	399.96	78.9	Pass
		Leg	HSS6.875x.4	204	-317.85	399.96	79.5	Pass
T10	25 - 0	Leg	HSS6.875x0.5 w/ (3) 2x5/8 Bars	229	-411.34	459.19	89.6	Pass
		Leg	HSS6.875x0.5 w/ (3) 2x5/8 Bars	230	-414.25	459.19	90.2	Pass
		Leg	HSS6.875x0.5 w/ (3) 2x5/8 Bars	231	-416.46	459.19	90.7	Pass
T1	160 - 150	Diagonal	2L2 1/2x2x3/16	8	-2.29	38.28	6.0 12.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	9	-2.36	38.28	6.2 12.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	11	-2.24	38.28	5.8 11.3 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	12	-2.15	38.28	5.6 11.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	14	-3.19	38.28	8.3 17.0 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	15	-3.17	38.28	8.3 17.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	16	-1.13	39.13	2.9 6.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	17	-1.21	39.13	3.1 5.7 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2x3/16	18	-1.21	39.13	3.1 5.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	19	-1.14	39.13	2.9 6.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	20	-2.12	39.13	5.4 11.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	21	-2.11	39.13	5.4 11.2 (b)	Pass
T2	150 - 125	Diagonal	2L2 1/2x2x3/16	26	-9.18	20.25	45.3 50.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	27	-9.24	20.25	45.6 50.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	29	-11.23	20.25	55.4 61.7 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	30	-11.17	20.25	55.2 61.9 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	32	-10.98	20.25	54.2 60.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	33	-10.98	20.25	54.2 60.6 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	35	-7.86	21.10	37.3 43.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	36	-7.93	21.10	37.6 43.2 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	38	-9.37	21.10	44.4 51.3 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	39	-9.31	21.10	44.1 51.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	41	-9.53	21.10	45.2 52.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	42	-9.52	21.10	45.1 52.5 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	44	-2.78	21.97	12.6 15.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	45	-2.88	21.97	13.1 14.9 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	47	-3.15	21.97	14.3 16.1 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	48	-2.99	21.97	13.6 16.9 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	50	-4.14	21.97	18.9 22.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16	51	-4.13	21.97	18.8 22.5 (b)	Pass
T3	125 - 100	Diagonal	2L2 1/2x2 1/2x5/16	56	-15.47	29.84	51.9	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	57	-15.52	29.84	52.0	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	59	-17.00	29.84	57.0	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	60	-16.96	29.84	56.8	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	62	-15.43	29.84	51.7	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	63	-15.43	29.84	51.7	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	68	-12.93	31.12	41.5 42.5 (b)	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	69	-12.98	31.12	41.7 42.4 (b)	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	71	-15.27	31.12	49.1 50.0 (b)	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	72	-15.21	31.12	48.9 50.1 (b)	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	74	-14.00	31.12	45.0 45.9 (b)	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	75	-14.01	31.12	45.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2 1/2x5/16	80	-11.36	32.44	45.9 (b) 35.0	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	81	-11.41	32.44	37.3 (b) 35.2	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	83	-13.75	32.44	37.2 (b) 42.4	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	84	-13.71	32.44	45.0 (b) 42.3	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	86	-12.79	32.44	45.1 (b) 39.4	Pass
		Diagonal	2L2 1/2x2 1/2x5/16	87	-12.80	32.44	41.9 (b) 39.4	Pass
T4	100 - 75	Diagonal	2L3x2 1/2x1/4	98	-20.50	37.14	41.9 (b) 55.2	Pass
		Diagonal	2L3x2 1/2x1/4	99	-20.52	37.14	79.9 (b) 55.2	Pass
		Diagonal	2L3x2 1/2x1/4	101	-23.57	37.14	79.9 (b) 63.5	Pass
		Diagonal	2L3x2 1/2x1/4	102	-23.54	37.14	91.9 (b) 63.4	Pass
		Diagonal	2L3x2 1/2x1/4	104	-20.60	37.14	92.0 (b) 55.5	Pass
		Diagonal	2L3x2 1/2x1/4	105	-20.61	37.14	80.3 (b) 55.5	Pass
		Diagonal	2L3x2 1/2x1/4	110	-19.71	38.75	80.3 (b) 50.9	Pass
		Diagonal	2L3x2 1/2x1/4	111	-19.74	38.75	76.9 (b) 51.0	Pass
		Diagonal	2L3x2 1/2x1/4	113	-21.80	38.75	76.8 (b) 56.3	Pass
		Diagonal	2L3x2 1/2x1/4	114	-21.77	38.75	85.0 (b) 56.2	Pass
		Diagonal	2L3x2 1/2x1/4	116	-19.50	38.75	85.1 (b) 50.3	Pass
		Diagonal	2L3x2 1/2x1/4	117	-19.50	38.75	76.0 (b) 50.3	Pass
		Diagonal	2L3x2 1/2x1/4	121	-17.53	40.43	76.0 (b) 43.4	Pass
		Diagonal	2L3x2 1/2x1/4	122	-17.57	40.43	68.6 (b) 43.5	Pass
		Diagonal	2L3x2 1/2x1/4	123	-19.42	40.43	68.5 (b) 48.0	Pass
		Diagonal	2L3x2 1/2x1/4	124	-19.38	40.43	75.8 (b) 47.9	Pass
		Diagonal	2L3x2 1/2x1/4	125	-17.44	40.43	75.9 (b) 43.1	Pass
		Diagonal	2L3x2 1/2x1/4	126	-17.44	40.43	68.1 (b) 43.1	Pass
T5	75 - 66.6667	Diagonal	2L3x2 1/2x5/16	134	-22.30	43.06	68.1 (b) 51.8	Pass
		Diagonal	2L3x2 1/2x5/16	135	-22.29	43.06	61.9 (b) 51.8	Pass
		Diagonal	2L3x2 1/2x5/16	137	-26.62	43.06	61.9 (b) 61.8	Pass
		Diagonal	2L3x2 1/2x5/16	138	-26.59	43.06	74.1 (b) 61.8	Pass
		Diagonal	2L3x2 1/2x5/16	140	-22.41	43.06	74.1 (b) 52.0	Pass
		Diagonal	2L3x2 1/2x5/16	141	-22.45	43.06	62.4 (b) 52.1	Pass
							62.3 (b)	

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T6	66.6667 - 58.3333	Diagonal	2L3x2 1/2x5/16	151	-22.98	41.23	55.7 63.8 (b)	Pass
		Diagonal	2L3x2 1/2x5/16	152	-22.97	41.23	55.7 63.8 (b)	Pass
		Diagonal	2L3x2 1/2x5/16	153	-27.28	41.23	66.2 75.9 (b)	Pass
		Diagonal	2L3x2 1/2x5/16	154	-27.26	41.23	66.1 76.0 (b)	Pass
		Diagonal	2L3x2 1/2x5/16	155	-22.96	41.23	55.7 63.8 (b)	Pass
		Diagonal	2L3x2 1/2x5/16	156	-22.99	41.23	55.8 63.8 (b)	Pass
T7	58.3333 - 50	Diagonal	2L3x3x5/16	166	-23.96	74.52	32.2 74.0 (b)	Pass
		Diagonal	2L3x3x5/16	169	-23.95	74.52	32.1 74.0 (b)	Pass
		Diagonal	2L3x3x5/16	172	-28.37	74.52	38.1 88.1 (b)	Pass
		Diagonal	2L3x3x5/16	175	-28.36	74.52	38.1 88.1 (b)	Pass
		Diagonal	2L3x3x5/16	178	-23.84	74.52	32.0 73.8 (b)	Pass
		Diagonal	2L3x3x5/16	181	-23.87	74.52	32.0 73.6 (b)	Pass
T8	50 - 37.5	Diagonal	2L3 1/2x3x3/8	193	-30.33	46.80	64.8	Pass
		Diagonal	2L3 1/2x3x3/8	194	-30.31	46.80	64.8	Pass
		Diagonal	2L3 1/2x3x3/8	195	-36.14	46.80	77.2	Pass
		Diagonal	2L3 1/2x3x3/8	196	-36.12	46.80	77.2	Pass
		Diagonal	2L3 1/2x3x3/8	197	-30.02	46.80	64.1	Pass
		Diagonal	2L3 1/2x3x3/8	198	-30.06	46.80	64.2	Pass
T9	37.5 - 25	Diagonal	2L3 1/2x3 1/2x5/16	208	-32.50	74.26	43.8 69.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	211	-32.48	74.26	43.7 69.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	214	-38.45	74.26	51.8 82.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	217	-38.46	74.26	51.8 82.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	220	-32.02	74.26	43.1 68.5 (b)	Pass
		Diagonal	2L3 1/2x3 1/2x5/16	223	-32.04	74.26	43.1 68.4 (b)	Pass
T10	25 - 0	Diagonal	2L4x3x3/8	233	-34.93	53.36	65.5	Pass
		Diagonal	2L4x3x3/8	234	-34.89	53.36	65.4	Pass
		Diagonal	2L4x3x3/8	236	-41.53	53.36	77.8	Pass
		Diagonal	2L4x3x3/8	237	-41.53	53.36	77.8	Pass
		Diagonal	2L4x3x3/8	239	-34.15	53.36	64.0	Pass
		Diagonal	2L4x3x3/8	240	-34.20	53.36	64.1	Pass
		Diagonal	2L4x3x3/8	245	-32.88	55.65	59.1	Pass
		Diagonal	2L4x3x3/8	246	-32.84	55.65	59.0	Pass
		Diagonal	2L4x3x3/8	248	-39.22	55.65	70.5	Pass
		Diagonal	2L4x3x3/8	249	-39.22	55.65	70.5	Pass
		Diagonal	2L4x3x3/8	251	-32.25	55.65	57.9	Pass
		Diagonal	2L4x3x3/8	252	-32.30	55.65	58.0	Pass
T1	160 - 150	Horizontal	L3x3x1/4	7	-1.92	37.58	5.1 9.1 (b)	Pass
		Horizontal	L3x3x1/4	10	-1.74	37.58	4.6 8.3 (b)	Pass
		Horizontal	L3x3x1/4	13	-2.33	37.58	6.2 11.4 (b)	Pass
T2	150 - 125	Horizontal	L2 1/2x2 1/2x3/16	25	-5.61	20.79	27.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Horizontal	L2 1/2x2 1/2x3/16	28	-7.04	20.79	39.2 (b) 33.8	Pass
		Horizontal	L2 1/2x2 1/2x3/16	31	-6.78	20.79	48.1 (b) 32.6	Pass
		Horizontal	L2 1/2x2 1/2x3/16	34	-5.25	21.36	47.4 (b) 24.6	Pass
		Horizontal	L2 1/2x2 1/2x3/16	37	-6.13	21.36	35.0 (b) 28.7	Pass
		Horizontal	L2 1/2x2 1/2x3/16	40	-6.17	21.36	41.1 (b) 28.9	Pass
		Horizontal	L2 1/2x2 1/2x3/16	43	-1.61	21.91	41.6 (b) 7.4	Pass
		Horizontal	L2 1/2x2 1/2x3/16	46	-1.74	21.91	11.4 (b) 8.0	Pass
		Horizontal	L2 1/2x2 1/2x3/16	49	-2.29	21.91	12.4 (b) 10.4	Pass
T3	125 - 100	Horizontal	L3x3x5/16	55	-10.19	41.41	16.5 (b) 24.6	Pass
		Horizontal	L3x3x5/16	58	-11.20	41.41	40.2 (b) 27.0	Pass
		Horizontal	L3x3x5/16	61	-10.13	41.41	44.1 (b) 24.5	Pass
		Horizontal	L3x3x5/16	67	-8.28	42.34	40.0 (b) 19.5	Pass
		Horizontal	L3x3x5/16	70	-9.87	42.34	32.7 (b) 23.3	Pass
		Horizontal	L3x3x5/16	73	-9.02	42.34	38.5 (b) 21.3	Pass
		Horizontal	L3x3x5/16	79	-7.09	43.26	35.6 (b) 16.4	Pass
		Horizontal	L3x3x5/16	82	-8.78	43.26	27.8 (b) 20.3	Pass
		Horizontal	L3x3x5/16	85	-8.13	43.26	33.7 (b) 18.8	Pass
T4	100 - 75	Horizontal	L3x3x1/2	97	-14.41	59.59	31.8 (b) 24.2	Pass
		Horizontal	L3x3x1/2	100	-16.57	59.59	42.3 (b) 27.8	Pass
		Horizontal	L3x3x1/2	103	-14.47	59.59	48.5 (b) 24.3	Pass
		Horizontal	L3x3x1/2	109	-13.59	61.13	42.5 (b) 22.2	Pass
		Horizontal	L3x3x1/2	112	-15.04	61.13	39.8 (b) 24.6	Pass
		Horizontal	L3x3x1/2	115	-13.46	61.13	43.9 (b) 22.0	Pass
T5	75 - 66.6667	Horizontal	L3x3x1/2	133	-15.98	58.01	39.4 (b) 27.5	Pass
		Horizontal	L3x3x1/2	136	-19.08	58.01	46.8 (b) 32.9	Pass
		Horizontal	L3x3x1/2	139	-16.14	58.01	55.8 (b) 27.8	Pass
T10	25 - 0	Horizontal	L4x4x1/2	232	-23.11	80.95	47.2 (b) 28.5	Pass
		Horizontal	L4x4x1/2	235	-27.58	80.95	68.1 (b) 34.1	Pass
		Horizontal	L4x4x1/2	238	-22.61	80.95	81.1 (b) 27.9	Pass
		Horizontal	L4x4x1/2	244	-21.45	83.31	66.7 (b) 25.7 62.3 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Horizontal	L4x4x1/2	247	-25.46	83.31	30.6 74.5 (b)	Pass
		Horizontal	L4x4x1/2	250	-21.03	83.31	25.2 61.6 (b)	Pass
T1	160 - 150	Top Girt	L3x3x1/4	4	-1.25	32.98	3.8 5.7 (b)	Pass
		Top Girt	L3x3x1/4	5	-1.23	32.98	3.7 5.6 (b)	Pass
		Top Girt	L3x3x1/4	6	-1.63	32.98	4.9 7.5 (b)	Pass
T4	100 - 75	Top Girt	L3x3x1/4	94	-11.84	21.09	56.1	Pass
		Top Girt	L3x3x1/4	95	-13.14	21.09	62.3	Pass
		Top Girt	L3x3x1/4	96	-11.80	21.09	55.9	Pass
T6	66.6667 - 58.3333	Top Girt	L3x3x1/2	148	-16.67	31.10	53.6	Pass
		Top Girt	L3x3x1/2	149	-19.84	31.10	63.8	Pass
		Top Girt	L3x3x1/2	150	-16.68	31.10	53.6	Pass
T7	58.3333 - 50	Top Girt	L3x3x1/2	163	-17.56	28.64	61.3	Pass
		Top Girt	L3x3x1/2	164	-20.94	28.64	73.1	Pass
		Top Girt	L3x3x1/2	165	-17.51	28.64	61.1	Pass
T8	50 - 37.5	Top Girt	L4x4x1/4	190	-18.55	30.66	60.5	Pass
		Top Girt	L4x4x1/4	191	-22.17	30.66	72.3	Pass
		Top Girt	L4x4x1/4	192	-18.37	30.66	59.9	Pass
T9	37.5 - 25	Top Girt	L4x4x5/16	205	-20.08	35.76	56.1 62.0 (b)	Pass
		Top Girt	L4x4x5/16	206	-23.97	35.76	67.0 73.9 (b)	Pass
		Top Girt	L4x4x5/16	207	-19.83	35.76	55.5 61.1 (b)	Pass
T7	58.3333 - 50	Redund Horz 1 Bracing	L2x2x5/16	167	-4.14	18.16	22.8	Pass
		Redund Horz 1 Bracing	L2x2x5/16	170	-4.16	18.16	22.9	Pass
		Redund Horz 1 Bracing	L2x2x5/16	173	-4.16	18.16	22.9	Pass
		Redund Horz 1 Bracing	L2x2x5/16	176	-4.20	18.16	23.1	Pass
		Redund Horz 1 Bracing	L2x2x5/16	179	-4.20	18.16	23.1	Pass
		Redund Horz 1 Bracing	L2x2x5/16	182	-4.14	18.16	22.8	Pass
T9	37.5 - 25	Redund Horz 1 Bracing	L2x2x5/16	209	-5.44	15.65	34.8	Pass
		Redund Horz 1 Bracing	L2x2x5/16	212	-5.47	15.65	35.0	Pass
		Redund Horz 1 Bracing	L2x2x5/16	215	-5.47	15.65	35.0	Pass
		Redund Horz 1 Bracing	L2x2x5/16	218	-5.51	15.65	35.2	Pass
		Redund Horz 1 Bracing	L2x2x5/16	221	-5.51	15.65	35.2	Pass
		Redund Horz 1 Bracing	L2x2x5/16	224	-5.44	15.65	34.8	Pass
T7	58.3333 - 50	Redund Diag 1 Bracing	L2x2x5/16	168	-2.74	10.38	26.4	Pass
		Redund Diag 1 Bracing	L2x2x5/16	171	-2.76	10.38	26.5	Pass
		Redund Diag 1 Bracing	L2x2x5/16	174	-2.76	10.38	26.5	Pass
		Redund Diag 1 Bracing	L2x2x5/16	177	-2.78	10.38	26.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Redund Diag 1 Bracing	L2x2x5/16	180	-2.78	10.38	26.8	Pass
		Redund Diag 1 Bracing	L2x2x5/16	183	-2.74	10.38	26.4	Pass
T9	37.5 - 25	Redund Diag 1 Bracing	L2x2x5/16	210	-4.27	6.39	66.9	Pass
		Redund Diag 1 Bracing	L2x2x5/16	213	-4.30	6.39	67.3	Pass
		Redund Diag 1 Bracing	L2x2x5/16	216	-4.30	6.39	67.3	Pass
		Redund Diag 1 Bracing	L2x2x5/16	219	-4.33	6.39	67.8	Pass
		Redund Diag 1 Bracing	L2x2x5/16	222	-4.33	6.39	67.8	Pass
		Redund Diag 1 Bracing	L2x2x5/16	225	-4.27	6.39	66.9	Pass
T3	125 - 100	Inner Bracing	L2 1/2x2x3/16	64	-0.01	5.71	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	65	-0.01	5.71	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	66	-0.01	5.71	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	76	-0.01	6.28	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	77	-0.01	6.28	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	78	-0.01	6.28	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	88	-0.01	6.94	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	89	-0.01	6.94	0.4	Pass
		Inner Bracing	L2 1/2x2x3/16	90	-0.01	6.94	0.4	Pass
T4	100 - 75	Inner Bracing	L2 1/2x2x3/16	106	-0.01	4.40	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	107	-0.01	4.40	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	108	-0.01	4.40	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	118	-0.01	4.78	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	119	-0.01	4.78	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	120	-0.01	4.78	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	127	-0.23	5.21	4.4	Pass
		Inner Bracing	L2 1/2x2x3/16	128	-0.23	5.21	4.4	Pass
		Inner Bracing	L2 1/2x2x3/16	129	-0.21	5.21	4.0	Pass
T5	75 - 66.6667	Inner Bracing	L2 1/2x2x3/16	142	-0.01	4.06	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	143	-0.01	4.06	0.5	Pass
		Inner Bracing	L2 1/2x2x3/16	144	-0.01	4.06	0.5	Pass
T6	66.6667 - 58.3333	Inner Bracing	L2 1/2x2x3/16	157	-0.35	3.76	9.3	Pass
		Inner Bracing	L2 1/2x2x3/16	158	-0.35	3.76	9.3	Pass
		Inner Bracing	L2 1/2x2x3/16	159	-0.29	3.76	7.8	Pass
T7	58.3333 - 50	Inner Bracing	L2 1/2x2x3/16	184	-0.37	3.49	10.6	Pass
		Inner Bracing	L2 1/2x2x3/16	185	-0.37	3.49	10.6	Pass
		Inner Bracing	L2 1/2x2x3/16	186	-0.31	3.49	8.9	Pass
T8	50 - 37.5	Inner Bracing	L2 1/2x2 1/2x3/16	199	-0.39	4.87	8.1	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	200	-0.39	4.87	8.1	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	201	-0.33	4.87	6.8	Pass
T9	37.5 - 25	Inner Bracing	L2 1/2x2 1/2x3/16	226	-0.42	4.39	9.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	227	-0.42	4.39	9.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	228	-0.35	4.39	8.1	Pass
T10	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	241	-0.02	3.63	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	242	-0.02	3.63	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	243	-0.02	3.63	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	253	-0.02	3.98	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	254	-0.02	3.98	0.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	255	-0.02	3.98	0.7	Pass
							Summary	
						Leg (T8)	90.8	Pass
						Diagonal (T4)	92.0	Pass
						Horizontal	81.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						(T10) Top Girt	73.9	Pass
						(T9) Redund Horz 1 Bracing (T9)	35.2	Pass
						Redund Diag 1 Bracing (T9)	67.8	Pass
						Inner Bracing (T7)	10.6	Pass
						Bolt Checks	92.0	Pass
						RATING =	**92.0**	**Pass**

ANCHOR BOLT EVALUATION

TNX Output / Max Leg Reactions

Max Compression	$Compression := 466kip$	
Concurrent Shear	$Shear_c := 61kip$	
Max Uplift	$Uplift := 409kip$	
Concurrent Shear	$Shear_u := 55kip$	

Anchor Rod Data

Diameter of Anchor Rod	$D := 1.75in$	Note: Previous anchor rod reinforcement does not provide additional compressive resistance (per TIA-H, grout does not provide compressive resistance). Grout shall be removed and replaced with shim plates. See updated compressive resistance below.
Number of Anchor Rods	$N := 6$	
Length from Top of Conc to Bottom of Anchor Rod Leveling Nut	$l_{ar} := 1.5in$	[Assumed. Note: values less than or equal to bolt diameter do not reduce capacity of anchor bolts]
Threads per Inch	$n := 5$	
Anchor Rod Ultimate Strength	$F_u := 58ksi$	[A36 - Original Design Calculations]
Anchor Rod Yield Strength	$F_y := 36ksi$	[A36 - Original Design Calculations]
Modulus of Elasticity of Steel	$E := 29000ksi$	

Anchor Rod Section Properties

Gross Area of Rod	$A_g := \frac{\pi}{4} \cdot D^2 = 2.405 \cdot in^2$
Net Area of Rod	$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 1.899 \cdot in^2$
Net Diameter of Rod	$D_n := D - \frac{0.9743in}{n} = 1.555 \cdot in$
Radius of Gyration of Rod	$r := \frac{D_n}{4} = 0.389 \cdot in$
Plastic Section Modulus of Rod	$Z := \frac{D_n^3}{6} = 0.627 \cdot in^3$

Anchor Rod Capacities

Design Tensile Strength [4.9.6.1]

Nominal Tensile Strength $R_{nt} := F_u \cdot A_n = 110.168 \cdot kip$

Resistance Factor - Tension $\phi_t := 0.75$

Design Tensile Strength $\phi R_{nt} := \phi_t \cdot R_{nt} = 82.626 \cdot kip$

Design Compression Yield Strength [4.9.9 A1]

Nominal Compression Yield Strength $R_{nc} := F_y \cdot A_g = 86.59 \cdot kip$

$A_g = 2.405 \cdot in^2$

Resistance Factor - Compression $\phi_c := 0.9$

Design Compression Yield Strength $\phi R_{nc} := \phi_c \cdot R_{nc} = 77.931 \cdot kip$

Design Buckling Strength [4.5.4.2]

Column Effective Length Factor [4.9.9] $k := 1.2$

Elastic Critical Buckling Stress $F_e := \dfrac{\pi^2 \cdot E}{\left(\dfrac{k \cdot l_{ar}}{r}\right)^2} = 13352.78 \cdot ksi$

Critical Compressive Stress $F_{cr} := 0.658^{\frac{F_y}{F_e}} \cdot F_y = 35.959 \cdot ksi$

Nominal Buckling Strength $R_{nb} := F_{cr} \cdot A_g = 86.492 \cdot kip$

Design Buckling Strength $\phi R_{nb} := \phi_c \cdot R_{nb} = 77.843 \cdot kip$

Design Shear Rupture Strength [4.9.9]

Nominal Shear Rupture Strength $R_{nv} := 0.5 \cdot F_u \cdot A_g = 69.753 \cdot kip$

Resistance Factor - Shear $\phi_v := 0.75$

Design Shear Rupture Strength $\phi R_{nv} := \phi_v \cdot R_{nv} = 52.315 \cdot kip$

Design Shear Yield Strength [4.9.9 A1]

Nominal Shear Yield Strength $R_{nvc} := 0.6 \cdot F_y \cdot 0.75 A_g = 38.966 \cdot kip$

Design Shear Yield Strength $\phi R_{nvc} := \phi_c \cdot R_{nvc} = 35.069 \cdot kip$

Design Flexural Strength [4.9.9]

Nominal Flexural Strength $M_n := F_y \cdot Z = 1.881 \cdot ft \cdot kip$

Resistance Factor - Flexure $\phi_f := 0.90$

Design Flexural Strength $\phi M_n := \phi_f \cdot M_n = 20.31 \cdot in \cdot kip$

Anchor Rod Demands

Uplift

Tension Demand $P_{ut} := \frac{Uplift}{N} = 68.167 \cdot kip$

Shear Demand $V_{ut} := \frac{Shear_u}{N} = 9.167 \cdot kip$

Flexure Demand [4.9.9] $M_{ut} := 0.65 \cdot l_{ar} \cdot V_{ut} = 8.938 \cdot in \cdot kip$

Compression

Compression Demand $P_{uc} := \frac{Compression}{N + 2} = 58.25 \cdot kip$

Shear Demand $V_{uc} := \frac{Shear_c}{N} = 10.167 \cdot kip$

Flexure Demand [4.9.9] $M_{uc} := 0.65 \cdot l_{ar} \cdot V_{uc} = 9.912 \cdot in \cdot kip$

Conservatively assume shim plates provide compressive resistance equivalent to two anchor bolts.

Anchor Rod Interaction Equations

$$Inter_t := \begin{cases} \left(\frac{P_{ut}}{\phi R_{nt}}\right)^2 + \left(\frac{V_{ut}}{\phi R_{nv}}\right)^2 & \text{if } l_{ar} \le D \\ \left(\frac{P_{ut}}{\phi R_{nt}} + \frac{M_{ut}}{\phi M_n}\right)^2 + \left(\frac{V_{ut}}{\phi R_{nv}}\right)^2 & \text{if } l_{ar} \ge 4 \cdot D \\ \left(\frac{P_{ut}}{\phi R_{nt}} + \frac{M_{ut}}{\phi M_n}\right)^2 + \left(\frac{V_{ut}}{\phi R_{nv}}\right)^2 & \text{otherwise} \end{cases} = 0.711$$

$$Inter_c := \begin{cases} \left(\frac{P_{uc}}{\phi R_{nc}}\right) + \left(\frac{V_{uc}}{\phi R_{nvc}}\right)^2 & \text{if } l_{ar} \le D \\ \left(\frac{P_{uc}}{\phi R_{nb}} + \frac{M_{uc}}{\phi M_n}\right) + \left(\frac{V_{uc}}{\phi R_{nvc}}\right)^2 & \text{if } l_{ar} \ge 4 \cdot D \\ \left(\frac{P_{uc}}{\phi R_{nc}} + \frac{M_{uc}}{\phi M_n}\right) + \left(\frac{V_{uc}}{\phi R_{nvc}}\right)^2 & \text{otherwise} \end{cases} = 0.831$$

FOUNDATION ANALYSIS

JOB TITLE Foundation Analysis - TIA-H - Middlebury CSP#20

JOB NO. VZ5-228 / SMK-007 CALCULATION NO. _____ ORIGINATOR K.Barker DATE 07/02/2021

SHEET _____ OF _____ REVIEWER _____ DATE _____

Legend

Input | Design Check | Output

TNX Output / Max Leg Reactions

Tower Moment	$M := 8865ft \cdot kip$
Tower Axial	$P := 62kip$
Tower Shear	$V := 111kip$
Leg Compression	$P_{comp} := 466kip$
Concurrent Shear	$V_{u\_comp} := 61kip$
Leg Uplift	$P_{uplift} := 409kip$
Concurrent Shear	$V_{u\_uplift} := 55kip$

Soil Data

Unit Weight Soil	$\gamma := 125pcf$	
Ultimate Gross Bearing Capacity	$Q_{ult} := 4.5ksf \cdot 2$	Note: Allowable BP 4.5ksf & FOS=2
Cohesion	$Cu := 0ksf$	
Friction Angle	$\phi := 34deg$	
Base Friction	$\mu := 0$	
Neglected Depth	$N := 0ft$	
Foundation Bearing on	$Bear := "Soil"$	
Depth to Groundwater	$gw := 5ft$	[Welti 12/17/2012]

Coefficient of Lateral Soil Pressure: $K_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)} = 3.537$

Load Factors/Resistance Factors

Min Dead Load Factor	$\gamma_{DL.min} := 0.9$
Max Dead Load Factor	$\gamma_{DL.max} := 1.2$
Resistance Factor for Bearing on Rock/Soil	$\phi_s := 0.75$

Rebar Data

Redefine Origin for Programming: $ORIGIN := 1$

Rebar Size: $No\_Bar\_Size := (1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9\ 10\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 18)^T$

Rebar Diameter: $d_{bar} := (0\ 0\ 0.375\ 0.5\ 0.625\ 0.75\ 0.875\ 1.00\ 1.128\ 1.27\ 1.41\ 0\ 0\ 1.693\ 0\ 0\ 0\ 2.257$

Rebar Area: $A_{bar} := (0\ 0\ 0.11\ 0.20\ 0.31\ 0.44\ 0.60\ 0.79\ 1.00\ 1.27\ 1.56\ 0\ 0\ 2.25\ 0\ 0\ 0\ 4.00)^T \cdot in^2$

Tower Data

Height of Tower	$H := 160ft$
Tower Base Width	$BW := 23.0ft$
Base PL Dist to Foundation	$bp_{dist} := 2in$

Pier Data

Dia of Pier	$d_{pier} := 3.5ft + 1.5ft$
Extension above Grade	$E := 1.0ft$
Pier Rebar Size	$Sc := 7$
Pier Rebar Quantity	$mc := 16$
Pier Confinement Bar Size	$St := 4$
Pier Confinement Bar Count	$mt := 4$
Pier Confinement Type	$Type := "Tie"$
Pier Rebar Clear Cover	$cc_{pier} := 3in$
Number of Piers	$N_{pier} := 3$
Position of Tower Relative to Center of Pad (1=Offset, 2=Not Offset)	$Pos_{tower} := 2$

Pad Data

Total Depth	$D := 5ft$	
Pad Width & Length	$W := 34ft$	$L := 36ft$
Pad Thickness	$T := 2.25ft$	
Pad Rebar Size	$Sp := 9$	
Pad Rebar Count	$mp := 39$	
Pad Rebar Clear Cover	$cc_{pad} := 3in$	

Note: 11 #11, 17 #8 & 11 #11 in pad. 39 bars total with average bar area = 1.22in^2, Use 39 #9 bars in calc.

Material Properties

Rebar Yield Strength	$F_y := 60ksi$
Concrete Comp Strength	$f_c := 3ksi$
Concrete Density	$\delta_c := 150pcf$
Water Density	$\delta_w := 62.4pcf$
Modulus of Elasticity - Steel	$E_s := 29000ksi$

JOB TITLE Foundation Analysis - TIA-H - Middlebury CSP#20

JOB NO. VZ5-228 / SMK-007 CALCULATION NO. _____ ORIGINATOR K.Barker DATE 07/02/2021

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Global Stability

Pier Height Above Water Table

$$h_{pier.above} := \min(gw, D - T) + E = 3.75 \cdot ft$$

Pier Height Below Water Table

$$h_{pier.below} := D - T - \min(gw, D - T) = 0\,ft$$

Bouyant Weight of Pier

$$W_{pier} := \frac{\pi}{4} \cdot d_{pier}^{2} \cdot h_{pier.above} \cdot \delta_c + \frac{\pi}{4} \cdot d_{pier}^{2} \cdot h_{pier.below} \cdot (\delta_c - \delta_w) = 11.045 \cdot kip$$

Pad Height Above Water Table

$$h_{pad.above} := if[gw \le D - T, 0, if[gw > D, T, T - (D - gw)]] = 2.25\,ft$$

Pad Height Below Water Table

$$h_{pad.below} := T - h_{pad.above} = 0\,ft$$

Bouyant Weight of Pad

$$W_{pad} := W \cdot L \cdot h_{pad.above} \cdot \delta_c + W^{2} \cdot h_{pad.below} \cdot (\delta_c - \delta_w) = 413.1 \cdot kip$$

Concrete Weight

$$W_c := N_{pier} \cdot W_{pier} + W_{pad} = 446.234 \cdot kip$$

Soil Weight Above Pad

$$W_s := (D - T) \cdot \left(W \cdot L - N_{pier} \cdot \frac{\pi \cdot d_{pier}^{2}}{4} \right) \cdot \gamma = 400.501 \cdot kip$$

Lateral Resistance

Passive Pressure at Depth to Neglect

$$P_{pn} := K_p \cdot \gamma \cdot N + Cu \cdot 2\sqrt{K_p} = 0 \cdot ksf$$

Passive Pressure at Bottom of Pier/TOF

$$P_{p.TOF} := K_p \cdot \gamma \cdot (D - T) + Cu \cdot 2\sqrt{K_p} = 1.216 \cdot ksf$$

Passive Pressure at Bottom of Footing

$$P_{p.BOF} := K_p \cdot \gamma \cdot (D) + Cu \cdot 2\sqrt{K_p} = 2.211 \cdot ksf$$

Average Passive Pressure on Pier

$$P_{p.pier} := \frac{P_{pn} + P_{p.TOF}}{2} = 0.608 \cdot ksf$$

Average Passive Pressure on Pad

$$P_{p.pad} := \frac{P_{p.TOF} + P_{p.BOF}}{2} = 1.713 \cdot ksf$$

Pier Passive Resistance per Pier

$$P_{pr.pier} := \max(D - T - N, 0) \cdot d_{pier} \cdot P_{p.pier} = 8.359 \cdot kip$$

Pad Passive Resistance

$$P_{pr.pad} := \min(T, D - N) \cdot \min(W, L) \cdot P_{p.pad} = 131.067 \cdot kip$$

Total Passive Resistance

$$P_{pr.total} := P_{pr.pier} \cdot N_{pier} + P_{pr.pad} = 156.145 \cdot kip$$

Factored Total Weight for Compression

$$P_{fact.comp} := \gamma_{DL.min} \cdot \left(W_c + W_s + \frac{P}{\gamma_{DL.max}} \right) = 808.562 \cdot kip$$

Nominal Base Friction Resistance

$$R_{s.comp} := Cu \cdot W \cdot L = 0 \cdot kip$$

Lateral Resistance

$$\phi V_n := \phi_s \cdot (P_{pr.total} + R_{s.comp}) = 117.109 \cdot kip$$

Lateral Check

$$Check_{lat} := if(\phi V_n \ge V, "OK", "NG") = "OK"$$

$$\frac{V}{\phi V_n} = 94.784 \cdot \%$$

JOB TITLE Foundation Analysis - TIA-H - Middlebury CSP#20

JOB NO. VZ5-228 / SMK-007 CALCULATION NO. _____ ORIGINATOR K.Barker DATE 07/02/2021

SHEET _____ OF _____ REVIEWER _____ DATE _____

Overturning Resistance

Dist from Center of Tower to Edge of Pad

$$X_{t1} := \frac{W}{2} - \frac{BW \cdot \cos(30 \cdot deg)}{2} \qquad X_{t2} := \frac{W}{2} - \frac{BW \cdot \cos(30 \cdot deg)}{3}$$

$$X_t := if\left(Pos_{tower} = 1 , X_{t1} , X_{t2}\right) = 10.36\,ft$$

Offset of Tower/Piers Relative to Center of Pad

$$Offset := \frac{W}{2} - \left(\frac{BW \cdot \cos(30 \cdot deg)}{3} + X_t\right) = 0\,ft$$

Overturning Moment

$$M_{o.0.9} := M + V \cdot \left(D + E + bp_{dist}\right) + \left(\frac{\gamma_{DL.min}}{\gamma_{DL.max}} \cdot P + \gamma_{DL.min} \cdot N_{pier} \cdot W_{pier}\right) \cdot Offset = 9550\,ft \cdot kip$$

$$M_{o.1.2} := M + V \cdot \left(D + E + bp_{dist}\right) + \left(P + \gamma_{DL.max} \cdot N_{pier} \cdot W_{pier}\right) \cdot Offset = 9550\,ft \cdot kip$$

Axial Load

$$P_{0.9} := \gamma_{DL.min} \cdot \left(W_c + W_s + \frac{P}{\gamma_{DL.max}}\right) = 808.562 \cdot kip$$

$$P_{1.2} := \gamma_{DL.max} \cdot \left(W_c + W_s\right) + P = 1078.083 \cdot kip$$

Eccentricity

$$e_{0.9} := \frac{M_{o.0.9}}{P_{0.9}} = 11.81 \cdot ft \qquad e_{1.2} := \frac{M_{o.1.2}}{P_{1.2}} = 8.858 \cdot ft$$

Eccentricity Limit [9.4.1]

$$e_{limit} := 0.45 \cdot \min(W , L) = 15.3 \cdot ft$$

Eccentricity Check

$$Check_e := if\left(\max\left(e_{0.9} , e_{1.2}\right) < e_{limit} , "OK" , "NG"\right) = "OK"$$

$$\frac{\max\left(e_{0.9} , e_{1.2}\right)}{e_{limit}} = 77.193 \cdot \%$$

Bearing Pressure

Area of Pad

$$A_{pad} := W \cdot L = 1224 \cdot ft^2$$

Section Modulus of Pad

$$S_{pad} := \min\left(\frac{W \cdot L^2}{6} , \frac{L \cdot W^2}{6}\right) = 6936 \cdot ft^3$$

Max Pressure (Min Load Factor)

$$P_{max.0.9} := \frac{P_{0.9}}{A_{pad}} + \frac{M_{o.0.9}}{S_{pad}} = 2.037 \cdot ksf$$

Min Pressure (Min Load Factor)

$$P_{min.0.9} := \frac{P_{0.9}}{A_{pad}} - \frac{M_{o.0.9}}{S_{pad}} = -0.716 \cdot ksf$$

Adjusted Max Pressure

$$P_{adj.0.9} := \frac{2 \cdot P_{0.9}}{3 \cdot \min(W , L) \cdot \left(\frac{\min(W , L)}{2} - e_{0.9}\right)} = 3.055 \cdot ksf$$

Note: Applicable only if $P_{min} < 0$

Max Pressure (Max Load Factor) $P_{max.1.2} := \frac{P_{1.2}}{A_{pad}} + \frac{M_{o.1.2}}{S_{pad}} = 2.258 \cdot ksf$

Min Pressure (Max Load Factor) $P_{min.1.2} := \frac{P_{1.2}}{A_{pad}} - \frac{M_{o.1.2}}{S_{pad}} = -0.496 \cdot ksf$

Adjusted Max Pressure $P_{adj.1.2} := \frac{2 \cdot P_{1.2}}{3 \cdot \min(W, L) \cdot \left(\frac{\min(W, L)}{2} - e_{1.2} \right)} = 2.596 \cdot ksf$

Note: Applicable only if $P_{min} < 0$

Maximum Pressure $q_{u.0.9} := \text{if}\left(P_{min.0.9} < 0, P_{adj.0.9}, P_{max.0.9}\right) = 3.055 \cdot ksf$

$q_{u.1.2} := \text{if}\left(P_{min.1.2} < 0, P_{adj.1.2}, P_{max.1.2}\right) = 2.596 \cdot ksf$

$q_u := \max\left(q_{u.0.9}, q_{u.1.2}\right) = 3.055 \cdot ksf$

Bearing Capacity $q_n := \phi_s \cdot Q_{ult} = 6.75 \cdot ksf$

Bearing Capacity Check $\text{Check}_{bp} := \text{if}\left(q_u < q_n, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$

$\frac{q_u}{q_n} = 45.26 \cdot \%$

Pad Design

One-Way Shear

Effective Depth $d_c := T - cc_{pad} - 1.5 \cdot d_{bar_{Sp}} = 22.308 \cdot in$

Dist Edge of Pad to Column Face $d' := X_t - \frac{d_{pier}}{2} = 7.86\,ft$

Dist Edge of Pad to dc from Col Face $d'' := d' - d_c = 6.001\,ft$

Distance to qs $L'_{0.9} := \left(\frac{\min(W, L)}{2} - e_{0.9} \right) \cdot 3 = 15.569\,ft$

$L'_{1.2} := \left(\frac{\min(W, L)}{2} - e_{1.2} \right) \cdot 3 = 24.426\,ft$

Slope of qs $sq_{s.0.9} := \text{if}\left(L'_{0.9} > \min(W, L), \frac{P_{max.0.9} - P_{min.0.9}}{\min(W, L)}, \frac{q_{u.0.9}}{L'_{0.9}} \right) = 0.196 \cdot \frac{ksf}{ft}$

$sq_{s.1.2} := \text{if}\left(L'_{1.2} > \min(W, L), \frac{P_{max.1.2} - P_{min.1.2}}{\min(W, L)}, \frac{q_{u.1.2}}{L'_{1.2}} \right) = 0.106 \cdot \frac{ksf}{ft}$

Bearing Pressure at d" $q_{u.d''.0.9} := q_{u.0.9} - d'' \cdot sq_{s.0.9} = 1.877 \cdot ksf$

$q_{u.d''.1.2} := q_{u.1.2} - d'' \cdot sq_{s.1.2} = 1.958 \cdot ksf$

$V_{n1} := 2 \cdot \min(W, L) \cdot \sqrt{f_c \cdot psi} \cdot d_c = 997.037 \cdot kip$

Resistance Factor - Shear

$\phi_v := 0.75$

Design Shear Strength

$\phi V_{n1} := \phi_v \cdot V_{n1} = 747.778 \cdot kip$

Applied Shear

$$V_{u1.0.9} := \frac{\min(W, L) \cdot d'' \cdot \left(q_{u.0.9} + q_{u.d''.0.9}\right)}{2} = 503.227 \cdot kip$$

$$V_{u1.1.2} := \frac{\min(W, L) \cdot d'' \cdot \left(q_{u.1.2} + q_{u.d''.1.2}\right)}{2} = 464.681 \cdot kip$$

Check

$Check_{V1} := if\left(\max\left(V_{u1.0.9}, V_{u1.1.2}\right) < \phi V_{n1}, "OK", "NG"\right) = "OK"$

$$\frac{\max\left(V_{u1.0.9}, V_{u1.1.2}\right)}{\phi V_{n1}} = 67.296 \cdot \%$$

Two-Way Shear (Compression)

Average Effective Depth

$d_{c.2} := T - cc_{pad} - d_{bar_{Sp}} = 22.872 \cdot in$

Radius of Two-Way Shear Plane

$r_{2way} := 0.5 \cdot \left(d_{pier} + d_{c.2}\right) = 3.453\ ft$

Length to Edge of Pad from Pier Centroid

$$L_{edge.2} := \frac{\min(W, L)}{2} - \frac{2}{3} \sin(60deg) \cdot BW + Offset = 3.721\ ft$$

Critical Perimeter

$P_{crit.cir} := \left(d_{pier} + d_{c.2}\right) \cdot \pi = 260.35 \cdot in$

Area of Conc in Shear

$A_c := P_{crit.cir} \cdot d_{c.2} = 5954.727 \cdot in^2$

Polar Moment if Inertia of Critical Section

$$J_{c.cir} := \frac{\pi \cdot \left(d_{pier} + d_{c.2}\right)^4}{32} = 4630535.037 \cdot in^4$$

Applied Share Force

$V_{u.1.2} := 1.2 \cdot W_{pier} + P_{comp} = 479.254 \cdot kip$

Total Moment to Pier

$M_{u.comp} := V_{u\_comp} \cdot \left(D + E + bp_{dist} - T\right) = 238.917 \cdot ft \cdot kip$

Controlling Shear Stress

$$v_{u.1.2} := \frac{V_{u.1.2}}{A_c} + 0.4 \cdot M_{u.comp} \cdot \frac{\left(\frac{d_{pier} + d_{c.2}}{2}\right)}{J_{c.cir}} = 0.091 \cdot ksi$$

Shear Stress Capacity

$\phi v_n := \phi_s \cdot 4 \cdot \sqrt{f_c \cdot psi} = 164.317 \cdot psi$

Two-Way Shear Check

$Check_{v2.comp} := if\left(v_{u.1.2} < \phi v_n, "OK", "NG"\right) = "OK"$

$$\frac{v_{u.1.2}}{\phi v_n} = 55.226 \cdot \%$$

Two-Way Shear (Compression, Flexure)

Distance to Outside Edge

$$dist_{outside} := \min\left(\frac{\min(W, L) - BW}{2}, \frac{BW}{2}\right) \cdot 2 = 11\,ft$$

Effective Pad Width

$$b_{pad} := \min\left(d_{pier} + 3 \cdot T, \min(W, L), dist_{outside}\right) = 11\,ft$$

Bar Spacing in Pad

$$B_{s.pad} := \frac{\min(W, L) - 2 \cdot cc_{pad} - d_{bar_{Sp}}}{mp - 1} = 10.549 \cdot in$$

Fraction of Bars in Effective Width

$$m_{eff} := if\left(b_{pad} = \min(W, L), mp, \frac{b_{pad}}{B_{s.pad}}\right) = 12.513$$

Area of Steel in Effective Width

$$A_{s.eff} := m_{eff} \cdot A_{bar_{Sp}} = 12.513 \cdot in^2$$

Depth of Equivalent Rectangular Stress Block

$$a_{eff} := \frac{A_{s.eff} \cdot F_y}{0.85 \cdot f_c \cdot b_{pad}} = 2.23 \cdot in$$

$$\beta_{pad} := if\left[f_c \le 4ksi, 0.85, if\left[f_c \ge 8ksi, 0.65, 0.85 - \left(\frac{f_c}{ksi} - 4\right) \cdot 0.05\right]\right] = 0.85$$

Dist from Top to Neutral Axis

$$c_{eff} := \frac{a_{eff}}{\beta_{pad}} = 2.624 \cdot in$$

Strain in Steel

$$\varepsilon_{s.eff} := 0.003 \cdot \left(\frac{d_c - c_{eff}}{c_{eff}}\right) = 0.023 \cdot \frac{in}{in}$$

Compression-Controlled Strain Limit

$$\varepsilon_c := \frac{F_y}{E_s} = 2.069 \times 10^{-3} \cdot \frac{in}{in}$$

Resistance Factor

$$\phi_{flex.eff} := if\left[\varepsilon_{s.eff} \ge 0.005, 0.9, if\left[\varepsilon_{s.eff} \le \varepsilon_c, 0.65, 0.65 + (0.9 + 0.65) \cdot \frac{\left(\varepsilon_{s.eff} - \varepsilon_c\right)}{\left(0.005 - \varepsilon_c\right)}\right]\right] = 0.9$$

Nominal Flexural Strength

$$M_{n.eff} := A_{s.eff} \cdot F_y \cdot \left(d_c - \frac{a_{eff}}{2}\right) = 1.326 \times 10^3 \cdot ft \cdot kip$$

Design Flexural Strength

$$\phi M_{n.eff} := \phi_{flex.eff} \cdot M_{n.eff} = 1.193 \times 10^3 \cdot ft \cdot kip$$

$$\frac{0.6 M_{u.comp}}{\phi M_{n.eff} \cdot 2} = 6.006 \cdot \%$$

Since top and bottom reinforcement in pad is the same, the total moment capacity will be 2x.

Two-Way Shear Check

$$Check_{v2.comp.flex} := if\left(0.6 M_{u.comp} < \phi M_{n.eff} \cdot 2, "OK", "NG"\right) = "OK"$$

Two-Way Shear (Uplift)

Diameter of Longitudinal Rebar Cage

$$d_{cage} := d_{pier} - 2\cdot\left(cc_{pier} + d_{bar_{St}}\right) - d_{bar_{Sc}} = 52.125\cdot in$$

$$d_{c.2} = 22.872\cdot in$$

Steel Embedment Length

$$L_{embed} := d_{c.2} = 22.872\cdot in$$

Radius of Two-Way Shear Plane

$$r_{2way.tens} := 0.5\cdot\left(d_{cage} + L_{embed}\right) = 3.125\,ft$$

Critical Perimeter

$$P_{crit.tens} := \left(d_{cage} + L_{embed}\right)\cdot\pi = 235.61\cdot in$$

Area of Concrete in Shear

$$A_{c.tens} := P_{crit.tens}\cdot L_{embed} = 5388.872\cdot in^2$$

Polar Moment of Inertia of Critical Section

$$J_{c.tens} := \frac{\pi\cdot\left(d_{cage} + L_{embed}\right)^4}{32} = 3105814.116\cdot in^4$$

Total Moment in Pier

$$M_{u.uplift} := V_{u\_uplift}\cdot\left(D + E + bp_{dist} - T\right) = 215.417\cdot ft\cdot kip$$

Controlling Shear Stress

$$v_{u.0.9.tens} := \frac{V_{u.0.9.tens}}{A_{c.tens}} + 0.4\cdot M_{u.uplift}\cdot\frac{\left(\frac{d_{cage} + L_{embed}}{2}\right)}{J_{c.tens}} = 0.087\cdot ksi$$

Two-Way Shear Check

$$Check_{v2.uplift} := if\left(v_{u.0.9.tens} < \phi v_n, "OK", "NG"\right) = "OK"$$

$$\frac{v_{u.0.9.tens}}{\phi v_n} = 52.665\cdot\%$$

Two-Way Shear (Uplift, Flexure)

$$M_{u.up.pier} := 0.6\cdot M_{u.uplift} = 129.25\cdot ft\cdot kip$$

$$\frac{M_{u.up.pier}}{\phi M_{n.eff}\cdot 2} = 5.416\cdot\%$$

Since top and bottom reinforcement in pad is the same, the total moment capacity will be 2x.

Two-Way Shear Check

$$Check_{v2.uplift.flex} := if\left(M_{u.up.pier} < \phi M_{n.eff}\cdot 2, "OK", "NG"\right) = "OK"$$

JOB TITLE Foundation Analysis - TIA-H - Middlebury CSP#20

JOB NO. VZ5-228 / SMK-007 CALCULATION NO. _____ ORIGINATOR K.Barker DATE 07/02/2021

SHEET _____ OF _____ REVIEWER _____ DATE _____

Pad Flexure

Area of Steel in Pad

$$A_{s.pad} := A_{bar_{Sp}} \cdot mp = 39 \cdot in^2$$

Depth to Equivalent Stress Block

$$a_{pad} := \frac{A_{s.pad} \cdot F_y}{0.85 \cdot f_c \cdot \min(W, L)} = 2.249 \cdot in$$

Dist from Top to Neutral Axis

$$c_{pad} := \frac{a_{pad}}{\beta_{pad}} = 2.646 \cdot in$$

Strain in Steel

$$\varepsilon_s := 0.003 \cdot \frac{d_c - c_{pad}}{c_{pad}} = 0.022 \cdot \frac{in}{in}$$

Resistance Factor

$$\phi_{flex.pad} := \text{if}\left[\varepsilon_s \geq 0.005, 0.9, \text{if}\left[\varepsilon_s \leq \varepsilon_c, 0.65, 0.65 + (0.9 + 0.65) \cdot \frac{(\varepsilon_s - \varepsilon_c)}{(0.005 - \varepsilon_c)}\right]\right] = 0.9$$

Nominal Flexural Strength

$$M_n := A_{s.pad} \cdot F_y \cdot \left(d_c - \frac{a_{pad}}{2}\right) = 4130.769 \cdot ft \cdot kip$$

Design Flexural Strength

$$\phi M_n := \phi_{flex.pad} \cdot M_n = 3717.692 \cdot ft \cdot kip$$

Bearing Pressure at Critical Section

$$qmid_{0.9} := q_{u.0.9} - sq_{s.0.9} \cdot d' = 1.513 \cdot ksf$$

$$qmid_{1.2} := q_{u.1.2} - sq_{s.1.2} \cdot d' = 1.761 \cdot ksf$$

Factored Bending Moment

$$M_{u.pad.0.9} := \left[\frac{qmid_{0.9} \cdot d'^2}{2} + \frac{\left(q_{u.0.9} - qmid_{0.9}\right) \cdot d'^2}{3}\right] \cdot \min(W, L) = 2.669 \times 10^3 \cdot ft \cdot kip$$

$$M_{u.pad.1.2} := \left[\frac{qmid_{1.2} \cdot d'^2}{2} + \frac{\left(q_{u.1.2} - qmid_{1.2}\right) \cdot d'^2}{3}\right] \cdot \min(W, L) = 2.435 \times 10^3 \cdot ft \cdot kip$$

Check

$$Check_{Mu.pad} := \text{if}\left(\max\left(M_{u.pad.0.9}, M_{u.pad.1.2}\right) < \phi M_n, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$$

$$\frac{\max\left(M_{u.pad.0.9}, M_{u.pad.1.2}\right)}{\phi M_n} = 71.789 \cdot \%$$

Pier Design

Compute Axial Loads to Pier

$$P_{pier.c.1.2} := -1 \cdot \left(P_{comp} + \gamma_{DL.max} \cdot W_{pier}\right) = -479.254 \cdot kip$$

$$P_{pier.c.0.9} := -1 \cdot \left(P_{comp} \cdot \frac{\gamma_{DL.min}}{\gamma_{DL.max}} + 0.9 \cdot W_{pier}\right) = -359.44 \cdot kip$$

$$P_{pier.u.1.2} := P_{uplift} - 1.2 W_{pier} = 395.746 \cdot kip$$

$$P_{pier.u.0.9} := P_{uplift} \cdot \frac{\gamma_{DL.min}}{\gamma_{DL.max}} - 0.9 \cdot W_{pier} = 296.81 \cdot kip$$

Compute Moments to Base of Pier (Passive resistance of soil neglected due to movement required to develop resistance)

$$M_{pier.c} := \left(D - T + E + bp_{dist}\right) \cdot V_{u\_comp} = 238.917 \cdot ft \cdot kip$$

$$M_{pier.u} := \left(D - T + E + bp_{dist}\right) \cdot V_{u\_uplift} = 215.417 \cdot ft \cdot kip$$

Format Data for Graphing

$$P_{pier} := \begin{pmatrix} P_{pier.c.1.2} \\ P_{pier.c.0.9} \\ P_{pier.u.1.2} \\ P_{pier.u.0.9} \end{pmatrix} \qquad M_{pier} := \begin{pmatrix} M_{pier.c} \\ M_{pier.c} \\ M_{pier.u} \\ M_{pier.u} \end{pmatrix}$$

CSiBridge Version 22.0 has been utilized to compute PM-curves for the pier in accordance with ACI 318-14. The following inputs were used:

Pier Size: $d_{pier} = 60 \cdot in$

Pier Rebar Size: $Sc = 7$

No of Pier Rebar: $mc = 16$

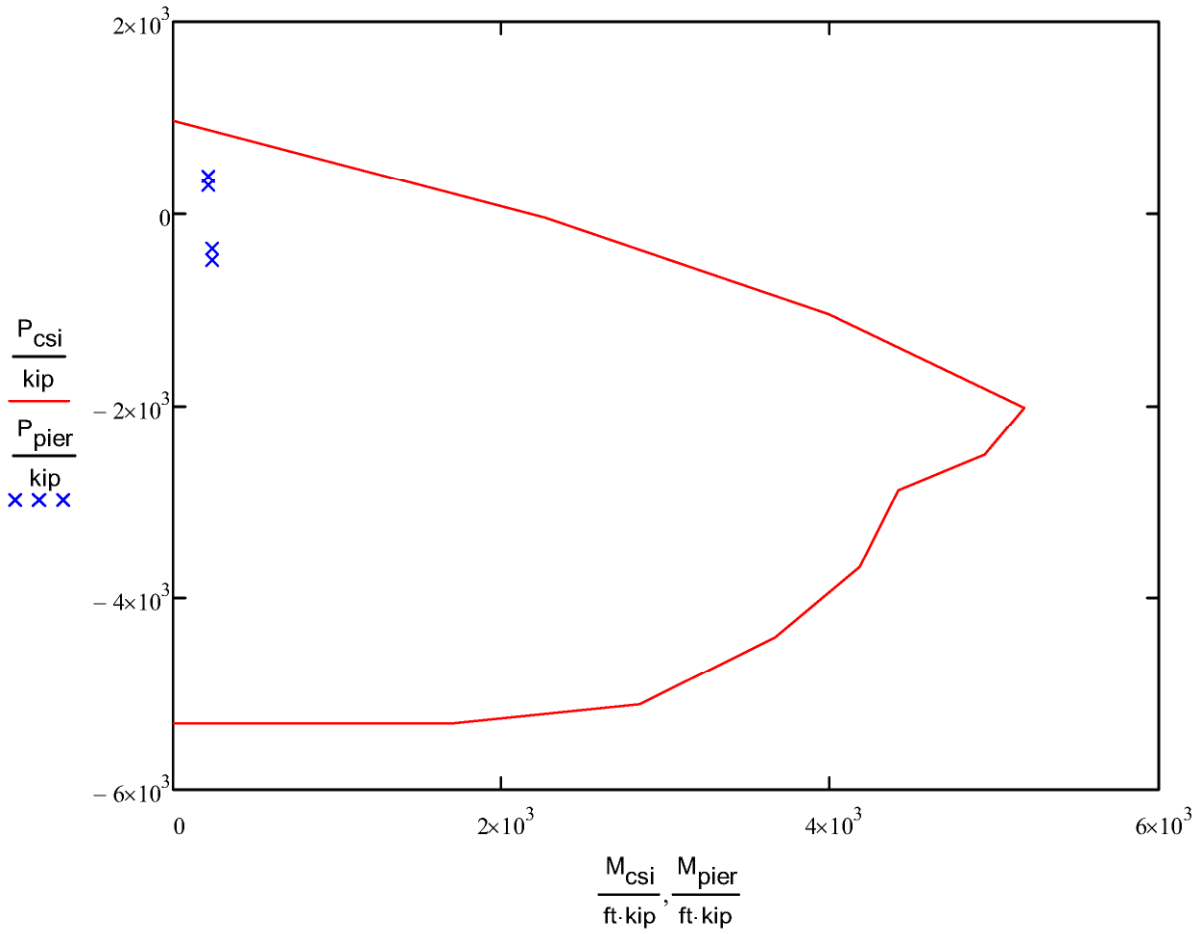
Dist to Center of Pier Rebar: $cc_{pier} + d_{bar_{St}} + 0.5 \cdot d_{bar_{Sc}} = 3.938 \cdot in$

Concrete Compressive Strength: $f_c = 3000\,psi$

P-M Curve Data from CSiBridge

$$P_{csi} := \begin{pmatrix} -5310058 \\ -5310058 \\ -5115433 \\ -4412494 \\ -3673317 \\ -2879374 \\ -2506717 \\ -2014955 \\ -1038191 \\ -40701 \\ 971173 \end{pmatrix} \cdot lbf \qquad M_{csi} := \begin{pmatrix} 0 \\ 20346548 \\ 34057670 \\ 43920143 \\ 50146473 \\ 52930436 \\ 59225312 \\ 62131239 \\ 47851413 \\ 27131054 \\ 0 \end{pmatrix} \cdot in \cdot lbf$$

Note: Negative P is compression and Positive P is tension



As shown graphically, the plotted axial and moments applied to the pier are within the graphed capacity, therefore the pier is structurally adequate for the applied loading.

Rebar Detail Checks

Minimum Longitudinal Rebar in Pier

$$A_{st.c} := \frac{\pi}{4} \cdot d_{pier}^{2} \cdot 0.005 = 14.137 \cdot in^2$$

Longitduinal Rebar in Pier

$$A_{s.pier} := A_{bar_{Sc}} \cdot mc + 9 \cdot A_{bar_9} = 18.6 \cdot in^2$$

Check

$$check_{min.pier} := if\left(A_{st.c} < A_{s.pier}, "OK", "NG"\right) = "OK"$$

Max Longitudinal Bar Spacing in Pier

$$B_{s.pier} := \frac{d_{cage} \cdot \pi}{mc} - d_{bar_{Sc}} = 9.36 \cdot in$$

Check

$$check_{max.spa.pier} := if\left(B_{s.pier} \le 18in, "OK", "NG"\right) = "OK"$$

Minimum Transverse Pier Bar Size

$$s_{t.min} := if(Sc \le 10, 3, 4) = 3$$

Check

$$check_{trans.pier.size} := if\left(s_{t.min} \le St, "OK", "NG"\right) = "OK"$$

Max Transverse Pier Bar Spacing

$$B_{s.t.max1} := \frac{8}{0.5} \cdot d_{bar_{Sc}} = 14 \cdot in$$

$$B_{s.t.max2} := \frac{24}{0.5} \cdot d_{bar_{St}} = 24 \cdot in$$

Transverse Bar Spacing

$$B_{s.t} := \frac{D - T + E - 2 \cdot cc_{pier}}{mt - 1} = 13 \cdot in$$

Check

$$check_{trans.pier.pa} := if\left(B_{s.t} \le \min\left(B_{s.t.max1}, B_{s.t.max2}\right), "OK", "NG"\right) = "OK"$$

Min Rebar Density for Shrinkage

$$\rho_{sh} := if\left(F_y \ge 60ksi, 0.0018, 0.002\right) = 0.0018$$

Min Temp/Shrink Rebar in Pad

$$A_{st.p.sh} := \rho_{sh} \cdot \max(W, L) \cdot T = 20.995 \cdot in^2$$

Area of Steel Provided

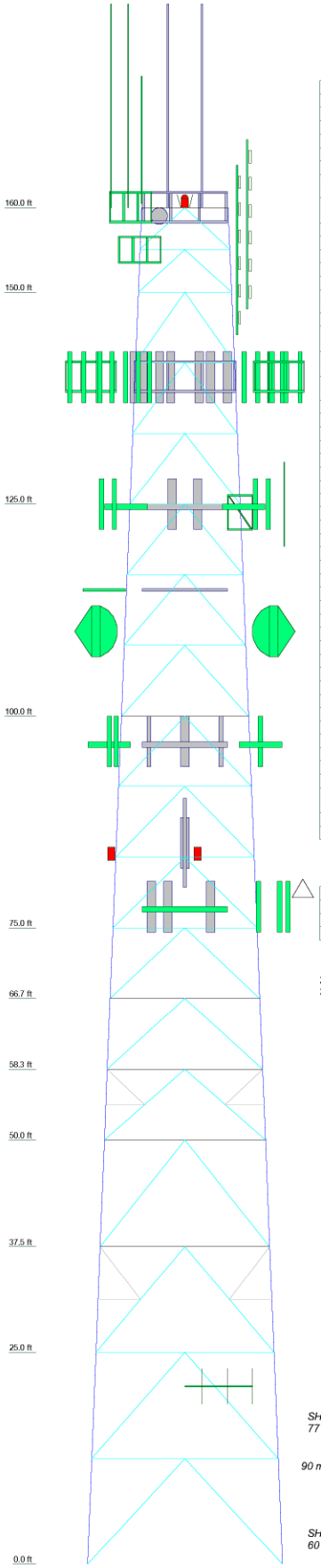
$$A_{s.p} := A_{bar_{Sp}} \cdot mp \cdot 2 = 78 \cdot in^2$$

Check

$$check_{shrink.pad} := if\left(A_{st.p.sh} \le A_{s.p}, "OK", "NG"\right) = "OK"$$

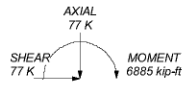
ANALYSIS UNDER TIA-222-F DESIGN CRITERIA (DESPP / CSP)

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1	
Legs	HSS6.875x0.5 w/ (3) 2x5/8 Bars	HSS6.875x.4		HSS5x.4	P5x0.4 w/ (3) 1.5x5/8 Plates		P5x0.3 w/ (3) 1.5x5/8 Plates		P.5x.250		
Leg Grade	A500-50	A514-60		A572-50			A500-50				
Diagonals	2L4x3x3/8	2L3 1/2x3 1/2x5/16	2L3 1/2x2x3/8	2L3x3x5/16	2L3x2 1/2x5/16		2L3x2 1/2x1/4	2L2 1/2x2 1/2x5/16	2L2 1/2x2x3/16		
Diagonal Grade	A529-50		A36		A529-50		A36				
Top Girts	N.A.	L4x4x5/16	L4x4x1/4	L3x3x1/2	N.A.		L3x3x1/4	L3x3x5/16	N.A.	L3x3x1/4	
Horizontals	L4x4x1/2	N.A.					L3x3x1/2		L2 1/2x2 1/2x3/16	L3x3x1/4	
Red. Horizontals	N.A.	N.A.	N.A.	L2x2x5/16			N.A.				
Red. Diagonals	N.A.	L2x2x5/16	N.A.	L2x2x5/16			N.A.				
Inner Bracing	L2 1/2x2 1/2x3/16						L2 1/2x2x3/16				
Face Width (ft)	23	21	20	19	17	15	13	11	10.2		
# Panels @ (ft)	4 @ 12.5			18.3333	17.6667	12 @ 8.33333				2 @ 5	
Weight (K)	34.1	8.7	3.0	2.3	2.1	2.1	6.1	3.9	2.3	1.2	

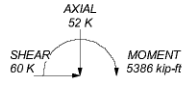


MAX. CORNER REACTIONS AT BASE:
DOWN: 371 K
SHEAR: 44 K

UPLIFT: -314 K
SHEAR: 39 K



TORQUE 185 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 104 kip-ft
REACTIONS - 90 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (1.158)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	125
Lightning Rod 1/2"x4' on 15' Pole (Tower - LR)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	125
DS7C09P36D-D (CSP)	160	DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	125
DS7C09P36D-D (CSP)	160	EMS RR90-17-xx (T-Mobile)	125
DS7C09P36D-D (CSP)	160	EMS RR90-17-xx (T-Mobile)	125
DS7C09P36D-D (CSP)	160	EMS RR90-17-xx (T-Mobile)	125
Commscope SFG23HD-12-4-96 Mount Assembly (CSP)	160	LNX-6515DS-A1M Andrew Panel (T-Mobile)	125
		LNX-6515DS-A1M Andrew Panel (T-Mobile)	125
Commscope SFG23HD-12-4-96 Mount Assembly (CSP)	160	LNX-6515DS-A1M Andrew Panel (T-Mobile)	125
432E-83I-01T TTA Unit (2-3.159 - TTA)	159	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	125
HPD2-4.7 (NWCT (C-A Face))	159	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	125
DB304-A (2.158)	158	Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	125
432E-83I-01T TTA Unit (3.155 - TTA Unit)	155	2" Dia 10' Omni (2.124)	124
DB228-A (2.155)	155	Pirod 6' Side Mount Standoff (1) (Mt for 2.124)	124
10' PCS Frame (1) (Mt for 2.155.1, 2.155.2 , 2.1557)	155	4'x96"x72" Ice Canopy (DNK-5)	115
		4'x96"x72" Ice Canopy (DNK-6)	115
DC6-48-60-18-8F (Squid) Suppressor (ATT)	146	6' w/ Radome (2.110)	110
Commscope SFG22 (14' Sector Frame) (ATI Proposed)	140	6' w/ Radome (3.110)	110
		TD-RRH8x20 (Sprint)	97
Commscope SFG22 (14' Sector Frame) (ATI Proposed)	140	RRH 800MHz 2x50W (Sprint)	97
		RRH 1900 MHz 2x40W (Sprint)	97
Commscope SFG22 (14' Sector Frame) (ATI Proposed)	140	RRH 800MHz 2x50W (Sprint)	97
		RRH 800MHz 2x50W (Sprint)	97
7770.00 (ATT)	140	RRH 800MHz 2x50W (Sprint)	97
CCI DMP65R-BU8D Panel (ATI Proposed)	140	RRH 800MHz 2x50W (Sprint)	97
CCI OPA65R-BU8D Panel (ATI Proposed)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-32 (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-12 (ATT)	140	TD-RRH8x20 (Sprint)	97
Radio 4449 B5/B12 RRH (ATI Proposed)	140	RRH 1900 MHz 2x40W (Sprint)	97
Radio 4478 B14 RRH (ATI Proposed)	140	RRH 1900 MHz 2x40W (Sprint)	97
TT19-08BP111-001 TMA's (ATT)	140	APXVSPP18-C-A20 (Sprint)	97
(2) LGP21401 Diplexer (ATT)	140	APXVSPP18-C-A20 (Sprint)	97
7770.00 (ATT)	140	APXVSPP18-C-A20 (Sprint)	97
CCI DMP65R-BU8D Panel (ATI Proposed)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
CCI OPA65R-BU8D Panel (ATI Proposed)	140	DT465B-2XR-V2 Panels (Commscope) (Sprint)	97
TPA-65R-LCUUUU-H8 Panel w/ RET (ATT)	140	RRH 800MHz 2x50W (Sprint)	97
RRUS-32 (ATT)	140	PM-SU35-48 - Pipe Mount 48" (Sprint)	97
RRUS-12 (ATT)	140	TD-RRH8x20 (Sprint)	97
Radio 4449 B5/B12 RRH (ATI Proposed)	140	10'6"x4" Pipe Mount (Mt for 1.85)	85
Radio 4478 B14 RRH (ATI Proposed)	140	PD10054 (2x2' Square - 1.85)	85
DC6-48-60-18-8F (Squid) Suppressor (ATT)	140	L-810 Tower Side-Light Beacon (1.83)	83
TT19-08BP111-001 TMA's (ATT)	140	L-810 Tower Side-Light Beacon (3.83)	83
(2) LGP21401 Diplexer (ATT)	140	5' T-arm (VZW)	77.5
7770.00 (ATT)	140	JMA MX06FR0660-03 (VZW)	77.5
DMP65R-BU6D (ATI Proposed)	140	JMA MX06FR0660-03 (VZW)	77.5
OPA65R-BU6D (ATI Proposed)	140	JMA 2" Edge to Edge (VZW)	77.5
QS66512 (ATT)	140	JMA MX06FR0660-03 (VZW)	77.5
RRUS-32 (ATT)	140	JMA MX06FR0660-03 (VZW)	77.5
RRUS-12 (ATT)	140	JMA 2" Edge to Edge (VZW)	77.5
Radio 4449 B5/B12 RRH (ATI Proposed)	140	Samsung MT6407-77A (VZW)	77.5
Radio 4478 B14 RRH (ATI Proposed)	140	Samsung MT6407-77A (VZW)	77.5
DC6-48-60-18-8F (Squid) Suppressor (ATI Proposed)	140	(3) RRH (VZW)	77.5
		(3) RRH (VZW)	77.5
TT19-08BP111-001 TMA's (ATT)	140	5' T-arm (VZW)	77.5
(2) LGP21401 Diplexer (ATT)	140	DC6-48-60-18-8F (VZW)	77.5
		Sinclair SY450-SF1SNM Yagi (3-1.21)	21

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A529-50	50 ksi	65 ksi
A36	36 ksi	58 ksi	A514-60	60 ksi	80 ksi
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

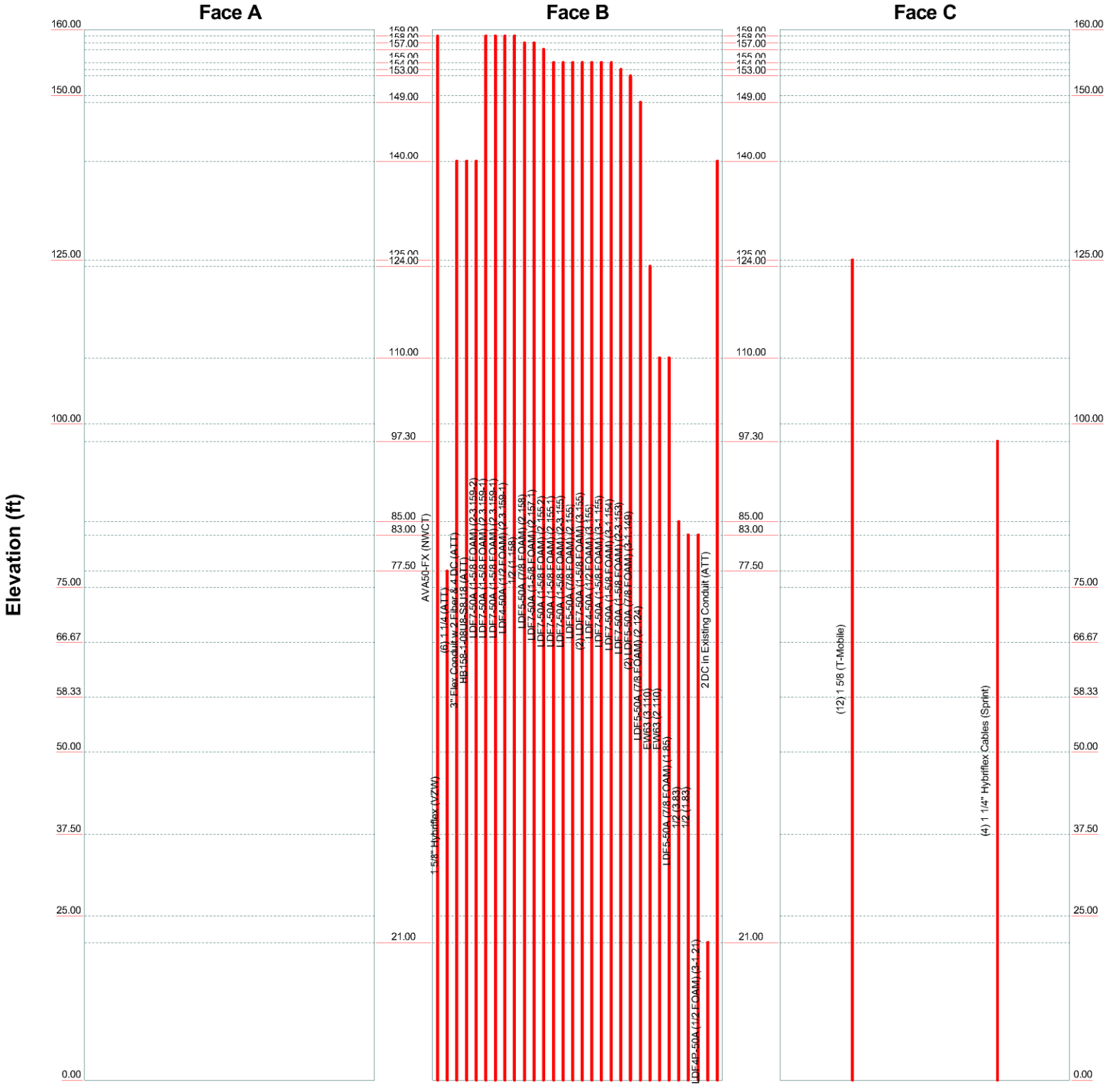
1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.

AECOM
500 Enterprise Drive
Rocky Hill, CT
Phone: (860) 529-8882
FAX:

Job: **160' Self Support Lattice - CSP #20**
Project: **Middlebury, CT**
Client: SMK-007 / VZ5-228 | Drawn by: KAB | App'd:
Code: TIA/EIA-222-F | Date: 07/02/21 | Scale: NTS
Path: | Dwg No. E-1

Feed Line Distribution Chart
0' - 160'

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



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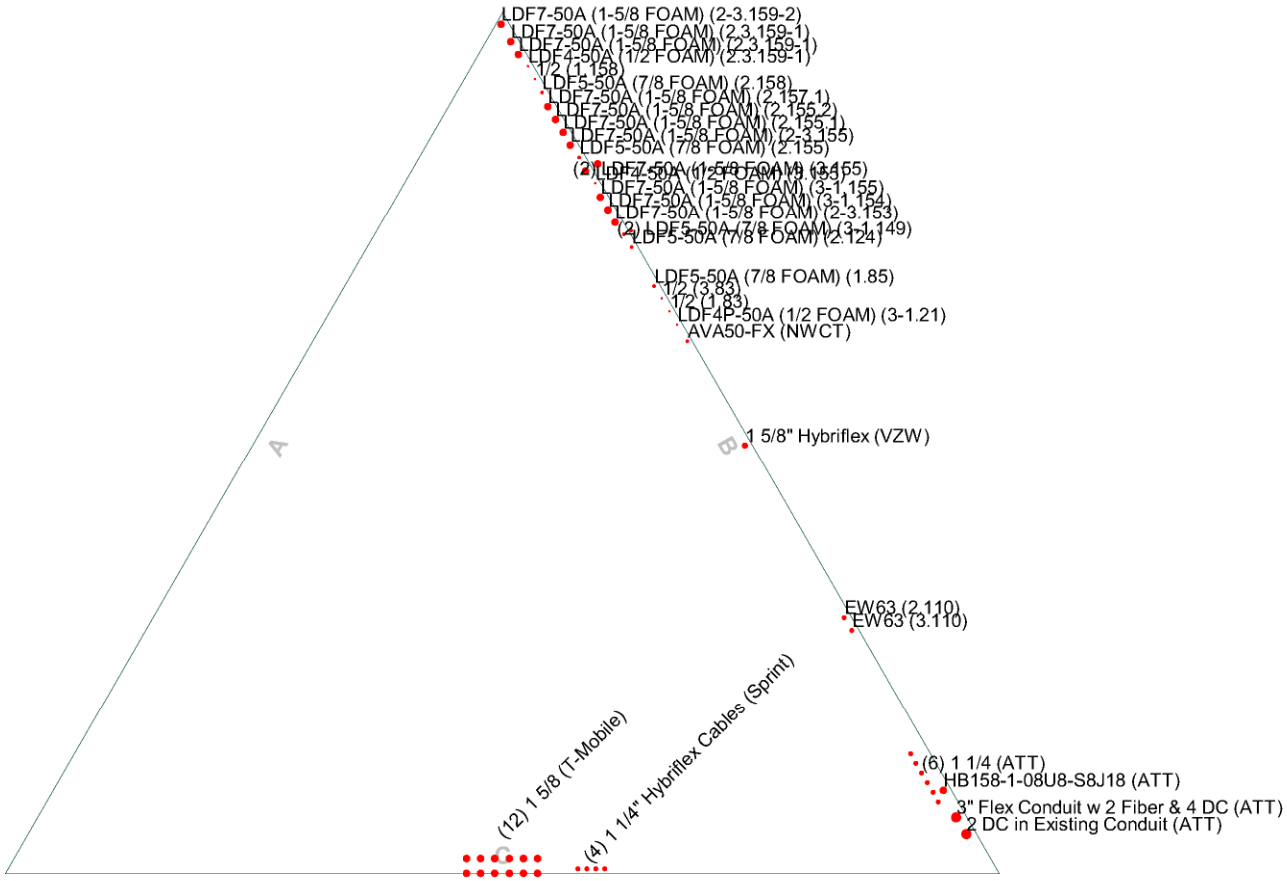
Client: SMK-007 / VZ5-228		Drawn by: KAB	App'd:
Code: TIA/EIA-222-F		Date: 07/02/21	Scale: NTS
Path:			Dwg No. E-7

Feed Line Plan

Round Flat App In Face App Out Face



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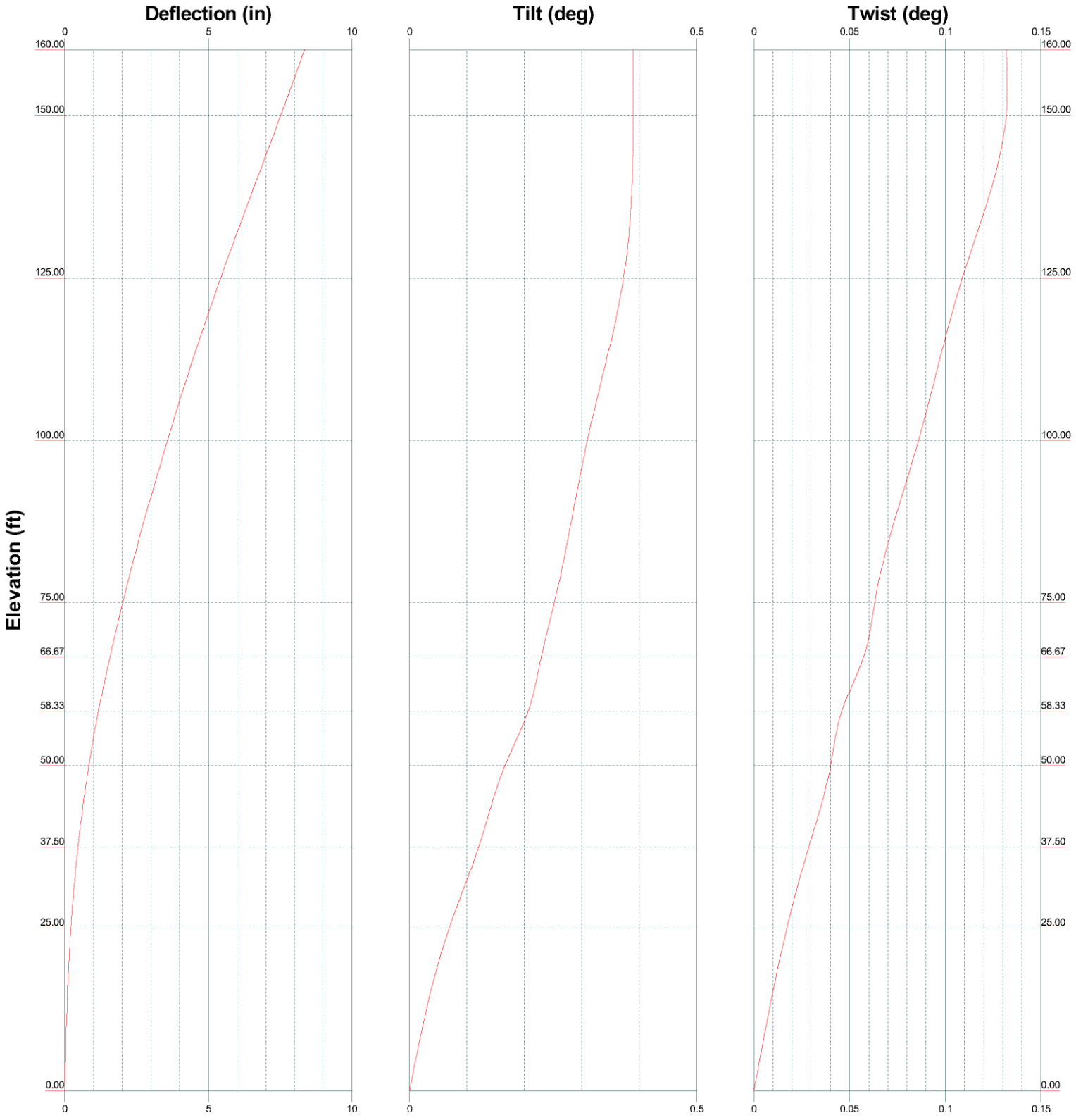
Project: ***Middlebury, CT***			
Client: SMK-007 / VZ5-228	Drawn by: KAB	App'd:	
Code: TIA/EIA-222-F	Date: 07/02/21	Scale: NTS	
Path:		Dwg No. E-7	

TIA/EIA-222-F - Service - 90 mph

Maximum Values



AECOM
500 Enterprise Drive
Rocky Hill, CT
Phone: (860) 529-8882
FAX:

Job: *160' Self Support Lattice - CSP #20*			
Project: *Middlebury, CT*			
Client: SMK-007 / VZ5-228	Drawn by: KAB		App'd:
Code: TIA/EIA-222-F	Date: 07/02/21		Scale: NTS
Path:			Dwg No. E-5

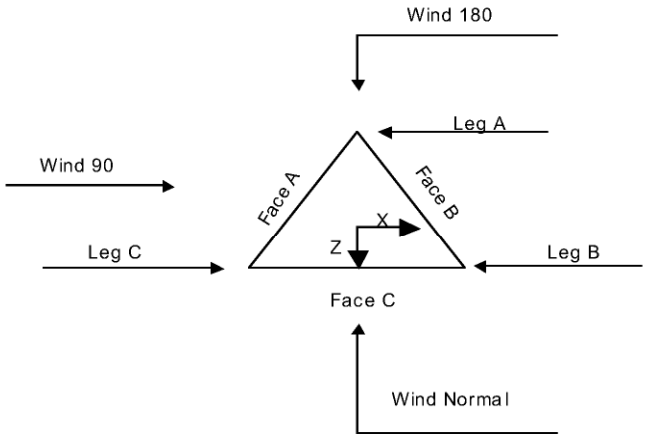
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 10.20 ft at the top and 23.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
Deflections calculated using a wind speed of 90 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	160.00-150.00			10.20	1	10.00
T2	150.00-125.00			11.00	1	25.00
T3	125.00-100.00			13.00	1	25.00
T4	100.00-75.00			15.00	1	25.00
T5	75.00-66.67			17.00	1	8.33
T6	66.67-58.33			17.67	1	8.33
T7	58.33-50.00			18.33	1	8.33
T8	50.00-37.50			19.00	1	12.50
T9	37.50-25.00			20.00	1	12.50
T10	25.00-0.00			21.00	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	160.00-150.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	150.00-125.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	125.00-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	75.00-66.67	8.33	K Brace Down	No	Yes	0.0000	0.0000

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
T6	66.67-58.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T7	58.33-50.00	8.33	K1 Down	No	Yes	0.0000	0.0000
T8	50.00-37.50	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	37.50-25.00	12.50	K1 Down	No	Yes	0.0000	0.0000
T10	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 160.00-150.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 150.00-125.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 125.00-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 100.00-75.00	Arbitrary Shape	P5x0.3 w/ (3) 1.5x5/8 Plates	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T5 75.00-66.67	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T6 66.67-58.33	Arbitrary Shape	P5x0.4 w/ (3) 1.5x5/8 Plates	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x5/16	A529-50 (50 ksi)
T7 58.33-50.00	Pipe	HSS5x.4	A514-60 (60 ksi)	Double Angle	2L3x3x5/16	A36 (36 ksi)
T8 50.00-37.50	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8	A36 (36 ksi)
T9 37.50-25.00	Pipe	HSS6.875x.4	A514-60 (60 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A529-50 (50 ksi)
T10 25.00-0.00	Arbitrary Shape	HSS6.875x0.5 w/ (3) 2x5/8 Bars	A500-50 (50 ksi)	Double Angle	2L4x3x3/8	A529-50 (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 160.00-150.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36M-50 (50 ksi)
T4 100.00-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 66.67-58.33	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 58.33-50.00	Single Angle	L3x3x1/2	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 50.00-37.50	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T9 37.50-25.00	Single Angle	L4x4x5/16	A529-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 160.00-150.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T2 150.00-125.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 125.00-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T4 100.00-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T5 75.00-66.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T6 66.67-58.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T7 58.33-50.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T8 50.00-37.50	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T9 37.50-25.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)
T10 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/2	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
T3 125.00-100.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-75.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 75.00-66.67	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 66.67-58.33	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 58.33-50.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-37.50	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 37.50-25.00	Equal Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T10 25.00-0.00	Solid Round		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T7	A36	Horizontal (1)	Equal Angle	L2x2x5/16	1
58.33-50.00	(36 ksi)	Diagonal (1)	Equal Angle	L2x2x5/16	1
T9	A36	Horizontal (1)	Equal Angle	L2x2x5/16	1
37.50-25.00	(36 ksi)	Diagonal (1)	Single Angle	L2x2x5/16	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1	0.00	0.0000	A36	1	1	1	0.0000	0.0000	36.0000
160.00-150.00			(36 ksi)						
T2	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
150.00-125.00			(36 ksi)						
T3	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
125.00-100.00			(36 ksi)						
T4	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
100.00-75.00			(36 ksi)						
T5 75.00-66.67	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T6 66.67-58.33	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T7 58.33-50.00	0.00	0.0000	A36	1	1	1.03	0.0000	36.0000	36.0000
			(36 ksi)						
T8 50.00-37.50	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						
T9 37.50-25.00	0.00	0.0000	A36	1	1	1.03	0.0000	36.0000	36.0000
			(36 ksi)						
T10 25.00-0.00	0.00	0.0000	A36	1	1	1	0.0000	36.0000	36.0000
			(36 ksi)						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	0.65	0.65	1
160.00-150.00				1	1	1	1	0.65	0.65	1
T2	Yes	Yes	1	1	1	1	1	0.65	0.65	1
150.00-125.00				1	1	1	1	0.65	0.65	1
T3	Yes	Yes	1	1	1	1	1	0.65	0.65	1
125.00-100.00				1	1	1	1	0.65	0.65	1
T4	Yes	Yes	1	1	1	1	1	0.65	0.65	1
100.00-75.00				1	1	1	1	0.65	0.65	1
T5	Yes	Yes	1	1	1	1	1	0.65	0.65	1
75.00-66.67				1	1	1	1	0.65	0.65	1
T6	Yes	Yes	1	1	1	1	1	0.65	0.65	1
66.67-58.33				1	1	1	1	0.65	0.65	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T7	Yes	Yes	1	1	1	1	1	0.65	0.65	1
58.33-50.00				1	1	1	1	0.65	0.65	1
T8	Yes	Yes	1	1	1	1	1	0.65	0.65	1
50.00-37.50				1	1	1	1	0.65	0.65	1
T9	Yes	Yes	1	1	1	1	1	0.65	0.65	1
37.50-25.00				1	1	1	1	0.65	0.65	1
T10	Yes	Yes	1	1	1	1	1	0.65	0.65	1
25.00-0.00				1	1	1	1	0.65	0.65	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
160.00-150.00														
T2	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-125.00														
T3	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
125.00-100.00														
T4	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-75.00														
T5 75.00-66.67	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 66.67-58.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 58.33-50.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-37.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 37.50-25.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 25.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Connection Offsets Diagonal Vert. Top in	Diagonal Horiz. Top in	Diagonal Vert. Bot. in	Diagonal Horiz. Bot. in	K-Bracing Vert. Top in	K-Bracing Horiz. Top in	K-Bracing Vert. Bot. in	K-Bracing Horiz. Bot. in
T1	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
160.00-150.00								
T2	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
150.00-125.00								
T3	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
125.00-100.00								

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T4 100.00-75.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T5 75.00-66.67	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T6 66.67-58.33	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T7 58.33-50.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T8 50.00-37.50	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T9 37.50-25.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000
T10 25.00-0.00	0.0000	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000

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 160.00-150.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 150.00-125.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 125.00-100.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-75.00	Flange	0.7500 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 75.00-66.67	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 66.67-58.33	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 58.33-50.00	Flange	0.8750 A325X	6	0.7500 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-37.50	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 37.50-25.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325X	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T10 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 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 plf
AVA50-FX (NWCT)	B	Yes	No	Ar (CfAe)	159.00 - 0.00	-0.5000	-0.12	1	1	1.1020	1.1020		0.29
1 5/8" Hybriflex (VZW)	B	Yes	No	Ar (CfAe)	77.50 - 0.00	-1.0000	0	1	1	1.6250	1.6250		1.48

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (T-Mobile)	C	Yes	No	Ar (CfAe)	125.00 - 0.00	-3.0000	0	12	6	1.9800	1.9800		1.04
1 1/4 (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-4.0000	0.38	6	6	1.5500	1.5500		0.66
3" Flex Conduit w 2 Fiber & 4 DC (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-1.0000	0.43	1	1	3.0000	3.0000		3.00
HB158-1-08U8-S8J18 (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-1.0000	0.4	1	1	1.9800	1.9800		1.30
1 1/4" Hybriflex Cables (Sprint) *	C	No	No	Ar (CfAe)	97.30 - 0.00	-0.5000	-0.09	4	4	1.2500	1.2500		1.13
* CSP Cables													
LDF7-50A (1-5/8 FOAM) (2-3.159-2)	B	Yes	No	Ar (CfAe)	159.00 - 0.00	-1.0000	-0.49	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.3.159-1)	B	Yes	No	Ar (CfAe)	159.00 - 0.00	-1.0000	-0.47	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.3.159-1)	B	Yes	No	Ar (CfAe)	159.00 - 0.00	-1.0000	-0.455	1	1	1.9800	1.9800		0.82
LDF4-50A (1/2 FOAM) (2.3.159-1)	B	Yes	No	Ar (CfAe)	159.00 - 0.00	-1.0000	-0.44	1	1	0.6300	0.6300		0.15
1/2 (1.158)	B	Yes	No	Ar (CfAe)	158.00 - 0.00	-1.0000	-0.425	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (2.158)	B	Yes	No	Ar (CfAe)	158.00 - 0.00	-1.0000	-0.41	1	1	1.0900	1.0900		0.33
LDF7-50A (1-5/8 FOAM) (2.157.1)	B	Yes	No	Ar (CfAe)	157.00 - 0.00	-1.0000	-0.395	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.155.2)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.38	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2.155.1)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.365	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (2-3.155)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.35	1	1	1.9800	1.9800		0.82
LDF5-50A (7/8 FOAM) (2.155)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.335	1	1	1.0900	1.0900		0.33
LDF7-50A (1-5/8 FOAM) (3.155)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.32	2	1	1.9800	1.9800		0.82
LDF4-50A (1/2 FOAM) (3.155)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.305	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM) (3-1.155)	B	Yes	No	Ar (CfAe)	155.00 - 0.00	-1.0000	-0.29	1	1	1.9800	1.9800		0.82
LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	154.00 - 0.00	-1.0000	-0.275	1	1	1.9800	1.9800		0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(3-1.154) LDF7-50A (1-5/8 FOAM)	B	Yes	No	Ar (CfAe)	153.00 - 0.00	-1.0000	-0.26	1	1	1.9800	1.9800		0.82
(2-3.153) LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	149.00 - 0.00	-1.0000	-0.245	2	1	1.0900	1.0900		0.33
(3-1.149) LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	124.00 - 0.00	-1.0000	-0.23	1	1	1.0900	1.0900		0.33
(2.124) EW63	B	Yes	No	Ar (CfAe)	110.00 - 0.00	-1.0000	0.215	1	1	1.5742	1.5742		0.51
(3.110) EW63	B	Yes	No	Ar (CfAe)	110.00 - 0.00	-1.0000	0.2	1	1	1.5742	1.5742		0.51
(2.110) LDF5-50A (7/8 FOAM)	B	Yes	No	Ar (CfAe)	85.00 - 0.00	-1.0000	-0.185	1	1	1.0900	1.0900		0.33
(1.85) 1/2	B	Yes	No	Ar (CfAe)	83.00 - 0.00	-1.0000	-0.17	1	1	0.5800	0.5800		0.25
(3.83) 1/2	B	Yes	No	Ar (CfAe)	83.00 - 0.00	-1.0000	-0.155	1	1	0.5800	0.5800		0.25
(1.83) LDF4P-50A (1/2 FOAM)	B	Yes	No	Ar (CfAe)	21.00 - 0.00	-1.0000	-0.14	1	1	0.6300	0.6300		0.15
(3-1.21) 2 DC in Existing Conduit (ATT)	B	Yes	No	Ar (CfAe)	140.00 - 0.00	-1.0000	0.45	1	1	3.0000	3.0000		3.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	160.00-150.00	A	0.000	0.000	0.000	0.000	0.00
		B	14.019	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	0.000	0.000	0.000	0.000	0.00
		B	79.826	0.000	0.000	0.000	0.47
		C	0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	99.120	0.000	0.000	0.000	0.60
		C	24.750	0.000	0.000	0.000	0.31
T4	100.00-75.00	A	0.000	0.000	0.000	0.000	0.00
		B	105.167	0.000	0.000	0.000	0.63
		C	34.042	0.000	0.000	0.000	0.41
T5	75.00-66.67	A	0.000	0.000	0.000	0.000	0.00
		B	37.073	0.000	0.000	0.000	0.22
		C	11.722	0.000	0.000	0.000	0.14
T6	66.67-58.33	A	0.000	0.000	0.000	0.000	0.00
		B	37.073	0.000	0.000	0.000	0.22
		C	11.722	0.000	0.000	0.000	0.14
T7	58.33-50.00	A	0.000	0.000	0.000	0.000	0.00
		B	37.073	0.000	0.000	0.000	0.22
		C	11.722	0.000	0.000	0.000	0.14
T8	50.00-37.50	A	0.000	0.000	0.000	0.000	0.00

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
		B	55.610	0.000	0.000	0.000	0.34
		C	17.583	0.000	0.000	0.000	0.21
T9	37.50-25.00	A	0.000	0.000	0.000	0.000	0.00
		B	55.610	0.000	0.000	0.000	0.34
		C	17.583	0.000	0.000	0.000	0.21
T10	25.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	112.322	0.000	0.000	0.000	0.68
		C	35.167	0.000	0.000	0.000	0.42

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	160.00-150.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		23.186	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.00
T2	150.00-125.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		128.493	0.000	0.000	0.000	1.29
		C		0.000	0.000	0.000	0.000	0.00
T3	125.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		159.037	0.000	0.000	0.000	1.61
		C		37.250	0.000	0.000	0.000	0.77
T4	100.00-75.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		170.042	0.000	0.000	0.000	1.70
		C		53.975	0.000	0.000	0.000	0.96
T5	75.00-66.67	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		60.684	0.000	0.000	0.000	0.60
		C		18.667	0.000	0.000	0.000	0.33
T6	66.67-58.33	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		60.684	0.000	0.000	0.000	0.60
		C		18.667	0.000	0.000	0.000	0.33
T7	58.33-50.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		60.684	0.000	0.000	0.000	0.60
		C		18.667	0.000	0.000	0.000	0.33
T8	50.00-37.50	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		91.026	0.000	0.000	0.000	0.90
		C		28.000	0.000	0.000	0.000	0.49
T9	37.50-25.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		91.026	0.000	0.000	0.000	0.90
		C		28.000	0.000	0.000	0.000	0.49
T10	25.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		184.905	0.000	0.000	0.000	1.83
		C		56.000	0.000	0.000	0.000	0.99

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	160.00-150.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.913	1.497	2.476
		C	0.000	0.000	0.000	0.000
T2	150.00-125.00	A	0.000	0.000	0.000	0.000

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
		B	0.000	3.448	5.354	8.619
		C	0.000	0.000	0.000	0.000
T3	125.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.000	4.031	6.777	10.874
		C	0.000	0.944	1.692	2.547
T4	100.00-75.00	A	0.000	0.000	0.000	0.000
		B	0.000	4.131	7.665	12.394
		C	0.000	0.905	1.804	2.715
T5	75.00-66.67	A	0.000	0.000	0.000	0.000
		B	0.000	1.441	2.641	4.323
		C	0.000	0.295	0.588	0.885
T6	66.67-58.33	A	0.000	0.000	0.000	0.000
		B	0.000	1.427	2.615	4.281
		C	0.000	0.292	0.582	0.876
T7	58.33-50.00	A	0.000	0.000	0.000	0.000
		B	0.000	2.855	4.352	7.124
		C	0.000	0.584	0.969	1.458
T8	50.00-37.50	A	0.000	0.000	0.000	0.000
		B	0.000	1.578	3.560	5.826
		C	0.000	0.323	0.792	1.192
T9	37.50-25.00	A	0.000	0.000	0.000	0.000
		B	0.000	3.160	5.466	8.948
		C	0.000	0.646	1.216	1.831
T10	25.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	3.076	7.473	12.303
		C	0.000	0.620	1.647	2.478

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	160.00-150.00	1.9184	-19.6729	2.7155	-26.5237
T2	150.00-125.00	19.7398	-34.7966	25.5894	-47.4806
T3	125.00-100.00	25.1117	-15.8603	31.6652	-22.9633
T4	100.00-75.00	25.2824	-11.2542	32.3785	-16.4447
T5	75.00-66.67	27.7236	-12.8520	35.8461	-19.0730
T6	66.67-58.33	28.3072	-13.1364	36.6274	-19.5046
T7	58.33-50.00	26.0880	-12.1052	32.8670	-17.2026
T8	50.00-37.50	30.8713	-14.3587	40.3495	-21.5907
T9	37.50-25.00	28.1171	-13.0341	36.3675	-19.1995
T10	25.00-0.00	30.0280	-14.1919	40.3796	-22.1121

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft	ft^2	ft^2	K

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
*									
*** Existing Carrier VZW									
5' T-arm	A	None		0.0000	77.50	No Ice	4.50	2.50	0.25
(VZW)						1/2" Ice	5.50	3.20	0.32
5' T-arm	B	None		0.0000	77.50	No Ice	4.50	2.50	0.25
(VZW)						1/2" Ice	5.50	3.20	0.32
DC6-48-60-18-8F	C	None		0.0000	77.50	No Ice	1.27	1.27	0.02
(VZW)						1/2" Ice	1.46	1.46	0.04
*									
*** Existing Carrier Sprint									
APXVSPP18-C-A20	A	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	0.09
(Sprint)			0.00			1/2" Ice	8.81	7.66	0.15
			0.00						
APXVSPP18-C-A20	B	From Face	0.50	0.0000	97.00	No Ice	8.26	6.71	0.09
(Sprint)			0.00			1/2" Ice	8.81	7.66	0.15
			0.00						
APXVSPP18-C-A20	C	From Leg	0.50	0.0000	97.00	No Ice	8.26	6.71	0.09
(Sprint)			0.00			1/2" Ice	8.81	7.66	0.15
			0.00						
DT465B-2XR-V2 Panels	A	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	0.06
(Commscope)			0.00			1/2" Ice	10.21	6.43	0.12
(Sprint)			0.00						
DT465B-2XR-V2 Panels	B	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	0.06
(Commscope)			0.00			1/2" Ice	10.21	6.43	0.12
(Sprint)			0.00						
DT465B-2XR-V2 Panels	C	From Leg	1.50	0.0000	97.00	No Ice	9.65	5.97	0.06
(Commscope)			0.00			1/2" Ice	10.21	6.43	0.12
(Sprint)			0.00						
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00						
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00						
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			-5.00			1/2" Ice	2.71	2.66	0.10
			0.00						
RRH 800MHz 2x50W	A	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00						
RRH 800MHz 2x50W	B	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.66	0.10
			0.00						
RRH 800MHz 2x50W	C	From Face	1.00	0.0000	97.00	No Ice	2.49	2.34	0.07
(Sprint)			-5.00			1/2" Ice	2.71	2.66	0.10
			0.00						
TD-RRH8x20	A	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	0.07
(Sprint)			0.00			1/2" Ice	5.01	1.92	0.09
			0.00						
TD-RRH8x20	B	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	0.07
(Sprint)			0.00			1/2" Ice	5.01	1.92	0.09
			0.00						
TD-RRH8x20	C	From Face	0.50	0.0000	97.00	No Ice	4.72	1.70	0.07
(Sprint)			-5.00			1/2" Ice	5.01	1.92	0.09
			0.00						
RRH 1900 MHz 2x40W	A	From Face	0.50	0.0000	97.00	No Ice	2.49	3.34	0.10
(Sprint)			0.00			1/2" Ice	2.71	3.69	0.13

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
			0.00						
RRH 1900 MHz 2x40W (Sprint)	B	From Face	0.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	2.49 2.71	3.34 3.69	0.10 0.13
RRH 1900 MHz 2x40W (Sprint)	C	From Face	0.50 -5.00 0.00	0.0000	97.00	No Ice 1/2" Ice	2.49 2.71	3.34 3.69	0.10 0.13
PM-SU35-48 - Pipe Mount 48" (Sprint)	A	From Leg	1.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	5.60 5.99	5.60 5.99	0.11 0.16
PM-SU35-48 - Pipe Mount 48" (Sprint)	B	From Leg	1.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	5.60 5.99	5.60 5.99	0.11 0.16
PM-SU35-48 - Pipe Mount 48" (Sprint)	C	From Leg	1.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	5.60 5.99	5.60 5.99	0.11 0.16
*									
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	A	From Leg	0.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	6.65 8.00	2.32 2.86	0.16 0.22
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	B	From Leg	0.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	6.65 8.00	2.32 2.86	0.16 0.22
DSM2 w/ additional SFS-H Stabilizer (T-Mobile)	C	From Leg	0.50 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	6.65 8.00	2.32 2.86	0.16 0.22
EMS RR90-17-xx (T-Mobile)	A	From Leg	3.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	4.36 4.99	4.36 4.99	0.02 0.04
EMS RR90-17-xx (T-Mobile)	B	From Leg	3.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	4.36 4.99	4.36 4.99	0.02 0.04
EMS RR90-17-xx (T-Mobile)	C	From Leg	3.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	4.36 4.99	4.36 4.99	0.02 0.04
LNX-6515DS-A1M Andrew Panel (T-Mobile)	A	From Leg	3.00 -1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	11.58 12.25	9.74 11.21	0.08 0.16
LNX-6515DS-A1M Andrew Panel (T-Mobile)	B	From Leg	3.00 -1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	11.58 12.25	9.74 11.21	0.08 0.16
LNX-6515DS-A1M Andrew Panel (T-Mobile)	C	From Leg	3.00 -1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	11.58 12.25	9.74 11.21	0.08 0.16
Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	A	From Leg	3.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	1.86 2.03	0.83 0.96	0.05 0.06
Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	B	From Leg	3.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	1.86 2.03	0.83 0.96	0.05 0.06
Ericsson Radio 4415 B25 RRH Unit (T-Mobile)	C	From Leg	3.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	1.86 2.03	0.83 0.96	0.05 0.06
*									
*ATT Inventory on Bottom (Proposed)									
*									

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
Sinclair SY450-SF1SNM	C	From Face	0.00	0.0000	21.00	No Ice	1.59	0.21	0.00
Yagi			0.00			1/2" Ice	1.77	0.28	0.01
(3-1.21)			0.00						
L-810 Tower Side-Light	A	From Leg	1.50	0.0000	83.00	No Ice	0.22	0.22	0.01
Beacon			1.50			1/2" Ice	0.40	0.40	0.01
(1.83)			0.00						
L-810 Tower Side-Light	C	From Leg	1.50	0.0000	83.00	No Ice	0.22	0.22	0.01
Beacon			-1.50			1/2" Ice	0.40	0.40	0.01
(3.83)			0.00						
PD10054	A	From Leg	1.00	0.0000	85.00	No Ice	5.62	5.62	0.02
(2'x2' Square - 1.85)			0.00			1/2" Ice	5.90	5.90	0.02
			0.00						
10'6"x4" Pipe Mount	A	From Leg	0.25	0.0000	85.00	No Ice	4.72	4.72	0.11
(Mt for 1.85)			0.00			1/2" Ice	5.62	5.62	0.15
			0.00						
432E-83I-01T TTA Unit	C	From Leg	0.00	-45.0000	155.00	No Ice	2.85	0.97	0.03
(3.155 - TTA Unit)			0.00			1/2" Ice	3.06	1.11	0.04
			0.00						
DB228-A	B	From Leg	1.00	0.0000	155.00	No Ice	7.30	7.30	0.07
(2.155)			0.00			1/2" Ice	13.14	13.14	0.09
			0.00						
10' PCS Frame (1)	C	From Leg	0.00	0.0000	155.00	No Ice	9.00	9.00	0.25
(Mt for 2.155.1, 2.155.2 & 2.1557)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00						
DB304-A	B	From Leg	2.50	0.0000	158.00	No Ice	4.85	4.85	0.04
(2.158)			0.00			1/2" Ice	8.73	8.73	0.06
			0.00						
Flash Beacon Lighting	A	From Leg	0.00	0.0000	160.00	No Ice	2.70	2.70	0.05
(1.158)			0.00			1/2" Ice	3.10	3.10	0.07
			0.00						
432E-83I-01T TTA Unit	C	From Face	0.00	0.0000	159.00	No Ice	2.85	0.97	0.03
(2-3.159 - TTA)			0.00			1/2" Ice	3.06	1.11	0.04
			0.00						
* Ice Shields for Dishes									
4"x96"x72" Ice Canopy	A	From Leg	3.00	0.0000	115.00	No Ice	3.73	2.80	0.30
(DNK-5)			0.00			1/2" Ice	4.39	3.30	0.55
			0.00						
4"x96"x72" Ice Canopy	C	From Leg	3.00	0.0000	115.00	No Ice	3.73	2.80	0.30
(DNK-6)			0.00			1/2" Ice	4.39	3.30	0.55
			0.00						
* AT&T Equipment 2020/06/23									
Commscope SFG22 (14'	A	From Leg	0.50	0.0000	140.00	No Ice	10.50	2.50	0.52
Sector Frame)			0.00			1/2" Ice	14.30	3.00	0.67
(AT&T Proposed)			0.00						
Commscope SFG22 (14'	B	From Leg	0.50	0.0000	140.00	No Ice	10.50	2.50	0.52
Sector Frame)			0.00			1/2" Ice	14.30	3.00	0.67
(AT&T Proposed)			0.00						
Commscope SFG22 (14'	C	From Leg	0.50	0.0000	140.00	No Ice	10.50	2.50	0.52
Sector Frame)			0.00			1/2" Ice	14.30	3.00	0.67
(AT&T Proposed)			0.00						
7770.00	A	From Leg	3.00	0.0000	140.00	No Ice	5.90	4.01	0.05
(ATT)			-6.00			1/2" Ice	6.34	4.64	0.10
			0.00						
CCI DMP65R-BU8D Panel	A	From Leg	3.00	0.0000	140.00	No Ice	17.87	8.12	0.11
(AT&T Proposed)			-3.00			1/2" Ice	18.50	8.72	0.21
			0.00						

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
CCI OPA65R-BU8D Panel	A	From Leg	3.00	0.0000	140.00	No Ice	18.09	8.20	0.08
(AT&T Proposed)			3.00			1/2" Ice	18.72	8.79	0.18
			0.00						
TPA-65R-LCUUUU-H8	A	From Leg	1.50	0.0000	140.00	No Ice	13.08	10.38	0.10
Panel w/ RET			-6.00			1/2" Ice	13.81	11.79	0.20
(ATT)			0.00						
RRUS-32	A	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	0.08
(ATT)			-5.00			1/2" Ice	4.14	2.98	0.11
			0.00						
RRUS-12	A	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	0.06
(ATT)			-5.00			1/2" Ice	3.93	1.67	0.08
			0.00						
Radio 4449 B5/B12 RRH	A	From Leg	1.50	0.0000	140.00	No Ice	1.66	1.16	0.08
(AT&T Proposed)			-5.00			1/2" Ice	1.82	1.29	0.10
			0.00						
Radio 4478 B14 RRH	A	From Leg	1.50	0.0000	140.00	No Ice	1.08	1.08	0.06
(AT&T Proposed)			-5.00			1/2" Ice	1.21	1.21	0.07
			0.00						
DC6-48-60-18-8F (Squid)	A	From Leg	0.50	0.0000	146.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(ATT)			0.00						
TT19-08BP111-001 TMA's	A	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	0.02
(ATT)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00						
(2) LGP21401 Diplexer	A	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	0.01
(ATT)			0.00			1/2" Ice	1.24	0.27	0.02
			0.00						
7770.00	B	From Leg	3.00	0.0000	140.00	No Ice	5.90	4.01	0.05
(ATT)			-6.00			1/2" Ice	6.34	4.64	0.10
			0.00						
CCI DMP65R-BU8D Panel	B	From Leg	3.00	0.0000	140.00	No Ice	17.87	8.12	0.11
(AT&T Proposed)			-3.00			1/2" Ice	18.50	8.72	0.21
			0.00						
CCI OPA65R-BU8D Panel	B	From Leg	3.00	0.0000	140.00	No Ice	18.09	8.20	0.08
(AT&T Proposed)			3.00			1/2" Ice	18.72	8.79	0.18
			0.00						
TPA-65R-LCUUUU-H8	B	From Leg	1.50	0.0000	140.00	No Ice	13.08	10.38	0.10
Panel w/ RET			-6.00			1/2" Ice	13.81	11.79	0.20
(ATT)			0.00						
RRUS-32	B	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	0.08
(ATT)			-5.00			1/2" Ice	4.14	2.98	0.11
			0.00						
RRUS-12	B	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	0.06
(ATT)			-5.00			1/2" Ice	3.93	1.67	0.08
			0.00						
Radio 4449 B5/B12 RRH	B	From Leg	1.50	0.0000	140.00	No Ice	1.66	1.16	0.08
(AT&T Proposed)			-5.00			1/2" Ice	1.82	1.29	0.10
			0.00						
Radio 4478 B14 RRH	B	From Leg	1.50	0.0000	140.00	No Ice	1.08	1.08	0.06
(AT&T Proposed)			-5.00			1/2" Ice	1.21	1.21	0.07
			0.00						
DC6-48-60-18-8F (Squid)	B	From Leg	0.50	0.0000	140.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(ATT)			0.00						
TT19-08BP111-001 TMA's	B	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	0.02
(ATT)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00						

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
(2) LGP21401 Diplexer	B	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	0.01
(ATT)			0.00			1/2" Ice	1.24	0.27	0.02
			0.00						
7770.00	C	From Leg	3.00	0.0000	140.00	No Ice	5.90	4.01	0.05
(ATT)			-6.00			1/2" Ice	6.34	4.64	0.10
			0.00						
DMP65R-BU6D	C	From Leg	3.00	0.0000	140.00	No Ice	14.33	5.62	0.10
(AT&T Proposed)			-3.00			1/2" Ice	14.93	6.07	0.17
			0.00						
OPA65R-BU6D	C	From Leg	3.00	0.0000	140.00	No Ice	14.54	5.67	0.06
(AT&T Proposed)			3.00			1/2" Ice	15.14	6.13	0.14
			0.00						
QS66512	C	From Leg	1.50	0.0000	140.00	No Ice	8.40	6.80	0.11
(ATT)			-6.00			1/2" Ice	8.95	7.27	0.16
			0.00						
RRUS-32	C	From Leg	1.50	0.0000	140.00	No Ice	3.88	2.76	0.08
(ATT)			-5.00			1/2" Ice	4.14	2.98	0.11
			0.00						
RRUS-12	C	From Leg	1.50	0.0000	140.00	No Ice	3.67	1.49	0.06
(ATT)			-5.00			1/2" Ice	3.93	1.67	0.08
			0.00						
Radio 4449 B5/B12 RRH	C	From Leg	1.50	0.0000	140.00	No Ice	1.66	1.16	0.08
(AT&T Proposed)			-5.00			1/2" Ice	1.82	1.29	0.10
			0.00						
Radio 4478 B14 RRH	C	From Leg	1.50	0.0000	140.00	No Ice	1.08	1.08	0.06
(AT&T Proposed)			-5.00			1/2" Ice	1.21	1.21	0.07
			0.00						
DC6-48-60-18-8F (Squid)	C	From Leg	0.50	0.0000	140.00	No Ice	1.27	1.27	0.02
Suppressor			0.00			1/2" Ice	1.46	1.46	0.04
(AT&T Proposed)			0.00						
TT19-08BP111-001 TMA's	C	From Leg	1.50	0.0000	140.00	No Ice	0.55	0.45	0.02
(ATT)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00						
(2) LGP21401 Diplexer	C	From Leg	1.50	0.0000	140.00	No Ice	1.10	0.21	0.01
(ATT)			0.00			1/2" Ice	1.24	0.27	0.02
			0.00						
* Tower L.R.									
Lightning Rod 1/2"x4' on 15'	C	From Leg	0.00	0.0000	160.00	No Ice	5.45	5.45	0.13
Pole			0.00			1/2" Ice	7.40	7.40	0.19
(Tower - LR)			8.00						
2" Dia 10' Omni	B	From Leg	6.00	0.0000	124.00	No Ice	2.00	2.00	0.01
(2.124)			0.00			1/2" Ice	3.03	3.03	0.03
			1.00						
Pirod 6' Side Mount Standoff	B	From Leg	0.00	0.0000	124.00	No Ice	4.97	4.97	0.07
(1)			0.00			1/2" Ice	6.12	6.12	0.13
(Mt for 2.124)			0.00						
DS7C09P36D-D	A	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			-2.00			1/2" Ice	7.22	7.22	0.12
			12.00						
DS7C09P36D-D	A	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			2.00			1/2" Ice	7.22	7.22	0.12
			12.00						
DS7C09P36D-D	C	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			-2.00			1/2" Ice	7.22	7.22	0.12
			12.00						
DS7C09P36D-D	C	From Leg	3.00	0.0000	160.00	No Ice	4.80	4.80	0.08
(CSP)			2.00			1/2" Ice	7.22	7.22	0.12

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
			12.00						
Commscope SFG23HD-12-4-96 Mount Assembly (CSP)	A	From Leg	1.50 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	13.20 19.50	9.20 14.60	0.85 0.95
Commscope SFG23HD-12-4-96 Mount Assembly (CSP)	C	From Leg	1.50 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	13.20 19.50	9.20 14.60	0.85 0.95
JMA MX06FR0660-03 (VZW)	A	From Leg	2.00 -4.00 0.00	0.0000	77.50	No Ice 1/2" Ice	10.68 11.24	7.42 7.95	0.10 0.16
JMA MX06FR0660-03 (VZW)	A	From Leg	2.00 -2.00 0.00	0.0000	77.50	No Ice 1/2" Ice	10.68 11.24	7.42 7.95	0.10 0.16
JMA 2" Edge to Edge (VZW)	A	From Leg	2.00 -3.00 0.00	0.0000	77.50	No Ice 1/2" Ice	2.69 2.97	0.17 0.24	0.02 0.04
JMA MX06FR0660-03 (VZW)	B	From Leg	2.00 -4.00 0.00	0.0000	77.50	No Ice 1/2" Ice	10.68 11.24	7.42 7.95	0.10 0.16
JMA MX06FR0660-03 (VZW)	B	From Leg	2.00 -2.00 0.00	0.0000	77.50	No Ice 1/2" Ice	10.68 11.24	7.42 7.95	0.10 0.16
JMA 2" Edge to Edge (VZW)	B	From Leg	2.00 -3.00 0.00	0.0000	77.50	No Ice 1/2" Ice	2.69 2.97	0.17 0.24	0.02 0.04
Samsung MT6407-77A (VZW)	A	From Leg	2.00 3.00 0.00	0.0000	77.50	No Ice 1/2" Ice	5.48 5.82	1.88 2.15	0.09 0.12
Samsung MT6407-77A (VZW)	B	From Leg	2.00 3.00 0.00	0.0000	77.50	No Ice 1/2" Ice	5.48 5.82	1.88 2.15	0.09 0.12
(3) RRH (VZW)	A	From Leg	2.00 0.00 0.00	0.0000	77.50	No Ice 1/2" Ice	2.49 2.70	1.40 1.57	0.07 0.09
(3) RRH (VZW)	B	From Leg	2.00 0.00 0.00	0.0000	77.50	No Ice 1/2" Ice	2.49 2.70	1.40 1.57	0.07 0.09

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HPD2-4.7 (NWCT (C-A Face))	A	Paraboloid w/Shroud (HP)	From Face	0.50 0.00 0.00	Worst		159.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.03 0.04
6' w/ Radome	B	Paraboloid	From	1.00	Worst		110.00	6.00	No Ice	28.27	0.23

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
(2.110)		w/Radome	Leg	0.00 0.00					1/2" Ice	29.07	0.34
6' w/ Radome (3.110)	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	Worst		110.00	6.00	No Ice 1/2" Ice	28.27 29.07	0.23 0.34

Tower Pressures - No Ice

$G_H = 1.129$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 160.00-150.00	155.00	1.556	32	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
					B	9.392	22.361		26.27	0.000	0.000
					C	10.889	8.342		43.38	0.000	0.000
T2 150.00-125.00	137.50	1.503	31	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
					B	14.202	100.681		18.15	0.000	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3 125.00-100.00	112.50	1.42	29	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
					B	16.504	119.976		15.28	0.000	0.000
					C	21.589	45.606		31.04	0.000	0.000
T4 100.00-75.00	87.50	1.321	27	416.680	A	28.157	30.202	30.202	51.75	0.000	0.000
					B	20.492	135.369		19.38	0.000	0.000
					C	26.353	64.243		33.34	0.000	0.000
T5 75.00-66.67	70.83	1.244	26	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	7.323	47.140		18.48	0.000	0.000
					C	9.377	21.789		32.30	0.000	0.000
T6 66.67-58.33	62.50	1.2	25	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000
					B	7.642	47.140		18.38	0.000	0.000
					C	9.675	21.789		32.00	0.000	0.000
T7 58.33-50.00	54.17	1.152	24	159.031	A	14.047	6.952	6.952	33.11	0.000	0.000
					B	9.695	44.025		12.94	0.000	0.000
					C	13.078	18.674		21.89	0.000	0.000
T8 50.00-37.50	43.75	1.084	22	250.917	A	15.214	14.338	14.338	48.52	0.000	0.000
					B	11.655	69.948		17.57	0.000	0.000
					C	14.422	31.922		30.94	0.000	0.000
T9 37.50-25.00	31.25	1	21	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	14.304	69.948		17.02	0.000	0.000
					C	18.554	31.922		28.41	0.000	0.000
T10 25.00-0.00	12.50	1	21	572.674	A	35.412	40.587	40.587	53.40	0.000	0.000
					B	27.939	152.909		22.44	0.000	0.000
					C	33.765	75.754		37.06	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.129$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.556	32	0.5000	111.004	A	10.889	14.033	10.011	40.17	0.000	0.000
160.00-150.00						B	8.413	36.306		22.39	0.000	0.000
						C	10.889	14.033		40.17	0.000	0.000
T2	137.50	1.503	31	0.5000	312.510	A	19.557	32.849	25.027	47.76	0.000	0.000
150.00-125.00						B	10.938	157.894		14.82	0.000	0.000
						C	19.557	32.849		47.76	0.000	0.000
T3	112.50	1.42	29	0.5000	362.510	A	23.281	33.677	25.027	43.94	0.000	0.000
125.00-100.00						B	12.408	188.682		12.45	0.000	0.000
						C	20.734	69.982		27.59	0.000	0.000
T4 100.00-75.00	87.50	1.321	27	0.5000	418.765	A	28.157	43.759	34.373	47.80	0.000	0.000
						B	15.764	209.669		15.25	0.000	0.000
						C	25.442	96.829		28.11	0.000	0.000
T5 75.00-66.67	70.83	1.244	26	0.5000	150.699	A	9.964	14.779	11.458	46.31	0.000	0.000
						B	5.641	74.022		14.38	0.000	0.000
						C	9.080	33.151		27.13	0.000	0.000
T6 66.67-58.33	62.50	1.2	25	0.5000	156.255	A	10.257	14.877	11.458	45.59	0.000	0.000
						B	5.976	74.134		14.30	0.000	0.000
						C	9.381	33.251		26.88	0.000	0.000
T7 58.33-50.00	54.17	1.152	24	0.5000	159.726	A	14.047	13.589	8.342	30.19	0.000	0.000
						B	6.923	71.418		10.65	0.000	0.000
						C	12.589	31.672		18.85	0.000	0.000
T8 50.00-37.50	43.75	1.084	22	0.5000	251.960	A	15.214	20.551	16.424	45.92	0.000	0.000
						B	9.388	110.000		13.76	0.000	0.000
						C	14.022	48.228		26.38	0.000	0.000
T9 37.50-25.00	31.25	1	21	0.5000	264.460	A	19.771	22.705	16.424	38.67	0.000	0.000
						B	10.823	110.572		13.53	0.000	0.000
						C	17.940	50.058		24.15	0.000	0.000
T10 25.00-0.00	12.50	1	21	0.5000	574.759	A	35.412	53.611	44.758	50.28	0.000	0.000
						B	23.109	235.441		17.31	0.000	0.000
						C	32.933	108.991		31.54	0.000	0.000

Tower Pressure - Service

$G_H = 1.129$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	155.00	1.556	32	110.170	A	10.889	8.342	8.342	43.38	0.000	0.000
160.00-150.00					B	9.392	22.361		26.27	0.000	0.000
					C	10.889	8.342		43.38	0.000	0.000
T2	137.50	1.503	31	310.425	A	19.557	20.856	20.856	51.61	0.000	0.000
150.00-125.00					B	14.202	100.681		18.15	0.000	0.000
					C	19.557	20.856		51.61	0.000	0.000
T3	112.50	1.42	29	360.425	A	23.281	20.856	20.856	47.25	0.000	0.000
125.00-100.00					B	16.504	119.976		15.28	0.000	0.000
					C	21.589	45.606		31.04	0.000	0.000
T4	87.50	1.321	27	416.680	A	28.157	30.202	30.202	51.75	0.000	0.000
100.00-75.00					B	20.492	135.369		19.38	0.000	0.000
					C	26.353	64.243		33.34	0.000	0.000
T5 75.00-66.67	70.83	1.244	26	150.004	A	9.964	10.067	10.067	50.26	0.000	0.000
					B	7.323	47.140		18.48	0.000	0.000
					C	9.377	21.789		32.30	0.000	0.000
T6 66.67-58.33	62.50	1.2	25	155.560	A	10.257	10.067	10.067	49.53	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	7.642	47.140		18.38	0.000	0.000
					C	9.675	21.789		32.00	0.000	0.000
T7 58.33-50.00	54.17	1.152	24	159.031	A	14.047	6.952	6.952	33.11	0.000	0.000
					B	9.695	44.025		12.94	0.000	0.000
					C	13.078	18.674		21.89	0.000	0.000
T8 50.00-37.50	43.75	1.084	22	250.917	A	15.214	14.338	14.338	48.52	0.000	0.000
					B	11.655	69.948		17.57	0.000	0.000
					C	14.422	31.922		30.94	0.000	0.000
T9 37.50-25.00	31.25	1	21	263.417	A	19.771	14.338	14.338	42.04	0.000	0.000
					B	14.304	69.948		17.02	0.000	0.000
					C	18.554	31.922		28.41	0.000	0.000
T10 25.00-0.00	12.50	1	21	572.674	A	35.412	40.587	40.587	53.40	0.000	0.000
					B	27.939	152.909		22.44	0.000	0.000
					C	33.765	75.754		37.06	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	1	1	15.774	1.96	195.70	B
160.00-150.00			B	0.288	2.328	0.612	1	1	23.085			
			C	0.175	2.683	0.586	1	1	15.774			
T2	0.47	2.32	A	0.13	2.846	0.579	1	1	31.625	5.88	235.33	B
150.00-125.00			B	0.37	2.126	0.64	1	1	78.623			
			C	0.13	2.846	0.579	1	1	31.625			
T3	0.91	3.86	A	0.122	2.875	0.578	1	1	35.328	6.56	262.43	B
125.00-100.00			B	0.379	2.108	0.643	1	1	93.664			
			C	0.186	2.642	0.588	1	1	48.393			
T4	1.04	5.08	A	0.14	2.808	0.58	1	1	45.674	7.03	281.14	B
100.00-75.00			B	0.374	2.118	0.641	1	1	107.312			
			C	0.217	2.539	0.594	1	1	64.521			
T5	0.37	2.10	A	0.134	2.833	0.579	1	1	15.794	2.33	279.59	B
75.00-66.67			B	0.363	2.142	0.637	1	1	37.363			
			C	0.208	2.57	0.592	1	1	22.276			
T6	0.37	2.14	A	0.131	2.844	0.579	1	1	16.083	2.28	273.85	B
66.67-58.33			B	0.352	2.167	0.633	1	1	37.493			
			C	0.202	2.588	0.591	1	1	22.550			
T7	0.37	2.32	A	0.132	2.839	0.579	1	1	18.071	2.22	265.97	B
58.33-50.00			B	0.338	2.2	0.628	1	1	37.351			
			C	0.2	2.597	0.59	1	1	24.102			
T8	0.55	3.00	A	0.118	2.894	0.577	1	1	23.489	3.13	250.42	B
50.00-37.50			B	0.325	2.231	0.624	1	1	55.298			
			C	0.185	2.648	0.587	1	1	33.173			
T9	0.55	3.42	A	0.129	2.848	0.579	1	1	28.066	3.04	243.05	B
37.50-25.00			B	0.32	2.245	0.622	1	1	57.824			
			C	0.192	2.624	0.589	1	1	37.347			
T10	1.10	8.68	A	0.133	2.836	0.579	1	1	58.911	6.49	259.42	B
25.00-0.00			B	0.316	2.255	0.621	1	1	122.874			
			C	0.191	2.626	0.589	1	1	78.358			
Sum Weight:	5.79	34.11						OTM	3206.03 kip-ft	40.91		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	0.825	1	13.868	1.82	181.77	B
160.00-150.00			B	0.288	2.328	0.612	0.825	1	21.441			
			C	0.175	2.683	0.586	0.825	1	13.868			
T2	0.47	2.32	A	0.13	2.846	0.579	0.825	1	28.202	5.70	227.89	B
150.00-125.00			B	0.37	2.126	0.64	0.825	1	76.138			
			C	0.13	2.846	0.579	0.825	1	28.202			
T3	0.91	3.86	A	0.122	2.875	0.578	0.825	1	31.254	6.36	254.33	B
125.00-100.00			B	0.379	2.108	0.643	0.825	1	90.776			
			C	0.186	2.642	0.588	0.825	1	44.615			
T4	1.04	5.08	A	0.14	2.808	0.58	0.825	1	40.747	6.79	271.75	B
100.00-75.00			B	0.374	2.118	0.641	0.825	1	103.726			
			C	0.217	2.539	0.594	0.825	1	59.909			
T5	0.37	2.10	A	0.134	2.833	0.579	0.825	1	14.051	2.25	270.00	B
75.00-66.67			B	0.363	2.142	0.637	0.825	1	36.081			
			C	0.208	2.57	0.592	0.825	1	20.636			
T6	0.37	2.14	A	0.131	2.844	0.579	0.825	1	14.288	2.20	264.08	B
66.67-58.33			B	0.352	2.167	0.633	0.825	1	36.156			
			C	0.202	2.588	0.591	0.825	1	20.856			
T7	0.37	2.32	A	0.132	2.839	0.579	0.825	1	15.613	2.12	253.88	B
58.33-50.00			B	0.338	2.2	0.628	0.825	1	35.654			
			C	0.2	2.597	0.59	0.825	1	21.814			
T8	0.55	3.00	A	0.118	2.894	0.577	0.825	1	20.826	3.01	241.18	B
50.00-37.50			B	0.325	2.231	0.624	0.825	1	53.259			
			C	0.185	2.648	0.587	0.825	1	30.649			
T9	0.55	3.42	A	0.129	2.848	0.579	0.825	1	24.606	2.91	232.53	B
37.50-25.00			B	0.32	2.245	0.622	0.825	1	55.321			
			C	0.192	2.624	0.589	0.825	1	34.100			
T10	1.10	8.68	A	0.133	2.836	0.579	0.825	1	52.714	6.23	249.09	B
25.00-0.00			B	0.316	2.255	0.621	0.825	1	117.985			
			C	0.191	2.626	0.589	0.825	1	72.449			
Sum Weight:	5.79	34.11						OTM	3086.97 kip-ft	39.38		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	0.8	1	13.596	1.80	179.78	B
160.00-150.00			B	0.288	2.328	0.612	0.8	1	21.207			
			C	0.175	2.683	0.586	0.8	1	13.596			
T2	0.47	2.32	A	0.13	2.846	0.579	0.8	1	27.713	5.67	226.83	B
150.00-125.00			B	0.37	2.126	0.64	0.8	1	75.783			
			C	0.13	2.846	0.579	0.8	1	27.713			
T3	0.91	3.86	A	0.122	2.875	0.578	0.8	1	30.672	6.33	253.18	B
125.00-100.00			B	0.379	2.108	0.643	0.8	1	90.363			
			C	0.186	2.642	0.588	0.8	1	44.075			
T4	1.04	5.08	A	0.14	2.808	0.58	0.8	1	40.043	6.76	270.41	B
100.00-75.00			B	0.374	2.118	0.641	0.8	1	103.213			
			C	0.217	2.539	0.594	0.8	1	59.250			
T5	0.37	2.10	A	0.134	2.833	0.579	0.8	1	13.801	2.24	268.63	B
75.00-66.67			B	0.363	2.142	0.637	0.8	1	35.898			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.208	2.57	0.592	0.8	1	20.401			
T6	0.37	2.14	A	0.131	2.844	0.579	0.8	1	14.032	2.19	262.68	B
66.67-58.33			B	0.352	2.167	0.633	0.8	1	35.965			
			C	0.202	2.588	0.591	0.8	1	20.615			
T7	0.37	2.32	A	0.132	2.839	0.579	0.8	1	15.262	2.10	252.16	B
58.33-50.00			B	0.338	2.2	0.628	0.8	1	35.412			
			C	0.2	2.597	0.59	0.8	1	21.487			
T8	0.55	3.00	A	0.118	2.894	0.577	0.8	1	20.446	3.00	239.87	B
50.00-37.50			B	0.325	2.231	0.624	0.8	1	52.967			
			C	0.185	2.648	0.587	0.8	1	30.288			
T9	0.55	3.42	A	0.129	2.848	0.579	0.8	1	24.112	2.89	231.02	B
37.50-25.00			B	0.32	2.245	0.622	0.8	1	54.963			
			C	0.192	2.624	0.589	0.8	1	33.637			
T10	1.10	8.68	A	0.133	2.836	0.579	0.8	1	51.829	6.19	247.62	B
25.00-0.00			B	0.316	2.255	0.621	0.8	1	117.286			
			C	0.191	2.626	0.589	0.8	1	71.605			
Sum Weight:	5.79	34.11						OTM	3069.96 kip-ft	39.16		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	0.85	1	14.140	1.84	183.76	B
160.00-150.00			B	0.288	2.328	0.612	0.85	1	21.676			
			C	0.175	2.683	0.586	0.85	1	14.140			
T2	0.47	2.32	A	0.13	2.846	0.579	0.85	1	28.691	5.72	228.95	B
150.00-125.00			B	0.37	2.126	0.64	0.85	1	76.493			
			C	0.13	2.846	0.579	0.85	1	28.691			
T3	0.91	3.86	A	0.122	2.875	0.578	0.85	1	31.836	6.39	255.49	B
125.00-100.00			B	0.379	2.108	0.643	0.85	1	91.188			
			C	0.186	2.642	0.588	0.85	1	45.154			
T4	1.04	5.08	A	0.14	2.808	0.58	0.85	1	41.451	6.83	273.09	B
100.00-75.00			B	0.374	2.118	0.641	0.85	1	104.238			
			C	0.217	2.539	0.594	0.85	1	60.568			
T5	0.37	2.10	A	0.134	2.833	0.579	0.85	1	14.300	2.26	271.37	B
75.00-66.67			B	0.363	2.142	0.637	0.85	1	36.264			
			C	0.208	2.57	0.592	0.85	1	20.870			
T6	0.37	2.14	A	0.131	2.844	0.579	0.85	1	14.544	2.21	265.47	B
66.67-58.33			B	0.352	2.167	0.633	0.85	1	36.347			
			C	0.202	2.588	0.591	0.85	1	21.098			
T7	0.37	2.32	A	0.132	2.839	0.579	0.85	1	15.964	2.13	255.61	B
58.33-50.00			B	0.338	2.2	0.628	0.85	1	35.897			
			C	0.2	2.597	0.59	0.85	1	22.141			
T8	0.55	3.00	A	0.118	2.894	0.577	0.85	1	21.206	3.03	242.50	B
50.00-37.50			B	0.325	2.231	0.624	0.85	1	53.550			
			C	0.185	2.648	0.587	0.85	1	31.010			
T9	0.55	3.42	A	0.129	2.848	0.579	0.85	1	25.101	2.93	234.03	B
37.50-25.00			B	0.32	2.245	0.622	0.85	1	55.679			
			C	0.192	2.624	0.589	0.85	1	34.564			
T10	1.10	8.68	A	0.133	2.836	0.579	0.85	1	53.599	6.26	250.57	B
25.00-0.00			B	0.316	2.255	0.621	0.85	1	118.683			
			C	0.191	2.626	0.589	0.85	1	73.293			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.79	34.11						OTM	3103.98 kip-ft	39.60		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.21	1.72	A	0.225	2.516	0.596	1	1	19.249	2.41	240.72	B
160.00-150.00			B	0.403	2.058	0.653	1	1	32.112			
			C	0.225	2.516	0.596	1	1	19.249			
T2	1.29	3.38	A	0.168	2.707	0.584	1	1	38.752	8.12	324.63	B
150.00-125.00			B	0.54	1.853	0.719	1	1	124.440			
			C	0.168	2.707	0.584	1	1	38.752			
T3	2.37	5.25	A	0.157	2.745	0.583	1	1	42.901	9.14	365.62	B
125.00-100.00			B	0.555	1.839	0.727	1	1	149.567			
			C	0.25	2.437	0.602	1	1	62.859			
T4	2.66	6.93	A	0.172	2.693	0.585	1	1	53.758	9.54	381.60	B
100.00-75.00			B	0.538	1.855	0.718	1	1	166.263			
			C	0.292	2.318	0.613	1	1	84.844			
T5	0.93	2.74	A	0.164	2.72	0.584	1	1	18.592	3.17	380.56	B
75.00-66.67			B	0.529	1.866	0.713	1	1	58.384			
			C	0.28	2.35	0.61	1	1	29.304			
T6	0.93	2.79	A	0.161	2.732	0.583	1	1	18.933	3.08	369.48	B
66.67-58.33			B	0.513	1.884	0.704	1	1	58.171			
			C	0.273	2.371	0.608	1	1	29.597			
T7	0.93	3.03	A	0.173	2.689	0.585	1	1	22.000	2.91	349.07	B
58.33-50.00			B	0.49	1.913	0.693	1	1	56.394			
			C	0.277	2.359	0.609	1	1	31.882			
T8	1.40	3.84	A	0.142	2.801	0.58	1	1	27.140	4.16	332.83	B
50.00-37.50			B	0.474	1.936	0.685	1	1	84.683			
			C	0.247	2.446	0.601	1	1	43.014			
T9	1.40	4.46	A	0.161	2.733	0.583	1	1	33.011	3.93	314.50	B
37.50-25.00			B	0.459	1.959	0.677	1	1	85.731			
			C	0.257	2.416	0.604	1	1	48.161			
T10	2.81	10.92	A	0.155	2.754	0.582	1	1	66.626	8.39	335.63	B
25.00-0.00			B	0.45	1.974	0.673	1	1	181.608			
			C	0.247	2.447	0.601	1	1	98.448			
Sum Weight:	14.95	45.05						OTM	4336.48 kip-ft	54.84		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.21	1.72	A	0.225	2.516	0.596	0.825	1	17.343	2.30	229.68	B
160.00-150.00			B	0.403	2.058	0.653	0.825	1	30.640			
			C	0.225	2.516	0.596	0.825	1	17.343			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2	1.29	3.38	A	0.168	2.707	0.584	0.825	1	35.329	7.99	319.64	B
150.00-125.00			B	0.54	1.853	0.719	0.825	1	122.526			
			C	0.168	2.707	0.584	0.825	1	35.329			
T3	2.37	5.25	A	0.157	2.745	0.583	0.825	1	38.827	9.01	360.32	B
125.00-100.00			B	0.555	1.839	0.727	0.825	1	147.395			
			C	0.25	2.437	0.602	0.825	1	59.231			
T4	2.66	6.93	A	0.172	2.693	0.585	0.825	1	48.830	9.38	375.26	B
100.00-75.00			B	0.538	1.855	0.718	0.825	1	163.505			
			C	0.292	2.318	0.613	0.825	1	80.392			
T5	0.93	2.74	A	0.164	2.72	0.584	0.825	1	16.848	3.12	374.13	B
75.00-66.67			B	0.529	1.866	0.713	0.825	1	57.396			
			C	0.28	2.35	0.61	0.825	1	27.715			
T6	0.93	2.79	A	0.161	2.732	0.583	0.825	1	17.138	3.02	362.84	B
66.67-58.33			B	0.513	1.884	0.704	0.825	1	57.125			
			C	0.273	2.371	0.608	0.825	1	27.955			
T7	0.93	3.03	A	0.173	2.689	0.585	0.825	1	19.542	2.85	341.57	B
58.33-50.00			B	0.49	1.913	0.693	0.825	1	55.182			
			C	0.277	2.359	0.609	0.825	1	29.679			
T8	1.40	3.84	A	0.142	2.801	0.58	0.825	1	24.477	4.08	326.37	B
50.00-37.50			B	0.474	1.936	0.685	0.825	1	83.040			
			C	0.247	2.446	0.601	0.825	1	40.560			
T9	1.40	4.46	A	0.161	2.733	0.583	0.825	1	29.551	3.84	307.55	B
37.50-25.00			B	0.459	1.959	0.677	0.825	1	83.837			
			C	0.257	2.416	0.604	0.825	1	45.022			
T10	2.81	10.92	A	0.155	2.754	0.582	0.825	1	60.429	8.20	328.15	B
25.00-0.00			B	0.45	1.974	0.673	0.825	1	177.564			
			C	0.247	2.447	0.601	0.825	1	92.685			
Sum Weight:	14.95	45.05						OTM	4254.20 kip-ft	53.79		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.21	1.72	A	0.225	2.516	0.596	0.8	1	17.071	2.28	228.10	B
160.00-150.00			B	0.403	2.058	0.653	0.8	1	30.430			
			C	0.225	2.516	0.596	0.8	1	17.071			
T2	1.29	3.38	A	0.168	2.707	0.584	0.8	1	34.841	7.97	318.92	B
150.00-125.00			B	0.54	1.853	0.719	0.8	1	122.253			
			C	0.168	2.707	0.584	0.8	1	34.841			
T3	2.37	5.25	A	0.157	2.745	0.583	0.8	1	38.245	8.99	359.56	B
125.00-100.00			B	0.555	1.839	0.727	0.8	1	147.085			
			C	0.25	2.437	0.602	0.8	1	58.713			
T4	2.66	6.93	A	0.172	2.693	0.585	0.8	1	48.126	9.36	374.36	B
100.00-75.00			B	0.538	1.855	0.718	0.8	1	163.111			
			C	0.292	2.318	0.613	0.8	1	79.756			
T5	0.93	2.74	A	0.164	2.72	0.584	0.8	1	16.599	3.11	373.21	B
75.00-66.67			B	0.529	1.866	0.713	0.8	1	57.255			
			C	0.28	2.35	0.61	0.8	1	27.488			
T6	0.93	2.79	A	0.161	2.732	0.583	0.8	1	16.881	3.02	361.89	B
66.67-58.33			B	0.513	1.884	0.704	0.8	1	56.975			
			C	0.273	2.371	0.608	0.8	1	27.720			
T7	0.93	3.03	A	0.173	2.689	0.585	0.8	1	19.191	2.84	340.50	B
58.33-50.00			B	0.49	1.913	0.693	0.8	1	55.009			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.277	2.359	0.609	0.8	1	29.365			
T8	1.40	3.84	A	0.142	2.801	0.58	0.8	1	24.097	4.07	325.45	B
50.00-37.50			B	0.474	1.936	0.685	0.8	1	82.806			
			C	0.247	2.446	0.601	0.8	1	40.209			
T9	1.40	4.46	A	0.161	2.733	0.583	0.8	1	29.057	3.83	306.56	B
37.50-25.00			B	0.459	1.959	0.677	0.8	1	83.567			
			C	0.257	2.416	0.604	0.8	1	44.573			
T10	2.81	10.92	A	0.155	2.754	0.582	0.8	1	59.544	8.18	327.08	B
25.00-0.00			B	0.45	1.974	0.673	0.8	1	176.987			
			C	0.247	2.447	0.601	0.8	1	91.861			
Sum Weight:	14.95	45.05						OTM	4242.45 kip-ft	53.64		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.21	1.72	A	0.225	2.516	0.596	0.85	1	17.615	2.31	231.26	B
160.00-150.00			B	0.403	2.058	0.653	0.85	1	30.850			
			C	0.225	2.516	0.596	0.85	1	17.615			
T2	1.29	3.38	A	0.168	2.707	0.584	0.85	1	35.818	8.01	320.35	B
150.00-125.00			B	0.54	1.853	0.719	0.85	1	122.800			
			C	0.168	2.707	0.584	0.85	1	35.818			
T3	2.37	5.25	A	0.157	2.745	0.583	0.85	1	39.409	9.03	361.07	B
125.00-100.00			B	0.555	1.839	0.727	0.85	1	147.706			
			C	0.25	2.437	0.602	0.85	1	59.749			
T4	2.66	6.93	A	0.172	2.693	0.585	0.85	1	49.534	9.40	376.17	B
100.00-75.00			B	0.538	1.855	0.718	0.85	1	163.899			
			C	0.292	2.318	0.613	0.85	1	81.028			
T5	0.93	2.74	A	0.164	2.72	0.584	0.85	1	17.097	3.13	375.05	B
75.00-66.67			B	0.529	1.866	0.713	0.85	1	57.537			
			C	0.28	2.35	0.61	0.85	1	27.942			
T6	0.93	2.79	A	0.161	2.732	0.583	0.85	1	17.394	3.03	363.78	B
66.67-58.33			B	0.513	1.884	0.704	0.85	1	57.274			
			C	0.273	2.371	0.608	0.85	1	28.190			
T7	0.93	3.03	A	0.173	2.689	0.585	0.85	1	19.893	2.86	342.64	B
58.33-50.00			B	0.49	1.913	0.693	0.85	1	55.355			
			C	0.277	2.359	0.609	0.85	1	29.994			
T8	1.40	3.84	A	0.142	2.801	0.58	0.85	1	24.858	4.09	327.30	B
50.00-37.50			B	0.474	1.936	0.685	0.85	1	83.275			
			C	0.247	2.446	0.601	0.85	1	40.910			
T9	1.40	4.46	A	0.161	2.733	0.583	0.85	1	30.046	3.86	308.54	B
37.50-25.00			B	0.459	1.959	0.677	0.85	1	84.108			
			C	0.257	2.416	0.604	0.85	1	45.470			
T10	2.81	10.92	A	0.155	2.754	0.582	0.85	1	61.314	8.23	329.22	B
25.00-0.00			B	0.45	1.974	0.673	0.85	1	178.142			
			C	0.247	2.447	0.601	0.85	1	93.508			
Sum Weight:	14.95	45.05						OTM	4265.96 kip-ft	53.94		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	1	1	15.774	1.96	195.70	B
160.00-150.00			B	0.288	2.328	0.612	1	1	23.085			
			C	0.175	2.683	0.586	1	1	15.774			
T2	0.47	2.32	A	0.13	2.846	0.579	1	1	31.625	5.88	235.33	B
150.00-125.00			B	0.37	2.126	0.64	1	1	78.623			
			C	0.13	2.846	0.579	1	1	31.625			
T3	0.91	3.86	A	0.122	2.875	0.578	1	1	35.328	6.56	262.43	B
125.00-100.00			B	0.379	2.108	0.643	1	1	93.664			
			C	0.186	2.642	0.588	1	1	48.393			
T4	1.04	5.08	A	0.14	2.808	0.58	1	1	45.674	7.03	281.14	B
100.00-75.00			B	0.374	2.118	0.641	1	1	107.312			
			C	0.217	2.539	0.594	1	1	64.521			
T5	0.37	2.10	A	0.134	2.833	0.579	1	1	15.794	2.33	279.59	B
75.00-66.67			B	0.363	2.142	0.637	1	1	37.363			
			C	0.208	2.57	0.592	1	1	22.276			
T6	0.37	2.14	A	0.131	2.844	0.579	1	1	16.083	2.28	273.85	B
66.67-58.33			B	0.352	2.167	0.633	1	1	37.493			
			C	0.202	2.588	0.591	1	1	22.550			
T7	0.37	2.32	A	0.132	2.839	0.579	1	1	18.071	2.22	265.97	B
58.33-50.00			B	0.338	2.2	0.628	1	1	37.351			
			C	0.2	2.597	0.59	1	1	24.102			
T8	0.55	3.00	A	0.118	2.894	0.577	1	1	23.489	3.13	250.42	B
50.00-37.50			B	0.325	2.231	0.624	1	1	55.298			
			C	0.185	2.648	0.587	1	1	33.173			
T9	0.55	3.42	A	0.129	2.848	0.579	1	1	28.066	3.04	243.05	B
37.50-25.00			B	0.32	2.245	0.622	1	1	57.824			
			C	0.192	2.624	0.589	1	1	37.347			
T10	1.10	8.68	A	0.133	2.836	0.579	1	1	58.911	6.49	259.42	B
25.00-0.00			B	0.316	2.255	0.621	1	1	122.874			
			C	0.191	2.626	0.589	1	1	78.358			
Sum Weight:	5.79	34.11						OTM	3206.03 kip-ft	40.91		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	0.825	1	13.868	1.82	181.77	B
160.00-150.00			B	0.288	2.328	0.612	0.825	1	21.441			
			C	0.175	2.683	0.586	0.825	1	13.868			
T2	0.47	2.32	A	0.13	2.846	0.579	0.825	1	28.202	5.70	227.89	B
150.00-125.00			B	0.37	2.126	0.64	0.825	1	76.138			
			C	0.13	2.846	0.579	0.825	1	28.202			
T3	0.91	3.86	A	0.122	2.875	0.578	0.825	1	31.254	6.36	254.33	B
125.00-100.00			B	0.379	2.108	0.643	0.825	1	90.776			
			C	0.186	2.642	0.588	0.825	1	44.615			
T4	1.04	5.08	A	0.14	2.808	0.58	0.825	1	40.747	6.79	271.75	B
100.00-75.00			B	0.374	2.118	0.641	0.825	1	103.726			
			C	0.217	2.539	0.594	0.825	1	59.909			
T5	0.37	2.10	A	0.134	2.833	0.579	0.825	1	14.051	2.25	270.00	B
75.00-66.67			B	0.363	2.142	0.637	0.825	1	36.081			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.208	2.57	0.592	0.825	1	20.636			
T6	0.37	2.14	A	0.131	2.844	0.579	0.825	1	14.288	2.20	264.08	B
66.67-58.33			B	0.352	2.167	0.633	0.825	1	36.156			
			C	0.202	2.588	0.591	0.825	1	20.856			
T7	0.37	2.32	A	0.132	2.839	0.579	0.825	1	15.613	2.12	253.88	B
58.33-50.00			B	0.338	2.2	0.628	0.825	1	35.654			
			C	0.2	2.597	0.59	0.825	1	21.814			
T8	0.55	3.00	A	0.118	2.894	0.577	0.825	1	20.826	3.01	241.18	B
50.00-37.50			B	0.325	2.231	0.624	0.825	1	53.259			
			C	0.185	2.648	0.587	0.825	1	30.649			
T9	0.55	3.42	A	0.129	2.848	0.579	0.825	1	24.606	2.91	232.53	B
37.50-25.00			B	0.32	2.245	0.622	0.825	1	55.321			
			C	0.192	2.624	0.589	0.825	1	34.100			
T10	1.10	8.68	A	0.133	2.836	0.579	0.825	1	52.714	6.23	249.09	B
25.00-0.00			B	0.316	2.255	0.621	0.825	1	117.985			
			C	0.191	2.626	0.589	0.825	1	72.449			
Sum Weight:	5.79	34.11						OTM	3086.97 kip-ft	39.38		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	0.8	1	13.596	1.80	179.78	B
160.00-150.00			B	0.288	2.328	0.612	0.8	1	21.207			
			C	0.175	2.683	0.586	0.8	1	13.596			
T2	0.47	2.32	A	0.13	2.846	0.579	0.8	1	27.713	5.67	226.83	B
150.00-125.00			B	0.37	2.126	0.64	0.8	1	75.783			
			C	0.13	2.846	0.579	0.8	1	27.713			
T3	0.91	3.86	A	0.122	2.875	0.578	0.8	1	30.672	6.33	253.18	B
125.00-100.00			B	0.379	2.108	0.643	0.8	1	90.363			
			C	0.186	2.642	0.588	0.8	1	44.075			
T4	1.04	5.08	A	0.14	2.808	0.58	0.8	1	40.043	6.76	270.41	B
100.00-75.00			B	0.374	2.118	0.641	0.8	1	103.213			
			C	0.217	2.539	0.594	0.8	1	59.250			
T5	0.37	2.10	A	0.134	2.833	0.579	0.8	1	13.801	2.24	268.63	B
75.00-66.67			B	0.363	2.142	0.637	0.8	1	35.898			
			C	0.208	2.57	0.592	0.8	1	20.401			
T6	0.37	2.14	A	0.131	2.844	0.579	0.8	1	14.032	2.19	262.68	B
66.67-58.33			B	0.352	2.167	0.633	0.8	1	35.965			
			C	0.202	2.588	0.591	0.8	1	20.615			
T7	0.37	2.32	A	0.132	2.839	0.579	0.8	1	15.262	2.10	252.16	B
58.33-50.00			B	0.338	2.2	0.628	0.8	1	35.412			
			C	0.2	2.597	0.59	0.8	1	21.487			
T8	0.55	3.00	A	0.118	2.894	0.577	0.8	1	20.446	3.00	239.87	B
50.00-37.50			B	0.325	2.231	0.624	0.8	1	52.967			
			C	0.185	2.648	0.587	0.8	1	30.288			
T9	0.55	3.42	A	0.129	2.848	0.579	0.8	1	24.112	2.89	231.02	B
37.50-25.00			B	0.32	2.245	0.622	0.8	1	54.963			
			C	0.192	2.624	0.589	0.8	1	33.637			
T10	1.10	8.68	A	0.133	2.836	0.579	0.8	1	51.829	6.19	247.62	B
25.00-0.00			B	0.316	2.255	0.621	0.8	1	117.286			
			C	0.191	2.626	0.589	0.8	1	71.605			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	5.79	34.11						OTM	3069.96 kip-ft	39.16		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.18	A	0.175	2.683	0.586	0.85	1	14.140	1.84	183.76	B
160.00-150.00			B	0.288	2.328	0.612	0.85	1	21.676			
			C	0.175	2.683	0.586	0.85	1	14.140			
T2	0.47	2.32	A	0.13	2.846	0.579	0.85	1	28.691	5.72	228.95	B
150.00-125.00			B	0.37	2.126	0.64	0.85	1	76.493			
			C	0.13	2.846	0.579	0.85	1	28.691			
T3	0.91	3.86	A	0.122	2.875	0.578	0.85	1	31.836	6.39	255.49	B
125.00-100.00			B	0.379	2.108	0.643	0.85	1	91.188			
			C	0.186	2.642	0.588	0.85	1	45.154			
T4	1.04	5.08	A	0.14	2.808	0.58	0.85	1	41.451	6.83	273.09	B
100.00-75.00			B	0.374	2.118	0.641	0.85	1	104.238			
			C	0.217	2.539	0.594	0.85	1	60.568			
T5	0.37	2.10	A	0.134	2.833	0.579	0.85	1	14.300	2.26	271.37	B
75.00-66.67			B	0.363	2.142	0.637	0.85	1	36.264			
			C	0.208	2.57	0.592	0.85	1	20.870			
T6	0.37	2.14	A	0.131	2.844	0.579	0.85	1	14.544	2.21	265.47	B
66.67-58.33			B	0.352	2.167	0.633	0.85	1	36.347			
			C	0.202	2.588	0.591	0.85	1	21.098			
T7	0.37	2.32	A	0.132	2.839	0.579	0.85	1	15.964	2.13	255.61	B
58.33-50.00			B	0.338	2.2	0.628	0.85	1	35.897			
			C	0.2	2.597	0.59	0.85	1	22.141			
T8	0.55	3.00	A	0.118	2.894	0.577	0.85	1	21.206	3.03	242.50	B
50.00-37.50			B	0.325	2.231	0.624	0.85	1	53.550			
			C	0.185	2.648	0.587	0.85	1	31.010			
T9	0.55	3.42	A	0.129	2.848	0.579	0.85	1	25.101	2.93	234.03	B
37.50-25.00			B	0.32	2.245	0.622	0.85	1	55.679			
			C	0.192	2.624	0.589	0.85	1	34.564			
T10	1.10	8.68	A	0.133	2.836	0.579	0.85	1	53.599	6.26	250.57	B
25.00-0.00			B	0.316	2.255	0.621	0.85	1	118.683			
			C	0.191	2.626	0.589	0.85	1	73.293			
Sum Weight:	5.79	34.11						OTM	3103.98 kip-ft	39.60		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	11.77					
Bracing Weight	22.34					
Total Member Self-Weight	34.11			-4.96	-12.42	

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Total Weight	51.56			-4.96	-12.42	
Wind 0 deg - No Ice		-0.14	-59.79	-5543.24	-6.17	88.68
Wind 30 deg - No Ice		28.88	-50.57	-4709.74	-2698.43	45.25
Wind 45 deg - No Ice		40.77	-41.10	-3832.50	-3802.21	19.36
Wind 60 deg - No Ice		49.79	-28.90	-2700.65	-4641.51	-7.58
Wind 90 deg - No Ice		58.01	0.14	1.29	-5395.25	-58.51
Wind 120 deg - No Ice		51.44	30.01	2769.59	-4765.60	-96.58
Wind 135 deg - No Ice		40.96	41.29	3831.42	-3811.05	-101.67
Wind 150 deg - No Ice		29.12	50.71	4706.07	-2709.25	-103.75
Wind 180 deg - No Ice		0.14	58.04	5397.24	-18.67	-85.14
Wind 210 deg - No Ice		-28.88	50.57	4699.82	2673.59	-45.25
Wind 225 deg - No Ice		-40.77	41.10	3822.58	3777.37	-19.36
Wind 240 deg - No Ice		-51.30	29.77	2758.77	4734.51	7.90
Wind 270 deg - No Ice		-58.01	-0.14	-11.21	5370.41	58.51
Wind 300 deg - No Ice		-49.93	-29.14	-2711.47	4622.91	92.72
Wind 315 deg - No Ice		-40.96	-41.29	-3841.34	3786.21	101.67
Wind 330 deg - No Ice		-29.12	-50.71	-4715.99	2684.41	103.75
Member Ice	10.94					
Total Weight Ice	76.87			-18.22	-33.97	
Wind 0 deg - Ice		-0.12	-76.74	-7105.45	-31.47	151.51
Wind 30 deg - Ice		37.56	-65.62	-6093.62	-3511.59	72.89
Wind 45 deg - Ice		53.08	-53.43	-4969.70	-4945.05	25.81
Wind 60 deg - Ice		64.92	-37.66	-3512.65	-6039.52	-22.78
Wind 90 deg - Ice		75.33	0.12	-15.72	-6993.54	-112.58
Wind 120 deg - Ice		66.08	38.47	3527.56	-6123.45	-174.81
Wind 135 deg - Ice		53.24	53.60	4936.81	-4948.58	-184.59
Wind 150 deg - Ice		37.77	65.73	6059.68	-3515.92	-185.47
Wind 180 deg - Ice		0.12	75.53	6974.99	-36.47	-148.39
Wind 210 deg - Ice		-37.56	65.62	6057.19	3443.65	-72.89
Wind 225 deg - Ice		-53.08	53.43	4933.27	4877.11	-25.81
Wind 240 deg - Ice		-65.96	38.27	3523.24	6053.02	23.30
Wind 270 deg - Ice		-75.33	-0.12	-20.72	6925.60	112.58
Wind 300 deg - Ice		-65.04	-37.87	-3516.98	5974.09	171.17
Wind 315 deg - Ice		-53.24	-53.60	-4973.24	4880.65	184.59
Wind 330 deg - Ice		-37.77	-65.73	-6096.12	3447.98	185.47
Total Weight	51.56			-4.96	-12.42	
Wind 0 deg - Service		-0.14	-59.79	-5544.64	10.43	88.68
Wind 30 deg - Service		28.88	-50.57	-4711.15	-2681.82	45.25
Wind 45 deg - Service		40.77	-41.10	-3833.91	-3785.61	19.36
Wind 60 deg - Service		49.79	-28.90	-2702.05	-4624.90	-7.58
Wind 90 deg - Service		58.01	0.14	-0.12	-5378.65	-58.51
Wind 120 deg - Service		51.44	30.01	2768.18	-4749.00	-96.58
Wind 135 deg - Service		40.96	41.29	3830.01	-3794.45	-101.67
Wind 150 deg - Service		29.12	50.71	4704.66	-2692.65	-103.75
Wind 180 deg - Service		0.14	58.04	5395.83	-2.07	-85.14
Wind 210 deg - Service		-28.88	50.57	4698.41	2690.19	-45.25
Wind 225 deg - Service		-40.77	41.10	3821.18	3793.98	-19.36
Wind 240 deg - Service		-51.30	29.77	2757.36	4751.11	7.90
Wind 270 deg - Service		-58.01	-0.14	-12.61	5387.02	58.51
Wind 300 deg - Service		-49.93	-29.14	-2712.88	4639.52	92.72
Wind 315 deg - Service		-40.96	-41.29	-3842.74	3802.81	101.67
Wind 330 deg - Service		-29.12	-50.71	-4717.39	2701.01	103.75

Load Combinations

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	8.347	35	0.3911	0.1293
T2	150 - 125	7.520	35	0.3896	0.1297
T3	125 - 100	5.425	35	0.3730	0.1070

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T4	100 - 75	3.575	35	0.3082	0.0864
T5	75 - 66.6667	2.012	35	0.2492	0.0629
T6	66.6667 - 58.3333	1.568	35	0.2277	0.0549
T7	58.3333 - 50	1.166	35	0.2036	0.0469
T8	50 - 37.5	0.834	35	0.1638	0.0393
T9	37.5 - 25	0.456	35	0.1183	0.0280
T10	25 - 0	0.206	35	0.0687	0.0170

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Flash Beacon Lighting	35	8.347	0.3911	0.1293	76014
159.00	HPD2-4.7	35	8.265	0.3909	0.1295	76014
158.00	DB304-A	35	8.183	0.3908	0.1297	76014
155.00	432E-83I-01T TTA Unit	35	7.935	0.3903	0.1301	76014
146.00	DC6-48-60-18-8F (Squid) Suppressor	35	7.183	0.3890	0.1279	66842
140.00	Commscope SFG22 (14' Sector Frame)	35	6.674	0.3874	0.1230	216581
125.00	DSM2 w/ additional SFS-H Stabilizer	35	5.425	0.3730	0.1070	22803
124.00	2" Dia 10' Omni	35	5.345	0.3712	0.1061	22389
115.00	4"x96"x72" Ice Canopy	35	4.649	0.3503	0.0985	24399
110.00	6' w/ Radome	35	4.280	0.3364	0.0945	26221
97.00	APXVSPP18-C-A20	35	3.372	0.3006	0.0838	28582
85.00	PD10054	35	2.598	0.2728	0.0725	22324
83.00	L-810 Tower Side-Light Beacon	35	2.476	0.2683	0.0706	21532
77.50	5' T-arm	35	2.153	0.2554	0.0653	19731
21.00	Sinclair SY450-SF1SNM Yagi	35	0.152	0.0546	0.0139	17621

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	160 - 150	10.680	19	0.5032	0.2378
T2	150 - 125	9.614	19	0.5011	0.2381
T3	125 - 100	6.927	19	0.4779	0.1986
T4	100 - 75	4.563	19	0.3938	0.1592
T5	75 - 66.6667	2.569	19	0.3182	0.1131
T6	66.6667 - 58.3333	2.003	19	0.2906	0.0986
T7	58.3333 - 50	1.490	19	0.2599	0.0840
T8	50 - 37.5	1.066	19	0.2092	0.0703
T9	37.5 - 25	0.584	19	0.1511	0.0500
T10	25 - 0	0.264	19	0.0878	0.0304

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Flash Beacon Lighting	19	10.680	0.5032	0.2378	64321
159.00	HPD2-4.7	19	10.574	0.5030	0.2381	64321
158.00	DB304-A	19	10.468	0.5028	0.2384	64321
155.00	432E-83I-01T TTA Unit	19	10.149	0.5022	0.2390	64321
146.00	DC6-48-60-18-8F (Squid) Suppressor	19	9.181	0.5001	0.2348	59402
140.00	Commscope SFG22 (14' Sector Frame)	19	8.527	0.4977	0.2262	128075
125.00	DSM2 w/ additional SFS-H Stabilizer	19	6.927	0.4779	0.1986	17453
124.00	2" Dia 10' Omni	19	6.825	0.4755	0.1968	17155
115.00	4"x96"x72" Ice Canopy	19	5.935	0.4482	0.1825	18768
110.00	6' w/ Radome	19	5.463	0.4301	0.1749	20212
97.00	APXVSPP18-C-A20	19	4.303	0.3839	0.1540	22182
85.00	PD10054	19	3.316	0.3483	0.1318	17399
83.00	L-810 Tower Side-Light Beacon	19	3.161	0.3425	0.1280	16791
77.50	5' T-arm	19	2.748	0.3261	0.1177	15409
21.00	Sinclair SY450-SF1SNM Yagi	19	0.195	0.0698	0.0248	13780

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Antenna Mount Analysis Report and PMI Requirements

Mount ReAnalysis-PMI

SMART Tool Project #: 10163461
Maser Consulting Connecticut Project #: 20777368A (Rev 1)

August 30, 2022

Site Information	*Site ID:*	*468946-VZW / Middlebury I-84*
	Site Name:	*Middlebury I-84*
	Carrier Name:	*Verizon Wireless*
	Address:	*2 Larkin Drive* *Middlebury, Connecticut 06762* *New Haven County*
	Latitude:	*41.51361111°*
	Longitude:	*-73.12444444°*
Structure Information	*Tower Type:*	*140-Ft Self Support*
	Mount Type:	*5.00-Ft T-Arm*

FUZE ID # 16244626

Analysis Results

T-Arm: **40.9% Pass***

***Antennas and equipment to be installed in compliance with PMI Requirements of this mount analysis.**

******Contractor PMI Requirements*:**
Included at the end of this MA report
Available & Submitted via portal at https://pmi.vzwsmart.com

For additional questions and support, please reach out to:
pmisupport@colliersengineering.com

Report Prepared By: Garrett Smith

Digitally signed by Justin Linette
Date: 2022.08.30 14:57:29-04'00'

Executive Summary:

The objective of this report is to determine the capacity of the antenna support mount at the subject facility for the final wireless telecommunications configuration, per the applicable codes and standards. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

This analysis is inclusive of the mount structure only and does not address the structural capacity of the supporting structure. This mounting frame was not analyzed as an anchor attachment point for fall protection. All climbing activities are required to have a fall protection plan completed by a competent person.

Sources of Information:

Document Type	Remarks
Radio Frequency Data Sheet (RFDS)	*Verizon RFDS Site ID: 2954976, dated May 24, 2022*
Mount Mapping Report	*Tower Engineering Professionals, Site ID: 468946, dated December 2, 2020*

Analysis Criteria:

Codes and Standards:	ANSI/TIA-222-H	
Wind Parameters:	Basic Wind Speed (Ultimate 3-sec. Gust), V_{ULT}:	117 mph
	Ice Wind Speed (3-sec. Gust):	50 mph
	Design Ice Thickness:	1.00 in
	Risk Category:	II
	Exposure Category:	C
	Topographic Category:	1
	Topographic Feature Considered:	N/A
	Topographic Method:	N/A
	Ground Elevation Factor, K_e:	0.973
Seismic Parameters:	S_S:	0.195
	S_1:	0.054
Maintenance Parameters:	Wind Speed (3-sec. Gust):	30 mph
	Maintenance Live Load, Lv:	250 lbs.
	Maintenance Live Load, Lm:	500 lbs.
Analysis Software:	RISA-3D (V17)	

Final Loading Configuration:

The following equipment has been considered for the analysis of the mounts:

Mount Elevation (ft)	Equipment Elevation (ft)	Quantity	Manufacturer	Model	Status
77.50	77.50	2	Samsung	MT6407-77A	Added
		4	JMA Wireless	MX06FRO660-03	
		2	Samsung	B2/B66A RRH-BR049	
		2	Samsung	B5/B13 RRH-BR04C	
		1	Raycap	RRFDC-3315-PF-48*	Retained

* Equipment to be flush mounted directly to the Self Support. They are not mounted on the T-Arm mounts and are not included in this mount analysis.

Any proposed antennas not currently installed should be mounted such that the centerline of the antennas does not exceed 6 inches vertically from the center of the antenna mounts.

The recent mount mapping reported existing OVP units. It is acceptable to install up to any three (3) of the OVP model numbers listed below as required at any location other than the mount face without affecting the structural capacity of the mount. If OVP units are installed on the mount face, a mount re-analysis may be required unless replacing an existing OVP.

Model Number	Ports	AKA
DB-B1-6C-12AB-0Z	6	OVP-6
RVZDC-6627-PF-48	12	OVP-12

Standard Conditions:

1. All engineering services are performed on the basis that the information provided to Maser Consulting Connecticut and used in this analysis is current and correct. The existing equipment loading has been applied at locations determined from the supplied documentation. Any deviation from the loading locations specified in this report shall be communicated to Maser Consulting Connecticut to verify deviation will not adversely impact the analysis.

2. Mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications.

   Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping and reported in the Mount Mapping Report are assumed to be corrected and documented as part of the PMI process and are not considered in the mount analysis.

   The mount analysis and the mount mapping are not a condition assessment of the mount. Proper maintenance and condition assessments are still required post analysis.

3. For mount analyses completed from other data sources (including new replacement mounts) and not specifically mapped in accordance with the NSTD-446 Standard, the mounts are assumed to have been properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications.

4. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.

5. The mount was checked up to, and including, the bolts that fasten it to the mount collar/attachment and threaded rod connections in collar members if applicable. Local deformation and interaction between the mount collar/attachment and the supporting tower structure are outside the scope of this analysis.

6. All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Maser Consulting Connecticut is not responsible for the conclusion, opinions, and recommendations made by others based on the information supplied.

7. Structural Steel Grades have been assumed as follows, if applicable, unless otherwise noted in this analysis:
   - Channel, Solid Round, Angle, Plate — ASTM A36 (Gr. 36)
   - HSS (Rectangular) — ASTM 500 (Gr. B-46)
   - Pipe — ASTM A53 (Gr. B-35)
   - Threaded Rod — F1554 (Gr. 36)
   - Bolts — ASTM A325

Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Maser Consulting Connecticut.

Analysis Results:

Component	Utilization %	Pass/Fail
Antenna Pipe	*24.8%*	*Pass*
Face Horizontal	*40.9%*	*Pass*
Standoff Arm	*18.1%*	*Pass*
Connection Check	*17.6%*	*Pass*

Structure Rating – *(Controlling Utilization of all Components)*	**40.9%**

Mount Steel (EPA)a per ANSI/TIA-222-H Section 2.6.11.2:

Ice Thickness (In)	Mount Pipes Excluded		Mount Pipes Included	
	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)	Front (EPA)a (Sq. Ft.)	Side (EPA)a (Sq. Ft.)
0	2.0	0.2	6.6	4.8
0.5	2.7	0.3	9.1	6.8
1	3.3	0.3	11.7	8.7

Notes:
- (EPA)a values listed above may be used in the absence of more precise information
- (EPA)a values in the table above include 1 sector(s).
- Ka factors included in (EPA)a calculations

Requirements:

The existing mounts are **SUFFICIENT** for the final loading configuration shown in attachment 2 and do not require modifications. Additional requirements are noted below.

If required, ANSI/ASSP rigging plan review services compliant with the requirements of ANSI/TIA 322 are available for a Construction Class IV site or other. Separate review fees will apply.

Attachments:

1. **Contractor Required Post Installation Inspection (PMI) Report Deliverables**
2. Antenna Placement Diagrams
3. Mount Photos
4. Mount Mapping Report (for reference only)
5. Analysis Calculations
6. TIA Adoption and Wind Speed Usage Letter

Mount Desktop – Post Modification Inspection (PMI) Report Requirements

Documents & Photos Required from Contractor – Passing Mount Analysis

Passing Mount Analysis requires a PMI due to a modification in loading.

Electronic pdf version of this can be downloaded at https://pmi.vzwsmart.com.

For additional questions and support, please reach out to pmisupport@colliersengineering.com

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PSLC #: 468946 SMART Project #: 10163461 Fuze Project ID: 16244626

Purpose – to provide SMART Tool structural vendor the proper documentation in order to complete the required Mount Desktop review of the Post Modification Inspection Report.

- Contractor is responsible for making certain the photos provided as noted below provide confirmation that the installation was completed in accordance with this Passing Mount Analysis.
- Contractor shall relay any data that can impact the performance of the mount, this includes safety issues.

Base Requirements:

- If installation will cause damage to the structure, the climbing facility, or safety climb if present or any installed system, SMART Tool vendor to be notified prior to install. Any special photos outside of the standard requirements will be indicated on the drawings.
- Provide "as built mount drawings" showing contractor's name, contact information, preparer's signature, and date. Any deviations from the drawings (Proposed modification) shall be shown. NOTE: If loading is different than what is conveyed in the passing mount analysis (MA) contact the SMART Tool vendor immediately.
- Each photo should be time and date stamped
- Photos should be high resolution.
- Contractor shall ensure that the safety climb wire rope is supported and not adversely impacted by the install of the modification components. This may involve the install of wire rope guides, or other items to protect the wire rope. If there is conflict, contact the SMART Tool engineer for recommendations.
- The PMI can be accessed at the following portal: ***https://pmi.vzwsmart.com***

Photo Requirements:

- *Photos taken at ground level*
  - Photo of Gate Signs showing the tower owner, site name, and number.
  - Overall tower structure after installation.
  - Photos of the mount after installation; if the mounts are at different rad elevations, pictures must be provided for all elevations that equipment was installed.
- *Photos taken at Mount Elevation*
  - Photos showing the safety climb wire rope above and below the mount prior to installation.
  - Photos showing the climbing facility and safety climb if present.
  - Photos showing each individual sector after installation. Each entire sector shall be in one photo to show the interconnection of members.

        - These photos shall also certify that the placement and geometry of the equipment on the mount is as depicted in the antenna placement diagram in this form.
    - Photos that show the model number of each antenna and piece of equipment installed per sector.

Antenna & equipment placement and Geometry Confirmation:

- The contractor shall certify that the antenna & equipment placement and geometry is in accordance with the sketch and table as included in the mount analysis and noted below.

☐ The contractor certifies that the photos support and the equipment on the mount is as depicted on the sketch and table included in this form and with the mount analysis provided.

OR

☐ The contractor notes that the equipment on the mount is not in accordance with the sketch and has noted the differences below and provided photo documentation of any alterations.

Special Instructions / Validation as required from the MA or any other information the contractor deems necessary to share that was identified:

Issue:

Response:

Special Instruction Confirmation:

☐ The contractor has read and acknowledges the above special instructions.

☐ All hardware listed in the Special Instructions above (if applicable) has been properly installed, and the existing hardware was inspected.

☐ The material utilized was as specified in the SMART Tool engineering vendor Special Instructions above (if applicable) and included in the material certification folder is a packing list or invoice for these materials.

OR

☐ The material utilized was approved by a SMART Tool engineering vendor as an “equivalent” and this approval is included as part of the contractor submission.

Comments:

Contractor certifies that the climbing facility / safety climb was not damaged prior to starting work:

☐ Yes ☐ No

Contractor certifies no new damage created during the current installation:

☐ Yes ☐ No

Contractor to certify the condition of the safety climb and verify no damage when leaving the site:

☐ Safety Climb in Good Condition ☐ Safety Climb Damaged

Certifying Individual:

Company:	
Employee Name:	
Contact Phone:	
Email:	
Date:	

Structure: 468946-VZW - Middlebury I-84

Sector: **A**

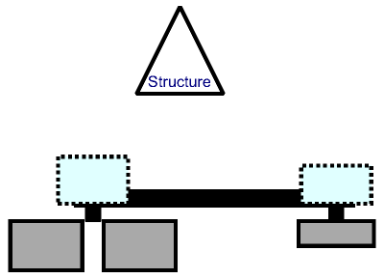
Structure Type: Self Support

Mount Elev: 77.50

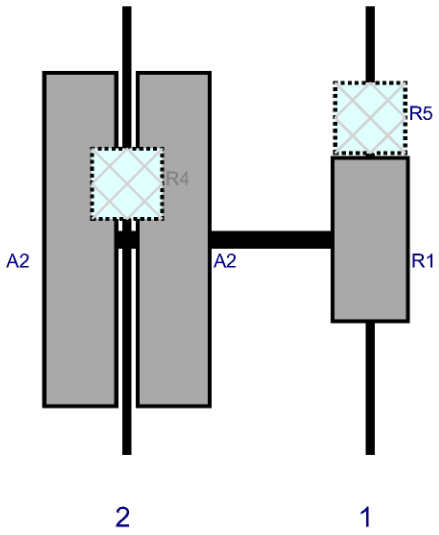
10163461

8/29/2022

Plan View

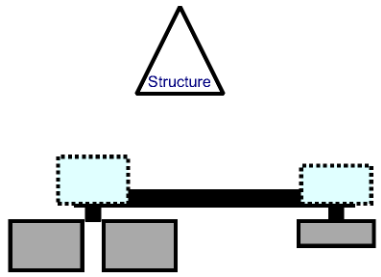


Front View - Looking at Structure

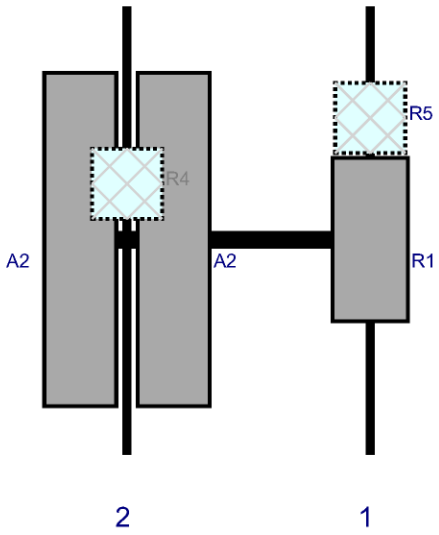


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
R1	MT6407-77A	35.1	16.1	56	1	a	Front	50.04	0	Added	
R5	B5/B13 RRH-BR04C	15	15	56	1	a	Behind	24	0	Added	
A2	MX06FRO660-03	71.3	15.4	4	2	a	Front	50.04	10	Added	
A2	MX06FRO660-03	71.3	15.4	4	2	b	Front	50.04	-10	Added	
R4	B2/B66A RRH-BR049	15	15	4	2	a	Behind	38.04	0	Added	

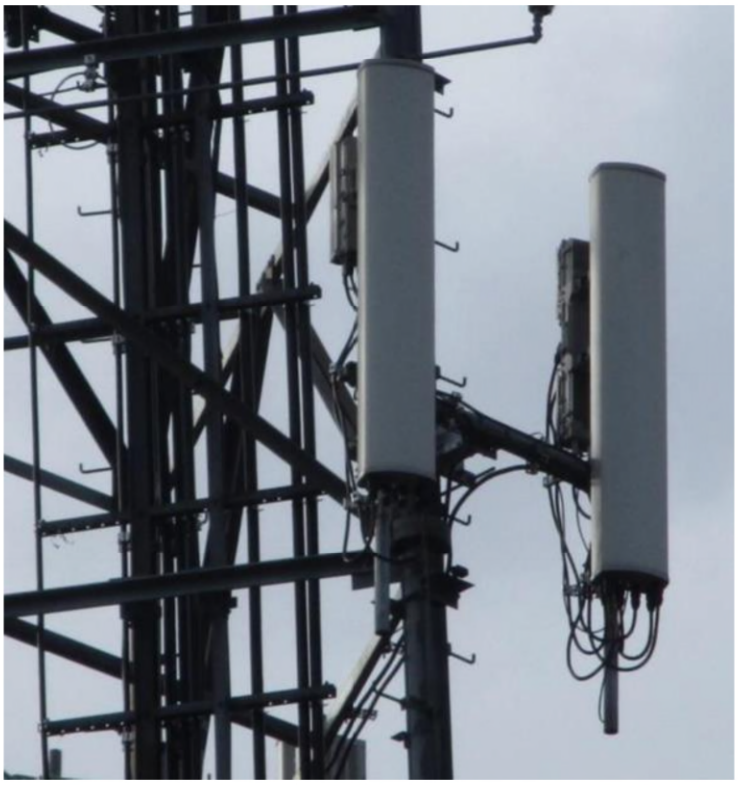
Plan View



Front View - Looking at Structure



Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
R1	MT6407-77A	35.1	16.1	56	1	a	Front	50.04	0	Added	
R5	B5/B13 RRH-BR04C	15	15	56	1	a	Behind	24	0	Added	
A2	MX06FRO660-03	71.3	15.4	4	2	a	Front	50.04	10	Added	
A2	MX06FRO660-03	71.3	15.4	4	2	b	Front	50.04	-10	Added	
R4	B2/B66A RRH-BR049	15	15	4	2	a	Behind	38.04	0	Added	

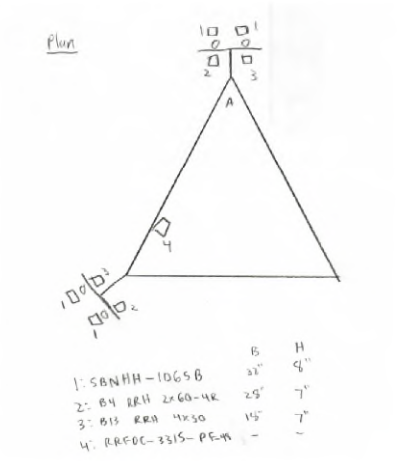


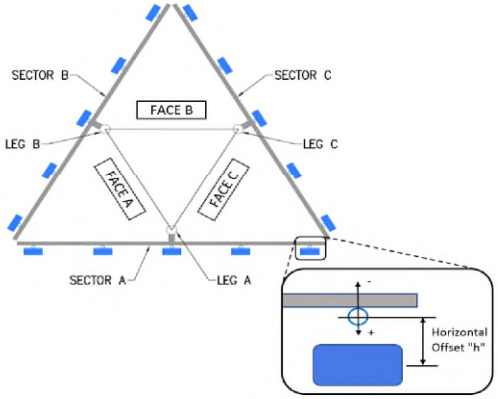
V3.0 Updated on 8-31-2020

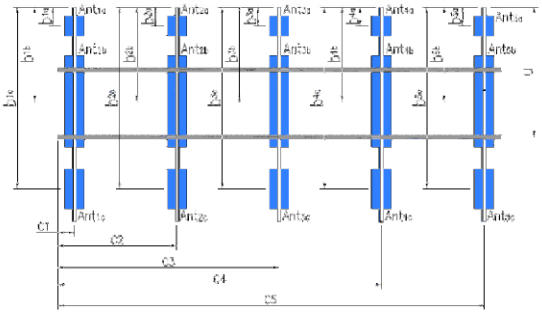
Antenna Mount Mapping Form (PATENT PENDING)

FCC # 1045077

Tower Owner:	Unknown	**Mapping Date:**	12/2/2020
Site Name:	Middlebury I-84	**Tower Type:**	Self Support
Site Number or ID:	468946	**Tower Height (Ft.):**	140
Mapping Contractor:	TEP	**Mount Elevation (Ft.):**	77.5







Antenna Layout (Looking Out From Tower)

Mount Pipe Configuration and Geometries [Unit = Inches]

Sector / Position	Mount Pipe Size & Length	Vertical Offset Dimension "u"	Horizontal Offset "C1, C2, C3, etc."	Sector / Position	Mount Pipe Size & Length	Vertical Offset Dimension "u"	Horizontal Offset "C1, C2, C3, etc."
A1	2.4"Øx0.154"x8'-0"	50.00	4.00	C1	2.4"Øx0.154"x8'-0"	50.00	4.00
A2	2.4"Øx0.154"x8'-0"	50.00	56.00	C2	2.4"Ø"0.154"x8'-0"	50.00	56.00
A3				C3			
A4				C4			
A5				C5			
A6				C6			
B1				D1			
B2				D2			
B3				D3			
B4				D4			
B5				D5			
B6				D6			

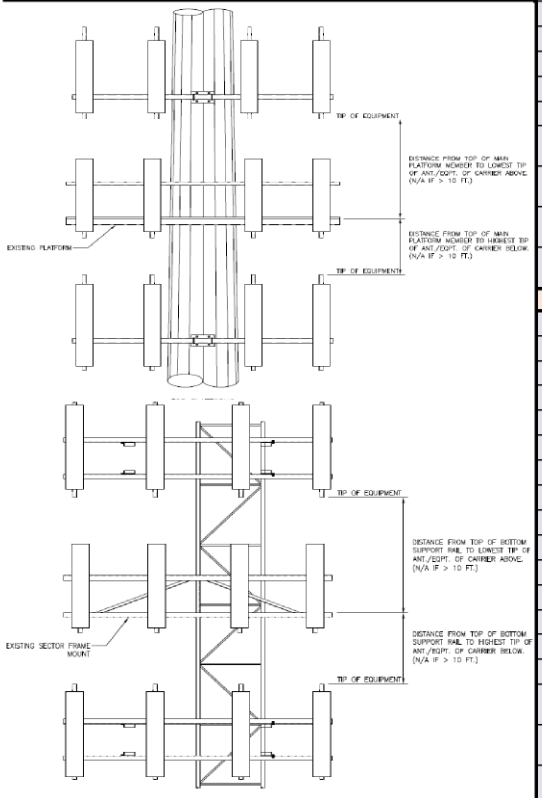
Distance between bottom rail and mount CL elevation (dim d). Unit is inches. See 'Mount Elev Ref' tab for details. :	0.00
Distance from top of bottom support rail to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.) :	
Distance from top of bottom support rail to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.) :	
Please enter additional infomation or comments below.	

Tower Face Width at Mount Elev. (ft.):	16.75	Tower Leg Size or Pole Shaft Diameter at Mount Elev. (in.):	6.9

	Enter antenna model. If not labeled, enter "Unknown".						Mounting Locations [Units are inches and degrees]			Photos of antennas
Ants. Items	Antenna Models if Known	Width (in.)	Depth (in.)	Height (in.)	Coax Size and Qty	Antenna Center-line (Ft.)	Vertical Distances"b_{1a}, b_{2a}, b_{3a}, b_{1b}...." (Inches)	Horiz. Offset "h" (Use "-" if Ant. is behind)	Antenna Azimuth (Degrees)	Photo Numbers
Sector A										
Ant_{1a}										
Ant_{1b}	SBNHH-1D65B	11.85	7.10	72.87	er from R	79	32.00	8.00	80.00	108
Ant_{1c}	B4 RRH2x60-4R	10.63	5.74	36.60	er from R	79.3333	28.00	7.00		112
Ant_{2a}										
Ant_{2b}	SBNHH-1D65B	11.85	7.10	72.87	er from R	79	32.00	8.00	80.00	118
Ant_{2c}	B13 RRH4x30	12.00	9.00	21.60	er from R	80.1667	18.00	7.00		121
Ant_{3a}										
Ant_{3b}										
Ant_{3c}										
Ant_{4a}										
Ant_{4b}										
Ant_{4c}										
Ant_{5a}										
Ant_{5b}										
Ant_{5c}										
Ant on Standoff										
Ant on Standoff										
Ant on Tower	RRFDC-3315-PF-48			1 1/4" Hybrid						141
Ant on Tower										

Mount Azimuth (Degree) for Each Sector			Tower Leg Azimuth (Degree) for Each Sector		
Sector A:	80.00	Deg	Leg A:	40.00	Deg
Sector B:		Deg	Leg B:	160.00	Deg
Sector C:	260.00	Deg	Leg C:	280.00	Deg
Sector D:		Deg	Leg D:		Deg

Climbing Facility Information		
Location:	40.00 Deg	Sector A
Climbing Facility	Corrosion Type:	Good condition.
	Access:	Climbing path was unobstructed.
	Condition:	Good condition.



Sector B										
Ant_{1a}										
Ant_{1b}										
Ant_{1c}										
Ant_{2a}										
Ant_{2b}										
Ant_{2c}										
Ant_{3a}										
Ant_{3b}										
Ant_{3c}										
Ant_{4a}										
Ant_{4b}										
Ant_{4c}										
Ant_{5a}										
Ant_{5b}										
Ant_{5c}										
Ant on Standoff										
Ant on Standoff										
Ant on Tower										
Ant on Tower										
Sector C										
Ant_{1a}										
Ant_{1b}	SBNHH-1D65B	11.85	7.10	72.87	er from R	79	32.00	8.00	260.00	156
Ant_{1c}	B4 RRH2x60-4R	10.63	5.74	36.60	er from R	79.3333	28.00	7.00		159
Ant_{2a}										
Ant_{2b}	SBNHH-1D65B	11.85	7.10	72.87	er from R	79	32.00	8.00	260.00	162
Ant_{2c}	B13 RRH4x30	12.00	9.00	21.60	er from R	80.1667	18.00	7.00		165
Ant_{3a}										
Ant_{3b}										
Ant_{3c}										
Ant_{4a}										
Ant_{4b}										
Ant_{4c}										
Ant_{5a}										
Ant_{5b}										
Ant_{5c}										
Ant on Standoff										
Ant on Standoff										
Ant on Tower										
Ant on Tower										
Sector D										
Ant_{1a}										
Ant_{1b}										
Ant_{1c}										
Ant_{2a}										
Ant_{2b}										
Ant_{2c}										
Ant_{3a}										
Ant_{3b}										
Ant_{3c}										
Ant_{4a}										
Ant_{4b}										
Ant_{4c}										
Ant_{5a}										
Ant_{5b}										
Ant_{5c}										
Ant on Standoff										
Ant on Standoff										
Ant on Tower										
Ant on Tower										

Observed Safety and Structural Issues During the Mount Mapping		
Issue #	Description of Issue	Photo #

1		
2		
3		
4		
5		
6		
7		
8		

Mapping Notes
1. Please report any visible structural or safety issues observed on the antenna mounts (Damaged members, loose connections, tilting mounts, safety climb issues, etc.)
2. If the thickness of the existing pipes or tubing can't be obtained from a general tool (such as Caliper), please use an ultrasonic measurement tool (thickness gauge) to measure the thickness.
3. Please create all required detail sketches of the mounts and insert them into the "Sketches" tab.
4. Please measure and enter the bolt sizes and types under the Members Box in the spreadsheet of the mount type.
5. Take and label the photos of the tower, mounts, connections, antennas and all measurements. Minimum 50 photos are required.
6. Please measure and report the size and length of all existing antenna mounting pipes.
7. Please measure and report the antenna information for all sectors.
8. Don't delete or rearrange any sheet or contents of any sheet from this mapping form.

Standard Conditions
1. Obvious safety and structural issues/deficiencies noticed at the time of the mount mapping are to be reported in this mapping. However, this mount mapping is not a condition assessment of the mount.

Antenna Mount Mapping Form (PATENT PENDING)

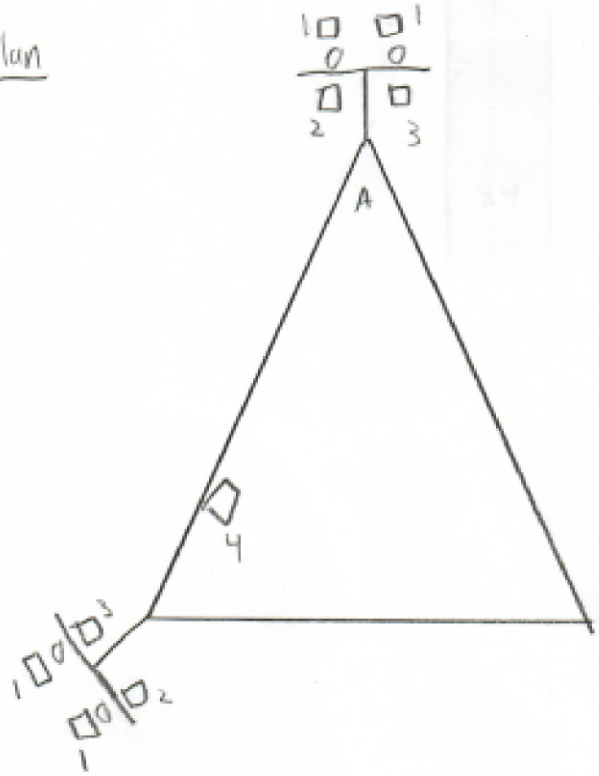
FCC # 1045077

Tower Owner:	Unknown	**Mapping Date:**	12/2/2020
Site Name:	Middlebury I-84	**Tower Type:**	Self Support
Site Number or ID:	468946	**Tower Height (Ft.):**	140
Mapping Contractor:	TEP	**Mount Elevation (Ft.):**	77.5

Please Insert Sketches of the Antenna Mount

Middlebury I-84

Plan



A-Leg @ 40°

Leg: 6 9/8"

Fw: 16'-9"

Elev:

MNT: 77'-6"

ANT: 78'-6"

Coax - (1) 1 1/4" Hyb

Az:	MNT	ANT
A:	40°	80°
C:	300°	260°

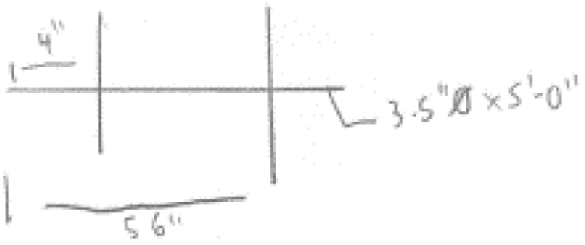
		B	H
1:	SBNHH-1D65B	32"	8"
2:	B4 RRH 2x60-4R	29"	7"
3:	B13 RRH 4x30	15"	7"
4:	RRFDC-3315-PF-48	-	-

Rayfcop Pipe

2.4" Ø x 32"

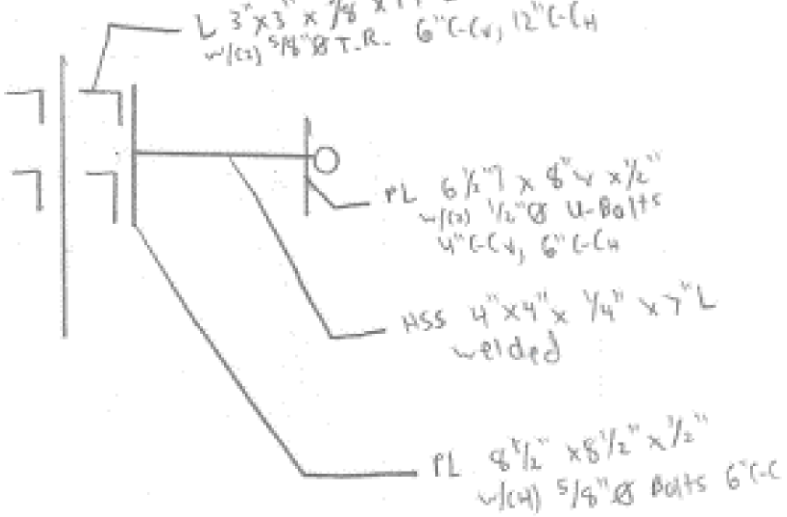
Please Insert Sketches of the Antenna Mount, cont'd

Front



MP: 2.4"Ø x 8'-0" U: 50"

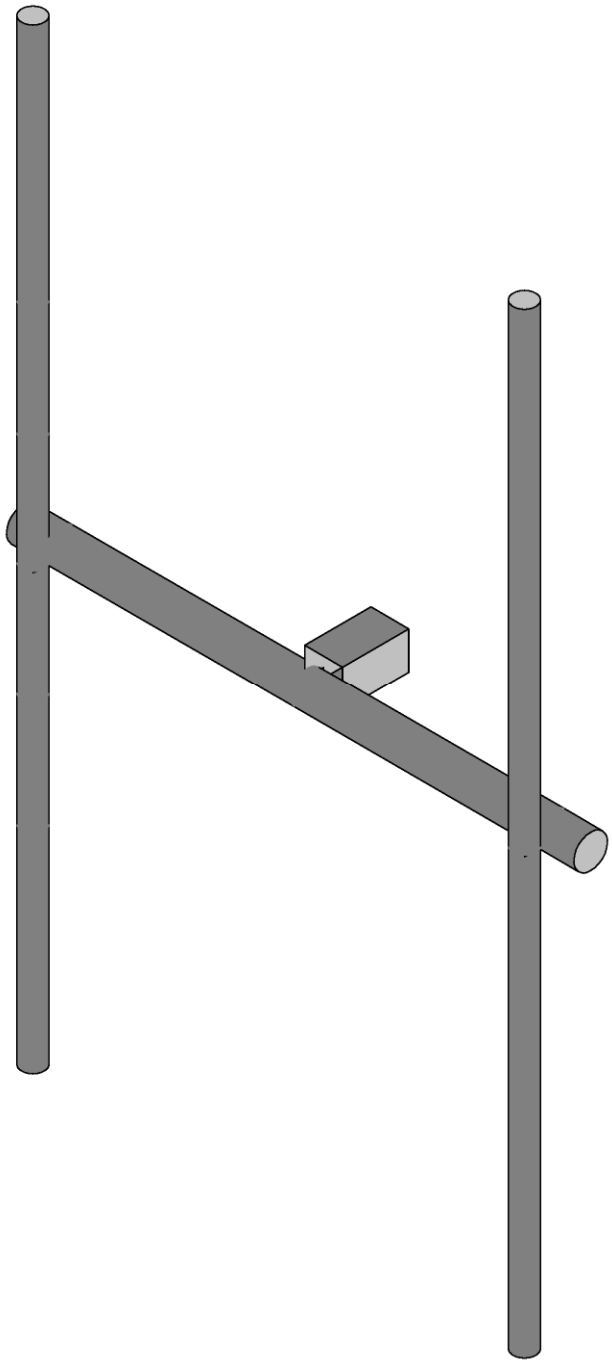
Side



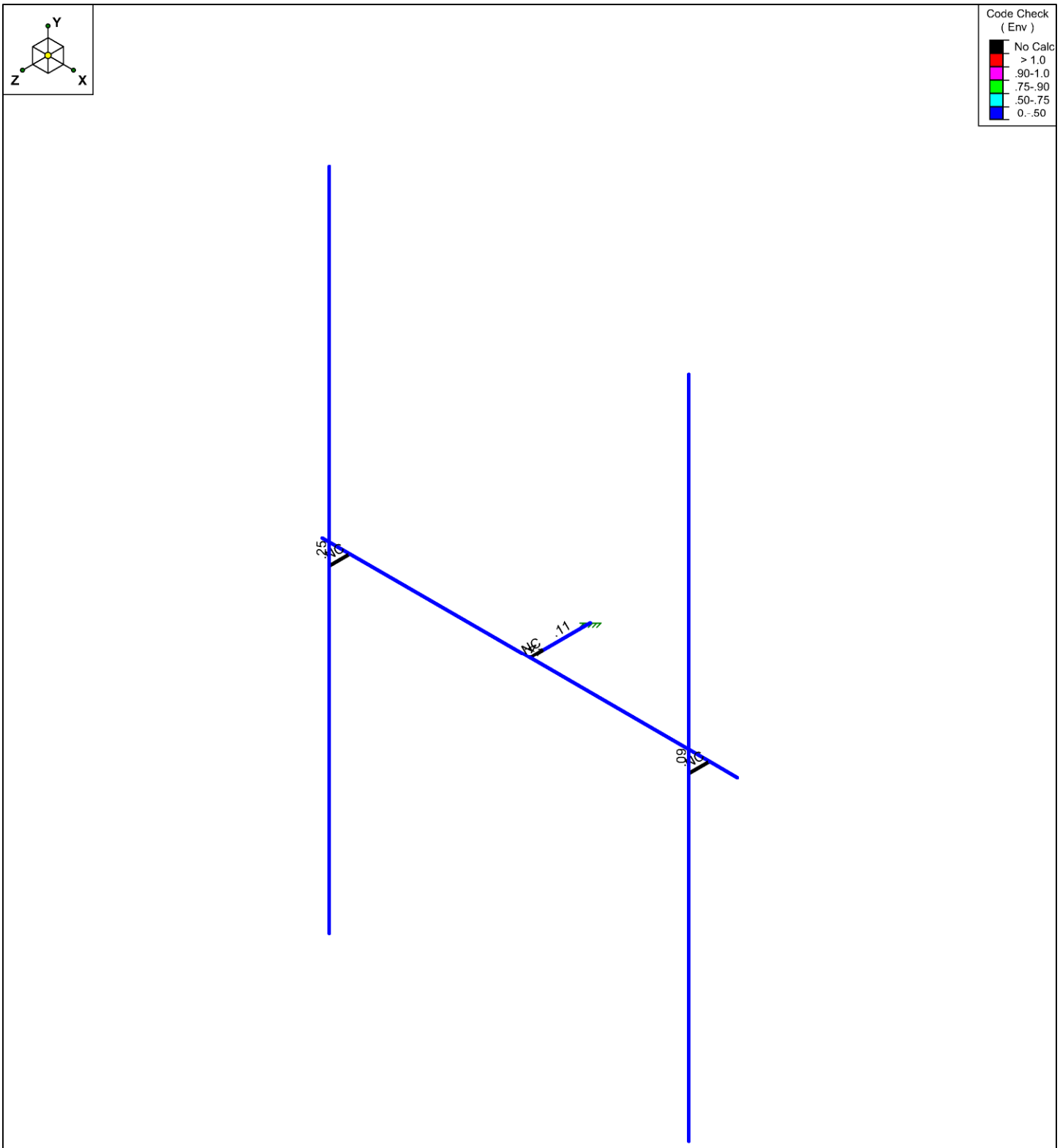
MP Connection

PL 7" W x 8" T x 1/2" Th
w/(2) 1/2"Ø U-Bolts to PP
6" C-C H, 4" C-C V

(2) BPL 7" W x 1'1/2" T x 1/2" Th
w/(2) 1/2" Ø T.R.
5'1/2" C-C V, 6" C-C H

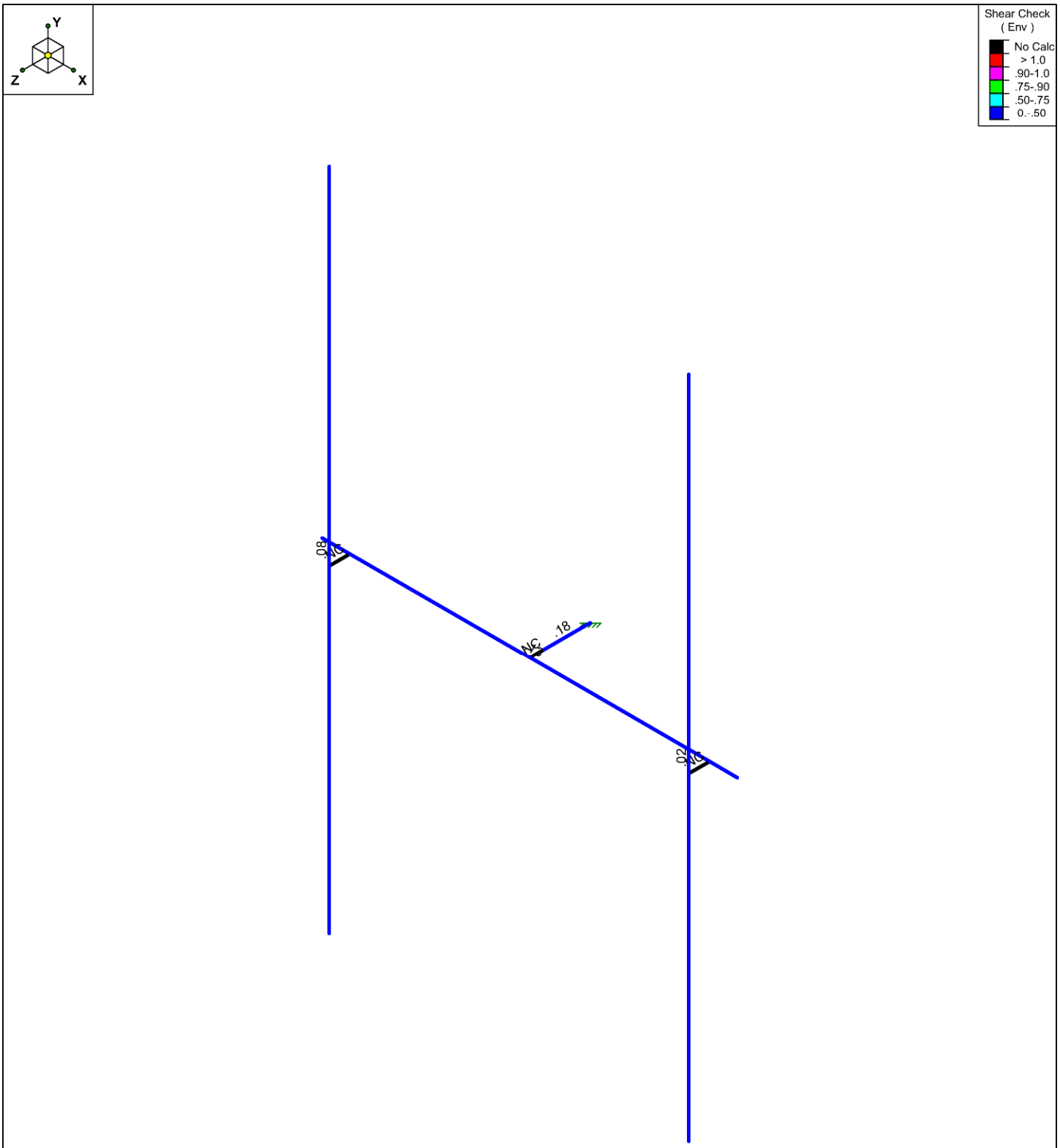


Maser Consulting	468946-VZW_MT_LOT_SectorA_H	SK - 1
		Aug 29, 2022 at 3:20 PM
		468946-VZW_MT_LOT_A_H.r3d



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.2D+1.0Wo (0 Deg)

Maser Consulting	468946-VZW_MT_LOT_SectorA_H	SK - 2
		Aug 29, 2022 at 3:20 PM
		468946-VZW_MT_LOT_A_H.r3d



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.2D+1.0Wo (0 Deg)

Maser Consulting	468946-VZW_MT_LOT_SectorA_H	SK - 3
		Aug 29, 2022 at 3:20 PM
		468946-VZW_MT_LOT_A_H.r3d

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Antenna D	None					24			
2	Antenna Di	None					24			
3	Antenna Wo (0 Deg)	None					24			
4	Antenna Wo (30 Deg)	None					24			
5	Antenna Wo (60 Deg)	None					24			
6	Antenna Wo (90 Deg)	None					24			
7	Antenna Wo (120 Deg)	None					24			
8	Antenna Wo (150 Deg)	None					24			
9	Antenna Wo (180 Deg)	None					24			
10	Antenna Wo (210 Deg)	None					24			
11	Antenna Wo (240 Deg)	None					24			
12	Antenna Wo (270 Deg)	None					24			
13	Antenna Wo (300 Deg)	None					24			
14	Antenna Wo (330 Deg)	None					24			
15	Antenna Wi (0 Deg)	None					24			
16	Antenna Wi (30 Deg)	None					24			
17	Antenna Wi (60 Deg)	None					24			
18	Antenna Wi (90 Deg)	None					24			
19	Antenna Wi (120 Deg)	None					24			
20	Antenna Wi (150 Deg)	None					24			
21	Antenna Wi (180 Deg)	None					24			
22	Antenna Wi (210 Deg)	None					24			
23	Antenna Wi (240 Deg)	None					24			
24	Antenna Wi (270 Deg)	None					24			
25	Antenna Wi (300 Deg)	None					24			
26	Antenna Wi (330 Deg)	None					24			
27	Antenna Wm (0 Deg)	None					24			
28	Antenna Wm (30 Deg)	None					24			
29	Antenna Wm (60 Deg)	None					24			
30	Antenna Wm (90 Deg)	None					24			
31	Antenna Wm (120 Deg)	None					24			
32	Antenna Wm (150 Deg)	None					24			
33	Antenna Wm (180 Deg)	None					24			
34	Antenna Wm (210 Deg)	None					24			
35	Antenna Wm (240 Deg)	None					24			
36	Antenna Wm (270 Deg)	None					24			
37	Antenna Wm (300 Deg)	None					24			
38	Antenna Wm (330 Deg)	None					24			
39	Structure D	None		-1						
40	Structure Di	None						4		
41	Structure Wo (0 Deg)	None						8		
42	Structure Wo (30 Deg)	None						8		
43	Structure Wo (60 Deg)	None						8		
44	Structure Wo (90 Deg)	None						8		
45	Structure Wo (120 D...	None						8		
46	Structure Wo (150 D...	None						8		
47	Structure Wo (180 D...	None						8		
48	Structure Wo (210 D...	None						8		
49	Structure Wo (240 D...	None						8		
50	Structure Wo (270 D...	None						8		
51	Structure Wo (300 D...	None						8		
52	Structure Wo (330 D...	None						8		
53	Structure Wi (0 Deg)	None						8		
54	Structure Wi (30 Deg)	None						8		
55	Structure Wi (60 Deg)	None						8		
56	Structure Wi (90 Deg)	None						8		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
57	Structure Wi (120 De...	None						8		
58	Structure Wi (150 De...	None						8		
59	Structure Wi (180 De...	None						8		
60	Structure Wi (210 De...	None						8		
61	Structure Wi (240 De...	None						8		
62	Structure Wi (270 De...	None						8		
63	Structure Wi (300 De...	None						8		
64	Structure Wi (330 De...	None						8		
65	Structure Wm (0 Deg)	None						8		
66	Structure Wm (30 De...	None						8		
67	Structure Wm (60 De...	None						8		
68	Structure Wm (90 De...	None						8		
69	Structure Wm (120 D...	None						8		
70	Structure Wm (150 D...	None						8		
71	Structure Wm (180 D...	None						8		
72	Structure Wm (210 D...	None						8		
73	Structure Wm (240 D...	None						8		
74	Structure Wm (270 D...	None						8		
75	Structure Wm (300 D...	None						8		
76	Structure Wm (330 D...	None						8		
77	Lm1	None					1			
78	Lm2	None					1			
79	Lv1	None					1			
80	Lv2	None					1			
81	Antenna Ev	None					24			
82	Antenna Eh (0 Deg)	None					16			
83	Antenna Eh (90 Deg)	None					16			
84	Structure Ev	ELY		-.042						
85	Structure Eh (0 Deg)	ELZ			-.104					
86	Structure Eh (90 Deg)	ELX	.104							

Load Combinations

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D+1.0Wo (0 Deg)	Yes	Y		1	1.2	39	1.2	3	1	41	1														
2	1.2D+1.0Wo (30 Deg)	Yes	Y		1	1.2	39	1.2	4	1	42	1														
3	1.2D+1.0Wo (60 Deg)	Yes	Y		1	1.2	39	1.2	5	1	43	1														
4	1.2D+1.0Wo (90 Deg)	Yes	Y		1	1.2	39	1.2	6	1	44	1														
5	1.2D+1.0Wo (120 Deg)	Yes	Y		1	1.2	39	1.2	7	1	45	1														
6	1.2D+1.0Wo (150 Deg)	Yes	Y		1	1.2	39	1.2	8	1	46	1														
7	1.2D+1.0Wo (180 Deg)	Yes	Y		1	1.2	39	1.2	9	1	47	1														
8	1.2D+1.0Wo (210 Deg)	Yes	Y		1	1.2	39	1.2	10	1	48	1														
9	1.2D+1.0Wo (240 Deg)	Yes	Y		1	1.2	39	1.2	11	1	49	1														
10	1.2D+1.0Wo (270 Deg)	Yes	Y		1	1.2	39	1.2	12	1	50	1														
11	1.2D+1.0Wo (300 Deg)	Yes	Y		1	1.2	39	1.2	13	1	51	1														
12	1.2D+1.0Wo (330 Deg)	Yes	Y		1	1.2	39	1.2	14	1	52	1														
13	1.2D + 1.0Di + 1.0Wi (0 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	15	1	53	1										
14	1.2D + 1.0Di + 1.0Wi (30 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	16	1	54	1										
15	1.2D + 1.0Di + 1.0Wi (60 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	17	1	55	1										
16	1.2D + 1.0Di + 1.0Wi (90 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	18	1	56	1										
17	1.2D + 1.0Di + 1.0Wi (120 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	19	1	57	1										
18	1.2D + 1.0Di + 1.0Wi (150 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	20	1	58	1										
19	1.2D + 1.0Di + 1.0Wi (180 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	21	1	59	1										
20	1.2D + 1.0Di + 1.0Wi (210 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	22	1	60	1										
21	1.2D + 1.0Di + 1.0Wi (240 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	23	1	61	1										
22	1.2D + 1.0Di + 1.0Wi (270 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	24	1	62	1										

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
23	1.2D + 1.0Di + 1.0Wi (300 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	25	1	63	1								
24	1.2D + 1.0Di + 1.0Wi (330 Deg)	Yes	Y		1	1.2	39	1.2	2	1	40	1	26	1	64	1								
25	1.2D + 1.5Lm1 + 1.0Wm (0 D...	Yes	Y		1	1.2	39	1.2	77	1.5	27	1	65	1										
26	1.2D + 1.5Lm1 + 1.0Wm (30 ...	Yes	Y		1	1.2	39	1.2	77	1.5	28	1	66	1										
27	1.2D + 1.5Lm1 + 1.0Wm (60 ...	Yes	Y		1	1.2	39	1.2	77	1.5	29	1	67	1										
28	1.2D + 1.5Lm1 + 1.0Wm (90 ...	Yes	Y		1	1.2	39	1.2	77	1.5	30	1	68	1										
29	1.2D + 1.5Lm1 + 1.0Wm (120 ...	Yes	Y		1	1.2	39	1.2	77	1.5	31	1	69	1										
30	1.2D + 1.5Lm1 + 1.0Wm (150 ...	Yes	Y		1	1.2	39	1.2	77	1.5	32	1	70	1										
31	1.2D + 1.5Lm1 + 1.0Wm (180 ...	Yes	Y		1	1.2	39	1.2	77	1.5	33	1	71	1										
32	1.2D + 1.5Lm1 + 1.0Wm (210 ...	Yes	Y		1	1.2	39	1.2	77	1.5	34	1	72	1										
33	1.2D + 1.5Lm1 + 1.0Wm (240 ...	Yes	Y		1	1.2	39	1.2	77	1.5	35	1	73	1										
34	1.2D + 1.5Lm1 + 1.0Wm (270 ...	Yes	Y		1	1.2	39	1.2	77	1.5	36	1	74	1										
35	1.2D + 1.5Lm1 + 1.0Wm (300 ...	Yes	Y		1	1.2	39	1.2	77	1.5	37	1	75	1										
36	1.2D + 1.5Lm1 + 1.0Wm (330 ...	Yes	Y		1	1.2	39	1.2	77	1.5	38	1	76	1										
37	1.2D + 1.5Lm2 + 1.0Wm (0 D...	Yes	Y		1	1.2	39	1.2	78	1.5	27	1	65	1										
38	1.2D + 1.5Lm2 + 1.0Wm (30 ...	Yes	Y		1	1.2	39	1.2	78	1.5	28	1	66	1										
39	1.2D + 1.5Lm2 + 1.0Wm (60 ...	Yes	Y		1	1.2	39	1.2	78	1.5	29	1	67	1										
40	1.2D + 1.5Lm2 + 1.0Wm (90 ...	Yes	Y		1	1.2	39	1.2	78	1.5	30	1	68	1										
41	1.2D + 1.5Lm2 + 1.0Wm (120 ...	Yes	Y		1	1.2	39	1.2	78	1.5	31	1	69	1										
42	1.2D + 1.5Lm2 + 1.0Wm (150 ...	Yes	Y		1	1.2	39	1.2	78	1.5	32	1	70	1										
43	1.2D + 1.5Lm2 + 1.0Wm (180 ...	Yes	Y		1	1.2	39	1.2	78	1.5	33	1	71	1										
44	1.2D + 1.5Lm2 + 1.0Wm (210 ...	Yes	Y		1	1.2	39	1.2	78	1.5	34	1	72	1										
45	1.2D + 1.5Lm2 + 1.0Wm (240 ...	Yes	Y		1	1.2	39	1.2	78	1.5	35	1	73	1										
46	1.2D + 1.5Lm2 + 1.0Wm (270 ...	Yes	Y		1	1.2	39	1.2	78	1.5	36	1	74	1										
47	1.2D + 1.5Lm2 + 1.0Wm (300 ...	Yes	Y		1	1.2	39	1.2	78	1.5	37	1	75	1										
48	1.2D + 1.5Lm2 + 1.0Wm (330 ...	Yes	Y		1	1.2	39	1.2	78	1.5	38	1	76	1										
49	1.2D + 1.5Lv1	Yes	Y		1	1.2	39	1.2	79	1.5														
50	1.2D + 1.5Lv2	Yes	Y		1	1.2	39	1.2	80	1.5														
51	1.4D	Yes	Y		1	1.4	39	1.4																
52	1.2D + 1.0Ev + 1.0Eh (0 Deg)	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	1	83		E...	1	E...					
53	1.2D + 1.0Ev + 1.0Eh (30 Deg)	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	.866	83	.5	E...	.866	E...	.5				
54	1.2D + 1.0Ev + 1.0Eh (60 Deg)	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	.5	83	.866	E...	.5	E...	.866				
55	1.2D + 1.0Ev + 1.0Eh (90 Deg)	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82		83	1	E...		E...	1				
56	1.2D + 1.0Ev + 1.0Eh (120 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	-.5	83	.866	E...	-.5	E...	.866				
57	1.2D + 1.0Ev + 1.0Eh (150 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	-.8...	83	.5	E...	-.8...	E...	.5				
58	1.2D + 1.0Ev + 1.0Eh (180 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	-1	83		E...	-1	E...					
59	1.2D + 1.0Ev + 1.0Eh (210 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	-.8...	83	-.5	E...	-.8...	E...	-.5				
60	1.2D + 1.0Ev + 1.0Eh (240 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	-.5	83	-.8...	E...	-.5	E...	-.8...				
61	1.2D + 1.0Ev + 1.0Eh (270 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82		83	-1	E...		E...	-1				
62	1.2D + 1.0Ev + 1.0Eh (300 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	.5	83	-.8...	E...	.5	E...	-.8...				
63	1.2D + 1.0Ev + 1.0Eh (330 De...	Yes	Y		1	1.2	39	1.2	81	1	E...	1	82	.866	83	-.5	E...	.866	E...	-.5				
64	0.9D - 1.0Ev + 1.0Eh (0 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	1	83		E...	1	E...					
65	0.9D - 1.0Ev + 1.0Eh (30 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	.866	83	.5	E...	.866	E...	.5				
66	0.9D - 1.0Ev + 1.0Eh (60 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	.5	83	.866	E...	.5	E...	.866				
67	0.9D - 1.0Ev + 1.0Eh (90 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82		83	1	E...		E...	1				
68	0.9D - 1.0Ev + 1.0Eh (120 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	-.5	83	.866	E...	-.5	E...	.866				
69	0.9D - 1.0Ev + 1.0Eh (150 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	-.8...	83	.5	E...	-.8...	E...	.5				
70	0.9D - 1.0Ev + 1.0Eh (180 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	-1	83		E...	-1	E...					
71	0.9D - 1.0Ev + 1.0Eh (210 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	-.8...	83	-.5	E...	-.8...	E...	-.5				
72	0.9D - 1.0Ev + 1.0Eh (240 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	-.5	83	-.8...	E...	-.5	E...	-.8...				
73	0.9D - 1.0Ev + 1.0Eh (270 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82		83	-1	E...		E...	-1				
74	0.9D - 1.0Ev + 1.0Eh (300 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	.5	83	-.8...	E...	.5	E...	-.8...				
75	0.9D - 1.0Ev + 1.0Eh (330 Deg)	Yes	Y		1	.9	39	.9	81	-1	E...	-1	82	.866	83	-.5	E...	.866	E...	-.5				

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	1.46875	0	
2	N2	0	0	2.052083	0	
3	N5	0	0	2.197917	0	
4	N6	2.5	0	2.197917	0	
5	N7	-2.5	0	2.197917	0	
6	N11	2.166667	0	2.197917	0	
7	N12	2.166667	0	2.447917	0	
8	N13	2.166667	4.166667	2.447917	0	
9	N15	-2.166667	0	2.197917	0	
10	N16	-2.166667	0	2.447917	0	
11	N17	-2.166667	4.166667	2.447917	0	
12	N14A	2.166667	-3.833333	2.447917	0	
13	N15A	-2.166667	-3.833333	2.447917	0	
14	N14	-2.166667	2	2.447917	0	
15	N15B	-2.166667	-2	2.447917	0	
16	N16A	-2.166667	1	2.447917	0	
17	N17A	-2.166667	-1	2.447917	0	

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Antenna Pipe	PIPE_2.0	Column	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
2	Standoff Arm	HSS4X4X4	Beam	Tube	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
3	Horizontal	PIPE_3.0	Column	Pipe	A53 Gr. B	Typical	2.07	2.85	2.85	5.69

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2
7	A500 Gr 50	29000	11154	.3	.65	.49	50	1.5	58	1.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Standoff Arm	Beam	Tube	A500 Gr.46	Typical
2	FACE	N7	N6			Horizontal	Column	Pipe	A53 Gr. B	Typical
3	MP1A	N13	N14A			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
4	M8	N11	N12			RIGID	None	None	RIGID	Typical
5	MP2A	N17	N15A			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
6	M10	N15	N16			RIGID	None	None	RIGID	Typical
7	M10A	N2	N5			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes	Default			None
2	FACE						Yes	** NA **			None
3	MP1A						Yes	** NA **			None
4	M8						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
5	MP2A						Yes	** NA **			None
6	M10						Yes	** NA **			None
7	M10A						Yes	** NA **			None

Member Point Loads (BLC 1 : Antenna D)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Y	-43.55	3.17
2	MP1A	My	-.022	3.17
3	MP1A	Mz	0	3.17
4	MP1A	Y	-43.55	5.17
5	MP1A	My	-.022	5.17
6	MP1A	Mz	0	5.17
7	MP2A	Y	-23	2.17
8	MP2A	My	-.021	2.17
9	MP2A	Mz	.019	2.17
10	MP2A	Y	-23	6.17
11	MP2A	My	-.021	6.17
12	MP2A	Mz	.019	6.17
13	MP2A	Y	-23	2.17
14	MP2A	My	-.021	2.17
15	MP2A	Mz	-.019	2.17
16	MP2A	Y	-23	6.17
17	MP2A	My	-.021	6.17
18	MP2A	Mz	-.019	6.17
19	MP2A	Y	-84.4	3.17
20	MP2A	My	.042	3.17
21	MP2A	Mz	0	3.17
22	MP2A	Y	-70.3	5.17
23	MP2A	My	.035	5.17
24	MP2A	Mz	0	5.17

Member Point Loads (BLC 2 : Antenna Di)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Y	-33.276	3.17
2	MP1A	My	-.017	3.17
3	MP1A	Mz	0	3.17
4	MP1A	Y	-33.276	5.17
5	MP1A	My	-.017	5.17
6	MP1A	Mz	0	5.17
7	MP2A	Y	-77.195	2.17
8	MP2A	My	-.071	2.17
9	MP2A	Mz	.064	2.17
10	MP2A	Y	-77.195	6.17
11	MP2A	My	-.071	6.17
12	MP2A	Mz	.064	6.17
13	MP2A	Y	-77.195	2.17
14	MP2A	My	-.071	2.17
15	MP2A	Mz	-.064	2.17
16	MP2A	Y	-77.195	6.17
17	MP2A	My	-.071	6.17
18	MP2A	Mz	-.064	6.17
19	MP2A	Y	-41.912	3.17
20	MP2A	My	.021	3.17
21	MP2A	Mz	0	3.17
22	MP2A	Y	-37.674	5.17

Member Point Loads (BLC 2 : Antenna Di) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
23	MP2A	My	.019	5.17
24	MP2A	Mz	0	5.17

Member Point Loads (BLC 3 : Antenna Wo (0 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	0	3.17
2	MP1A	Z	-68.068	3.17
3	MP1A	Mx	0	3.17
4	MP1A	X	0	5.17
5	MP1A	Z	-68.068	5.17
6	MP1A	Mx	0	5.17
7	MP2A	X	0	2.17
8	MP2A	Z	-82.134	2.17
9	MP2A	Mx	-.068	2.17
10	MP2A	X	0	6.17
11	MP2A	Z	-82.134	6.17
12	MP2A	Mx	-.068	6.17
13	MP2A	X	0	2.17
14	MP2A	Z	-82.134	2.17
15	MP2A	Mx	.068	2.17
16	MP2A	X	0	6.17
17	MP2A	Z	-82.134	6.17
18	MP2A	Mx	.068	6.17
19	MP2A	X	0	3.17
20	MP2A	Z	-53.83	3.17
21	MP2A	Mx	0	3.17
22	MP2A	X	0	5.17
23	MP2A	Z	-53.83	5.17
24	MP2A	Mx	0	5.17

Member Point Loads (BLC 4 : Antenna Wo (30 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	28.456	3.17
2	MP1A	Z	-49.287	3.17
3	MP1A	Mx	-.014	3.17
4	MP1A	X	28.456	5.17
5	MP1A	Z	-49.287	5.17
6	MP1A	Mx	-.014	5.17
7	MP2A	X	38.484	2.17
8	MP2A	Z	-66.656	2.17
9	MP2A	Mx	-.091	2.17
10	MP2A	X	38.484	6.17
11	MP2A	Z	-66.656	6.17
12	MP2A	Mx	-.091	6.17
13	MP2A	X	38.484	2.17
14	MP2A	Z	-66.656	2.17
15	MP2A	Mx	.02	2.17
16	MP2A	X	38.484	6.17
17	MP2A	Z	-66.656	6.17
18	MP2A	Mx	.02	6.17
19	MP2A	X	24.701	3.17
20	MP2A	Z	-42.783	3.17
21	MP2A	Mx	.012	3.17
22	MP2A	X	23.876	5.17
23	MP2A	Z	-41.355	5.17
24	MP2A	Mx	.012	5.17

Member Point Loads (BLC 5 : Antenna Wo (60 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	29.963	3.17
2	MP1A	Z	-17.299	3.17
3	MP1A	Mx	-.015	3.17
4	MP1A	X	29.963	5.17
5	MP1A	Z	-17.299	5.17
6	MP1A	Mx	-.015	5.17
7	MP2A	X	57.708	2.17
8	MP2A	Z	-33.318	2.17
9	MP2A	Mx	-.081	2.17
10	MP2A	X	57.708	6.17
11	MP2A	Z	-33.318	6.17
12	MP2A	Mx	-.081	6.17
13	MP2A	X	57.708	2.17
14	MP2A	Z	-33.318	2.17
15	MP2A	Mx	-.025	2.17
16	MP2A	X	57.708	6.17
17	MP2A	Z	-33.318	6.17
18	MP2A	Mx	-.025	6.17
19	MP2A	X	35.114	3.17
20	MP2A	Z	-20.273	3.17
21	MP2A	Mx	.018	3.17
22	MP2A	X	30.828	5.17
23	MP2A	Z	-17.799	5.17
24	MP2A	Mx	.015	5.17

Member Point Loads (BLC 6 : Antenna Wo (90 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	23.442	3.17
2	MP1A	Z	0	3.17
3	MP1A	Mx	-.012	3.17
4	MP1A	X	23.442	5.17
5	MP1A	Z	0	5.17
6	MP1A	Mx	-.012	5.17
7	MP2A	X	61.47	2.17
8	MP2A	Z	0	2.17
9	MP2A	Mx	-.056	2.17
10	MP2A	X	61.47	6.17
11	MP2A	Z	0	6.17
12	MP2A	Mx	-.056	6.17
13	MP2A	X	61.47	2.17
14	MP2A	Z	0	2.17
15	MP2A	Mx	-.056	2.17
16	MP2A	X	61.47	6.17
17	MP2A	Z	0	6.17
18	MP2A	Mx	-.056	6.17
19	MP2A	X	36.118	3.17
20	MP2A	Z	0	3.17
21	MP2A	Mx	.018	3.17
22	MP2A	X	29.519	5.17
23	MP2A	Z	0	5.17
24	MP2A	Mx	.015	5.17

Member Point Loads (BLC 7 : Antenna Wo (120 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	29.963	3.17
2	MP1A	Z	17.299	3.17

Member Point Loads (BLC 7 : Antenna Wo (120 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
3	MP1A	Mx	-.015	3.17
4	MP1A	X	29.963	5.17
5	MP1A	Z	17.299	5.17
6	MP1A	Mx	-.015	5.17
7	MP2A	X	57.708	2.17
8	MP2A	Z	33.318	2.17
9	MP2A	Mx	-.025	2.17
10	MP2A	X	57.708	6.17
11	MP2A	Z	33.318	6.17
12	MP2A	Mx	-.025	6.17
13	MP2A	X	57.708	2.17
14	MP2A	Z	33.318	2.17
15	MP2A	Mx	-.081	2.17
16	MP2A	X	57.708	6.17
17	MP2A	Z	33.318	6.17
18	MP2A	Mx	-.081	6.17
19	MP2A	X	35.114	3.17
20	MP2A	Z	20.273	3.17
21	MP2A	Mx	.018	3.17
22	MP2A	X	30.828	5.17
23	MP2A	Z	17.799	5.17
24	MP2A	Mx	.015	5.17

Member Point Loads (BLC 8 : Antenna Wo (150 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	28.456	3.17
2	MP1A	Z	49.287	3.17
3	MP1A	Mx	-.014	3.17
4	MP1A	X	28.456	5.17
5	MP1A	Z	49.287	5.17
6	MP1A	Mx	-.014	5.17
7	MP2A	X	38.484	2.17
8	MP2A	Z	66.656	2.17
9	MP2A	Mx	.02	2.17
10	MP2A	X	38.484	6.17
11	MP2A	Z	66.656	6.17
12	MP2A	Mx	.02	6.17
13	MP2A	X	38.484	2.17
14	MP2A	Z	66.656	2.17
15	MP2A	Mx	-.091	2.17
16	MP2A	X	38.484	6.17
17	MP2A	Z	66.656	6.17
18	MP2A	Mx	-.091	6.17
19	MP2A	X	24.701	3.17
20	MP2A	Z	42.783	3.17
21	MP2A	Mx	.012	3.17
22	MP2A	X	23.876	5.17
23	MP2A	Z	41.355	5.17
24	MP2A	Mx	.012	5.17

Member Point Loads (BLC 9 : Antenna Wo (180 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	0	3.17
2	MP1A	Z	68.068	3.17
3	MP1A	Mx	0	3.17
4	MP1A	X	0	5.17

Member Point Loads (BLC 9 : Antenna Wo (180 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
5	MP1A	Z	68.068	5.17
6	MP1A	Mx	0	5.17
7	MP2A	X	0	2.17
8	MP2A	Z	82.134	2.17
9	MP2A	Mx	.068	2.17
10	MP2A	X	0	6.17
11	MP2A	Z	82.134	6.17
12	MP2A	Mx	.068	6.17
13	MP2A	X	0	2.17
14	MP2A	Z	82.134	2.17
15	MP2A	Mx	-.068	2.17
16	MP2A	X	0	6.17
17	MP2A	Z	82.134	6.17
18	MP2A	Mx	-.068	6.17
19	MP2A	X	0	3.17
20	MP2A	Z	53.83	3.17
21	MP2A	Mx	0	3.17
22	MP2A	X	0	5.17
23	MP2A	Z	53.83	5.17
24	MP2A	Mx	0	5.17

Member Point Loads (BLC 10 : Antenna Wo (210 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-28.456	3.17
2	MP1A	Z	49.287	3.17
3	MP1A	Mx	.014	3.17
4	MP1A	X	-28.456	5.17
5	MP1A	Z	49.287	5.17
6	MP1A	Mx	.014	5.17
7	MP2A	X	-38.484	2.17
8	MP2A	Z	66.656	2.17
9	MP2A	Mx	.091	2.17
10	MP2A	X	-38.484	6.17
11	MP2A	Z	66.656	6.17
12	MP2A	Mx	.091	6.17
13	MP2A	X	-38.484	2.17
14	MP2A	Z	66.656	2.17
15	MP2A	Mx	-.02	2.17
16	MP2A	X	-38.484	6.17
17	MP2A	Z	66.656	6.17
18	MP2A	Mx	-.02	6.17
19	MP2A	X	-24.701	3.17
20	MP2A	Z	42.783	3.17
21	MP2A	Mx	-.012	3.17
22	MP2A	X	-23.876	5.17
23	MP2A	Z	41.355	5.17
24	MP2A	Mx	-.012	5.17

Member Point Loads (BLC 11 : Antenna Wo (240 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-29.963	3.17
2	MP1A	Z	17.299	3.17
3	MP1A	Mx	.015	3.17
4	MP1A	X	-29.963	5.17
5	MP1A	Z	17.299	5.17
6	MP1A	Mx	.015	5.17

Member Point Loads (BLC 11 : Antenna Wo (240 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
7	MP2A	X	-57.708	2.17
8	MP2A	Z	33.318	2.17
9	MP2A	Mx	.081	2.17
10	MP2A	X	-57.708	6.17
11	MP2A	Z	33.318	6.17
12	MP2A	Mx	.081	6.17
13	MP2A	X	-57.708	2.17
14	MP2A	Z	33.318	2.17
15	MP2A	Mx	.025	2.17
16	MP2A	X	-57.708	6.17
17	MP2A	Z	33.318	6.17
18	MP2A	Mx	.025	6.17
19	MP2A	X	-35.114	3.17
20	MP2A	Z	20.273	3.17
21	MP2A	Mx	-.018	3.17
22	MP2A	X	-30.828	5.17
23	MP2A	Z	17.799	5.17
24	MP2A	Mx	-.015	5.17

Member Point Loads (BLC 12 : Antenna Wo (270 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-23.442	3.17
2	MP1A	Z	0	3.17
3	MP1A	Mx	.012	3.17
4	MP1A	X	-23.442	5.17
5	MP1A	Z	0	5.17
6	MP1A	Mx	.012	5.17
7	MP2A	X	-61.47	2.17
8	MP2A	Z	0	2.17
9	MP2A	Mx	.056	2.17
10	MP2A	X	-61.47	6.17
11	MP2A	Z	0	6.17
12	MP2A	Mx	.056	6.17
13	MP2A	X	-61.47	2.17
14	MP2A	Z	0	2.17
15	MP2A	Mx	.056	2.17
16	MP2A	X	-61.47	6.17
17	MP2A	Z	0	6.17
18	MP2A	Mx	.056	6.17
19	MP2A	X	-36.118	3.17
20	MP2A	Z	0	3.17
21	MP2A	Mx	-.018	3.17
22	MP2A	X	-29.519	5.17
23	MP2A	Z	0	5.17
24	MP2A	Mx	-.015	5.17

Member Point Loads (BLC 13 : Antenna Wo (300 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-29.963	3.17
2	MP1A	Z	-17.299	3.17
3	MP1A	Mx	.015	3.17
4	MP1A	X	-29.963	5.17
5	MP1A	Z	-17.299	5.17
6	MP1A	Mx	.015	5.17
7	MP2A	X	-57.708	2.17
8	MP2A	Z	-33.318	2.17

Member Point Loads (BLC 13 : Antenna Wo (300 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
9	MP2A	Mx	.025	2.17
10	MP2A	X	-57.708	6.17
11	MP2A	Z	-33.318	6.17
12	MP2A	Mx	.025	6.17
13	MP2A	X	-57.708	2.17
14	MP2A	Z	-33.318	2.17
15	MP2A	Mx	.081	2.17
16	MP2A	X	-57.708	6.17
17	MP2A	Z	-33.318	6.17
18	MP2A	Mx	.081	6.17
19	MP2A	X	-35.114	3.17
20	MP2A	Z	-20.273	3.17
21	MP2A	Mx	-.018	3.17
22	MP2A	X	-30.828	5.17
23	MP2A	Z	-17.799	5.17
24	MP2A	Mx	-.015	5.17

Member Point Loads (BLC 14 : Antenna Wo (330 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-28.456	3.17
2	MP1A	Z	-49.287	3.17
3	MP1A	Mx	.014	3.17
4	MP1A	X	-28.456	5.17
5	MP1A	Z	-49.287	5.17
6	MP1A	Mx	.014	5.17
7	MP2A	X	-38.484	2.17
8	MP2A	Z	-66.656	2.17
9	MP2A	Mx	-.02	2.17
10	MP2A	X	-38.484	6.17
11	MP2A	Z	-66.656	6.17
12	MP2A	Mx	-.02	6.17
13	MP2A	X	-38.484	2.17
14	MP2A	Z	-66.656	2.17
15	MP2A	Mx	.091	2.17
16	MP2A	X	-38.484	6.17
17	MP2A	Z	-66.656	6.17
18	MP2A	Mx	.091	6.17
19	MP2A	X	-24.701	3.17
20	MP2A	Z	-42.783	3.17
21	MP2A	Mx	-.012	3.17
22	MP2A	X	-23.876	5.17
23	MP2A	Z	-41.355	5.17
24	MP2A	Mx	-.012	5.17

Member Point Loads (BLC 15 : Antenna Wi (0 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	0	3.17
2	MP1A	Z	-16.72	3.17
3	MP1A	Mx	0	3.17
4	MP1A	X	0	5.17
5	MP1A	Z	-16.72	5.17
6	MP1A	Mx	0	5.17
7	MP2A	X	0	2.17
8	MP2A	Z	-33.958	2.17
9	MP2A	Mx	-.028	2.17
10	MP2A	X	0	6.17

Member Point Loads (BLC 15 : Antenna Wi (0 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
11	MP2A	Z	-33.958	6.17
12	MP2A	Mx	-.028	6.17
13	MP2A	X	0	2.17
14	MP2A	Z	-33.958	2.17
15	MP2A	Mx	.028	2.17
16	MP2A	X	0	6.17
17	MP2A	Z	-33.958	6.17
18	MP2A	Mx	.028	6.17
19	MP2A	X	0	3.17
20	MP2A	Z	-14.046	3.17
21	MP2A	Mx	0	3.17
22	MP2A	X	0	5.17
23	MP2A	Z	-14.046	5.17
24	MP2A	Mx	0	5.17

Member Point Loads (BLC 16 : Antenna Wi (30 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	7.156	3.17
2	MP1A	Z	-12.394	3.17
3	MP1A	Mx	-.004	3.17
4	MP1A	X	7.156	5.17
5	MP1A	Z	-12.394	5.17
6	MP1A	Mx	-.004	5.17
7	MP2A	X	15.942	2.17
8	MP2A	Z	-27.612	2.17
9	MP2A	Mx	-.038	2.17
10	MP2A	X	15.942	6.17
11	MP2A	Z	-27.612	6.17
12	MP2A	Mx	-.038	6.17
13	MP2A	X	15.942	2.17
14	MP2A	Z	-27.612	2.17
15	MP2A	Mx	.008	2.17
16	MP2A	X	15.942	6.17
17	MP2A	Z	-27.612	6.17
18	MP2A	Mx	.008	6.17
19	MP2A	X	6.485	3.17
20	MP2A	Z	-11.233	3.17
21	MP2A	Mx	.003	3.17
22	MP2A	X	6.281	5.17
23	MP2A	Z	-10.879	5.17
24	MP2A	Mx	.003	5.17

Member Point Loads (BLC 17 : Antenna Wi (60 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	8.223	3.17
2	MP1A	Z	-4.747	3.17
3	MP1A	Mx	-.004	3.17
4	MP1A	X	8.223	5.17
5	MP1A	Z	-4.747	5.17
6	MP1A	Mx	-.004	5.17
7	MP2A	X	24.019	2.17
8	MP2A	Z	-13.868	2.17
9	MP2A	Mx	-.034	2.17
10	MP2A	X	24.019	6.17
11	MP2A	Z	-13.868	6.17
12	MP2A	Mx	-.034	6.17

Member Point Loads (BLC 17 : Antenna Wi (60 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
13	MP2A	X	24.019	2.17
14	MP2A	Z	-13.868	2.17
15	MP2A	Mx	-.01	2.17
16	MP2A	X	24.019	6.17
17	MP2A	Z	-13.868	6.17
18	MP2A	Mx	-.01	6.17
19	MP2A	X	9.372	3.17
20	MP2A	Z	-5.411	3.17
21	MP2A	Mx	.005	3.17
22	MP2A	X	8.311	5.17
23	MP2A	Z	-4.798	5.17
24	MP2A	Mx	.004	5.17

Member Point Loads (BLC 18 : Antenna Wi (90 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	7.086	3.17
2	MP1A	Z	0	3.17
3	MP1A	Mx	-.004	3.17
4	MP1A	X	7.086	5.17
5	MP1A	Z	0	5.17
6	MP1A	Mx	-.004	5.17
7	MP2A	X	25.661	2.17
8	MP2A	Z	0	2.17
9	MP2A	Mx	-.024	2.17
10	MP2A	X	25.661	6.17
11	MP2A	Z	0	6.17
12	MP2A	Mx	-.024	6.17
13	MP2A	X	25.661	2.17
14	MP2A	Z	0	2.17
15	MP2A	Mx	-.024	2.17
16	MP2A	X	25.661	6.17
17	MP2A	Z	0	6.17
18	MP2A	Mx	-.024	6.17
19	MP2A	X	9.747	3.17
20	MP2A	Z	0	3.17
21	MP2A	Mx	.005	3.17
22	MP2A	X	8.113	5.17
23	MP2A	Z	0	5.17
24	MP2A	Mx	.004	5.17

Member Point Loads (BLC 19 : Antenna Wi (120 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	8.223	3.17
2	MP1A	Z	4.747	3.17
3	MP1A	Mx	-.004	3.17
4	MP1A	X	8.223	5.17
5	MP1A	Z	4.747	5.17
6	MP1A	Mx	-.004	5.17
7	MP2A	X	24.019	2.17
8	MP2A	Z	13.868	2.17
9	MP2A	Mx	-.01	2.17
10	MP2A	X	24.019	6.17
11	MP2A	Z	13.868	6.17
12	MP2A	Mx	-.01	6.17
13	MP2A	X	24.019	2.17
14	MP2A	Z	13.868	2.17

Member Point Loads (BLC 19 : Antenna Wi (120 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
15	MP2A	Mx	-.034	2.17
16	MP2A	X	24.019	6.17
17	MP2A	Z	13.868	6.17
18	MP2A	Mx	-.034	6.17
19	MP2A	X	9.372	3.17
20	MP2A	Z	5.411	3.17
21	MP2A	Mx	.005	3.17
22	MP2A	X	8.311	5.17
23	MP2A	Z	4.798	5.17
24	MP2A	Mx	.004	5.17

Member Point Loads (BLC 20 : Antenna Wi (150 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	7.156	3.17
2	MP1A	Z	12.394	3.17
3	MP1A	Mx	-.004	3.17
4	MP1A	X	7.156	5.17
5	MP1A	Z	12.394	5.17
6	MP1A	Mx	-.004	5.17
7	MP2A	X	15.942	2.17
8	MP2A	Z	27.612	2.17
9	MP2A	Mx	.008	2.17
10	MP2A	X	15.942	6.17
11	MP2A	Z	27.612	6.17
12	MP2A	Mx	.008	6.17
13	MP2A	X	15.942	2.17
14	MP2A	Z	27.612	2.17
15	MP2A	Mx	-.038	2.17
16	MP2A	X	15.942	6.17
17	MP2A	Z	27.612	6.17
18	MP2A	Mx	-.038	6.17
19	MP2A	X	6.485	3.17
20	MP2A	Z	11.233	3.17
21	MP2A	Mx	.003	3.17
22	MP2A	X	6.281	5.17
23	MP2A	Z	10.879	5.17
24	MP2A	Mx	.003	5.17

Member Point Loads (BLC 21 : Antenna Wi (180 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	0	3.17
2	MP1A	Z	16.72	3.17
3	MP1A	Mx	0	3.17
4	MP1A	X	0	5.17
5	MP1A	Z	16.72	5.17
6	MP1A	Mx	0	5.17
7	MP2A	X	0	2.17
8	MP2A	Z	33.958	2.17
9	MP2A	Mx	.028	2.17
10	MP2A	X	0	6.17
11	MP2A	Z	33.958	6.17
12	MP2A	Mx	.028	6.17
13	MP2A	X	0	2.17
14	MP2A	Z	33.958	2.17
15	MP2A	Mx	-.028	2.17
16	MP2A	X	0	6.17

Member Point Loads (BLC 21 : Antenna Wi (180 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
17	MP2A	Z	33.958	6.17
18	MP2A	Mx	-.028	6.17
19	MP2A	X	0	3.17
20	MP2A	Z	14.046	3.17
21	MP2A	Mx	0	3.17
22	MP2A	X	0	5.17
23	MP2A	Z	14.046	5.17
24	MP2A	Mx	0	5.17

Member Point Loads (BLC 22 : Antenna Wi (210 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-7.156	3.17
2	MP1A	Z	12.394	3.17
3	MP1A	Mx	.004	3.17
4	MP1A	X	-7.156	5.17
5	MP1A	Z	12.394	5.17
6	MP1A	Mx	.004	5.17
7	MP2A	X	-15.942	2.17
8	MP2A	Z	27.612	2.17
9	MP2A	Mx	.038	2.17
10	MP2A	X	-15.942	6.17
11	MP2A	Z	27.612	6.17
12	MP2A	Mx	.038	6.17
13	MP2A	X	-15.942	2.17
14	MP2A	Z	27.612	2.17
15	MP2A	Mx	-.008	2.17
16	MP2A	X	-15.942	6.17
17	MP2A	Z	27.612	6.17
18	MP2A	Mx	-.008	6.17
19	MP2A	X	-6.485	3.17
20	MP2A	Z	11.233	3.17
21	MP2A	Mx	-.003	3.17
22	MP2A	X	-6.281	5.17
23	MP2A	Z	10.879	5.17
24	MP2A	Mx	-.003	5.17

Member Point Loads (BLC 23 : Antenna Wi (240 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-8.223	3.17
2	MP1A	Z	4.747	3.17
3	MP1A	Mx	.004	3.17
4	MP1A	X	-8.223	5.17
5	MP1A	Z	4.747	5.17
6	MP1A	Mx	.004	5.17
7	MP2A	X	-24.019	2.17
8	MP2A	Z	13.868	2.17
9	MP2A	Mx	.034	2.17
10	MP2A	X	-24.019	6.17
11	MP2A	Z	13.868	6.17
12	MP2A	Mx	.034	6.17
13	MP2A	X	-24.019	2.17
14	MP2A	Z	13.868	2.17
15	MP2A	Mx	.01	2.17
16	MP2A	X	-24.019	6.17
17	MP2A	Z	13.868	6.17
18	MP2A	Mx	.01	6.17

Member Point Loads (BLC 23 : Antenna Wi (240 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
19	MP2A	X	-9.372	3.17
20	MP2A	Z	5.411	3.17
21	MP2A	Mx	-.005	3.17
22	MP2A	X	-8.311	5.17
23	MP2A	Z	4.798	5.17
24	MP2A	Mx	-.004	5.17

Member Point Loads (BLC 24 : Antenna Wi (270 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-7.086	3.17
2	MP1A	Z	0	3.17
3	MP1A	Mx	.004	3.17
4	MP1A	X	-7.086	5.17
5	MP1A	Z	0	5.17
6	MP1A	Mx	.004	5.17
7	MP2A	X	-25.661	2.17
8	MP2A	Z	0	2.17
9	MP2A	Mx	.024	2.17
10	MP2A	X	-25.661	6.17
11	MP2A	Z	0	6.17
12	MP2A	Mx	.024	6.17
13	MP2A	X	-25.661	2.17
14	MP2A	Z	0	2.17
15	MP2A	Mx	.024	2.17
16	MP2A	X	-25.661	6.17
17	MP2A	Z	0	6.17
18	MP2A	Mx	.024	6.17
19	MP2A	X	-9.747	3.17
20	MP2A	Z	0	3.17
21	MP2A	Mx	-.005	3.17
22	MP2A	X	-8.113	5.17
23	MP2A	Z	0	5.17
24	MP2A	Mx	-.004	5.17

Member Point Loads (BLC 25 : Antenna Wi (300 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-8.223	3.17
2	MP1A	Z	-4.747	3.17
3	MP1A	Mx	.004	3.17
4	MP1A	X	-8.223	5.17
5	MP1A	Z	-4.747	5.17
6	MP1A	Mx	.004	5.17
7	MP2A	X	-24.019	2.17
8	MP2A	Z	-13.868	2.17
9	MP2A	Mx	.01	2.17
10	MP2A	X	-24.019	6.17
11	MP2A	Z	-13.868	6.17
12	MP2A	Mx	.01	6.17
13	MP2A	X	-24.019	2.17
14	MP2A	Z	-13.868	2.17
15	MP2A	Mx	.034	2.17
16	MP2A	X	-24.019	6.17
17	MP2A	Z	-13.868	6.17
18	MP2A	Mx	.034	6.17
19	MP2A	X	-9.372	3.17
20	MP2A	Z	-5.411	3.17

Member Point Loads (BLC 25 : Antenna Wi (300 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
21	MP2A	Mx	-.005	3.17
22	MP2A	X	-8.311	5.17
23	MP2A	Z	-4.798	5.17
24	MP2A	Mx	-.004	5.17

Member Point Loads (BLC 26 : Antenna Wi (330 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-7.156	3.17
2	MP1A	Z	-12.394	3.17
3	MP1A	Mx	.004	3.17
4	MP1A	X	-7.156	5.17
5	MP1A	Z	-12.394	5.17
6	MP1A	Mx	.004	5.17
7	MP2A	X	-15.942	2.17
8	MP2A	Z	-27.612	2.17
9	MP2A	Mx	-.008	2.17
10	MP2A	X	-15.942	6.17
11	MP2A	Z	-27.612	6.17
12	MP2A	Mx	-.008	6.17
13	MP2A	X	-15.942	2.17
14	MP2A	Z	-27.612	2.17
15	MP2A	Mx	.038	2.17
16	MP2A	X	-15.942	6.17
17	MP2A	Z	-27.612	6.17
18	MP2A	Mx	.038	6.17
19	MP2A	X	-6.485	3.17
20	MP2A	Z	-11.233	3.17
21	MP2A	Mx	-.003	3.17
22	MP2A	X	-6.281	5.17
23	MP2A	Z	-10.879	5.17
24	MP2A	Mx	-.003	5.17

Member Point Loads (BLC 27 : Antenna Wm (0 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	0	3.17
2	MP1A	Z	-4.475	3.17
3	MP1A	Mx	0	3.17
4	MP1A	X	0	5.17
5	MP1A	Z	-4.475	5.17
6	MP1A	Mx	0	5.17
7	MP2A	X	0	2.17
8	MP2A	Z	-5.4	2.17
9	MP2A	Mx	-.004	2.17
10	MP2A	X	0	6.17
11	MP2A	Z	-5.4	6.17
12	MP2A	Mx	-.004	6.17
13	MP2A	X	0	2.17
14	MP2A	Z	-5.4	2.17
15	MP2A	Mx	.004	2.17
16	MP2A	X	0	6.17
17	MP2A	Z	-5.4	6.17
18	MP2A	Mx	.004	6.17
19	MP2A	X	0	3.17
20	MP2A	Z	-3.539	3.17
21	MP2A	Mx	0	3.17
22	MP2A	X	0	5.17

Member Point Loads (BLC 27 : Antenna Wm (0 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
23	MP2A	Z	-3.539	5.17
24	MP2A	Mx	0	5.17

Member Point Loads (BLC 28 : Antenna Wm (30 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	1.871	3.17
2	MP1A	Z	-3.24	3.17
3	MP1A	Mx	-.000935	3.17
4	MP1A	X	1.871	5.17
5	MP1A	Z	-3.24	5.17
6	MP1A	Mx	-.000935	5.17
7	MP2A	X	2.53	2.17
8	MP2A	Z	-4.382	2.17
9	MP2A	Mx	-.006	2.17
10	MP2A	X	2.53	6.17
11	MP2A	Z	-4.382	6.17
12	MP2A	Mx	-.006	6.17
13	MP2A	X	2.53	2.17
14	MP2A	Z	-4.382	2.17
15	MP2A	Mx	.001	2.17
16	MP2A	X	2.53	6.17
17	MP2A	Z	-4.382	6.17
18	MP2A	Mx	.001	6.17
19	MP2A	X	1.624	3.17
20	MP2A	Z	-2.813	3.17
21	MP2A	Mx	.000812	3.17
22	MP2A	X	1.57	5.17
23	MP2A	Z	-2.719	5.17
24	MP2A	Mx	.000785	5.17

Member Point Loads (BLC 29 : Antenna Wm (60 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	1.97	3.17
2	MP1A	Z	-1.137	3.17
3	MP1A	Mx	-.000985	3.17
4	MP1A	X	1.97	5.17
5	MP1A	Z	-1.137	5.17
6	MP1A	Mx	-.000985	5.17
7	MP2A	X	3.794	2.17
8	MP2A	Z	-2.191	2.17
9	MP2A	Mx	-.005	2.17
10	MP2A	X	3.794	6.17
11	MP2A	Z	-2.191	6.17
12	MP2A	Mx	-.005	6.17
13	MP2A	X	3.794	2.17
14	MP2A	Z	-2.191	2.17
15	MP2A	Mx	-.002	2.17
16	MP2A	X	3.794	6.17
17	MP2A	Z	-2.191	6.17
18	MP2A	Mx	-.002	6.17
19	MP2A	X	2.309	3.17
20	MP2A	Z	-1.333	3.17
21	MP2A	Mx	.001	3.17
22	MP2A	X	2.027	5.17
23	MP2A	Z	-1.17	5.17
24	MP2A	Mx	.001	5.17

Member Point Loads (BLC 30 : Antenna Wm (90 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	1.541	3.17
2	MP1A	Z	0	3.17
3	MP1A	Mx	-.00077	3.17
4	MP1A	X	1.541	5.17
5	MP1A	Z	0	5.17
6	MP1A	Mx	-.00077	5.17
7	MP2A	X	4.041	2.17
8	MP2A	Z	0	2.17
9	MP2A	Mx	-.004	2.17
10	MP2A	X	4.041	6.17
11	MP2A	Z	0	6.17
12	MP2A	Mx	-.004	6.17
13	MP2A	X	4.041	2.17
14	MP2A	Z	0	2.17
15	MP2A	Mx	-.004	2.17
16	MP2A	X	4.041	6.17
17	MP2A	Z	0	6.17
18	MP2A	Mx	-.004	6.17
19	MP2A	X	2.375	3.17
20	MP2A	Z	0	3.17
21	MP2A	Mx	.001	3.17
22	MP2A	X	1.941	5.17
23	MP2A	Z	0	5.17
24	MP2A	Mx	.000971	5.17

Member Point Loads (BLC 31 : Antenna Wm (120 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	1.97	3.17
2	MP1A	Z	1.137	3.17
3	MP1A	Mx	-.000985	3.17
4	MP1A	X	1.97	5.17
5	MP1A	Z	1.137	5.17
6	MP1A	Mx	-.000985	5.17
7	MP2A	X	3.794	2.17
8	MP2A	Z	2.191	2.17
9	MP2A	Mx	-.002	2.17
10	MP2A	X	3.794	6.17
11	MP2A	Z	2.191	6.17
12	MP2A	Mx	-.002	6.17
13	MP2A	X	3.794	2.17
14	MP2A	Z	2.191	2.17
15	MP2A	Mx	-.005	2.17
16	MP2A	X	3.794	6.17
17	MP2A	Z	2.191	6.17
18	MP2A	Mx	-.005	6.17
19	MP2A	X	2.309	3.17
20	MP2A	Z	1.333	3.17
21	MP2A	Mx	.001	3.17
22	MP2A	X	2.027	5.17
23	MP2A	Z	1.17	5.17
24	MP2A	Mx	.001	5.17

Member Point Loads (BLC 32 : Antenna Wm (150 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	1.871	3.17
2	MP1A	Z	3.24	3.17

Member Point Loads (BLC 32 : Antenna Wm (150 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
3	MP1A	Mx	-.000935	3.17
4	MP1A	X	1.871	5.17
5	MP1A	Z	3.24	5.17
6	MP1A	Mx	-.000935	5.17
7	MP2A	X	2.53	2.17
8	MP2A	Z	4.382	2.17
9	MP2A	Mx	.001	2.17
10	MP2A	X	2.53	6.17
11	MP2A	Z	4.382	6.17
12	MP2A	Mx	.001	6.17
13	MP2A	X	2.53	2.17
14	MP2A	Z	4.382	2.17
15	MP2A	Mx	-.006	2.17
16	MP2A	X	2.53	6.17
17	MP2A	Z	4.382	6.17
18	MP2A	Mx	-.006	6.17
19	MP2A	X	1.624	3.17
20	MP2A	Z	2.813	3.17
21	MP2A	Mx	.000812	3.17
22	MP2A	X	1.57	5.17
23	MP2A	Z	2.719	5.17
24	MP2A	Mx	.000785	5.17

Member Point Loads (BLC 33 : Antenna Wm (180 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	0	3.17
2	MP1A	Z	4.475	3.17
3	MP1A	Mx	0	3.17
4	MP1A	X	0	5.17
5	MP1A	Z	4.475	5.17
6	MP1A	Mx	0	5.17
7	MP2A	X	0	2.17
8	MP2A	Z	5.4	2.17
9	MP2A	Mx	.004	2.17
10	MP2A	X	0	6.17
11	MP2A	Z	5.4	6.17
12	MP2A	Mx	.004	6.17
13	MP2A	X	0	2.17
14	MP2A	Z	5.4	2.17
15	MP2A	Mx	-.004	2.17
16	MP2A	X	0	6.17
17	MP2A	Z	5.4	6.17
18	MP2A	Mx	-.004	6.17
19	MP2A	X	0	3.17
20	MP2A	Z	3.539	3.17
21	MP2A	Mx	0	3.17
22	MP2A	X	0	5.17
23	MP2A	Z	3.539	5.17
24	MP2A	Mx	0	5.17

Member Point Loads (BLC 34 : Antenna Wm (210 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-1.871	3.17
2	MP1A	Z	3.24	3.17
3	MP1A	Mx	.000935	3.17
4	MP1A	X	-1.871	5.17

Member Point Loads (BLC 34 : Antenna Wm (210 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
5	MP1A	Z	3.24	5.17
6	MP1A	Mx	.000935	5.17
7	MP2A	X	-2.53	2.17
8	MP2A	Z	4.382	2.17
9	MP2A	Mx	.006	2.17
10	MP2A	X	-2.53	6.17
11	MP2A	Z	4.382	6.17
12	MP2A	Mx	.006	6.17
13	MP2A	X	-2.53	2.17
14	MP2A	Z	4.382	2.17
15	MP2A	Mx	-.001	2.17
16	MP2A	X	-2.53	6.17
17	MP2A	Z	4.382	6.17
18	MP2A	Mx	-.001	6.17
19	MP2A	X	-1.624	3.17
20	MP2A	Z	2.813	3.17
21	MP2A	Mx	-.000812	3.17
22	MP2A	X	-1.57	5.17
23	MP2A	Z	2.719	5.17
24	MP2A	Mx	-.000785	5.17

Member Point Loads (BLC 35 : Antenna Wm (240 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-1.97	3.17
2	MP1A	Z	1.137	3.17
3	MP1A	Mx	.000985	3.17
4	MP1A	X	-1.97	5.17
5	MP1A	Z	1.137	5.17
6	MP1A	Mx	.000985	5.17
7	MP2A	X	-3.794	2.17
8	MP2A	Z	2.191	2.17
9	MP2A	Mx	.005	2.17
10	MP2A	X	-3.794	6.17
11	MP2A	Z	2.191	6.17
12	MP2A	Mx	.005	6.17
13	MP2A	X	-3.794	2.17
14	MP2A	Z	2.191	2.17
15	MP2A	Mx	.002	2.17
16	MP2A	X	-3.794	6.17
17	MP2A	Z	2.191	6.17
18	MP2A	Mx	.002	6.17
19	MP2A	X	-2.309	3.17
20	MP2A	Z	1.333	3.17
21	MP2A	Mx	-.001	3.17
22	MP2A	X	-2.027	5.17
23	MP2A	Z	1.17	5.17
24	MP2A	Mx	-.001	5.17

Member Point Loads (BLC 36 : Antenna Wm (270 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-1.541	3.17
2	MP1A	Z	0	3.17
3	MP1A	Mx	.00077	3.17
4	MP1A	X	-1.541	5.17
5	MP1A	Z	0	5.17
6	MP1A	Mx	.00077	5.17

Member Point Loads (BLC 36 : Antenna Wm (270 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
7	MP2A	X	-4.041	2.17
8	MP2A	Z	0	2.17
9	MP2A	Mx	.004	2.17
10	MP2A	X	-4.041	6.17
11	MP2A	Z	0	6.17
12	MP2A	Mx	.004	6.17
13	MP2A	X	-4.041	2.17
14	MP2A	Z	0	2.17
15	MP2A	Mx	.004	2.17
16	MP2A	X	-4.041	6.17
17	MP2A	Z	0	6.17
18	MP2A	Mx	.004	6.17
19	MP2A	X	-2.375	3.17
20	MP2A	Z	0	3.17
21	MP2A	Mx	-.001	3.17
22	MP2A	X	-1.941	5.17
23	MP2A	Z	0	5.17
24	MP2A	Mx	-.000971	5.17

Member Point Loads (BLC 37 : Antenna Wm (300 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-1.97	3.17
2	MP1A	Z	-1.137	3.17
3	MP1A	Mx	.000985	3.17
4	MP1A	X	-1.97	5.17
5	MP1A	Z	-1.137	5.17
6	MP1A	Mx	.000985	5.17
7	MP2A	X	-3.794	2.17
8	MP2A	Z	-2.191	2.17
9	MP2A	Mx	.002	2.17
10	MP2A	X	-3.794	6.17
11	MP2A	Z	-2.191	6.17
12	MP2A	Mx	.002	6.17
13	MP2A	X	-3.794	2.17
14	MP2A	Z	-2.191	2.17
15	MP2A	Mx	.005	2.17
16	MP2A	X	-3.794	6.17
17	MP2A	Z	-2.191	6.17
18	MP2A	Mx	.005	6.17
19	MP2A	X	-2.309	3.17
20	MP2A	Z	-1.333	3.17
21	MP2A	Mx	-.001	3.17
22	MP2A	X	-2.027	5.17
23	MP2A	Z	-1.17	5.17
24	MP2A	Mx	-.001	5.17

Member Point Loads (BLC 38 : Antenna Wm (330 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	-1.871	3.17
2	MP1A	Z	-3.24	3.17
3	MP1A	Mx	.000935	3.17
4	MP1A	X	-1.871	5.17
5	MP1A	Z	-3.24	5.17
6	MP1A	Mx	.000935	5.17
7	MP2A	X	-2.53	2.17
8	MP2A	Z	-4.382	2.17

Member Point Loads (BLC 38 : Antenna Wm (330 Deg)) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
9	MP2A	Mx	-.001	2.17
10	MP2A	X	-2.53	6.17
11	MP2A	Z	-4.382	6.17
12	MP2A	Mx	-.001	6.17
13	MP2A	X	-2.53	2.17
14	MP2A	Z	-4.382	2.17
15	MP2A	Mx	.006	2.17
16	MP2A	X	-2.53	6.17
17	MP2A	Z	-4.382	6.17
18	MP2A	Mx	.006	6.17
19	MP2A	X	-1.624	3.17
20	MP2A	Z	-2.813	3.17
21	MP2A	Mx	-.000812	3.17
22	MP2A	X	-1.57	5.17
23	MP2A	Z	-2.719	5.17
24	MP2A	Mx	-.000785	5.17

Member Point Loads (BLC 77 : Lm1)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	FACE	Y	-500	%93

Member Point Loads (BLC 78 : Lm2)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	FACE	Y	-500	%7

Member Point Loads (BLC 79 : Lv1)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	FACE	Y	-250	%50

Member Point Loads (BLC 80 : Lv2)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	FACE	Y	-250	0

Member Point Loads (BLC 81 : Antenna Ev)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Y	-1.812	3.17
2	MP1A	My	-.000906	3.17
3	MP1A	Mz	0	3.17
4	MP1A	Y	-1.812	5.17
5	MP1A	My	-.000906	5.17
6	MP1A	Mz	0	5.17
7	MP2A	Y	-.957	2.17
8	MP2A	My	-.000877	2.17
9	MP2A	Mz	.000797	2.17
10	MP2A	Y	-.957	6.17
11	MP2A	My	-.000877	6.17
12	MP2A	Mz	.000797	6.17
13	MP2A	Y	-.957	2.17
14	MP2A	My	-.000877	2.17
15	MP2A	Mz	-.000797	2.17
16	MP2A	Y	-.957	6.17
17	MP2A	My	-.000877	6.17
18	MP2A	Mz	-.000797	6.17
19	MP2A	Y	-3.511	3.17

Member Point Loads (BLC 81 : Antenna Ev) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
20	MP2A	My	.002	3.17
21	MP2A	Mz	0	3.17
22	MP2A	Y	-2.924	5.17
23	MP2A	My	.001	5.17
24	MP2A	Mz	0	5.17

Member Point Loads (BLC 82 : Antenna Eh (0 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Z	-4.529	3.17
2	MP1A	Mx	0	3.17
3	MP1A	Z	-4.529	5.17
4	MP1A	Mx	0	5.17
5	MP2A	Z	-2.392	2.17
6	MP2A	Mx	-.002	2.17
7	MP2A	Z	-2.392	6.17
8	MP2A	Mx	-.002	6.17
9	MP2A	Z	-2.392	2.17
10	MP2A	Mx	.002	2.17
11	MP2A	Z	-2.392	6.17
12	MP2A	Mx	.002	6.17
13	MP2A	Z	-8.778	3.17
14	MP2A	Mx	0	3.17
15	MP2A	Z	-7.311	5.17
16	MP2A	Mx	0	5.17

Member Point Loads (BLC 83 : Antenna Eh (90 Deg))

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	4.529	3.17
2	MP1A	Mx	-.002	3.17
3	MP1A	X	4.529	5.17
4	MP1A	Mx	-.002	5.17
5	MP2A	X	2.392	2.17
6	MP2A	Mx	-.002	2.17
7	MP2A	X	2.392	6.17
8	MP2A	Mx	-.002	6.17
9	MP2A	X	2.392	2.17
10	MP2A	Mx	-.002	2.17
11	MP2A	X	2.392	6.17
12	MP2A	Mx	-.002	6.17
13	MP2A	X	8.778	3.17
14	MP2A	Mx	.004	3.17
15	MP2A	X	7.311	5.17
16	MP2A	Mx	.004	5.17

Member Distributed Loads (BLC 40 : Structure Di)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-8.942	-8.942	0	%100
2	FACE	Y	-6.082	-6.082	0	%100
3	MP1A	Y	-4.59	-4.59	0	%100
4	MP2A	Y	-4.59	-4.59	0	%100

Member Distributed Loads (BLC 41 : Structure Wo (0 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	0	0	0	%100

Member Distributed Loads (BLC 41 : Structure Wo (0 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	-10.386	-10.386	0	%100
5	MP1A	X	0	0	0	%100
6	MP1A	Z	-8.248	-8.248	0	%100
7	MP2A	X	0	0	0	%100
8	MP2A	Z	-8.248	-8.248	0	%100

Member Distributed Loads (BLC 42 : Structure Wo (30 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	1.23	1.23	0	%100
2	M1	Z	-2.13	-2.13	0	%100
3	FACE	X	3.895	3.895	0	%100
4	FACE	Z	-6.746	-6.746	0	%100
5	MP1A	X	4.124	4.124	0	%100
6	MP1A	Z	-7.143	-7.143	0	%100
7	MP2A	X	4.124	4.124	0	%100
8	MP2A	Z	-7.143	-7.143	0	%100

Member Distributed Loads (BLC 43 : Structure Wo (60 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	6.391	6.391	0	%100
2	M1	Z	-3.69	-3.69	0	%100
3	FACE	X	2.249	2.249	0	%100
4	FACE	Z	-1.298	-1.298	0	%100
5	MP1A	X	7.143	7.143	0	%100
6	MP1A	Z	-4.124	-4.124	0	%100
7	MP2A	X	7.143	7.143	0	%100
8	MP2A	Z	-4.124	-4.124	0	%100

Member Distributed Loads (BLC 44 : Structure Wo (90 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	9.84	9.84	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	0	0	0	%100
5	MP1A	X	8.248	8.248	0	%100
6	MP1A	Z	0	0	0	%100
7	MP2A	X	8.248	8.248	0	%100
8	MP2A	Z	0	0	0	%100

Member Distributed Loads (BLC 45 : Structure Wo (120 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	6.391	6.391	0	%100
2	M1	Z	3.69	3.69	0	%100
3	FACE	X	2.249	2.249	0	%100
4	FACE	Z	1.298	1.298	0	%100
5	MP1A	X	7.143	7.143	0	%100
6	MP1A	Z	4.124	4.124	0	%100
7	MP2A	X	7.143	7.143	0	%100
8	MP2A	Z	4.124	4.124	0	%100

Member Distributed Loads (BLC 46 : Structure Wo (150 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 46 : Structure Wo (150 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	1.23	1.23	0	%100
2	M1	Z	2.13	2.13	0	%100
3	FACE	X	3.895	3.895	0	%100
4	FACE	Z	6.746	6.746	0	%100
5	MP1A	X	4.124	4.124	0	%100
6	MP1A	Z	7.143	7.143	0	%100
7	MP2A	X	4.124	4.124	0	%100
8	MP2A	Z	7.143	7.143	0	%100

Member Distributed Loads (BLC 47 : Structure Wo (180 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	0	0	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	10.386	10.386	0	%100
5	MP1A	X	0	0	0	%100
6	MP1A	Z	8.248	8.248	0	%100
7	MP2A	X	0	0	0	%100
8	MP2A	Z	8.248	8.248	0	%100

Member Distributed Loads (BLC 48 : Structure Wo (210 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-1.23	-1.23	0	%100
2	M1	Z	2.13	2.13	0	%100
3	FACE	X	-3.895	-3.895	0	%100
4	FACE	Z	6.746	6.746	0	%100
5	MP1A	X	-4.124	-4.124	0	%100
6	MP1A	Z	7.143	7.143	0	%100
7	MP2A	X	-4.124	-4.124	0	%100
8	MP2A	Z	7.143	7.143	0	%100

Member Distributed Loads (BLC 49 : Structure Wo (240 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-6.391	-6.391	0	%100
2	M1	Z	3.69	3.69	0	%100
3	FACE	X	-2.249	-2.249	0	%100
4	FACE	Z	1.298	1.298	0	%100
5	MP1A	X	-7.143	-7.143	0	%100
6	MP1A	Z	4.124	4.124	0	%100
7	MP2A	X	-7.143	-7.143	0	%100
8	MP2A	Z	4.124	4.124	0	%100

Member Distributed Loads (BLC 50 : Structure Wo (270 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-9.84	-9.84	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	0	0	0	%100
5	MP1A	X	-8.248	-8.248	0	%100
6	MP1A	Z	0	0	0	%100
7	MP2A	X	-8.248	-8.248	0	%100
8	MP2A	Z	0	0	0	%100

Member Distributed Loads (BLC 51 : Structure Wo (300 Deg))

Member Label	Direction	Start Magnitude[l	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 51 : Structure Wo (300 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-6.391	-6.391	0	%100
2	M1	Z	-3.69	-3.69	0	%100
3	FACE	X	-2.249	-2.249	0	%100
4	FACE	Z	-1.298	-1.298	0	%100
5	MP1A	X	-7.143	-7.143	0	%100
6	MP1A	Z	-4.124	-4.124	0	%100
7	MP2A	X	-7.143	-7.143	0	%100
8	MP2A	Z	-4.124	-4.124	0	%100

Member Distributed Loads (BLC 52 : Structure Wo (330 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-1.23	-1.23	0	%100
2	M1	Z	-2.13	-2.13	0	%100
3	FACE	X	-3.895	-3.895	0	%100
4	FACE	Z	-6.746	-6.746	0	%100
5	MP1A	X	-4.124	-4.124	0	%100
6	MP1A	Z	-7.143	-7.143	0	%100
7	MP2A	X	-4.124	-4.124	0	%100
8	MP2A	Z	-7.143	-7.143	0	%100

Member Distributed Loads (BLC 53 : Structure Wi (0 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	0	0	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	-3.274	-3.274	0	%100
5	MP1A	X	0	0	0	%100
6	MP1A	Z	-2.883	-2.883	0	%100
7	MP2A	X	0	0	0	%100
8	MP2A	Z	-2.883	-2.883	0	%100

Member Distributed Loads (BLC 54 : Structure Wi (30 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.327	.327	0	%100
2	M1	Z	-.567	-.567	0	%100
3	FACE	X	1.228	1.228	0	%100
4	FACE	Z	-2.126	-2.126	0	%100
5	MP1A	X	1.442	1.442	0	%100
6	MP1A	Z	-2.497	-2.497	0	%100
7	MP2A	X	1.442	1.442	0	%100
8	MP2A	Z	-2.497	-2.497	0	%100

Member Distributed Loads (BLC 55 : Structure Wi (60 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	1.701	1.701	0	%100
2	M1	Z	-.982	-.982	0	%100
3	FACE	X	.709	.709	0	%100
4	FACE	Z	-.409	-.409	0	%100
5	MP1A	X	2.497	2.497	0	%100
6	MP1A	Z	-1.442	-1.442	0	%100
7	MP2A	X	2.497	2.497	0	%100
8	MP2A	Z	-1.442	-1.442	0	%100

Member Distributed Loads (BLC 56 : Structure Wi (90 Deg))

Member Label	Direction	Start Magnitude[l	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 56 : Structure Wi (90 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	2.619	2.619	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	0	0	0	%100
5	MP1A	X	2.883	2.883	0	%100
6	MP1A	Z	0	0	0	%100
7	MP2A	X	2.883	2.883	0	%100
8	MP2A	Z	0	0	0	%100

Member Distributed Loads (BLC 57 : Structure Wi (120 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	1.701	1.701	0	%100
2	M1	Z	.982	.982	0	%100
3	FACE	X	.709	.709	0	%100
4	FACE	Z	.409	.409	0	%100
5	MP1A	X	2.497	2.497	0	%100
6	MP1A	Z	1.442	1.442	0	%100
7	MP2A	X	2.497	2.497	0	%100
8	MP2A	Z	1.442	1.442	0	%100

Member Distributed Loads (BLC 58 : Structure Wi (150 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.327	.327	0	%100
2	M1	Z	.567	.567	0	%100
3	FACE	X	1.228	1.228	0	%100
4	FACE	Z	2.126	2.126	0	%100
5	MP1A	X	1.442	1.442	0	%100
6	MP1A	Z	2.497	2.497	0	%100
7	MP2A	X	1.442	1.442	0	%100
8	MP2A	Z	2.497	2.497	0	%100

Member Distributed Loads (BLC 59 : Structure Wi (180 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	0	0	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	3.274	3.274	0	%100
5	MP1A	X	0	0	0	%100
6	MP1A	Z	2.883	2.883	0	%100
7	MP2A	X	0	0	0	%100
8	MP2A	Z	2.883	2.883	0	%100

Member Distributed Loads (BLC 60 : Structure Wi (210 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.327	-.327	0	%100
2	M1	Z	.567	.567	0	%100
3	FACE	X	-1.228	-1.228	0	%100
4	FACE	Z	2.126	2.126	0	%100
5	MP1A	X	-1.442	-1.442	0	%100
6	MP1A	Z	2.497	2.497	0	%100
7	MP2A	X	-1.442	-1.442	0	%100
8	MP2A	Z	2.497	2.497	0	%100

Member Distributed Loads (BLC 61 : Structure Wi (240 Deg))

Member Label	Direction	Start Magnitude[l	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 61 : Structure Wi (240 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-1.701	-1.701	0	%100
2	M1	Z	.982	.982	0	%100
3	FACE	X	-.709	-.709	0	%100
4	FACE	Z	.409	.409	0	%100
5	MP1A	X	-2.497	-2.497	0	%100
6	MP1A	Z	1.442	1.442	0	%100
7	MP2A	X	-2.497	-2.497	0	%100
8	MP2A	Z	1.442	1.442	0	%100

Member Distributed Loads (BLC 62 : Structure Wi (270 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-2.619	-2.619	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	0	0	0	%100
5	MP1A	X	-2.883	-2.883	0	%100
6	MP1A	Z	0	0	0	%100
7	MP2A	X	-2.883	-2.883	0	%100
8	MP2A	Z	0	0	0	%100

Member Distributed Loads (BLC 63 : Structure Wi (300 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-1.701	-1.701	0	%100
2	M1	Z	-.982	-.982	0	%100
3	FACE	X	-.709	-.709	0	%100
4	FACE	Z	-.409	-.409	0	%100
5	MP1A	X	-2.497	-2.497	0	%100
6	MP1A	Z	-1.442	-1.442	0	%100
7	MP2A	X	-2.497	-2.497	0	%100
8	MP2A	Z	-1.442	-1.442	0	%100

Member Distributed Loads (BLC 64 : Structure Wi (330 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.327	-.327	0	%100
2	M1	Z	-.567	-.567	0	%100
3	FACE	X	-1.228	-1.228	0	%100
4	FACE	Z	-2.126	-2.126	0	%100
5	MP1A	X	-1.442	-1.442	0	%100
6	MP1A	Z	-2.497	-2.497	0	%100
7	MP2A	X	-1.442	-1.442	0	%100
8	MP2A	Z	-2.497	-2.497	0	%100

Member Distributed Loads (BLC 65 : Structure Wm (0 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	0	0	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	-.683	-.683	0	%100
5	MP1A	X	0	0	0	%100
6	MP1A	Z	-.542	-.542	0	%100
7	MP2A	X	0	0	0	%100
8	MP2A	Z	-.542	-.542	0	%100

Member Distributed Loads (BLC 66 : Structure Wm (30 Deg))

Member Label	Direction	Start Magnitude[l	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 66 : Structure Wm (30 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.081	.081	0	%100
2	M1	Z	-.14	-.14	0	%100
3	FACE	X	.256	.256	0	%100
4	FACE	Z	-.444	-.444	0	%100
5	MP1A	X	.271	.271	0	%100
6	MP1A	Z	-.47	-.47	0	%100
7	MP2A	X	.271	.271	0	%100
8	MP2A	Z	-.47	-.47	0	%100

Member Distributed Loads (BLC 67 : Structure Wm (60 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.42	.42	0	%100
2	M1	Z	-.243	-.243	0	%100
3	FACE	X	.148	.148	0	%100
4	FACE	Z	-.085	-.085	0	%100
5	MP1A	X	.47	.47	0	%100
6	MP1A	Z	-.271	-.271	0	%100
7	MP2A	X	.47	.47	0	%100
8	MP2A	Z	-.271	-.271	0	%100

Member Distributed Loads (BLC 68 : Structure Wm (90 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.647	.647	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	0	0	0	%100
5	MP1A	X	.542	.542	0	%100
6	MP1A	Z	0	0	0	%100
7	MP2A	X	.542	.542	0	%100
8	MP2A	Z	0	0	0	%100

Member Distributed Loads (BLC 69 : Structure Wm (120 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.42	.42	0	%100
2	M1	Z	.243	.243	0	%100
3	FACE	X	.148	.148	0	%100
4	FACE	Z	.085	.085	0	%100
5	MP1A	X	.47	.47	0	%100
6	MP1A	Z	.271	.271	0	%100
7	MP2A	X	.47	.47	0	%100
8	MP2A	Z	.271	.271	0	%100

Member Distributed Loads (BLC 70 : Structure Wm (150 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.081	.081	0	%100
2	M1	Z	.14	.14	0	%100
3	FACE	X	.256	.256	0	%100
4	FACE	Z	.444	.444	0	%100
5	MP1A	X	.271	.271	0	%100
6	MP1A	Z	.47	.47	0	%100
7	MP2A	X	.271	.271	0	%100
8	MP2A	Z	.47	.47	0	%100

Member Distributed Loads (BLC 71 : Structure Wm (180 Deg))

Member Label	Direction	Start Magnitude[l	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 71 : Structure Wm (180 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	0	0	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	.683	.683	0	%100
5	MP1A	X	0	0	0	%100
6	MP1A	Z	.542	.542	0	%100
7	MP2A	X	0	0	0	%100
8	MP2A	Z	.542	.542	0	%100

Member Distributed Loads (BLC 72 : Structure Wm (210 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.081	-.081	0	%100
2	M1	Z	.14	.14	0	%100
3	FACE	X	-.256	-.256	0	%100
4	FACE	Z	.444	.444	0	%100
5	MP1A	X	-.271	-.271	0	%100
6	MP1A	Z	.47	.47	0	%100
7	MP2A	X	-.271	-.271	0	%100
8	MP2A	Z	.47	.47	0	%100

Member Distributed Loads (BLC 73 : Structure Wm (240 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.42	-.42	0	%100
2	M1	Z	.243	.243	0	%100
3	FACE	X	-.148	-.148	0	%100
4	FACE	Z	.085	.085	0	%100
5	MP1A	X	-.47	-.47	0	%100
6	MP1A	Z	.271	.271	0	%100
7	MP2A	X	-.47	-.47	0	%100
8	MP2A	Z	.271	.271	0	%100

Member Distributed Loads (BLC 74 : Structure Wm (270 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.647	-.647	0	%100
2	M1	Z	0	0	0	%100
3	FACE	X	0	0	0	%100
4	FACE	Z	0	0	0	%100
5	MP1A	X	-.542	-.542	0	%100
6	MP1A	Z	0	0	0	%100
7	MP2A	X	-.542	-.542	0	%100
8	MP2A	Z	0	0	0	%100

Member Distributed Loads (BLC 75 : Structure Wm (300 Deg))

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.42	-.42	0	%100
2	M1	Z	-.243	-.243	0	%100
3	FACE	X	-.148	-.148	0	%100
4	FACE	Z	-.085	-.085	0	%100
5	MP1A	X	-.47	-.47	0	%100
6	MP1A	Z	-.271	-.271	0	%100
7	MP2A	X	-.47	-.47	0	%100
8	MP2A	Z	-.271	-.271	0	%100

Member Distributed Loads (BLC 76 : Structure Wm (330 Deg))

Member Label	Direction	Start Magnitude[l	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 76 : Structure Wm (330 Deg)) (Continued)

	Member Label	Direction	Start Magnitude[l...	End Magnitude[lb/ft,F,ksf]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.081	-.081	0	%100
2	M1	Z	-.14	-.14	0	%100
3	FACE	X	-.256	-.256	0	%100
4	FACE	Z	-.444	-.444	0	%100
5	MP1A	X	-.271	-.271	0	%100
6	MP1A	Z	-.47	-.47	0	%100
7	MP2A	X	-.271	-.271	0	%100
8	MP2A	Z	-.47	-.47	0	%100

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
No Data to Print ...						

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	496.11	10	1267.489	28	756.235	1	-.392	64	1.024	12	1.2	28
2		min	-496.11	4	370.177	73	-756.235	7	-1.375	19	-1.025	6	-2.028	46
3	Totals:	max	496.11	10	1267.489	28	756.235	1						
4		min	-496.11	4	370.177	73	-756.235	7						

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

	Member	Shape	Code Ch..	Loc[...	LC	Shear ...	Loc[ft] ...		LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y ...	phi*Mn z-z ...	Cb	Eqn
1	M1	HSS4X4...	.111	0	18	.181	0	y	46	139319.454	139518	16.181	16.181	1.224	H1-1b
2	FACE	PIPE_3.0	.409	2.5	47	.128	2.5		19	57037.472	65205	5.749	5.749	1.578	H1-1b
3	MP1A	PIPE_2.0	.091	4.167	7	.018	4.167		6	14916.096	32130	1.872	1.872	1.361	H1-1b
4	MP2A	PIPE_2.0	.248	4.167	7	.083	3.167		10	14916.096	32130	1.872	1.872	2.413	H1-1b

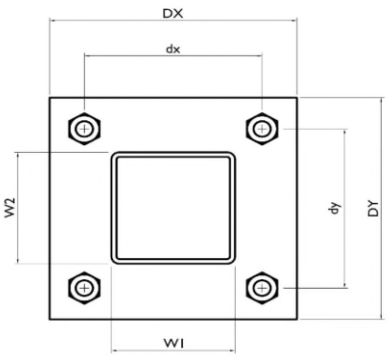
VzW SMART Tool© Vendor

Client:	Verizon	Date:	8/29/2022
Site Name:	Middlebury I-84		
PSLC #:	468946		
Fuze ID #:	16244626	Page:	1

Version 1.01

I. Mount-to-Tower Connection Check

Custom Orientation Required	No
Tower Connection Bolt Checks	Yes
Bolt Orientation	Parallel
Bolt Quantity per Reaction:	4
d_x (in) *(Delta X of typ. bolt config. sketch)* :	12
d_y (in) *(Delta Y of typ. bolt config. sketch)* :	6
Bolt Type:	A307
Bolt Diameter (in):	0.625
Required Tensile Strength / bolt (kips):	1.1
Required Shear Strength / bolt (kips):	1.1
Tensile Capacity / bolt (kips):	10.4
Shear Capacity / bolt (kips):	6.2
Bolt Overall Utilization:	**17.6%**
Tower Connection Baseplate Checks	No



Maser Consulting Connecticut

MASER CONSULTING
— CONNECTICUT —

Subject		TIA-222-H Usage
Site Information	Site ID:	468946-VZW / Middlebury I-84
	Site Name:	Middlebury I-84
	Carrier Name:	Verizon Wireless
	Address:	2 Larkin Drive Middlebury, Connecticut 06762 New Haven County
	Latitude:	41.51361111°
	Longitude:	-73.12444444°
Structure Information	Tower Type:	140-Ft Self Support
	Mount Type:	5.00-Ft T-Arm

To Whom It May Concern,

We respectfully submit the above referenced Antenna Mount Structural Analysis report in conformance with ANSI/TIA-222-H, Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures.

The 2015 International Building Code states that, in Section 3108, telecommunication towers shall be designed and constructed in accordance with the provisions of TIA-222. The TIA-222-H is the latest revision of the TIA-222 Standard, effective as of January 01, 2018.

As with all ANSI standards and engineering best practice is to apply the most current revision of the standard. This ensures the engineer is applying all updates. As an example, the TIA-222-H standard includes updates to bring it in line with the latest AISC and ACI standards and it also incorporates the latest wind speed map by ASCE 7 based on updated studies of the wind data.

The TIA-222-H standard clarifies these specific requirements for the antenna mount analysis such as modeling method, seismic analysis, 30-degree increment wind direction and maintenance loading. Therefore, it is our opinion that TIA-222-H is the most appropriate standard for antenna mount structural analysis and is acceptable for use at this site to ensure the engineer is taking into account the most current engineering standard available.

Sincerely,

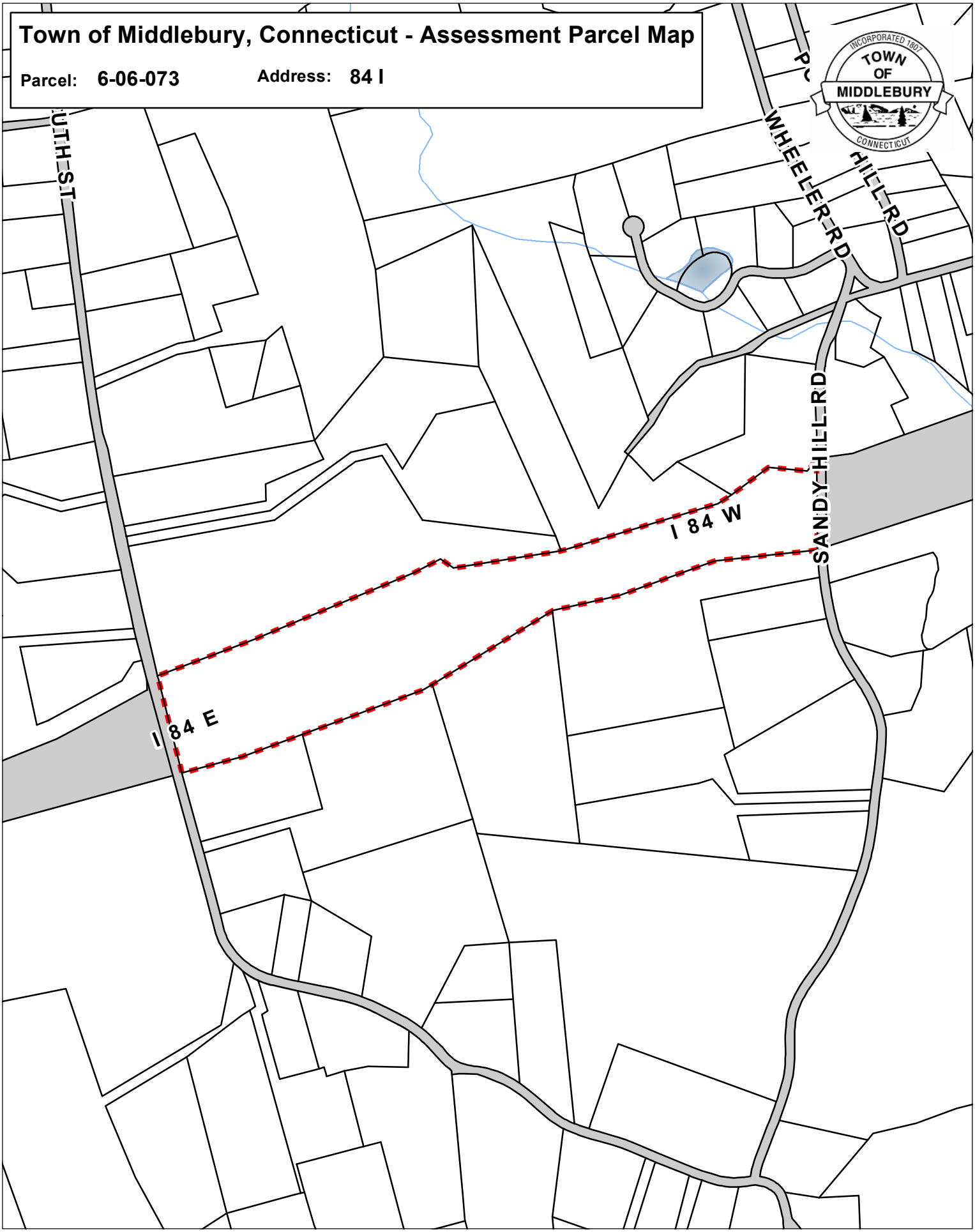
Justin Linette, PE
Technical Specialist

Digitally signed by Justin Linette
Date: 2022.08.30 14:57:54-04'00'

ATTACHMENT 5

Town of Middlebury, Connecticut - Assessment Parcel Map

Parcel: 6-06-073 **Address:** 84 I



Map Produced May 2020

Approximate Scale: 1 inch = 600 feet

Town of Middlebury, CT

Property Listing Report

Map Block Lot 6-06/073 Account I8400000

Property Information

Property Location	84 I
Owner	CONN STATE OF
Co-Owner	DEPT OF PUBLIC SAFETY
Mailing Address	PO BOX 2794 MIDDLETOWN CT 06457
Land Use	913 State Land Res
Land Class	E
Zoning Code	
Census Tract	

Neighborhood	
Acreage	0
Utilities	
Lot Setting/Desc	
Additional Info	

Photo

Sketch

Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Floors	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	

Report Created On 9/12/2022

Town of Middlebury, CT

Property Listing Report | Map Block Lot **6-06/073** | Account **I8400000**

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings		
Extras		
Improvements		
Outbuildings		
Land		
Total		

Outbuilding and Extra Items

Type	Description
Cell Tower	1 Units

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CONN STATE OF			

Report Created On **9/12/2022**

ATTACHMENT 6

UNITED STATES POSTAL SERVICE®

MIDDLEBURY I-84

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here ***Postmark with Date of Receipt.***
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	3	3	neopost 09/13/2022 US POSTAGE $003.09⁰ ZIP 06103 041L12203937
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Edward St. John, First Selectman Town of Middlebury 1212 Whittemore Road Middlebury, CT 06762				
2.	Curtis Bosco, Zoning Enforcement Officer Town of Middlebury 1212 Whittemore Road Middlebury, CT 06762				
3.	State of Connecticut, Department of Emergency Services & Public Protection Attn: Brian Benito 1111 Country Club Road Middletown, CT 06457				
4.					
5.					
6.					

OLD STATE HOUSE STATION 06108
SEP 13 2022
USPS

PS Form **3665**, January 2017 (Page 1 of 1) PSN 7530-17-000-5549

See Reverse for Instructions