HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

HPC WIRELESS SERVICES

August 26, 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
Olcott Street, a/k/a 250 Olcott Street, Manchester, Connecticut

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 Mayor of the Town of Manchester.

Sprint plans to modify the existing wireless communications facility owned by The Connecticut Light and Power Company and located at Olcott Street, a/k/a/ 250 Olcott Street, Manchester, (coordinates 41°-46'-14" N, 72°-33'-28" 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. 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 the existing six (6) CMDA antennas and add three (3) dual-band panel LTE antennas to the existing sector frames by new pipe masts, at a centerline height of approximately 125'. Sprint will also install six (6) RRHs (remote radio heads) on existing boom gates onto the Tower legs, also at a centerline height of approximately 125'. During an interim period of up to one year, the three (3) existing CDMA antennas will remain. Sprint will also install three (3) hybriflex cables along the existing coaxial

cable run, and will remove the coaxial cable at the end of the interim period. The proposed modifications will not extend the height of the approximately 200' structure.

2. Sprint will replace the two (2) existing cabinets with three (3) similar cabinets, and add a proposed H-frame and a fiber junction box, all on the existing concrete equipment pad. The existing GPS antenna will be replaced by another 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 24.406%; the combined site operations will result in a total power density of approximately 28.976%.

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
Connecticut Light and Power Company (underlying property owner)

From: steven.florio@nu.com [mailto:steven.florio@nu.com]
Sent: Wednesday, August 07, 2013 1:23 PM
To: Jennifer Gaudet
Cc: Daniel Burnett-Pollock; Halene Fujimoto; Thomas Shevlin
Subject: Re: FW: CT03XC067 CDs

Jennifer, Your CDs for Manchester look good, let me know if you should need anything else.

Steven J. Florio

860-665-5611 (office)
860-655-7943 (cell)
steven.florio@nu.com

Northeast Utilities
Telecommunication Engineering

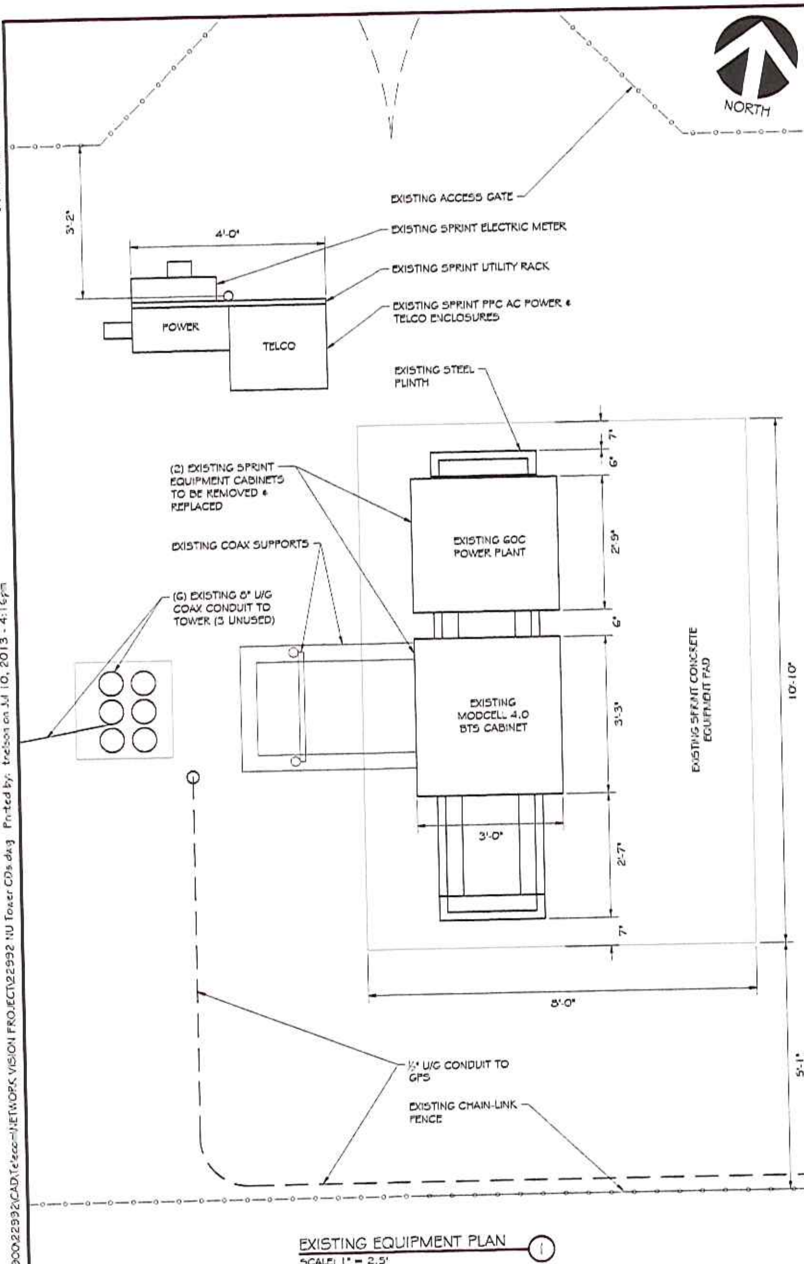
From: Jennifer Gaudet <jgaudet@hpcwireless.com>
To: Steven J. Florio/NUS@NU
Cc: Daniel Burnett-Pollock <dburnett-pollock@hpcwireless.com>, Halene Fujimoto <hfujimoto@hpcwireless.com>, Thomas Shevlin <tshevlin@hpcwireless.com>
Date: 08/07/2013 12:18 PM
Subject: FW: CT03XC067 CDs

Steve –

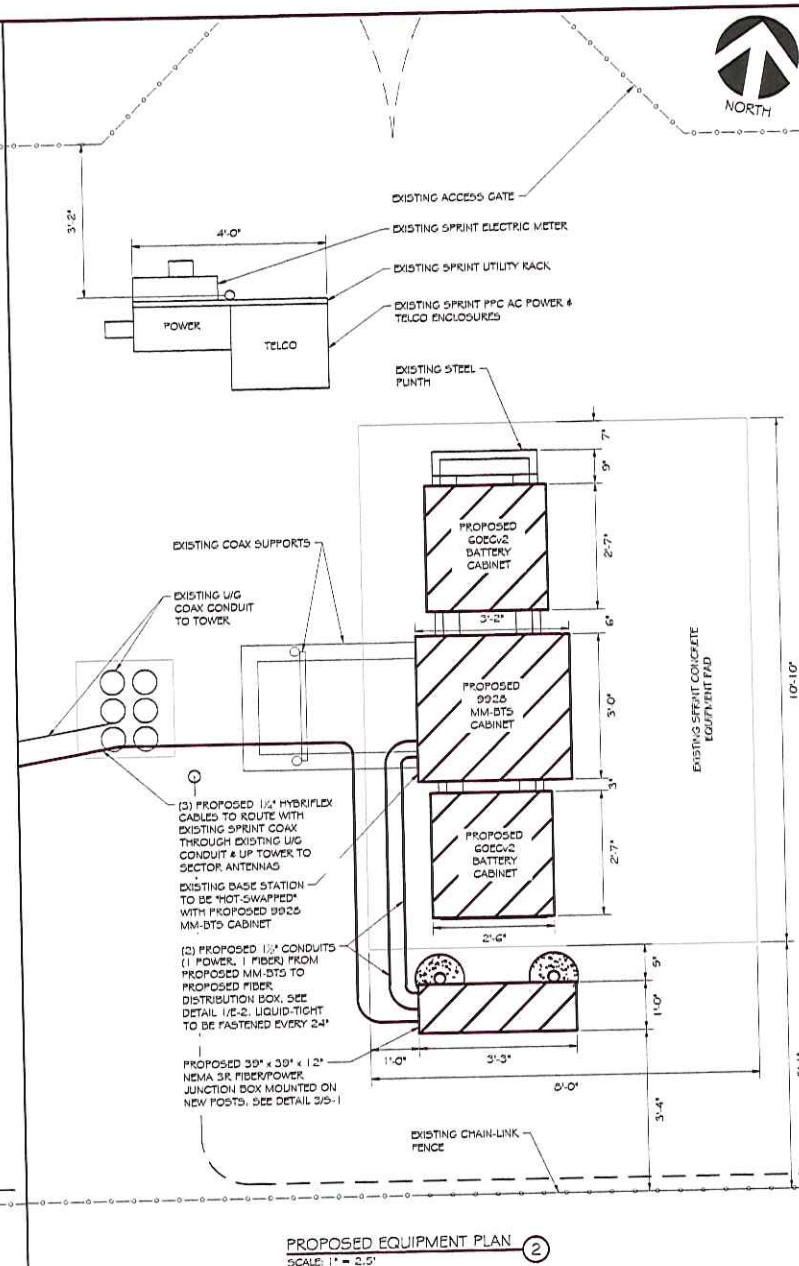
Attached for your review are the CDs for the Manchester tower. Please let me know if you require any changes to them. If not, we will file asap with the Siting Council.

Thanks.
Jennifer

Jennifer Young Gaudet
860.798.7454



EXISTING EQUIPMENT PLAN (1)
SCALE: 1" = 2.5'



PROPOSED EQUIPMENT PLAN (2)
SCALE: 1" = 2.5'

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Certification & Seal:

MARK	DATE	DESCRIPTION
C	7/10/13	REISSUED, FINAL PRELIMINARY CD'S
B	1/14/13	FINAL PRELIMINARY CD'S
A	11/14/12	90% CD REVIEW

ISSUE PHASE: FINAL PRELIMINARY — DATE ISSUED: 07/10/13

PROJECT TITLE:
NU TOWER
SITE #: CT03XC067

PROJECT INFORMATION:
250 SOUTH OLCOTT STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE:
EQUIPMENT PLAN

0 1.25' 2.5' 5'
11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 22992
SHEET NUMBER: A-1

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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 MAY BE ORIENTED USING THE REFLECTOR AS THE REFERENCE, ADJUSTING ITS AZIMUTH 180 DEGREES FROM MAXIMUM ANTENNA RADIATION.

B. MICROWAVE ANTENNAS (DISHES) SHALL BE ASSEMBLED PER MANUFACTURERS DRAWINGS. STIFF ARMS AND RADOMES 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 STIFF ARMS SHALL BE PROVIDED FOR MICROWAVE DISHES 6'-0" IN 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 HEIGHT OF THE TOWER. ANGLE ADAPTERS OR ROUND MEMBER ADAPTERS WITH BUTTERFLY CLAMPS SHALL BE USED ELSEWHERE, I.E. SIDEARMS, PLATFORMS, AND MICROWAVE MOUNTS.

B. COAXIAL CABLE SHALL ALSO BE SUPPORTED WITH HOISTING GRIPS, INSTALLED AT MAXIMUM INTERVALS OF 200 FEET. HOISTING GRIPS SHALL BE ATTACHED WITH SHACKLES, BOLTED IN THE 7/16" HOLE OF WAVEGUIDE LADDER.

C. ALL JUMPERS USED BETWEEN COAXIAL CABLE AND ANTENNA SHALL BE SUPPORTED WITHIN 18 INCHES OF ANTENNA, USING BUTTERFLY CLAMPS 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 16" 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 2" WIDE COLORED TAPE TO INDICATE SECTORS. CONTRACTOR TO USE SECTOR COLOR CODING AS INDICATED IN THESE DRAWINGS OR AS PROVIDED BY SPRINT.

I. ALL EXCEPTIONS NEED TO BE VERIFIED WITH THE PROJECT MANAGER.

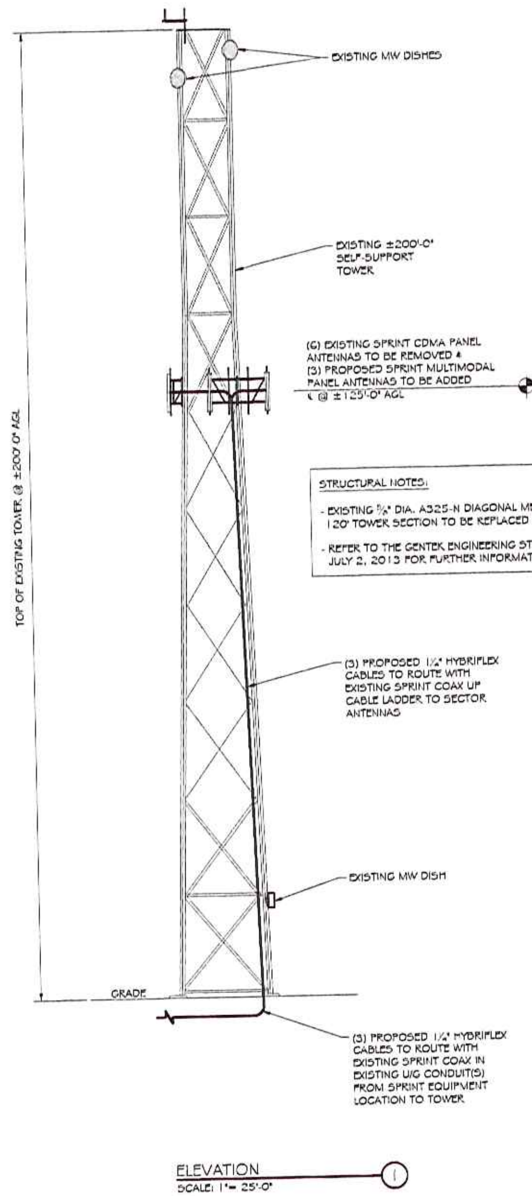
IV. CONNECTORS:

A. ALL CONNECTIONS AND GROUNDING KITS SHALL BE WEATHERPROOFED USING COLD SHRINK OR ANDREW APPROVED WEATHER STRIPPING. NOTE: NO PORTION OF CONNECTOR SHALL BE EXPOSED TO THE ELEMENTS.

B. COAXIAL CABLE SHALL BE GROUNDED USING GROUNDING KITS AT THE TOP (BELOW THE BEND), BOTTOM (ABOVE THE BEND ON TOWER GROUND BAR), AND ON BUILDING GROUND BAR BEFORE 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 GROUND BAR. 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 BAR/TOWER.

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.



STRUCTURAL NOTES:

- EXISTING 5/8" DIA. A325-N DIAGONAL MEMBER BOLTS AT THE 100' - 120' TOWER SECTION TO BE REPLACED WITH 5/8" DIA. A325-X BOLTS.
- REFER TO THE GENTEK ENGINEERING STRUCTURAL, REV. 2, DATED JULY 2, 2013 FOR FURTHER INFORMATION.

ELEVATION (1)
SCALE: 1" = 25'-0"

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Certification & Seal:

MARK	DATE	DESCRIPTION
C	7/10/13	REVISED, FINAL PRELIMINARY CDS
B	1/14/13	FINAL PRELIMINARY CDS
A	11/14/12	90% CD REVIEW

ISSUE PHASE: FINAL PRELIMINARY   DATE ISSUED: 07/10/13

PROJECT TITLE:

NU TOWER
SITE #: CT03XC067

PROJECT INFORMATION:
250 SOUTH OLCOTT STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE:

SITE ELEVATION & NOTES

0 12.5' 25' 50'

11" x 17" - 1" = 25'
22" x 34" - 1" = 12.5'

PROJECT NUMBER: 22992

SHEET NUMBER: A-2

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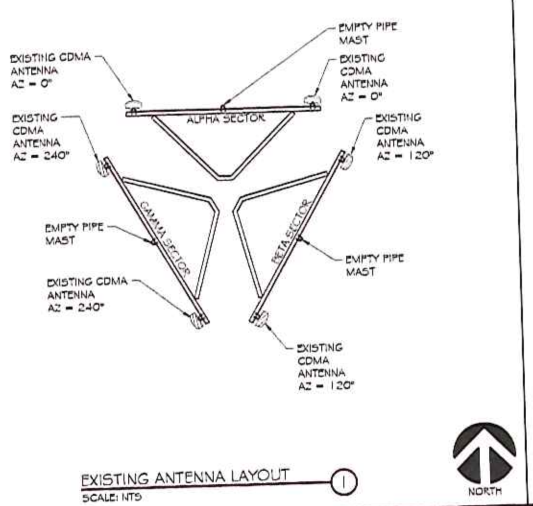
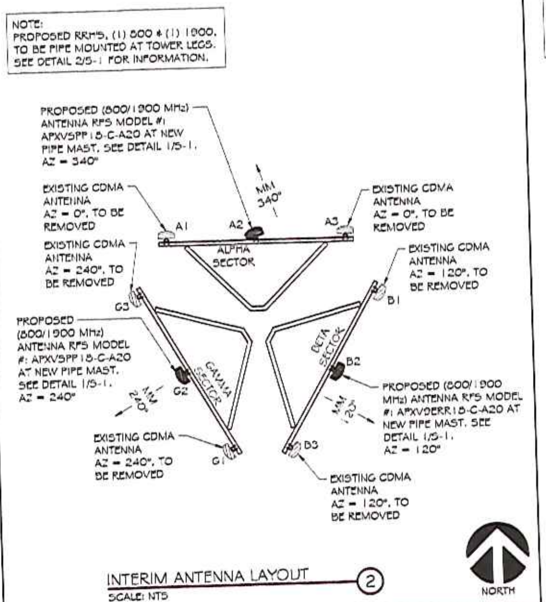
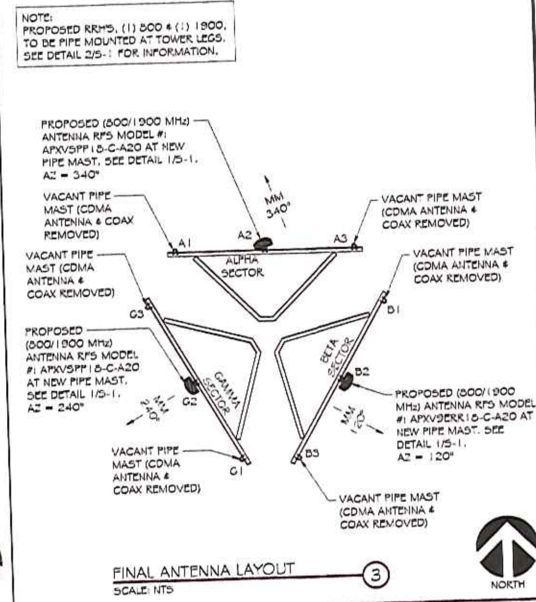


EXISTING ANTENNA LAYOUT ①
SCALE: NTS



INTERIM ANTENNA LAYOUT ②
SCALE: NTS



FINAL ANTENNA LAYOUT ③
SCALE: NTS

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°	125'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
	A-2	340°	125'-0"	PROPOSED	MULTIMODAL	RFS #APXVSPP18-C-A20	0°	0° (1900), -3° (800)	(1) 1900, (1) 800	(1) 1 ¼" HYBRIFLEX HYBRID CABLE RFS #HB114-1-0813U4-M5J	± 375'-0"
	A-3	0°	125'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
BETA	B-1	120°	125'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
	B-2	120°	125'-0"	PROPOSED	MULTIMODAL	RFS #APXV9ERR18-C-A20	0°	0° (1900), 0° (800)	(1) 1900, (1) 800	(1) 1 ¼" HYBRIFLEX HYBRID CABLE RFS #HB114-1-0813U4-M5J	± 375'-0"
	B-3	120°	125'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
GAMMA	G-1	240°	125'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-
	G-2	240°	125'-0"	PROPOSED	MULTIMODAL	RFS #APXVSPP18-C-A20	0°	-1° (1900), -1° (800)	(1) 1900, (1) 800	(1) 1 ¼" HYBRIFLEX HYBRID CABLE RFS #HB114-1-0813U4-M5J	± 375'-0"
	G-3	240°	125'-0"	EX. TO BE REMOVED	CDMA	-	-	-	-	EX. TO BE REMOVED	-

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Certification & Seal:

MARK	DATE	DESCRIPTION
C	7/10/13	REVISED, FINAL PRELIMINARY CDS
B	1/14/13	FINAL PRELIMINARY CDS
A	11/14/12	90% CD REVIEW

ISSUE PHASE: FINAL PRELIMINARY DATE ISSUED: 07/10/13

PROJECT TITLE:
NU TOWER
SITE #: CT03XC067

PROJECT INFORMATION:
250 SOUTH OLCOTT STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

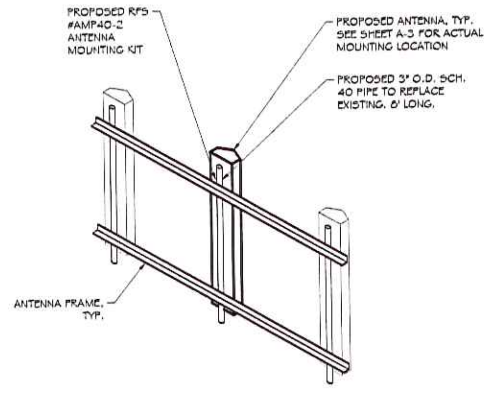
SHEET TITLE:
ANTENNA DETAILS
& COAX SCHEDULE

SCALE: NONE

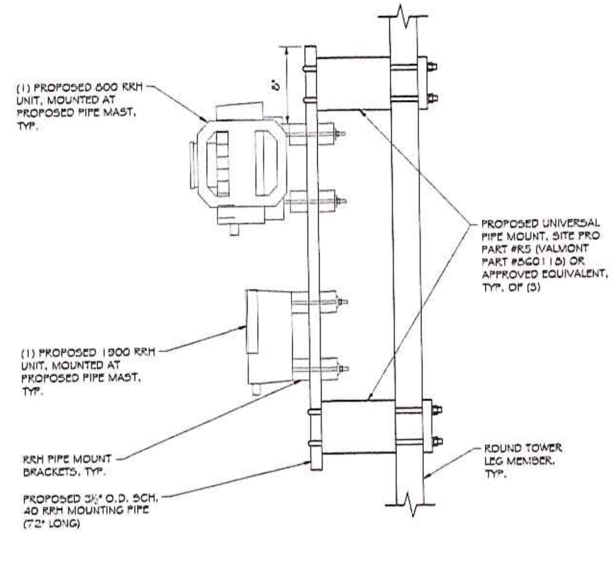
PROJECT NUMBER: 22992
SHEET NUMBER: A-3

STRUCTURAL NOTES

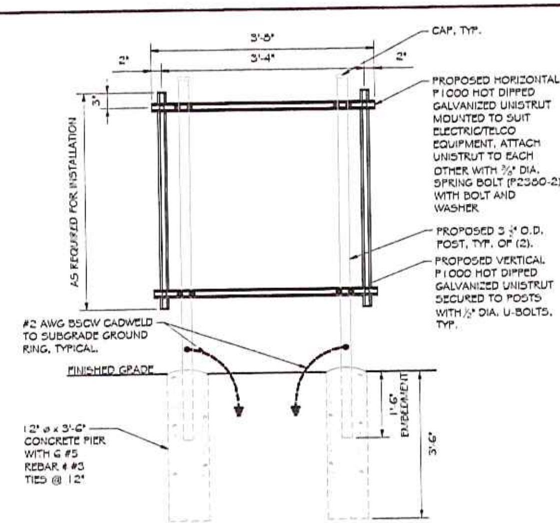
1. DESIGN REQUIREMENTS PER INTERNATIONAL BUILDING CODE 2009 AND THE TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED BY FIELD MEASUREMENTS AND FROM THE EXISTING STRUCTURAL DRAWINGS. THE GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIALS OR PROCEEDING WITH CONSTRUCTION.
3. THE GENERAL CONTRACTOR AND HIS SUB-CONSULTANTS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK.
4. STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS- ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN INCLUDING THE COMMENTARY AND THE AISC CODE FOR STANDARD PRACTICE.
5. STRUCTURAL STEEL PLATES AND SHAPES SHALL CONFORM TO ASTM A992. ALL STRUCTURAL STEEL PIPES SHALL CONFORM TO ASTM A53 GRADE B. ALL STRUCTURAL STEEL COMPONENTS AND FABRICATED ASSEMBLIES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
6. WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF AMERICAN WELDING SOCIETY (AWS) STRUCTURAL WELDING CODE- STEEL WELD ELECTRODES SHALL BE E70XX.
7. ALL COAXIAL CABLE CONNECTORS AND TRANSMITTER EQUIPMENT SHALL BE AS SPECIFIED BY THE OWNER AND IS NOT INCLUDED IN THESE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL FURNISH ALL CONNECTION HARDWARE REQUIRED TO SECURE THE CABLES. CONNECTION HARDWARE SHALL BE STAINLESS STEEL.
8. ALL THREADED STRUCTURAL FASTENERS FOR ANTENNA SUPPORT ASSEMBLIES SHALL CONFORM TO ASTM A193 GR. B7. ALL STRUCTURAL FASTENERS FOR STRUCTURAL STEEL FRAMING SHALL CONFORM TO ASTM A325. FASTENERS SHALL BE ¾" MIN. DIAMETER BEARING TYPE CONNECTIONS WITH THREADS INCLUDED IN THE SHEAR PLANE. ALL EXPOSED FASTENERS, NUTS, AND WASHERS SHALL BE GALVANIZED UNLESS OTHERWISE NOTED. CONCRETE EXPANSION ANCHORS SHALL BE HILTI KWIK BOLTS UNLESS OTHERWISE NOTED.
9. LUMBER (IF APPLICABLE) SHALL COMPLY WITH THE REQUIREMENTS OF AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATIONS NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
10. IF APPLICABLE, ROOF PROTECTION PADS UNDER THE CONCRETE PAVERS AND WAVEGUIDE SUPPORTS SHALL BE 0.30" THICK RUBBER FIRESTONE PROTECTION PADS. THE ROOF PROTECTION PADS SHALL EXTEND A MINIMUM OF TWO INCHES BEYOND THE PERIMETER OF THE PAVERS AND THE WOOD SLEEPERS AND SHALL BE PLACED WITH A MINIMUM ½" SPACE BETWEEN ADJACENT PADS TO FACILITATE DRAINAGE. PROVIDE A 25 LB. INORGANIC PAD DIRECTLY ON THE ROOF. REMOVE ALL LOOSE STONES PRIOR TO PLACING THE SEPARATOR SHEET.
11. NORTH ARROW SHOWN ON PLANS REFERS TO TRUE NORTH. CONTRACTOR SHALL VERIFY TRUE NORTH AND INFORM CONSTRUCTION MANAGER OF ANY DISCREPANCY BEFORE STARTING CONSTRUCTION.



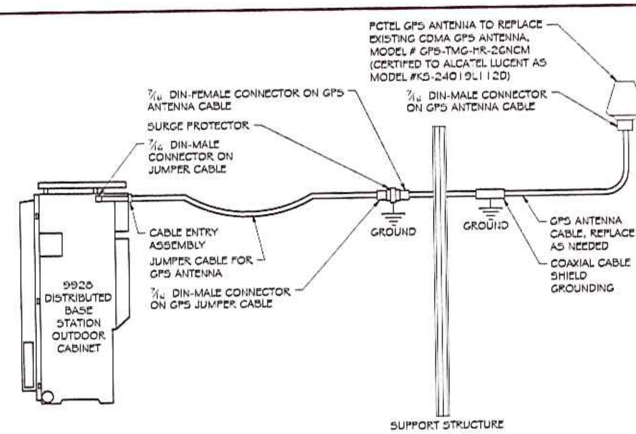
ANTENNA MOUNTING DETAIL (1)
SCALE: NTS



RRH MOUNTING DETAIL (2)
SCALE: NTS



FIBER BOX MOUNTING FRAME (3)
SCALE: NTS



NOTES:
1. CONTRACTOR TO INSTALL GPS SURGE PROTECTION PER ALU SPECIFICATIONS.
2. THE GPS SURGE NEEDS TO BE INSTALLED AWAY FROM, AND SEPARATE FROM THE MMBTS CABINET.
3. THE JUMPERS ARE DESIGNED TO BE INSTALLED BEFORE/AFTER THE GPS SURGE.
4. THE GPS SURGE NEEDS TO BE CONNECTED TO THE GROUND SYSTEM, VIA A GROUND LEAD.

GPS MOUNTING DETAIL (4)
SCALE: NTS

Sprint

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Certification & Seal:

MARK	DATE	DESCRIPTION
C	7/10/13	REISSUED, FINAL PRELIMINARY CDS
B	1/14/13	FINAL PRELIMINARY CDS
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ISSUE PHASE: FINAL PRELIMINARY — DATE ISSUED: 07/10/13

PROJECT TITLE:
NU TOWER
SITE #: CT03XC067

PROJECT INFORMATION:
250 SOUTH OLCOTT STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

SHEET TITLE:
STRUCTURAL DETAILS

SCALE: NONE

PROJECT NUMBER: 22992
SHEET NUMBER: S-1

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

200-ft Existing ROHN Lattice Tower

Proposed Sprint Antenna Upgrade

Sprint Site Ref: CT03XC067

Northeast Utilities
Site Ref: Manchester Sub Station

250 Olcott Street
Manchester, CT

Centek Project No. 13003.CO5

~~Date: March 4, 2013~~

~~Rev 1: March 27, 2013~~

Rev 2: July 2, 2013

STATE OF CONNECTICUT No.16694 LICENSED PROFESSIONAL ENGINEER

Prepared for:

Sprint Nextel
8 Airline Drive, Suite 105
Albany, NY 12205

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
Manchester, CT
Rev 2 ~ July 2, 2013

Table of Contents

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
Manchester, CT
Rev 2 ~ July 2, 2013

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Sprint on the existing self supporting lattice tower located in Manchester, Connecticut.

The host tower is a 200-ft, ten-section, three legged, self-supporting tapered lattice tower originally designed and manufactured by Rohn Industries Inc., eng file no. 8046GR, dated March 2, 1997. The tower geometry, structure member sizes and the foundation system information were obtained from a previous structural analysis prepared by Centek Engineering; job no. 09130 (Rev. 1) dated July 22, 2010 and a tower mapping report prepared by Construction Services of Branford dated October 2, 2009. Existing antenna and appurtenance information were obtained from a combination of the aforementioned structural report, visual verification conducted from grade by Centek personnel on March 4, 2013 and tower mapping report.

The tower is made up of ten (10) tapered vertical sections consisting of A572-50 steel pipe legs. Diagonal lateral support bracing consists of A572-50 pipe and A36 angle construction. Horizontal and inner support bracing consists of A572-50 pipe construction. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted and welded gusset connections. The width of the tower face is 8.56-ft at the top and 30.04-ft at the base.

Sprint's proposed antenna upgrade shall be completed in two phases as follows:

During the interim phase Sprint proposes the installation of three (3) panel antennas and six (6) Remote Radio Heads (RRH's) mounted to the three (3) existing boom gates.

After testing of the proposed equipment is complete Sprint proposes the removal of the six (6) existing panel antennas for the final configuration.

Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna configuration.

Antenna and Appurtenance Summary

The existing tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- UNKNOWN (Existing):
  Appurtenance: Two (2) Beacons and one (1) lightning rod, leg mounted with elevations of 204-ft, 202-ft and 201-ft respectively, above existing grade.
  Conduit: 1in dia.
- NORTHEAST UTILITIES (Existing):
  Antennas: One (1) 6-ft x2in omni antenna mounted on a 3-ft side arm, one (1) Decibel DB806D Omni antenna on a 3-ft stand-off mount and one (1) 10-ftx3in omni antenna flush mounted with an elevation of 201-ft above existing grade.
  Coax Cables: Two (2) 7/8" Ø and one (1) 1/2" Ø coax cable.

- NORTHEAST UTILITIES (Existing):
  Antennas: One (1) 8-ft ø Parabolic Dish with Radome on one (1) pipe mount with a RAD center elevation of 199-ft above existing grade.
  Coax Cable: One (1) WE-65 coax cable.
- NORTHEAST UTILITIES (Reserved):
  Antennas: One (1) 8-ft ø Parabolic Dish with Radome on one (1) pipe mount with a RAD center elevation of 198-ft above existing grade.
  Coax Cable: One (1) WE-65 coax cable.
- NORTHEAST UTILITIES (Existing):
  Antennas: One (1) 8-ft ø Parabolic Dish with Radome on one (1) pipe mount with a RAD center elevation of 192-ft above existing grade.
  Coax Cable: One (1) WE-65 coax cable.
- UNKNOWN (Existing):
  Appurtenance: Two (2) Beacons flush mounted with an elevation of 97-ft above the existing grade.
  Conduit: 1in dia.
- NORTHEAST UTILITIES (Existing):
  Antennas: One (1) Decibel D212 dipole antenna leg mounted with a RAD center elevation of 84-ft above existing grade.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- UNKNOWN (Existing):
  Appurtenance: Two (2) camera on one (1) 3-ft stand-off mount with a RAD center elevation of 57-ft above existing grade.
  Cable: N/A
- SPRINT (Existing - To Remain for Interim Configuration):
  Antennas: Six (6) Andrew DB980H90E-M panel antennas mounted on three (3) existing 12' boom gates with a RAD center elevation of 125-ft above the existing tower base plate.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a face of the existing tower as specified in Section 3 of this report.
- **SPRINT (Proposed – Interim Configuration):**
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) RFS APXV9ERR18-C-A20 panel antenna, three (3) 1900MHz 4X45W RRH's and three (3) 800MHz 2X50W RRH's mounted on three (3) existing 12' boom gates with a RAD center elevation of 125-ft above the existing tower base plate.
  Coax Cables: Three (3) 1-1/4"∅ Hybriflex cables running on a face of the existing tower as specified in Section 3 of this report.

- SPRINT (Existing - To be Removed for Final Configuration):[1]
  Antennas: Six (6) Andrew DB980H90E-M panel antennas mounted on three (3) existing 12' boom gates with a RAD center elevation of 125-ft above the existing tower base plate.
  Coax Cables: Six (6) 1-5/8" Ø coax cables running on a face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed along the leg/face of the tower as specified in Section 3 of this report.

[1] All existing equipment shall be removed upon the completion of the testing of the proposed equipment. The removal the equipment shall be completed within a time frame acceptable to CL&P.

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
Manchester, CT
Rev 2 ~ July 2, 2013

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower legs, and the model assumes that the leg members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 85 mph basic wind speed (fastest mile) with no ice and 85mph with ½ inch accumulative ice to determine stresses in members as per guidelines of Northeast Utilities Substation Standard (NU SUB-090), TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD). **The controlling antenna configuration was determined to be the interim configuration. All calculations were performed using this configuration.**

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	NU SUB-090; v = 85 mph (fastest mile)	*[Northeast Utilities Substation Standard 090]*
	Manchester; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	NU–SUB-090 wind speed controls	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design of monopole towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 2; 85 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

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200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
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Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

The tower deflection was evaluated with a wind velocity of 85 mph concurrent with 0.5" ice to determine twist (rotation) and sway (deflection) in accordance with NU SUB-90 requirements.

- Calculated stresses with the **reinforcements outlined in the conclusion were found** to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **82.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T7)	61'-0"-81'-0"	82.0%	**PASS**
Diagonal (T5)	101'-0"-121'-0"	81.7%	**PASS**
Redundant Diagonal 1 (T9)	21'-0"-41'-0"	82.3%	**PASS**

- The tower combined deflection is **0.5983 degrees.**

Deflection (degrees)	Proposed	Allowable	Result
Sway (Tilt)	0.5942	0.5	**PASS**
Twist	0.0700	0.5	**PASS**
Combined	0.5983	0.5	**PASS**

Note 1: Under the controlling Load Case 2 the tower exceeds NU-SUB-90 limitation of 0.5 degrees. Tower deflection subject to NEU approval.

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
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Foundation and Anchors

The existing foundation consists of three (3) individual reinforced concrete, 10'-6" square by 2'-6" thick pads with three (3) 3'-0" square by 10'-0" long piers bearing directly on existing sub grade. The foundation properties and sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned structural analysis report prepared by Centek and foundation drawing 17701-11024 by Northeast Utilities. Tower legs are connected to the foundation by means of (6) 1" ∅, ASTM A354-BC quality anchor bolts per leg, embedded into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base maximum corner reactions developed from the governing Load Case 2 were used in the verification of the foundation and its anchors:

Vector	Proposed Reactions
Compression	**231 kips**
Uplift	**174 kips**
Shear	**31 kips**
Total Shear	**52 kips**
Overturning Moment	**5560 kip-ft**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[(1)]	Proposed Loading (FS)[(1)]	Result
Reinf. Conc. Pad and Pier	Uplift	2.0	2.1	**PASS**

Note 1: FS denotes Factor of Safety

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	59.7%	**PASS**

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
Manchester, CT
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Conclusion

This analysis shows that the subject tower **with the reinforcements listed below is adequate** to support the proposed antenna upgrade configuration.

- **Replacement of the existing 5/8" dia. A325-N diagonal member bolts at tower section (T5 ~ 100'-120') with 5/8" dia. A325-X bolts.**

The analysis is based, in part, on the information provided to this office by Northeast Utilities and Sprint. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16084
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
Manchester, CT
Rev 2 ~ July 2, 2013

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

CENTEK Engineering, Inc.
200-ft Existing ROHN Lattice Tower
Sprint Antenna Upgrade – CT03XC067
Manchester, CT
Rev 2 ~ July 2, 2013

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

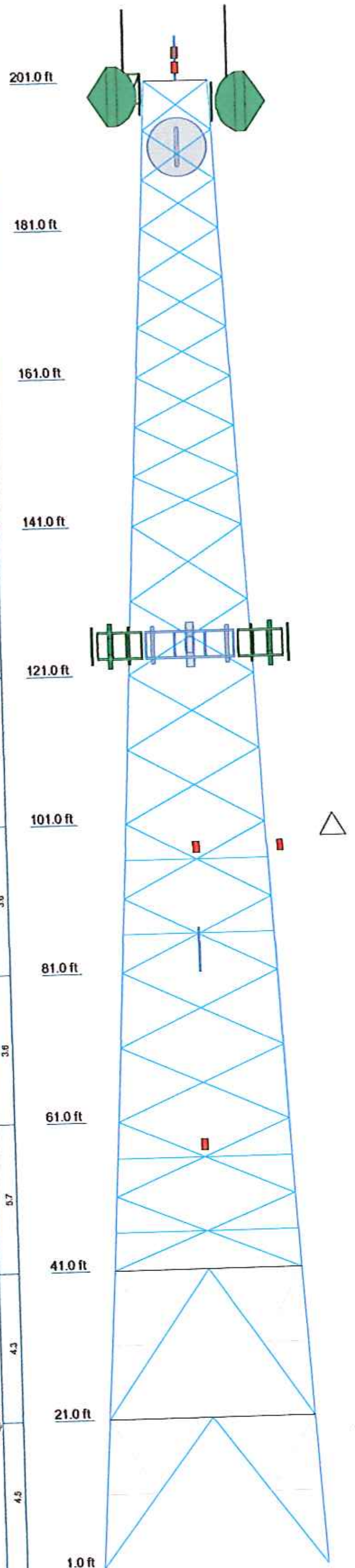
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Site No: NV_CT03XC067

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 6 EH		ROHN 5 EH		ROHN 5 STD	ROHN 4 EH	ROHN 3.5 EH	ROHN 3 STD	ROHN 2.5 EH	
Leg Grade	A572-50									
Diagonals	ROHN 3 STD		L4x4x3/8	L4x4x5/16	L3 1/2x3 1/2x5/16	L3x3x3/8	L3x3x1/4	L2 1/2x2 1/2x1/4	L2x2x5/16	L1 3/4x1 3/4x1/4
Diagonal Grade	A572-50		A36							
Top Girts	ROHN 3 STD		L4x4x3/8	N.A.	L3 1/2x3 1/2x5/16	N.A.				L2x2x1/8
Sec. Horizontals	N.A.		N.A.							
Red. Horizontals	ROHN 1.5 STD		N.A.							
Red. Diagonals	ROHN 2 STD	ROHN 1.5 STD	N.A.							
Red. Hips	ROHN 1.5 STD		N.A.							
Inner Bracing	ROHN 3 STD		N.A.							
Face Width (ft) 30.04	27.54	25.04	22.78	20.78	18.7	18.7	14.66	12.6	10.56	8.56
# Panels @ (ft)	2 @ 20				10 @ 10				9 @ 6.66667	
Weight (K) 30.2	4.5	4.3	5.7	3.6	3.6	2.7	1.8	1.8	1.4	1.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Top Beacon	204	Rohn 6'x12' Boom Gate (Sprint)	125
Top Beacon	202	Rohn 6'x12' Boom Gate (Sprint)	125
Lightning Rod	201	APXVSPP18-C-A20 (Sprint)	125
6' x 2" Omni	201	APXV9ERR18-C-A20 (Sprint)	125
10' x 3" Dia Omni	201	APXVSPP18-C-A20 (Sprint)	125
3' Side arm	200	FD-RRH 2x50 800 (Sprint)	125
3' Side arm	200	FD-RRH 2x50 800 (Sprint)	125
DB806D-A (NU - Relocated)	200	FD-RRH 2x50 800 (Sprint)	125
5'3"x4" Pipe Mount	199	FD-RRH 4x40 1900 (Sprint)	125
8 FT DISH	199	FD-RRH 4x40 1900 (Sprint)	125
5'3"x4" Pipe Mount	198	FD-RRH 4x40 1900 (Sprint)	125
8 FT DISH	198	(2) DB980H90E-M (Sprint)	125
5'3"x4" Pipe Mount	192	Beacon	97
8 FT DISH	192	Beacon	97
(2) DB980H90E-M (Sprint)	125	DB212-1	84
(2) DB980H90E-M (Sprint)	125	3' Side arm	57
Rohn 6'x12' Boom Gate (Sprint)	125	(2) Camera	57

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 82.3%

MAX. CORNER REACTIONS AT BASE:
DOWN: 231 K
UPLIFT: -174 K
SHEAR: 31 K

AXIAL 52 K
SHEAR 52 K
MOMENT 5560 kip-ft
TORQUE 46 kip-ft
85 mph WIND - 0.5000 in ICE

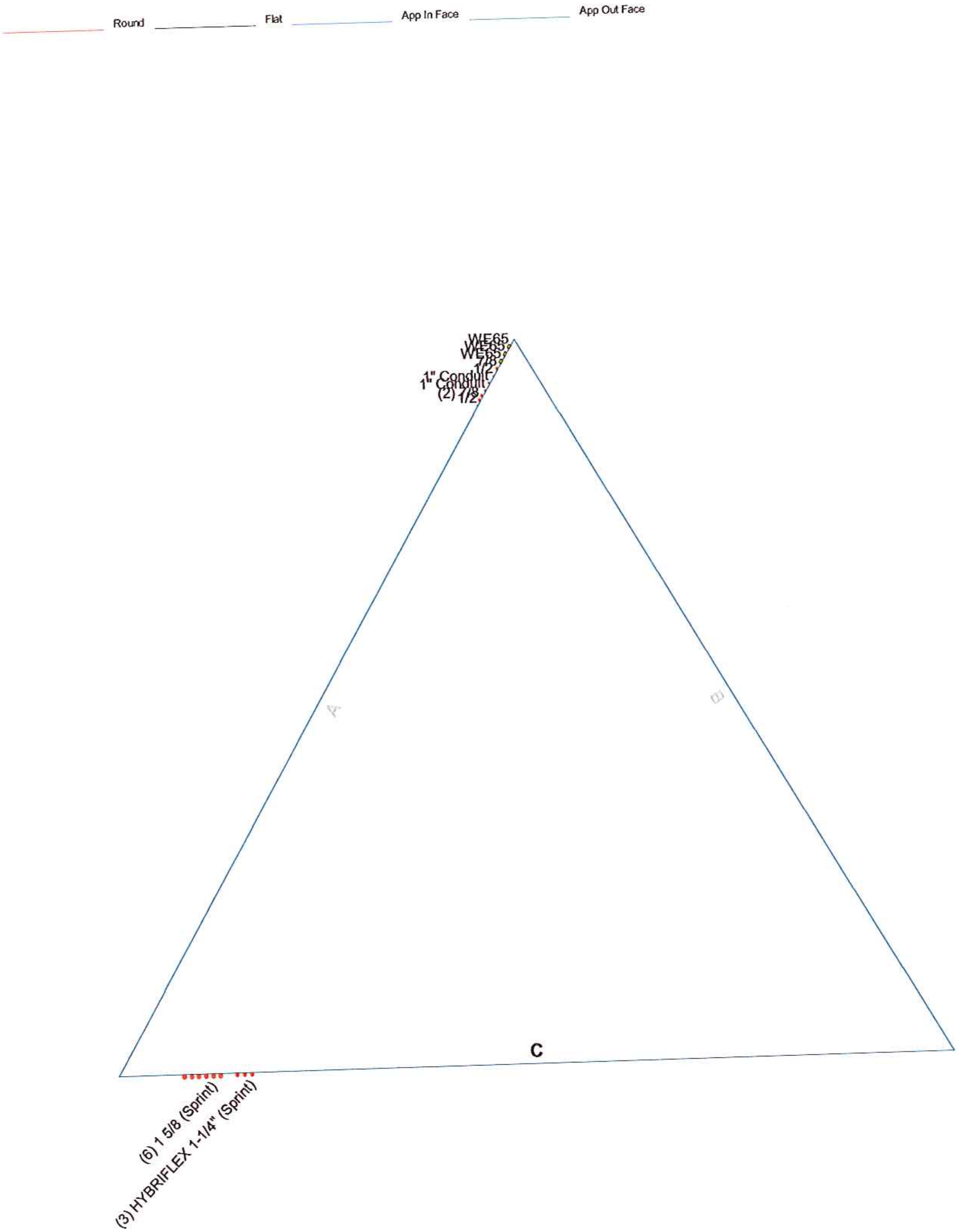
AXIAL 36 K
SHEAR 41 K
MOMENT 4462 kip-ft
TORQUE 30 kip-ft
REACTIONS - 85 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: *13003.CO5 ~ 200-ft Rohn SSMW Tower*		
Project: *250 Olcott Street, Manchester, CT*		
Client: Sprint	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 07/02/13	Scale: NT
Path:		Dwg No. E

Feedline Plan

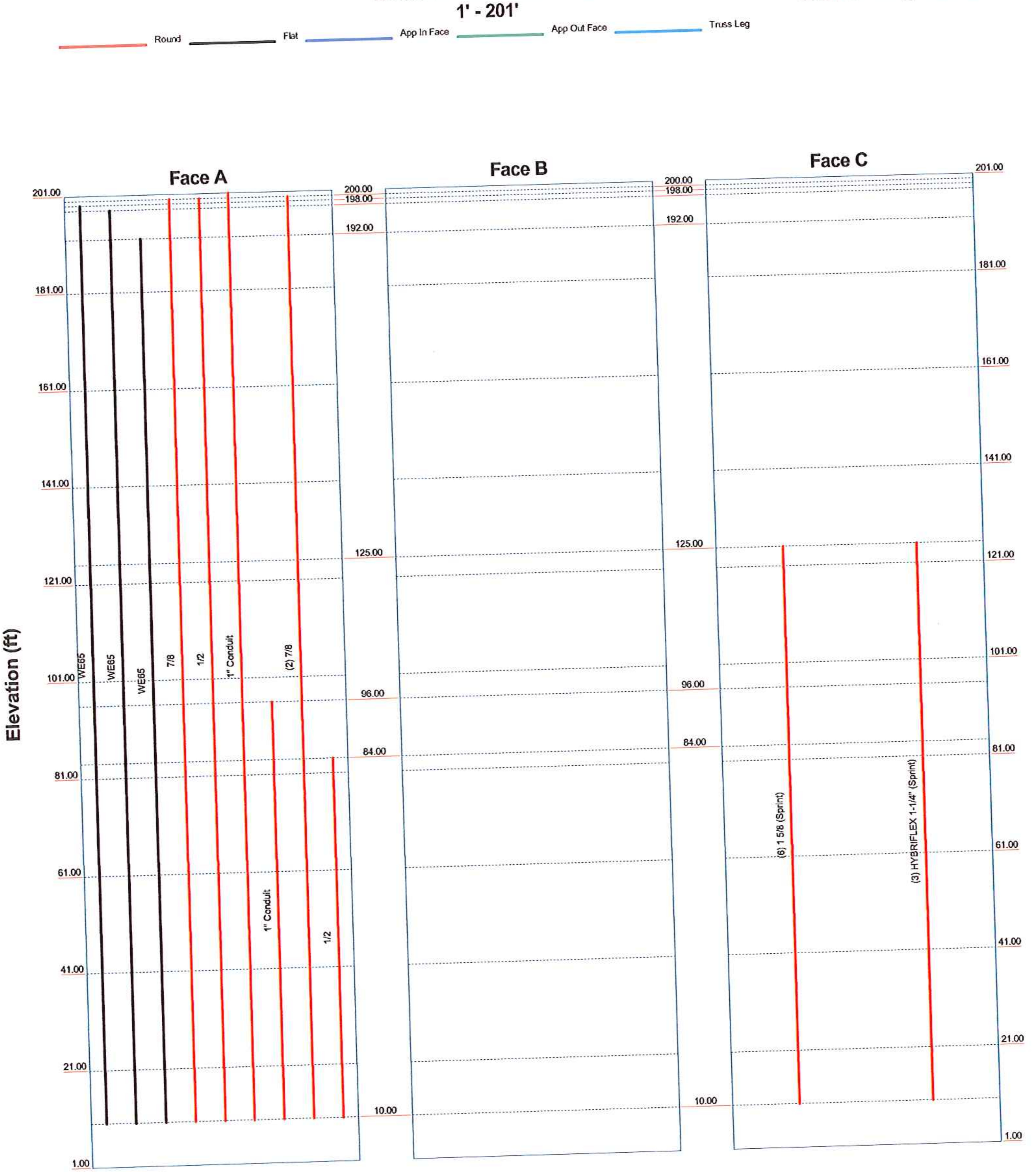
Site No: NV_CT03XC067



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: 13003.CO5 ~ 200-ft Rohn SSMW Towe		
	Project: 250 Olcott Street, Manchester, CT		
	Client: Sprint	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 07/02/13	Scale: NT
	Path:		Dwg No. E

Feedline Distribution Chart
1' - 201'

Site No: NV_CT03XC067



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Job: **13003.CO5 ~ 200-ft Rohn SSMW Towe**		
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Client: Sprint	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 07/02/13	Scale: NT
Path:		Dwg No. E

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 1 of 37
	Project: 250 Olcott Street, Manchester, CT	Date: 09:16:03 07/02/13
	Client: Sprint	Designed by: TJL

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
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Tower Input Data

The main tower is a 3x free standing tower with an overall height of 201.00 ft above the ground line.
The base of the tower is set at an elevation of 1.00 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 30.04 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.5000 in.
- Ice density of 56 pcf.
- A wind speed of 85 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 85 mph.
- Weld together tower sections have flange connections..
- Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
- Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
- Welds are fabricated with ER-70S-6 electrodes..
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.333.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

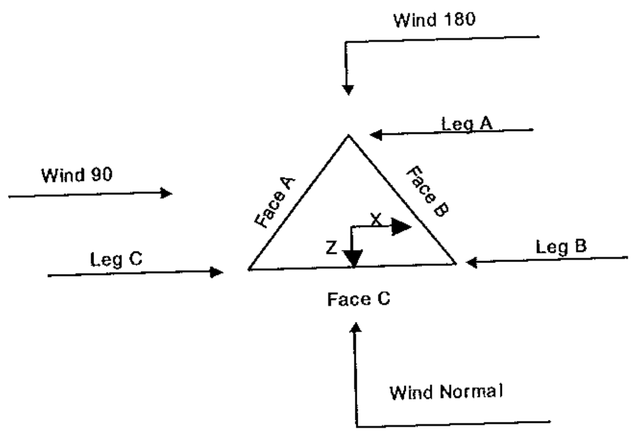
Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
√ Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
√ Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
Add IBC .6D+W Combination

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
√ Use Clear Spans For KL/r
Retension Guys To Initial Tension
Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
SR Members Have Cut Ends
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing

Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
√ Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
√ All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feedline Torque
Include Angle Block Shear Check
Poles
Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets

tnxTower *Centek Engineering Inc.* *63-2 North Branford Rd.* *Branford, CT 06405* *Phone: (203) 488-0580* *FAX: (203) 488-8587*	**Job** 13003.CO5 ~ 200-ft Rohn SSMW Tower	**Page** 2 of 37
	Project 250 Olcott Street, Manchester, CT	**Date** 09:16:03 07/02/13
	Client Sprint	**Designed by** TJL



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	201.00-181.00			8.56	1	20.00
T2	181.00-161.00			10.56	1	20.00
T3	161.00-141.00			12.60	1	20.00
T4	141.00-121.00			14.66	1	20.00
T5	121.00-101.00			16.70	1	20.00
T6	101.00-81.00			18.70	1	20.00
T7	81.00-61.00			20.78	1	20.00
T8	61.00-41.00			22.78	1	20.00
T9	41.00-21.00			25.04	1	20.00
T10	21.00-1.00			27.54	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	201.00-181.00	6.67	X Brace	No	No	0.0000	0.0000
T2	181.00-161.00	6.67	X Brace	No	No	0.0000	0.0000
T3	161.00-141.00	6.67	X Brace	No	No	0.0000	0.0000
T4	141.00-121.00	10.00	X Brace	No	No	0.0000	0.0000
T5	121.00-101.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	101.00-81.00	10.00	X Brace	No	Yes	0.0000	0.0000
T7	81.00-61.00	10.00	X Brace	No	No	0.0000	0.0000
T8	61.00-41.00	10.00	X Brace	No	Yes	0.0000	0.0000
T9	41.00-21.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T10	21.00-1.00	20.00	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 201.00-181.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x1/4	A36 (36 ksi)
T2 181.00-161.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Equal Angle	L2x2x5/16	A36 (36 ksi)
T3 161.00-141.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 141.00-121.00	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T5 121.00-101.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T6 101.00-81.00	Pipe	ROHN 5 STD	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T7 81.00-61.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A36 (36 ksi)
T8 61.00-41.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A36 (36 ksi)
T9 41.00-21.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 21.00-1.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 201.00-181.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T9 41.00-21.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T10 21.00-1.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 4 of 37
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 250 Olcott Street, Manchester, CT	Date: 09:16:03 07/02/13
	Client: Sprint	Designed by: TJL

Tower Elevation *ft*	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T9 41.00-21.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 21.00-1.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Secondary Horizontal Type*	*Secondary Horizontal Size*	*Secondary Horizontal Grade*	*Inner Bracing Type*	*Inner Bracing Size*	*Inner Bracing Grade*
T6 101.00-81.00	Single Angle	L3 1/2x3 1/2x5/16	A572-50 (50 ksi)	Equal Angle		A36 (36 ksi)
T8 61.00-41.00	Single Angle	L4x4x3/8	A572-50 (50 ksi)	Equal Angle		A36 (36 ksi)
T9 41.00-21.00	Solid Round		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 21.00-1.00	Solid Round		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Redundant Bracing Grade*		*Redundant Type*	*Redundant Size*	*K Factor*
T9 41.00-21.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	1
		Diagonal (1)	Pipe	ROHN 1.5 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 2.5 STD	1
T10 21.00-1.00	A572-50 (50 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	1
		Diagonal (1)	Pipe	ROHN 2 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 2.5 STD	1

Tower Section Geometry *(cont'd)*

Tower Elevation *ft*	*Gusset Area (per face)* ft^2	*Gusset Thickness* *in*	*Gusset Grade*	*Adjust. Factor* A_f	*Adjust. Factor* A_r	*Weight Mult.*	*Double Angle Stitch Bolt Spacing Diagonals* *in*	*Double Angle Stitch Bolt Spacing Horizontals* *in*
T1 201.00-181.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 181.00-161.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 161.00-141.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T4 141.00-121.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 121.00-101.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 101.00-81.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 81.00-61.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 61.00-41.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 41.00-21.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 21.00-1.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

			K Factors[1]							
Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 201.00-181.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 181.00-161.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 161.00-141.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 141.00-121.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 121.00-101.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 101.00-81.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 81.00-61.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 61.00-41.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 41.00-21.00	Yes	Yes	1	1 1	0.5 0.5	1 1	1 1	1 1	1 1	1 1
T10 21.00-1.00	Yes	Yes	1	1 1	0.5 0.5	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Tower Elevation ft	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
	Net Width Deduct in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*	*Net Width Deduct* in	*U*
T1 201.00-181.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 181.00-161.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 161.00-141.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 141.00-121.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 121.00-101.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 101.00-81.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 81.00-61.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 61.00-41.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 41.00-21.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 21.00-1.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Connection Type*	*Leg*		*Diagonal*		*Top Girt*		*Bottom Girt*		*Mid Girt*		*Long Horizontal*		*Short Horizontal*	
		Bolt Size in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*	*Bolt Size* in	*No.*
T1 201.00-181.00	Flange	0.6250 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 181.00-161.00	Flange	0.7500 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 161.00-141.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 141.00-121.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 121.00-101.00	Flange	1.0000 A325N	4	0.6250 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 101.00-81.00	Flange	1.0000 A325N	4	0.6250 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325X	2
T7 81.00-61.00	Flange	1.0000 A325N	4	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 61.00-41.00	Flange	1.0000 A325N	6	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325X	2
T9 41.00-21.00	Flange	1.0000 A325N	6	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T10 21.00-1.00	Flange	1.0000 A354-BC	6	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 7 of 37
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 250 Olcott Street, Manchester, CT	Date: 09:16:03 07/02/13
	Client: Sprint	Designed by: TJL

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Sprint)	C	Yes	Ar (CfAe)	125.00 - 10.00	0.0000	0.4	6	6	1.0000	1.9800		1.04
WE65	A	Yes	Af (CfAe)	199.00 - 10.00	0.0000	0.49	1	1	1.5836	1.5836	5.1284	0.53
WE65	A	Yes	Af (CfAe)	198.00 - 10.00	0.0000	0.48	1	1	1.5836	1.5836	5.1284	0.53
WE65	A	Yes	Af (CfAe)	192.00 - 10.00	0.0000	0.47	1	1	1.5836	1.5836	5.1284	0.53
7/8	A	Yes	Ar (CfAe)	200.00 - 10.00	0.0000	0.46	1	1	1.1100	1.1100		0.54
1/2	A	Yes	Ar (CfAe)	200.00 - 10.00	0.0000	0.45	1	1	0.5800	0.5800		0.25
1" Conduit	A	Yes	Ar (CfAe)	201.00 - 10.00	0.0000	0.44	1	1	1.2500	1.0000		0.58
1" Conduit	A	Yes	Ar (CfAe)	96.00 - 10.00	0.0000	0.43	1	1	1.2500	1.0000		0.58
7/8	A	Yes	Ar (CfAe)	200.00 - 10.00	0.0000	0.42	2	2	1.1100	1.1100		0.54
1/2	A	Yes	Ar (CfAe)	84.00 - 10.00	0.0000	0.41	1	1	0.5800	0.5800		0.25
HYBRIFLEX 1-1/4" (Sprint)	C	Yes	Ar (CfAe)	125.00 - 10.00	0.0000	0.35	3	3	1.5400	1.5400		1.30

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T1	201.00-181.00	A	7.857	6.070	0.000	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	181.00-161.00	A	8.183	7.918	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	161.00-141.00	A	8.183	7.918	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T4	141.00-121.00	A	8.183	7.918	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	5.500	0.000	0.000	0.000	0.04
T5	121.00-101.00	A	8.183	7.918	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	27.500	0.000	0.000	0.000	0.20
T6	101.00-81.00	A	9.578	7.918	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.00
		C	27.500	0.000	0.000	0.000	0.20
T7	81.00-61.00	A	10.817	7.918	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	27.500	0.000	0.000	0.000	0.20
T8	61.00-41.00	A	10.817	7.918	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	27.500	0.000	0.000	0.000	0.20
T9	41.00-21.00	A	10.817	7.918	0.000	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	27.500	0.000	0.000	0.000	0.20
T10	21.00-1.00	A	5.949	4.355	0.000	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.00
		C	15.125	0.000	0.000	0.000	0.11

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T1	201.00-181.00	A	0.500	15.858	8.626	0.000	0.000	0.22
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	181.00-161.00	A	0.500	16.517	11.251	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	161.00-141.00	A	0.500	16.517	11.251	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T4	141.00-121.00	A	0.500	16.517	11.251	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.00
		C		3.533	4.967	0.000	0.000	0.11
T5	121.00-101.00	A	0.500	16.517	11.251	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.00
		C		17.667	24.833	0.000	0.000	0.53
T6	101.00-81.00	A	0.500	19.412	11.251	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	0.00
		C		17.667	24.833	0.000	0.000	0.53
T7	81.00-61.00	A	0.500	22.483	11.251	0.000	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.00
		C		17.667	24.833	0.000	0.000	0.53
T8	61.00-41.00	A	0.500	22.483	11.251	0.000	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.00
		C		17.667	24.833	0.000	0.000	0.53
T9	41.00-21.00	A	0.500	22.483	11.251	0.000	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.00
		C		17.667	24.833	0.000	0.000	0.53
T10	21.00-1.00	A	0.500	12.366	6.188	0.000	0.000	0.17
		B		0.000	0.000	0.000	0.000	0.00
		C		9.717	13.658	0.000	0.000	0.29

Feed Line Shielding

Section	Elevation ft	Face	A_R ft²	A_R Ice ft²	A_F ft²	A_F Ice ft²
T1	201.00-181.00	A	0.000	0.894	0.860	1.591
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	181.00-161.00	A	0.000	0.850	0.930	1.699
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	161.00-141.00	A	0.000	0.820	1.121	2.049
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	141.00-121.00	A	0.000	0.582	0.955	1.746
		B	0.000	0.000	0.000	0.000
		C	0.000	0.168	0.326	0.504
T5	121.00-101.00	A	0.000	0.564	0.925	1.691
		B	0.000	0.000	0.000	0.000
		C	0.000	0.814	1.580	2.441
T6	101.00-81.00	A	0.000	0.874	1.655	3.057
		B	0.000	0.000	0.000	0.000
		C	0.000	1.148	2.601	4.019
T7	81.00-61.00	A	0.000	0.649	1.374	2.597
		B	0.000	0.000	0.000	0.000
		C	0.000	0.780	2.018	3.118

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T8	61.00-41.00	A	0.000	0.935	1.978	3.738
		B	0.000	0.000	0.000	0.000
		C	0.000	1.122	2.904	4.488
T9	41.00-21.00	A	1.205	3.131	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	1.768	3.759	0.000	0.000
T10	21.00-1.00	A	0.674	1.723	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.989	2.069	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	201.00-181.00	-0.5110	-10.8282	-0.6101	-12.0514
T2	181.00-161.00	-0.6114	-13.7465	-0.7371	-15.3846
T3	161.00-141.00	-0.5483	-12.5667	-0.6990	-14.8436
T4	141.00-121.00	-4.0140	-10.8218	-4.0829	-13.9827
T5	121.00-101.00	-15.0735	-0.9196	-14.6462	-3.9516
T6	101.00-81.00	-11.4957	-1.4709	-11.4556	-4.2916
T7	81.00-61.00	-13.9542	-2.5620	-14.2128	-6.6805
T8	61.00-41.00	-11.5785	-2.1338	-11.7602	-5.5948
T9	41.00-21.00	-16.1308	-2.9830	-16.0316	-7.5518
T10	21.00-1.00	-10.0925	-1.8708	-10.2835	-4.8490

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Top Beacon	A	None		0.0000	202.00	No Ice 1/2" Ice	2.80 3.04	2.80 3.04	0.10 0.13
Top Beacon	A	None		0.0000	204.00	No Ice 1/2" Ice	2.80 3.04	2.80 3.04	0.10 0.13
Lightning Rod	A	From Leg	0.00 0.00 3.00	0.0000	201.00	No Ice 1/2" Ice	0.40 0.81	0.40 0.81	0.02 0.02
3' Side arm	C	From Leg	1.50 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	3.00 4.00	3.00 4.00	0.10 0.11
DB806D-A (NU - Relocated)	C	From Leg	3.00 0.00 5.00	0.0000	200.00	No Ice 1/2" Ice	3.38 4.53	3.38 4.53	0.03 0.05
5'3"x4" Pipe Mount	A	From Leg	0.50 0.00 0.00	0.0000	192.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
5'3"x4" Pipe Mount	B	From Leg	0.50	0.0000	198.00	No Ice	1.88	1.88	0.06

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* °	*Placement* *ft*		*C_AA_A Front* *ft²*	*C_AA_A Side* *ft²*	*Weight* *K*
			0.00			1/2" Ice	2.21	2.21	0.07
5'3"x4" Pipe Mount	C	From Leg	0.00 0.50 0.00	0.0000	199.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
(2) DB980H90E-M (Sprint)	A	From Leg	0.00 3.00 0.00	0.0000	125.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
(2) DB980H90E-M (Sprint)	B	From Leg	0.00 3.00 0.00	0.0000	125.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
(2) DB980H90E-M (Sprint)	C	From Leg	0.00 3.00 0.00	0.0000	125.00	No Ice 1/2" Ice	3.80 4.18	2.19 2.56	0.01 0.03
Beacon	A	From Leg	0.00 2.00 0.00	0.0000	97.00	No Ice 1/2" Ice	0.50 0.60	0.50 0.60	0.01 0.01
Beacon	B	From Leg	0.00 2.00 0.00	0.0000	97.00	No Ice 1/2" Ice	0.50 0.60	0.50 0.60	0.01 0.01
DB212-1	A	From Leg	0.00 0.50 0.00	0.0000	84.00	No Ice 1/2" Ice	4.40 8.42	4.40 8.42	0.03 0.07
3' Side arm	A	From Leg	0.00 1.50 0.00	0.0000	57.00	No Ice 1/2" Ice	2.00 2.50	2.00 2.50	0.10 0.11
(2) Camera	A	From Leg	0.00 3.00 0.00	0.0000	57.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.01
3' Side arm	A	From Leg	0.00 1.50 0.00	0.0000	200.00	No Ice 1/2" Ice	2.00 2.50	2.00 2.50	0.10 0.11
6' x 2" Omni	A	From Leg	0.00 3.00 0.00	0.0000	201.00	No Ice 1/2" Ice	1.20 1.80	1.20 1.80	0.02 0.03
10' x 3" Dia Omni	B	From Leg	3.00 3.00 0.00	0.0000	201.00	No Ice 1/2" Ice	3.00 4.03	3.00 4.03	0.03 0.05
Rohn 6'x12' Boom Gate (Sprint)	A	From Leg	5.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	16.60 19.77	16.60 19.77	0.56 0.70
Rohn 6'x12' Boom Gate (Sprint)	B	From Leg	0.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	16.60 19.77	16.60 19.77	0.56 0.70
Rohn 6'x12' Boom Gate (Sprint)	C	From Leg	0.00 1.50 0.00	0.0000	125.00	No Ice 1/2" Ice	16.60 19.77	16.60 19.77	0.56 0.70
APXVSPP18-C-A20 (Sprint)	A	From Leg	0.00 3.00 0.00	0.0000	125.00	No Ice 1/2" Ice	8.26 8.81	5.28 5.74	0.06 0.11
APXV9ERR18-C-A20 (Sprint)	B	From Leg	0.00 3.00 0.00	0.0000	125.00	No Ice 1/2" Ice	8.26 8.81	5.81 6.27	0.06 0.11
APXVSPP18-C-A20 (Sprint)	C	From Leg	0.00 3.00 0.00	0.0000	125.00	No Ice 1/2" Ice	8.26 8.81	5.28 5.74	0.06 0.11
FD-RRH 2x50 800	A	From Leg	0.00 3.00	0.0000	125.00	No Ice	2.40	2.25	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
(Sprint)			0.00 0.00			1/2" Ice	2.61	2.46	0.09
FD-RRH 2x50 800 (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 2x50 800 (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 4x40 1900 (Sprint)	A	From Leg	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08
FD-RRH 4x40 1900 (Sprint)	B	From Leg	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08
FD-RRH 4x40 1900 (Sprint)	C	From Leg	3.00 0.00 0.00	0.0000	125.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
8 FT DISH	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		192.00	8.00	No Ice 1/2" Ice	50.30 51.29	0.25 0.51
8 FT DISH	B	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	-30.0000		198.00	8.00	No Ice 1/2" Ice	50.30 51.29	0.25 0.51
8 FT DISH	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	-30.0000		199.00	8.00	No Ice 1/2" Ice	50.30 51.29	0.25 0.51

Tower Pressures - No Ice

$G_H = 1.114$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 201.00-181.00	191.00	1.651	31	195.998	A B C	16.544 11.334 11.334	17.457 9.599 9.599	9.599	28.23 45.86 45.86	0.000 0.000 0.000	0.000 0.000 0.000
T2	171.00	1.6	30	236.398	A	20.078	17.783	9.600	25.36	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
181.00-161.00					B	13.090	9.600		42.31	0.000	0.000
					C	13.090	9.600		42.31	0.000	0.000
T3 161.00-141.00	151.00	1.544	29	278.441	A	25.374	19.871	11.687	25.83	0.000	0.000
					B	18.577	11.687		38.62	0.000	0.000
					C	18.577	11.687		38.62	0.000	0.000
T4 141.00-121.00	131.00	1.483	27	320.275	A	25.181	21.540	13.356	28.59	0.000	0.000
					B	18.219	13.356		42.30	0.000	0.000
					C	17.892	18.856		36.35	0.000	0.000
T5 121.00-101.00	111.00	1.414	26	361.509	A	26.907	23.208	15.025	29.98	0.000	0.000
					B	19.914	15.025		43.00	0.000	0.000
					C	18.335	42.525		24.69	0.000	0.000
T6 101.00-81.00	91.00	1.336	25	404.084	A	42.743	28.155	18.577	26.20	0.000	0.000
					B	36.480	18.577		33.74	0.000	0.000
					C	33.879	46.077		23.23	0.000	0.000
T7 81.00-61.00	71.00	1.245	23	444.883	A	37.821	29.391	18.574	27.64	0.000	0.000
					B	31.278	18.574		37.26	0.000	0.000
					C	29.260	46.074		24.66	0.000	0.000
T8 61.00-41.00	51.00	1.132	21	487.486	A	55.451	29.399	18.583	21.90	0.000	0.000
					B	49.512	18.583		27.29	0.000	0.000
					C	46.608	46.083		20.05	0.000	0.000
T9 41.00-21.00	31.00	1	18	536.863	A	7.918	66.384	22.141	29.80	0.000	0.000
					B	0.000	53.170		41.64	0.000	0.000
					C	0.000	75.301		29.40	0.000	0.000
T10 21.00-1.00	11.00	1	18	586.863	A	4.355	64.862	22.141	31.99	0.000	0.000
					B	0.000	55.788		39.69	0.000	0.000
					C	0.000	66.126		33.48	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.114$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 201.00-181.00	191.00	1.651	31	0.5000	197.666	A	18.369	34.280	12.938	24.57	0.000	0.000
						B	11.334	19.316		42.21	0.000	0.000
						C	11.334	19.316		42.21	0.000	0.000
T2 181.00-161.00	171.00	1.6	30	0.5000	238.067	A	22.641	35.151	12.939	22.39	0.000	0.000
						B	13.090	19.484		39.72	0.000	0.000
						C	13.090	19.484		39.72	0.000	0.000
T3 161.00-141.00	151.00	1.544	29	0.5000	280.110	A	27.779	38.154	15.026	22.79	0.000	0.000
						B	18.577	22.457		36.62	0.000	0.000
						C	18.577	22.457		36.62	0.000	0.000
T4 141.00-121.00	131.00	1.483	27	0.5000	321.944	A	27.724	38.703	16.696	25.13	0.000	0.000
						B	18.219	22.768		40.73	0.000	0.000
						C	22.681	26.134		34.20	0.000	0.000
T5 121.00-101.00	111.00	1.414	26	0.5000	363.178	A	29.475	40.955	18.364	26.07	0.000	0.000
						B	19.914	25.002		40.88	0.000	0.000
						C	42.306	41.855		21.82	0.000	0.000
T6 101.00-81.00	91.00	1.336	25	0.5000	405.753	A	44.673	50.877	21.916	22.94	0.000	0.000
						B	36.480	32.339		31.85	0.000	0.000
						C	57.294	48.857		20.65	0.000	0.000
T7 81.00-61.00	71.00	1.245	23	0.5000	446.552	A	39.932	51.567	21.913	23.95	0.000	0.000
						B	31.278	29.733		35.92	0.000	0.000
						C	52.993	46.620		22.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T8 61.00-41.00	51.00	1.132	21	0.5000	489.156	A	57.025	55.850	21.923	19.42	0.000	0.000
						B	49.512	34.301		26.16	0.000	0.000
						C	69.857	50.846		18.16	0.000	0.000
T9 41.00-21.00	31.00	1	18	0.5000	538.533	A	11.251	91.341	25.483	24.84	0.000	0.000
						B	0.000	67.135		37.96	0.000	0.000
						C	24.833	76.189		25.22	0.000	0.000
T10 21.00-1.00	11.00	1	18	0.5000	588.533	A	6.188	86.112	25.483	27.61	0.000	0.000
						B	0.000	70.350		36.22	0.000	0.000
						C	13.658	72.879		29.45	0.000	0.000

Tower Pressure - Service

$G_H = 1.114$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 201.00-181.00	191.00	1.651	31	195.998	A	16.544	17.457	9.599	28.23	0.000	0.000
					B	11.334	9.599		45.86	0.000	0.000
					C	11.334	9.599		45.86	0.000	0.000
T2 181.00-161.00	171.00	1.6	30	236.398	A	20.078	17.783	9.600	25.36	0.000	0.000
					B	13.090	9.600		42.31	0.000	0.000
					C	13.090	9.600		42.31	0.000	0.000
T3 161.00-141.00	151.00	1.544	29	278.441	A	25.374	19.871	11.687	25.83	0.000	0.000
					B	18.577	11.687		38.62	0.000	0.000
					C	18.577	11.687		38.62	0.000	0.000
T4 141.00-121.00	131.00	1.483	27	320.275	A	25.181	21.540	13.356	28.59	0.000	0.000
					B	18.219	13.356		42.30	0.000	0.000
					C	17.892	18.856		36.35	0.000	0.000
T5 121.00-101.00	111.00	1.414	26	361.509	A	26.907	23.208	15.025	29.98	0.000	0.000
					B	19.914	15.025		43.00	0.000	0.000
					C	18.335	42.525		24.69	0.000	0.000
T6 101.00-81.00	91.00	1.336	25	404.084	A	42.743	28.155	18.577	26.20	0.000	0.000
					B	36.480	18.577		33.74	0.000	0.000
					C	33.879	46.077		23.23	0.000	0.000
T7 81.00-61.00	71.00	1.245	23	444.883	A	37.821	29.391	18.574	27.64	0.000	0.000
					B	31.278	18.574		37.26	0.000	0.000
					C	29.260	46.074		24.66	0.000	0.000
T8 61.00-41.00	51.00	1.132	21	487.486	A	55.451	29.399	18.583	21.90	0.000	0.000
					B	49.512	18.583		27.29	0.000	0.000
					C	46.608	46.083		20.05	0.000	0.000
T9 41.00-21.00	31.00	1	18	536.863	A	7.918	66.384	22.141	29.80	0.000	0.000
					B	0.000	53.170		41.64	0.000	0.000
					C	0.000	75.301		29.40	0.000	0.000
T10 21.00-1.00	11.00	1	18	586.863	A	4.355	64.862	22.141	31.99	0.000	0.000
					B	0.000	55.788		39.69	0.000	0.000
					C	0.000	66.126		33.48	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 201.00-181.00	0.07	1.08	A	0.173	2.687	0.585	1	1	26.763	2.45	122.33	A
			B	0.107	2.937	0.576	1	1	16.861			
			C	0.107	2.937	0.576	1	1	16.861			
T2 181.00-161.00	0.08	1.40	A	0.16	2.734	0.583	1	1	30.447	2.74	137.22	A
			B	0.096	2.98	0.575	1	1	18.607			
			C	0.096	2.98	0.575	1	1	18.607			
T3 161.00-141.00	0.08	1.56	A	0.162	2.726	0.583	1	1	36.968	3.21	160.30	A
			B	0.109	2.929	0.576	1	1	25.309			
			C	0.109	2.929	0.576	1	1	25.309			
T4 141.00-121.00	0.12	1.85	A	0.146	2.787	0.581	1	1	37.693	3.21	160.43	A
			B	0.099	2.97	0.575	1	1	25.898			
			C	0.115	2.905	0.577	1	1	28.767			
T5 121.00-101.00	0.28	2.65	A	0.139	2.814	0.58	1	1	40.364	3.40	170.19	C
			B	0.097	2.978	0.575	1	1	28.550			
			C	0.168	2.705	0.584	1	1	43.189			
T6 101.00-81.00	0.29	3.61	A	0.175	2.68	0.586	1	1	59.233	4.38	218.78	C
			B	0.136	2.823	0.579	1	1	47.244			
			C	0.198	2.603	0.59	1	1	61.063			
T7 81.00-61.00	0.30	3.60	A	0.151	2.768	0.582	1	1	54.916	3.90	194.86	A
			B	0.112	2.916	0.576	1	1	41.984			
			C	0.169	2.702	0.585	1	1	56.196			
T8 61.00-41.00	0.30	5.67	A	0.174	2.685	0.585	1	1	72.663	4.55	227.58	A
			B	0.14	2.81	0.58	1	1	60.289			
			C	0.19	2.629	0.588	1	1	73.725			
T9 41.00-21.00	0.30	4.28	A	0.138	2.815	0.58	1	1	46.405	2.69	134.54	A
			B	0.099	2.968	0.575	1	1	30.573			
			C	0.14	2.808	0.58	1	1	43.677			
T10 21.00-1.00	0.17	4.50	A	0.118	2.893	0.577	1	1	41.786	2.49	124.52	A
			B	0.095	2.984	0.575	1	1	32.056			
			C	0.113	2.914	0.576	1	1	38.120			
Sum Weight:	2.00	30.21						OTM	3203.67 kip-ft	33.02		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 201.00-181.00	0.07	1.08	A	0.173	2.687	0.585	0.8	1	23.454	2.14	107.20	A
			B	0.107	2.937	0.576	0.8	1	14.595			
			C	0.107	2.937	0.576	0.8	1	14.595			
T2 181.00-161.00	0.08	1.40	A	0.16	2.734	0.583	0.8	1	26.431	2.38	119.12	A
			B	0.096	2.98	0.575	0.8	1	15.989			
			C	0.096	2.98	0.575	0.8	1	15.989			
T3 161.00-141.00	0.08	1.56	A	0.162	2.726	0.583	0.8	1	31.893	2.77	138.29	A
			B	0.109	2.929	0.576	0.8	1	21.593			
			C	0.109	2.929	0.576	0.8	1	21.593			
T4 141.00-121.00	0.12	1.85	A	0.146	2.787	0.581	0.8	1	32.657	2.78	139.00	A
			B	0.099	2.97	0.575	0.8	1	22.254			
			C	0.115	2.905	0.577	0.8	1	25.189			
T5 121.00-101.00	0.28	2.65	A	0.139	2.814	0.58	0.8	1	34.982	3.11	155.74	C
			B	0.097	2.978	0.575	0.8	1	24.567			
			C	0.168	2.705	0.584	0.8	1	39.522			
T6 101.00-81.00	0.29	3.61	A	0.175	2.68	0.586	0.8	1	50.685	3.89	194.50	C
			B	0.136	2.823	0.579	0.8	1	39.948			

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
			C	0.198	2.603	0.59	0.8	1	54.287			
T7	0.30	3.60	A	0.151	2.768	0.582	0.8	1	47.352	3.49	174.39	C
81.00-61.00			B	0.112	2.916	0.576	0.8	1	35.729			
			C	0.169	2.702	0.585	0.8	1	50.344			
T8	0.30	5.67	A	0.174	2.685	0.585	0.8	1	61.573	3.95	197.53	C
61.00-41.00			B	0.14	2.81	0.58	0.8	1	50.387			
			C	0.19	2.629	0.588	0.8	1	64.403			
T9	0.30	4.28	A	0.138	2.815	0.58	0.8	1	44.821	2.60	129.95	A
41.00-21.00			B	0.099	2.968	0.575	0.8	1	30.573			
			C	0.14	2.808	0.58	0.8	1	43.677			
T10	0.17	4.50	A	0.118	2.893	0.577	0.8	1	40.915	2.44	121.93	A
21.00-1.00			B	0.095	2.984	0.575	0.8	1	32.056			
			C	0.113	2.914	0.576	0.8	1	38.120			
Sum Weight:	2.00	30.21						OTM	2825.43 kip-ft	29.55		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T1	0.07	1.08	A	0.173	2.687	0.585	0.85	1	24.281	2.22	110.98	A
201.00-181.00			B	0.107	2.937	0.576	0.85	1	15.161			
			C	0.107	2.937	0.576	0.85	1	15.161			
T2	0.08	1.40	A	0.16	2.734	0.583	0.85	1	27.435	2.47	123.65	A
181.00-161.00			B	0.096	2.98	0.575	0.85	1	16.643			
			C	0.096	2.98	0.575	0.85	1	16.643			
T3	0.08	1.56	A	0.162	2.726	0.583	0.85	1	33.161	2.88	143.79	A
161.00-141.00			B	0.109	2.929	0.576	0.85	1	22.522			
			C	0.109	2.929	0.576	0.85	1	22.522			
T4	0.12	1.85	A	0.146	2.787	0.581	0.85	1	33.916	2.89	144.36	A
141.00-121.00			B	0.099	2.97	0.575	0.85	1	23.165			
			C	0.115	2.905	0.577	0.85	1	26.083			
T5	0.28	2.65	A	0.139	2.814	0.58	0.85	1	36.327	3.19	159.36	C
121.00-101.00			B	0.097	2.978	0.575	0.85	1	25.563			
			C	0.168	2.705	0.584	0.85	1	40.438			
T6	0.29	3.61	A	0.175	2.68	0.586	0.85	1	52.822	4.01	200.57	C
101.00-81.00			B	0.136	2.823	0.579	0.85	1	41.772			
			C	0.198	2.603	0.59	0.85	1	55.981			
T7	0.30	3.60	A	0.151	2.768	0.582	0.85	1	49.243	3.59	179.45	C
81.00-61.00			B	0.112	2.916	0.576	0.85	1	37.293			
			C	0.169	2.702	0.585	0.85	1	51.807			
T8	0.30	5.67	A	0.174	2.685	0.585	0.85	1	64.346	4.09	204.67	C
61.00-41.00			B	0.14	2.81	0.58	0.85	1	52.862			
			C	0.19	2.629	0.588	0.85	1	66.733			
T9	0.30	4.28	A	0.138	2.815	0.58	0.85	1	45.217	2.62	131.10	A
41.00-21.00			B	0.099	2.968	0.575	0.85	1	30.573			
			C	0.14	2.808	0.58	0.85	1	43.677			
T10	0.17	4.50	A	0.118	2.893	0.577	0.85	1	41.133	2.45	122.58	A
21.00-1.00			B	0.095	2.984	0.575	0.85	1	32.056			
			C	0.113	2.914	0.576	0.85	1	38.120			
Sum Weight:	2.00	30.21						OTM	2919.55 kip-ft	30.41		

tnxTower	Job 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page 16 of 37
Centek Engineering Inc.	Project 250 Olcott Street, Manchester, CT	Date 09:16:03 07/02/13
63-2 North Branford Rd. *Branford, CT 06405* *Phone: (203) 488-0580* *FAX: (203) 488-8587*	Client Sprint	Designed by TJL

Tower Forces - With Ice - Wind Normal To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T1 201.00-181.00	0.22	1.62	A	0.266	2.389	0.606	1	1	39.149	3.18	159.12	A
			B	0.155	2.753	0.582	1	1	22.581			
			C	0.155	2.753	0.582	1	1	22.581			
T2 181.00-161.00	0.25	1.99	A	0.243	2.459	0.6	1	1	43.734	3.55	177.28	A
			B	0.137	2.821	0.58	1	1	24.381			
			C	0.137	2.821	0.58	1	1	24.381			
T3 161.00-141.00	0.25	2.34	A	0.235	2.482	0.598	1	1	50.605	4.00	199.79	A
			B	0.146	2.784	0.581	1	1	31.623			
			C	0.146	2.784	0.581	1	1	31.623			
T4 141.00-121.00	0.36	2.62	A	0.206	2.575	0.592	1	1	50.625	3.98	199.10	A
			B	0.127	2.857	0.578	1	1	31.385			
			C	0.152	2.766	0.582	1	1	37.884			
T5 121.00-101.00	0.79	3.50	A	0.194	2.616	0.589	1	1	53.605	4.89	244.49	C
			B	0.124	2.871	0.578	1	1	34.360			
			C	0.232	2.493	0.597	1	1	67.310			
T6 101.00-81.00	0.81	5.02	A	0.235	2.482	0.598	1	1	75.112	5.75	287.25	C
			B	0.17	2.701	0.585	1	1	55.387			
			C	0.262	2.403	0.605	1	1	86.848			
T7 81.00-61.00	0.83	4.83	A	0.205	2.58	0.591	1	1	70.429	5.22	260.98	C
			B	0.137	2.821	0.58	1	1	48.509			
			C	0.223	2.521	0.595	1	1	80.750			
T8 61.00-41.00	0.83	7.48	A	0.231	2.496	0.597	1	1	90.376	5.73	286.67	C
			B	0.171	2.695	0.585	1	1	69.577			
			C	0.247	2.447	0.601	1	1	100.418			
T9 41.00-21.00	0.83	5.45	A	0.191	2.628	0.589	1	1	65.006	3.78	189.20	C
			B	0.125	2.867	0.578	1	1	38.799			
			C	0.188	2.638	0.588	1	1	69.629			
T10 21.00-1.00	0.46	5.75	A	0.157	2.747	0.583	1	1	56.352	3.21	160.51	C
			B	0.12	2.887	0.577	1	1	40.612			
			C	0.147	2.782	0.581	1	1	56.003			
Sum Weight:	5.65	40.61						OTM	4177.06 kip-ft	43.29		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T1 201.00-181.00	0.22	1.62	A	0.266	2.389	0.606	0.8	1	35.475	2.88	144.19	A
			B	0.155	2.753	0.582	0.8	1	20.314			
			C	0.155	2.753	0.582	0.8	1	20.314			
T2 181.00-161.00	0.25	1.99	A	0.243	2.459	0.6	0.8	1	39.205	3.18	158.92	A
			B	0.137	2.821	0.58	0.8	1	21.763			
			C	0.137	2.821	0.58	0.8	1	21.763			
T3 161.00-141.00	0.25	2.34	A	0.235	2.482	0.598	0.8	1	45.049	3.56	177.86	A
			B	0.146	2.784	0.581	0.8	1	27.908			
			C	0.146	2.784	0.581	0.8	1	27.908			
T4 141.00-121.00	0.36	2.62	A	0.206	2.575	0.592	0.8	1	45.080	3.55	177.30	A
			B	0.127	2.857	0.578	0.8	1	27.741			

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
			C	0.152	2.766	0.582	0.8	1	33.348			
T5 121.00-101.00	0.79	3.50	A	0.194	2.616	0.589	0.8	1	47.710	4.28	213.76	C
			B	0.124	2.871	0.578	0.8	1	30.378			
			C	0.232	2.493	0.597	0.8	1	58.849			
T6 101.00-81.00	0.81	5.02	A	0.235	2.482	0.598	0.8	1	66.178	4.99	249.35	C
			B	0.17	2.701	0.585	0.8	1	48.091			
			C	0.262	2.403	0.605	0.8	1	75.389			
T7 81.00-61.00	0.83	4.83	A	0.205	2.58	0.591	0.8	1	62.443	4.53	226.73	C
			B	0.137	2.821	0.58	0.8	1	42.253			
			C	0.223	2.521	0.595	0.8	1	70.151			
T8 61.00-41.00	0.83	7.48	A	0.231	2.496	0.597	0.8	1	78.971	4.94	246.78	C
			B	0.171	2.695	0.585	0.8	1	59.675			
			C	0.247	2.447	0.601	0.8	1	86.447			
T9 41.00-21.00	0.83	5.45	A	0.191	2.628	0.589	0.8	1	62.756	3.51	175.71	C
			B	0.125	2.867	0.578	0.8	1	38.799			
			C	0.188	2.638	0.588	0.8	1	64.662			
T10 21.00-1.00	0.46	5.75	A	0.157	2.747	0.583	0.8	1	55.115	3.12	155.93	A
			B	0.12	2.887	0.577	0.8	1	40.612			
			C	0.147	2.782	0.581	0.8	1	53.271			
Sum Weight:	5.65	40.61						OTM	3702.71 kip-ft	38.53		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E *ft²*	*F* *K*	*w* *plf*	*Ctrl. Face*
T1 201.00-181.00	0.22	1.62	A	0.266	2.389	0.606	0.85	1	36.394	2.96	147.92	A
			B	0.155	2.753	0.582	0.85	1	20.881			
			C	0.155	2.753	0.582	0.85	1	20.881			
T2 181.00-161.00	0.25	1.99	A	0.243	2.459	0.6	0.85	1	40.337	3.27	163.51	A
			B	0.137	2.821	0.58	0.85	1	22.418			
			C	0.137	2.821	0.58	0.85	1	22.418			
T3 161.00-141.00	0.25	2.34	A	0.235	2.482	0.598	0.85	1	46.438	3.67	183.34	A
			B	0.146	2.784	0.581	0.85	1	28.836			
			C	0.146	2.784	0.581	0.85	1	28.836			
T4 141.00-121.00	0.36	2.62	A	0.206	2.575	0.592	0.85	1	46.466	3.65	182.75	A
			B	0.127	2.857	0.578	0.85	1	28.652			
			C	0.152	2.766	0.582	0.85	1	34.482			
T5 121.00-101.00	0.79	3.50	A	0.194	2.616	0.589	0.85	1	49.183	4.43	221.44	C
			B	0.124	2.871	0.578	0.85	1	31.373			
			C	0.232	2.493	0.597	0.85	1	60.964			
T6 101.00-81.00	0.81	5.02	A	0.235	2.482	0.598	0.85	1	68.411	5.18	258.83	C
			B	0.17	2.701	0.585	0.85	1	49.915			
			C	0.262	2.403	0.605	0.85	1	78.254			
T7 81.00-61.00	0.83	4.83	A	0.205	2.58	0.591	0.85	1	64.439	4.71	235.29	C
			B	0.137	2.821	0.58	0.85	1	43.817			
			C	0.223	2.521	0.595	0.85	1	72.801			
T8 61.00-41.00	0.83	7.48	A	0.231	2.496	0.597	0.85	1	81.822	5.14	256.75	C
			B	0.171	2.695	0.585	0.85	1	62.150			
			C	0.247	2.447	0.601	0.85	1	89.940			
T9 41.00-21.00	0.83	5.45	A	0.191	2.628	0.589	0.85	1	63.318	3.58	179.08	C
			B	0.125	2.867	0.578	0.85	1	38.799			
			C	0.188	2.638	0.588	0.85	1	65.904			
T10	0.46	5.75	A	0.157	2.747	0.583	0.85	1	55.424	3.14	156.80	A

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
21.00-1.00			B	0.12	2.887	0.577	0.85	1	40.612			
			C	0.147	2.782	0.581	0.85	1	53.954			
Sum Weight:	5.65	40.61						OTM	3821.25 kip-ft	39.71		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 201.00-181.00	0.07	1.08	A	0.173	2.687	0.585	1	1	26.763	2.45	122.33	A
			B	0.107	2.937	0.576	1	1	16.861			
			C	0.107	2.937	0.576	1	1	16.861			
T2 181.00-161.00	0.08	1.40	A	0.16	2.734	0.583	1	1	30.447	2.74	137.22	A
			B	0.096	2.98	0.575	1	1	18.607			
			C	0.096	2.98	0.575	1	1	18.607			
T3 161.00-141.00	0.08	1.56	A	0.162	2.726	0.583	1	1	36.968	3.21	160.30	A
			B	0.109	2.929	0.576	1	1	25.309			
			C	0.109	2.929	0.576	1	1	25.309			
T4 141.00-121.00	0.12	1.85	A	0.146	2.787	0.581	1	1	37.693	3.21	160.43	A
			B	0.099	2.97	0.575	1	1	25.898			
			C	0.115	2.905	0.577	1	1	28.767			
T5 121.00-101.00	0.28	2.65	A	0.139	2.814	0.58	1	1	40.364	3.40	170.19	C
			B	0.097	2.978	0.575	1	1	28.550			
			C	0.168	2.705	0.584	1	1	43.189			
T6 101.00-81.00	0.29	3.61	A	0.175	2.68	0.586	1	1	59.233	4.38	218.78	C
			B	0.136	2.823	0.579	1	1	47.244			
			C	0.198	2.603	0.59	1	1	61.063			
T7 81.00-61.00	0.30	3.60	A	0.151	2.768	0.582	1	1	54.916	3.90	194.86	A
			B	0.112	2.916	0.576	1	1	41.984			
			C	0.169	2.702	0.585	1	1	56.196			
T8 61.00-41.00	0.30	5.67	A	0.174	2.685	0.585	1	1	72.663	4.55	227.58	A
			B	0.14	2.81	0.58	1	1	60.289			
			C	0.19	2.629	0.588	1	1	73.725			
T9 41.00-21.00	0.30	4.28	A	0.138	2.815	0.58	1	1	46.405	2.69	134.54	A
			B	0.099	2.968	0.575	1	1	30.573			
			C	0.14	2.808	0.58	1	1	43.677			
T10 21.00-1.00	0.17	4.50	A	0.118	2.893	0.577	1	1	41.786	2.49	124.52	A
			B	0.095	2.984	0.575	1	1	32.056			
			C	0.113	2.914	0.576	1	1	38.120			
Sum Weight:	2.00	30.21						OTM	3203.67 kip-ft	33.02		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.07	1.08	A	0.173	2.687	0.585	0.8	1	23.454	2.14	107.20	A

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Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
201.00-181.00			B	0.107	2.937	0.576	0.8	1	14.595			
			C	0.107	2.937	0.576	0.8	1	14.595			
T2	0.08	1.40	A	0.16	2.734	0.583	0.8	1	26.431	2.38	119.12	A
181.00-161.00			B	0.096	2.98	0.575	0.8	1	15.989			
			C	0.096	2.98	0.575	0.8	1	15.989			
T3	0.08	1.56	A	0.162	2.726	0.583	0.8	1	31.893	2.77	138.29	A
161.00-141.00			B	0.109	2.929	0.576	0.8	1	21.593			
			C	0.109	2.929	0.576	0.8	1	21.593			
T4	0.12	1.85	A	0.146	2.787	0.581	0.8	1	32.657	2.78	139.00	A
141.00-121.00			B	0.099	2.97	0.575	0.8	1	22.254			
			C	0.115	2.905	0.577	0.8	1	25.189			
T5	0.28	2.65	A	0.139	2.814	0.58	0.8	1	34.982	3.11	155.74	C
121.00-101.00			B	0.097	2.978	0.575	0.8	1	24.567			
			C	0.168	2.705	0.584	0.8	1	39.522			
T6	0.29	3.61	A	0.175	2.68	0.586	0.8	1	50.685	3.89	194.50	C
101.00-81.00			B	0.136	2.823	0.579	0.8	1	39.948			
			C	0.198	2.603	0.59	0.8	1	54.287			
T7	0.30	3.60	A	0.151	2.768	0.582	0.8	1	47.352	3.49	174.39	C
81.00-61.00			B	0.112	2.916	0.576	0.8	1	35.729			
			C	0.169	2.702	0.585	0.8	1	50.344			
T8	0.30	5.67	A	0.174	2.685	0.585	0.8	1	61.573	3.95	197.53	C
61.00-41.00			B	0.14	2.81	0.58	0.8	1	50.387			
			C	0.19	2.629	0.588	0.8	1	64.403			
T9	0.30	4.28	A	0.138	2.815	0.58	0.8	1	44.821	2.60	129.95	A
41.00-21.00			B	0.099	2.968	0.575	0.8	1	30.573			
			C	0.14	2.808	0.58	0.8	1	43.677			
T10	0.17	4.50	A	0.118	2.893	0.577	0.8	1	40.915	2.44	121.93	A
21.00-1.00			B	0.095	2.984	0.575	0.8	1	32.056			
			C	0.113	2.914	0.576	0.8	1	38.120			
Sum Weight:	2.00	30.21						OTM	2825.43 kip-ft	29.55		

Tower Forces - Service - Wind 90 To Face

Section Elevation *ft*	*Add Weight* *K*	*Self Weight* *K*	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft^2	*F* *K*	*w* *plf*	*Ctrl. Face*
T1	0.07	1.08	A	0.173	2.687	0.585	0.85	1	24.281	2.22	110.98	A
201.00-181.00			B	0.107	2.937	0.576	0.85	1	15.161			
			C	0.107	2.937	0.576	0.85	1	15.161			
T2	0.08	1.40	A	0.16	2.734	0.583	0.85	1	27.435	2.47	123.65	A
181.00-161.00			B	0.096	2.98	0.575	0.85	1	16.643			
			C	0.096	2.98	0.575	0.85	1	16.643			
T3	0.08	1.56	A	0.162	2.726	0.583	0.85	1	33.161	2.88	143.79	A
161.00-141.00			B	0.109	2.929	0.576	0.85	1	22.522			
			C	0.109	2.929	0.576	0.85	1	22.522			
T4	0.12	1.85	A	0.146	2.787	0.581	0.85	1	33.916	2.89	144.36	A
141.00-121.00			B	0.099	2.97	0.575	0.85	1	23.165			
			C	0.115	2.905	0.577	0.85	1	26.083			
T5	0.28	2.65	A	0.139	2.814	0.58	0.85	1	36.327	3.19	159.36	C
121.00-101.00			B	0.097	2.978	0.575	0.85	1	25.563			
			C	0.168	2.705	0.584	0.85	1	40.438			
T6	0.29	3.61	A	0.175	2.68	0.586	0.85	1	52.822	4.01	200.57	C
101.00-81.00			B	0.136	2.823	0.579	0.85	1	41.772			
			C	0.198	2.603	0.59	0.85	1	55.981			

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 20 of 37
	Project: 250 Olcott Street, Manchester, CT	Date: 09:16:03 07/02/13
	Client: Sprint	Designed by: TJL

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Section Elevation ft	*Add Weight* K	*Self Weight* K	*Face*	*e*	C_F	R_R	D_F	D_R	A_E ft²	*F* K	*w* plf	*Ctrl. Face*
T7 81.00-61.00	0.30	3.60	A	0.151	2.768	0.582	0.85	1	49.243	3.59	179.45	C
			B	0.112	2.916	0.576	0.85	1	37.293			
			C	0.169	2.702	0.585	0.85	1	51.807			
T8 61.00-41.00	0.30	5.67	A	0.174	2.685	0.585	0.85	1	64.346	4.09	204.67	C
			B	0.14	2.81	0.58	0.85	1	52.862			
			C	0.19	2.629	0.588	0.85	1	66.733			
T9 41.00-21.00	0.30	4.28	A	0.138	2.815	0.58	0.85	1	45.217	2.62	131.10	A
			B	0.099	2.968	0.575	0.85	1	30.573			
			C	0.14	2.808	0.58	0.85	1	43.677			
T10 21.00-1.00	0.17	4.50	A	0.118	2.893	0.577	0.85	1	41.133	2.45	122.58	A
			B	0.095	2.984	0.575	0.85	1	32.056			
			C	0.113	2.914	0.576	0.85	1	38.120			
Sum Weight:	2.00	30.21						OTM	2919.55 kip-ft	30.41		

Force Totals

Load Case	*Vertical Forces* K	*Sum of Forces X* K	*Sum of Forces Z* K	*Sum of Overturning Moments, M_x* kip-ft	*Sum of Overturning Moments, M_z* kip-ft	*Sum of Torques* kip-ft
Leg Weight	9.85					
Bracing Weight	20.36					
Total Member Self-Weight	30.21			-3.54	10.76	
Total Weight	36.08			-3.54	10.76	
Wind 0 deg - No Ice		-0.18	-40.60	-4440.73	46.35	-26.01
Wind 30 deg - No Ice		18.81	-32.76	-3572.84	-2028.81	-30.30
Wind 60 deg - No Ice		31.99	-18.42	-2005.86	-3474.49	-26.89
Wind 90 deg - No Ice		37.60	0.03	0.69	-4068.74	-16.92
Wind 120 deg - No Ice		34.70	19.94	2143.89	-3742.11	-3.77
Wind 150 deg - No Ice		18.66	32.42	3496.17	-1999.21	10.59
Wind 180 deg - No Ice		-0.28	36.95	4016.32	64.72	22.06
Wind 210 deg - No Ice		-19.33	33.18	3645.89	2152.10	28.18
Wind 240 deg - No Ice		-35.26	20.58	2269.10	3873.82	26.56
Wind 270 deg - No Ice		-37.45	0.18	29.90	4060.05	13.86
Wind 300 deg - No Ice		-31.63	-18.41	-2004.18	3423.15	0.16
Wind 330 deg - No Ice		-18.87	-32.78	-3577.37	2064.16	-12.58
Member Ice	10.40					
Total Weight Ice	51.98			-9.81	27.97	
Wind 0 deg - Ice		-0.18	-51.74	-5542.26	64.27	-34.68
Wind 30 deg - Ice		23.89	-41.57	-4465.00	-2522.66	-44.85
Wind 60 deg - Ice		40.52	-23.34	-2511.16	-4322.00	-44.02
Wind 90 deg - Ice		47.77	0.03	-5.48	-5073.67	-32.88
Wind 120 deg - Ice		44.34	25.51	2683.87	-4671.68	-14.19
Wind 150 deg - Ice		23.74	41.22	4374.45	-2492.49	9.13
Wind 180 deg - Ice		-0.28	46.79	5008.46	82.98	29.23
Wind 210 deg - Ice		-24.42	42.00	4527.10	2682.37	42.69
Wind 240 deg - Ice		-44.91	26.16	2811.53	4839.97	45.59
Wind 270 deg - Ice		-47.61	0.18	24.29	5098.80	29.76
Wind 300 deg - Ice		-40.14	-23.33	-2509.46	4303.65	10.03
Wind 330 deg - Ice		-23.96	-41.59	-4469.63	2592.72	-11.16
Total Weight	36.08			-3.54	10.76	
Wind 0 deg - Service		-0.18	-40.60	-4439.90	36.03	-26.01
Wind 30 deg - Service		18.81	-32.76	-3572.01	-2039.13	-30.30
Wind 60 deg - Service		31.99	-18.42	-2005.03	-3484.81	-26.89
Wind 90 deg - Service		37.60	0.03	1.52	-4079.07	-16.92

Load Case	*Vertical Forces* K	*Sum of Forces X* K	*Sum of Forces Z* K	*Sum of Overturning Moments, M_x* kip-ft	*Sum of Overturning Moments, M_z* kip-ft	*Sum of Torques* kip-ft
Wind 120 deg - Service		34.70	19.94	2144.72	-3752.43	-3.77
Wind 150 deg - Service		18.66	32.42	3497.00	-2009.53	10.59
Wind 180 deg - Service		-0.28	36.95	4017.15	54.40	22.06
Wind 210 deg - Service		-19.33	33.18	3646.72	2141.78	28.18
Wind 240 deg - Service		-35.26	20.58	2269.93	3863.50	26.56
Wind 270 deg - Service		-37.45	0.18	30.73	4049.73	13.86
Wind 300 deg - Service		-31.63	-18.41	-2003.35	3412.83	0.16
Wind 330 deg - Service		-18.87	-32.78	-3576.54	2053.84	-12.58

Load Combinations

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

Maximum Member Forces

tnxTower	Job 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page 22 of 37
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project 250 Olcott Street, Manchester, CT	Date 09:16:03 07/02/13
	Client Sprint	Designed by TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	201 - 181	Leg	Max Tension	17	7.85	0.01	0.23
			Max. Compression	23	-10.93	0.07	0.03
			Max. Mx	17	0.16	1.14	0.03
			Max. My	25	-1.42	0.31	-1.62
			Max. Vy	17	-0.65	0.00	0.00
			Max. Vx	25	0.91	0.00	0.00
		Diagonal	Max Tension	22	2.83	0.00	0.00
			Max. Compression	22	-2.84	0.00	0.00
			Max. Mx	22	2.77	0.02	0.00
			Max. My	24	-2.49	0.02	0.01
			Max. Vy	22	0.02	0.02	0.00
			Max. Vx	25	-0.00	0.00	0.00
		Top Girt	Max Tension	15	0.06	0.00	0.00
			Max. Compression	17	-0.10	0.00	0.00
			Max. Mx	14	-0.01	-0.03	0.00
			Max. My	17	0.04	0.00	0.00
			Max. Vy	14	0.02	0.00	0.00
			Max. Vx	17	0.00	0.00	0.00
T2	181 - 161	Leg	Max Tension	17	21.21	-0.06	0.03
			Max. Compression	23	-27.16	0.07	-0.04
			Max. Mx	17	12.08	-0.08	-0.02
			Max. My	24	-1.54	-0.01	-0.13
			Max. Vy	21	0.05	-0.07	-0.00
			Max. Vx	24	0.10	-0.01	-0.13
		Diagonal	Max Tension	22	3.47	0.00	0.00
			Max. Compression	22	-3.50	0.00	0.00
			Max. Mx	17	2.21	0.04	0.01
			Max. My	17	-2.92	0.03	0.01
			Max. Vy	17	0.02	0.04	0.01
			Max. Vx	17	-0.00	0.00	0.00
T3	161 - 141	Leg	Max Tension	17	35.86	-0.12	0.03
			Max. Compression	23	-45.10	0.03	-0.05
			Max. Mx	21	29.93	-0.12	-0.00
			Max. My	18	-2.99	-0.02	0.17
			Max. Vy	21	-0.07	-0.12	-0.00
			Max. Vx	24	-0.11	-0.02	-0.17
		Diagonal	Max Tension	22	4.27	0.00	0.00
			Max. Compression	22	-4.32	0.00	0.00
			Max. Mx	17	2.68	0.06	0.01
			Max. My	17	-3.41	0.04	0.01
			Max. Vy	17	0.03	0.06	0.01
			Max. Vx	17	-0.00	0.00	0.00
T4	141 - 121	Leg	Max Tension	17	50.20	-0.94	0.07
			Max. Compression	23	-63.95	1.45	-0.07
			Max. Mx	21	48.24	1.91	-0.03
			Max. My	24	-4.46	-0.05	1.89
			Max. Vy	21	0.89	-1.52	-0.03
			Max. Vx	18	-0.86	-0.04	1.35
		Diagonal	Max Tension	22	5.84	0.00	0.00
			Max. Compression	23	-6.10	0.00	0.00
			Max. Mx	23	3.97	0.10	-0.01
			Max. My	17	-4.25	0.06	0.02
			Max. Vy	22	0.04	0.10	0.01
			Max. Vx	17	-0.00	0.00	0.00
T5	121 - 101	Leg	Max Tension	17	69.81	0.11	0.05
			Max. Compression	23	-89.71	0.30	-0.05
			Max. Mx	17	59.21	-1.53	0.06
			Max. My	18	-5.67	-0.04	1.35
			Max. Vy	17	-0.25	-1.53	0.06
			Max. Vx	20	-0.23	-0.04	-1.31

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	22	7.62	0.00	0.00
			Max. Compression	22	-7.71	0.00	0.00
			Max. Mx	23	5.72	0.16	-0.02
			Max. My	17	-6.32	0.10	0.03
			Max. Vy	22	0.06	0.15	0.02
			Max. Vx	17	-0.00	0.00	0.00
T6	101 - 81	Leg	Max Tension	17	90.44	0.14	0.07
			Max. Compression	23	-116.71	0.26	-0.13
			Max. Mx	23	-102.79	0.83	0.02
			Max. My	18	-7.97	-0.16	1.28
			Max. Vy	23	-0.32	0.79	0.10
			Max. Vx	18	0.42	-0.16	1.28
		Diagonal	Max Tension	22	8.60	0.00	0.00
			Max. Compression	22	-8.79	0.00	0.00
			Max. Mx	23	6.23	0.21	-0.02
			Max. My	16	-7.78	0.08	0.03
			Max. Vy	22	0.07	0.20	0.02
			Max. Vx	17	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	23	2.02	0.00	0.00
			Max. Compression	23	-2.02	0.00	0.00
			Max. Mx	14	0.15	-0.52	0.00
			Max. My	23	2.02	0.00	0.02
			Max. Vy	14	-0.10	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T7	81 - 61	Leg	Max Tension	17	112.29	-0.36	0.03
			Max. Compression	23	-145.52	0.31	-0.12
			Max. Mx	17	101.06	-0.36	0.03
			Max. My	26	-9.74	-0.08	0.58
			Max. Vy	17	0.10	-0.36	0.03
			Max. Vx	15	0.14	-0.25	0.54
		Diagonal	Max Tension	22	9.80	0.00	0.00
			Max. Compression	22	-10.01	0.00	0.00
			Max. Mx	23	7.22	0.27	-0.03
			Max. My	17	-8.12	0.16	0.04
			Max. Vy	22	0.09	0.26	0.03
			Max. Vx	17	-0.01	0.00	0.00
T8	61 - 41	Leg	Max Tension	17	133.11	0.32	0.06
			Max. Compression	23	-174.61	-1.58	-0.07
			Max. Mx	23	-174.61	-1.58	-0.07
			Max. My	24	-10.57	-0.20	-1.65
			Max. Vy	23	0.63	1.43	0.01
			Max. Vx	26	0.54	-0.20	1.64
		Diagonal	Max Tension	22	10.32	0.00	0.00
			Max. Compression	23	-10.68	0.00	0.00
			Max. Mx	23	7.30	0.35	-0.04
			Max. My	22	-9.44	0.17	-0.06
			Max. Vy	22	0.11	0.34	0.04
			Max. Vx	22	0.01	0.00	0.00
		Secondary Horizontal	Max Tension	23	3.03	0.00	0.00
			Max. Compression	23	-3.03	0.00	0.00
			Max. Mx	14	0.23	-0.99	0.00
			Max. My	23	3.03	0.00	0.03
			Max. Vy	14	0.16	0.00	0.00
			Max. Vx	23	0.01	0.00	0.00
T9	41 - 21	Leg	Max Tension	21	136.76	0.82	-0.08
			Max. Compression	23	-182.68	-2.81	-0.26
			Max. Mx	23	-182.24	3.80	0.17
			Max. My	18	-14.54	-0.09	2.40
			Max. Vy	23	0.72	3.80	0.17

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 24 of 37
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 250 Olcott Street, Manchester, CT	Date: 09:16:03 07/02/13
	Client: Sprint	Designed by: TJL

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	18	-0.46	-0.09	2.40
		Diagonal	Max Tension	16	16.32	-0.16	-0.04
			Max. Compression	22	-17.01	0.00	0.00
			Max. Mx	17	11.24	-0.20	0.06
			Max. My	16	-16.90	-0.01	-0.11
			Max. Vy	17	0.05	-0.20	0.06
			Max. Vx	16	-0.01	0.00	0.00
		Top Girt	Max Tension	16	9.31	-0.21	0.00
			Max. Compression	16	-9.21	-0.21	0.00
			Max. Mx	21	0.52	-0.28	-0.02
			Max. My	23	1.03	-0.13	0.02
			Max. Vy	21	0.09	-0.28	-0.02
			Max. Vx	23	-0.00	-0.13	0.02
		Redund Horz 1 Bracing	Max Tension	23	3.17	0.00	0.00
			Max. Compression	23	-3.17	0.00	0.00
			Max. Mx	14	0.23	0.02	0.00
			Max. Vy	14	-0.01	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	23	2.91	0.00	0.00
			Max. Compression	23	-2.91	0.00	0.00
			Max. Mx	23	2.91	0.03	0.00
			Max. My	22	2.44	0.00	-0.00
			Max. Vy	23	-0.01	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-0.05	0.00	0.00
			Max. Mx	14	-0.01	0.02	0.00
			Max. Vy	14	-0.01	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	22	0.09	0.00	0.00
			Max. Compression	15	-0.07	0.00	0.00
			Max. Mx	23	0.09	0.17	0.00
			Max. My	15	0.04	0.00	0.00
			Max. Vy	23	-0.04	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00
		Inner Bracing	Max Tension	16	0.16	0.00	0.00
			Max. Compression	16	-0.16	0.00	0.00
			Max. Mx	14	-0.01	0.20	0.00
			Max. My	23	0.15	0.00	0.00
			Max. Vy	14	-0.06	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
T10	21 - 1	Leg	Max Tension	21	155.23	2.21	-0.18
			Max. Compression	23	-208.27	-0.00	0.00
			Max. Mx	23	-207.87	3.61	0.16
			Max. My	18	-15.98	-0.09	2.39
			Max. Vy	23	-0.71	3.61	0.16
			Max. Vx	18	0.42	-0.09	2.39
		Diagonal	Max Tension	16	16.06	-0.18	-0.04
			Max. Compression	16	-16.76	0.00	0.00
			Max. Mx	17	11.07	-0.22	0.06
			Max. My	16	-16.66	-0.02	-0.10
			Max. Vy	17	0.05	-0.22	0.06
			Max. Vx	16	-0.01	0.00	0.00
		Top Girt	Max Tension	16	9.58	-0.22	-0.00
			Max. Compression	16	-9.75	-0.22	-0.00
			Max. Mx	21	-1.36	-0.28	-0.02
			Max. My	23	1.90	-0.14	0.02
			Max. Vy	21	-0.09	-0.28	-0.02
			Max. Vx	23	-0.00	-0.14	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Redund Horz 1 Bracing	Max Tension	23	3.61	0.00	0.00
			Max. Compression	23	-3.61	0.00	0.00
			Max. Mx	24	0.27	0.02	0.00
			Max. Vy	24	-0.01	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	23	3.10	0.00	0.00
			Max. Compression	23	-3.10	0.00	0.00
			Max. Mx	23	3.10	0.05	0.00
			Max. My	16	0.85	0.00	0.00
			Max. Vy	23	-0.02	0.00	0.00
			Max. Vx	16	-0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-0.05	0.00	0.00
			Max. Mx	14	-0.01	0.02	0.00
			Max. Vy	14	-0.01	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	22	0.09	0.00	0.00
			Max. Compression	15	-0.07	0.00	0.00
			Max. Mx	22	0.09	0.19	0.00
			Max. My	21	0.07	0.00	-0.00
			Max. Vy	22	-0.05	0.00	0.00
			Max. Vx	21	0.00	0.00	0.00
		Inner Bracing	Max Tension	16	0.17	0.00	0.00
			Max. Compression	16	-0.17	0.00	0.00
			Max. Mx	14	-0.01	0.24	0.00
			Max. My	15	0.16	0.00	0.00
			Max. Vy	14	-0.07	0.00	0.00
			Max. Vx	15	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	23	231.03	26.44	-16.28
	Max. H_x	23	231.03	26.44	-16.28
	Max. H_z	16	-151.22	-17.37	13.83
	Min. Vert	17	-173.39	-21.21	13.22
	Min. H_x	17	-173.39	-21.21	13.22
	Min. H_z	23	231.03	26.44	-16.28
Leg B	Max. Vert	19	222.95	-26.27	-15.47
	Max. H_x	25	-172.74	21.37	12.57
	Max. H_z	26	-153.64	17.97	12.93
	Min. Vert	25	-172.74	21.37	12.57
	Min. H_x	19	222.95	-26.27	-15.47
	Min. H_z	19	222.95	-26.27	-15.47
Leg A	Max. Vert	15	228.91	-0.67	30.89
	Max. H_x	23	-90.02	5.36	-13.27
	Max. H_z	15	228.91	-0.67	30.89
	Min. Vert	21	-173.77	0.56	-25.00
	Min. H_x	18	17.54	-5.42	1.61
	Min. H_z	21	-173.77	0.56	-25.00

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	36.08	0.00	0.00	-3.54	10.76	-0.00
Dead+Wind 0 deg - No Ice	36.08	-0.18	-40.60	-4412.84	46.49	-26.04
Dead+Wind 30 deg - No Ice	36.08	18.81	-32.76	-3548.88	-2014.84	-30.33
Dead+Wind 60 deg - No Ice	36.08	31.99	-18.42	-1992.08	-3450.53	-26.92
Dead+Wind 90 deg - No Ice	36.08	37.60	0.03	0.64	-4040.93	-16.93
Dead+Wind 120 deg - No Ice	36.08	34.70	19.94	2129.74	-3717.73	-3.77
Dead+Wind 150 deg - No Ice	36.08	18.66	32.42	3471.99	-1985.21	10.61
Dead+Wind 180 deg - No Ice	36.08	-0.28	36.95	3988.67	64.89	22.09
Dead+Wind 210 deg - No Ice	36.08	-19.33	33.18	3622.05	2138.50	28.22
Dead+Wind 240 deg - No Ice	36.08	-35.26	20.58	2255.22	3849.76	26.59
Dead+Wind 270 deg - No Ice	36.08	-37.45	0.18	29.94	4032.19	13.88
Dead+Wind 300 deg - No Ice	36.08	-31.63	-18.41	-1990.36	3399.06	0.16
Dead+Wind 330 deg - No Ice	36.08	-18.87	-32.78	-3553.39	2050.32	-12.59
Dead+Ice+Temp	51.98	0.00	0.00	-9.80	27.96	-0.00
Dead+Wind 0 deg+Ice+Temp	51.98	-0.18	-51.74	-5504.41	64.50	-34.76
Dead+Wind 30 deg+Ice+Temp	51.98	23.89	-41.57	-4432.80	-2503.81	-44.95
Dead+Wind 60 deg+Ice+Temp	51.98	40.52	-23.34	-2492.80	-4289.93	-44.10
Dead+Wind 90 deg+Ice+Temp	51.98	47.77	0.03	-5.59	-5036.19	-32.93
Dead+Wind 120 deg+Ice+Temp	51.98	44.34	25.51	2664.58	-4638.52	-14.20
Dead+Wind 150 deg+Ice+Temp	51.98	23.74	41.22	4341.86	-2473.61	9.17
Dead+Wind 180 deg+Ice+Temp	51.98	-0.28	46.79	4971.47	83.27	29.30
Dead+Wind 210 deg+Ice+Temp	51.98	-24.42	42.00	4494.99	2664.14	42.79
Dead+Wind 240 deg+Ice+Temp	51.98	-44.91	26.16	2792.64	4807.34	45.68
Dead+Wind 270 deg+Ice+Temp	51.98	-47.61	0.18	24.29	5061.32	29.82
Dead+Wind 300 deg+Ice+Temp	51.98	-40.14	-23.33	-2491.10	4271.46	10.03
Dead+Wind 330 deg+Ice+Temp	51.98	-23.96	-41.59	-4437.39	2574.10	-11.19
Dead+Wind 0 deg - Service	36.08	-0.18	-40.60	-4412.84	46.49	-26.04
Dead+Wind 30 deg - Service	36.08	18.81	-32.76	-3548.88	-2014.84	-30.33
Dead+Wind 60 deg - Service	36.08	31.99	-18.42	-1992.08	-3450.53	-26.92
Dead+Wind 90 deg - Service	36.08	37.60	0.03	0.64	-4040.93	-16.93
Dead+Wind 120 deg - Service	36.08	34.70	19.94	2129.74	-3717.73	-3.77
Dead+Wind 150 deg - Service	36.08	18.66	32.42	3471.99	-1985.21	10.61
Dead+Wind 180 deg - Service	36.08	-0.28	36.95	3988.67	64.89	22.09
Dead+Wind 210 deg - Service	36.08	-19.33	33.18	3622.05	2138.50	28.22
Dead+Wind 240 deg - Service	36.08	-35.26	20.58	2255.22	3849.76	26.59
Dead+Wind 270 deg - Service	36.08	-37.45	0.18	29.94	4032.19	13.88
Dead+Wind 300 deg - Service	36.08	-31.63	-18.41	-1990.36	3399.06	0.16
Dead+Wind 330 deg - Service	36.08	-18.87	-32.78	-3553.39	2050.32	-12.59

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-36.08	0.00	0.00	36.08	0.00	0.000%
2	-0.18	-36.08	-40.60	0.18	36.08	40.60	0.000%
3	18.81	-36.08	-32.76	-18.81	36.08	32.76	0.000%
4	31.99	-36.08	-18.42	-31.99	36.08	18.42	0.000%
5	37.60	-36.08	0.03	-37.60	36.08	-0.03	0.000%
6	34.70	-36.08	19.94	-34.70	36.08	-19.94	0.000%
7	18.66	-36.08	32.42	-18.66	36.08	-32.42	0.000%
8	-0.28	-36.08	36.95	0.28	36.08	-36.95	0.000%
9	-19.33	-36.08	33.18	19.33	36.08	-33.18	0.000%
10	-35.26	-36.08	20.58	35.26	36.08	-20.58	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	-37.45	-36.08	0.18	37.45	36.08	-0.18	0.000%
12	-31.63	-36.08	-18.41	31.63	36.08	18.41	0.000%
13	-18.87	-36.08	-32.78	18.87	36.08	32.78	0.000%
14	0.00	-51.98	0.00	0.00	51.98	0.00	0.000%
15	-0.18	-51.98	-51.74	0.18	51.98	51.74	0.000%
16	23.89	-51.98	-41.57	-23.89	51.98	41.57	0.000%
17	40.52	-51.98	-23.34	-40.52	51.98	23.34	0.000%
18	47.77	-51.98	0.03	-47.77	51.98	-0.03	0.000%
19	44.34	-51.98	25.51	-44.34	51.98	-25.51	0.000%
20	23.74	-51.98	41.22	-23.74	51.98	-41.22	0.000%
21	-0.28	-51.98	46.79	0.28	51.98	-46.79	0.000%
22	-24.42	-51.98	42.00	24.42	51.98	-42.00	0.000%
23	-44.91	-51.98	26.16	44.91	51.98	-26.16	0.000%
24	-47.61	-51.98	0.18	47.61	51.98	-0.18	0.000%
25	-40.14	-51.98	-23.33	40.14	51.98	23.33	0.000%
26	-23.96	-51.98	-41.59	23.96	51.98	41.59	0.000%
27	-0.18	-36.08	-40.60	0.18	36.08	40.60	0.000%
28	18.81	-36.08	-32.76	-18.81	36.08	32.76	0.000%
29	31.99	-36.08	-18.42	-31.99	36.08	18.42	0.000%
30	37.60	-36.08	0.03	-37.60	36.08	-0.03	0.000%
31	34.70	-36.08	19.94	-34.70	36.08	-19.94	0.000%
32	18.66	-36.08	32.42	-18.66	36.08	-32.42	0.000%
33	-0.28	-36.08	36.95	0.28	36.08	-36.95	0.000%
34	-19.33	-36.08	33.18	19.33	36.08	-33.18	0.000%
35	-35.26	-36.08	20.58	35.26	36.08	-20.58	0.000%
36	-37.45	-36.08	0.18	37.45	36.08	-0.18	0.000%
37	-31.63	-36.08	-18.41	31.63	36.08	18.41	0.000%
38	-18.87	-36.08	-32.78	18.87	36.08	32.78	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000135
4	Yes	4	0.00000001	0.00000179
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000174
9	Yes	4	0.00000001	0.00000150
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000169
13	Yes	4	0.00000001	0.00000137
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000184
16	Yes	4	0.00000001	0.00000260
17	Yes	4	0.00000001	0.00000347
18	Yes	4	0.00000001	0.00000253
19	Yes	4	0.00000001	0.00000163
20	Yes	4	0.00000001	0.00000239
21	Yes	4	0.00000001	0.00000336
22	Yes	4	0.00000001	0.00000280
23	Yes	4	0.00000001	0.00000193

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	Client: Sprint	Designed by: TJL

24	Yes	4	0.00000001	0.00000247
25	Yes	4	0.00000001	0.00000332
26	Yes	4	0.00000001	0.00000263
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000135
29	Yes	4	0.00000001	0.00000179
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000174
34	Yes	4	0.00000001	0.00000150
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000169
38	Yes	4	0.00000001	0.00000137

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
T1	201 - 181	11.375	35	0.4955	0.0470
T2	181 - 161	9.276	35	0.4834	0.0454
T3	161 - 141	7.289	35	0.4399	0.0390
T4	141 - 121	5.528	35	0.3715	0.0316
T5	121 - 101	4.028	35	0.3185	0.0266
T6	101 - 81	2.753	35	0.2630	0.0233
T7	81 - 61	1.728	35	0.1961	0.0195
T8	61 - 41	0.951	35	0.1431	0.0158
T9	41 - 21	0.413	35	0.0851	0.0124
T10	21 - 1	0.115	35	0.0434	0.0058

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
204.00	Top Beacon	35	11.375	0.4955	0.0470	180926
202.00	Top Beacon	35	11.375	0.4955	0.0470	180926
201.00	Lightning Rod	35	11.375	0.4955	0.0470	180926
200.00	3' Side arm	35	11.269	0.4953	0.0468	180926
199.00	8 FT DISH	35	11.163	0.4950	0.0466	180926
198.00	8 FT DISH	35	11.058	0.4947	0.0464	180926
192.00	8 FT DISH	35	10.424	0.4924	0.0464	100515
125.00	(2) DB980H90E-M	35	4.309	0.3283	0.0274	22057
97.00	Beacon	35	2.528	0.2497	0.0226	18577
84.00	DB212-1	35	1.865	0.2054	0.0201	19012
57.00	3' Side arm	35	0.825	0.1316	0.0152	20359

Maximum Tower Deflections - Design Wind

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	Client: Sprint	Designed by: TJL

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	201 - 181	13.819	23	0.5942	0.0700
T2	181 - 161	11.306	23	0.5803	0.0679
T3	161 - 141	8.917	23	0.5305	0.0594
T4	141 - 121	6.787	23	0.4508	0.0493
T5	121 - 101	4.965	23	0.3880	0.0410
T6	101 - 81	3.408	23	0.3219	0.0355
T7	81 - 61	2.148	23	0.2412	0.0297
T8	61 - 41	1.189	23	0.1766	0.0239
T9	41 - 21	0.522	23	0.1053	0.0186
T10	21 - 1	0.149	19	0.0538	0.0086

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
204.00	Top Beacon	23	13.819	0.5942	0.0700	163219
202.00	Top Beacon	23	13.819	0.5942	0.0700	163219
201.00	Lightning Rod	23	13.819	0.5942	0.0700	163219
200.00	3' Side arm	23	13.693	0.5939	0.0700	163219
199.00	8 FT DISH	23	13.566	0.5935	0.0700	163219
198.00	8 FT DISH	23	13.439	0.5932	0.0700	163219
192.00	8 FT DISH	23	12.681	0.5905	0.0697	90677
125.00	(2) DB980H90E-M	23	5.307	0.3997	0.0424	18642
97.00	Beacon	23	3.132	0.3059	0.0344	15590
84.00	DB212-1	23	2.318	0.2525	0.0306	15795
57.00	3' Side arm	23	1.033	0.1625	0.0229	16585

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load/Allowable	Allowable Ratio	Criteria
T1	201	Leg	A325N	0.6250	4	1.96	13.50	0.145 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	2.84	5.89	0.483 ✓	1.333	Bolt Shear
T2	181	Leg	A325N	0.7500	4	5.30	19.44	0.273 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	3.50	5.89	0.595 ✓	1.333	Bolt Shear
T3	161	Leg	A325N	0.8750	4	8.97	26.46	0.339 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4.32	4.12	1.047 ✓	1.333	Bolt Shear
T4	141	Leg	A325N	0.8750	4	12.55	26.45	0.474 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	6.10	6.44	0.946 ✓	1.333	Bolt Shear
T5	121	Leg	A325N	1.0000	4	17.45	34.56	0.505 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	7.71	9.20	0.838 ✓	1.333	Bolt Shear
T6	101	Leg	A325N	1.0000	4	22.52	34.56	0.652 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	8.79	9.20	0.955 ✓	1.333	Bolt Shear

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 30 of 37
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	Client: Sprint	Designed by: TJL

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Secondary Horizontal	A325X	0.7500	2	1.01	13.25	0.076 ✓	1.333	Bolt Shear
T7	81	Leg	A325N	1.0000	4	28.07	34.56	0.812 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	10.01	9.28	1.079 ✓	1.333	Bolt Shear
T8	61	Leg	A325N	1.0000	6	22.10	34.56	0.639 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	10.68	13.25	0.806 ✓	1.333	Bolt Shear
		Secondary Horizontal	A325X	0.7500	2	1.51	13.25	0.114 ✓	1.333	Bolt Shear
T9	41	Leg	A325N	1.0000	6	22.72	34.56	0.657 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	5.67	9.28	0.611 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	4.65	9.28	0.502 ✓	1.333	Bolt Shear
T10	21	Leg	A354-BC	1.0000	6	25.80	32.40	0.796 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	5.59	9.28	0.602 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.7500	2	4.88	9.28	0.526 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P/P_a
T1	201 - 181	ROHN 2.5 EH	20.03	6.68	86.7 K=1.00	17.635	2.2535	-10.93	39.74	0.275 ✓
T2	181 - 161	ROHN 2.5 EH	20.03	6.68	86.7 K=1.00	17.634	2.2535	-27.16	39.74	0.684 ✓
T3	161 - 141	ROHN 3 STD	20.04	6.68	68.9 K=1.00	21.145	2.2285	-45.10	47.12	0.957 ✓
T4	141 - 121	ROHN 3.5 EH	20.03	10.02	92.0 K=1.00	16.505	3.6784	-63.95	60.71	1.053 ✓
T5	121 - 101	ROHN 4 EH	20.03	10.02	81.4 K=1.00	18.731	4.4074	-89.71	82.56	1.087 ✓
T6	101 - 81	ROHN 5 STD	20.04	5.14	32.9 K=1.00	26.790	4.2999	-116.71	115.19	1.013 ✓
T7	81 - 61	ROHN 5 EH	20.03	10.02	65.4 K=1.00	21.782	6.1120	-145.52	133.13	1.093 ✓
T8	61 - 41	ROHN 5 EH	20.04	5.13	33.5 K=1.00	26.711	6.1120	-174.61	163.26	1.070 ✓
T9	41 - 21	ROHN 6 EH	20.05	10.03	54.8 K=1.00	23.583	8.4049	-182.68	198.21	0.922 ✓
T10	21 - 1	ROHN 6 EH	20.05	10.03	54.8 K=1.00	23.583	8.4049	-208.27	198.21	1.051 ✓

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 31 of 37
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	Client: Sprint	Designed by: TJL

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	201 - 181	L1 3/4x1 3/4x1/4	12.21	6.05	212.5 K=1.00	3.306	0.8125	-2.84	2.69	1.059 ✓
		KL/R > 200 (C) - 12								
T2	181 - 161	L2x2x5/16	13.96	6.92	213.0 K=1.00	3.293	1.1500	-3.50	3.79	0.925 ✓
		KL/R > 200 (C) - 33								
T3	161 - 141	L2 1/2x2 1/2x1/4	15.79	7.81	190.9 K=1.00	4.098	1.1900	-4.32	4.88	0.886 ✓
T4	141 - 121	L3x3x1/4	19.03	9.48	192.2 K=1.00	4.040	1.4400	-6.10	5.82	1.048 ✓
T5	121 - 101	L3x3x3/8	20.77	10.32	211.0 K=1.00	3.355	2.1100	-7.71	7.08	1.089 ✓
		KL/R > 200 (C) - 90								
T6	101 - 81	L3 1/2x3 1/2x5/16	22.60	11.19	194.7 K=1.00	3.940	2.0900	-8.79	8.24	1.067 ✓
T7	81 - 61	L4x4x5/16	24.42	12.09	183.3 K=1.00	4.442	2.4000	-10.01	10.66	0.939 ✓
T8	61 - 41	L4x4x3/8	26.44	13.13	199.9 K=1.00	3.735	2.8600	-10.68	10.68	0.999 ✓
T9	41 - 21	ROHN 3 STD	24.29	12.15	62.6 K=0.50	22.263	2.2285	-17.01	49.61	0.343 ✓
T10	21 - 1	ROHN 3 STD	25.02	12.51	64.5 K=0.50	21.932	2.2285	-16.76	48.88	0.343 ✓

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T6	101 - 81	L3 1/2x3 1/2x5/16	20.25	19.30	262.1 K=0.78	2.174	2.0900	-2.02	4.54	0.446 ✓
		KL/R > 250 (C) - 106								
T8	61 - 41	L4x4x3/8	24.46	23.52	276.9 K=0.77	1.948	2.8600	-3.03	5.57	0.544 ✓
		KL/R > 250 (C) - 142								

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	201 - 181	L2x2x1/8	8.56	8.32	200.7 K=0.80	3.709	0.4844	-0.10	1.80	0.057 ✓
		KL/R > 200 (C) - 5								

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 3 STD	25.04	12.29	126.7 K=1.00	9.298	2.2285	-9.21	20.72	0.444
T10	21 - 1	ROHN 3 STD	27.54	13.49	139.2 K=1.00	7.711	2.2285	-9.75	17.18	0.568

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 1.5 STD	6.26	5.98	115.3 K=1.00	11.226	0.7995	-3.17	8.97	0.353
T10	21 - 1	ROHN 1.5 STD	6.89	6.61	127.4 K=1.00	9.203	0.7995	-3.61	7.36	0.491

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 1.5 STD	11.48	11.01	212.3 K=1.00	3.315	0.7995	-2.91	2.65	1.097
T10	21 - 1	ROHN 2 STD	11.80	11.28	172.0 K=1.00	5.046	1.0745	-3.10	5.42	0.571

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 1.5 STD	6.26	6.26	120.7 K=1.00	10.258	0.7995	-0.05	8.20	0.006
T10	21 - 1	ROHN 1.5 STD	6.89	6.89	132.7 K=1.00	8.480	0.7995	-0.05	6.78	0.007

Redundant Hip Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 2.5 STD	15.03	15.03	190.4 K=1.00	4.120	1.7040	-0.07	7.02	0.010

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T10	21 - 1	ROHN 2.5 STD	15.85	15.85	200.8 K=1.00	3.704	1.7040	-0.07	6.31	0.010

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 3 STD	12.52	12.52	129.1 K=1.00	8.957	2.2285	-0.16	19.96	0.008
T10	21 - 1	ROHN 3 STD	13.77	13.77	142.0 K=1.00	7.405	2.2285	-0.17	16.50	0.010

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	201 - 181	ROHN 2.5 EH	20.03	6.68	86.7	30.000	2.2535	7.85	67.61	0.116
T2	181 - 161	ROHN 2.5 EH	20.03	6.68	86.7	30.000	2.2535	21.21	67.61	0.314
T3	161 - 141	ROHN 3 STD	20.04	6.68	68.9	30.000	2.2285	35.86	66.85	0.536
T4	141 - 121	ROHN 3.5 EH	20.03	10.02	92.0	30.000	3.6784	50.20	110.35	0.455
T5	121 - 101	ROHN 4 EH	20.03	10.02	81.4	30.000	4.4074	69.81	132.22	0.528
T6	101 - 81	ROHN 5 STD	20.04	5.14	32.9	30.000	4.2999	90.44	129.00	0.701
T7	81 - 61	ROHN 5 EH	20.03	10.02	65.4	30.000	6.1120	112.29	183.36	0.612
T8	61 - 41	ROHN 5 EH	20.04	5.13	33.5	30.000	6.1120	133.11	183.36	0.726
T9	41 - 21	ROHN 6 EH	20.05	10.03	54.8	30.000	8.4049	136.76	252.15	0.542
T10	21 - 1	ROHN 6 EH	20.05	10.03	54.8	30.000	8.4049	155.23	252.15	0.616

tnxTower	Job 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page 34 of 37
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project 250 Olcott Street, Manchester, CT	Date 09:16:03 07/02/13
	Client Sprint	Designed by TJL

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	201 - 181	L1 3/4x1 3/4x1/4	12.21	6.05	139.8	29.000	0.4922	2.83	14.27	0.198 ✓
T2	181 - 161	L2x2x5/16	13.96	6.92	140.5	29.000	0.7160	3.47	20.76	0.167 ✓
T3	161 - 141	L2 1/2x2 1/2x1/4	15.79	7.81	123.7	29.000	0.7753	4.27	22.48	0.190 ✓
T4	141 - 121	L3x3x1/4	19.03	9.48	124.1	29.000	0.9394	5.84	27.24	0.214 ✓
T5	121 - 101	L3x3x3/8	20.77	10.32	137.4	29.000	1.3716	7.62	39.78	0.192 ✓
T6	101 - 81	L3 1/2x3 1/2x5/16	22.60	11.19	125.9	29.000	1.3917	8.60	40.36	0.213 ✓
T7	81 - 61	L4x4x5/16	24.42	12.09	118.4	29.000	1.5949	9.80	46.25	0.212 ✓
T8	61 - 41	L4x4x3/8	26.44	13.13	129.5	29.000	1.8989	10.32	55.07	0.187 ✓
T9	41 - 21	ROHN 3 STD	24.29	12.15	125.3	30.000	2.2285	16.32	66.85	0.244 ✓
T10	21 - 1	ROHN 3 STD	25.02	12.51	129.0	30.000	2.2285	16.06	66.85	0.240 ✓

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T6	101 - 81	L3 1/2x3 1/2x5/16	20.25	19.30	219.8	32.500	1.3624	2.02	44.28	0.046 ✓
T8	61 - 41	L4x4x3/8	24.46	23.52	234.1	32.500	1.8989	3.03	61.71	0.049 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	201 - 181	L2x2x1/8	8.56	8.32	159.4	21.600	0.4844	0.06	10.46	0.006 ✓
T9	41 - 21	ROHN 3 STD	25.04	12.29	126.7	30.000	2.2285	9.31	66.85	0.139 ✓
T10	21 - 1	ROHN 3 STD	27.54	13.49	139.2	30.000	2.2285	9.58	66.85	0.143 ✓

tnxTower	Job: 13003.CO5 ~ 200-ft Rohn SSMW Tower	Page: 35 of 37
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 250 Olcott Street, Manchester, CT	Date: 09:16:03 07/02/13
	Client: Sprint	Designed by: TJL

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 1.5 STD	6.26	5.98	115.3	30.000	0.7995	3.17	23.98	0.132 ✓
T10	21 - 1	ROHN 1.5 STD	6.89	6.61	127.4	30.000	0.7995	3.61	23.98	0.151 ✓

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 1.5 STD	11.48	11.01	212.3	30.000	0.7995	2.91	23.98	0.121 ✓
T10	21 - 1	ROHN 2 STD	11.80	11.28	172.0	30.000	1.0745	3.10	32.24	0.096 ✓

Redundant Hip Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 2.5 STD	15.03	15.03	190.4	30.000	1.7040	0.09	51.12	0.002 ✓
T10	21 - 1	ROHN 2.5 STD	15.85	15.85	200.8	30.000	1.7040	0.09	51.12	0.002 ✓

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	41 - 21	ROHN 3 STD	12.52	12.52	129.1	30.000	2.2285	0.16	66.85	0.002 ✓
T10	21 - 1	ROHN 3 STD	13.77	13.77	142.0	30.000	2.2285	0.17	66.85	0.003 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	201 - 181	Leg	ROHN 2.5 EH	1	-10.93	52.98	20.6	Pass
T2	181 - 161	Leg	ROHN 2.5 EH	25	-27.16	52.97	51.3	Pass
T3	161 - 141	Leg	ROHN 3 STD	46	-45.10	62.81	71.8	Pass
T4	141 - 121	Leg	ROHN 3.5 EH	67	-63.95	80.93	79.0	Pass
T5	121 - 101	Leg	ROHN 4 EH	82	-89.71	110.05	81.5	Pass
T6	101 - 81	Leg	ROHN 5 STD	97	-116.71	153.55	76.0	Pass
T7	81 - 61	Leg	ROHN 5 EH	118	-145.52	177.46	82.0	Pass
T8	61 - 41	Leg	ROHN 5 EH	133	-174.61	217.62	80.2	Pass
T9	41 - 21	Leg	ROHN 6 EH	154	-182.68	264.22	69.1	Pass
T10	21 - 1	Leg	ROHN 6 EH	187	-208.27	264.22	78.8	Pass
T1	201 - 181	Diagonal	L1 3/4x1 3/4x1/4	12	-2.84	3.58	79.4	Pass
T2	181 - 161	Diagonal	L2x2x5/16	33	-3.50	5.05	69.4	Pass
T3	161 - 141	Diagonal	L2 1/2x2 1/2x1/4	54	-4.32	6.50	66.4 78.6 (b)	Pass
T4	141 - 121	Diagonal	L3x3x1/4	75	-6.10	7.76	78.6	Pass
T5	121 - 101	Diagonal	L3x3x3/8	90	-7.71	9.44	81.7	Pass
T6	101 - 81	Diagonal	L3 1/2x3 1/2x5/16	105	-8.79	10.98	80.1	Pass
T7	81 - 61	Diagonal	L4x4x5/16	126	-10.01	14.21	70.4 80.9 (b)	Pass
T8	61 - 41	Diagonal	L4x4x3/8	141	-10.68	14.24	75.0	Pass
T9	41 - 21	Diagonal	ROHN 3 STD	177	-17.01	66.13	25.7 45.8 (b)	Pass
T10	21 - 1	Diagonal	ROHN 3 STD	207	-16.76	65.15	25.7 45.2 (b)	Pass
T6	101 - 81	Secondary Horizontal	L3 1/2x3 1/2x5/16	106	-2.02	6.06	33.4	Pass
T8	61 - 41	Secondary Horizontal	L4x4x3/8	142	-3.03	7.43	40.8	Pass
T1	201 - 181	Top Girt	L2x2x1/8	5	-0.10	2.39	4.2	Pass
T9	41 - 21	Top Girt	ROHN 3 STD	159	-9.21	27.62	33.3 37.6 (b)	Pass
T10	21 - 1	Top Girt	ROHN 3 STD	192	-9.75	22.91	42.6	Pass
T9	41 - 21	Redund Horz 1 Bracing	ROHN 1.5 STD	161	-3.17	11.96	26.5	Pass
T10	21 - 1	Redund Horz 1 Bracing	ROHN 1.5 STD	194	-3.61	9.81	36.9	Pass
T9	41 - 21	Redund Diag 1 Bracing	ROHN 1.5 STD	179	-2.91	3.53	82.3	Pass
T10	21 - 1	Redund Diag 1 Bracing	ROHN 2 STD	212	-3.10	7.23	42.9	Pass
T9	41 - 21	Redund Hip 1 Bracing	ROHN 1.5 STD	180	-0.05	10.93	0.5	Pass
T10	21 - 1	Redund Hip 1 Bracing	ROHN 1.5 STD	213	-0.05	9.04	0.5	Pass
T9	41 - 21	Redund Hip Diagonal Bracing	ROHN 2.5 STD	183	-0.07	9.36	0.7	Pass
T10	21 - 1	Redund Hip Diagonal Bracing	ROHN 2.5 STD	216	-0.07	8.41	0.8	Pass
T9	41 - 21	Inner Bracing	ROHN 3 STD	185	-0.16	26.61	0.6	Pass
T10	21 - 1	Inner Bracing	ROHN 3 STD	218	-0.17	22.00	0.8	Pass
							Summary	
						Leg (T7)	82.0	Pass
						Diagonal (T5)	81.7	Pass
						Secondary Horizontal (T8)	40.8	Pass
						Top Girt (T10)	42.6	Pass
						Redund Horz 1 Bracing (T10)	36.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Redund Diag 1 Bracing (T9)	82.3	Pass
						Redund Hip 1 Bracing (T10)	0.5	Pass
						Redund Hip Diagonal Bracing (T10)	0.8	Pass
						Inner Bracing (T10)	0.8	Pass
						Bolt Checks	80.9	Pass
						RATING =	**82.3**	**Pass**

CENTEK engineering
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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	PAD AND PIER
Location:	200-ft ROHN Lattice Tower Manchester, CT
Rev. 1: 3/27/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 13003.CO5

Pad & Pier Foundation

Input Data:

Max. Loads at Tower Leg:

Uplift =	Uplift := 174·kips	(User Input from RISATower)
Compression =	Comp := 231·kips	(User Input from RISATower)
Max Shear =	Shear := 31·kips	(User Input from RISATower)

Pier and Pad Properties:

Pier Height =	$P_H := 10 \cdot ft$	(User Input)
Pier Projection Above Grade =	$P_P := 0.5 \cdot ft$	(User Input)
Pier Width =	$P_W := 3 \cdot ft$	(User Input)
Pad Thickness =	$PD_t := 2.5 \cdot ft$	(User Input)
Pad Width =	$PD_W := 10.5 \cdot ft$	(User Input)
Reinforcement Bar Diameter =	$d_{bar} := 0.75 \cdot in$	(User Input)
Number of Reinforcement Bars =	$N_{bar} := 11$	(User Input)
Reinforcement Bar Strength =	$f_y := 40 \cdot ksi$	(User Input)
Eccentricity of Anchor Bolts from CL of Pier =	$OS_{bolts} := 0 \cdot in$	(User Input)

Subgrade Properties:

Concrete Unit Weight =	$\gamma c := 150 \cdot pcf$	(User Input)
Water Unit Weight =	$\gamma w := 62.4 \cdot pcf$	(User Input)
Soil Unit Weight =	$\gamma s := 120 \cdot pcf$	(User Input)
Uplift Angle =	$\psi := 32 \cdot deg$	(User Input)
Soil Bearing Capacity =	$q_u := 6 \cdot ksf$	(User Input)
Distance to Water Table =	$D_{wt} := 20 \cdot ft$	(User Input)
Concrete Compressive Strength =	$f_c := 3 \cdot ksi$	(User Input)

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Subject:	PAD AND PIER
Location:	200-ft ROHN Lattice Tower Manchester, CT
Rev. 1: 3/27/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 13003.CO5

Calculated Data:

Active Pressure = $K_a := \frac{(1 - \sin(\psi))}{(1 + \sin(\psi))} = 0.307$

$P_a := \frac{1}{2} \cdot \left(P_H + PD_t\right)^2 \cdot P_w \cdot \gamma s \cdot K_a = 8.64 \cdot kips$

Passive Pressure = $K_p := \frac{(1 + \sin(\psi))}{(1 - \sin(\psi))} = 3.255$

$P_p := \frac{1}{2} \cdot \left(P_H + PD_t\right)^2 \cdot P_w \cdot \gamma s \cdot K_p = 91.54 \cdot kips$

Area of Reinforcement Bar = $A_{bar} := \frac{\pi \cdot d_{bar}^{2}}{4} = 0.442 \cdot in^2$

Area of Pier = $A_{pier} := P_w^{\,2} = 9ft^2$

Cross Sectional Area of Pad = $A_{pad} := PD_w^{\,2} = 110.25ft^2$

Section Modulus of Pad = $S_{pad} := \frac{PD_w \cdot PD_w^{\,2}}{6} = 192.9 \cdot ft^3$

Volume of Concrete = $V_{Conc} := P_H \cdot \left(A_{pier}\right) + A_{pad} \cdot PD_t = 365.6 \cdot ft^3$

$H_s := P_H - P_P = 9.5ft$

$B_1 := PD_w^{\,2} = 110.3ft^2$

$B_2 := \left(2 \cdot \tan(\psi) \cdot H_s + PD_w\right)^2 = 500.5ft^2$

Volume of Soil = $V_{Soil} := \left[\frac{\left(H_s\right)}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right] - \left(H_s \cdot A_{pier}\right) = 2592.5 \cdot ft^3$

Mass of Soil = $Mass_{Soil} := V_{Soil} \cdot \gamma s = 311.1 \cdot kips$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 54.8 \cdot kips$

Total Mass = $Mass_{Tot} := Mass_{Soil} + Mass_{Conc} = 365.95 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 2$

$$ActualFS := \frac{Mass_{Tot}}{Uplift} = 2.1$$

$$Uplift\_Check := if\left(\frac{Mass_{Tot}}{Uplift} \geq F_S, "OK", "Overstressed"\right)$$

$Uplift\_Check = "OK"$

Check Bearing:

$$Bearing := \frac{Comp + Mass_{Conc}}{A_{pad}} + \frac{Shear \cdot (P_H + PD_t)}{S_{pad}} = 4.6 \cdot ksf$$

$$Bearing\_Check := if(Bearing \leq q_u, "OK", "No Good")$$

$Bearing\_Check = "OK"$

Check Punching Shear:

$$p_u := \frac{(1.3 \cdot Comp + A_{pier} \cdot P_H \cdot \gamma c)}{A_{pad}} + 1.3 \cdot \frac{\left[Shear \cdot (P_H + PD_t) + Comp \cdot OS_{bolts} + (P_a - P_p) \cdot \frac{(P_H + PD_t)}{3}\right]}{S_{pad}} = 3.13 \cdot ksf$$

$$d := PD_t - (3 \cdot in + d_{bar}) = 2.188 ft$$

$$b_o := (P_w + d) \cdot 4 = 20.75 ft$$

$$Aout_{bo} := A_{pad} - (P_w + d)^2 = 83.34 ft^2$$

$$V_u := Aout_{bo} \cdot p_u = 260.853 \cdot kips$$

$$\phi V_c := 0.75 \cdot 4 \cdot \sqrt{\left(f_c \cdot \frac{lb}{in^2}\right)} \cdot b_o \cdot d = 1074 \cdot kips$$

$$Punching\_Shear\_Check := if(V_u \leq \phi V_c, "OK", "No Good")$$

$Punching\_Shear\_Check = "OK"$

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject:	PAD AND PIER
	Location:	200-ft ROHN Lattice Tower Manchester, CT
	Rev. 1: 3/27/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 13003.CO5

Check Beam Shear:

$$V_u := p_u \cdot PD_w \cdot \left[\frac{(PD_w - P_w)}{2} - d\right] = 51.4 \cdot kips$$

$$\phi V_c := 0.85 \cdot 2 \cdot \sqrt{\left(f_c \cdot \frac{lb}{in^2}\right)} \cdot PD_w \cdot d = 308 \cdot kips$$

Beam_Shear_Check := if($V_u \le \phi V_c$, "OK", "No Good")

Beam_Shear_Check = "OK"

Check Bending:

$$As_{provided} := N_{bar} \cdot A_{bar} = 4.86 \cdot in^2$$

$$M_{req} := \frac{p_u \cdot \frac{5}{6} \cdot PD_w \cdot \left(\frac{PD_w - P_w}{2}\right)^2}{2} = 192.568 \cdot kip \cdot ft$$

$$a := \frac{As_{provided} \cdot f_y}{0.85 \cdot f_c \cdot PD_w} = 0.605 \cdot in$$

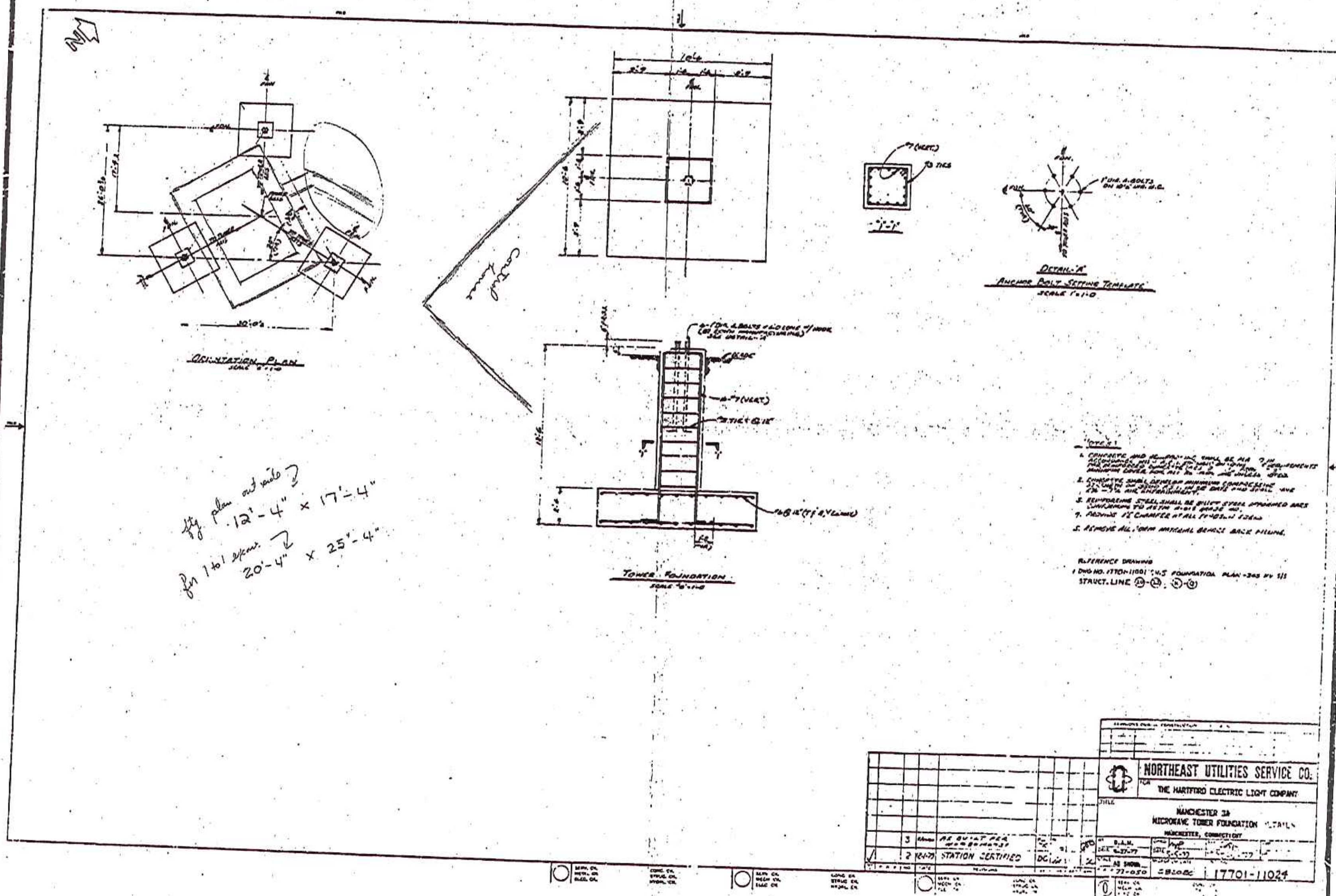
$$M_{Avail} := 0.9 \cdot As_{provided} \cdot f_y \cdot \left(d - \frac{a}{2}\right) = 378.287 \cdot kip \cdot ft$$

Bending_Check := if($M_{Avail} > M_{req}$, "OK", "No Good")

Bending_Check = "OK"

Site No: NY_CT03XC067

ROLL N 247



Site No: NV_CT03XC067

	Market	Northern Connecticut		
	Cascade ID	CT03XC067		
		SECTOR 1	SECTOR 2	SECTOR 3
	Split sector present	No	No	No
1900	1900MHz_Azimuth	340	120	240
1900	1900MHz_No_of_Antennas	1	1	1
1900	1900MHz_RADCenter(ft)	120	120	120
1900	1900MHz_Antenna Make	RFS	RFS	RFS
1900	1900MHz_Antenna Model	APXVSPP18-C-A20	APXV9ERR18-C-A20	APXVSPP18-C-A20
1900	1900MHz_Horizontal_Beamwidth	65	80	65
1900	1900MHz_Vertical_Beamwidth	5.5	5.5	5.5
1900	1900MHz_AntennaHeight (ft)	6	6	6
1900	1900MHz_AntennaGain(dBd)	15.9	14.9	15.9
1900	1900MHz_E_Tilt	0	0	-1
1900	1900MHz _M_Tilt	0	0	0
1900	1900MHz_Carrier_Forecast_Year_2013	4	4	4
1900	1900MHz_RRH Manufacturer	ALU	ALU	ALU
1900	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
1900	1900MHz_RRH Count	1	1	1
1900	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
1900	1900MHz Combiner Model	No Combiner Required	No Combiner Required	No Combiner Required
1900	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to	10	10	10
1900	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main	LCF12-50J	LCF12-50J	LCF12-50J
1900	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	N/A	N/A	N/A
1900	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A
800	800MHz_Azimuth	340	120	240
800	800MHz_No_of_Antennas	0	0	0
800	800MHz_RADCenter(ft)	120	120	120
800	800MHz_AntennaMake	RFS	RFS	RFS
800	800MHz_AntennaModel	APXVSPP18-C-A20 (Shared w/1900)	APXV9ERR18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)
800	800MHz_Horizontal_Beamwidth	65	80	65
800	800MHz_Vertical_Beamwidth	11.5	10.5	11.5
800	800MHz_AntennaHeight (ft)	6	6	6
800	800MHz_AntennaGain (dBd)	13.4	11.9	13.4
800	800MHz_E_Tilt	-3	0	-1
800	800MHz_M_Tilt	0	0	0
800	800MHz_RRH Manufacturer	ALU	ALU	ALU
800	800MHz_RRH Model	800 MHz RRH 2x50W	800 MHz RRH 2x50W	800 MHz RRH 2x50W
800	800MHz_RRH Count	1	1	1
800	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
800	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
800	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
800	800MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
800	800MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
800	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	N/A	N/A	N/A
800	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A
	Plumbing Scenario *	124	124	124
Comment	* If plumbing scenario does not match the material received, please contact your Construction Manager			
Comment	11/9/2012			

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

Sprint Existing Facility

Site ID: CT03XC067

NU Tower
250 South Olcott Street
Manchester, CT 06040

August 16, 2013

EBI Project Number: 62125654

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

EBI Consulting
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August 16, 2013

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

Re: Emissions Values for Site: **CT03XC067 – NU Tower**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 250 South Olcott 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 250 South Olcott 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 RFS APXVSPP18-C-A20 and the RFS APXV9ERR18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 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. The RFS APXV9ERR18-C-A20 has a 14.9 dBd gain value at its main lobe at 1900 MHz and 11.9 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 **125 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	CT03XC067 - NU Tower
Site Addresss	250 South Olcott Street, Manchester, CT, 06040
Site Type	Transmission Tower

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 (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	125	119	1/2 "	0.5	0	2773.8948	70.42098	7.04210%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	125	119	1/2 "	0.5	0	389.96892	9.900156	1.74606%
												Sector total Power Density Value:			8.788%		

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 (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	125	119	1/2 "	0.5	0	2773.8948	70.42098	7.04210%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	125	119	1/2 "	0.5	0	389.96892	9.900156	1.74606%
												Sector total Power Density Value:			8.788%		

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 (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXV9ERR18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	14.9	125	119	1/2 "	0.5	0	2203.383	55.93737	5.59374%
3a	RFS	APXV9ERR18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	11.9	125	119	1/2 "	0.5	0	276.07685	7.008774	1.23612%
												Sector total Power Density Value:			6.830%		

Site Composite MPE %

Carrier	MPE %
Sprint	24.406%
Unidentified Antennas	4.570%
Total Site MPE %	28.976%

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Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **24.406% (8.788% 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 **28.976%** 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 well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

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