

EM-SPRINT-077-131008

60 Adams Street

Manchester

Alcatel-Lucent 

RECEIVED
JUL 10 2014

1 Robbins Road
Westford, MA 01886

July 9, 2014

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

CONNECTICUT
SITING COUNCIL

RE: Notification of Construction Completion on telecommunication facilities

To whom it may concern:

Alcatel Lucent hereby acknowledges that the list of attached sites have completed construction per the approval granted on the specified date. Please advise if further information is needed..

Very truly yours,

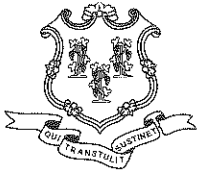
Martha Powers

Martha Powers
Lead Development Manager
Alcatel-Lucent
Sprint Vision Project
1 Robbins Road
Westford, MA 01886

Cc: FST, Siterra

EM/TS #	Address	Town	Sprint ID	Decision Date
EM-SPRINT-062-130912	1065 Wintergreen Avenue	Hamden	CT03XC003	10/15/2013
EM-SPRINT-NEXTEL-060-130118	10 Tanner Marsh Road	Guilford	CT03XC022	2/14/2013
EM-SPRINT-004-130822	181 Montevideo Road	Avon	CT03XC053	9/6/2013
EM-SPRINT-NEXTEL-155-130214A	1358 New Britain Ave.	West Hartford	CT03XC057	3/1/2013
EM-SPRINT-NEXTEL-164-130201	440 Hayden Station Road	Windsor	CT03XC065	3/8/2013
EM-SPRINT-NEXTEL-132-130201	59 McGuire Road	South Windsor	CT03XC066	3/1/2013
EM-SPRINT-NEXTEL-054-130201	299 Paxton Way	Glastonbury	CT03XC081	3/1/2013
EM-SPRINT-NEXTEL-094-130214E	36 Prospect Street	Newington	CT03XC084	3/1/2013
EM-SPRINT-110-130725	10 Sparks Street	Plainville	CT03XC086	8/8/2013
EM-SPRINT-007-130314	260 Beckley Road	Kensington	CT03XC088	4/5/2013
EM-SPRINT-NEXTEL-155-130201	570 New Park Avenue	West Hartford	CT03XC091	3/1/2013
EM-SPRINT-NEXTEL-106-130201	430 Middlesex Turnpike	Old Saybrook	CT03XC102	3/1/2013
EM-SPRINT-NEXTEL-105-130201	30 Short Hills Road	Old Lyme	CT03XC104	3/1/2013
EM-SPRINT-NEXTEL-152-130201	41 Manitock Hill Road	Waterford	CT03XC105	3/1/2013
EM-SPRINT-NEXTEL-045-130201	93 Roxbury Road	East Lyme	CT03XC110	3/1/2013
EM-SPRINT-152-130114	45R Fargo Road	Waterford	CT03XC112	2/14/2013
EM-SPRINT-NEXTEL-027-130201	48 Cow Hill Road	Clinton	CT03XC156	3/1/2013
EM-SPRINT-NEXTEL-082-130201	238 Meridan Road	Middlefield	CT03XC160	3/8/2013
EM-SPRINT-047-130109	160 Plantation Road	East Windsor	CT03XC202	2/7/2013
EM-SPRINT-NEXTEL-077-130214	53 Slater Street	Manchester	CT03XC211	3/1/2013
EM-SPRINT-142-130109	497 Old Post Road	Tolland	CT03XC212	2/7/2013
EM-SPRINT-NEXTEL-042-130222	94 East High Street	East Hampton	CT03XC335	3/8/2013
EM-SPRINT-057-121226	Butternut Hollow Road	Greenwich	CT03XC343	1/11/2013
EM-SPRINT-158-130213	515 Boston Post Road	Westport	CT03XC355	3/1/2013
EM-SPRINT-046-130402	206 Everett Road	Easton	CT03XC362	4/19/2013
EM-SPRINT-085-130322	474 MAIN STREET	MONROE	CT03XC365	4/5/2013
EM-SPRINT-086-131011	57 Cook Drive	Montville	CT03XC365	10/25/2013
EM-SPRINT-118-130322	76 EAST RIDGE	RIDGEFIELD	CT03XC370	4/5/2013
EM-SPRINT-097-131230	20 Barnabas Road	Newtown	CT03XC383	1/21/2014
EM-SPRINT-051-130207	3965 Congress Street	Fairfield	CT03XC385	3/1/2013
EM-SPRINT-NEXTEL-094-130214A	123 Costello Road	Newington	CT23XC555	3/1/2013
EM-SPRINT-119-131008	699 Old Main Street	Rocky Hill	CT23XC556	10/25/2013
EM-SPRINT-077-131008	60 Adams Street	Manchester	CT23XC557	10/25/2013
EM-SPRINT-NEXTEL-080-130123	462 West Main Street	Meriden	CT25XC840	2/14/2013
EM-SPRINT-096-130920	18 Hilltop View Lane	New Milford	CT33XC095	10/4/2013
EM-SPRINT-157-130213	237 Godfrey Road	Weston	CT33XC522	3/1/2013
EM-SPRINT-018-131008	20 Vale Road	Brookfield	CT33XC525	10/25/2013
EM-SPRINT-077-130528	595 Keeney Street	Manchester	CT33XC538	6/14/2013
EM-SPRINT-NEXTEL-129-130214	400 Main Street	Somers	CT33XC554	3/1/2013
EM-SPRINT-047-130322	15 CHAMBERLAIN	BROADBROOK	CT33XC565	4/5/2013
EM-SPRINT-004-130502	277 Huckleberry Road	Avon	CT33XC589	5/17/2013

EM-SPRINT-143-130604	218 Wheeler Road	Torrington	CT33XC592	6/28/2013
EM-SPRINT-140-130724	583 Chapel Street	Thomaston	CT33XC603	8/8/2013
EM-SPRINT-103-130920	Charles Marshall Drive	Norwalk	CT33XC802	10/4/2013
EM-SPRINT-NEXTEL-064-130214	439-455 Homestead Ave.	Hartford	CT43XC805	3/1/2013
EM-SPRINT-064-130311	99 Meadow Street	Hartford	CT43XC806	4/5/2013
EM-SPRINT-083-131127	290 Preston Ave.	Middletown	CT43XC816	12/16/2013
EM-SPRINT-128-130920	530 Bushy Hill Road	Simsbury	CT43XC825	10/4/2013
EM-SPRINT-164-130405A	340 Bloomfield Avenue	Windsor	CT43XC826	4/19/2013
EM-SPRINT-077-130109	239 Middle Turnpike	Manchester	CT43XC827	2/13/2013
EM-SPRINT-165-130118	2-4 Volunteer Drive	Windsor Locks	CT43XC828	2/14/2013
EM-SPRINT-NEXTEL-139-130214	44 Fyler Place	Suffield	CT43XC829	3/8/2013
EM-SPRINT-111-130712	171 Town Hill Road	Plymouth	CT54XC712	7/26/2013
EM-SPRINT-009-130322	38 Spring Hill Road	Bethel	CT54XC749	4/5/2013
EM-SPRINT-154-131011	315 Spencer Plains Road	Westbrook	CT54XC758	10/25/2013
EM-SPRINT-023-130405	14 Canton Springs Road	Canton	CT54XC760	4/19/2013
EM-SPRINT-104-130606	153 Old Salem Road	Norwich	CT54XC775	6/28/2013
EM-SPRINT-164-130405B	99 Day Hill Road	Windsor	CT54XC787	4/19/2013
EM-SPRINT-132-130920	300 Governor's Highway	South Windsor	CT60XC014	10/4/2013
EM-SPRINT-094-130108	605 Willard Avenue	Newington	CT60XC018	1/25/2013
EM-SPRINT-146-130506	197 South Street	Vernon	CT60XC935	5/24/2013
EM-SPRINT-146-130311	777 Talcottville Road	Vernon	CT70XC147	4/5/2013
EM-SPRINT-126-130531	62 Birdseye Road	Shelton	CT73XC004	6/21/2013



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

www.ct.gov/csc

October 25, 2013

Melanie Howlett
HPC Wireless Services
22 Shelter Rock Lane, Building C
Danbury, CT 06811

RE: **EM-SPRINT-077-131008** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 60 Adams Street, Manchester, Connecticut.

Dear Ms. Howlett:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated October 4, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.



Very truly yours,



Melanie A. Bachman
Acting Executive Director

MAB/CDM/cm

c: The Honorable Leo V. Diana, Mayor, Town of Manchester
James Davis, Zoning Enforcement Officer, Town of Manchester
Pom Pom Gali



October 4, 2013

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – Exempt Modification
60 Adams Street, Manchester, Connecticut

ORIGINAL
RECEIVED
OCT - 8 2013

CONNECTICUT
SITING COUNCIL

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. (“Sprint”). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Manchester.

Sprint plans to modify the existing wireless communications facility owned by the Balch Bridge Street Corporation and located at 60 Adams Street, Manchester (coordinates 41°-47’-38.64” N, 72°-33’-19.24” W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration, subject to modifications detailed in the attached structural documentation. Also included is a power density report reflecting the modification to Sprint’s operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will remove only six (6) of the existing CMDA antennas and add three (3) dual-band panel LTE antennas onto the existing platform which shall be reinforced, at a centerline height of approximately 115’ AGL. Three (3) other existing Clearwire antennas and two (2) satellite dish antennas shall remain. Sprint will also install six (6)

RRHs (remote radio heads) on new pipe masts behind the panel antennas, also at a centerline height of approximately 115' AGL. Sprint will also install three (3) hybridflex cables along the existing coaxial cable run, and will remove the existing coaxial cables. The proposed modifications will not extend the height of the approximately 140' structure.

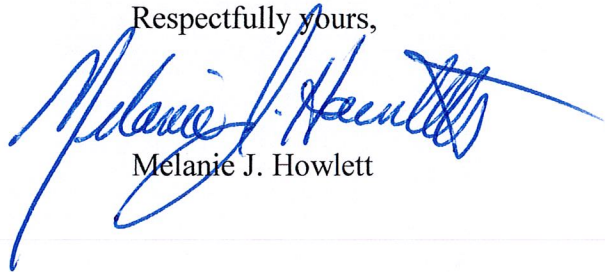
2. Sprint will replace the three (3) of the four (4) existing cabinets with three (3) similar cabinets, all on the existing concrete pad with canopy. Sprint will place a new fiber/power junction box on new posts on a proposed H-frame also on the existing concrete pad. The existing GPS Antenna will be removed and replaced with a new GPS Antenna. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 31.424%; the combined site operations will result in a total power density of approximately 95.014%.

Please contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Melanie J. Howlett

Attachments

cc: Honorable Leo V. Diana, Mayor, Town of Manchester
Pom Pom Gali (underlying property owner)

sprint
 6391 Sprint Parkway
 Overland Park, KS 66251

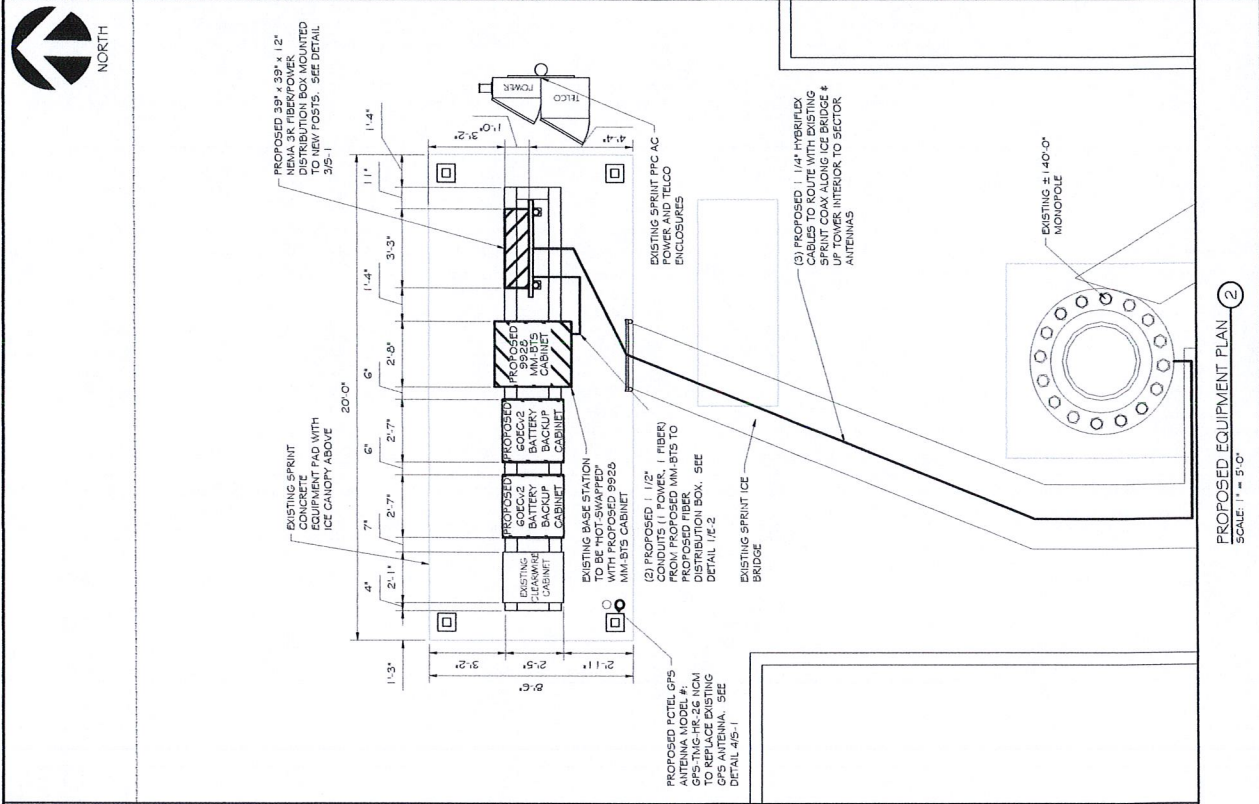
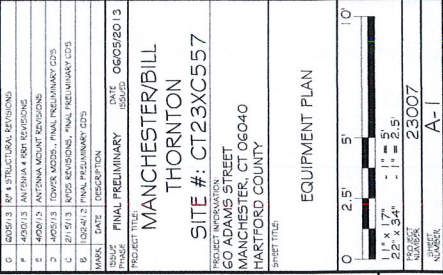
Alcatel-Lucent

RAMAKER & ASSOCIATES, INC.
 1120 Dallas Street, Suik City, WI 53583
 Phone: 608-643-4100 Fax: 608-643-7999
 www.Ramaker.com

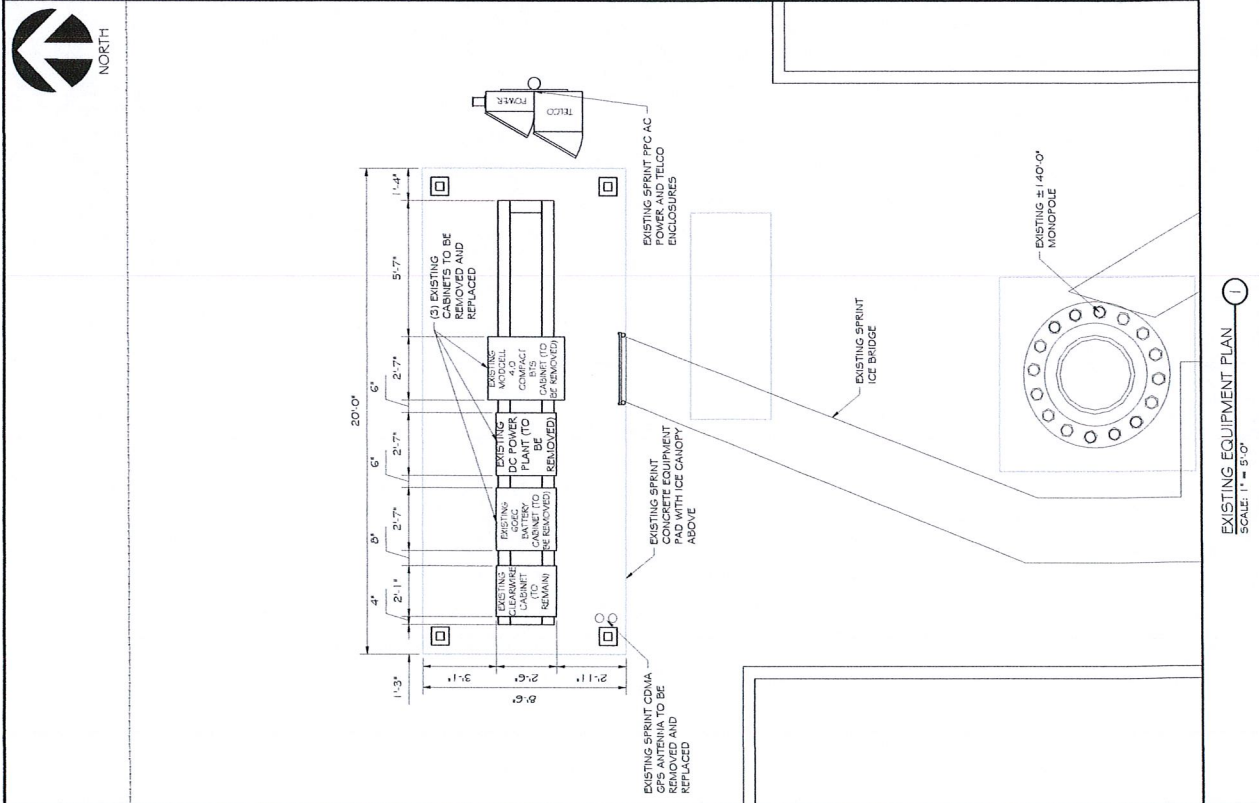
**NETWORK VISION
 MMBTS LAUNCH
 NORTHERN CT MARKET**

MARK	DATE	DESCRIPTION
G	02/05/13	8" x 4" STRUCTURAL REVISIONS
F	02/05/13	ANTENNA & FOOT REVISIONS
E	02/05/13	EXISTING EQUIPMENT ENCLOSURES
D	02/05/13	POWER AND TELCO ENCLOSURES
C	02/05/13	POWER AND TELCO ENCLOSURES
B	02/05/13	FINAL PRELIMINARY CDS
A	02/05/13	FINAL PRELIMINARY CDS


PROJECT NO: 130027
 DATE: 06/05/2013
 PROJECT TITLE: MANCHESTER/BILL THORNTON
 SITE #: CT23XC557
 60 ADAMS STREET
 MANCHESTER, CT 06040
 HARTFORD COUNTY
 SHEET TITLE: EQUIPMENT PLAN





PROPOSED EQUIPMENT PLAN (2)
 SCALE: 1" = 5'-0"



EXISTING EQUIPMENT PLAN (1)
 SCALE: 1" = 5'-0"



6381 Sprint Parkway
Overland Park, KS 66251

1120 Dallas Street, Sault City, WI 53883
Phone: 608-843-4100 Fax: 608-843-7999
www.Ramaker.com

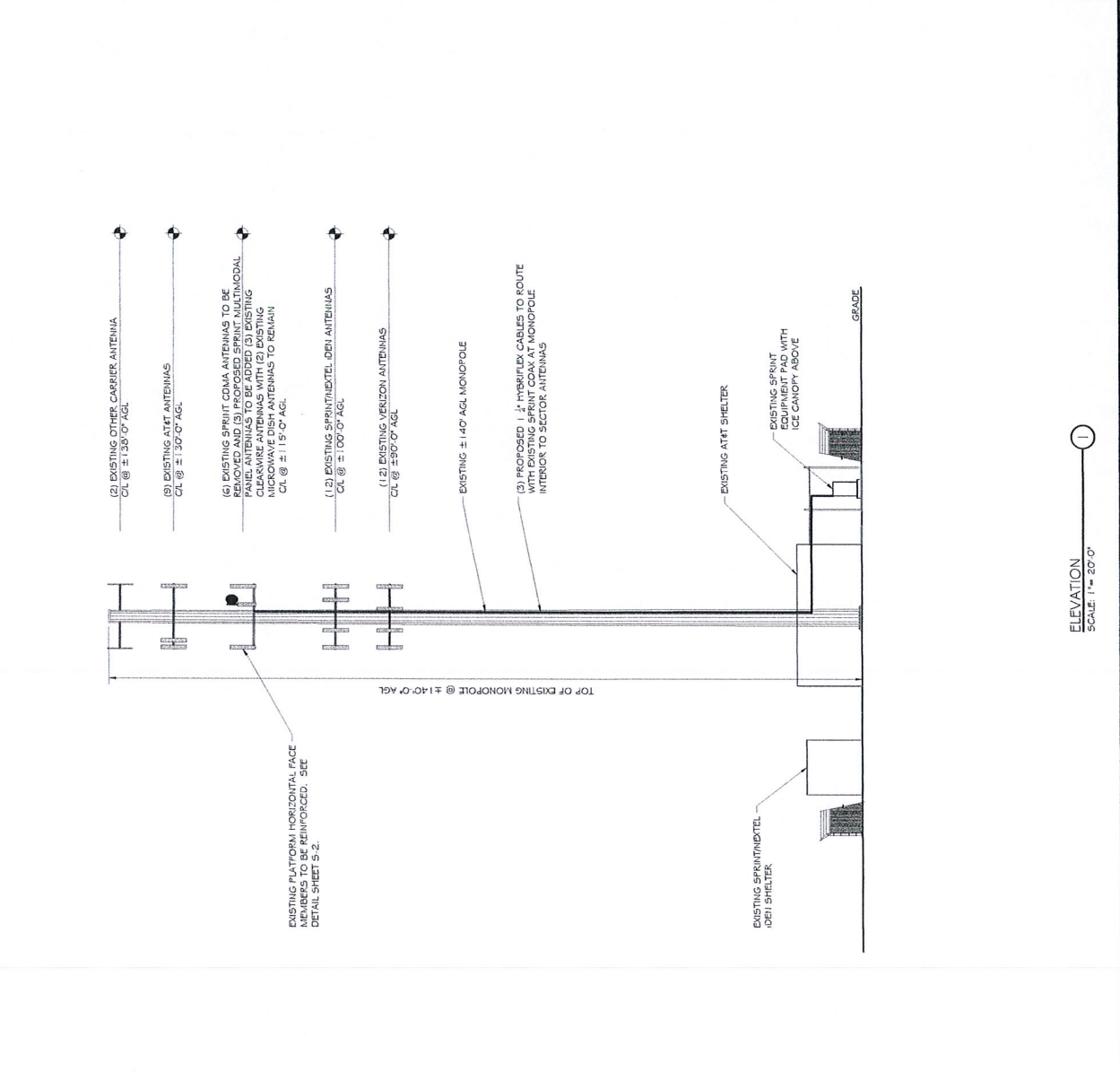
**NETWORK VISION
MMBTS LAUNCH
NORTHERN CT MARKET**

DATE: 06/05/2013
PROJECT: MANCHESTER/BILL THORNTON
SITE #: CT23XC557
60 ADAMS STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SCALE: 1" = 20'-0"

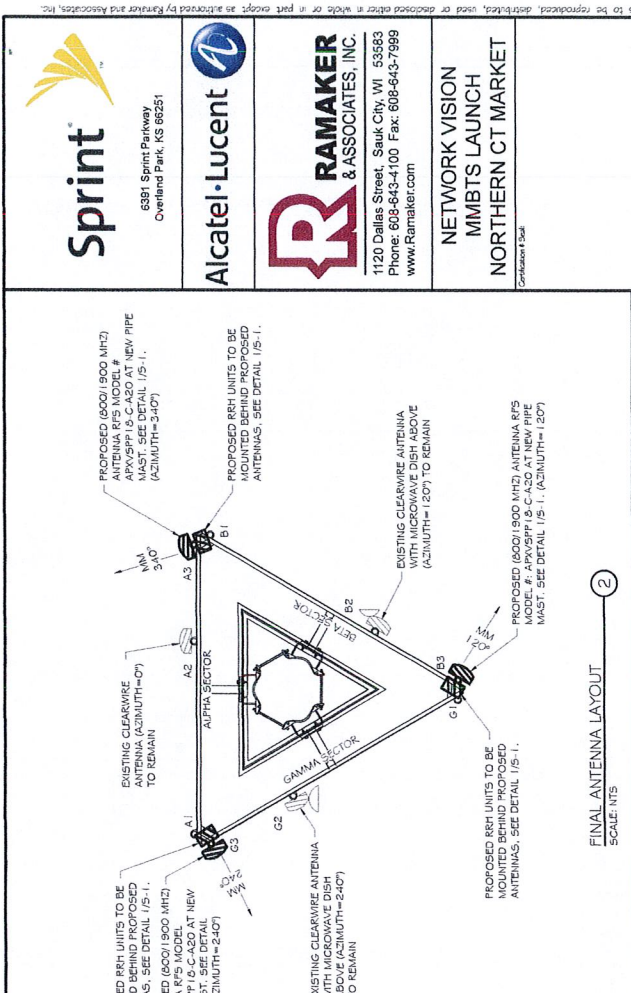
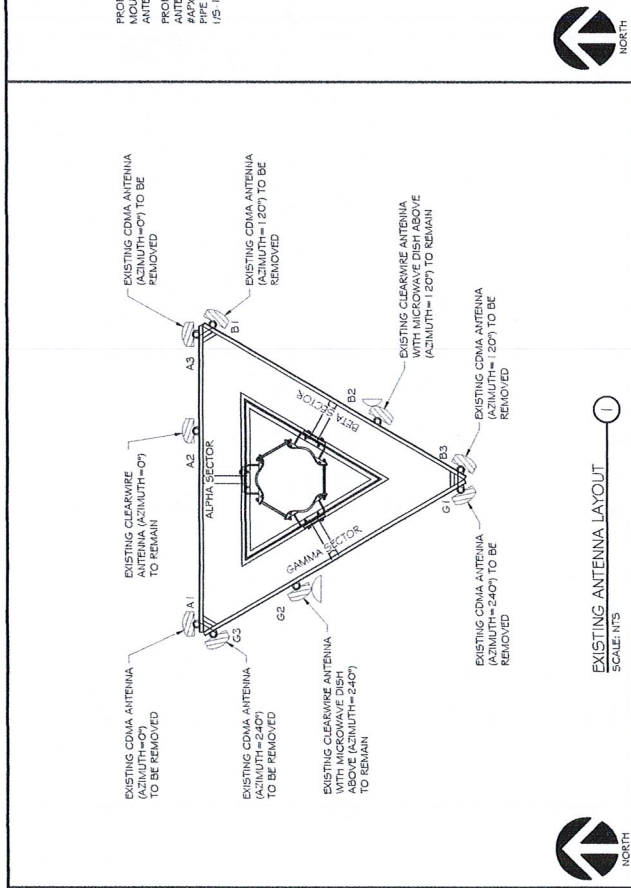
ELEVATION 23007

A-2



NOTES:

- I. SCOPE
 - A. THIS SECTION COVERS THE SPECIFICATIONS FOR ANTENNA AND COAXIAL CABLE INSTALLATION OF: ANTENNAS, COAXIAL CONNECTIONS, AND ICE BRIDGE.
 - B. REFERENCE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES FOR GENERAL REQUIREMENTS.
- II. ANTENNAS
 - A. ANTENNAS SHALL BE PLUMB AND INSTALLED SO THAT THE ENTIRE WHIP EXTENDS ABOVE VERTICAL PIPE MOUNT. DIRECTIONAL ANTENNAS SHALL BE ORIENTED TO PROPER AZIMUTH, PROVIDED ON THE RF SPECIFICATION SHEET. NOTE: THE ANTENNA SHALL BE ORIENTED TO PROPER AZIMUTH AND ELEVATION ADJUSTING ITS AZIMUTH 180 DEGREES FROM MAXIMUM ANTENNA RADIATION.
 - B. MICROWAVE ANTENNAS (DISHES) SHALL BE ASSEMBLED PER SPRINT STANDARD CONSTRUCTION SPECIFICATIONS FOR GENERAL REQUIREMENTS. ALL ANTENNAS SHALL BE INSTALLED WITH POLARIZATION PROVIDED BY RF SPECIFICATION SHEET. IF PATH IS NOT READY TO ALIGN, DISH SHOULD BE POINTED TOWARD CALCULATED AZIMUTH, OR DIRECTION OF FIELD STAKE DENOTING OPPOSITE END. 2 STRIP AIDS SHALL BE PROVIDED FOR MICROWAVE DISHES 6" OR 11" DIAMETER OR GREATER.
 - C. A TRANSIT SHALL BE USED TO PROPERLY ALIGN CELLULAR AND MICROWAVE ANTENNAS.
- III. COAXIAL CABLE
 - A. COAXIAL CABLE SHALL BE SUPPORTED WITH SNAP-IN HANGERS, SNAP-IN HANGERS SHOULD BE USED EVERY 3 FEET THE ENTIRE LENGTH OF THE CABLE. ALL COAXIAL CABLES SHALL BE SUPPORTED BY ADAPTERS WITH BUTTERFLY CLAMPS SHALL BE USED ELSEWHERE, I.E. SIDEARMS, PLATFORMS, AND MICROWAVE MOUNTS.
 - B. COAXIAL CABLE SHALL ALSO BE SUPPORTED WITH HOISTING HOISTING GRIPS SHALL BE ATTACHED WITH SHACKLES, BOLTED IN THE 1/2" HOLE OF WAVEGUIDE LADDER.
 - C. ALL JUMPERS USED BETWEEN COAXIAL CABLE AND ANTENNA SHALL BE INSTALLED WITH ANGLE ADAPTERS OR ROUND MEMBER ADAPTERS AROUND PIPES. CELLULAR ANTENNAS TYPICALLY USE 6' JUMPERS; MICROWAVE DISHES USE 3' JUMPERS.
 - D. COAXIAL CABLE SHALL BE NEATLY BENT WHEN REQUIRED, USING A MINIMUM BENDING RADIUS OF 10 TIMES THE DIAMETER OF THE COAXIAL CABLE. DRIP LOOPS SHOULD BEGIN AT THE ICE BRIDGE. THE END IN THE COAXIAL CABLE SHOULD BE AT A LOWER HEIGHT THAN THE ENTRY PORT.
 - E. COAXIAL CABLE SHALL BE SUPPORTED WITH SNAP-IN HANGERS ON THE WAVEGUIDE LADDER UNDER ICE BRIDGE. COAXIAL CABLE SHOULD BE NEATLY CUT 1/2" INSIDE BUILDING AND TERMINATED AT THE QUARTER WAVE SHORTS.
 - F. CONNECTORS WILL NORMALLY BE PROVIDED FIRST OFF REEL FROM FACTORY. CONNECTORS TERMINATED IN BUILDING SHALL BE NEATLY INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
 - G. COAXIAL CABLES SHOULD BE LABELED WITH TAGS INSIDE THE BUILDING.
 - H. USE 24 WIRE COLORED TAPES TO INDICATE SECTORS. CONTRACTOR TO USE SECTOR COLOR CODING AS INDICATED IN THESE DRAWINGS OR AS PROVIDED BY SPRINT.
- IV. CONNECTORS
 - A. ALL CONNECTIONS AND GROUNDING KITS SHALL BE WEATHERPROOFED USING GOLF SHRINK OR ADEQUATE APPROVED WEATHERPROOFING MATERIALS TO PORTION OF CONNECTOR SHALL BE EXPOSED TO THE ELEMENTS.
 - B. COAXIAL CABLE SHALL BE GROUNDED USING GROUNDING KITS OR BUSHINGS AT THE BOTTOM OF THE WAVEGUIDE LADDER. ENTRY INTO WAVEGUIDE PORTS. 4" CABLE BOOTS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
 - C. GROUNDING KITS SHALL BE NEATLY INSTALLED SO THAT THE JUMPER RUNS IN THE SAME DIRECTION AS THE COAXIAL AND WAVEGUIDE LADDER. JUMPER WIRE SHOULD RUN IN A DIRECT PATH TO THE GROUND BAR/TOWER LADDER, BUT HAVE ADEQUATE SLACK FOR EXPANSION, CONTRACTION, AND REPAIR. NON-OXIDE GREASE SHOULD BE APPLIED BETWEEN LUG AND BARTONNER.
 - D. TOWER GROUND BAR SHALL BE INSTALLED ON THE ANGLE BEHIND THE FIRST DIAGONAL WAVEGUIDE LADDER RUNG, ABOVE 8'-6". GROUND BAR SHALL BE ISOLATED FROM ANGLE USING NEWTON BUSHINGS PROVIDED.



ANTENNA AND COAXIAL CABLE SCHEDULE

SECTOR	POS.	AZIMUTH	ANTENNA CENTERLINE	ANTENNA STATUS	TECH.	ANTENNA MAKE/ MODEL	MECH. DOWNTILT (°)	ELEC. DOWNTILT (°)	RRHs	CABLE SIZE	CABLE LENGTH
ALPHA	A-1	0°	120'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
	A-2	0°	120'-0"	EX. TO REMAIN	CLEARWIRE	-	-	-	-	EX. TO REMAIN	-
	A-3	340°	120'-0"	PROPOSED	MULTIMODAL	RFS/APXV5PFI & C-A20	1900(0), 5000(3)	1900(1), 5000(3)	(1) 1900 & (1) 500	(1) 1/4" HB1RFLUX RFS MODEL # HB1141-08U4-N/S/J	± 160'-0"
BETA	B-1	120°	120'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
	B-2	120°	120'-0"	EX. TO REMAIN	CLEARWIRE	-	-	-	-	EX. TO REMAIN	-
	B-3	120°	120'-0"	PROPOSED	MULTIMODAL	RFS/APXV5PFI & C-A20	1900(0), 5000(3)	1900(1), 5000(3)	(1) 1900 & (1) 500	(1) 1/4" HB1RFLUX RFS MODEL # HB1141-08U4-N/S/J	± 160'-0"
GAMMA	G-1	240°	120'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
	G-2	240°	120'-0"	EX. TO REMAIN	CLEARWIRE	-	-	-	-	EX. TO REMAIN	-
	G-3	240°	120'-0"	PROPOSED	MULTIMODAL	RFS/APXV5PFI & C-A20	1900(0), 5000(3)	1900(1), 5000(3)	(1) 1900 & (1) 500	(1) 1/4" HB1RFLUX RFS MODEL # HB1141-08U4-N/S/J	± 140'-0"

6391 Sprint Parkway
Overland Park, KS 66251

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1120 Dallas Street, Sauk City, WI 53583
Phone: 608-843-4100 Fax: 608-643-7989
www.Ramaker.com

NETWORK VISION
MMBTS LAUNCH
NORTHERN CT MARKET

PROJECT TITLE
MANCHESTER/BILL THORNTON
SITE #: **CT23XC557**

PROJECT LOCATION
60 ADAMS STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE
ANTENNA DETAILS
& COAX SCHEDULE

SCALE: NONE

DATE	06/05/2013
TIME	09:50:57
SCALE	AS SHOWN
PROJECT NUMBER	23007
SHEET NUMBER	A-3



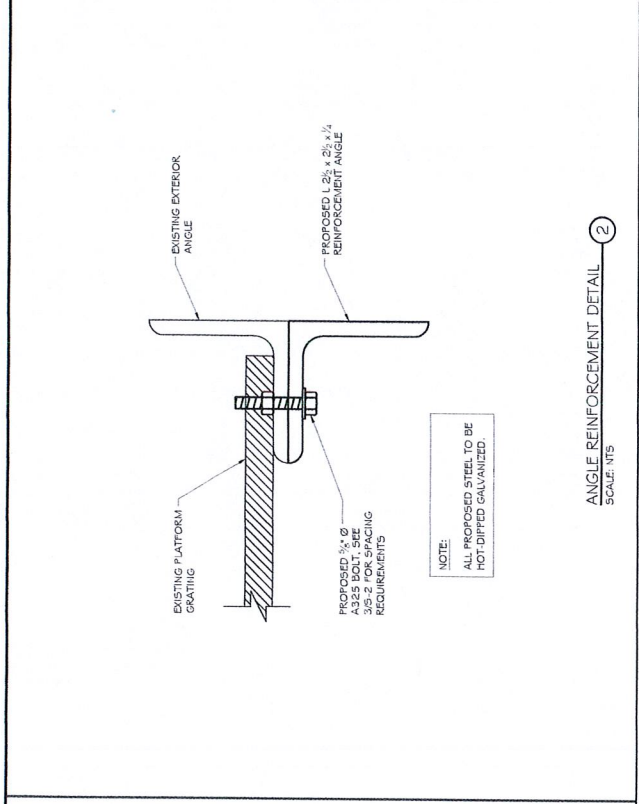
6891 Sprint Parkway
 Overland Park, KS 66251



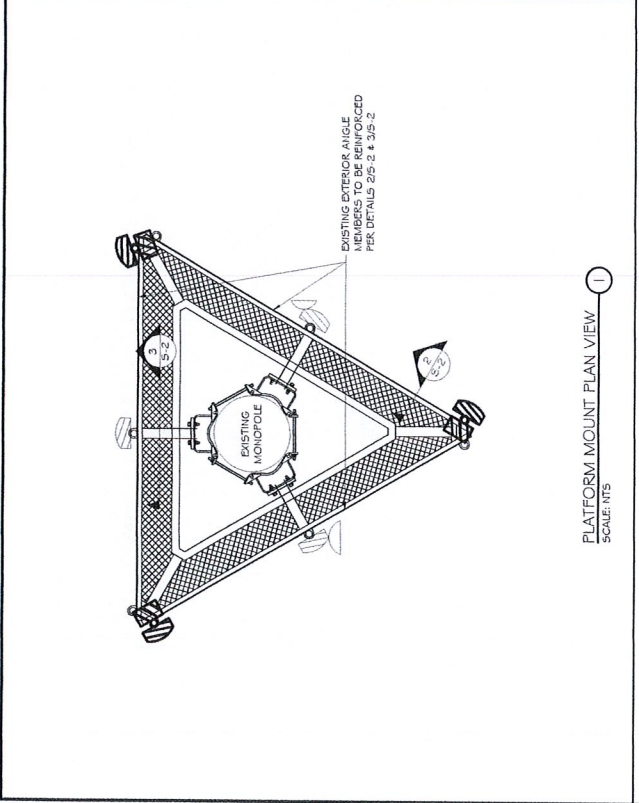

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NETWORK VISION
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 NORTHERN CT MARKET

Consultant Seal

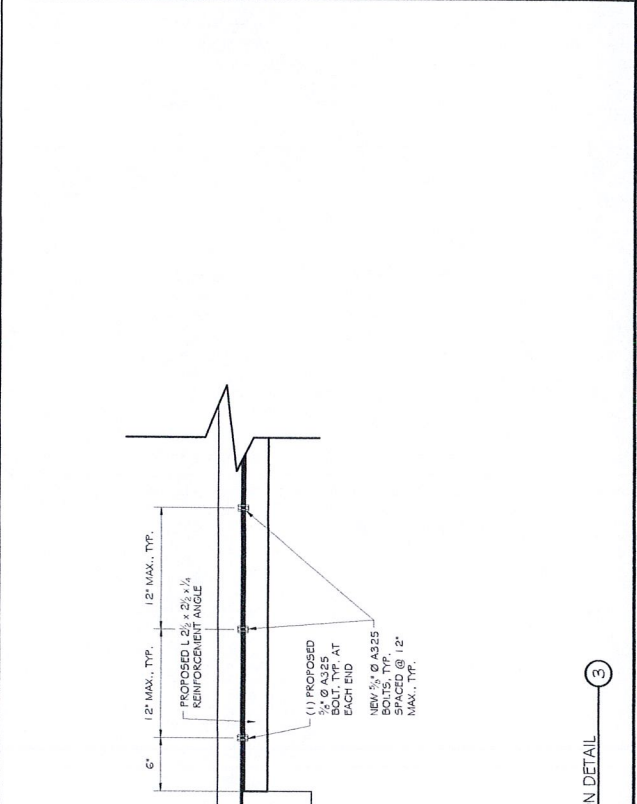


PLATFORM MOUNT PLAN VIEW
 SCALE: NTS ①



ANGLE REINFORCEMENT DETAIL
 SCALE: NTS ②

0	06/05/13	REV 4	STRUCTURAL REVISIONS
1	06/07/13	ANTONIA 4	REV 1 REVISIONS
2	06/07/13	ANTONIA	REV 2 REVISIONS
3	06/07/13	TONY	REV 3 REVISIONS
4	06/07/13	TONY	REV 4 REVISIONS
5	06/07/13	TONY	REV 5 REVISIONS
6	06/07/13	TONY	REV 6 REVISIONS
7	06/07/13	TONY	REV 7 REVISIONS
8	06/07/13	TONY	REV 8 REVISIONS
9	06/07/13	TONY	REV 9 REVISIONS
10	06/07/13	TONY	REV 10 REVISIONS
11	06/07/13	TONY	REV 11 REVISIONS
12	06/07/13	TONY	REV 12 REVISIONS
13	06/07/13	TONY	REV 13 REVISIONS
14	06/07/13	TONY	REV 14 REVISIONS
15	06/07/13	TONY	REV 15 REVISIONS
16	06/07/13	TONY	REV 16 REVISIONS
17	06/07/13	TONY	REV 17 REVISIONS
18	06/07/13	TONY	REV 18 REVISIONS
19	06/07/13	TONY	REV 19 REVISIONS
20	06/07/13	TONY	REV 20 REVISIONS
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22	06/07/13	TONY	REV 22 REVISIONS
23	06/07/13	TONY	REV 23 REVISIONS
24	06/07/13	TONY	REV 24 REVISIONS
25	06/07/13	TONY	REV 25 REVISIONS
26	06/07/13	TONY	REV 26 REVISIONS
27	06/07/13	TONY	REV 27 REVISIONS
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98	06/07/13	TONY	REV 98 REVISIONS
99	06/07/13	TONY	REV 99 REVISIONS
100	06/07/13	TONY	REV 100 REVISIONS



CONNECTION DETAIL
 SCALE: NTS ③

STRUCTURAL DETAILS
 SCALE: NONE
 PROJECT NUMBER: 23007
 SHEET NUMBER: S-2



**RAMAKER
& ASSOCIATES, INC.**

MANCHESTER/BILL THORNTON (CT23XC557)

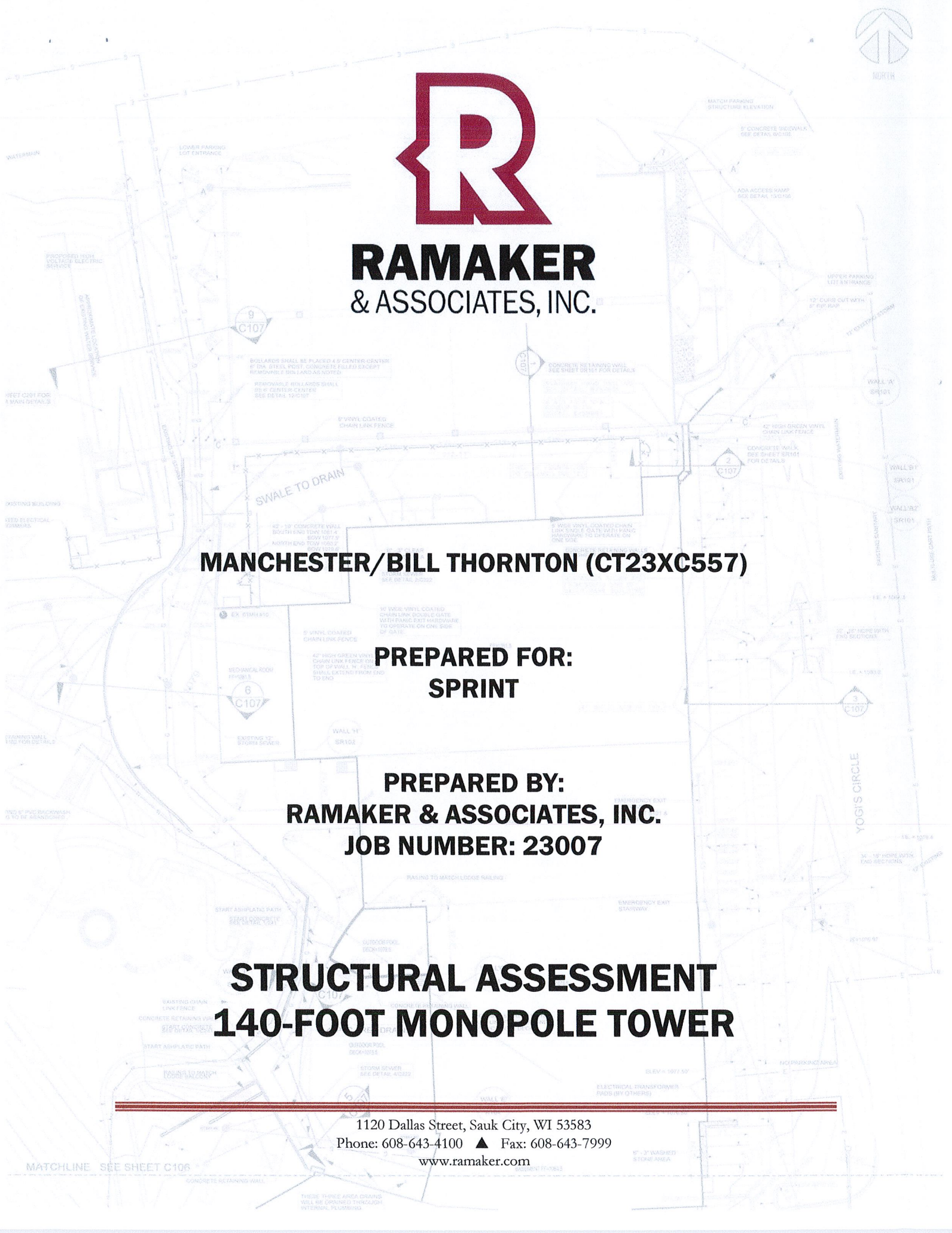
**PREPARED FOR:
SPRINT**

**PREPARED BY:
RAMAKER & ASSOCIATES, INC.
JOB NUMBER: 23007**

**STRUCTURAL ASSESSMENT
140-FOOT MONOPOLE TOWER**

1120 Dallas Street, Sauk City, WI 53583
Phone: 608-643-4100 ▲ Fax: 608-643-7999
www.ramaker.com

MATCHLINE SEE SHEET C106



STRUCTURAL ASSESSMENT

SITE: Manchester/Bill Thornton (CT23XC557)
60 Adams Street
Manchester, Hartford County, Connecticut 06040

PREPARED FOR: Alcatel-Lucent
600 Mountain Avenue
Murray Hill, New Jersey 07974

CONTACT PERSON: Alcatel-Lucent
John Szilezy
Site Acquisition Manager
john.szilezy@alcatel-lucent.com

PREPARED BY: Ramaker & Associates, Inc.
1120 Dallas Street
Sauk City, Wisconsin 53583
Telephone: (608) 643-4100
Facsimile: (608) 643-7999

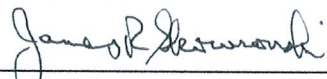
RAMAKER JOB NUMBER: 23007

DATE OF REPORT ISSUANCE: June 3, 2013



Adam Kraus
Engineering Technician

6/3/13
Date



James R. Skowronski, P.E.
Supervising Engineer

6/3/13
Date



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SECTION 1
EXECUTIVE SUMMARY

This report summarizes the structural analysis conducted by Ramaker & Associates, Inc. (Ramaker & Associates) for Alcatel-Lucent (ALU) on behalf of Sprint, who intends to install additional equipment on an existing 140-foot monopole tower. The tower site is located in Manchester, Hartford County, Connecticut.

ALU is proposing to remove all six (6) existing Sprint CDMA panel antennas and their associated coax and install three (3) RFS APXVSP18-C-A20 3G panel antennas on the existing low-profile platform at a centerline elevation of 115-feet AGL. ALU is also proposing to install three (3) ALU 1900MHz RRHs and three (3) ALU 800MHz RRHs on a new collar mount directly above the existing low-profile platform. The proposed equipment shall be fed with three (3) 1-1/4 inch fiber/power hybrid cables that were assumed to be routed up the inside of the tower.

Results of our analysis show that the tower will be stressed to a maximum of 97.5 percent of capacity under proposed loading conditions. All proposed model foundation reactions were found to be greater than the modified original design reactions. However, the foundation was also analyzed using the geotechnical report by Clarence Welti, dated July 2, 1998 and it was determined to provide adequate strength under proposed loading conditions.

In summary, the tower will pass the TIA-222-G code requirements under proposed loading conditions.

SECTION 2

INTRODUCTION

2.1 PROJECT INFORMATION

This report summarizes the structural analysis conducted by Ramaker & Associates, Inc. (Ramaker & Associates) for ALU, who intends to install additional equipment on an existing tower.

2.2 PURPOSE OF REPORT

The analysis activities of this report were conducted for the purposes of creating and analyzing a model of the subject structure under the required loading conditions. Base reactions from the resulting model were also determined for tower foundation and support development. Recommendations regarding the analysis results, loading configuration, and structural modifications are also provided.

2.3 SCOPE OF SERVICES

Ramaker & Associates developed a finite element model (FEM) of the tower, using tnxTower, for member force, joint deflection, and structure reaction determinations. Subsequently, this report was drafted to provide our engineering recommendations. All information contained herein is valid only for the described structure configuration and loading conditions. Ramaker & Associates reserves the right to modify our recommendations should alterations to the tower loading occur.

**SECTION 3
MODEL DEVELOPMENT**

3.1 INTRODUCTION

Ramaker & Associates, Inc. developed a FEM of the tower superstructure using the tower drawings and site photos. Required static loads consisting of the antenna configuration, wind forces, ice loads, and linear appurtenances (including cable loads) were then applied to the FEM. As a result, all member forces, allowable capacities, and base reactions were computed. Additionally, potentially overstressed members were identified.

3.2 EXISTING STRUCTURE INFORMATION

Tower information was gathered from the structural analysis by Engineered Endeavors, job number 6257, dated March 22, 2000. The previous structural analysis by All-Points Technology, job number CT231160, dated July 13, 2012 was also referenced.

3.3 EXISTING TOWER LOADS

Ramaker & Associates understands that the existing antenna, cable, and appurtenance configurations are as shown in the following chart:

Elevation	Appurtenance	Mount	Coax
138	(2) Pipe Mounts	(2) 3' Standoffs	--
132	Pipe Mount	5' Standoff	--
125	(6) KMW AM-X-WM-17-65-00T	Platform w/Handrail	(12) 1-5/8
	(3) Kathrein Scala 800 10121		
	(6) Kathrein Scala 860 10025		
	(6) CCI DTMABP7819VG12A		
	(6) Ericsson RRUS-11		(2) Power (1) Fiber
	Raycap DC6-48-60-18-8F		
115	** (6) Decibel DB980H65E-M **	Low-Profile Platform	** (6) 1-1/4 **
	(3) Argus LLPX310R		(5) 1/2
	(3) DAP Heads		
	Andrew VHLP2		
	Andrew VHLP1		
105	(2) Pipe Mounts	(2) 3' Standoffs	--
102	(12) Decibel DB844H90E-XY	Platform w/Handrail	(12) 7/8

MANCHESTER/BILL THORNTON (CT23XC557)

90	(6) Swedcom SC-E 6014 rev2	Platform w/Handrail	(12) 1-5/8
	(3) Antel BXA-70063/6CF		
	(3) RYMSA MGD3-900TX		
	(6) RFS FD9R6004/2C-3L		

** The six (6) existing Sprint CDMA panel antennas and their associated coax at 115-feet AGL shall be removed under proposed loading conditions.

3.4 PROPOSED TOWER LOADS

Ramaker & Associates understands that the total antenna loading for the tower will consist of the aforementioned existing antennas and the following proposed antennas:

Elevation	Appurtenance	Mount	Coax
115	(3) RFS APXVSPP18-C-A20	Existing Low-Profile Platform	(3) 1-1/4 Fiber/Power
	(3) ALU 1900MHz RRHs	New Collar Mount	
	(3) ALU 800MHz RRHs		

The proposed fiber/power hybrid cables were assumed to be routed up the inside of the tower.

3.5 WIND AND ICE LOAD

Wind forces used in model development are in compliance with the TIA-222-G Standard. These guidelines call for an analysis to be performed, which assumes a basic wind speed (3-second gust) of 100 miles-per-hour (mph) without ice in Hartford County. The tower is also designed for a 50 mph basic wind speed with 1.0-inch of radial ice. The tower was analyzed using the following parameters: Structure Class II, Topographic Category I, and Exposure Category C.

SECTION 4
ANALYSIS RESULTS

4.1 ANALYSIS RESULTS

The tower superstructure was analyzed with the combined existing and proposed antenna loading with and without radial ice. The computed maximum tower member stress capacities are as follows:

Component Type	Percent Capacity
Section 1	65.9
Section 2	84.5
Section 3	89.4
Base Plate	91.6
Anchor Bolts	97.5
RATING	97.5

4.2 BASE REACTIONS

The computed maximum reactions under the corresponding maximum moment are as follows:

Load Type	Original Design	Original Design * 1.35	Proposed Model
Total Axial (k)	22.2	30.0	35.6
Total Shear (k)	19.7	26.6	29.0
Total Moment (k-ft)	1939.1	2617.8	2818.4

The TIA-222-G code in Section 15.5.1 specifies to multiply original ASD reactions by 1.35 when comparing them with reactions determined using the TIA-222-G code. All proposed model foundation reactions were found to be greater than the modified original design reactions. However, the foundation was also analyzed using the geotechnical report by Clarence Welti, dated July 2, 1998 and it was determined to provide adequate strength under proposed loading conditions.

SECTION 5 LIMITATIONS

The recommendations contained within this report were developed using general project information provided by the owner, tower manufacturer, general field observations, reference information and laboratory testing data, as applicable. All recommendations pertain only to the proposed tower construction, location, and loading as described in this report. Ramaker & Associates assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

1. Missing, corroding, and/or deteriorating members
2. Improper manufacturing and/or construction
3. Improper maintenance

Ramaker & Associates assumes no responsibility for modifications completed prior to or hereafter in which Ramaker & Associates was not directly involved. These modifications include but are not limited to the following:

1. Replacing or strengthening bracing members
2. Reinforcing or extending vertical members
3. Installing or removing antenna mounting gates or side arms
4. Changing loading configurations

Furthermore, Ramaker & Associates hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations and conclusions are based on the information contained and set forth herein. If you are aware of any information contrary to that contained herein, or if you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact Ramaker & Associates. Ramaker & Associates isn't liable for any representation, recommendation, or conclusion not expressly stated herein.

The tower owner is responsible for verifying that the existing loading on the tower is consistent with the loading applied to the tower within this report.

SECTION 6
REFERENCES

1. 2009 International Building Code.
2. Telecommunications Industries Association, Structural Standard for Antenna Supporting Structures and Antennas, TIA Standard ANSI/TIA-222-G 2005, Washington, D.C.

APPENDIX A
TOWER FIGURES

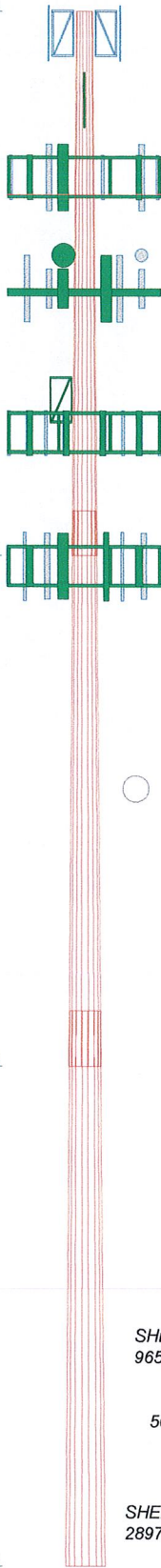
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Length (ft)	2	49.92	18	0.3125	4.92	26.0700	35.3000	5117.4
Number of Sides	3	49.96	18	0.3750	33.7653	43.0000	7690.7	15023.3
Thickness (in)								
Socket Length (ft)								
Top Dia (in)								
Bot Dia (in)								
Grade								
Weight (lb)								

140.0 ft

91.0 ft

45.0 ft

0.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3' Standoff (other)	138	DAP Head 2.5GHz (Clearwire)	115
3' Standoff (other)	138	DAP Head 2.5GHz (Clearwire)	115
5' x 2" Pipe Mount (other)	138	(2) 6" x 2" Pipe Mount	115
5' x 2" Pipe Mount (other)	138	(2) 6" x 2" Pipe Mount	115
5' Standoff (other)	132	(2) 6" x 2" Pipe Mount	115
5' x 2" Pipe Mount (other)	132	VHLP1	115
PIROD 13' Platform w/handrail (ATI)	125	VHLP2	115
(2) AM-X-WM-17-65-00T w/Mount Pipe (ATI)	125	5'x3" Pipe Mount (other)	105
(2) AM-X-WM-17-65-00T w/Mount Pipe (ATI)	125	5'x3" Pipe Mount (other)	105
(2) AM-X-WM-17-65-00T w/Mount Pipe (ATI)	125	3' Standoff (other)	105
800 10121 w/Mount Pipe (ATI)	125	3' Standoff (other)	105
800 10121 w/Mount Pipe (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	102
800 10121 w/Mount Pipe (ATI)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	102
(2) 860 10025 (ATI)	125	PIROD 13' Platform w/handrail (Sprint/Nextel)	102
(2) 860 10025 (ATI)	125	(2) 860 10025 (ATI)	102
(2) 860 10025 (ATI)	125	(2) 860 10025 (ATI)	102
(2) CCI DTMAPB7819VG12A (ATT)	125	(4) DB844H90E-XY w/Mount Pipe (Sprint/Nextel)	102
(2) CCI DTMAPB7819VG12A (ATT)	125	(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	90
(2) CCI DTMAPB7819VG12A (ATT)	125	(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	90
(2) RRUS-11 (ATT)	125	(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	90
(2) RRUS-11 (ATI)	125	RYMSA MGD3-900TX w/Mount Pipe (Verizon)	90
(2) RRUS-11 (ATI)	125	RYMSA MGD3-900TX w/Mount Pipe (Verizon)	90
DC6-48-60-18-8F (ATI)	125	RYMSA MGD3-900TX w/Mount Pipe (Verizon)	90
PIROD 15' Low Profile Platform (Sprint)	115	RYMSA MGD3-900TX w/Mount Pipe (Verizon)	90
Valmont Light Duty Tri-Bracket (1) (Sprint)	115	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	90
APXVSP18-C w/Mount Pipe (Sprint)	115	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	90
APXVSP18-C w/Mount Pipe (Sprint)	115	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	90
APXVSP18-C w/Mount Pipe (Sprint)	115	BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	90
1900MHz 4x40W RRH (Sprint)	115	(2) FD9R6004/2C-3L (Verizon)	90
1900MHz 4x40W RRH (Sprint)	115	(2) FD9R6004/2C-3L (Verizon)	90
1900MHz 4x40W RRH (Sprint)	115	(2) FD9R6004/2C-3L (Verizon)	90
800MHz 2x50W RRH (Sprint)	115	(2) FD9R6004/2C-3L (Verizon)	90
800MHz 2x50W RRH (Sprint)	115	PIROD 13' Platform w/handrail (Verizon)	90
800MHz 2x50W RRH (Sprint)	115	(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	90
LLPX310R w/Mount Pipe (Clearwire)	115		
LLPX310R w/Mount Pipe (Clearwire)	115		
LLPX310R w/Mount Pipe (Clearwire)	115		
DAP Head 2.5GHz (Clearwire)	115		

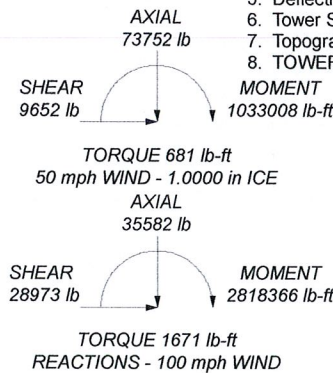
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 100 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 97.5%

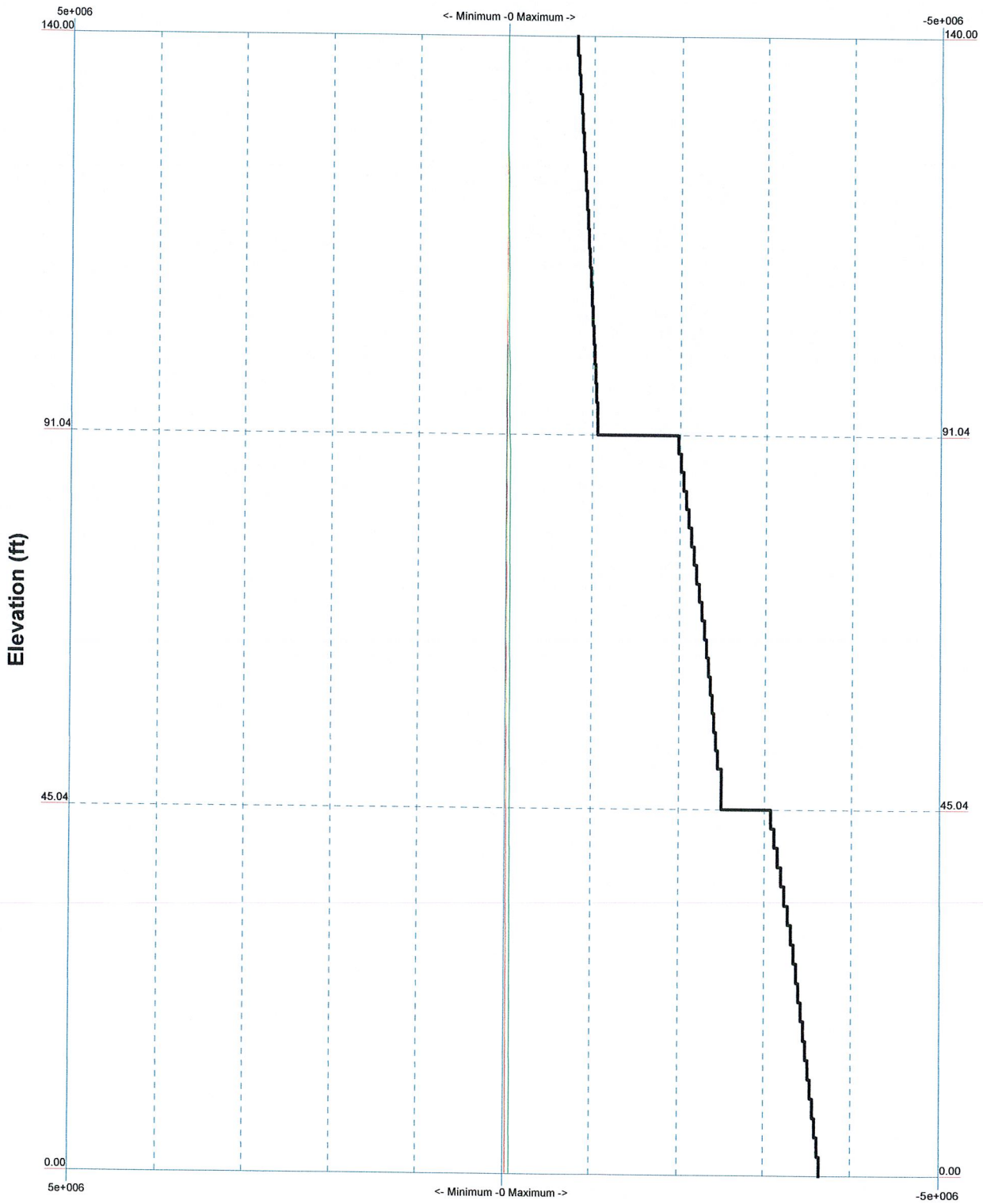
ALL REACTIONS ARE FACTORED



	Ramaker & Associates		Job: Manchester / Bill Thornton (CT23XC557)		
	1120 Dallas St.		Project: 23007		
	Sauk City, WI 53583		Client: Alcatel-Lucent / Sprint	Drawn by: A. Kraus	App'd:
	Phone: (608) 643-4100		Code: TIA-222-G	Date: 06/03/13	Scale: NTS
	FAX: (608) 643-7999		Path: I:\23000\23007\Structural\Ris\23007 rev3.rvt		Dwg No. E-1

TIA-222-G - 100 mph/50 mph 1.0000 in Ice Exposure C

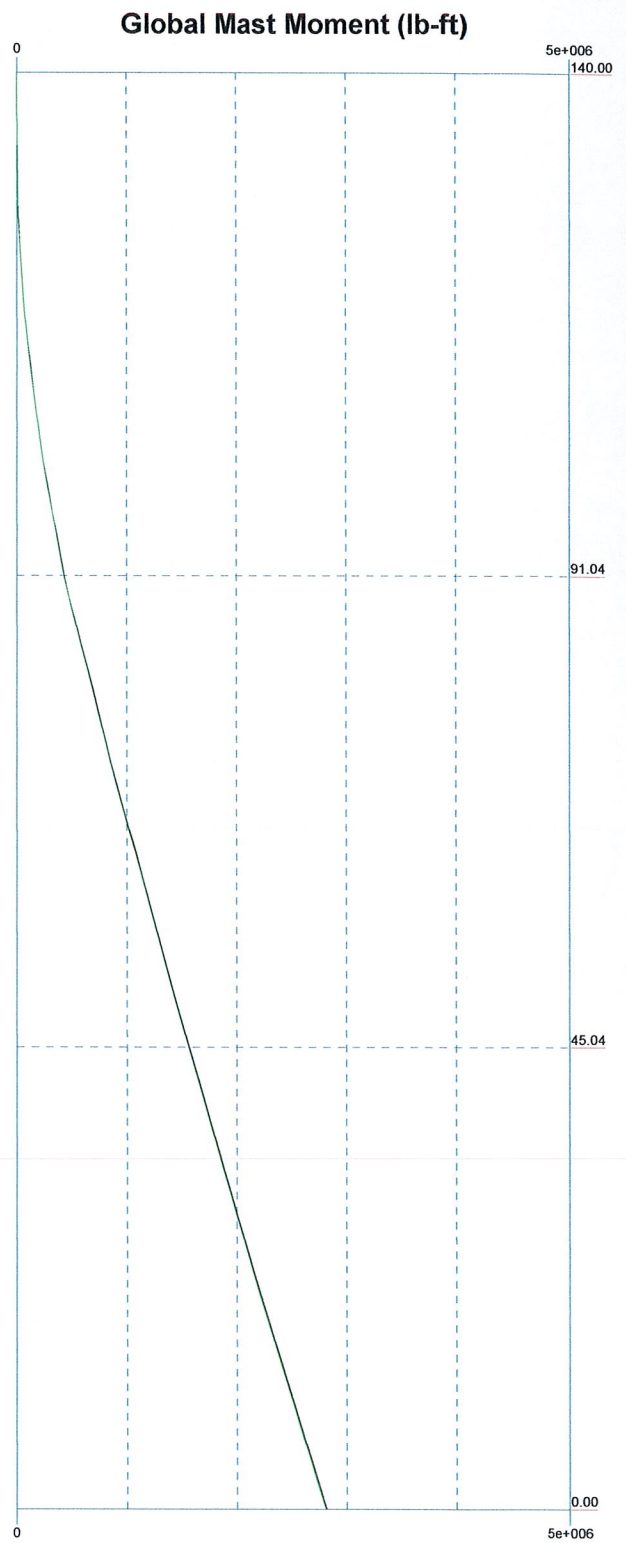
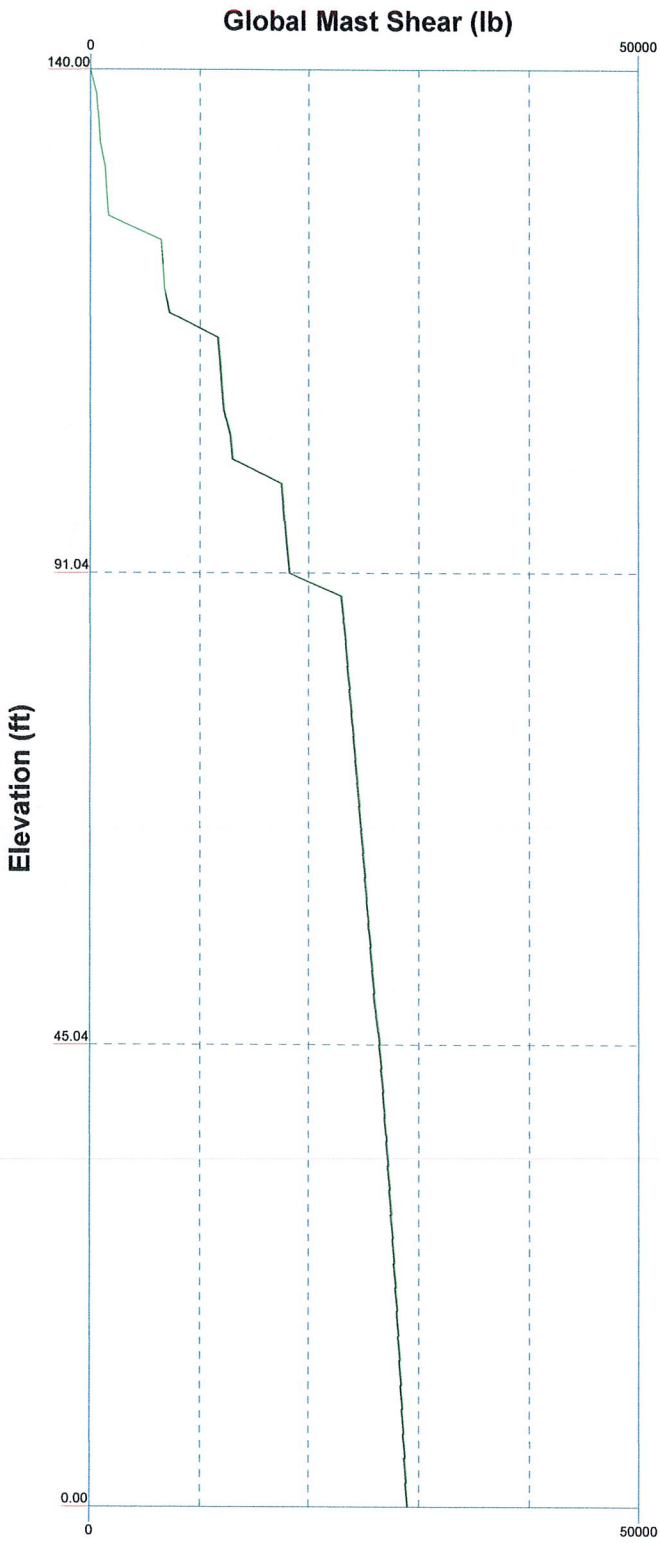
Leg Capacity ——— Leg Compression (lb)




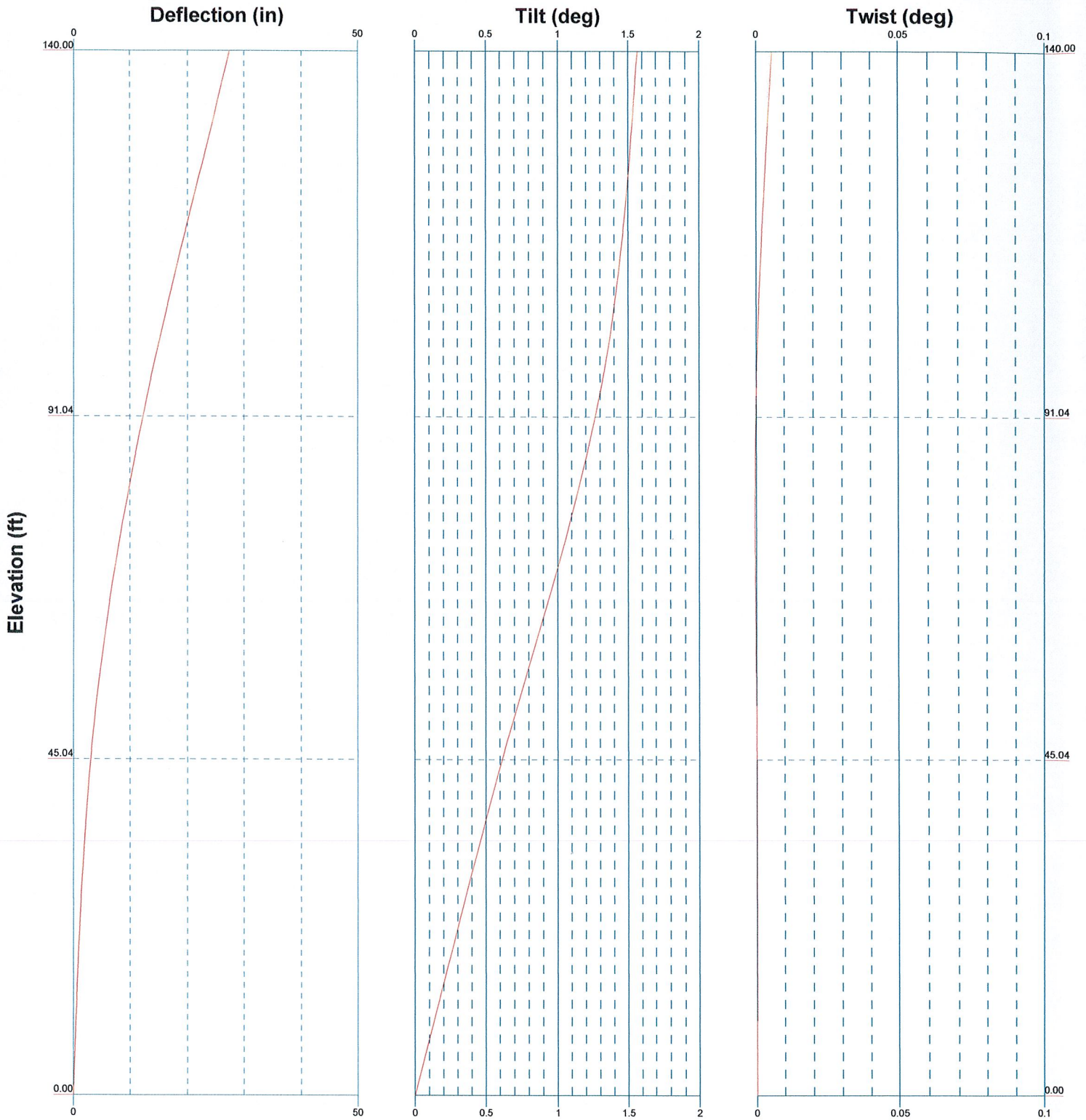
 Ramaker & Associates 1120 Dallas St. Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999	Job: Manchester / Bill Thornton (CT23XC557)
	Project: 23007
	Client: Alcatel-Lucent / Sprint
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Drawn by: A. Kraus	App'd:
Date: 06/03/13	Scale: NTS
	Dwg No. E-3

Vx Vz

Mx Mz



 <p>Ramaker & Associates 1120 Dallas St. Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999</p>	Job: Manchester / Bill Thornton (CT23XC557)		
	Project: 23007		
	Client: Alcatel-Lucent / Sprint	Drawn by: A. Kraus	App'd:
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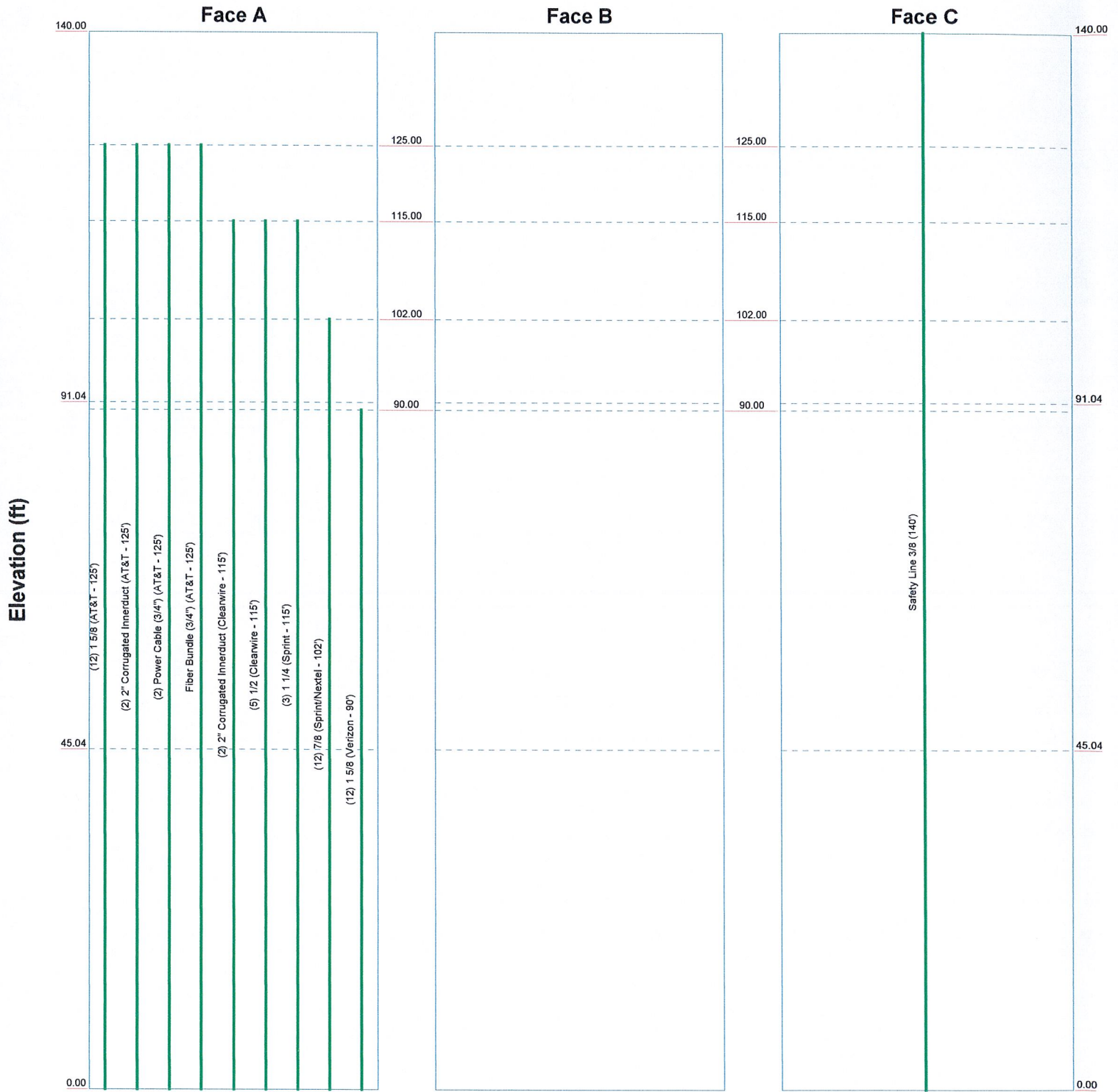


 <p>Ramaker & Associates 1120 Dallas St. Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999</p>	Job: Manchester / Bill Thornton (CT23XC557)		
	Project: 23007		
	Client: Alcatel-Lucent / Sprint	Drawn by: A. Kraus	App'd:
	Code: TIA-222-G	Date: 06/03/13	Scale: NTS
	Path: I:\23000\23007\Structural\Risat\23007_rev3.eri	Dwg No. E-5	

Feedline Distribution Chart

0' - 140'

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

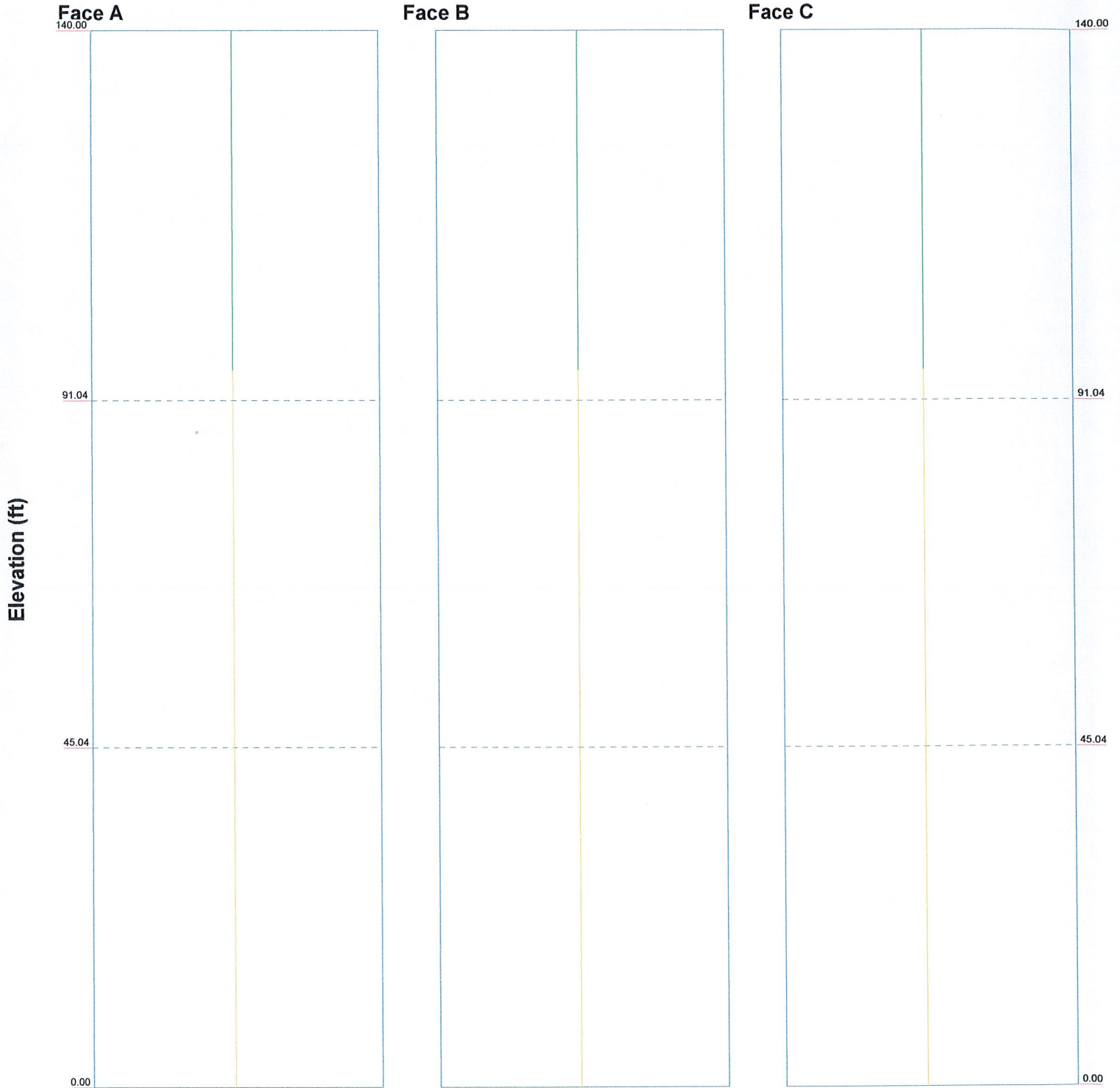


 RAMAKER <small>ASSOCIATES, INC.</small>	Ramaker & Associates		Job: Manchester / Bill Thornton (CT23XC557)	
	1120 Dallas St.		Project: 23007	
	Sauk City, WI 53583		Client: Alcatel-Lucent / Sprint	
	Phone: (608) 643-4100		Drawn by: A. Kraus	
	FAX: (608) 643-7999		Date: 06/03/13	
		Code: TIA-222-G	Scale: NTS	Dwg No. E-7
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Stress Distribution Chart

0' - 140'

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



	Ramaker & Associates		Job: Manchester / Bill Thornton (CT23XC557)		
	1120 Dallas St.		Project: 23007		
	Sauk City, WI 53583		Client: Alcatel-Lucent / Sprint	Drawn by: A. Kraus	App'd:
	Phone: (608) 643-4100		Code: TIA-222-G	Date: 06/03/13	Scale: NTS
	FAX: (608) 643-7999		Path: I:\23000\23007\Structural\Risa\23007 rev3.eri	Dwg No. E-8	

APPENDIX B
TOWER CALCULATIONS

tnxTower Ramaker & Associates 1120 Dallas St. Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999	Job Manchester / Bill Thornton (CT23XC557)	Page 1 of 22
	Project 23007	Date 16:00:48 06/03/13
	Client Alcatel-Lucent / Sprint	Designed by A. Kraus

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- Basic wind speed of 100 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	140.00-91.04	48.96	3.92	18	18.0000	27.1800	0.1875	0.7500	A572-65 (65 ksi)
L2	91.04-45.04	49.92	4.92	18	26.0700	35.3000	0.3125	1.2500	A572-65 (65 ksi)
L3	45.04-0.00	49.96		18	33.7653	43.0000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/O in ²	w in	w/t
L1	18.2777	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	27.5993	16.0639	1478.6826	9.5823	13.8074	107.0932	2959.3110	8.0335	4.4537	23.753
L2	27.2081	25.5482	2141.4381	9.1439	13.2436	161.6966	4285.6939	12.7765	4.0383	12.923
	35.8446	34.7032	5367.0190	12.4206	17.9324	299.2917	10741.1000	17.3549	5.6628	18.121
L3	35.2096	39.7428	5598.0544	11.8536	17.1528	326.3643	11203.4748	19.8752	5.2827	14.087
	43.6633	50.7344	11645.7863	15.1319	21.8440	533.1343	23306.8964	25.3720	6.9080	18.421

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stich Bolt Spacing Diagonals	Double Angle Stich Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 140.00-91.04				1	1	1		
L2 91.04-45.04				1	1	1		
L3 45.04-0.00				1	1	1		

Monopole Base Plate Data

Base Plate Data

Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	12
Embedment length	96.0000 in
f_c	4 ksi
Grout space	3.5000 in
Base plate grade	A572-60
Base plate thickness	1.7500 in
Bolt circle diameter	51.0000 in
Outer diameter	57.0000 in
Inner diameter	33.0000 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.7500 in
Stiffener height	8.0000 in

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	in	in	plf

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		C_{AA}	Weight
				ft			ft ² /ft	plf
Safety Line 3/8 (140')	C	No	CaAa (Out Of Face)	140.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.04 0.14 0.24	0.22 0.75 1.28

1 5/8 (AT&T - 125')	A	No	Inside Pole	125.00 - 0.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
2" Corrugated Innerduct (AT&T - 125')	A	No	Inside Pole	125.00 - 0.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.22 0.22 0.22
Power Cable (3/4") (AT&T - 125')	A	No	Inside Pole	125.00 - 0.00	2	No Ice 1/2" Ice	0.00 0.00	1.00 1.00

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_{AA} ft ² /ft	Weight plf
Fiber Bundle (3/4") (AT&T - 125')	A	No	Inside Pole	125.00 - 0.00	1	1" Ice	0.00	1.00
						No Ice	0.00	1.00
						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00

2" Corrugated Innerduct (Clearwire - 115')	A	No	Inside Pole	115.00 - 0.00	2	No Ice	0.00	0.22
						1/2" Ice	0.00	0.22
						1" Ice	0.00	0.22
1/2 (Clearwire - 115')	A	No	Inside Pole	115.00 - 0.00	5	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
						No Ice	0.00	0.66
1 1/4 (Sprint - 115')	A	No	Inside Pole	115.00 - 0.00	3	1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						No Ice	0.00	0.66

7/8 (Sprint/Nextel - 102')	A	No	Inside Pole	102.00 - 0.00	12	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54

1 5/8 (Verizon - 90')	A	No	Inside Pole	90.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
L1	140.00-91.04	A	0.000	0.000	0.000	0.000	699.48
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.836	10.77
L2	91.04-45.04	A	0.000	0.000	0.000	0.000	1760.14
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.725	10.12
L3	45.04-0.00	A	0.000	0.000	0.000	0.000	1736.11
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.689	9.91

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} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
L1	140.00-91.04	A	2.264	0.000	0.000	0.000	0.000	699.48
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	24.007	128.28
L2	91.04-45.04	A	2.148	0.000	0.000	0.000	0.000	1760.14
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	22.556	120.52
L3	45.04-0.00	A	1.926	0.000	0.000	0.000	0.000	1736.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.039	112.46

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Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	Ka No Ice	Ka Ice
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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral	Offsets: Vert	Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₁ Side	Weight
			ft	ft	°	ft	ft ²	ft ²	lb
3' Standoff (other)	A	From Face	1.50	0.0000	138.00	No Ice	2.00	2.00	38.00
			0.00			1/2" Ice	3.70	3.70	67.00
			0.00			1" Ice	5.40	5.40	96.00
3' Standoff (other)	B	From Face	1.50	0.0000	138.00	No Ice	2.00	2.00	38.00
			0.00			1/2" Ice	3.70	3.70	67.00
			0.00			1" Ice	5.40	5.40	96.00
5' x 2" Pipe Mount (other)	A	From Face	3.00	0.0000	138.00	No Ice	1.19	1.19	18.25
			0.00			1/2" Ice	1.50	1.50	27.32
			0.00			1" Ice	1.81	1.81	39.84
5' x 2" Pipe Mount (other)	B	From Face	3.00	0.0000	138.00	No Ice	1.19	1.19	18.25
			0.00			1/2" Ice	1.50	1.50	27.32
			0.00			1" Ice	1.81	1.81	39.84

5' Standoff (other)	C	From Face	2.50	0.0000	132.00	No Ice	3.26	3.26	60.00
			0.00			1/2" Ice	5.89	5.89	107.00
			0.00			1" Ice	8.52	8.52	154.00
5' x 2" Pipe Mount (other)	C	From Face	5.00	0.0000	132.00	No Ice	1.19	1.19	18.25
			0.00			1/2" Ice	1.50	1.50	27.32
			0.00			1" Ice	1.81	1.81	39.84

PiROD 13' Platform w/handrail (AT&T)	A	None		0.0000	125.00	No Ice	31.30	31.30	1822.00
						1/2" Ice	40.20	40.20	2452.00
						1" Ice	49.10	49.10	3082.00
(2) AM-X-WM-17-65-00T w/Mount Pipe (AT&T)	A	From Face	4.00	0.0000	125.00	No Ice	3.31	2.73	32.45
			0.00			1/2" Ice	3.71	3.33	60.36
			0.00			1" Ice	4.14	3.94	96.51
(2) AM-X-WM-17-65-00T w/Mount Pipe (AT&T)	B	From Face	4.00	0.0000	125.00	No Ice	3.31	2.73	32.45
			0.00			1/2" Ice	3.71	3.33	60.36
			0.00			1" Ice	4.14	3.94	96.51
(2) AM-X-WM-17-65-00T w/Mount Pipe (AT&T)	C	From Face	4.00	0.0000	125.00	No Ice	3.31	2.73	32.45
			0.00			1/2" Ice	3.71	3.33	60.36
			0.00			1" Ice	4.14	3.94	96.51
800 10121 w/Mount Pipe (AT&T)	A	From Face	4.00	0.0000	125.00	No Ice	5.80	4.72	72.60
			2.00			1/2" Ice	6.35	5.56	118.97
			0.00			1" Ice	6.87	6.29	175.23
800 10121 w/Mount Pipe (AT&T)	B	From Face	4.00	0.0000	125.00	No Ice	5.80	4.72	72.60
			2.00			1/2" Ice	6.35	5.56	118.97
			0.00			1" Ice	6.87	6.29	175.23
800 10121 w/Mount Pipe (AT&T)	C	From Face	4.00	0.0000	125.00	No Ice	5.80	4.72	72.60
			2.00			1/2" Ice	6.35	5.56	118.97
			0.00			1" Ice	6.87	6.29	175.23
(2) 860 10025 (AT&T)	A	From Face	3.00	0.0000	125.00	No Ice	0.16	0.14	1.16
			2.00			1/2" Ice	0.23	0.20	2.72
			0.00			1" Ice	0.30	0.27	5.20
(2) 860 10025	B	From Face	3.00	0.0000	125.00	No Ice	0.16	0.14	1.16

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₂ Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft ²	ft ²	lb	
(AT&T)			2.00							
			0.00				1/2" Ice	0.23	0.20	2.72
			0.00				1" Ice	0.30	0.27	5.20
(2) 860 10025 (AT&T)	C	From Face	3.00		0.0000	125.00	No Ice	0.16	0.14	1.16
			2.00				1/2" Ice	0.23	0.20	2.72
			0.00				1" Ice	0.30	0.27	5.20
(2) CCI DTMABP7819VG12A (AT&T)	A	From Face	3.00		0.0000	125.00	No Ice	1.17	0.35	15.00
			0.00				1/2" Ice	1.31	0.45	21.87
			0.00				1" Ice	1.45	0.55	28.74
(2) CCI DTMABP7819VG12A (AT&T)	B	From Face	3.00		0.0000	125.00	No Ice	1.17	0.35	15.00
			0.00				1/2" Ice	1.31	0.45	21.87
			0.00				1" Ice	1.45	0.55	28.74
(2) CCI DTMABP7819VG12A (AT&T)	C	From Face	3.00		0.0000	125.00	No Ice	1.17	0.35	15.00
			0.00				1/2" Ice	1.31	0.45	21.87
			0.00				1" Ice	1.45	0.55	28.74
(2) RRUS-11 (AT&T)	A	From Face	3.00		0.0000	125.00	No Ice	2.94	1.25	55.00
			0.00				1/2" Ice	3.17	1.41	74.32
			0.00				1" Ice	3.41	1.59	96.56
(2) RRUS-11 (AT&T)	B	From Face	3.00		0.0000	125.00	No Ice	2.94	1.25	55.00
			0.00				1/2" Ice	3.17	1.41	74.32
			0.00				1" Ice	3.41	1.59	96.56
(2) RRUS-11 (AT&T)	C	From Face	3.00		0.0000	125.00	No Ice	2.94	1.25	55.00
			0.00				1/2" Ice	3.17	1.41	74.32
			0.00				1" Ice	3.41	1.59	96.56
DC6-48-60-18-8F (AT&T)	C	None			0.0000	125.00	No Ice	1.47	1.47	33.00
							1/2" Ice	1.67	1.67	50.72
							1" Ice	1.88	1.88	70.92

PiROD 15' Low Profile Platform (Sprint)	C	None			0.0000	115.00	No Ice	17.30	17.30	1500.00
							1/2" Ice	22.10	22.10	2030.00
							1" Ice	26.90	26.90	2560.00
Valmont Light Duty Tri-Bracket (1) (Sprint)	C	None			0.0000	115.00	No Ice	1.76	1.76	54.00
							1/2" Ice	2.08	2.08	70.00
							1" Ice	2.40	2.40	86.00
APXVSPP18-C w/Mount Pipe (Sprint)	A	From Face	4.00		0.0000	115.00	No Ice	8.26	6.71	78.90
			-2.00				1/2" Ice	8.81	7.66	141.88
			0.00				1" Ice	9.36	8.49	216.06
APXVSPP18-C w/Mount Pipe (Sprint)	B	From Face	4.00		0.0000	115.00	No Ice	8.26	6.71	78.90
			-2.00				1/2" Ice	8.81	7.66	141.88
			0.00				1" Ice	9.36	8.49	216.06
APXVSPP18-C w/Mount Pipe (Sprint)	C	From Face	4.00		0.0000	115.00	No Ice	8.26	6.71	78.90
			-2.00				1/2" Ice	8.81	7.66	141.88
			0.00				1" Ice	9.36	8.49	216.06
1900MHz 4x40W RRH (Sprint)	A	From Face	2.00		0.0000	115.00	No Ice	2.71	2.61	60.00
			-2.00				1/2" Ice	2.95	2.84	83.12
			0.00				1" Ice	3.20	3.09	109.48
1900MHz 4x40W RRH (Sprint)	B	From Face	2.00		0.0000	115.00	No Ice	2.71	2.61	60.00
			-2.00				1/2" Ice	2.95	2.84	83.12
			0.00				1" Ice	3.20	3.09	109.48
1900MHz 4x40W RRH (Sprint)	C	From Face	2.00		0.0000	115.00	No Ice	2.71	2.61	60.00
			-2.00				1/2" Ice	2.95	2.84	83.12
			0.00				1" Ice	3.20	3.09	109.48
800MHz 2x50W RRH (Sprint)	A	From Face	2.00		0.0000	115.00	No Ice	2.40	2.25	64.00
			-2.00				1/2" Ice	2.61	2.46	86.12
			0.00				1" Ice	2.83	2.68	111.30
800MHz 2x50W RRH (Sprint)	B	From Face	2.00		0.0000	115.00	No Ice	2.40	2.25	64.00
			-2.00				1/2" Ice	2.61	2.46	86.12
			0.00				1" Ice	2.83	2.68	111.30

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁		Weight
			Horz Lateral	Vert			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	lb
PiROD 13' Platform w/handrail (Verizon)	C	None			0.0000	90.00	No Ice 31.30 1/2" Ice 40.20 1" Ice 49.10	31.30 40.20 49.10	1822.00 2452.00 3082.00
(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	A	From Face	4.00 0.00 0.00		0.0000	90.00	No Ice 3.64 1/2" Ice 4.01 1" Ice 4.38	4.21 4.79 5.39	34.60 70.80 114.64
(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	B	From Face	4.00 0.00 0.00		0.0000	90.00	No Ice 3.64 1/2" Ice 4.01 1" Ice 4.38	4.21 4.79 5.39	34.60 70.80 114.64
(2) SC-E 6014 rev2 w/Mount Pipe (Verizon)	C	From Face	4.00 0.00 0.00		0.0000	90.00	No Ice 3.64 1/2" Ice 4.01 1" Ice 4.38	4.21 4.79 5.39	34.60 70.80 114.64
RYMSA MGD3-900TX w/Mount Pipe (Verizon)	A	From Face	4.00 -2.00 0.00		0.0000	90.00	No Ice 4.98 1/2" Ice 5.43 1" Ice 5.90	4.74 5.68 6.50	113.90 154.05 204.89
RYMSA MGD3-900TX w/Mount Pipe (Verizon)	B	From Face	4.00 -2.00 0.00		0.0000	90.00	No Ice 4.98 1/2" Ice 5.43 1" Ice 5.90	4.74 5.68 6.50	113.90 154.05 204.89
RYMSA MGD3-900TX w/Mount Pipe (Verizon)	C	From Face	4.00 -2.00 0.00		0.0000	90.00	No Ice 4.98 1/2" Ice 5.43 1" Ice 5.90	4.74 5.68 6.50	113.90 154.05 204.89
BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	A	From Face	4.00 2.00 0.00		0.0000	90.00	No Ice 7.99 1/2" Ice 8.64 1" Ice 9.25	5.82 6.99 7.87	42.55 100.70 170.61
BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	B	From Face	4.00 2.00 0.00		0.0000	90.00	No Ice 7.99 1/2" Ice 8.64 1" Ice 9.25	5.82 6.99 7.87	42.55 100.70 170.61
BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	C	From Face	4.00 2.00 0.00		0.0000	90.00	No Ice 7.99 1/2" Ice 8.64 1" Ice 9.25	5.82 6.99 7.87	42.55 100.70 170.61
(2) FD9R6004/2C-3L (Verizon)	A	From Face	3.00 0.00 0.00		0.0000	90.00	No Ice 0.37 1/2" Ice 0.45 1" Ice 0.54	0.08 0.14 0.20	2.60 4.90 8.29
(2) FD9R6004/2C-3L (Verizon)	B	From Face	3.00 0.00 0.00		0.0000	90.00	No Ice 0.37 1/2" Ice 0.45 1" Ice 0.54	0.08 0.14 0.20	2.60 4.90 8.29
(2) FD9R6004/2C-3L (Verizon)	C	From Face	3.00 0.00 0.00		0.0000	90.00	No Ice 0.37 1/2" Ice 0.45 1" Ice 0.54	0.08 0.14 0.20	2.60 4.90 8.29

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
				ft	ft	°	°	ft	ft	ft ²	lb
VHLP1	B	Paraboloid w/Shroud (HP)	From Face	4.00 2.00 3.00		0.0000		115.00	1.28	No Ice 1.28 1/2" Ice 1.45 1" Ice 1.62	14.00 27.00 40.00
VHLP2	C	Paraboloid	From	4.00		0.0000		115.00	2.18	No Ice 3.72	27.00

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb
		w/Shroud (HP)	Face	2.00				1/2" Ice	4.01	54.00
				3.00				1" Ice	4.30	81.00

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x lb-ft	Sum of Overturning Moments, M _z lb-ft	Sum of Torques lb-ft
Leg Weight	15029.27					
Bracing Weight	0.00					
Total Member Self-Weight	15029.27			272.70	410.53	
Total Weight	29651.61			272.70	410.53	
Wind 0 deg - No Ice		17.81	-18107.97	-1672081.54	-1691.35	-818.21
Wind 30 deg - No Ice		9019.05	-15697.15	-1449820.78	-831644.06	-464.98
Wind 60 deg - No Ice		15598.28	-9101.31	-841488.31	-1438015.78	17.86
Wind 90 deg - No Ice		18033.11	-0.38	228.15	-1663110.67	810.25
Wind 120 deg - No Ice		15605.42	9049.00	835861.87	-1438858.93	1052.48
Wind 150 deg - No Ice		8996.43	15657.57	1445695.35	-828975.32	968.40
Wind 180 deg - No Ice		-28.50	18078.40	1669137.83	3773.37	754.96
Wind 210 deg - No Ice		-9019.96	15672.01	1447399.70	832572.63	374.89
Wind 240 deg - No Ice		-15617.01	9076.26	839078.41	1441047.44	-178.13
Wind 270 deg - No Ice		-18044.30	32.33	4087.19	1665251.22	-769.55
Wind 300 deg - No Ice		-15603.78	-9071.58	-837980.35	1439486.57	-1079.58
Wind 330 deg - No Ice		-8995.57	-15695.59	-1449636.54	829694.95	-1020.36
Member Ice	11814.85					
Total Weight Ice	67000.08			1397.67	1660.11	
Wind 0 deg - Ice		7.18	-9652.28	-885733.28	813.44	-588.89
Wind 30 deg - Ice		4815.39	-8364.25	-767485.25	-440636.86	-329.82
Wind 60 deg - Ice		8331.49	-4842.57	-444106.09	-763357.56	21.59
Wind 90 deg - Ice		9627.46	-1.07	1271.56	-882542.47	474.53
Wind 120 deg - Ice		8333.78	4823.46	444647.13	-763627.65	686.09
Wind 150 deg - Ice		4806.77	8350.43	768650.23	-439619.81	697.32
Wind 180 deg - Ice		-11.48	9642.43	887366.55	3014.71	567.53
Wind 210 deg - Ice		-4816.25	8356.25	769336.76	444058.34	297.45
Wind 240 deg - Ice		-8338.45	4834.44	445942.79	767498.70	-77.27
Wind 270 deg - Ice		-9631.97	12.10	2826.04	886394.20	-461.80
Wind 300 deg - Ice		-8333.71	-4830.59	-442693.04	766939.50	-698.02
Wind 330 deg - Ice		-4805.93	-8363.62	-767411.04	442841.22	-713.65
Total Weight	29651.61			272.70	410.53	
Wind 0 deg - Service		5.74	-5832.67	-538401.40	-266.50	-263.55
Wind 30 deg - Service		2905.08	-5056.14	-466810.04	-267598.63	-149.77
Wind 60 deg - Service		5024.29	-2931.58	-270862.95	-462914.16	5.75
Wind 90 deg - Service		5808.56	-0.12	258.35	-535418.40	260.99
Wind 120 deg - Service		5026.59	2914.73	269420.37	-463185.74	339.01
Wind 150 deg - Service		2897.80	5043.39	465850.94	-266739.02	311.93
Wind 180 deg - Service		-9.18	5823.15	537822.94	1493.72	243.18
Wind 210 deg - Service		-2905.38	5048.04	466399.92	268454.32	120.76
Wind 240 deg - Service		-5030.32	2923.51	270456.43	464447.26	-57.38
Wind 270 deg - Service		-5812.16	10.41	1501.37	536664.48	-247.88
Wind 300 deg - Service		-5026.06	-2922.00	-269733.02	463944.50	-347.74
Wind 330 deg - Service		-2897.52	-5055.63	-466750.70	267527.41	-328.66

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Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	140 - 91.04	Pole	Max Tension	45	0.00	-0.00	0.00
			Max. Compression	26	-35069.73	1924.04	-1634.87
			Max. Mx	20	-10676.36	363649.01	-1517.00
			Max. My	2	-10655.37	-293.71	365285.95
			Max. Vy	20	-17824.14	363649.01	-1517.00
			Max. Vx	2	-17930.89	-293.71	365285.95
			Max. Torque	23			1693.40
L2	91.04 - 45.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56123.34	2165.51	-1840.05
			Max. Mx	20	-21795.28	1429284.88	-4107.10
			Max. My	2	-21782.08	-1581.26	1435784.10
			Max. Vy	20	-25925.75	1429284.88	-4107.10
			Max. Vx	2	-26033.27	-1581.26	1435784.10
			Max. Torque	23			1689.81
L3	45.04 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73752.27	2165.50	-1840.04
			Max. Mx	20	-35540.65	2806602.37	-6803.07
			Max. My	2	-35540.33	-3044.80	2818364.11
			Max. Vy	20	-28921.68	2806602.37	-6803.07
			Max. Vx	2	-29023.77	-3044.80	2818364.11
			Max. Torque	23			1676.79

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	33	73752.27	11.48	-9642.43
	Max. H _x	21	26686.45	28870.88	-51.72
	Max. H _z	3	26686.45	-28.50	28972.75
	Max. M _x	2	2818364.11	-28.50	28972.75
	Max. M _z	8	2803312.58	-28852.98	0.60
	Max. Torsion	23	1671.23	24966.05	14514.53
	Min. Vert	19	26686.45	24987.22	-14522.02
	Min. H _x	9	26686.45	-28852.98	0.60
	Min. H _z	15	26686.45	45.60	-28925.44
	Min. M _x	14	-2813198.52	45.60	-28925.44
	Min. M _z	20	-2806602.37	28870.88	-51.72
	Min. Torsion	11	-1626.62	-24968.68	-14478.40

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
Dead Only	29651.61	0.00	0.00	272.70	410.53	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	35581.93	28.50	-28972.75	-2818364.11	-3045.36	-1276.61
0.9 Dead+1.6 Wind 0 deg - No Ice	26686.45	28.50	-28972.75	-2779099.56	-3129.04	-1278.89
1.2 Dead+1.6 Wind 30 deg - No Ice	35581.93	14430.48	-25115.44	-2443765.72	-1401848.43	-737.91
0.9 Dead+1.6 Wind 30 deg - No Ice	26686.45	14430.48	-25115.44	-2409728.26	-1382417.76	-735.75
1.2 Dead+1.6 Wind 60 deg - No Ice	35581.93	24957.24	-14562.09	-1418503.25	-2423865.54	6.40
0.9 Dead+1.6 Wind 60 deg - No Ice	26686.45	24957.24	-14562.09	-1398769.79	-2390178.16	12.41
1.2 Dead+1.6 Wind 90 deg - No Ice	35581.93	28852.98	-0.60	259.80	-2803312.58	1237.68

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Load Combination	Vertical lb	Shear _x lb	Shear _y lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _y lb-ft	Torque lb-ft
0.9 Dead+1.6 Wind 90 deg - No Ice	26686.45	28852.98	-0.60	170.52	-2764321.70	1246.43
1.2 Dead+1.6 Wind 120 deg - No Ice	35581.93	24968.68	14478.40	1408743.73	-2425329.84	1617.98
0.9 Dead+1.6 Wind 120 deg - No Ice	26686.45	24968.68	14478.40	1388985.88	-2391615.72	1626.62
1.2 Dead+1.6 Wind 150 deg - No Ice	35581.93	14394.29	25052.11	2436605.52	-1397363.81	1495.99
0.9 Dead+1.6 Wind 150 deg - No Ice	26686.45	14394.29	25052.11	2402497.63	-1377999.18	1502.14
1.2 Dead+1.6 Wind 180 deg - No Ice	35581.93	-45.60	28925.44	2813198.52	6219.82	1176.67
0.9 Dead+1.6 Wind 180 deg - No Ice	26686.45	-45.60	28925.44	2773832.08	5991.84	1178.86
1.2 Dead+1.6 Wind 210 deg - No Ice	35581.93	-14431.94	25075.22	2439479.12	1403098.84	598.82
0.9 Dead+1.6 Wind 210 deg - No Ice	26686.45	-14431.94	25075.22	2405324.78	1383381.51	596.52
1.2 Dead+1.6 Wind 240 deg - No Ice	35581.93	-24987.22	14522.02	1414195.62	2428679.20	-253.24
0.9 Dead+1.6 Wind 240 deg - No Ice	26686.45	-24987.22	14522.02	1394350.01	2394646.52	-259.54
1.2 Dead+1.6 Wind 270 deg - No Ice	35581.93	-28870.88	51.72	6802.56	2806602.37	-1173.03
0.9 Dead+1.6 Wind 270 deg - No Ice	26686.45	-28870.88	51.72	6611.44	2767290.91	-1181.77
1.2 Dead+1.6 Wind 300 deg - No Ice	35581.93	-24966.05	-14514.53	-1412584.28	2426034.97	-1662.55
0.9 Dead+1.6 Wind 300 deg - No Ice	26686.45	-24966.05	-14514.53	-1392937.07	2392046.14	-1671.23
1.2 Dead+1.6 Wind 330 deg - No Ice	35581.93	-14392.92	-25112.94	-2443483.89	1398202.96	-1579.52
0.9 Dead+1.6 Wind 330 deg - No Ice	26686.45	-14392.92	-25112.94	-2409446.19	1378564.95	-1585.73
1.2 Dead+1.0 Ice+1.0 Temp	73752.27	-0.00	0.00	1840.04	2165.50	0.22
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	73752.27	7.18	-9652.28	-1029272.80	1280.99	-580.45
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	73752.27	4815.39	-8364.25	-891828.95	-511823.25	-347.24
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	73752.27	8331.49	-4842.57	-515956.54	-886917.80	-16.94
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	73752.27	9627.46	-1.07	1788.77	-1025467.90	424.48
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	73752.27	8333.78	4823.46	517172.47	-887241.58	638.59
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	73752.27	4806.77	8350.43	893788.39	-510624.69	665.27
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	73752.27	-11.48	9642.43	1031786.62	3883.88	559.45
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	73752.27	-4816.25	8356.25	894604.98	516514.19	315.56
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	73752.27	-8338.45	4834.44	518710.42	892466.63	-37.64
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	73752.27	-9631.97	12.10	3626.73	1030674.86	-411.19
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	73752.27	-8333.71	-4830.59	-514294.64	891802.26	-650.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	73752.27	-4805.93	-8363.62	-891748.83	515071.73	-681.40
Dead+Wind 0 deg - Service	29651.61	5.74	-5832.67	-563400.27	-266.48	-262.55
Dead+Wind 30 deg - Service	29651.61	2905.08	-5056.14	-488486.36	-280006.61	-151.34
Dead+Wind 60 deg - Service	29651.61	5024.29	-2931.58	-283443.40	-484385.77	2.04

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Load Combination	Vertical lb	Shear _x lb	Shear _y lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _y lb-ft	Torque lb-ft
Dead+Wind 90 deg - Service	29651.61	5808.56	-0.12	282.33	-560260.16	255.87
Dead+Wind 120 deg - Service	29651.61	5026.59	2914.73	281947.87	-484672.02	334.05
Dead+Wind 150 deg - Service	29651.61	2897.80	5043.39	487500.21	-279102.94	308.49
Dead+Wind 180 deg - Service	29651.61	-9.18	5823.15	562814.57	1585.11	242.16
Dead+Wind 210 deg - Service	29651.61	-2905.38	5048.04	488077.88	280935.12	122.46
Dead+Wind 240 deg - Service	29651.61	-5030.32	2923.51	283038.07	486027.26	-53.40
Dead+Wind 270 deg - Service	29651.61	-5812.16	10.41	1589.86	561599.56	-242.70
Dead+Wind 300 deg - Service	29651.61	-5026.06	-2922.00	-282255.61	485498.06	-342.87
Dead+Wind 330 deg - Service	29651.61	-2897.52	-5055.63	-488424.57	279959.67	-325.32

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-29651.61	0.00	0.00	29651.61	0.00	0.000%
2	28.50	-35581.93	-28972.75	-28.50	35581.93	28972.75	0.000%
3	28.50	-26686.45	-28972.75	-28.50	26686.45	28972.75	0.000%
4	14430.48	-35581.93	-25115.44	-14430.48	35581.93	25115.44	0.000%
5	14430.48	-26686.45	-25115.44	-14430.48	26686.45	25115.44	0.000%
6	24957.24	-35581.93	-14562.09	-24957.24	35581.93	14562.09	0.000%
7	24957.24	-26686.45	-14562.09	-24957.24	26686.45	14562.09	0.000%
8	28852.98	-35581.93	-0.60	-28852.98	35581.93	0.60	0.000%
9	28852.98	-26686.45	-0.60	-28852.98	26686.45	0.60	0.000%
10	24968.68	-35581.93	14478.40	-24968.68	35581.93	-14478.40	0.000%
11	24968.68	-26686.45	14478.40	-24968.68	26686.45	-14478.40	0.000%
12	14394.29	-35581.93	25052.11	-14394.29	35581.93	-25052.11	0.000%
13	14394.29	-26686.45	25052.11	-14394.29	26686.45	-25052.11	0.000%
14	-45.60	-35581.93	28925.44	45.60	35581.93	-28925.44	0.000%
15	-45.60	-26686.45	28925.44	45.60	26686.45	-28925.44	0.000%
16	-14431.94	-35581.93	25075.22	14431.94	35581.93	-25075.22	0.000%
17	-14431.94	-26686.45	25075.22	14431.94	26686.45	-25075.22	0.000%
18	-24987.22	-35581.93	14522.02	24987.22	35581.93	-14522.02	0.000%
19	-24987.22	-26686.45	14522.02	24987.22	26686.45	-14522.02	0.000%
20	-28870.88	-35581.93	51.72	28870.88	35581.93	-51.72	0.000%
21	-28870.88	-26686.45	51.72	28870.88	26686.45	-51.72	0.000%
22	-24966.05	-35581.93	-14514.53	24966.05	35581.93	14514.53	0.000%
23	-24966.05	-26686.45	-14514.53	24966.05	26686.45	14514.53	0.000%
24	-14392.92	-35581.93	-25112.94	14392.92	35581.93	25112.94	0.000%
25	-14392.92	-26686.45	-25112.94	14392.92	26686.45	25112.94	0.000%
26	0.00	-73752.27	0.00	0.00	73752.27	-0.00	0.000%
27	7.18	-73752.27	-9652.28	-7.18	73752.27	9652.28	0.000%
28	4815.39	-73752.27	-8364.25	-4815.39	73752.27	8364.25	0.000%
29	8331.49	-73752.27	-4842.57	-8331.49	73752.27	4842.57	0.000%
30	9627.46	-73752.27	-1.07	-9627.46	73752.27	1.07	0.000%
31	8333.78	-73752.27	4823.46	-8333.78	73752.27	-4823.46	0.000%
32	4806.77	-73752.27	8350.43	-4806.77	73752.27	-8350.43	0.000%
33	-11.48	-73752.27	9642.43	11.48	73752.27	-9642.43	0.000%
34	-4816.25	-73752.27	8356.25	4816.25	73752.27	-8356.25	0.000%
35	-8338.45	-73752.27	4834.44	8338.45	73752.27	-4834.44	0.000%
36	-9631.97	-73752.27	12.10	9631.97	73752.27	-12.10	0.000%
37	-8333.71	-73752.27	-4830.59	8333.71	73752.27	4830.59	0.000%
38	-4805.93	-73752.27	-8363.62	4805.93	73752.27	8363.62	0.000%
39	5.74	-29651.61	-5832.67	-5.74	29651.61	5832.67	0.000%
40	2905.08	-29651.61	-5056.14	-2905.08	29651.61	5056.14	0.000%
41	5024.29	-29651.61	-2931.58	-5024.29	29651.61	2931.58	0.000%
42	5808.56	-29651.61	-0.12	-5808.56	29651.61	0.12	0.000%
43	5026.59	-29651.61	2914.73	-5026.59	29651.61	-2914.73	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
44	2897.80	-29651.61	5043.39	-2897.80	29651.61	-5043.39	0.000%
45	-9.18	-29651.61	5823.15	9.18	29651.61	-5823.15	0.000%
46	-2905.38	-29651.61	5048.04	2905.38	29651.61	-5048.04	0.000%
47	-5030.32	-29651.61	2923.51	5030.32	29651.61	-2923.51	0.000%
48	-5812.16	-29651.61	10.41	5812.16	29651.61	-10.41	0.000%
49	-5026.06	-29651.61	-2922.00	5026.06	29651.61	2922.00	0.000%
50	-2897.52	-29651.61	-5055.63	2897.52	29651.61	5055.63	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	7	0.0000001	0.0000001
3	Yes	6	0.0000001	0.0000001
4	Yes	8	0.0000001	0.0000001
5	Yes	7	0.0000001	0.0000001
6	Yes	8	0.0000001	0.0000001
7	Yes	7	0.0000001	0.0000001
8	Yes	7	0.0000001	0.0000001
9	Yes	6	0.0000001	0.0000001
10	Yes	8	0.0000001	0.0000001
11	Yes	7	0.0000001	0.0000001
12	Yes	8	0.0000001	0.0000001
13	Yes	7	0.0000001	0.0000001
14	Yes	7	0.0000001	0.0000001
15	Yes	6	0.0000001	0.0000001
16	Yes	8	0.0000001	0.0000001
17	Yes	7	0.0000001	0.0000001
18	Yes	8	0.0000001	0.0000001
19	Yes	7	0.0000001	0.0000001
20	Yes	7	0.0000001	0.0000001
21	Yes	6	0.0000001	0.0000001
22	Yes	8	0.0000001	0.0000001
23	Yes	7	0.0000001	0.0000001
24	Yes	8	0.0000001	0.0000001
25	Yes	7	0.0000001	0.0000001
26	Yes	6	0.0000001	0.0000001
27	Yes	9	0.0000001	0.0000001
28	Yes	10	0.0000001	0.0000001
29	Yes	10	0.0000001	0.0000001
30	Yes	9	0.0000001	0.0000001
31	Yes	10	0.0000001	0.0000001
32	Yes	10	0.0000001	0.0000001
33	Yes	9	0.0000001	0.0000001
34	Yes	10	0.0000001	0.0000001
35	Yes	10	0.0000001	0.0000001
36	Yes	9	0.0000001	0.0000001
37	Yes	10	0.0000001	0.0000001
38	Yes	10	0.0000001	0.0000001
39	Yes	5	0.0000001	0.0000001
40	Yes	6	0.0000001	0.0000001
41	Yes	6	0.0000001	0.0000001
42	Yes	5	0.0000001	0.0000001
43	Yes	6	0.0000001	0.0000001
44	Yes	6	0.0000001	0.0000001

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45	Yes	5	0.00000001	0.00000001
46	Yes	6	0.00000001	0.00000001
47	Yes	6	0.00000001	0.00000001
48	Yes	5	0.00000001	0.00000001
49	Yes	6	0.00000001	0.00000001
50	Yes	6	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.04	27.506	46	1.5615	0.0047
L2	94.96 - 45.04	13.391	46	1.3056	0.0023
L3	49.96 - 0	3.708	39	0.6854	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	3' Standoff	46	26.845	1.5544	0.0048	117977
132.00	5' Standoff	46	24.866	1.5327	0.0044	29494
125.00	PiROD 13' Platform w/handrail	46	22.576	1.5050	0.0040	15730
118.00	VHLP1	46	20.323	1.4727	0.0036	10724
115.00	PiROD 15' Low Profile Platform	46	19.374	1.4568	0.0034	9437
105.00	3' Standoff	46	16.299	1.3926	0.0029	6740
102.00	PiROD 13' Platform w/handrail	46	15.409	1.3692	0.0028	6208
90.00	PiROD 13' Platform w/handrail	46	12.037	1.2527	0.0022	4859

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 91.04	137.409	2	7.8073	0.0231
L2	94.96 - 45.04	66.998	2	6.5373	0.0113
L3	49.96 - 0	18.559	2	3.4329	0.0035

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	3' Standoff	2	134.113	7.7725	0.0236	24535
132.00	5' Standoff	2	124.244	7.6658	0.0219	6132
125.00	PiROD 13' Platform w/handrail	2	112.826	7.5291	0.0199	3268

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Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	VHLP1	2	101.592	7.3689	0.0179	2226
115.00	PiROD 15' Low Profile Platform	2	96.856	7.2902	0.0171	1958
105.00	3' Standoff	2	81.515	6.9709	0.0144	1395
102.00	PiROD 13' Platform w/handrail	2	77.073	6.8547	0.0137	1284
90.00	PiROD 13' Platform w/handrail	2	60.231	6.2727	0.0108	999

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual	Actual	Actual	Actual	Controlling Condition	Ratio
			Allowable Ratio Bolt Tension lb	Allowable Ratio Bolt Compression lb	Allowable Ratio Plate Stress ksi	Allowable Ratio Stiffener Stress ksi		
1.7500	12	2.2500	218086.60 223654.40 0.98	224009.99 371266.30 0.60	49.494 54.000 0.92	47.376 54.000 0.88	Bolt T	0.98 ✓

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _u lb	Ratio P _u φP _u
L1	140 - 137.629	TP27.18x18x0.1875	48.96	0.00	0.0	10.8652	-854.17	807229.00	0.001
	137.629 - 135.259					11.1297	-1168.80	826881.00	0.001
	135.259 - 132.888					11.3942	-463.86	842182.00	0.001
	132.888 - 130.518					11.6587	-653.62	856585.00	0.001
	130.518 - 128.147					11.9233	-787.10	870754.00	0.001
	128.147 - 125.777					12.1878	-922.89	884689.00	0.001
	125.777 - 123.406					12.4523	-3697.56	898390.00	0.004
	123.406 - 121.036					12.7168	-3840.26	911858.00	0.004
	121.036 - 118.665					12.9813	-3986.78	925092.00	0.004
	118.665 - 116.295					13.2458	-4150.11	938093.00	0.004
	116.295 - 113.924					13.5104	-6835.67	950860.00	0.007
	113.924 - 111.554					13.7749	-6999.89	963393.00	0.007
	111.554 - 109.183					14.0394	-7168.41	975693.00	0.007

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _u lb	Ratio $\frac{P_u}{\phi P_u}$
	109.183 - 106.813					14.3039	-7344.44	987759.00	0.007
	106.813 - 104.442					14.5684	-7658.86	999591.00	0.008
	104.442 - 102.072					14.8329	-7847.07	1011190.00	0.008
	102.072 - 99.7011					15.0975	-10230.70	1022560.00	0.010
	99.7011 - 97.3305					15.3620	-10435.40	1033690.00	0.010
	97.3305 - 94.96					15.6265	-10655.40	1044580.00	0.010
L2	94.96 - 91.04	TP35.3x26.07x0.3125	49.92	0.00	0.0	16.0639	-4334.95	1062090.00	0.004
	91.04 - 88.7578					26.2671	-7062.33	1951520.00	0.004
	88.7578 - 86.4756					26.6857	-14299.80	1982610.00	0.007
	86.4756 - 84.1933					27.1042	-14685.50	2013710.00	0.007
	84.1933 - 81.9111					27.5228	-15078.80	2044800.00	0.007
	81.9111 - 79.6289					27.9413	-15479.60	2075900.00	0.007
	79.6289 - 77.3467					28.3598	-15887.70	2106990.00	0.008
	77.3467 - 75.0644					28.7784	-16302.90	2138090.00	0.008
	75.0644 - 72.7822					29.1969	-16724.90	2169190.00	0.008
	72.7822 - 70.5					29.6155	-17153.70	2200280.00	0.008
	70.5 - 68.2178					30.0340	-17589.00	2231380.00	0.008
	68.2178 - 65.9356					30.4526	-18030.80	2262470.00	0.008
	65.9356 - 63.6533					30.8711	-18478.90	2293570.00	0.008
	63.6533 - 61.3711					31.2897	-18933.10	2319510.00	0.008
	61.3711 - 59.0889					31.7082	-19393.40	2342560.00	0.008
	59.0889 - 56.8067					32.1268	-19859.60	2365400.00	0.008
	56.8067 - 54.5244					32.5453	-20331.70	2388020.00	0.009
	54.5244 - 52.2422					32.9638	-20809.50	2410440.00	0.009
	52.2422 - 49.96					33.3824	-21293.00	2432650.00	0.009
L3	49.96 - 45.04	TP43x33.7653x0.375	49.96	0.00	0.0	33.8009	-21782.10	2454650.00	0.009
	45.04 - 42.6695					34.7032	-10882.00	2501350.00	0.004
	42.6695 - 40.2989					40.8253	-12680.70	3033110.00	0.004
	40.2989 - 37.9284					41.3468	-24143.20	3071860.00	0.008
	37.9284 - 35.5579					41.8683	-24725.70	3110610.00	0.008
	35.5579 - 33.1874					42.3899	-25314.60	3149350.00	0.008
	33.1874 - 30.8168					42.9114	-25909.60	3188100.00	0.008
	30.8168 - 28.4463					43.4329	-26510.80	3226850.00	0.008
						43.9545	-27118.10	3265600.00	0.008
						44.4760	-27731.50	3304340.00	0.008

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio P _u φP _n
	28.4463 - 26.0758					44.9975	-28350.70	3336790.00	0.008
	26.0758 - 23.7053					45.5191	-28975.90	3365560.00	0.009
	23.7053 - 21.3347					46.0406	-29606.90	3394090.00	0.009
	21.3347 - 18.9642					46.5621	-30243.70	3422410.00	0.009
	18.9642 - 16.5937					47.0837	-30886.20	3450490.00	0.009
	16.5937 - 14.2232					47.6052	-31534.40	3478350.00	0.009
	14.2232 - 11.8526					48.1267	-32188.30	3505980.00	0.009
	11.8526 - 9.48211					48.6483	-32847.70	3533380.00	0.009
	9.48211 - 7.11158					49.1698	-33512.60	3560560.00	0.009
	7.11158 - 4.74105					49.6913	-34183.10	3587510.00	0.010
	4.74105 - 2.37053					50.2129	-34859.00	3614230.00	0.010
	2.37053 - 0					50.7344	-35540.30	3640720.00	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} lb-ft	φM _{ux} lb-ft	Ratio M _{ux} φM _{ux}	M _{uy} lb-ft	φM _{uy} lb-ft	Ratio M _{uy} φM _{uy}
L1	140 - 137.629	TP27.18x18x0.1875	955.16	302329.17	0.003	0.00	302329.17	0.000
	137.629 - 135.259		1820.80	317305.83	0.006	0.00	317305.83	0.000
	135.259 - 132.888		3872.46	330935.00	0.012	0.00	330935.00	0.000
	132.888 - 130.518		6527.98	344484.17	0.019	0.00	344484.17	0.000
	130.518 - 128.147		9832.50	358202.50	0.027	0.00	358202.50	0.000
	128.147 - 125.777		13548.50	372084.17	0.036	0.00	372084.17	0.000
	125.777 - 123.406		25008.83	386121.67	0.065	0.00	386121.67	0.000
	123.406 - 121.036		40473.00	400309.17	0.101	0.00	400309.17	0.000
	121.036 - 118.665		56364.92	414640.00	0.136	0.00	414640.00	0.000
	118.665 - 116.295		73299.83	429107.50	0.171	0.00	429107.50	0.000
	116.295 - 113.924		95246.67	443705.83	0.215	0.00	443705.83	0.000
	113.924 - 111.554		123085.00	458428.33	0.268	0.00	458428.33	0.000
	111.554 - 109.183		151365.00	473268.33	0.320	0.00	473268.33	0.000
	109.183 - 106.813		180092.50	488220.00	0.369	0.00	488220.00	0.000
	106.813 - 104.442		209739.17	503275.00	0.417	0.00	503275.00	0.000
	104.442 - 102.072		240300.83	518429.17	0.464	0.00	518429.17	0.000
	102.072 - 99.7011		281285.00	533675.00	0.527	0.00	533675.00	0.000
	99.7011 - 97.3305		323032.50	549005.83	0.588	0.00	549005.83	0.000
	97.3305 - 94.96		365285.83	564415.83	0.647	0.00	564415.83	0.000
	94.96 - 91.04		169575.83	590054.17	0.287	0.00	590054.17	0.000
L2	94.96 - 91.04	TP35.3x26.07x0.3125	266679.17	1058583.33	0.252	0.00	1058583.33	0.000
	91.04 - 88.7578		483840.83	1092791.67	0.443	0.00	1092791.67	0.000
	88.7578 - 86.4756		536558.33	1127533.33	0.476	0.00	1127533.33	0.000
	86.4756 - 84.1933		589701.67	1162825.00	0.507	0.00	1162825.00	0.000
	84.1933 - 81.9111		643269.17	1198666.67	0.537	0.00	1198666.67	0.000
	81.9111 - 79.6289		697255.83	1235041.67	0.565	0.00	1235041.67	0.000
	79.6289 - 77.3467		751659.17	1271966.67	0.591	0.00	1271966.67	0.000

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Section No.	Elevation ft	Size	M_{xx}	ϕM_{xx}	Ratio	M_{yy}	ϕM_{yy}	Ratio
			lb-ft	lb-ft	$\frac{M_{xx}}{\phi M_{xx}}$	lb-ft	lb-ft	$\frac{M_{yy}}{\phi M_{yy}}$
	77.3467 - 75.0644		806475.83	1309433.33	0.616	0.00	1309433.33	0.000
	75.0644 - 72.7822		861700.00	1347441.67	0.640	0.00	1347441.67	0.000
	72.7822 - 70.5		917333.33	1386000.00	0.662	0.00	1386000.00	0.000
	70.5 - 68.2178		973375.00	1425100.00	0.683	0.00	1425100.00	0.000
	68.2178 - 65.9356		1029808.33	1464741.67	0.703	0.00	1464741.67	0.000
	65.9356 - 63.6533		1086641.67	1501591.67	0.724	0.00	1501591.67	0.000
	63.6533 - 61.3711		1143866.67	1536991.67	0.744	0.00	1536991.67	0.000
	61.3711 - 59.0889		1201483.33	1572666.67	0.764	0.00	1572666.67	0.000
	59.0889 - 56.8067		1259483.33	1608591.67	0.783	0.00	1608591.67	0.000
	56.8067 - 54.5244		1317875.00	1644775.00	0.801	0.00	1644775.00	0.000
	54.5244 - 52.2422		1376641.67	1681200.00	0.819	0.00	1681200.00	0.000
	52.2422 - 49.96		1435783.33	1717866.67	0.836	0.00	1717866.67	0.000
	49.96 - 45.04		734870.83	1797708.33	0.409	0.00	1797708.33	0.000
L3	49.96 - 45.04	TP43x33.7653x0.375	830012.50	2132800.00	0.389	0.00	2132800.00	0.000
	45.04 - 42.6695		1627850.00	2187933.33	0.744	0.00	2187933.33	0.000
	42.6695 - 40.2989		1691191.67	2243775.00	0.754	0.00	2243775.00	0.000
	40.2989 - 37.9284		1754908.33	2300325.00	0.763	0.00	2300325.00	0.000
	37.9284 - 35.5579		1818991.67	2357575.00	0.772	0.00	2357575.00	0.000
	35.5579 - 33.1874		1883433.33	2415525.00	0.780	0.00	2415525.00	0.000
	33.1874 - 30.8168		1948216.67	2474183.33	0.787	0.00	2474183.33	0.000
	30.8168 - 28.4463		2013341.67	2533541.67	0.795	0.00	2533541.67	0.000
	28.4463 - 26.0758		2078800.00	2588725.00	0.803	0.00	2588725.00	0.000
	26.0758 - 23.7053		2144583.33	2641600.00	0.812	0.00	2641600.00	0.000
	23.7053 - 21.3347		2210675.00	2694816.67	0.820	0.00	2694816.67	0.000
	21.3347 - 18.9642		2277083.33	2748375.00	0.829	0.00	2748375.00	0.000
	18.9642 - 16.5937		2343783.33	2802258.33	0.836	0.00	2802258.33	0.000
	16.5937 - 14.2232		2410775.00	2856466.67	0.844	0.00	2856466.67	0.000
	14.2232 - 11.8526		2478050.00	2910991.67	0.851	0.00	2910991.67	0.000
	11.8526 - 9.48211		2545591.67	2965825.00	0.858	0.00	2965825.00	0.000
	9.48211 - 7.11158		2613408.33	3020966.67	0.865	0.00	3020966.67	0.000
	7.11158 - 4.74105		2681483.33	3076408.33	0.872	0.00	3076408.33	0.000
	4.74105 - 2.37053		2749800.00	3132141.67	0.878	0.00	3132141.67	0.000
	2.37053 - 0		2818366.67	3188158.33	0.884	0.00	3188158.33	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	ϕV_n	Ratio	Actual	ϕT_n	Ratio
			V_n lb	lb	$\frac{V_n}{\phi V_n}$	T_n lb-ft	lb-ft	$\frac{T_n}{\phi T_n}$
L1	140 - 137.629	TP27.18x18x0.1875	328.44	403614.00	0.001	0.04	605398.33	0.000
	137.629 - 135.259		402.13	413441.00	0.001	0.04	635388.33	0.000
	135.259 - 132.888		873.40	421091.00	0.002	0.02	662679.17	0.000
	132.888 - 130.518		1308.22	428292.00	0.003	0.05	689810.83	0.000
	130.518 - 128.147		1480.35	435377.00	0.003	0.05	717281.67	0.000
	128.147 - 125.777		1655.49	442344.00	0.004	0.05	745078.33	0.000
	125.777 - 123.406		6434.67	449195.00	0.014	0.31	773187.50	0.000
	123.406 - 121.036		6614.49	455929.00	0.015	0.31	801597.50	0.000
	121.036 - 118.665		6796.40	462546.00	0.015	0.30	830294.17	0.000

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Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	118.665 - 116.295		7253.38	469047.00	0.015	157.42	859266.67	0.000
	116.295 - 113.924		11655.90	475430.00	0.025	157.38	888500.00	0.000
	113.924 - 111.554		11840.40	481697.00	0.025	157.25	917975.00	0.000
	111.554 - 109.183		12032.30	487847.00	0.025	289.34	947691.67	0.000
	109.183 - 106.813		12218.20	493880.00	0.025	289.34	977633.33	0.000
	106.813 - 104.442		12807.40	499796.00	0.026	607.27	1007783.33	0.001
	104.442 - 102.072		12994.60	505595.00	0.026	606.95	1038125.00	0.001
	102.072 - 99.7011		17525.00	511278.00	0.034	606.76	1068658.33	0.001
	99.7011 - 97.3305		17749.40	511278.00	0.035	1292.67	1099358.33	0.001
	97.3305 - 94.96		17930.90	516843.00	0.035	1292.14	1130216.67	0.001
	94.96 - 91.04		7213.86	522292.00	0.014	501.90	1181550.00	0.000
L2	94.96 - 91.04	TP35.3x26.07x0.3125	11093.10	975758.00	0.011	789.77	2119758.33	0.000
	91.04 - 88.7578		23020.60	975758.00	0.024	1291.27	2188250.00	0.001
	88.7578 - 86.4756		23209.80	1006850.00	0.023	1290.80	2257833.33	0.001
	86.4756 - 84.1933		23397.40	1022400.00	0.023	1290.33	2328500.00	0.001
	84.1933 - 81.9111		23583.50	1037950.00	0.023	1289.84	2400258.33	0.001
	81.9111 - 79.6289		23768.00	1053500.00	0.023	1289.33	2473108.33	0.001
	79.6289 - 77.3467		23951.10	1069050.00	0.022	1288.78	2547041.67	0.001
	77.3467 - 75.0644		24132.60	1084590.00	0.022	1288.23	2622066.67	0.000
	75.0644 - 72.7822		24312.70	1100140.00	0.022	1287.66	2698183.33	0.000
	72.7822 - 70.5		24491.30	1115690.00	0.022	1287.08	2775391.67	0.000
	70.5 - 68.2178		24668.40	1131240.00	0.022	1286.50	2853683.33	0.000
	68.2178 - 65.9356		24844.00	1146780.00	0.022	1285.91	2933066.67	0.000
	65.9356 - 63.6533		25018.20	1159750.00	0.022	1285.33	3006850.00	0.000
	63.6533 - 61.3711		25190.90	1171280.00	0.022	1284.74	3077750.00	0.000
	61.3711 - 59.0889		25362.30	1182700.00	0.021	1284.17	3149175.00	0.000
	59.0889 - 56.8067		25532.10	1194010.00	0.021	1283.61	3221116.67	0.000
	56.8067 - 54.5244		25700.60	1205220.00	0.021	1283.06	3293566.67	0.000
	54.5244 - 52.2422		25867.70	1216330.00	0.021	1282.52	3366508.33	0.000
	52.2422 - 49.96		26033.30	1227320.00	0.021	1282.00	3439933.33	0.000
	49.96 - 45.04		12576.60	1250680.00	0.010	601.72	3599808.33	0.000
L3	49.96 - 45.04	TP43x33.7653x0.375	13942.70	1516560.00	0.009	679.78	4270808.33	0.000
	45.04 - 42.6695		26678.80	1535930.00	0.017	1281.01	4381225.00	0.000
	42.6695 - 40.2989		26838.60	1555300.00	0.017	1280.58	4493041.67	0.000
	40.2989 - 37.9284		26995.00	1574680.00	0.017	1280.15	4606275.00	0.000

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Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	37.9284 - 35.5579		27147.80	1594050.00	0.017	1279.75	4720916.67	0.000
	35.5579 - 33.1874		27297.20	1613420.00	0.017	1279.37	4836958.33	0.000
	33.1874 - 30.8168		27443.10	1632800.00	0.017	1279.02	4954416.67	0.000
	30.8168 - 28.4463		27585.50	1652170.00	0.017	1278.67	5073283.33	0.000
	28.4463 - 26.0758		27724.40	1668400.00	0.017	1278.37	5183775.00	0.000
	26.0758 - 23.7053		27859.80	1682780.00	0.017	1278.08	5289658.33	0.000
	23.7053 - 21.3347		27991.80	1697050.00	0.016	1277.82	5396225.00	0.000
	21.3347 - 18.9642		28120.20	1711200.00	0.016	1277.58	5503466.67	0.000
	18.9642 - 16.5937		28245.30	1725240.00	0.016	1277.37	5611366.67	0.000
	16.5937 - 14.2232		28366.80	1739170.00	0.016	1277.18	5719916.67	0.000
	14.2232 - 11.8526		28484.90	1752990.00	0.016	1277.02	5829100.00	0.000
	11.8526 - 9.48211		28599.60	1766690.00	0.016	1276.88	5938908.00	0.000
	9.48211 - 7.11158		28710.80	1780280.00	0.016	1276.77	6049324.67	0.000
	7.11158 - 4.74105		28818.50	1793750.00	0.016	1276.70	6160341.33	0.000
	4.74105 - 2.37053		28922.90	1807110.00	0.016	1276.64	6271941.33	0.000
	2.37053 - 0		29023.80	1820360.00	0.016	1276.62	6384124.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{ux}	ϕM_{uy}	ϕV_n	ϕT_n			
L1	140 - 137.629	0.001	0.003	0.000	0.001	0.000	0.004 ✓	1.000	4.8.2 ✓
	137.629 - 135.259	0.001	0.006	0.000	0.001	0.000	0.007 ✓	1.000	4.8.2 ✓
	135.259 - 132.888	0.001	0.012	0.000	0.002	0.000	0.012 ✓	1.000	4.8.2 ✓
	132.888 - 130.518	0.001	0.019	0.000	0.003	0.000	0.020 ✓	1.000	4.8.2 ✓
	130.518 - 128.147	0.001	0.027	0.000	0.003	0.000	0.028 ✓	1.000	4.8.2 ✓
	128.147 - 125.777	0.001	0.036	0.000	0.004	0.000	0.037 ✓	1.000	4.8.2 ✓
	125.777 - 123.406	0.004	0.065	0.000	0.014	0.000	0.069 ✓	1.000	4.8.2 ✓
	123.406 - 121.036	0.004	0.101	0.000	0.015	0.000	0.106 ✓	1.000	4.8.2 ✓
	121.036 - 118.665	0.004	0.136	0.000	0.015	0.000	0.140 ✓	1.000	4.8.2 ✓

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Section No.	Elevation <i>ft</i>	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
	118.665 - 116.295	0.004	0.171	0.000	0.015	0.000	0.175 ✓	1.000	4.8.2 ✓
	116.295 - 113.924	0.007	0.215	0.000	0.025	0.000	0.222 ✓	1.000	4.8.2 ✓
	113.924 - 111.554	0.007	0.268	0.000	0.025	0.000	0.276 ✓	1.000	4.8.2 ✓
	111.554 - 109.183	0.007	0.320	0.000	0.025	0.000	0.328 ✓	1.000	4.8.2 ✓
	109.183 - 106.813	0.007	0.369	0.000	0.025	0.000	0.377 ✓	1.000	4.8.2 ✓
	106.813 - 104.442	0.008	0.417	0.000	0.026	0.001	0.425 ✓	1.000	4.8.2 ✓
	104.442 - 102.072	0.008	0.464	0.000	0.026	0.001	0.472 ✓	1.000	4.8.2 ✓
	102.072 - 99.7011	0.010	0.527	0.000	0.034	0.001	0.538 ✓	1.000	4.8.2 ✓
	99.7011 - 97.3305	0.010	0.588	0.000	0.035	0.001	0.600 ✓	1.000	4.8.2 ✓
	97.3305 - 94.96	0.010	0.647	0.000	0.035	0.001	0.659 ✓	1.000	4.8.2 ✓
	94.96 - 91.04	0.004	0.287	0.000	0.014	0.000	0.292 ✓	1.000	4.8.2 ✓
L2	94.96 - 91.04	0.004	0.252	0.000	0.011	0.000	0.256 ✓	1.000	4.8.2 ✓
	91.04 - 88.7578	0.007	0.443	0.000	0.024	0.001	0.451 ✓	1.000	4.8.2 ✓
	88.7578 - 86.4756	0.007	0.476	0.000	0.023	0.001	0.484 ✓	1.000	4.8.2 ✓
	86.4756 - 84.1933	0.007	0.507	0.000	0.023	0.001	0.515 ✓	1.000	4.8.2 ✓
	84.1933 - 81.9111	0.007	0.537	0.000	0.023	0.001	0.545 ✓	1.000	4.8.2 ✓
	81.9111 - 79.6289	0.008	0.565	0.000	0.023	0.001	0.573 ✓	1.000	4.8.2 ✓
	79.6289 - 77.3467	0.008	0.591	0.000	0.022	0.001	0.599 ✓	1.000	4.8.2 ✓
	77.3467 - 75.0644	0.008	0.616	0.000	0.022	0.000	0.624 ✓	1.000	4.8.2 ✓
	75.0644 - 72.7822	0.008	0.640	0.000	0.022	0.000	0.648 ✓	1.000	4.8.2 ✓
	72.7822 - 70.5	0.008	0.662	0.000	0.022	0.000	0.670 ✓	1.000	4.8.2 ✓
	70.5 - 68.2178	0.008	0.683	0.000	0.022	0.000	0.691 ✓	1.000	4.8.2 ✓
	68.2178 - 65.9356	0.008	0.703	0.000	0.022	0.000	0.712 ✓	1.000	4.8.2 ✓
	65.9356 - 63.6533	0.008	0.724	0.000	0.022	0.000	0.732 ✓	1.000	4.8.2 ✓
	63.6533 - 61.3711	0.008	0.744	0.000	0.022	0.000	0.753 ✓	1.000	4.8.2 ✓
	61.3711 - 59.0889	0.008	0.764	0.000	0.021	0.000	0.773 ✓	1.000	4.8.2 ✓
	59.0889 - 56.8067	0.009	0.783	0.000	0.021	0.000	0.792 ✓	1.000	4.8.2 ✓
	56.8067 - 54.5244	0.009	0.801	0.000	0.021	0.000	0.810 ✓	1.000	4.8.2 ✓
	54.5244 - 52.2422	0.009	0.819	0.000	0.021	0.000	0.828 ✓	1.000	4.8.2 ✓
	52.2422 - 49.96	0.009	0.836	0.000	0.021	0.000	0.845 ✓	1.000	4.8.2 ✓
	49.96 - 45.04	0.004	0.409	0.000	0.010	0.000	0.413 ✓	1.000	4.8.2 ✓
L3	49.96 - 45.04	0.004	0.389	0.000	0.009	0.000	0.393 ✓	1.000	4.8.2 ✓

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Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{ux}	ϕM_{uy}	ϕV_n	ϕT_n			
	45.04 - 42.6695	0.008	0.744	0.000	0.017	0.000	0.752 ✓	1.000	4.8.2 ✓
	42.6695 - 40.2989	0.008	0.754	0.000	0.017	0.000	0.762 ✓	1.000	4.8.2 ✓
	40.2989 - 37.9284	0.008	0.763	0.000	0.017	0.000	0.771 ✓	1.000	4.8.2 ✓
	37.9284 - 35.5579	0.008	0.772	0.000	0.017	0.000	0.780 ✓	1.000	4.8.2 ✓
	35.5579 - 33.1874	0.008	0.780	0.000	0.017	0.000	0.788 ✓	1.000	4.8.2 ✓
	33.1874 - 30.8168	0.008	0.787	0.000	0.017	0.000	0.796 ✓	1.000	4.8.2 ✓
	30.8168 - 28.4463	0.008	0.795	0.000	0.017	0.000	0.803 ✓	1.000	4.8.2 ✓
	28.4463 - 26.0758	0.008	0.803	0.000	0.017	0.000	0.812 ✓	1.000	4.8.2 ✓
	26.0758 - 23.7053	0.009	0.812	0.000	0.017	0.000	0.821 ✓	1.000	4.8.2 ✓
	23.7053 - 21.3347	0.009	0.820	0.000	0.016	0.000	0.829 ✓	1.000	4.8.2 ✓
	21.3347 - 18.9642	0.009	0.829	0.000	0.016	0.000	0.838 ✓	1.000	4.8.2 ✓
	18.9642 - 16.5937	0.009	0.836	0.000	0.016	0.000	0.846 ✓	1.000	4.8.2 ✓
	16.5937 - 14.2232	0.009	0.844	0.000	0.016	0.000	0.853 ✓	1.000	4.8.2 ✓
	14.2232 - 11.8526	0.009	0.851	0.000	0.016	0.000	0.861 ✓	1.000	4.8.2 ✓
	11.8526 - 9.48211	0.009	0.858	0.000	0.016	0.000	0.868 ✓	1.000	4.8.2 ✓
	9.48211 - 7.11158	0.009	0.865	0.000	0.016	0.000	0.875 ✓	1.000	4.8.2 ✓
	7.11158 - 4.74105	0.010	0.872	0.000	0.016	0.000	0.881 ✓	1.000	4.8.2 ✓
	4.74105 - 2.37053	0.010	0.878	0.000	0.016	0.000	0.888 ✓	1.000	4.8.2 ✓
	2.37053 - 0	0.010	0.884	0.000	0.016	0.000	0.894 ✓	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail	
L1	140 - 91.04	Pole	TP27.18x18x0.1875	1	-10655.40	1044580.00	65.9	Pass	
L2	91.04 - 45.04	Pole	TP35.3x26.07x0.3125	2	-21782.10	2454650.00	84.5	Pass	
L3	45.04 - 0	Pole	TP43x33.7653x0.375	3	-35540.30	3640720.00	89.4	Pass	
							Summary		
							Pole (L3)	89.4	Pass
							Base Plate	97.5	Pass
							RATING =	97.5	Pass

POLE FOUNDATION ANALYSIS
For Free-Top Rigid Round Piers Embedded in Granular Soil Using USS/Teng Method
Subjected Vertical Load, Horizontal Load, and/or Moment

Job Name:	CT23XC557	Subject:	
Job Number:	23007	Originator:	AMK
		Checker:	

Input Data:

Pier Data:

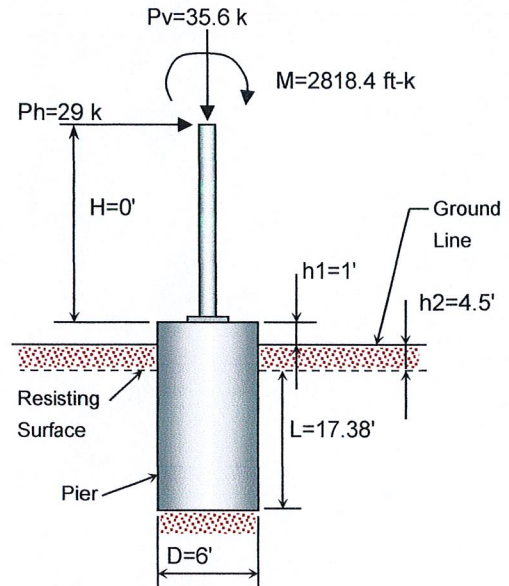
Pier Foundation Diameter, D =	6.000	ft.
Pier Height Above Soil, h1 =	1.000	ft.

Soil Data:

Unit Weight of Soil, γ =	0.125	kcf
Blows/Foot (Penetrometer), N =	22	
Depth to Resisting Surface, h2 =	4.500	ft.
Allow. Soil Bearing Pressure, Pa =	9.000	ksf

Pier Loadings:

Axial Load, Pv =	35.600	kips
Horizontal Load, Ph =	29.000	kips
Distance from Ph to Top/Pier, H =	0.000	ft.
Externally Applied Moment, M =	2818.400	ft-kips
Overload Factor, OLF =	2.000	



Nomenclature

Results:

Granular Soil Parameters:

ϕ =	34.00	deg.
Kp =	3.537	

$\phi = 28.5 + N/4$ (angle of internal friction)
 $Kp = \text{TAN}(45 + \phi/2)^2$ (passive soil pressure coefficient)

Pier Embedment and Total Length:

Ho =	58.00	kips
Mo =	5955.80	ft-kips
L =	17.38	ft.
Lt =	22.88	ft.

Ho = Ph*OLF
 Mo = (M+Ph*(H+h1+h2))*OLF
 L = solution of cubic equation: $L^3 - 2*Ho*L / (Kp*\gamma*D) - 2*Mo / (Kp*\gamma*D) = 0$
 Lt = h1+h2+L (total length)

Actual length = 23' ---> OK

Pier End Bearing Pressure:

Af =	28.27	ft.^2
Wf =	97.04	kips
ΣPv =	132.64	kips
P(bot) =	4.691	ksf

Af = $\pi*D^2/4$ (pier base area)
 Wf = (Af*Lt)*0.150 (pier weight)
 ΣPv = Pv+Wf (total vertical load)
 P(bot) = $\Sigma Pv/Af$

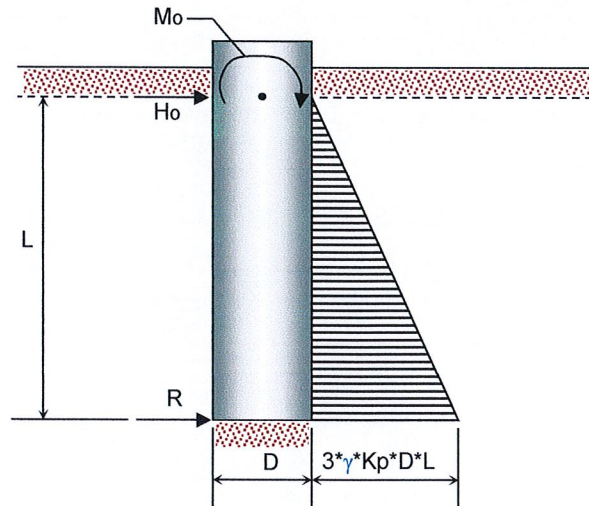
(continued)

APPLIED LATERAL LOAD AND RESISTANCE OF POLE/FOUNDATION

Reference: "Tapered Steel Poles - Caisson Foundation Design"

Prepared for United States Steel Corp. by Teng and Assoc., July 1969

Embedment depth, L, is solution of:
 $L^3 - 2*H_o / (K_p * \gamma * D) * L - 2*M_o / (K_p * \gamma * D) = 0$



FOUNDATION IN GRANULAR SOIL

Comments:

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

Sprint Existing Facility

Site ID: CT23XC557

**Manchester - Bill Thornton
60 Adams Street
Manchester, CT 06040**

September 27, 2013

EBI Project Number: 69130126

September 27, 2013

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT23XC557 – Manchester - Bill Thornton**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 60 Adams Street, Manchester, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

General population/uncontrolled exposure limits apply to situations in which the general 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the cellular band is approximately $567 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS band is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 60 Adams Street, Manchester, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

- 1) 4 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
- 2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
- 3) 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.
- 4) 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.
- 5) The antenna used in this modeling is the APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

- 6) The antenna mounting height centerline of the proposed antennas is **115 feet** above ground level (AGL)
- 7) 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT23XC557 - Manchester - Bill Thornton
Site Address	60 Adams Street, Manchester, CT, 06040
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSP18-CA20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	115	109	1/2 "	0.5	0	2773.8948	83.93498	8.39350%
1a	RFS	APXVSP18-CA20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	115	109	1/2 "	0.5	0	389.96892	11.80003	2.08113%
Sector total Power Density Value: 10.475%																	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSP18-CA20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	115	109	1/2 "	0.5	0	2773.8948	83.93498	8.39350%
2a	RFS	APXVSP18-CA20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	115	109	1/2 "	0.5	0	389.96892	11.80003	2.08113%
Sector total Power Density Value: 10.475%																	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSP18-CA20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	115	109	1/2 "	0.5	0	2773.8948	83.93498	8.39350%
3a	RFS	APXVSP18-CA20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	115	109	1/2 "	0.5	0	389.96892	11.80003	2.08113%
Sector total Power Density Value: 10.475%																	

Site Composite MPE %	
Carrier	MPE %
Sprint	31.424%
AT&T	2.500%
PageNET	3.990%
Nextel	5.700%
Verizon Wireless	49.990%
ClearWire	1.410%
Total Site MPE %	95.014%

Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **31.424% (10.475% 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 **95.014%** 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

EBI Consulting
21 B Street
Burlington, MA 01803