COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

August 22, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification
Radio Communications Corp./MetroPCS co-location
Site ID CTNH520A
21 Birchwood Drive Ansonia

Dear Attorney Bachman:

This office represents MetroPCS Massachusetts, LLC ("MetroPCS") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Radio Communications Corporation owns the existing lattice telecommunications tower and related facility at 21 Birchwood Drive, Ansonia, Connecticut (Latitude: 41.329078, Longitude:-73.056294). MetroPCS intends to replace three existing antennas with six new antennas and related equipment at this existing telecommunications facility in Ansonia ("Ansonia Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which 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 the Mayor David S. Cassetti, and the property owner, Robert Knapp.

The existing Ansonia Facility consists of a 60 foot guyed lattice tower.[1] MetroPCS plans to replace existing antennas with six new antennas and 6 TMAs (tower mounted amplifiers) on at a centerline of 51 feet. (See the plans revised to May 19, 2014 attached hereto as Exhibit A). MetroPCS will also install replace an equipment cabinet, install a battery backup unit, install coax cable and reuse existing coax cables. The existing Ansonia Facility is structurally capable of supporting MetroPCS' proposed modifications, as indicated in KM Consulting Engineers, Inc. ("KM Consulting") letter certifying the tower reinforcement design, dated August 20, 2014, attached hereto as Exhibit B.

[1] The Ansonia Facility is not the subject of any Docket or Petition but was approved in a tower sharing request by the Council in TS-POCKET-002-090727.

An initial structural analysis, dated July 11, 2014, indicated that the existing Ansonia Facility was not capable of supporting the proposed equipment. (See structural analysis dated June 19, 2014 and revised July 11, 2014, attached hereto as Exhibit B). Subsequently, KM Consulting created a tower reinforcement design dated August 5, 2014 and KM Consulting certified that this design was acceptable to support the proposed T-Mobile equipment by letter dated August 20, 2014, both of which are attached hereto as Exhibit B.

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

1. The proposed modification will not increase the height of the tower. MetroPCS' replacement and additional antennas will be installed at a centerline of 51 feet, merely replacing existing antennas located at the same 51 foot elevation. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension of the site boundaries or lease area, as depicted on Sheets 2 of Exhibit A. MetroPCS' equipment will be located entirely within the existing compound area.

3. The proposed modification to the Ansonia Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated June 30, 2014, MetroPCS' operations would add 1.402% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 39.526% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

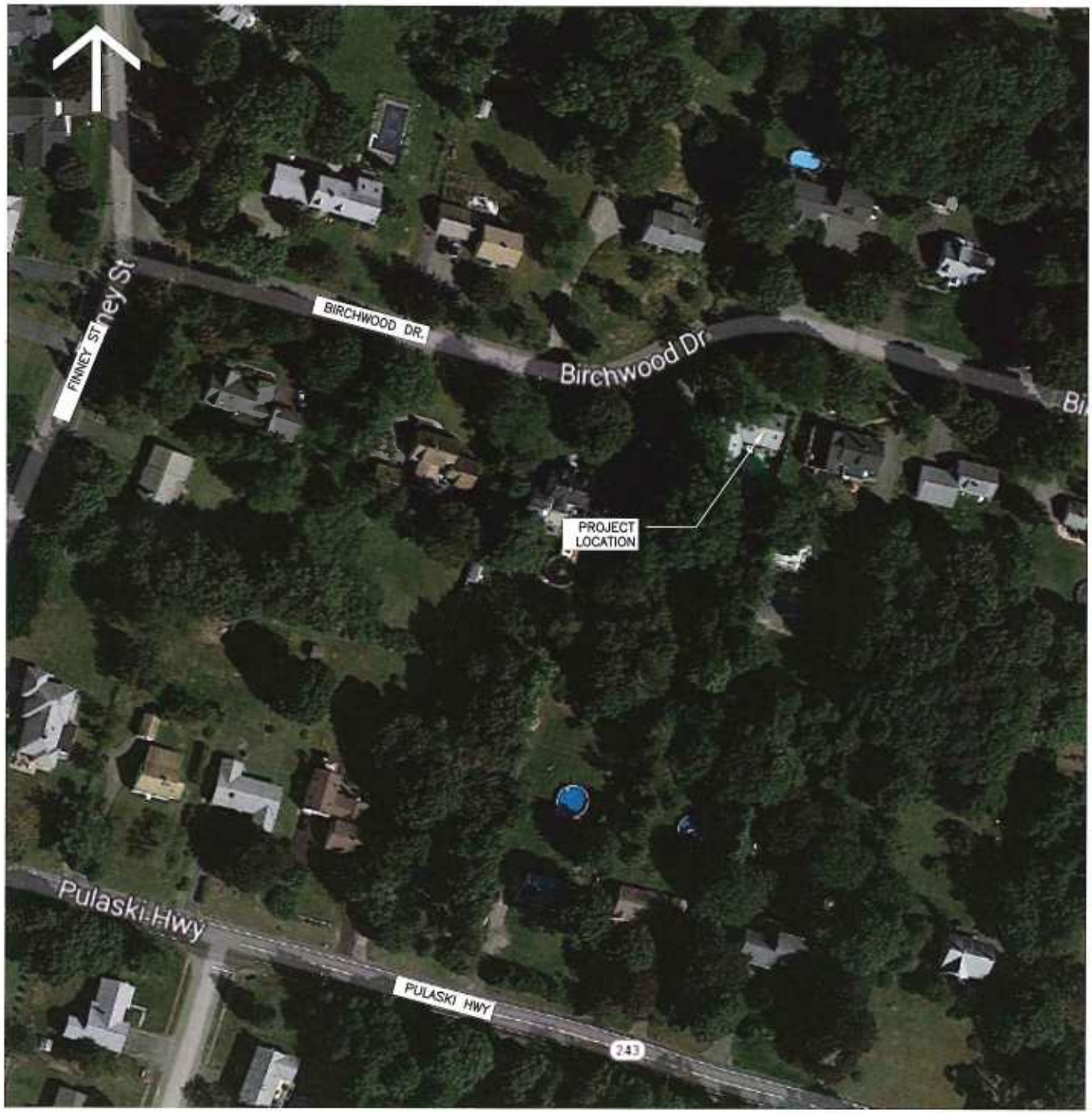
For the foregoing reasons, MetroPCS respectfully submits that the proposed replacement antennas and equipment at the Ansonia Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, MetroPCS shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Ansonia, Mayor David S. Cassetti
Radio Communications Corp.
Robert Knapp
Sheldon Freincle, NSS

EXHIBIT A



KEY PLAN

N.T.S.

MetroKeep-AAV
CONFIGURATION
5A

SUBMITTALS	
LE REV A	05.19.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

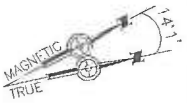
SITE NUMBER:
CTNH520A
SITE NAME:
KNAPP ANSONIA LATTICE TOWER
SITE ADDRESS:
21 BIRCHWOOD DR
ANSONIA, CT 06401

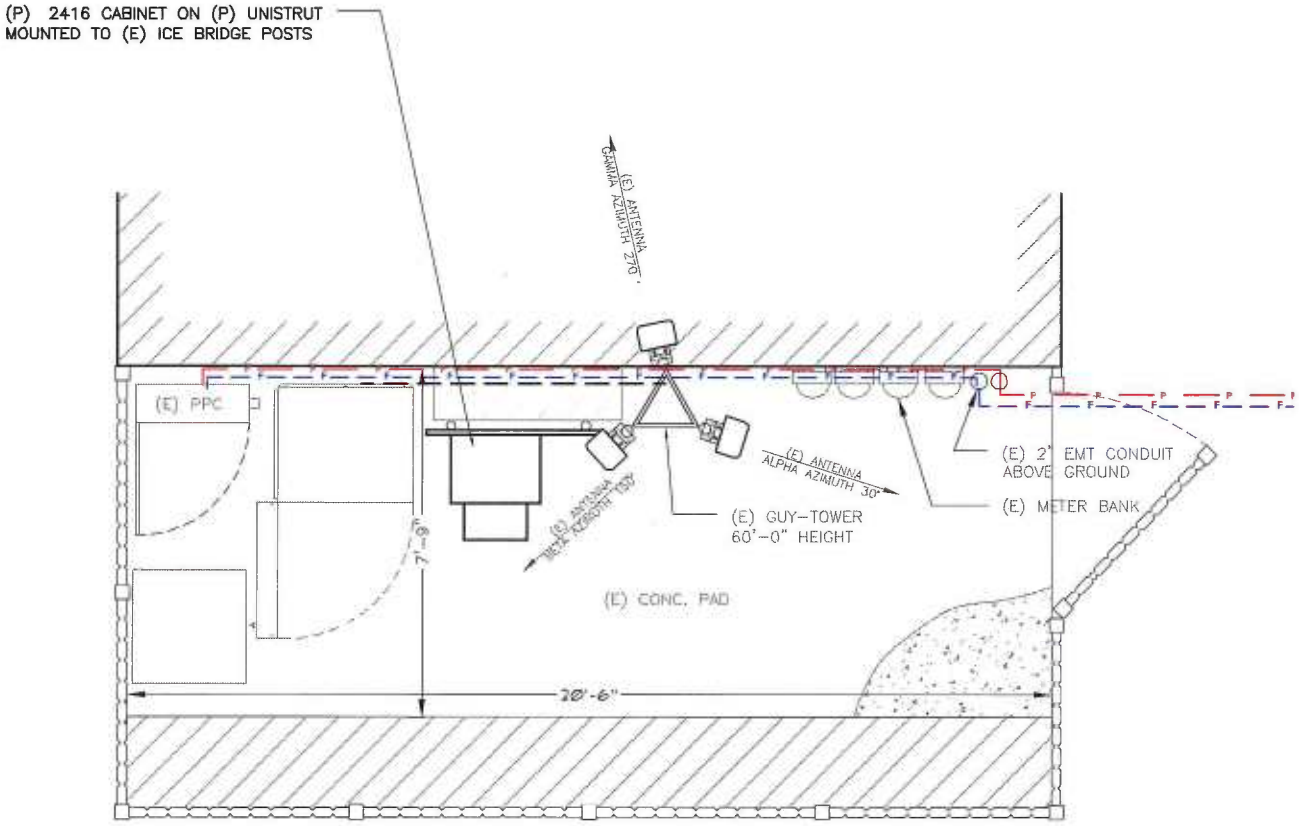
NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR metroPCS.

metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MB | CHECKED BY: SM





1
LE-3

ROOF PLAN 1 LE-2

SCALE: 1: 4

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

MetroKeep-AAV

CONFIGURATION

5A

SUBMITTALS	
LE REV A	05.19.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CTNH520A
SITE NAME:
KNAPP ANSONIA LATTICE TOWER
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21 BIRCHWOOD DR
ANSONIA, CT 06401

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
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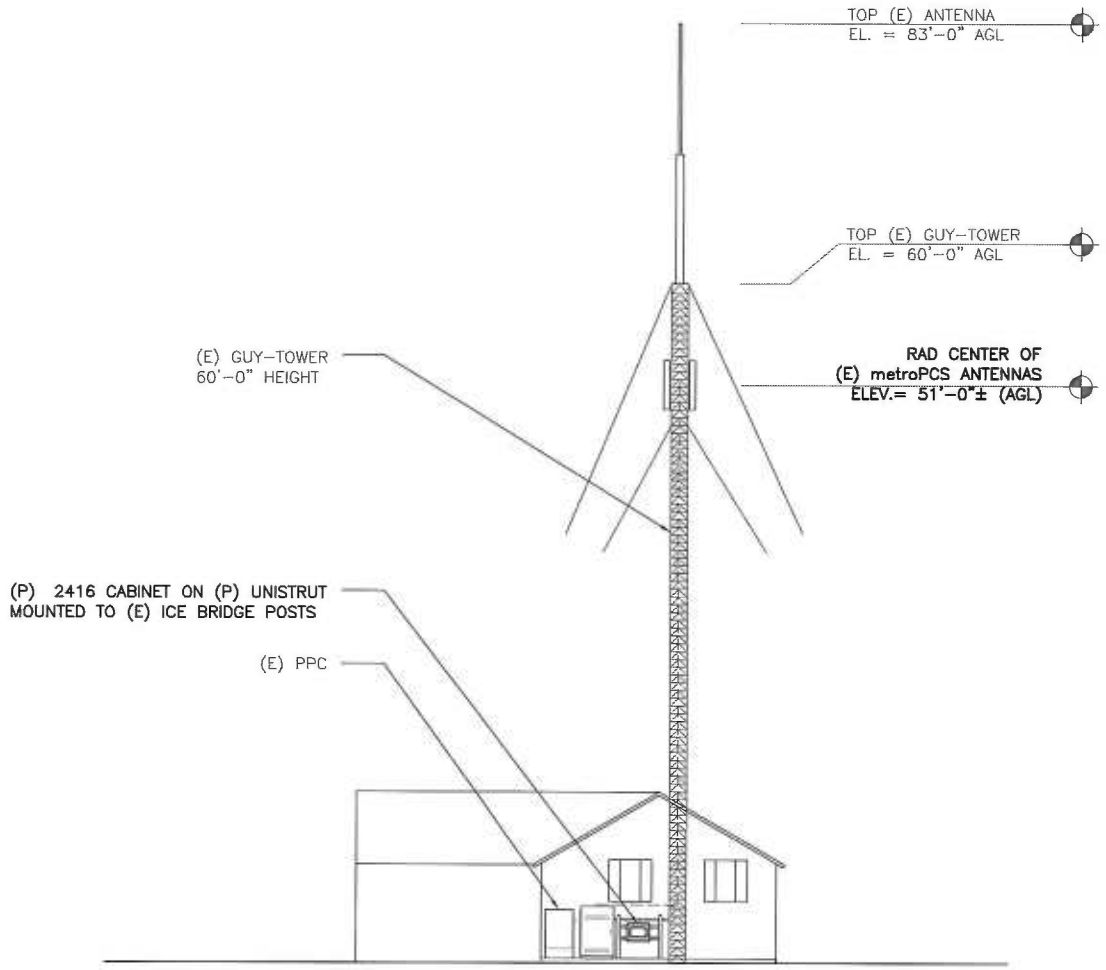
(508) 434-5237
FOR
metroPCS.
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MB | CHECKED BY: SM



ELEVATION

SCALE = 1:16

1
LE-3

MetroKeep-AAV

CONFIGURATION

5A

SUBMITTALS	
LE REV A	05.19.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
CTNH520A
SITE NAME:
KNAPP ANSONIA LATTICE TOWER
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21 BIRCHWOOD DR
ANSONIA, CT 06401

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR metroPCS.

metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MB | CHECKED BY: SM

EXHIBIT B

KM Consulting Engineers, Inc.
Wireless Engineering and Project Management

August 20, 2014

Sheldon Freincle
Northeast Site Solutions
54 Main Street, Suite 3
Sturbridge, MA 01566

Re: Ansonia Tower Reinforcement
KM Proposal No. 140604.00

Dear Mr. Freincle,

Further to your request, KM Consulting Engineers, Inc. (KMCE) has reviewed the structural capability of the Ansonia guyed tower to support the proposed T-Mobile installation with the proposed reinforcement by KMCE dated 8/5/14.

T-Mobile is proposing to install (3) Andrew APX16DWV_16DWVS panel antennas, (3) TwinB2 TMAs, (3) TwinB4 TMAs, and (6) 7/8" coax lines.

With the proposed modification installed on the tower, KMCE finds the tower superstructure is acceptable to support the proposed T-Mobile installation as per the TIA/EIA-222-F standards. The tower superstructure is rated at 88.2%, the guy wires are rated at 68.3%, the base foundation is rated at 12.5%, and the guy anchors are rated at 60.6%.

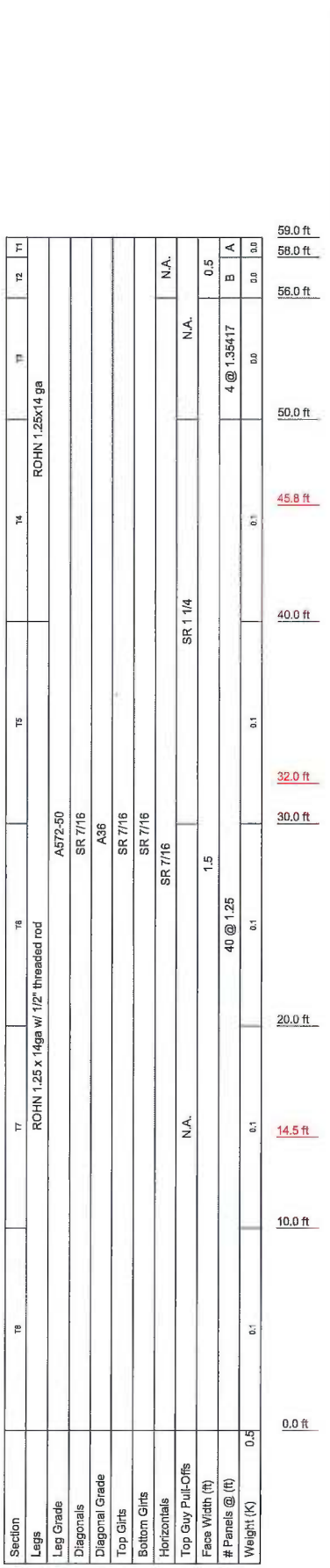
Should you require additional information, please do not hesitate to contact our office.

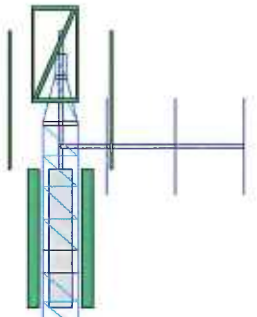
Sincerely,
KM CONSULTING ENGINEERS, INC.

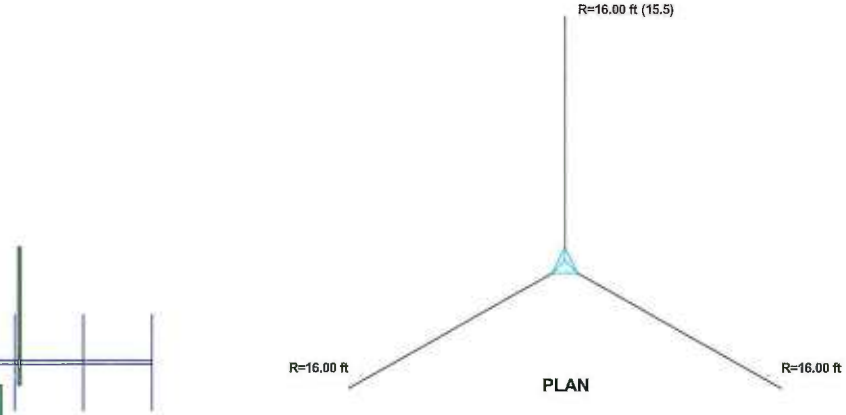
Michael L. Bohlinger, PE
CT License No. 20405
Principal

8/20/14

9 Forest Lane, Ewing, New Jersey 08628 Tel. (609)538-0400 Fax. (609)538-8853
Email: info@kmengr.com VISIT OUR WEB PAGE @ www.kmengr.com







DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' Omni x 2" OD	60	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
4' Standoff Mount	59	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
5' Omni x 1" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
5' Omni x 1" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
5' Omni x 2.5" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
2' Standoff Mount	55	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
2' Standoff Mount	55		
2' Standoff Mount	55		
Yagi	55		

SYMBOL LIST

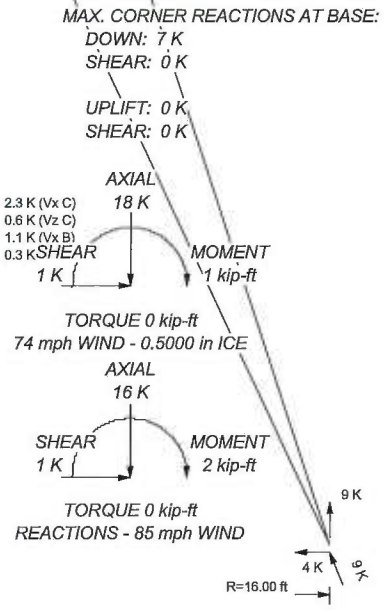
MARK	SIZE	MARK	SIZE
A	1 @ 0.916667	B	1 @ 1.83333

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 88.2%



KM Consulting Engineers, Inc.
9 Forest Lane
Ewing, NJ 08628
Phone: (609) 538-0400
FAX:
Consulting Engineers

Job: Ansonia Guy Tower			
Project: Ansonia Load Case 1 (proposed)			
Client: HPC Development	Drawn by: Domenic Aversa		App'd:
Code: TIA/EIA-222-F	Date: 08/20/14		Scale: NTS
Path: C:\Users\Domenic Aversa\Desktop\Work Stuff\Ansonia\Engineering\Ansonia LC2.eri			Dwg No. E-1

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	59 - 58	Leg	ROHN 1.25x14 ga	1	-2.19	11.95	18.3 22.7 (b)	Pass
		Diagonal	7/16	10	-1.49	3.03	49.1	Pass
		Top Girt	7/16	6	-0.35	3.86	9.2	Pass
		Bottom Girt	7/16	9	-0.43	3.86	11.1	Pass
T2	58 - 56	Leg	ROHN 1.25x14 ga	15	-1.94	10.85	17.9	Pass
		Diagonal	7/16	23	-1.34	1.88	71.3	Pass
		Top Girt	7/16	18	-0.50	3.78	13.2	Pass
		Bottom Girt	7/16	21	-0.15	2.82	5.3	Pass
T3	56 - 50	Leg	ROHN 1.25x14 ga	25	-3.46	11.50	30.0	Pass
		Diagonal	7/16	36	-1.22	1.86	65.6	Pass
		Horizontal	7/16	39	-0.65	2.75	23.5	Pass
		Top Girt	7/16	28	0.18	4.33	4.1	Pass
		Bottom Girt	7/16	31	-0.51	2.75	18.7	Pass
T4	50 - 40	Leg	ROHN 1.25x14 ga	57	-8.94	11.62	77.0	Pass
		Diagonal	7/16	102	-1.52	1.99	76.4	Pass
		Horizontal	7/16	97	-0.96	2.75	34.8	Pass
		Top Girt	7/16	60	-0.70	2.75	25.6	Pass
		Bottom Girt	7/16	61	-0.37	2.75	13.6	Pass
		Guy A@45.75	3/8	297	4.51	7.70	58.6	Pass
		Guy B@45.75	3/8	296	5.26	7.70	68.3	Pass
		Guy C@45.75	3/8	295	5.18	7.70	67.2	Pass
		Top Guy Pull-Off@45.75	1 1/4	87	1.27	49.08	2.6	Pass
T5	40 - 30	Leg	ROHN 1.25 x 14ga w/ 1/2" threaded rod	105	-13.95	18.26	76.4	Pass
		Diagonal	7/16	113	-1.63	2.10	77.5	Pass
		Horizontal	7/16	121	-0.78	2.82	27.5	Pass
		Top Girt	7/16	108	-0.57	2.82	20.1	Pass
		Bottom Girt	7/16	110	0.69	4.33	15.8	Pass
		Guy A@32	3/8	300	2.96	7.70	38.4	Pass
		Guy B@32	3/8	299	4.26	7.70	55.4	Pass
		Guy C@32	3/8	298	4.25	7.70	55.2	Pass
		Top Guy Pull-Off@32	1 1/4	117	1.21	49.08	2.5	Pass
T6	30 - 20	Leg	ROHN 1.25 x 14ga w/ 1/2" threaded rod	153	-13.83	18.16	76.1	Pass
		Diagonal	7/16	197	-1.60	2.10	76.3	Pass
		Horizontal	7/16	165	-0.65	2.82	22.9	Pass
		Top Girt	7/16	155	-0.52	2.82	18.5	Pass
		Bottom Girt	7/16	157	-0.49	2.82	17.5	Pass
T7	20 - 10	Leg	ROHN 1.25 x 14ga w/ 1/2" threaded rod	201	-15.61	18.17	85.9	Pass
		Diagonal	7/16	210	-1.85	2.10	88.2	Pass
		Horizontal	7/16	223	1.42	3.25	43.6	Pass
		Top Girt	7/16	204	-0.57	2.82	20.3	Pass
		Bottom Girt	7/16	206	-0.67	2.82	23.9	Pass
T8	10 - 0	Leg	ROHN 1.25 x 14ga w/ 1/2" threaded rod	249	-11.77	18.15	64.9	Pass
		Diagonal	7/16	294	-1.77	2.10	84.6	Pass
		Horizontal	7/16	261	1.05	4.33	24.1	Pass
		Top Girt	7/16	252	0.97	4.33	22.5	Pass
		Bottom Girt	7/16	254	-0.51	2.82	18.3	Pass
							Summary	
						Leg (T7)	85.9	Pass
						Diagonal (T7)	88.2	Pass
						Horizontal	43.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						(T7) Top Girt	25.6	Pass
						(T4) Bottom Girt	23.9	Pass
						(T7) Guy A (T4)	58.6	Pass
						Guy B (T4)	68.3	Pass
						Guy C (T4)	67.2	Pass
						Top Guy Pull-Off (T4)	2.6	Pass
						Bolt Checks	62.7	Pass
						RATING =	**88.2**	**Pass**

TOWER REINFORCEMENT DRAWINGS & SPECIFICATIONS

SITE LOCATION: 21 BIRCHWOOD DRIVE, ANSONIA, CT 06401

SCOPE:
THE PURPOSE OF THESE REINFORCING DETAILS AND SPECIFICATIONS IS TO REINFORCE THE TOWER MEMBERS. THE LEGS REQUIRE BRACING VIA THREADED ROD FROM GRADE UP TO 40' AGL.

REINFORCING INCLUDES: STRAPPING A ½"ø GRADE 60 THREADED ROD TO THE EXISTING TOWER LEG FROM GRADE UP TO 40' AGL. THE THREADED ROD WILL BE SECURED USING ¼"ø U-BOLTS AND A ¼" THICK BENT PLATE BRACKET. THE BRACKETS WILL BE SPACED APPROXIMATELY 2' CENTER TO CENTER. STANDARD THREADED ROD CONNECTIONS MAY BE USED TO CONNECT MULTIPLE THREADED ROD SECTIONS TOGETHER. TWO BRACKETS WILL BE USED AT THE START AND END OF THE REINFORCEMENT.

THIS REINFORCEMENT IS REQUIRED AFTER ANALYZING THE TOWER. REFER TO STRUCTURAL ANALYSIS DATED JULY 11, 2014.

OWNER:

STATE OF CONNECTICUT · MICHAEL L BOHLINGER · 20405 · LICENSED PROFESSIONAL ENGINEER

MICHAEL L. BOHLINGER, PE
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE # 20405

5/4/14

KM Consulting Engineers, Inc.
Wireless Engineering & Project Management
32 West Upper Ferry Road Ewing, NJ 08628
Phone: (609) 538-0400 Fax: (609) 538-8858

CLIENT: NSS NORTHEAST SITE SOLUTIONS
54 MAIN STREET
SUITE 3
STURBRIDGE, MA 01566

APPROVALS & DATE:
OWNER: _____ DATE: _____
S.A.C.: _____ DATE: _____
R / F.: _____ DATE: _____
CONST.: _____ DATE: _____

PROJECT NAME: ANSONIA

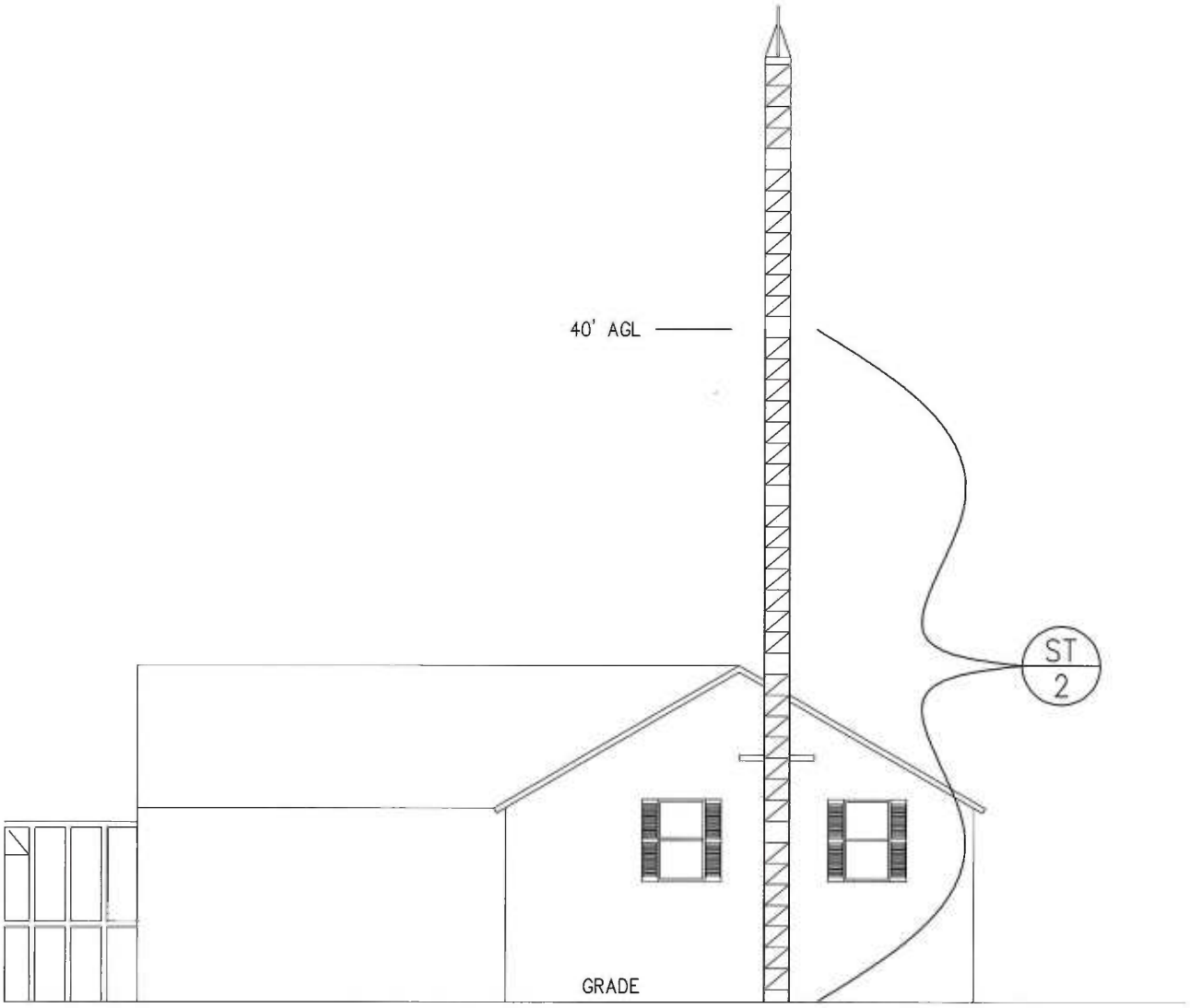
PROJECT ADDRESS: 21 BIRCHWOOD DRIVE
ANSONIA, CT 06401

REVISIONS:

NO.	DATE

DRAWING NO.: **T-1**

PROJECT #:	SITE ID #:	DRAWING TITLE:	P.C.:	CHKD:	DRN:	DATE:
140604.01		TITLE SHEET		MLB	DJA	8/5/14



1 / ST-1 TOWER ELEVATION

SCALE: NTS

OWNER:

KM Consulting Engineers, Inc.
Wireless Engineering & Project Management
32 West Upper Ferry Road Ewing, NJ 08628
Phone: (609) 538-0400 Fax: (609) 538-8858

CLIENT: NSS NORTHEAST SITE SOLUTIONS
54 MAIN STREET
SUITE 3
STURBRIDGE, MA 01566

REVISIONS:

NO.	DATE

STATE OF CONNECTICUT
MICHAEL L. BOHLINGER
20405
LICENSED
PROFESSIONAL ENGINEER

MICHAEL L. BOHLINGER, PE
CONNECTICUT PROFESSIONAL ENGINEER
LICENSE # 20405
8/6/14

APPROVALS & DATE:

OWNER: _____ DATE: _____

S.A.C.: _____ DATE: _____

R / F.: _____ DATE: _____

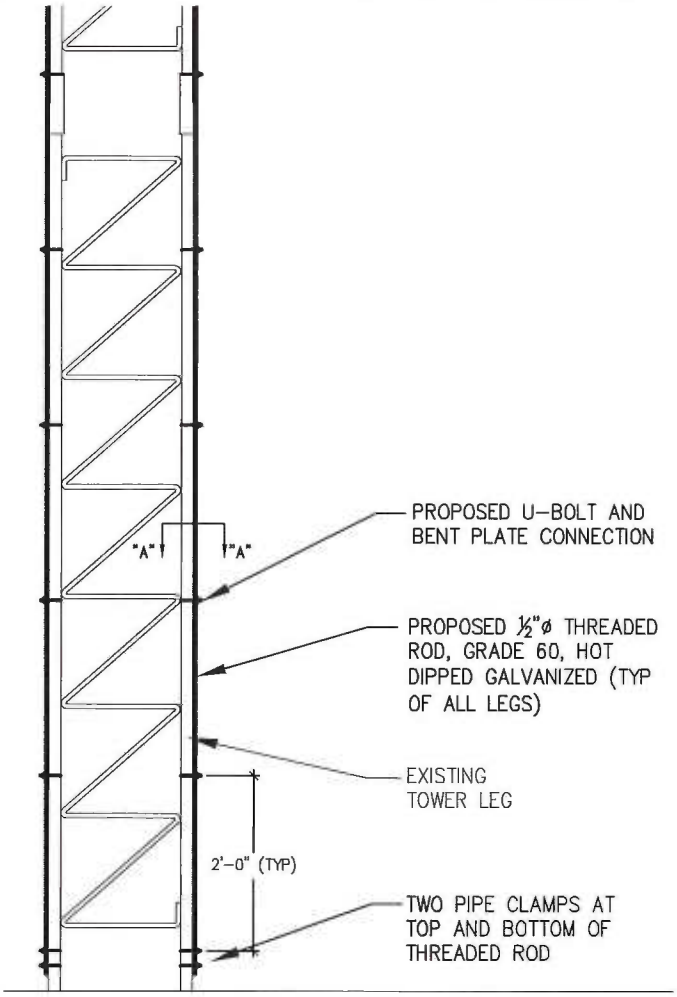
CONST.: _____ DATE: _____

PROJECT NAME:
ANSONIA

PROJECT ADDRESS:
21 BIRCHWOOD DRIVE
ANSONIA, CT 06401

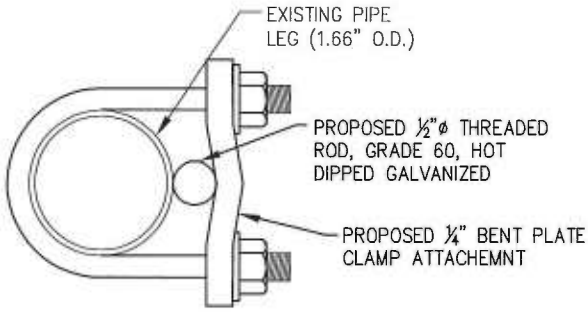
DRAWING NO.:
ST-1

PROJECT #:	SITE ID #:	DRAWING TITLE:	P.C.:	CHKD:	DRN:	DATE:
140604.01		TOWER ELEVATION		MLB	DJA	8/5/14



1 / ST-2 LEG REINFORCEMENT: 0-40' AGL

SCALE: 1/2" = 1'-0"



2 / ST-2 SECTION "A"

SCALE: 6" = 1'-0"

NOTE:
CONTRACTOR MUST BE AWARE THAT OVER-TIGHTENING OF U-BOLTS AT LEG CONNECTIONS COULD DAMAGE EXISTING PIPE LEG. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING LEGS CAUSED BY OVER-TOGHTENING CONNECTIONS.

NOTES:
1. ALL MEMBERS, BOLTS HOLES, AND DIMENSIONS MUST BE FIELD VERIFIED PRIOR TO FABRICATION / PROCUREMENT OF REINFORCEMENT MATERIALS. ANY CHANGES TO THESE DRAWINGS AND SPECIFICATIONS OR CHANGES FOUND IN THE FIELD OF EXISTING TOWER MEMBERS MUST BE COMMUNICATED TO KM CONSULTING ENGINEERS INC. PRIOR TO INSTALLING REINFORCEMENT.

2. STEEL: ALL STEEL BENT PLATE MEMBERS TO BE A-36, HOT-DIP GALVANIZED TO ASTM A-123. ALL THREADED ROD MEMBERS TO BE 1.2"ø THREADED ROD, GRADE 60, HOT DIPPED GALVANIZED OR EQUIVALENT.

3. IF STEEL IS FIELD CUT, ENDS OF STEEL MUST BE SPRAYED WITH COLD GALVANIZE ZRC.

SAFETY NOTICE!
INSTALLATION OF THESE TOWER MODIFICATIONS WILL REQUIRE TOWER CLIMBING AT HEIGHTS WHERE FALLING COULD HARM OR PROVE FATAL TO WORKERS. THESE DRAWINGS INDICATE ONLY THE REINFORCEMENT AND NOT THE MEANS, METHODS, AND REQUIRED CONTRACTOR SAFETY. THESE REINFORCEMENT MEMBERS SHOULD BE INSTALLED BY A QUALIFIED, PROFESSIONAL TOWER CLIMBING COMPANY. KM CONSULTING ENGINEERS INC. TAKES NO RESPONSIBILITY FOR THE CONTRACTORS SAFETY POLICIES, PRACTICES, AND METHODS.

CERTIFICATION OF INSTALLATION:
DURING OR UPON COMPLETION OF THESE MODIFICATIONS TO THE TOWER, A CERTIFICATION LETTER FROM A LICENSED PROFESSIONAL ENGINEER MUST BE SUBMITTED TO THE TOWER OWNER.

NOTES:
ANY INTERFERENCE OF EXISTING TOWER LEG STRUCTURE OR APPURTENANCES TO PROPOSED REINFORCEMENT, CONTRACTOR TO COORDINATE SHIFTING OF REINFORCEMENT ATTACHMENT WITH ENGINEER PRIOR TO INSTALL.

OWNER:

KM Consulting Engineers, Inc.
Wireless Engineering & Project Management
32 West Upper Ferry Road Ewing, NJ 08628
Phone: (609) 538-0400 Fax: (609) 538-8858

CLIENT: NSS NORTHEAST SITE SOLUTIONS *Turnkey Wireless Development*
54 MAIN STREET
SUITE 3
STURBRIDGE, MA 01566

REVISIONS:

NO.	DATE

STATE OF CONNECTICUT ★ MICHAEL L. BOHLINGER ★ 20405 LICENSED PROFESSIONAL ENGINEER

MICHAEL L. BOHLINGER, PE
CONNECTICUT PROFESSIONAL ENGINEER
LICENSE # 20405
8/6/14

APPROVALS & DATE:
OWNER: _____ DATE: _____
S.A.C.: _____ DATE: _____
R / F.: _____ DATE: _____
CONST.: _____ DATE: _____

PROJECT NAME: ANSONIA

PROJECT ADDRESS:
21 BIRCHWOOD DRIVE
ANSONIA, CT 06401

DRAWING NO.: **ST-2**

PROJECT #:	SITE ID #:	DRAWING TITLE:	P.C.:	CHKD:	DRN:	DATE:
140604.01		TOP GIRT REINFORCEMENT		MLB	DJA	8/5/14

SECTION 1704
SPECIAL INSPECTIONS

1704.1 General. Where application is made for construction as described in this section, the owner or the *registered design professional in responsible charge* acting as the owner's agent shall employ one or more *approved agencies* to perform inspections during construction on the types of work listed under Section 1704. These inspections are in addition to the inspections identified in Section 110.

The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the *bUilding official*, for the inspection of the particular type of construction or operation requiring *special inspection*. The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as the special inspector for the work designed by them, provided those personnel meet the qualification requirements of this section to the satisfaction of the *bUilding official*. The special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

Exceptions:

1. *Special inspections* are not required for work of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. *Special inspections* are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. Unless otherwise required by the *bUilding official*, *special inspections* are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

1704.1.1 Statement of special inspections. The applicant shall submit a statement of *special inspections* prepared by the *registered design professional in responsible charge* in accordance with Section 107.1 as a condition for issuance. This statement shall be in accordance with Section 1705.

Exceptions:

1. A statement of *special inspections* is not required for structures designed and constructed in accordance with the conventional construction provisions of Section 2308.
2. The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *bUilding official* for construction not designed by a *registered design professional*.

1704.1.2 Report requirement. Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the *building official*, and to the *registered design professional in responsible charge*. Reports shall indicate that work inspected was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon prior to the start of work by the applicant and the *bUilding official*.

1704.2 Inspection of fabricators. Where fabrication of structural load-bearing members and assemblies is being performed

1704.2.1 Fabrication and implementation procedures. The special inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to *approved construction documents* and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

Exception: *Special inspections* as required by Section 1704.2 shall not be required where the fabricator is *approved* in accordance with Section 1704.2.2.

1704.2.2 Fabricator approval. *Special inspections* required by Section 1704 are not required where the work is done on the premises of a fabricator registered and *approved* to perform such work without *special inspection*. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an *approved special inspection* agency. At completion of fabrication, the *approved* fabricator shall submit a *certificate of compliance* to the *building official* stating that the work was performed in accordance with the *approved construction documents*.

1704.3 Steel construction. The *special inspections* for steel elements of buildings and structures shall be as required by Section 1704.3 and Table 1704.3.

Exceptions:

1. *Special inspection* of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification, grade and mill test reports for the main stress carrying elements are capable of being determined.
2. The special inspector need not be continuously present during welding of the following items, provided the materials, welding procedures and qualifications of welders are verified prior to the start of the work; periodic inspections are made of the work in progress and a visual inspection of all welds is made prior to completion or prior to shipment of shop welding.
   - 2.1. Single-pass fillet welds not exceeding $^{5}/_{16}$ inch (7.9 mm) in size.
   - 2.2. Floor and roof deck welding.
   - 2.3. Welded studs when used for structural diaphragm.
   - 2.4. Welded sheet steel for cold-formed steel members.
   - 2.5. Welding of stairs and railing systems.

1704.3.1 Welding. Welding inspection and welding inspector qualification shall be in accordance with this section.

1704.3.1.1 Structural steel. Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1.

1704.3.1.2 Cold-formed steel. Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

1704.3.1.3 Reinforcing steel. Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

1704.3.2 Details. The special inspector shall perform an inspection of the steel frame to verify compliance with the details shown on the *approved construction documents*, such as bracing, stiffening, member locations and proper application of joint details at each connection.

1704.3.3 High-strength bolts. Installation of high-strength bolts shall be inspected in accordance with AISC 360.

1704.3.3.1 General. While the work is in progress, the special inspector shall determine that the requirements for bolts, nuts, washers and paint; bolted parts and installation and tightening in such standards are met. For bolts requiring pretensioning, the special inspector shall observe the preinstallation testing and calibration procedures when such procedures are required by the installation method or by project plans or specifications; determine that all plies of connected materials have been drawn together and properly snugged and monitor the installation of bolts to verify that the selected procedure for installation is properly used to tighten bolts. For joints required to be tightened only to the snug-tight con-

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CONNECTICUT PROFESSIONAL ENGINEER
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8/4/14

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Wireless Engineering & Project Management
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Phone: (609) 538-0400 Fax: (609) 538-8858

APPROVALS & DATE:
OWNER: _____ DATE: _____
S.A.C.: _____ DATE: _____
R / F.: _____ DATE: _____
CONST.: _____ DATE: _____

CLIENT: NSS NORTHEAST SITE SOLUTIONS
54 MAIN STREET
SUITE 3
STURBRIDGE, MA 01566

PROJECT NAME: ANSONIA

PROJECT ADDRESS: 21 BIRCHWOOD DRIVE ANSONIA, CT 06401

REVISIONS:

NO.	DATE

DRAWING NO.: **ST-3**

PROJECT #:	SITE ID #:	DRAWING TITLE:	P.C.:	CHKD:	DRN:	DATE:
140604.01		SPECIAL INSPECTION NOTES		MLB	DJA	8/5/14

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFERENCE
1. Material verification of high-strength bolts, nuts and washers:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		X	AISC 360, Section A3.3 and applicable ASTM material standards	
b. Manufacturer's certificate of compliance required.		X		
2. Inspection of high-strength bolting:				
a. Snug-tight joints.		X	AISC 360, Section M2.5	1701.3.3
b. Pretensioned and slip-critical joints using turn-of-nut with matchmarking, twist-off bolt or direct tension indicator methods of installation.		X		
c. Pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation.	X			
3. Material verification of structural steel and cold-formed steel deck:				
a. For structural steel, identification markings to conform to AISC 360.		X	AISC 360, Section M5.5	
b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.		X	Applicable ASTM material standards	
c. Manufacturer's certified test reports.		X		
4. Material verification of weld filler materials:				
a. Identification markings to conform to AWS specification in the approved construction documents.		X	AISC 360, Section A3.5 and applicable AWS A5 documents	
b. Manufacturer's certificate of compliance required.		X		
5. Inspection of welding:				
a. Structural steel and cold-formed steel deck:				
1) Complete and partial joint penetration groove welds.	X		AWS D1.1	1704.3.1
2) Multipass fillet welds.	X			
3) Single-pass fillet welds > 5/16"	X			
4) Plug and slot welds.	X			
5) Single-pass fillet welds ≤ 5/16"		X		
6) Floor and roof deck welds.		X	AWS D1.3	
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A 706.		X	AWS D1.4 ACI 318: Section 3.5.2	
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X			
3) Shear reinforcement.	X			
4) Other reinforcing steel.		X		
6. Inspection of steel frame joint details for compliance:				
a. Details such as bracing and stiffening.		X		1704.3.2
b. Member locations.		X		
c. Application of joint details at each connection.		X		

For SI: 1 inch = 25.4 mm.

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CLIENT: NSS NORTHEAST SITE SOLUTIONS
54 MAIN STREET
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STURBRIDGE, MA 01566

REVISIONS:

NO.	DATE

STATE OF CONNECTICUT
MICHAEL L BOHLINGER
20405
LICENSED PROFESSIONAL ENGINEER

MICHAEL L. BOHLINGER, PE
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE # 20405
8/4/14

APPROVALS & DATE:
OWNER: _____ DATE: _____
S.A.C.: _____ DATE: _____
R / F.: _____ DATE: _____
CONST.: _____ DATE: _____

PROJECT NAME: ANSONIA

PROJECT ADDRESS: 21 BIRCHWOOD DRIVE ANSONIA, CT 06401

DRAWING NO.: **ST-4**

PROJECT #:	SITE ID #:	DRAWING TITLE:	P.C.:	CHKD:	DRN:	DATE:
140604.01		SPECIAL INSPECTION NOTES		MLB	DJA	8/5/14

STRUCTURAL ANALYSIS REPORT

For

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
54 Main Street, Suite 3
Sturbridge, MA 01566

Ansonia
KM No. 140604.00

60' Guyed Tower
Ansonia, CT

Prepared By:

KM CONSULTING ENGINEERS, INC.
9 Forest Ln, Ewing, NJ 08628
Ph: (609) 538-0400 www.kmengr.com

June 19th, 2014
Revised July 11, 2014

Prepared to EIA/TIA-222-F June 1996
Structural Standards for Steel Antenna Towers
and Antenna Supporting Structures

Northeast Site Solutions
Ansonia

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Structure

Tower Manager: RCI

Location: 21 Birchwood Dr.
Ansonia, CT 06401

Manufacturer: Rohn
Model 45G

Equipment

Existing tower inventory plus the proposed installation are detailed in Section 2.0 "Tower Inventory."

Synopsis

Load Case No. 1: The existing tower superstructure with the current inventory and proposed MetroPCS installation.

The tower superstructure, guy wires, base foundation and guy anchors are found to have sufficient capacity and meet the current TIA standards. The tower superstructure is rated at 128%, the guy wires are rated at 72.7%, the guy anchors are rated at 60.6%, and the base foundation is also acceptable.

2.0 TOWER INVENTORY

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' Omni x 2" OD	60	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
4' Standoff Mount	59	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
5' Omni x 1" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
5' Omni x 1" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
5' Omni x 2.5" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
2' Standoff Mount	55	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
2' Standoff Mount	55		
2' Standoff Mount	55		
Yagi	55		

Proposed Metro PCS Loading:
*(3) Andrew APX16DWV_16DWVS panel antennas @ 51' AGL
*(3) TwinB2 TMAs @ 51' AGL
*(3) TwinB4 TMAs @ 51' AGL
*(6) Proposed 7/8" coax lines up to 51' AGL
*(6) Existing 7/8" coax lines up to 51' AGL
*Removal of existing MetroPCS antennas

3.0 COMMENTARY

Our scope of work is to determine if the existing structure is capable of withstanding the additional stresses/forces imposed by the installation of the proposed MetroPCS equipment noted in the tower inventory.

The tower member layout/sizes and foundation information were obtained from previous structural analysis by KM Consulting Engineers Inc. (KMCE) dated January 16, 2009 and verified with original Rohn 45G assembly drawings. Guy location was updated based on Atlantis Group mapping report. Guy anchor reinforcement details were obtained from KMCE drawings dated 7/20/09. Antenna inventory was obtained from a recent mapping of the tower.

The following report will provide analytical calculations and commentary regarding the capacity of the proposed tower and subsequent recommendations.

4.0 ANALYSIS PROCEDURE

KM Consulting Engineers, Inc. carried out their structural analysis by correlating field inspection and tower member data into proprietary software designed specifically for communication tower analysis.

These programs run in conjunction with the guidelines set down in the EIA/TIA-222-F June 1996 Standard "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures".

The existing tower is analyzed by placing wind forces on the structure in 30° positional increments around the tower (ie. wind pressure directly onto the tower corners, faces and parallel to the faces). This enables the user to "create" a three-dimensional representation, yielding results for worst case scenarios. In effect, the production of these results allows the user to study the structural integrity of the tower when influenced by wind forces from any direction.

The proceeding report includes analysis for the tower with the addition of antennas in the scenarios stated. For clarity, the analysis shall include worst case loadings and a typical elevation view with maximum foundation loads tabulated.

Codes and Standards

ACI - American Concrete Institute - *Building Code Requirements for Structural Concrete (ACI 318-05)*, 2005

AISC - American Institute of Steel Construction - *Manual of Steel Construction, Allowable Stress Design*, 14th edition, 2010

TIA - Telecommunications Industry Association - *EIA/TIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures*, 1996

IBC 2003- International Building Code

5.0 TOWER ANALYSIS RESULTS

The tower was analyzed for the inventory detailed in Section 2.0 "Tower Inventory".

Structural wind speed is in accordance with TIA/EIA-222-F listing applicable to New Haven: 85 MPH (fastest mile), no ice and 74 MPH (fastest mile), 1/2" radial ice.

All allowable capacities have been calculated to comply with the permitted EIA allowable increases (for wind). All bolts loaded in shear assume the threads **are included** in the shear plane.

Load Case No. 1: Proposed inventory of (3) Andrew APX16DWV_16DWVS panel antennas, (3) TwinB2 TMAs, (3) TwinB4 TMAs, and (6) 7/8" coax lines.

The tower superstructure, guy wires, base foundation and guy anchors are found to have sufficient capacity and meet the current TIA standards. The tower superstructure is rated at 128%, the guy wires are rated at 72.7%, the guy anchors are rated at 60.6%, and the base foundation is also acceptable.

Guy Wires			
Level (ft)	Factor of Safety		
	Actual	Allowable	Overstress
45.75	2.751	2	-
32	3.603	2	-

Foundations				
Radius (ft)	Force	Capacity	Actual Force	% Capacity
Base	Compression	144	18	12.5%
16	Uplift	28	9	32.1%
16	Sliding	6.6	4	60.6%

6.0 RECOMMENDATIONS

Further to our calculations, we conclude that the existing tower superstructure does not have adequate capacity and therefore does not meet the current EIA/TIA-222-F design standards. The existing tower superstructure requires structural reinforcement to support the proposed MetroPCS installation.

Please do not hesitate to contact our office with any questions or concerns regarding this report.

Sincerely,
KM CONSULTING ENGINEERS, INC

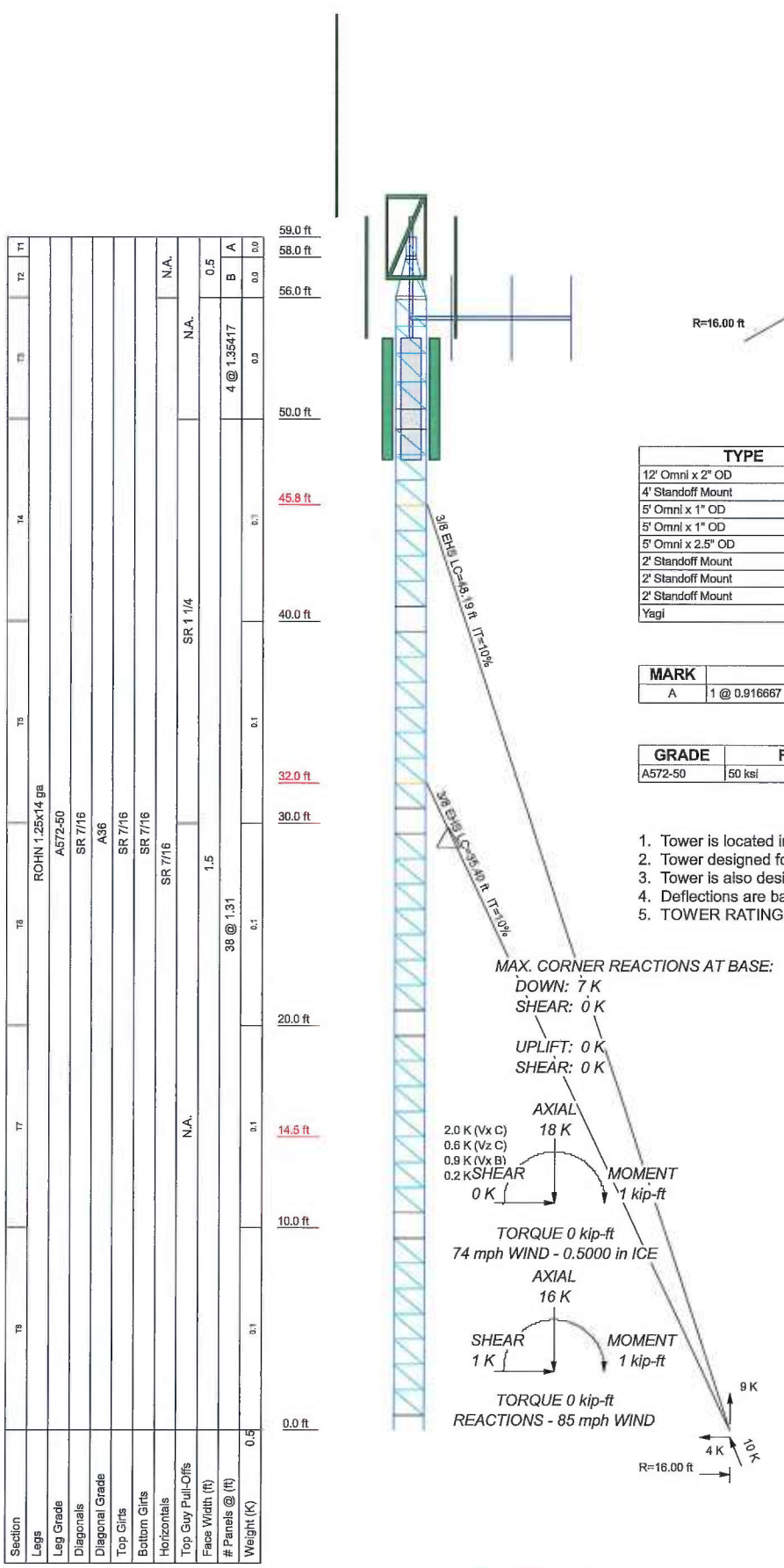
Domenic Aversa, EIT
Project Manager

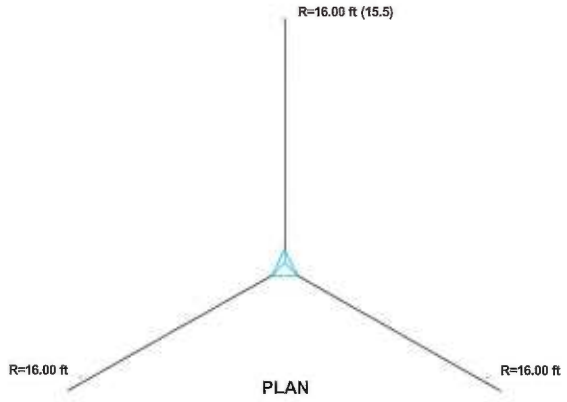
Reviewed and Approved by:

Michael L. Bohlinger, PE
Principal
CT License # 20405

7.0 APPENDIX

LOAD CASE 1





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' Omni x 2" OD	60	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
4' Standoff Mount	59	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
5' Omni x 1" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
5' Omni x 1" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
5' Omni x 2.5" OD	59 - 55	APX16DWV_16DWVS (MetroPCS)	51
2' Standoff Mount	55	(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	51
2' Standoff Mount	55		
2' Standoff Mount	55		
Yagi	55		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	1 @ 0.916667	B	1 @ 1.83333

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 128%

KM Consulting Engineers, Inc.
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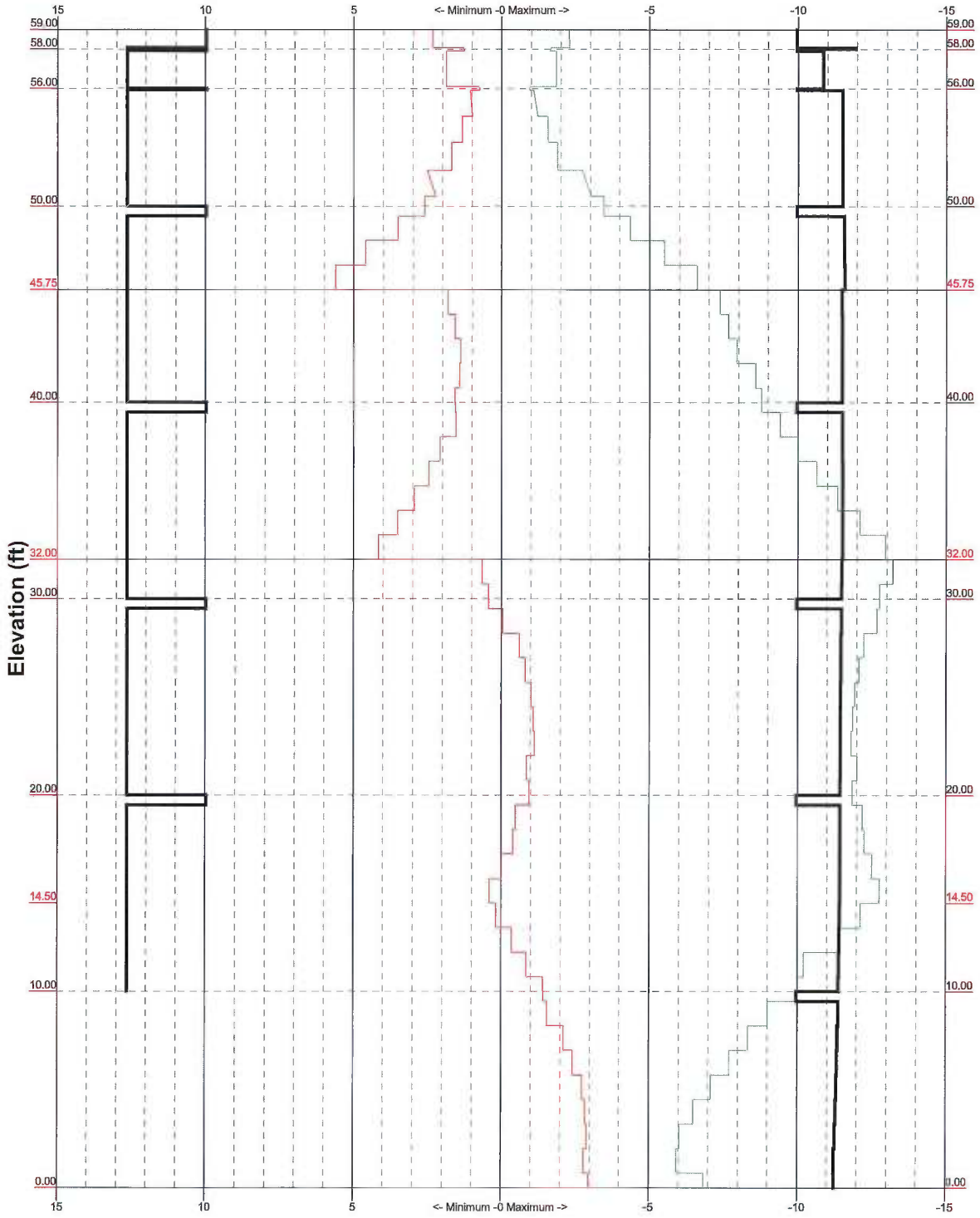
Ewing, NJ 08628
Phone: (609) 538-0400
FAX:
Consulting Engineers

Job:	Ansonia Guy Tower
Project:	Ansonia Load Case 1 (proposed)
Client: HPC Development	Drawn by: Domenic Aversa App'd:
Code: TIA/EIA-222-F	Date: 07/11/14 Scale: NTS
Path: K:\Northeast Site Solutions\Ansonia\Engineering\Ansonia LC1.eri	Dwg No. E-1

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

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



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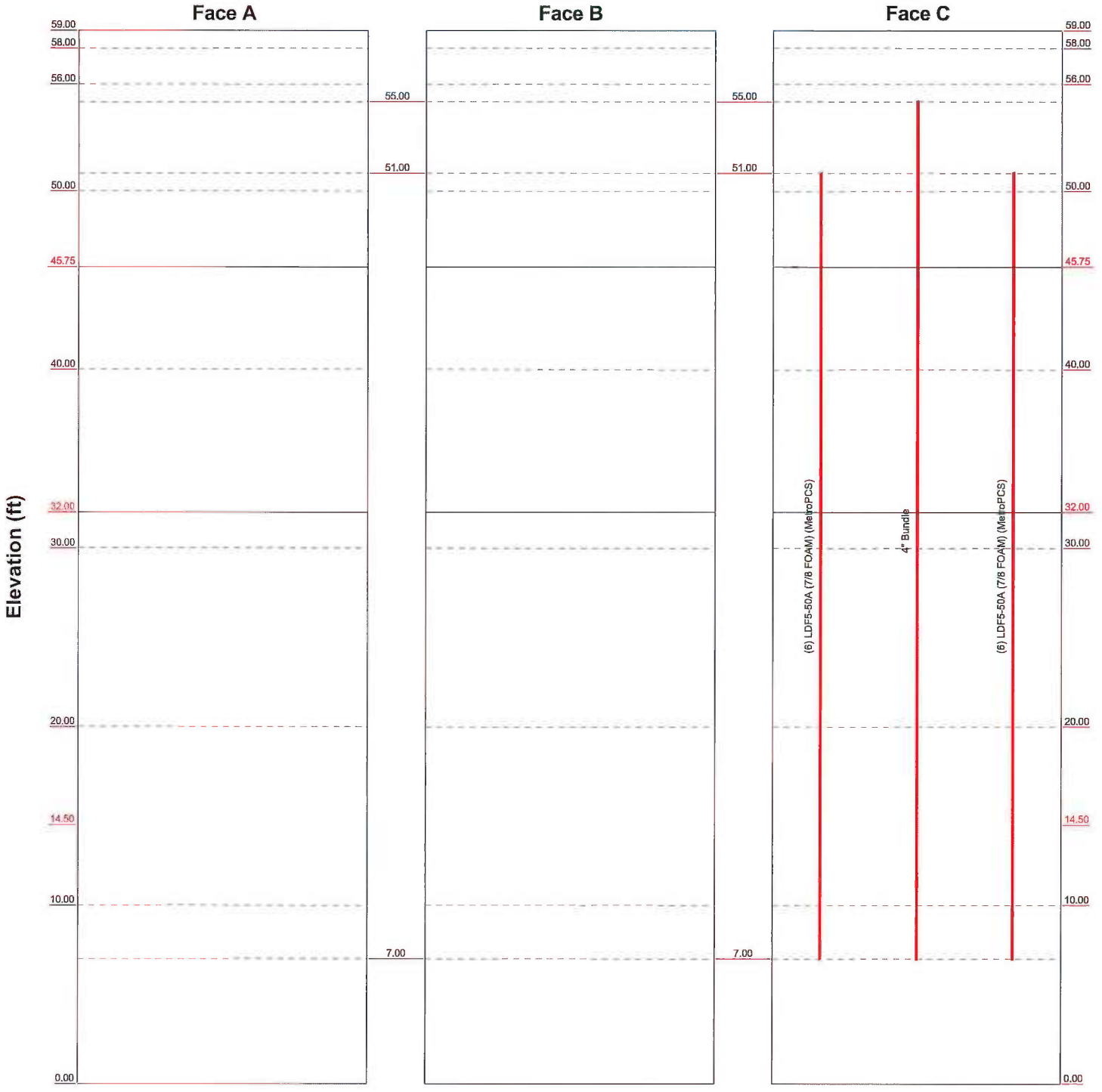
Job: *Ansonia Guy Tower*			
Project: *Ansonia Load Case 1 (proposed)*			
Client: HPC Development	Drawn by: Domenic Aversa	App'd:	
Code: TIA/EIA-222-F	Date: 07/11/14	Scale: NTS	
Path: K:\Northeast Site Solutions\Ansonia\Engineering\Ansonia LC1.eri		Dwg No. E-3	

Feed Line Distribution Chart
0' - 59'

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



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Consulting Engineers

Job: Ansonia Guy Tower			
Project: Ansonia Load Case 1 (proposed)			
Client: HPC Development	Drawn by: Domenic Aversa	App'd:	
Code: TIA/EIA-222-F	Date: 07/11/14	Scale: NTS	
Path: K:\Northeast Site Solutions\Ansonia\Engineering\Ansonia LC1.eri		Dwg No. E-7	

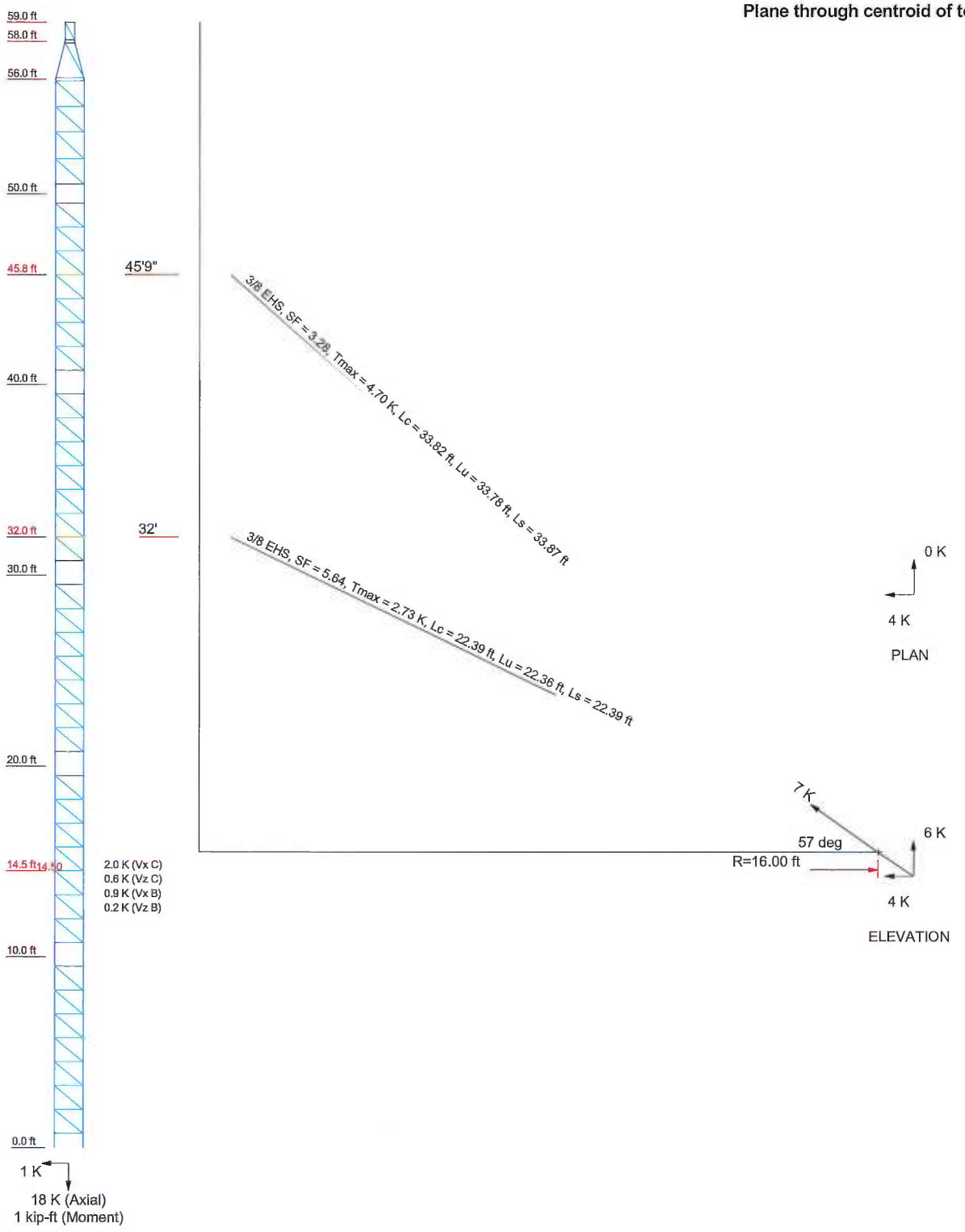
Guy Tensions and Tower Reactions

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Maximum Values

Anchor 'A'@16 ft Azimuth 0 deg Elev 15.5 ft

Plane through centroid of tower



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Job: ***Ansonia Guy Tower***			
Project: ***Ansonia Load Case 1 (proposed)***			
Client: HPC Development	Drawn by: Domenic Aversa		App'd:
Code: TIA/EIA-222-F	Date: 07/11/14		Scale: NTS
Path: K:\Northeast Site Solutions\Ansonia\Engineering\Ansonia LC1.eri			Dwg No. E-6

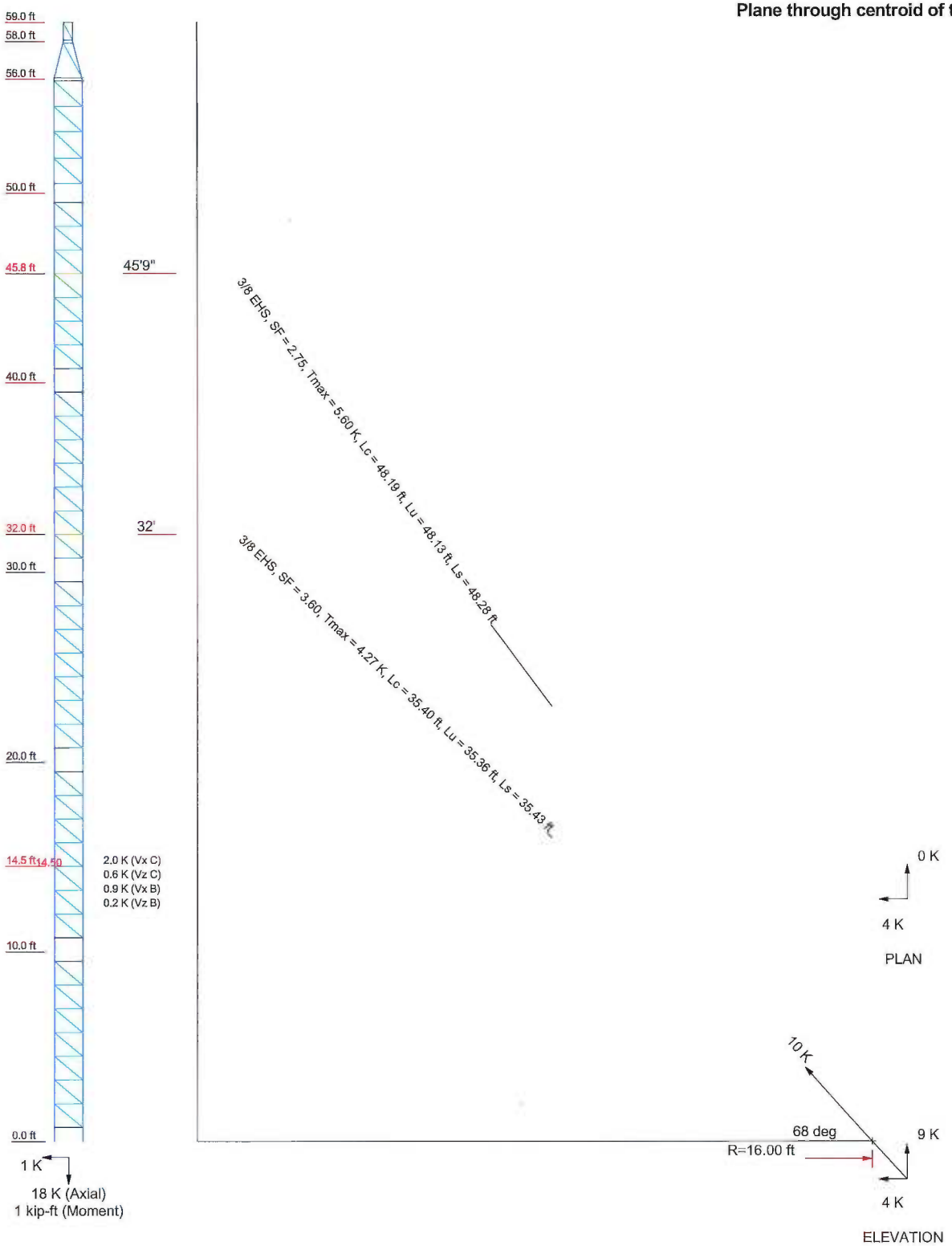
Guy Tensions and Tower Reactions

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Maximum Values

Anchor 'B'@16 ft Azimuth 120 deg Elev 0 ft

Plane through centroid of tower



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Consulting Engineers

Job: *Ansonia Guy Tower*			
Project: *Ansonia Load Case 1 (proposed)*			
Client: HPC Development	Drawn by: Domenic Aversa		App'd:
Code: TIA/EIA-222-F	Date: 07/11/14		Scale: NTS
Path: K:\Northeast Site Solutions\Ansonia\Engineering\Ansonia LC1.eri			Dwg No. E-6

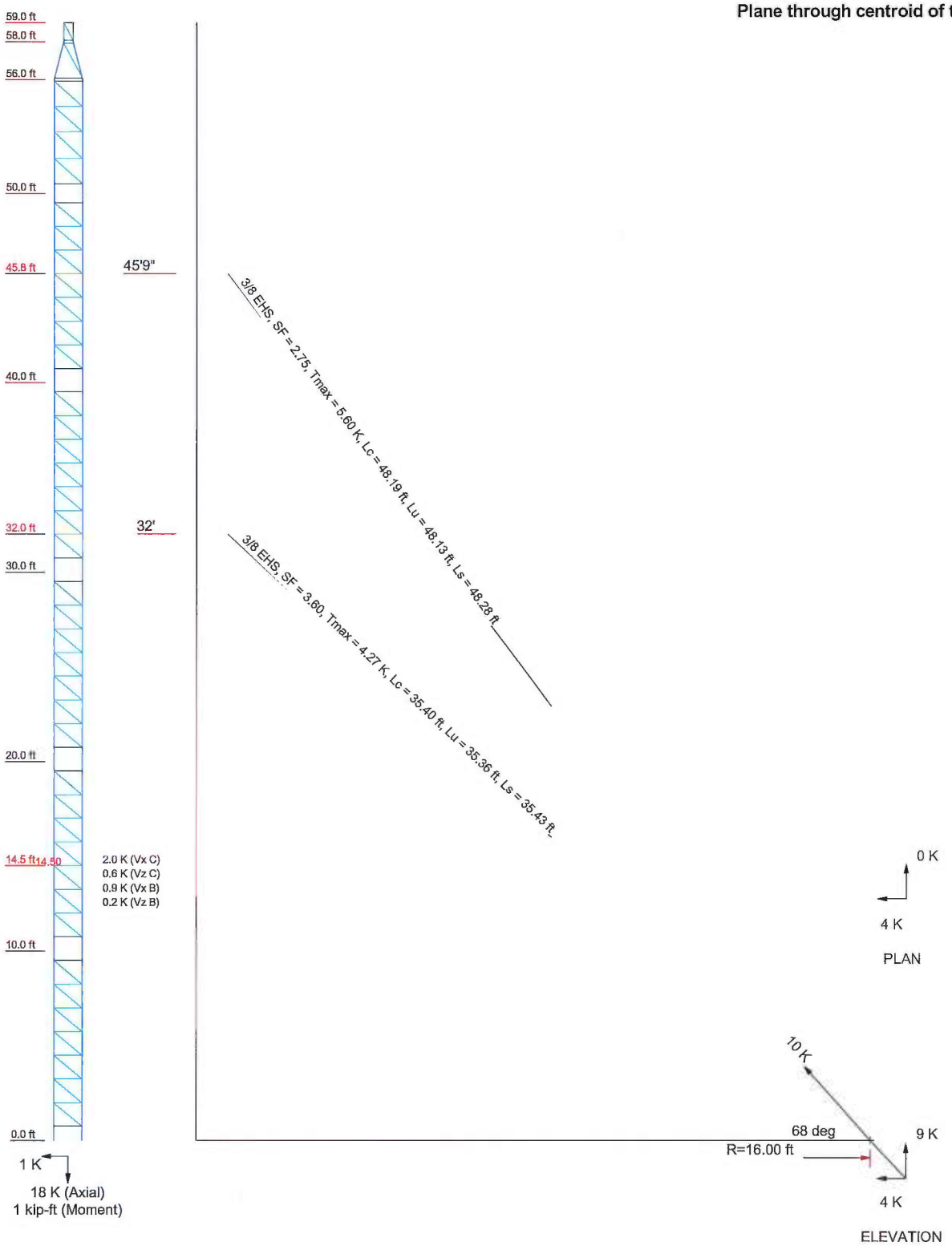
Guy Tensions and Tower Reactions

TIA/EIA-222-F - 85 mph/74 mph 0.5000 in Ice

Maximum Values

Anchor 'C'@16 ft Azimuth 240 deg Elev 0 ft

Plane through centroid of tower



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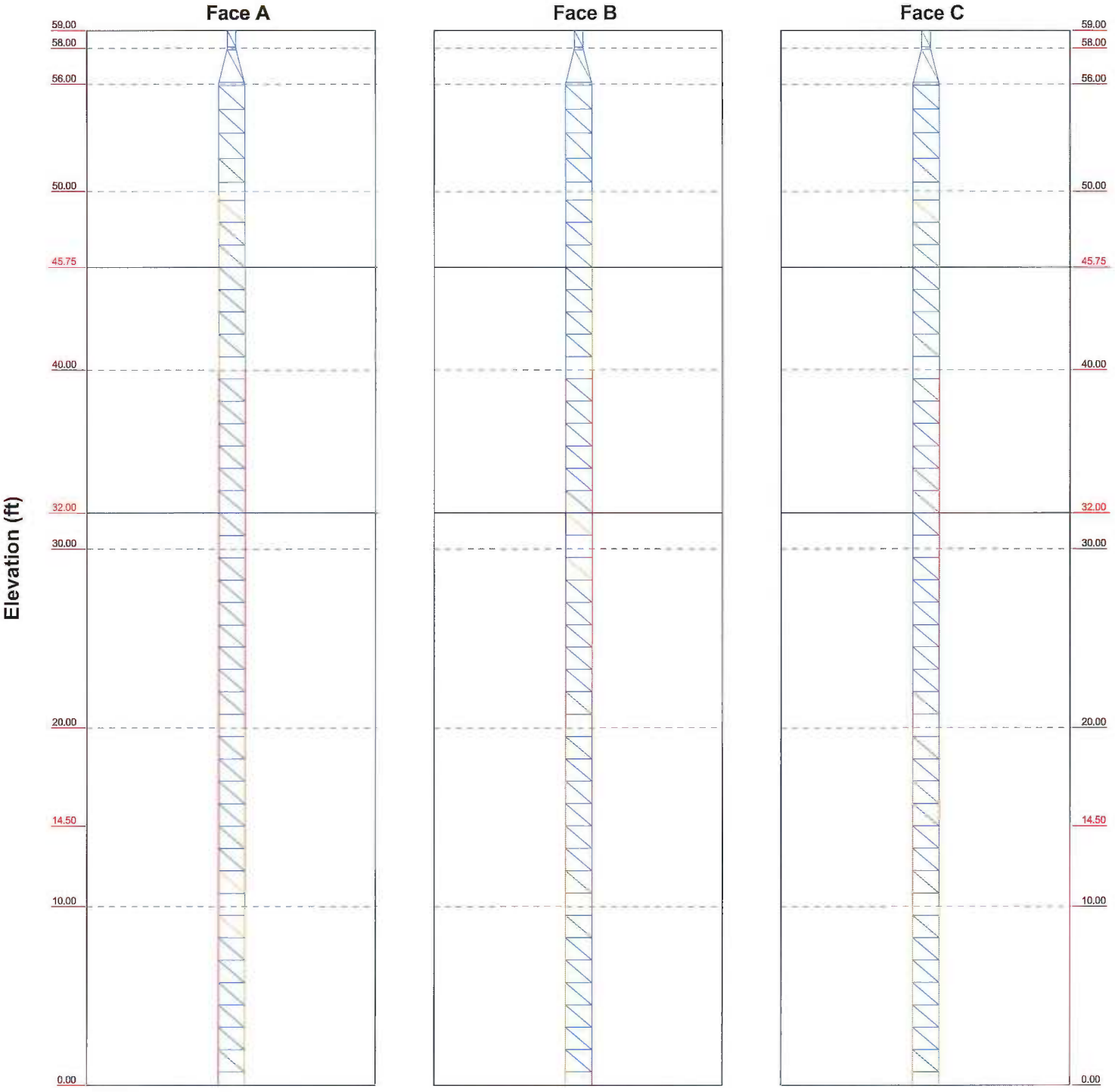
Job: *Ansonia Guy Tower*			
Project: *Ansonia Load Case 1 (proposed)*			
Client: HPC Development	Drawn by: Domenic Aversa	App'd:	
Code: TIA/EIA-222-F	Date: 07/11/14	Scale: NTS	
Path: K:\Northeast Site Solutions\Ansonia\Engineering\Ansonia LC1.eri		Dwg No. E-6	

Stress Distribution Chart
0' - 59'

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



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Job: Ansonia Guy Tower		
Project: Ansonia Load Case 1 (proposed)		
Client: HPC Development	Drawn by: Domenic Aversa	App'd:
Code: TIA/EIA-222-F	Date: 07/11/14	Scale: NTS
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tnxTower	Job: Ansonia Guy Tower	Page: 1 of 35
KM Consulting Engineers, Inc. 9 Forest Lane Ewing, NJ 08628 Phone: (609) 538-0400 FAX:	Project: Ansonia Load Case 1 (proposed)	Date: 08:58:44 07/11/14
	Client: HPC Development	Designed by: Domenic Aversa

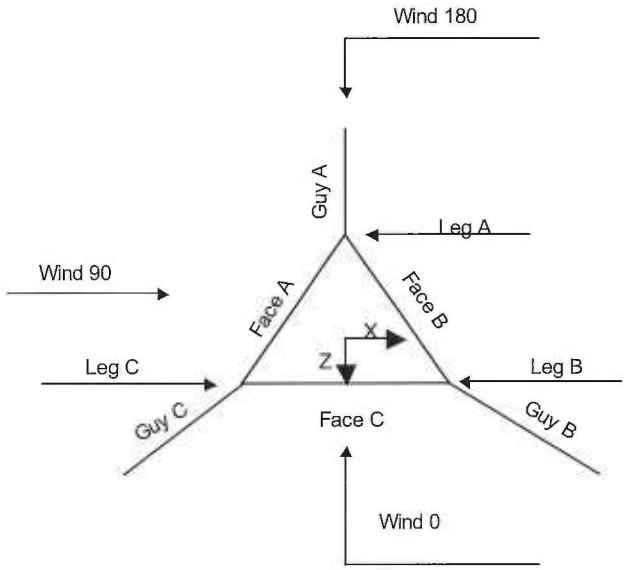
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 59.00 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 0.50 ft at the top and 1.50 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Special horizontal support at 14.50 on leg B,C.
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	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	



Corner & Starmount Guyed Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	59.00-58.00			0.50	1	1.00
T2	58.00-56.00			0.50	1	2.00
T3	56.00-50.00			1.50	1	6.00
T4-T8	50.00-0.00			1.50	5	10.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	59.00-58.00	0.92	Diag Down	No	Yes	0.0000	1.0000
T2	58.00-56.00	1.83	Diag Down	No	Yes	1.0000	1.0000
T3	56.00-50.00	1.35	Diag Down	No	Yes	1.0000	6.0000
T4-T8	50.00-0.00	1.31	Diag Down	No	Yes	6.0000	9.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 59.00-58.00	Pipe	ROHN 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T2 58.00-56.00	Pipe	ROHN 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 56.00-50.00	Pipe	ROHN 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T4-T8 50.00-0.00	Pipe	ROHN 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 59.00-58.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T2 58.00-56.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 56.00-50.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T4-T8 50.00-0.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	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 59.00-58.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T2 58.00-56.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 56.00-50.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T4-T8 50.00-0.00	None	Flat Bar		A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 59.00-58.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 58.00-56.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 56.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4-T8 50.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1 59.00-58.00	No	Yes	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9	1	1	1	1
T2 58.00-56.00	No	Yes	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9	1	1	1	1
T3 56.00-50.00	No	Yes	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9	1	1	1	1
T4-T8 50.00-0.00	No	Yes	1	1	1	0.9	0.9	0.9	0.9	0.9	0.9	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 59.00-58.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 58.00-56.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 56.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4-T8 50.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 59.00-58.00	Sleeve DS	0.3802	4	0.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		SAEGR-5		A325N		A325N		A325N		A325N		A325N		A325N	
T2 58.00-56.00	Sleeve DS	0.3802	4	0.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		SAEGR-5		A325N		A325N		A325N		A325N		A325N		A325N	
T3 56.00-50.00	Sleeve DS	0.3802	4	0.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		SAEGR-5		A325N		A325N		A325N		A325N		A325N		A325N	
T4-T8	Sleeve DS	0.3802	4	0.0000	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
50.00-0.00		SAEGR-5		A325N		A325N		A325N		A325N		A325N		A325N	

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
45.75	EHS	A	3/8	1.54	10%	21000	0.273	33.79	16.00	0.0000	15.50	100%
		B	3/8	1.54	10%	21000	0.273	48.14	16.00	0.0000	0.00	100%
		C	3/8	1.54	10%	21000	0.273	48.14	16.00	0.0000	0.00	100%
32	EHS	A	3/8	1.54	10%	21000	0.273	22.37	16.00	0.0000	15.50	100%
		B	3/8	1.54	10%	21000	0.273	35.37	16.00	0.0000	0.00	100%
		C	3/8	1.54	10%	21000	0.273	35.37	16.00	0.0000	0.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
45.75	Corner						
32	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
45.75	A572-50 (50 ksi)	Solid Round			No	A572-50 (50 ksi)	Solid Round	1 1/4
32.00	A572-50 (50 ksi)	Solid Round			No	A572-50 (50 ksi)	Solid Round	1 1/4

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
45.75	0.01	0.01	0.01		0.10 0.5 sec/pulse	0.20 0.8 sec/pulse	0.20 0.8 sec/pulse	
32	0.01	0.01	0.01		0.04 0.4 sec/pulse	0.11 0.6 sec/pulse	0.11 0.6 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
45.75	No	No			1	1	1	1
32	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
45.75	0.4375 A325X	6	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
32	0.4375 A325X	6	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
45.75	A	30.63	18	14	0.5000
	B	22.88	18	14	0.5000
	C	22.88	18	14	0.5000
32	A	23.75	18	14	0.5000
	B	16.00	18	14	0.5000
	C	16.00	18	14	0.5000

Guy-Tensioning Information

Temperature At Time Of Tensioning						
0 F	20 F	40 F	60 F	80 F	100 F	120 F

Guy Elevation ft		H ft	V ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft
45.75	A	15.13	30.25	1.670	0.09	1.627	0.10	1.583	0.10	1.540	0.10	1.497	0.10	1.453	0.11	1.410	0.11
	B	15.13	45.75	1.604	0.20	1.583	0.20	1.561	0.20	1.540	0.20	1.519	0.21	1.497	0.21	1.476	0.21
	C	15.13	45.75	1.604	0.20	1.583	0.20	1.561	0.20	1.540	0.20	1.519	0.21	1.497	0.21	1.476	0.21
32	A	15.13	16.50	1.837	0.04	1.738	0.04	1.639	0.04	1.540	0.04	1.441	0.05	1.342	0.05	1.244	0.05
	B	15.13	32.00	1.659	0.10	1.619	0.11	1.580	0.11	1.540	0.11	1.500	0.11	1.461	0.12	1.421	0.12
	C	15.13	32.00	1.659	0.10	1.619	0.11	1.580	0.11	1.540	0.11	1.500	0.11	1.461	0.12	1.421	0.12

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF5-50A (7/8 FOAM) (MetroPCS)	C	No	Ar (CfAe)	51.00 - 7.00	0.0000	0.25	6	6	0.0000	1.0900		0.33
4" Bundle	C	No	Ar (CfAe)	55.00 - 7.00	-0.0100	0.25	1	1	0.0000	4.0000		1.00
LDF5-50A (7/8 FOAM) (MetroPCS)	C	No	Ar (CfAe)	51.00 - 7.00	0.0000	-0.25	6	3	0.0000	1.0900		0.33

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	59.00-58.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	58.00-56.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	56.00-50.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	2.484	0.000	0.000	0.000	0.01
T4	50.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	11.508	0.000	0.000	0.000	0.05
T5	40.00-30.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	11.508	0.000	0.000	0.000	0.05
T6	30.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	11.508	0.000	0.000	0.000	0.05
T7	20.00-10.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	11.508	0.000	0.000	0.000	0.05
T8	10.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	3.453	0.000	0.000	0.000	0.01

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	59.00-58.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	58.00-56.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	56.00-50.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		2.432	0.636	0.000	0.000	0.03
T4	50.00-40.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		7.650	6.358	0.000	0.000	0.14
T5	40.00-30.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		7.650	6.358	0.000	0.000	0.14
T6	30.00-20.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		7.650	6.358	0.000	0.000	0.14
T7	20.00-10.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		7.650	6.358	0.000	0.000	0.14
T8	10.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		2.295	1.908	0.000	0.000	0.04

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	59.00-58.00	0.0000	0.0000	0.0000	0.0000
T2	58.00-56.00	0.0000	0.0000	0.0000	0.0000
T3	56.00-50.00	-0.9684	1.1266	-0.6572	0.6439
T4	50.00-40.00	-1.2045	2.6085	-0.8624	1.4119
T5	40.00-30.00	-1.2045	2.6085	-0.8624	1.4119
T6	30.00-20.00	-1.2194	2.6408	-0.8691	1.4228
T7	20.00-10.00	-1.2194	2.6408	-0.8691	1.4228
T8	10.00-0.00	-0.5719	1.2385	-0.3595	0.5886

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
12' Omni x 2" OD	C	From Leg	4.00 0.00 5.00	0.0000	60.00	No Ice 1/2" Ice	2.00 3.02	2.00 3.02	0.03 0.07
2' Standoff Mount	A	From Leg	0.00	0.0000	55.00	No Ice	0.31	1.10	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	0.50	1.65	0.08
			1.00						
2' Standoff Mount	B	From Leg	0.00	0.0000	55.00	No Ice	0.31	1.10	0.06
			0.00			1/2" Ice	0.50	1.65	0.08
			1.00						
2' Standoff Mount	C	From Leg	0.00	0.0000	55.00	No Ice	0.31	1.10	0.06
			0.00			1/2" Ice	0.50	1.65	0.08
			1.00						
Yagi	A	From Leg	0.00	0.0000	55.00	No Ice	0.27	0.50	0.02
			0.00			1/2" Ice	0.50	0.75	0.04
			0.00						
APX16DWV_16DWVS (MetroPCS)	A	From Leg	0.50	0.0000	51.00	No Ice	5.05	1.22	0.04
			0.00			1/2" Ice	5.53	1.64	0.07
			0.00						
APX16DWV_16DWVS (MetroPCS)	B	From Leg	0.50	0.0000	51.00	No Ice	5.05	1.22	0.04
			0.00			1/2" Ice	5.53	1.64	0.07
			0.00						
APX16DWV_16DWVS (MetroPCS)	C	From Leg	0.50	0.0000	51.00	No Ice	5.05	1.22	0.04
			0.00			1/2" Ice	5.53	1.64	0.07
			0.00						
(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	A	From Leg	0.00	0.0000	51.00	No Ice	2.00	1.33	0.09
			0.00			1/2" Ice	2.26	1.56	0.12
			0.00						
(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	B	From Leg	0.00	0.0000	51.00	No Ice	2.00	1.33	0.09
			0.00			1/2" Ice	2.26	1.56	0.12
			0.00						
(2) Ericsson TMA KRY 112 89/5 (MetroPCS)	C	From Leg	0.00	0.0000	51.00	No Ice	2.00	1.33	0.09
			0.00			1/2" Ice	2.26	1.56	0.12
			0.00						
4' Standoff Mount	C	From Leg	0.00	0.0000	59.00	No Ice	0.31	2.27	0.10
			0.00			1/2" Ice	0.50	3.50	0.13
			0.00						
5' Omni x 1" OD	A	From Leg	2.00	0.0000	59.00 - 55.00	No Ice	0.42	0.42	0.01
			0.00			1/2" Ice	0.85	0.85	0.02
			0.00						
5' Omni x 1" OD	B	From Leg	2.00	0.0000	59.00 - 55.00	No Ice	0.42	0.42	0.01
			0.00			1/2" Ice	0.85	0.85	0.02
			0.00						
5' Omni x 2.5" OD	C	From Leg	2.00	0.0000	59.00 - 55.00	No Ice	1.04	1.04	0.02
			0.00			1/2" Ice	1.48	1.48	0.04
			0.00						

Tower Pressures - No Ice

$G_H = 1.202$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2

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 59.00-58.00	58.50	1.178	22	0.638	A	0.000	0.331	0.277	83.69	0.000	0.000
					B	0.000	0.331		83.69	0.000	0.000
					C	0.000	0.331		83.69	0.000	0.000
T2 58.00-56.00	57.00	1.169	22	2.285	A	0.000	0.705	0.576	81.66	0.000	0.000
					B	0.000	0.705		81.66	0.000	0.000
					C	0.000	0.705		81.66	0.000	0.000
T3 56.00-50.00	53.00	1.145	21	9.830	A	0.000	2.176	1.660	76.30	0.000	0.000
					B	0.000	2.176		76.30	0.000	0.000
					C	0.000	4.660		35.62	0.000	0.000
T4 50.00-40.00	45.00	1.093	20	16.383	A	0.000	3.708	2.767	74.61	0.000	0.000
					B	0.000	3.708		74.61	0.000	0.000
					C	0.000	15.217		18.18	0.000	0.000
T5 40.00-30.00	35.00	1.017	19	16.383	A	0.000	3.708	2.767	74.61	0.000	0.000
					B	0.000	3.708		74.61	0.000	0.000
					C	0.000	15.217		18.18	0.000	0.000
T6 30.00-20.00	25.00	1	18	16.383	A	0.000	3.616	2.767	76.51	0.000	0.000
					B	0.000	3.616		76.51	0.000	0.000
					C	0.000	15.125		18.29	0.000	0.000
T7 20.00-10.00	15.00	1	18	16.383	A	0.000	3.616	2.767	76.51	0.000	0.000
					B	0.000	3.616		76.51	0.000	0.000
					C	0.000	15.125		18.29	0.000	0.000
T8 10.00-0.00	5.00	1	18	16.383	A	0.000	3.616	2.767	76.51	0.000	0.000
					B	0.000	3.616		76.51	0.000	0.000
					C	0.000	7.069		39.14	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.202$

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 59.00-58.00	58.50	1.178	16	0.5000	0.722	A	0.000	0.620	0.443	71.45	0.000	0.000
						B	0.000	0.620		71.45	0.000	0.000
						C	0.000	0.620		71.45	0.000	0.000
T2 58.00-56.00	57.00	1.169	16	0.5000	2.457	A	0.000	1.348	0.923	68.47	0.000	0.000
						B	0.000	1.348		68.47	0.000	0.000
						C	0.000	1.348		68.47	0.000	0.000
T3 56.00-50.00	53.00	1.145	16	0.5000	10.330	A	0.000	4.355	2.660	61.08	0.000	0.000
						B	0.000	4.355		61.08	0.000	0.000
						C	0.636	6.786		35.84	0.000	0.000
T4 50.00-40.00	45.00	1.093	15	0.5000	17.217	A	0.000	7.317	4.433	60.59	0.000	0.000
						B	0.000	7.317		60.59	0.000	0.000
						C	6.358	14.967		20.79	0.000	0.000
T5 40.00-30.00	35.00	1.017	14	0.5000	17.217	A	0.000	7.317	4.433	60.59	0.000	0.000
						B	0.000	7.317		60.59	0.000	0.000
						C	6.358	14.967		20.79	0.000	0.000
T6 30.00-20.00	25.00	1	14	0.5000	17.217	A	0.000	7.225	4.433	61.36	0.000	0.000
						B	0.000	7.225		61.36	0.000	0.000
						C	6.358	14.875		20.88	0.000	0.000
T7 20.00-10.00	15.00	1	14	0.5000	17.217	A	0.000	7.225	4.433	61.36	0.000	0.000
						B	0.000	7.225		61.36	0.000	0.000
						C	6.358	14.875		20.88	0.000	0.000
T8 10.00-0.00	5.00	1	14	0.5000	17.217	A	0.000	7.225	4.433	61.36	0.000	0.000
						B	0.000	7.225		61.36	0.000	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	1.908	9.520		38.80	0.000	0.000

Tower Pressure - Service

$G_H = 1.202$

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 59.00-58.00	58.50	1.178	8	0.638	A	0.000	0.331	0.277	83.69	0.000	0.000
					B	0.000	0.331		83.69	0.000	0.000
					C	0.000	0.331		83.69	0.000	0.000
T2 58.00-56.00	57.00	1.169	7	2.285	A	0.000	0.705	0.576	81.66	0.000	0.000
					B	0.000	0.705		81.66	0.000	0.000
					C	0.000	0.705		81.66	0.000	0.000
T3 56.00-50.00	53.00	1.145	7	9.830	A	0.000	2.176	1.660	76.30	0.000	0.000
					B	0.000	2.176		76.30	0.000	0.000
					C	0.000	4.660		35.62	0.000	0.000
T4 50.00-40.00	45.00	1.093	7	16.383	A	0.000	3.708	2.767	74.61	0.000	0.000
					B	0.000	3.708		74.61	0.000	0.000
					C	0.000	15.217		18.18	0.000	0.000
T5 40.00-30.00	35.00	1.017	7	16.383	A	0.000	3.708	2.767	74.61	0.000	0.000
					B	0.000	3.708		74.61	0.000	0.000
					C	0.000	15.217		18.18	0.000	0.000
T6 30.00-20.00	25.00	1	6	16.383	A	0.000	3.616	2.767	76.51	0.000	0.000
					B	0.000	3.616		76.51	0.000	0.000
					C	0.000	15.125		18.29	0.000	0.000
T7 20.00-10.00	15.00	1	6	16.383	A	0.000	3.616	2.767	76.51	0.000	0.000
					B	0.000	3.616		76.51	0.000	0.000
					C	0.000	15.125		18.29	0.000	0.000
T8 10.00-0.00	5.00	1	6	16.383	A	0.000	3.616	2.767	76.51	0.000	0.000
					B	0.000	3.616		76.51	0.000	0.000
					C	0.000	7.069		39.14	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	0.00	0.01	A	0.518	1.878	0.707	1	1	0.234	0.01	11.49	C
59.00-58.00			B	0.518	1.878	0.707	1	1	0.234			
			C	0.518	1.878	0.707	1	1	0.234			
T2	0.00	0.01	A	0.309	2.273	0.619	1	1	0.436	0.03	12.89	C
58.00-56.00			B	0.309	2.273	0.619	1	1	0.436			
			C	0.309	2.273	0.619	1	1	0.436			
T3	0.01	0.04	A	0.221	2.526	0.595	1	1	1.295	0.16	26.21	C
56.00-50.00			B	0.221	2.526	0.595	1	1	1.295			
			C	0.474	1.936	0.685	1	1	3.190			
T4	0.05	0.09	A	0.226	2.51	0.596	1	1	2.211	0.73	72.75	C
50.00-40.00			B	0.226	2.51	0.596	1	1	2.211			

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	0.929	1.968	1	1	1	15.217			
T5	0.05	0.09	A	0.226	2.51	0.596	1	1	2.211	0.68	67.71	C
40.00-30.00			B	0.226	2.51	0.596	1	1	2.211			
			C	0.929	1.968	1	1	1	15.217			
T6	0.05	0.07	A	0.221	2.528	0.595	1	1	2.151	0.66	65.87	C
30.00-20.00			B	0.221	2.528	0.595	1	1	2.151			
			C	0.923	1.959	1	1	1	15.125			
T7	0.05	0.07	A	0.221	2.528	0.595	1	1	2.151	0.66	65.87	C
20.00-10.00			B	0.221	2.528	0.595	1	1	2.151			
			C	0.923	1.959	1	1	1	15.125			
T8 10.00-0.00	0.01	0.07	A	0.221	2.528	0.595	1	1	2.151	0.21	20.96	C
			B	0.221	2.528	0.595	1	1	2.151			
			C	0.431	2.005	0.665	1	1	4.700			
Sum Weight:	0.22	0.45								3.13		

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 ft²	F K	w plf	Ctrl. Face
T1	0.00	0.01	A	0.518	1.878	0.707	0.8	1	0.234	0.01	11.49	C
59.00-58.00			B	0.518	1.878	0.707	0.8	1	0.234			
			C	0.518	1.878	0.707	0.8	1	0.234			
T2	0.00	0.01	A	0.309	2.273	0.619	0.8	1	0.436	0.03	12.89	C
58.00-56.00			B	0.309	2.273	0.619	0.8	1	0.436			
			C	0.309	2.273	0.619	0.8	1	0.436			
T3	0.01	0.04	A	0.221	2.526	0.595	0.8	1	1.295	0.16	26.21	C
56.00-50.00			B	0.221	2.526	0.595	0.8	1	1.295			
			C	0.474	1.936	0.685	0.8	1	3.190			
T4	0.05	0.09	A	0.226	2.51	0.596	0.8	1	2.211	0.73	72.75	C
50.00-40.00			B	0.226	2.51	0.596	0.8	1	2.211			
			C	0.929	1.968	1	0.8	1	15.217			
T5	0.05	0.09	A	0.226	2.51	0.596	0.8	1	2.211	0.68	67.71	C
40.00-30.00			B	0.226	2.51	0.596	0.8	1	2.211			
			C	0.929	1.968	1	0.8	1	15.217			
T6	0.05	0.07	A	0.221	2.528	0.595	0.8	1	2.151	0.66	65.87	C
30.00-20.00			B	0.221	2.528	0.595	0.8	1	2.151			
			C	0.923	1.959	1	0.8	1	15.125			
T7	0.05	0.07	A	0.221	2.528	0.595	0.8	1	2.151	0.66	65.87	C
20.00-10.00			B	0.221	2.528	0.595	0.8	1	2.151			
			C	0.923	1.959	1	0.8	1	15.125			
T8 10.00-0.00	0.01	0.07	A	0.221	2.528	0.595	0.8	1	2.151	0.21	20.96	C
			B	0.221	2.528	0.595	0.8	1	2.151			
			C	0.431	2.005	0.665	0.8	1	4.700			
Sum Weight:	0.22	0.45								3.13		

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	0.00	0.01	A	0.518	1.878	0.707	0.85	1	0.234	0.01	11.49	C
59.00-58.00			B	0.518	1.878	0.707	0.85	1	0.234			
			C	0.518	1.878	0.707	0.85	1	0.234			
T2	0.00	0.01	A	0.309	2.273	0.619	0.85	1	0.436	0.03	12.89	C
58.00-56.00			B	0.309	2.273	0.619	0.85	1	0.436			
			C	0.309	2.273	0.619	0.85	1	0.436			
T3	0.01	0.04	A	0.221	2.526	0.595	0.85	1	1.295	0.16	26.21	C
56.00-50.00			B	0.221	2.526	0.595	0.85	1	1.295			
			C	0.474	1.936	0.685	0.85	1	3.190			
T4	0.05	0.09	A	0.226	2.51	0.596	0.85	1	2.211	0.73	72.75	C
50.00-40.00			B	0.226	2.51	0.596	0.85	1	2.211			
			C	0.929	1.968	1	0.85	1	15.217			
T5	0.05	0.09	A	0.226	2.51	0.596	0.85	1	2.211	0.68	67.71	C
40.00-30.00			B	0.226	2.51	0.596	0.85	1	2.211			
			C	0.929	1.968	1	0.85	1	15.217			
T6	0.05	0.07	A	0.221	2.528	0.595	0.85	1	2.151	0.66	65.87	C
30.00-20.00			B	0.221	2.528	0.595	0.85	1	2.151			
			C	0.923	1.959	1	0.85	1	15.125			
T7	0.05	0.07	A	0.221	2.528	0.595	0.85	1	2.151	0.66	65.87	C
20.00-10.00			B	0.221	2.528	0.595	0.85	1	2.151			
			C	0.923	1.959	1	0.85	1	15.125			
T8 10.00-0.00	0.01	0.07	A	0.221	2.528	0.595	0.85	1	2.151	0.21	20.96	C
			B	0.221	2.528	0.595	0.85	1	2.151			
			C	0.431	2.005	0.665	0.85	1	4.700			
Sum Weight:	0.22	0.45								3.13		

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	0.00	0.01	A	0.86	1.872	0.947	1	1	0.588	0.02	21.61	C
59.00-58.00			B	0.86	1.872	0.947	1	1	0.588			
			C	0.86	1.872	0.947	1	1	0.588			
T2	0.00	0.03	A	0.549	1.845	0.723	1	1	0.975	0.04	17.53	C
58.00-56.00			B	0.549	1.845	0.723	1	1	0.975			
			C	0.549	1.845	0.723	1	1	0.975			
T3	0.03	0.09	A	0.422	2.023	0.661	1	1	2.877	0.21	35.60	C
56.00-50.00			B	0.422	2.023	0.661	1	1	2.877			
			C	0.718	1.778	0.833	1	1	6.291			
T4	0.14	0.17	A	0.425	2.017	0.662	1	1	4.845	0.63*	62.75	C
50.00-40.00			B	0.425	2.017	0.662	1	1	4.845			
			C	1	2.1	1	1	1	21.325			
T5	0.14	0.17	A	0.425	2.017	0.662	1	1	4.845	0.58*	58.40	C
40.00-30.00			B	0.425	2.017	0.662	1	1	4.845			
			C	1	2.1	1	1	1	21.325			
T6	0.14	0.16	A	0.42	2.026	0.66	1	1	4.767	0.57*	57.42	C
30.00-20.00			B	0.42	2.026	0.66	1	1	4.767			
			C	1	2.1	1	1	1	21.233			
T7	0.14	0.16	A	0.42	2.026	0.66	1	1	4.767	0.57*	57.42	C
20.00-10.00			B	0.42	2.026	0.66	1	1	4.767			
			C	1	2.1	1	1	1	21.233			
T8 10.00-0.00	0.04	0.16	A	0.42	2.026	0.66	1	1	4.767	0.28	28.09	C
			B	0.42	2.026	0.66	1	1	4.767			
			C	0.664	1.778	0.795	1	1	9.472			

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:	0.63	0.95			*2A_g limit					2.91		

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	0.00	0.01	A	0.86	1.872	0.947	0.8	1	0.588	0.02	21.61	C
59.00-58.00			B	0.86	1.872	0.947	0.8	1	0.588			
			C	0.86	1.872	0.947	0.8	1	0.588			
T2	0.00	0.03	A	0.549	1.845	0.723	0.8	1	0.975	0.04	17.53	C
58.00-56.00			B	0.549	1.845	0.723	0.8	1	0.975			
			C	0.549	1.845	0.723	0.8	1	0.975			
T3	0.03	0.09	A	0.422	2.023	0.661	0.8	1	2.877	0.21	34.88	C
56.00-50.00			B	0.422	2.023	0.661	0.8	1	2.877			
			C	0.718	1.778	0.833	0.8	1	6.164			
T4	0.14	0.17	A	0.425	2.017	0.662	0.8	1	4.845	0.63*	62.75	C
50.00-40.00			B	0.425	2.017	0.662	0.8	1	4.845			
			C	1	2.1	1	0.8	1	20.053			
T5	0.14	0.17	A	0.425	2.017	0.662	0.8	1	4.845	0.58*	58.40	C
40.00-30.00			B	0.425	2.017	0.662	0.8	1	4.845			
			C	1	2.1	1	0.8	1	20.053			
T6	0.14	0.16	A	0.42	2.026	0.66	0.8	1	4.767	0.57*	57.42	C
30.00-20.00			B	0.42	2.026	0.66	0.8	1	4.767			
			C	1	2.1	1	0.8	1	19.961			
T7	0.14	0.16	A	0.42	2.026	0.66	0.8	1	4.767	0.57*	57.42	C
20.00-10.00			B	0.42	2.026	0.66	0.8	1	4.767			
			C	1	2.1	1	0.8	1	19.961			
T8 10.00-0.00	0.04	0.16	A	0.42	2.026	0.66	0.8	1	4.767	0.27	26.96	C
			B	0.42	2.026	0.66	0.8	1	4.767			
			C	0.664	1.778	0.795	0.8	1	9.091			
Sum Weight:	0.63	0.95			*2A_g limit					2.90		

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	0.00	0.01	A	0.86	1.872	0.947	0.85	1	0.588	0.02	21.61	C
59.00-58.00			B	0.86	1.872	0.947	0.85	1	0.588			
			C	0.86	1.872	0.947	0.85	1	0.588			
T2	0.00	0.03	A	0.549	1.845	0.723	0.85	1	0.975	0.04	17.53	C
58.00-56.00			B	0.549	1.845	0.723	0.85	1	0.975			
			C	0.549	1.845	0.723	0.85	1	0.975			
T3	0.03	0.09	A	0.422	2.023	0.661	0.85	1	2.877	0.21	35.06	C
56.00-50.00			B	0.422	2.023	0.661	0.85	1	2.877			
			C	0.718	1.778	0.833	0.85	1	6.195			

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
T4	0.14	0.17	A	0.425	2.017	0.662	0.85	1	4.845	0.63*	62.75	C
50.00-40.00			B	0.425	2.017	0.662	0.85	1	4.845			
			C	1	2.1	1	0.85	1	20.371			
T5	0.14	0.17	A	0.425	2.017	0.662	0.85	1	4.845	0.58*	58.40	C
40.00-30.00			B	0.425	2.017	0.662	0.85	1	4.845			
			C	1	2.1	1	0.85	1	20.371			
T6	0.14	0.16	A	0.42	2.026	0.66	0.85	1	4.767	0.57*	57.42	C
30.00-20.00			B	0.42	2.026	0.66	0.85	1	4.767			
			C	1	2.1	1	0.85	1	20.279			
T7	0.14	0.16	A	0.42	2.026	0.66	0.85	1	4.767	0.57*	57.42	C
20.00-10.00			B	0.42	2.026	0.66	0.85	1	4.767			
			C	1	2.1	1	0.85	1	20.279			
T8 10.00-0.00	0.04	0.16	A	0.42	2.026	0.66	0.85	1	4.767	0.27	27.24	C
			B	0.42	2.026	0.66	0.85	1	4.767			
			C	0.664	1.778	0.795	0.85	1	9.186			
Sum Weight:	0.63	0.95			*2A_g limit					2.90		

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	0.00	0.01	A	0.518	1.878	0.707	1	1	0.234	0.00	3.98	C
59.00-58.00			B	0.518	1.878	0.707	1	1	0.234			
			C	0.518	1.878	0.707	1	1	0.234			
T2	0.00	0.01	A	0.309	2.273	0.619	1	1	0.436	0.01	4.46	C
58.00-56.00			B	0.309	2.273	0.619	1	1	0.436			
			C	0.309	2.273	0.619	1	1	0.436			
T3	0.01	0.04	A	0.221	2.526	0.595	1	1	1.295	0.05	9.07	C
56.00-50.00			B	0.221	2.526	0.595	1	1	1.295			
			C	0.474	1.936	0.685	1	1	3.190			
T4	0.05	0.09	A	0.226	2.51	0.596	1	1	2.211	0.25	25.17	C
50.00-40.00			B	0.226	2.51	0.596	1	1	2.211			
			C	0.929	1.968	1	1	1	15.217			
T5	0.05	0.09	A	0.226	2.51	0.596	1	1	2.211	0.23	23.43	C
40.00-30.00			B	0.226	2.51	0.596	1	1	2.211			
			C	0.929	1.968	1	1	1	15.217			
T6	0.05	0.07	A	0.221	2.528	0.595	1	1	2.151	0.23	22.79	C
30.00-20.00			B	0.221	2.528	0.595	1	1	2.151			
			C	0.923	1.959	1	1	1	15.125			
T7	0.05	0.07	A	0.221	2.528	0.595	1	1	2.151	0.23	22.79	C
20.00-10.00			B	0.221	2.528	0.595	1	1	2.151			
			C	0.923	1.959	1	1	1	15.125			
T8 10.00-0.00	0.01	0.07	A	0.221	2.528	0.595	1	1	2.151	0.07	7.25	C
			B	0.221	2.528	0.595	1	1	2.151			
			C	0.431	2.005	0.665	1	1	4.700			
Sum Weight:	0.22	0.45								1.08		

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	0.00	0.01	A	0.518	1.878	0.707	0.8	1	0.234	0.00	3.98	C
59.00-58.00			B	0.518	1.878	0.707	0.8	1	0.234			
			C	0.518	1.878	0.707	0.8	1	0.234			
T2	0.00	0.01	A	0.309	2.273	0.619	0.8	1	0.436	0.01	4.46	C
58.00-56.00			B	0.309	2.273	0.619	0.8	1	0.436			
			C	0.309	2.273	0.619	0.8	1	0.436			
T3	0.01	0.04	A	0.221	2.526	0.595	0.8	1	1.295	0.05	9.07	C
56.00-50.00			B	0.221	2.526	0.595	0.8	1	1.295			
			C	0.474	1.936	0.685	0.8	1	3.190			
T4	0.05	0.09	A	0.226	2.51	0.596	0.8	1	2.211	0.25	25.17	C
50.00-40.00			B	0.226	2.51	0.596	0.8	1	2.211			
			C	0.929	1.968	1	0.8	1	15.217			
T5	0.05	0.09	A	0.226	2.51	0.596	0.8	1	2.211	0.23	23.43	C
40.00-30.00			B	0.226	2.51	0.596	0.8	1	2.211			
			C	0.929	1.968	1	0.8	1	15.217			
T6	0.05	0.07	A	0.221	2.528	0.595	0.8	1	2.151	0.23	22.79	C
30.00-20.00			B	0.221	2.528	0.595	0.8	1	2.151			
			C	0.923	1.959	1	0.8	1	15.125			
T7	0.05	0.07	A	0.221	2.528	0.595	0.8	1	2.151	0.23	22.79	C
20.00-10.00			B	0.221	2.528	0.595	0.8	1	2.151			
			C	0.923	1.959	1	0.8	1	15.125			
T8 10.00-0.00	0.01	0.07	A	0.221	2.528	0.595	0.8	1	2.151	0.07	7.25	C
			B	0.221	2.528	0.595	0.8	1	2.151			
			C	0.431	2.005	0.665	0.8	1	4.700			
Sum Weight:	0.22	0.45								1.08		

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	0.00	0.01	A	0.518	1.878	0.707	0.85	1	0.234	0.00	3.98	C
59.00-58.00			B	0.518	1.878	0.707	0.85	1	0.234			
			C	0.518	1.878	0.707	0.85	1	0.234			
T2	0.00	0.01	A	0.309	2.273	0.619	0.85	1	0.436	0.01	4.46	C
58.00-56.00			B	0.309	2.273	0.619	0.85	1	0.436			
			C	0.309	2.273	0.619	0.85	1	0.436			
T3	0.01	0.04	A	0.221	2.526	0.595	0.85	1	1.295	0.05	9.07	C
56.00-50.00			B	0.221	2.526	0.595	0.85	1	1.295			
			C	0.474	1.936	0.685	0.85	1	3.190			
T4	0.05	0.09	A	0.226	2.51	0.596	0.85	1	2.211	0.25	25.17	C
50.00-40.00			B	0.226	2.51	0.596	0.85	1	2.211			
			C	0.929	1.968	1	0.85	1	15.217			
T5	0.05	0.09	A	0.226	2.51	0.596	0.85	1	2.211	0.23	23.43	C
40.00-30.00			B	0.226	2.51	0.596	0.85	1	2.211			
			C	0.929	1.968	1	0.85	1	15.217			
T6	0.05	0.07	A	0.221	2.528	0.595	0.85	1	2.151	0.23	22.79	C
30.00-20.00			B	0.221	2.528	0.595	0.85	1	2.151			
			C	0.923	1.959	1	0.85	1	15.125			
T7	0.05	0.07	A	0.221	2.528	0.595	0.85	1	2.151	0.23	22.79	C
20.00-10.00			B	0.221	2.528	0.595	0.85	1	2.151			
			C	0.923	1.959	1	0.85	1	15.125			
T8 10.00-0.00	0.01	0.07	A	0.221	2.528	0.595	0.85	1	2.151	0.07	7.25	C
			B	0.221	2.528	0.595	0.85	1	2.151			
			C	0.431	2.005	0.665	0.85	1	4.700			

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
Sum Weight:	0.22	0.45								1.08		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Torques kip-ft
Leg Weight	0.19			
Bracing Weight	0.26			
Total Member Self-Weight	0.45			
Guy Weight	0.06			
Total Weight	1.74			
Wind 0 deg - No Ice		-0.02	-3.83	-0.55
Wind 30 deg - No Ice		1.88	-3.30	-0.09
Wind 60 deg - No Ice		3.28	-1.89	0.39
Wind 90 deg - No Ice		3.81	0.02	0.77
Wind 120 deg - No Ice		3.31	1.93	0.94
Wind 150 deg - No Ice		1.92	3.32	0.86
Wind 180 deg - No Ice		0.02	3.83	0.55
Wind 210 deg - No Ice		-1.88	3.30	0.09
Wind 240 deg - No Ice		-3.28	1.89	-0.39
Wind 270 deg - No Ice		-3.81	-0.02	-0.77
Wind 300 deg - No Ice		-3.31	-1.93	-0.94
Wind 330 deg - No Ice		-1.92	-3.32	-0.86
Member Ice	0.50			
Guy Ice	0.12			
Total Weight Ice	3.19			
Wind 0 deg - Ice		-0.03	-3.58	-0.46
Wind 30 deg - Ice		1.75	-3.08	-0.18
Wind 60 deg - Ice		3.05	-1.76	0.16
Wind 90 deg - Ice		3.54	0.03	0.45
Wind 120 deg - Ice		3.09	1.81	0.62
Wind 150 deg - Ice		1.79	3.10	0.62
Wind 180 deg - Ice		0.03	3.56	0.46
Wind 210 deg - Ice		-1.75	3.08	0.18
Wind 240 deg - Ice		-3.07	1.77	-0.16
Wind 270 deg - Ice		-3.54	-0.03	-0.45
Wind 300 deg - Ice		-3.08	-1.80	-0.62
Wind 330 deg - Ice		-1.79	-3.10	-0.62
Total Weight	1.74			
Wind 0 deg - Service		-0.01	-1.32	-0.19
Wind 30 deg - Service		0.65	-1.14	-0.03
Wind 60 deg - Service		1.14	-0.66	0.13
Wind 90 deg - Service		1.32	0.01	0.26
Wind 120 deg - Service		1.14	0.67	0.32
Wind 150 deg - Service		0.67	1.15	0.30
Wind 180 deg - Service		0.01	1.32	0.19
Wind 210 deg - Service		-0.65	1.14	0.03
Wind 240 deg - Service		-1.14	0.66	-0.13
Wind 270 deg - Service		-1.32	-0.01	-0.26
Wind 300 deg - Service		-1.14	-0.67	-0.32
Wind 330 deg - Service		-0.67	-1.15	-0.30

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 30 deg - No Ice+Guy
4	Dead+Wind 60 deg - No Ice+Guy
5	Dead+Wind 90 deg - No Ice+Guy
6	Dead+Wind 120 deg - No Ice+Guy
7	Dead+Wind 150 deg - No Ice+Guy
8	Dead+Wind 180 deg - No Ice+Guy
9	Dead+Wind 210 deg - No Ice+Guy
10	Dead+Wind 240 deg - No Ice+Guy
11	Dead+Wind 270 deg - No Ice+Guy
12	Dead+Wind 300 deg - No Ice+Guy
13	Dead+Wind 330 deg - No Ice+Guy
14	Dead+Ice+Temp+Guy
15	Dead+Wind 0 deg+Ice+Temp+Guy
16	Dead+Wind 30 deg+Ice+Temp+Guy
17	Dead+Wind 60 deg+Ice+Temp+Guy
18	Dead+Wind 90 deg+Ice+Temp+Guy
19	Dead+Wind 120 deg+Ice+Temp+Guy
20	Dead+Wind 150 deg+Ice+Temp+Guy
21	Dead+Wind 180 deg+Ice+Temp+Guy
22	Dead+Wind 210 deg+Ice+Temp+Guy
23	Dead+Wind 240 deg+Ice+Temp+Guy
24	Dead+Wind 270 deg+Ice+Temp+Guy
25	Dead+Wind 300 deg+Ice+Temp+Guy
26	Dead+Wind 330 deg+Ice+Temp+Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	59 - 58	Leg	Max Tension	20	2.32	-0.00	0.00
			Max. Compression	25	-2.30	0.05	-0.00
			Max. Mx	25	-1.19	0.07	0.01
			Max. My	21	1.29	0.02	-0.04
			Max. Vy	26	0.37	-0.03	0.03
			Max. Vx	20	0.32	0.00	-0.03
		Diagonal	Max Tension	26	1.53	0.00	0.00
			Max. Compression	20	-1.56	0.00	0.00
			Max. Mx	24	0.68	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	15	1.19	0.00	0.00
			Max. Vy	24	-0.00	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
		Top Girt	Max Tension	20	0.39	0.00	0.00
			Max. Compression	26	-0.39	0.00	0.00
			Max. Mx	14	0.00	0.00	0.00
			Max. My	26	-0.27	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	20	0.37	0.00	0.00
			Max. Compression	26	-0.45	0.00	0.00
			Max. Mx	14	0.04	0.00	0.00
			Max. My	26	-0.30	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T2	58 - 56	Leg	Max Tension	20	1.88	-0.02	-0.04
			Max. Compression	26	-1.86	-0.01	-0.04
			Max. Mx	24	-1.51	0.06	0.03
			Max. My	26	-0.70	0.03	0.07
			Max. Vy	23	0.33	0.05	0.01
			Max. Vx	20	0.38	0.02	-0.01
		Diagonal	Max Tension	26	1.39	0.00	0.00
			Max. Compression	20	-1.30	0.00	0.00
			Max. Mx	24	0.13	0.00	0.00
			Max. My	15	0.81	0.00	0.00
			Max. Vy	24	-0.00	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
		Top Girt	Max Tension	20	0.43	0.00	0.00
			Max. Compression	26	-0.47	0.00	0.00
			Max. Mx	14	-0.00	0.00	0.00
			Max. My	26	-0.44	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	20	0.19	0.00	0.00
			Max. Compression	26	-0.16	0.00	0.00
			Max. Mx	14	0.00	0.00	0.00
			Max. My	26	-0.15	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T3	56 - 50	Leg	Max Tension	25	2.61	-0.15	-0.04
			Max. Compression	23	-3.48	0.01	-0.01
			Max. Mx	18	1.38	0.16	0.03
			Max. My	15	0.45	-0.03	-0.19
			Max. Vy	18	0.36	-0.02	0.00
			Max. Vx	21	0.41	-0.00	-0.02
		Diagonal	Max Tension	25	1.22	0.00	0.00
			Max. Compression	19	-1.26	0.00	0.00
			Max. Mx	24	0.32	0.00	0.00
			Max. My	26	0.40	0.00	0.00
			Max. Vy	24	-0.00	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Horizontal	Max Tension	21	0.71	0.00	0.00
			Max. Compression	15	-0.69	0.00	0.00
			Max. Mx	14	0.01	0.00	0.00
			Max. My	26	0.05	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Top Girt	Max Tension	20	0.19	0.00	0.00
			Max. Compression	26	-0.13	0.00	0.00
			Max. Mx	14	0.00	0.00	0.00
			Max. My	26	-0.04	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	0.58	0.00	0.00
			Max. Compression	25	-0.54	0.00	0.00
			Max. Mx	14	0.01	0.00	0.00
			Max. My	26	0.22	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T4	50 - 40	Leg	Max Tension	21	5.62	0.01	-0.03
			Max. Compression	15	-8.77	0.06	-0.11
			Max. Mx	18	-3.18	-0.19	0.02
			Max. My	21	-2.12	-0.03	-0.22
			Max. Vy	18	0.36	-0.19	0.02
			Max. Vx	21	0.41	-0.03	-0.22
		Diagonal	Max Tension	25	1.53	0.00	0.00
			Max. Compression	19	-1.55	0.00	0.00
			Max. Mx	24	1.49	0.00	0.00
			Max. My	26	1.17	0.00	0.00
			Max. Vy	24	-0.00	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Horizontal	Max Tension	19	1.02	0.00	0.00
			Max. Compression	25	-1.01	0.00	0.00
			Max. Mx	14	0.04	0.00	0.00
			Max. My	26	0.57	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Top Girt	Max Tension	21	0.72	0.00	0.00
			Max. Compression	15	-0.73	0.00	0.00
			Max. Mx	14	0.01	0.00	0.00
			Max. My	26	0.36	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	0.44	0.00	0.00
			Max. Compression	12	-0.33	0.00	0.00
			Max. Mx	14	0.05	0.00	0.00
			Max. My	26	0.10	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Guy A	Bottom Tension	21	4.67		
			Top Tension	21	4.70		
			Top Cable Vert	21	4.21		
			Top Cable Norm	21	2.09		
			Top Cable Tan	21	0.00		
			Bot Cable Vert	21	-4.16		
			Bot Cable Norm	21	2.14		
			Bot Cable Tan	21	0.00		
		Guy B	Bottom Tension	24	5.56		
			Top Tension	24	5.60		
			Top Cable Vert	24	5.32		
			Top Cable Norm	24	1.75		
			Top Cable Tan	24	0.01		
			Bot Cable Vert	24	-5.25		
			Bot Cable Norm	24	1.83		
			Bot Cable Tan	24	0.06		
		Guy C	Bottom Tension	18	5.46		
			Top Tension	18	5.50		
			Top Cable Vert	18	5.22		
			Top Cable Norm	18	1.71		
			Top Cable Tan	18	0.00		
			Bot Cable Vert	18	-5.16		
			Bot Cable Norm	18	1.80		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Bot Cable Tan	18	0.05		
		Top Guy Pull-Off	Max Tension	20	1.32	0.00	0.00
			Max. Compression	26	-0.27	0.00	0.00
			Max. Mx	14	0.33	0.00	0.00
			Max. My	26	0.68	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T5	40 - 30	Leg	Max Tension	25	4.16	0.02	0.01
			Max. Compression	15	-13.20	0.00	0.02
			Max. Mx	6	-2.05	-0.23	-0.11
			Max. My	7	-7.75	0.01	-0.25
			Max. Vy	6	-0.34	0.03	0.01
			Max. Vx	7	-0.39	-0.01	0.04
		Diagonal	Max Tension	12	1.24	0.00	0.00
			Max. Compression	7	-1.72	0.00	0.00
			Max. Mx	15	0.99	0.00	0.00
			Max. My	26	0.58	0.00	0.00
			Max. Vy	15	0.00	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Horizontal	Max Tension	6	0.80	0.00	0.00
			Max. Compression	11	-0.75	0.00	0.00
			Max. Mx	14	0.06	0.00	0.00
			Max. My	26	0.20	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Top Girt	Max Tension	19	0.44	0.00	0.00
			Max. Compression	15	-0.47	0.00	0.00
			Max. Mx	14	0.03	0.00	0.00
			Max. My	26	0.04	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	0.66	0.00	0.00
			Max. Compression	11	-0.43	0.00	0.00
			Max. Mx	20	0.20	0.00	0.00
			Max. My	26	-0.37	0.00	-0.00
			Max. Vy	20	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Guy A	Bottom Tension	21	2.73		
			Top Tension	8	2.73		
			Top Cable Vert	21	2.02		
			Top Cable Norm	21	1.84		
			Top Cable Tan	21	0.00		
			Bot Cable Vert	8	-2.00		
			Bot Cable Norm	8	1.85		
			Bot Cable Tan	8	0.00		
		Guy B	Bottom Tension	24	4.25		
			Top Tension	24	4.27		
			Top Cable Vert	24	3.87		
			Top Cable Norm	24	1.81		
			Top Cable Tan	24	0.01		
			Bot Cable Vert	24	-3.82		
			Bot Cable Norm	24	1.86		
			Bot Cable Tan	24	0.03		
		Guy C	Bottom Tension	18	4.24		
			Top Tension	18	4.27		
			Top Cable Vert	18	3.87		
			Top Cable Norm	18	1.81		
			Top Cable Tan	18	0.01		
			Bot Cable Vert	18	-3.81		
			Bot Cable Norm	18	1.86		
			Bot Cable Tan	18	0.03		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Guy Pull-Off	Max Tension	6	1.22	0.00	0.00
			Max. Compression	12	-0.29	0.00	0.00
			Max. Mx	14	0.41	0.00	0.00
			Max. My	26	0.23	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T6	30 - 20	Leg	Max Tension	12	0.42	-0.00	-0.02
			Max. Compression	15	-12.75	-0.01	0.00
			Max. Mx	6	-1.67	0.20	0.10
			Max. My	7	-6.97	-0.01	0.24
			Max. Vy	6	-0.34	0.20	0.10
			Max. Vx	7	-0.39	-0.01	0.24
		Diagonal	Max Tension	12	1.26	0.00	0.00
			Max. Compression	7	-1.69	0.00	0.00
			Max. Mx	15	-0.12	0.00	0.00
			Max. My	26	0.06	0.00	0.00
			Max. Vy	15	-0.00	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Horizontal	Max Tension	7	0.96	0.00	0.00
			Max. Compression	12	-0.67	0.00	0.00
			Max. Mx	14	0.06	0.00	0.00
			Max. My	26	0.19	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Top Girt	Max Tension	6	0.68	0.00	0.00
			Max. Compression	12	-0.54	0.00	0.00
			Max. Mx	14	0.06	0.00	0.00
			Max. My	26	-0.38	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	0.48	0.00	0.00
			Max. Compression	12	-0.43	0.00	0.00
			Max. Mx	14	0.02	0.00	0.00
			Max. My	26	-0.17	0.00	-0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T7	20 - 10	Leg	Max Tension	5	0.39	-0.01	-0.00
			Max. Compression	15	-12.75	-0.00	0.02
			Max. Mx	18	-5.44	-0.22	-0.00
			Max. My	15	-4.14	0.04	0.27
			Max. Vy	18	-0.35	-0.22	-0.00
			Max. Vx	15	0.41	0.04	0.27
		Diagonal	Max Tension	12	1.19	0.00	0.00
			Max. Compression	15	-1.60	0.00	0.00
			Max. Mx	15	0.51	0.00	0.00
			Max. My	15	0.27	0.00	0.00
			Max. Vy	15	-0.00	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
		Horizontal	Max Tension	18	1.44	0.00	0.00
			Max. Compression	12	-0.75	0.00	0.00
			Max. Mx	14	1.42	0.00	0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
		Top Girt	Max Tension	6	0.54	0.00	0.00
			Max. Compression	12	-0.44	0.00	0.00
			Max. Mx	14	0.06	0.00	0.00
			Max. Vy	14	-0.00	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
		Bottom Girt	Max Tension	24	0.54	0.00	0.00
			Max. Compression	2	-0.28	0.00	0.00
			Max. Mx	14	0.15	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	14	-0.00	0.00	0.00
T8	10 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	15	-10.00	0.10	-0.17
			Max. Mx	18	-4.84	0.21	0.00
			Max. My	2	-6.28	0.04	0.26
			Max. Vy	18	-0.34	0.04	0.00
			Max. Vx	15	0.41	-0.01	-0.04
		Diagonal	Max Tension	13	0.38	0.00	0.00
			Max. Compression	15	-1.56	0.00	0.00
			Max. Mx	15	-1.55	0.00	0.00
			Max. My	15	-0.62	0.00	-0.00
			Max. Vy	15	0.00	0.00	0.00
			Max. Vx	15	0.00	0.00	0.00
		Horizontal	Max Tension	2	0.85	0.00	0.00
			Max. Compression	2	-0.26	0.00	0.00
			Max. Mx	14	0.15	0.00	0.00
			Max. Vy	14	-0.00	0.00	0.00
		Top Girt	Max Tension	15	0.72	0.00	0.00
			Max. Compression	5	-0.13	0.00	0.00
			Max. Mx	14	0.17	0.00	0.00
			Max. Vy	14	-0.00	0.00	0.00
		Bottom Girt	Max Tension	15	0.47	0.00	0.00
			Max. Compression	2	-0.18	0.00	0.00
			Max. Mx	24	0.04	0.00	0.00
			Max. Vy	24	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C Elev 14.5 ft	Max. Vert	1	0.00	0.07	0.16
	Max. H_x	10	0.00	0.78	-0.14
	Max. H_z	2	0.00	-0.38	1.18
	Min. Vert	1	0.00	0.07	0.16
	Min. H_x	17	0.00	-2.00	0.54
	Min. H_z	8	0.00	0.46	-0.56
Leg B Elev 14.5 ft	Max. Vert	1	0.00	-0.08	-0.06
	Max. H_x	25	0.00	1.99	0.01
	Max. H_z	2	0.00	0.34	0.32
	Min. Vert	1	0.00	-0.08	-0.06
	Min. H_x	6	0.00	-0.90	-0.14
	Min. H_z	9	0.00	-0.07	-0.25
Leg C Elev 0.0 ft	Max. Vert	15	6.84	-0.07	-0.27
	Max. H_x	5	5.01	0.06	-0.10
	Max. H_z	27	3.12	-0.03	-0.08
	Min. Vert	38	3.09	-0.05	-0.08
	Min. H_x	24	4.89	-0.18	-0.10
	Min. H_z	2	6.29	-0.05	-0.29
Leg B Elev 0.0 ft	Max. Vert	15	6.29	-0.06	-0.03
	Max. H_x	5	3.77	0.07	0.10
	Max. H_z	18	4.64	0.06	0.12
	Min. Vert	28	3.00	-0.02	0.05
	Min. H_x	11	5.20	-0.17	0.08
	Min. H_z	2	5.71	-0.06	-0.07
Leg A Elev 0.0 ft	Max. Vert	19	5.69	0.23	-0.03
	Max. H_x	18	5.51	0.23	-0.01

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_z	5	4.71	0.23	0.00
	Min. Vert	38	2.96	0.06	-0.01
	Min. H_x	11	4.22	-0.01	-0.01
	Min. H_z	2	4.38	0.14	-0.20
Guy C @ 16 ft Elev 0 ft Azimuth 240 deg Elev 0.0 ft	Max. Vert	10	-0.26	-0.06	0.04
	Max. H_x	10	-0.26	-0.06	0.04
	Max. H_z	16	-8.58	-2.98	1.83
	Min. Vert	18	-8.97	-3.21	1.76
	Min. H_x	18	-8.97	-3.21	1.76
	Min. H_z	10	-0.26	-0.06	0.04
Guy B @ 16 ft Elev 0 ft Azimuth 120 deg Elev 0.0 ft	Max. Vert	6	-0.26	0.06	0.04
	Max. H_x	24	-9.07	3.24	1.77
	Max. H_z	26	-8.81	3.06	1.86
	Min. Vert	24	-9.07	3.24	1.77
	Min. H_x	6	-0.26	0.06	0.04
	Min. H_z	6	-0.26	0.06	0.04
Guy A @ 16 ft Elev 15.5 ft Azimuth 0 deg Elev 15.5 ft	Max. Vert	2	-0.05	-0.00	-0.02
	Max. H_x	23	-4.96	0.10	-3.26
	Max. H_z	2	-0.05	-0.00	-0.02
	Min. Vert	21	-6.14	0.00	-4.00
	Min. H_x	19	-5.11	-0.11	-3.34
	Min. H_z	21	-6.14	0.00	-4.00

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	9.65	-0.00	0.04	0.10	0.03	0.19
Dead+Wind 0 deg - No Ice+Guy	16.38	-0.03	0.56	1.40	0.43	0.29
Dead+Wind 30 deg - No Ice+Guy	14.51	-0.12	0.42	0.95	0.60	0.28
Dead+Wind 60 deg - No Ice+Guy	10.58	-0.22	0.03	-0.10	0.63	0.23
Dead+Wind 90 deg - No Ice+Guy	13.50	-0.36	0.00	-0.27	0.93	0.31
Dead+Wind 120 deg - No Ice+Guy	14.39	-0.33	0.01	-0.23	0.83	0.34
Dead+Wind 150 deg - No Ice+Guy	12.72	-0.16	0.05	-0.03	0.37	0.31
Dead+Wind 180 deg - No Ice+Guy	11.43	-0.00	0.06	0.12	-0.03	0.26
Dead+Wind 210 deg - No Ice+Guy	12.50	0.15	0.06	0.24	-0.41	0.26
Dead+Wind 240 deg - No Ice+Guy	14.19	0.33	0.03	0.32	-0.85	0.26
Dead+Wind 270 deg - No	13.42	0.36	0.02	0.33	-0.90	0.22

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
Ice+Guy						
Dead+Wind 300 deg - No Ice+Guy	10.67	0.21	0.06	0.35	-0.49	0.16
Dead+Wind 330 deg - No Ice+Guy	14.68	0.08	0.44	1.20	0.08	0.24
Dead+Ice+Temp+Guy	11.03	-0.01	0.04	0.13	0.06	0.21
Dead+Wind 0 deg+Ice+Temp+Guy	18.25	-0.02	0.48	1.26	0.41	0.32
Dead+Wind 30 deg+Ice+Temp+Guy	16.45	-0.09	0.36	0.86	0.52	0.30
Dead+Wind 60 deg+Ice+Temp+Guy	13.42	-0.20	0.01	-0.12	0.61	0.27
Dead+Wind 90 deg+Ice+Temp+Guy	15.95	-0.33	-0.00	-0.25	0.87	0.34
Dead+Wind 120 deg+Ice+Temp+Guy	16.78	-0.30	0.05	-0.13	0.79	0.37
Dead+Wind 150 deg+Ice+Temp+Guy	15.30	-0.17	0.10	0.09	0.43	0.34
Dead+Wind 180 deg+Ice+Temp+Guy	13.81	-0.01	0.12	0.28	0.02	0.30
Dead+Wind 210 deg+Ice+Temp+Guy	15.11	0.14	0.10	0.37	-0.38	0.31
Dead+Wind 240 deg+Ice+Temp+Guy	16.62	0.28	0.06	0.39	-0.74	0.31
Dead+Wind 270 deg+Ice+Temp+Guy	15.90	0.31	0.01	0.33	-0.80	0.28
Dead+Wind 300 deg+Ice+Temp+Guy	13.54	0.19	0.03	0.31	-0.44	0.22
Dead+Wind 330 deg+Ice+Temp+Guy	16.66	0.05	0.38	1.08	0.15	0.28
Dead+Wind 0 deg - Service+Guy	9.14	-0.01	0.04	0.10	0.06	0.17
Dead+Wind 30 deg - Service+Guy	9.23	-0.04	0.03	0.06	0.15	0.18
Dead+Wind 60 deg - Service+Guy	9.43	-0.07	0.04	0.04	0.21	0.20
Dead+Wind 90 deg - Service+Guy	9.70	-0.08	0.04	0.03	0.22	0.21
Dead+Wind 120 deg - Service+Guy	9.95	-0.07	0.04	0.04	0.18	0.22
Dead+Wind 150 deg - Service+Guy	10.13	-0.04	0.05	0.07	0.11	0.22
Dead+Wind 180 deg - Service+Guy	10.18	-0.00	0.05	0.11	0.01	0.22
Dead+Wind 210 deg - Service+Guy	10.09	0.03	0.05	0.15	-0.08	0.21
Dead+Wind 240 deg - Service+Guy	9.89	0.06	0.05	0.17	-0.14	0.19
Dead+Wind 270 deg - Service+Guy	9.62	0.07	0.05	0.18	-0.15	0.18
Dead+Wind 300 deg - Service+Guy	9.37	0.06	0.04	0.17	-0.12	0.17
Dead+Wind 330 deg - Service+Guy	9.19	0.03	0.04	0.14	-0.04	0.17

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	-1.74	0.00	-0.00	1.74	-0.00	0.016%
2	-0.02	-1.75	-3.99	0.02	1.75	3.98	0.019%
3	1.97	-1.74	-3.44	-1.97	1.74	3.44	0.018%
4	3.43	-1.74	-1.97	-3.43	1.74	1.97	0.014%
5	3.97	-1.74	0.02	-3.97	1.74	-0.02	0.015%
6	3.45	-1.74	2.01	-3.45	1.74	-2.01	0.016%
7	2.00	-1.74	3.46	-2.00	1.74	-3.46	0.013%
8	0.02	-1.73	3.99	-0.02	1.73	-3.99	0.006%
9	-1.97	-1.74	3.44	1.96	1.74	-3.44	0.015%
10	-3.43	-1.74	1.97	3.43	1.74	-1.97	0.016%
11	-3.97	-1.74	-0.02	3.97	1.74	0.02	0.013%
12	-3.45	-1.74	-2.01	3.45	1.74	2.01	0.007%
13	-2.00	-1.74	-3.46	2.00	1.74	3.46	0.016%
14	0.00	-3.19	0.00	-0.00	3.19	-0.00	0.006%
15	-0.03	-3.20	-4.02	0.03	3.20	4.02	0.020%
16	1.97	-3.20	-3.46	-1.97	3.20	3.46	0.019%
17	3.45	-3.19	-1.98	-3.44	3.19	1.98	0.014%
18	4.00	-3.19	0.03	-4.00	3.19	-0.03	0.015%
19	3.48	-3.19	2.03	-3.48	3.19	-2.03	0.016%
20	2.02	-3.18	3.48	-2.02	3.18	-3.48	0.014%
21	0.03	-3.17	4.00	-0.03	3.17	-4.00	0.007%
22	-1.97	-3.18	3.46	1.97	3.18	-3.46	0.013%
23	-3.46	-3.19	1.99	3.46	3.19	-1.99	0.017%
24	-4.00	-3.19	-0.03	4.00	3.19	0.03	0.013%
25	-3.47	-3.19	-2.03	3.47	3.19	2.03	0.009%
26	-2.02	-3.20	-3.48	2.02	3.20	3.48	0.017%
27	-0.01	-1.74	-1.38	0.01	1.74	1.38	0.005%
28	0.68	-1.74	-1.19	-0.68	1.74	1.19	0.013%
29	1.19	-1.74	-0.68	-1.19	1.74	0.68	0.015%
30	1.37	-1.74	0.01	-1.37	1.74	-0.01	0.012%
31	1.19	-1.74	0.70	-1.19	1.74	-0.70	0.015%
32	0.69	-1.74	1.20	-0.69	1.74	-1.20	0.017%
33	0.01	-1.74	1.38	-0.01	1.74	-1.38	0.009%
34	-0.68	-1.74	1.19	0.68	1.74	-1.19	0.012%
35	-1.19	-1.74	0.68	1.19	1.74	-0.68	0.011%
36	-1.37	-1.74	-0.01	1.37	1.74	0.01	0.009%
37	-1.19	-1.74	-0.70	1.19	1.74	0.70	0.011%
38	-0.69	-1.74	-1.20	0.69	1.74	1.20	0.010%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	17	0.00000001	0.00012949
2	Yes	45	0.00000001	0.00013572
3	Yes	43	0.00000001	0.00013062
4	Yes	26	0.00000001	0.00013352
5	Yes	34	0.00000001	0.00012694
6	Yes	34	0.00000001	0.00013929
7	Yes	30	0.00000001	0.00014144
8	Yes	16	0.00000001	0.00012055
9	Yes	29	0.00000001	0.00014585
10	Yes	34	0.00000001	0.00014209
11	Yes	35	0.00000001	0.00013484
12	Yes	28	0.00000001	0.00011283
13	Yes	44	0.00000001	0.00013365

14	Yes	12	0.00000001	0.00010178
15	Yes	45	0.00000001	0.00014892
16	Yes	43	0.00000001	0.00014917
17	Yes	28	0.00000001	0.00013362
18	Yes	34	0.00000001	0.00012639
19	Yes	34	0.00000001	0.00013694
20	Yes	31	0.00000001	0.00014076
21	Yes	18	0.00000001	0.00010473
22	Yes	31	0.00000001	0.00012412
23	Yes	34	0.00000001	0.00014741
24	Yes	35	0.00000001	0.00013645
25	Yes	28	0.00000001	0.00013887
26	Yes	44	0.00000001	0.00014884
27	Yes	16	0.00000001	0.00009323
28	Yes	15	0.00000001	0.00014466
29	Yes	16	0.00000001	0.00013831
30	Yes	17	0.00000001	0.00010533
31	Yes	16	0.00000001	0.00012639
32	Yes	14	0.00000001	0.00014754
33	Yes	13	0.00000001	0.00010072
34	Yes	15	0.00000001	0.00010987
35	Yes	17	0.00000001	0.00010530
36	Yes	18	0.00000001	0.00010181
37	Yes	17	0.00000001	0.00013943
38	Yes	16	0.00000001	0.00013494

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	59 - 58	2.079	36	0.3983	2.0264
T2	58 - 56	1.997	36	0.3854	1.9078
T3	56 - 50	1.846	36	0.3626	1.7537
T4	50 - 40	1.389	36	0.3386	1.6924
T5	40 - 30	0.755	36	0.2511	1.4226
T6	30 - 20	0.339	30	0.1486	0.9879
T7	20 - 10	0.095	30	0.0933	0.3560
T8	10 - 0	0.015	30	0.0180	0.0129

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
60.00	12' Omni x 2" OD	36	2.079	0.3983	2.0264	31169
59.00	4' Standoff Mount	36	2.079	0.3983	2.0264	31169
57.00	5' Omni x 1" OD	36	1.920	0.3731	1.8177	31169
55.00	2' Standoff Mount	36	1.770	0.3550	1.7131	31169
51.00	APX16DWV_16DWVS	36	1.464	0.3417	1.6906	8762
45.75	Guy	36	1.093	0.3114	1.6257	5075
32.00	Guy	30	0.407	0.1652	1.0932	6261

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	59 - 58	11.708	15	1.9139	4.5938
T2	58 - 56	11.308	15	1.8986	4.2355
T3	56 - 50	10.522	15	1.8733	3.7709
T4	50 - 40	8.148	15	1.8049	3.5614
T5	40 - 30	4.588	15	1.4795	2.9543
T6	30 - 20	2.005	2	0.9573	2.0289
T7	20 - 10	0.494	2	0.5287	0.7308
T8	10 - 0	0.093	2	0.1012	0.0314

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
60.00	12' Omni x 2" OD	15	11.708	1.9139	4.5938	14145
59.00	4' Standoff Mount	15	11.708	1.9139	4.5938	14145
57.00	5' Omni x 1" OD	15	10.914	1.8851	3.9603	14145
55.00	2' Standoff Mount	15	10.127	1.8629	3.6501	14145
51.00	APX16DWV_16DWVS	15	8.540	1.8201	3.5590	2839
45.75	Guy	15	6.543	1.7040	3.4009	1615
32.00	Guy	2	2.430	1.0594	2.2484	1147

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	59	Leg	SAEGR-5	0.3802	4	1.16	3.74	0.311 ✓	1.333	Bearing
T2	58	Leg	SAEGR-5	0.3802	4	0.82	3.74	0.219 ✓	1.333	Bearing
T3	56	Leg	SAEGR-5	0.3802	4	0.47	3.74	0.127 ✓	1.333	Bearing
T4	50	Leg	SAEGR-5	0.3802	4	1.74	3.74	0.466 ✓	1.333	Bearing
T5	40	Leg	SAEGR-5	0.3802	4	4.38	3.74	1.173 ✓	1.333	Bearing
T6	30	Leg	SAEGR-5	0.3802	4	6.38	3.74	1.707 ✗	1.333	Bearing
T7	20	Leg	SAEGR-5	0.3802	4	5.92	3.74	1.585 ✗	1.333	Bearing
T8	10	Leg	SAEGR-5	0.3802	4	5.00	3.74	1.338 ✗	1.333	Bearing

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
T4	45.75 (A) (297)	3/8 EHS	1.54	15.40	4.70	7.70	2.000	3.278 ✓
	45.75 (B) (296)	3/8 EHS	1.54	15.40	5.60	7.70	2.000	2.751 ✓
	45.75 (C) (295)	3/8 EHS	1.54	15.40	5.50	7.70	2.000	2.801 ✓
T5	32.00 (A) (300)	3/8 EHS	1.54	15.40	2.73	7.70	2.000	5.636 ✓
	32.00 (B) (299)	3/8 EHS	1.54	15.40	4.27	7.70	2.000	3.603 ✓
	32.00 (C) (298)	3/8 EHS	1.54	15.40	4.27	7.70	2.000	3.608 ✓

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	59 - 58	ROHN 1.25x14 ga	1.00	0.92	19.5 K=1.00	1.00	28.356	0.3161	-2.30	8.96	0.257 ✓
T2	58 - 56	ROHN 1.25x14 ga	2.08	1.91	40.5 K=1.00	1.00	25.758	0.3161	-1.86	8.14	0.229 ✓
T3	56 - 50	ROHN 1.25x14 ga	6.00	1.35	28.8 K=1.00	1.00	27.305	0.3161	-3.48	8.63	0.403 ✓
T4	50 - 40	ROHN 1.25x14 ga	10.00	1.25	26.5 K=1.00	0.99	27.282	0.3161	-8.77	8.62	1.017 ✓
T5	40 - 30	ROHN 1.25x14 ga H1-3 (1.53 CR) - 105	10.00	1.25	26.5 K=1.00	0.99	27.255	0.3161	-13.20	8.61	1.532 ✗
T6	30 - 20	ROHN 1.25x14 ga bolt (1.71 CR) - 153/7	10.00	1.25	26.5 K=1.00	0.99	27.232	0.3161	-12.75	8.61	1.482 ✗
T7	20 - 10	ROHN 1.25x14 ga bolt (1.59 CR) - 201/4	10.00	1.25	26.5 K=1.00	0.98	27.135	0.3161	-12.75	8.58	1.487 ✗
T8	10 - 0	ROHN 1.25x14 ga	10.00	1.25	26.5 K=1.00	0.98	27.023	0.3161	-10.00	8.54	1.170 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	59 - 58	7/16	1.04	0.76	82.0 K=0.99	15.127	0.1503	-1.56	2.27	0.687 ✔
T2	58 - 56	7/16	2.11	1.82	126.0 K=0.63	9.400	0.1503	-1.30	1.41	0.923 ✔
T3	56 - 50	7/16	2.02	1.83	126.8 K=0.63	9.288	0.1503	-1.26	1.40	0.899 ✔
T4	50 - 40	7/16	1.95	1.77	122.5 K=0.63	9.919	0.1503	-1.55	1.49	1.040 ✔
T5	40 - 30	7/16	1.95	1.77	122.5 K=0.63	9.919	0.1503	-1.72	1.49	1.151 ✔
T6	30 - 20	7/16	1.95	1.77	122.5 K=0.63	9.919	0.1503	-1.69	1.49	1.132 ✔
T7	20 - 10	7/16	1.95	1.77	122.5 K=0.63	9.919	0.1503	-1.60	1.49	1.075 ✔
T8	10 - 0	7/16	1.95	1.77	122.5 K=0.63	9.919	0.1503	-1.56	1.49	1.043 ✔

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T3	56 - 50	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-0.69	2.06	0.334 ✔
T4	50 - 40	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-1.01	2.06	0.490 ✔
T5	40 - 30	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-0.75	2.06	0.363 ✔
T6	30 - 20	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-0.67	2.06	0.325 ✔
T7	20 - 10	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-0.75	2.06	0.362 ✔
T8	10 - 0	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-0.26	2.06	0.124 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	59 - 58	7/16	0.50	0.36	39.3 K=0.99	19.247	0.1503	-0.39	2.89	0.135 ✔
T2	58 - 56	7/16	0.54	0.40	43.8 K=0.99	18.880	0.1503	-0.47	2.84	0.164 ✔
T3	56 - 50	7/16	1.50	1.36	94.1 K=0.63	13.709	0.1503	-0.13	2.06	0.062 ✔
T4	50 - 40	7/16	1.50	1.36	94.1	13.709	0.1503	-0.73	2.06	0.356

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=0.63					✓
T5	40 - 30	7/16	1.50	1.36	94.1	13.709	0.1503	-0.47	2.06	0.227
					K=0.63					✓
T6	30 - 20	7/16	1.50	1.36	94.1	13.709	0.1503	-0.54	2.06	0.264
					K=0.63					✓
T7	20 - 10	7/16	1.50	1.36	94.1	13.709	0.1503	-0.44	2.06	0.214
					K=0.63					✓
T8	10 - 0	7/16	1.50	1.36	94.1	13.709	0.1503	-0.13	2.06	0.063
					K=0.63					✓

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	59 - 58	7/16	0.50	0.36	39.3	19.247	0.1503	-0.45	2.89	0.157
					K=0.99					✓
T2	58 - 56	7/16	1.46	1.32	91.2	14.057	0.1503	-0.16	2.11	0.074
					K=0.63					✓
T3	56 - 50	7/16	1.50	1.36	94.1	13.709	0.1503	-0.54	2.06	0.264
					K=0.63					✓
T4	50 - 40	7/16	1.50	1.36	94.1	13.709	0.1503	-0.33	2.06	0.159
					K=0.63					✓
T5	40 - 30	7/16	1.50	1.36	94.1	13.709	0.1503	-0.43	2.06	0.208
					K=0.63					✓
T6	30 - 20	7/16	1.50	1.36	94.1	13.709	0.1503	-0.43	2.06	0.208
					K=0.63					✓
T7	20 - 10	7/16	1.50	1.36	94.1	13.709	0.1503	-0.28	2.06	0.137
					K=0.63					✓
T8	10 - 0	7/16	1.50	1.36	94.1	13.709	0.1503	-0.18	2.06	0.087
					K=0.63					✓

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	50 - 40	1 1/4	1.50	1.36	52.3	23.990	1.2272	-0.27	29.44	0.009
					K=1.00					✓
T5	40 - 30	1 1/4	1.50	1.36	52.3	23.990	1.2272	-0.29	29.44	0.010
					K=1.00					✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	59 - 58	ROHN 1.25x14 ga	1.00	0.92	19.5	30.000	0.3161	2.32	9.48	0.245 ✔
T2	58 - 56	ROHN 1.25x14 ga	2.08	1.91	40.5	30.000	0.3161	1.88	9.48	0.198 ✔
T3	56 - 50	ROHN 1.25x14 ga	6.00	1.35	28.8	30.000	0.3161	2.61	9.48	0.275 ✔
T4	50 - 40	ROHN 1.25x14 ga	10.00	1.25	26.5	30.000	0.3161	5.62	9.48	0.593 ✔
T5	40 - 30	ROHN 1.25x14 ga	10.00	1.25	26.5	30.000	0.3161	4.16	9.48	0.438 ✔
T6	30 - 20	H1-3 (1.33 CR) - 104/2 ROHN 1.25x14 ga	10.00	1.25	26.5	30.000	0.3161	0.42	9.48	0.045 ✔
T7	20 - 10	bolt (1.53 CR) - 152/7 ROHN 1.25x14 ga	10.00	1.25	26.5	30.000	0.3161	0.39	9.48	0.041 ✔

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	59 - 58	7/16	1.04	0.76	82.9	21.600	0.1503	1.53	3.25	0.470 ✔
T2	58 - 56	7/16	2.11	1.82	200.1	21.600	0.1503	1.39	3.25	0.429 ✔
T3	56 - 50	7/16	2.02	1.83	201.3	21.600	0.1503	1.22	3.25	0.377 ✔
T4	50 - 40	7/16	1.95	1.77	194.5	21.600	0.1503	1.53	3.25	0.470 ✔
T5	40 - 30	7/16	1.95	1.77	194.5	21.600	0.1503	1.24	3.25	0.383 ✔
T6	30 - 20	7/16	1.95	1.77	194.5	21.600	0.1503	1.26	3.25	0.388 ✔
T7	20 - 10	7/16	1.95	1.77	194.5	21.600	0.1503	1.19	3.25	0.367 ✔
T8	10 - 0	7/16	1.95	1.77	194.5	21.600	0.1503	0.38	3.25	0.117 ✔

Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T3	56 - 50	7/16	1.50	1.36	149.4	21.600	0.1503	0.71	3.25	0.219 ✔
T4	50 - 40	7/16	1.50	1.36	149.4	21.600	0.1503	1.02	3.25	0.315 ✔
T5	40 - 30	7/16	1.50	1.36	149.4	21.600	0.1503	0.80	3.25	0.248 ✔
T6	30 - 20	7/16	1.50	1.36	149.4	21.600	0.1503	0.96	3.25	0.297 ✔
T7	20 - 10	7/16	1.50	1.36	149.4	21.600	0.1503	1.42	3.25	0.436* ✔
T8	10 - 0	7/16	1.50	1.36	149.4	21.600	0.1503	0.85	3.25	0.262 ✔

* DL controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	59 - 58	7/16	0.50	0.36	39.7	21.600	0.1503	0.39	3.25	0.120 ✔
T2	58 - 56	7/16	0.54	0.40	44.3	21.600	0.1503	0.43	3.25	0.133 ✔
T3	56 - 50	7/16	1.50	1.36	149.4	21.600	0.1503	0.19	3.25	0.059 ✔
T4	50 - 40	7/16	1.50	1.36	149.4	21.600	0.1503	0.72	3.25	0.221 ✔
T5	40 - 30	7/16	1.50	1.36	149.4	21.600	0.1503	0.44	3.25	0.136 ✔
T6	30 - 20	7/16	1.50	1.36	149.4	21.600	0.1503	0.68	3.25	0.208 ✔
T7	20 - 10	7/16	1.50	1.36	149.4	21.600	0.1503	0.54	3.25	0.166 ✔
T8	10 - 0	7/16	1.50	1.36	149.4	21.600	0.1503	0.72	3.25	0.221 ✔

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	59 - 58	7/16	0.50	0.36	39.7	21.600	0.1503	0.37	3.25	0.115 ✔
T2	58 - 56	7/16	1.46	1.32	144.8	21.600	0.1503	0.19	3.25	0.058 ✔
T3	56 - 50	7/16	1.50	1.36	149.4	21.600	0.1503	0.58	3.25	0.179

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	50 - 40	7/16	1.50	1.36	149.4	21.600	0.1503	0.44	3.25	0.136
T5	40 - 30	7/16	1.50	1.36	149.4	21.600	0.1503	0.66	3.25	0.202
T6	30 - 20	7/16	1.50	1.36	149.4	21.600	0.1503	0.48	3.25	0.148
T7	20 - 10	7/16	1.50	1.36	149.4	21.600	0.1503	0.54	3.25	0.166
T8	10 - 0	7/16	1.50	1.36	149.4	21.600	0.1503	0.47	3.25	0.145

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	50 - 40	1 1/4	1.50	1.36	52.3	30.000	1.2272	1.32	36.82	0.036
T5	40 - 30	1 1/4	1.50	1.36	52.3	30.000	1.2272	1.22	36.82	0.033

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	59 - 58	Leg	ROHN 1.25x14 ga	1	-2.30	11.95	19.2 23.3 (b)	Pass
		Diagonal	7/16	10	-1.56	3.03	51.5	Pass
		Top Girt	7/16	6	-0.39	3.86	10.2	Pass
		Bottom Girt	7/16	9	-0.45	3.86	11.8	Pass
T2	58 - 56	Leg	ROHN 1.25x14 ga	15	-1.86	10.85	17.2	Pass
		Diagonal	7/16	23	-1.30	1.88	69.2	Pass
		Top Girt	7/16	18	-0.47	3.78	12.3	Pass
		Bottom Girt	7/16	21	-0.16	2.82	5.5	Pass
T3	56 - 50	Leg	ROHN 1.25x14 ga	25	-3.48	11.50	30.2	Pass
		Diagonal	7/16	34	-1.26	1.86	67.5	Pass
		Horizontal	7/16	39	-0.69	2.75	25.1	Pass
		Top Girt	7/16	28	-0.13	2.75	4.7	Pass
		Bottom Girt	7/16	31	-0.54	2.75	19.8	Pass
T4	50 - 40	Leg	ROHN 1.25x14 ga	57	-8.77	11.49	76.3	Pass
		Diagonal	7/16	100	-1.55	1.99	78.0	Pass
		Horizontal	7/16	97	-1.01	2.75	36.8	Pass
		Top Girt	7/16	60	-0.73	2.75	26.7	Pass
		Bottom Girt	7/16	61	-0.33	2.75	12.0	Pass
		Guy A@45.75	3/8	297	4.70	7.70	61.0	Pass
		Guy B@45.75	3/8	296	5.60	7.70	72.7	Pass
		Guy C@45.75	3/8	295	5.50	7.70	71.4	Pass
		Top Guy Pull-Off@45.75	1 1/4	87	1.32	49.08	2.7	Pass

tnxTower	Job: Ansonia Guy Tower	Page: 35 of 35
KM Consulting Engineers, Inc. 9 Forest Lane Ewing, NJ 08628 Phone: (609) 538-0400 FAX:	Project: Ansonia Load Case 1 (proposed)	Date: 08:58:44 07/11/14
	Client: HPC Development	Designed by: Domenic Aversa

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T5	40 - 30	Leg	ROHN 1.25x14 ga	105	-13.20	11.48	114.9	Fail ✗
		Diagonal	7/16	113	-1.72	1.99	86.4	Pass
		Horizontal	7/16	121	-0.75	2.75	27.2	Pass
		Top Girt	7/16	108	-0.47	2.75	17.0	Pass
		Bottom Girt	7/16	111	-0.43	2.75	15.6	Pass
		Guy A@32	3/8	300	2.73	7.70	35.5	Pass
		Guy B@32	3/8	299	4.27	7.70	55.5	Pass
		Guy C@32	3/8	298	4.27	7.70	55.4	Pass
		Top Guy Pull-Off@32	1 1/4	117	1.22	49.08	2.5	Pass
T6	30 - 20	Leg	ROHN 1.25x14 ga	153	-12.75	11.47	111.2 128.0 (b)	Fail ✗
		Diagonal	7/16	197	-1.69	1.99	85.0	Pass
		Horizontal	7/16	194	-0.67	2.75	24.4	Pass
		Top Girt	7/16	155	-0.54	2.75	19.8	Pass
		Bottom Girt	7/16	157	-0.43	2.75	15.6	Pass
T7	20 - 10	Leg	ROHN 1.25x14 ga	201	-12.75	11.43	111.6 118.9 (b)	Fail ✗
		Diagonal	7/16	210	-1.60	1.99	80.7	Pass
		Horizontal	7/16	223	1.42	3.25	43.6	Pass
		Top Girt	7/16	202	-0.44	2.75	16.0	Pass
		Bottom Girt	7/16	205	0.54	4.33	12.5	Pass
T8	10 - 0	Leg	ROHN 1.25x14 ga	249	-10.00	11.39	87.8 100.3 (b)	Fail ✗
		Diagonal	7/16	294	-1.56	1.99	78.3	Pass
		Horizontal	7/16	261	0.85	4.33	19.6	Pass
		Top Girt	7/16	252	0.72	4.33	16.6	Pass
		Bottom Girt	7/16	255	0.47	4.33	10.9	Pass
							Summary	
						Leg (T6)	128.0	Fail ✗
						Diagonal (T5)	86.4	Pass
						Horizontal (T7)	43.6	Pass
						Top Girt (T4)	26.7	Pass
						Bottom Girt (T3)	19.8	Pass
						Guy A (T4)	61.0	Pass
						Guy B (T4)	72.7	Pass
						Guy C (T4)	71.4	Pass
						Top Guy Pull-Off (T4)	2.7	Pass
						Bolt Checks	128.0	Fail ✗
						RATING =	**128.0**	**Fail ✗**

EXHIBIT C

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

MetroPCS / T-Mobile Existing Facility

Site ID: CTNH520A

Knapp Ansonia Lattice Tower
21 Birchwood Drive
Ansonia, CT 06401

June 30, 2014

EBI PROJECT NUMBER: 62143691

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

EBI Consulting
environmental | engineering | due diligence

June 30, 2014

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

Re: Emissions Values for Site: **CTNH520A - Knapp Ansonia Lattice Tower**

EBI Consulting was directed to analyze the proposed MetroPCS / T-Mobile facility located at 21 Birchwood Drive, Ansonia, CT, for the purpose of determining whether the emissions from the Proposed MetroPCS / T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS and AWS bands is 1000 μW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed MetroPCS / T-Mobile Wireless antenna facility located at 21 Birchwood Drive, Ansonia, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since MetroPCS / T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower

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

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz / 1980.000 MHz—to 1985.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
3) 2 LTE channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications

7) The antenna mounting height centerline of the proposed antennas is **51 feet** above ground level (AGL)
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

Site ID	CTNH520A - Knapp Ansonia Lattice Tower
Site Address	21 Birchwood Drive, ansonia, CT 06401
Site Type	Guyed Tower

Sector 1																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS-E-A20	Passive	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.25	51	45	7/8"	1.2	0	21.535316	3.823246	0.38232%
1B	RFS	APX16DWV-16DWVS-E-A20	Passive	AWS - 2100 MHz	UMTS/LTE	40	4	160	-3.25	51	45	7/8"	1.2	0	57.42751	10.19532	1.01953%
														Sector total Power Density Value:		1.402%	

Sector 2																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS-E-A20	Passive	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.25	51	45	7/8"	1.2	0	21.535316	3.823246	0.38232%
1B	RFS	APX16DWV-16DWVS-E-A20	Passive	AWS - 2100 MHz	UMTS/LTE	40	4	160	-3.25	51	45	1-5/8"	1.2	0	57.42751	10.19532	1.01953%
														Sector total Power Density Value:		1.402%	

Sector 3																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX16DWV-16DWVS-E-A20	Passive	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.25	51	45	7/8"	1.2	0	21.535316	3.823246	0.38232%
1B	RFS	APX16DWV-16DWVS-E-A20	Passive	AWS - 2100 MHz	UMTS/LTE	40	4	160	-3.25	51	45	1-5/8"	1.2	0	57.42751	10.19532	1.01953%
														Sector total Power Density Value:		1.402%	

Site Composite MPE %	
Carrier	MPE %
MetroPCS / T-Mobile	4.206%
Radio Comm. Corp	4.150%
Paging Assoc. Inc	14.500%
Paging	7.080%
Paging	9.590%
Total Site MPE %	**39.526%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the MetroPCS / T-Mobile facility are **1.402% (4.206% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **39.526%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

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