10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

October 8, 2019

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
124 Quarry Road Trumbull, CT 06611
Latitude: 41.232475
Longitude: -73.185922
Sprint Site#: CT43XC811 – DO Macro

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 100-foot level of the existing 162-foot transmission tower at 124 Quarry Road Trumbull, CT. The 162-foot transmission tower is owned by The Connecticut Light & Power Company, d/b/a Eversource Energy and the property is owned by CMB Trumbull LLC c/o Deco LLC. Sprint now intends to replace three (3) of its existing antennas with three (3) new 800/1900/2500 MHz antennas. The new antennas will be installed at the same 100-foot level of the tower.

Planned Modifications:
Tower:

Remove
N/A

Remove and Replace:
(3) RFS APXVSPP18-C antennas (Remove) - CommScope DHHTT65B-3XR antennas (Replace) 800/1900/2500 MHz

Install New:
(3) RFS KIT-FD9R6004 / 1C-DL diplexers
(3) CCI DPO-7126Y-0-T1 diplexers

Existing to Remain:
(18) 1-5/8” coax cables

Ground:

Install New: (3) RFS KIT-FD9R6004 / 1C-DL diplexers, (3) CCI DPO-7126Y-0-T1 diplexers (3) 2500 MHz RRHs

This facility was approved by the CSC for Sprint use in Petition No. 516 dated July 11, 2001. This modification complies with this approval. Please see the enclosed.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman – Vicki A. Tesoro, Elected Official, and Douglas Wenz, Zoning Enforcement Officer for the Town of Trumbull, as well as the owners.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Jake Shappy
Transcend Wireless
Cell: 845-553-3330
Email: jshappy@transcendwireless.com

Attachments
cc: Vicki A. Tesoro – Town of Trumbull First Selectman
Douglas Wenz – Town of Trumbull Zoning Enforcement Officer
CMB Trumbull LLC c/o Deco LLC – property owner
The Connecticut Light & Power Company, d/b/a Eversource Energy – tower owner

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

September 10, 2019

Mr. Jake Shappy
Transcend Mobile
10 Industrial Ave, Suite 3
Mahwah, NJ 07430

RE: Sprint Antenna Site, CT-43XC811, Quarry Road, Trumbull, CT, structure 844

Dear Mr. Shappy:

Based on the structural report and construction drawings provided by Centek Engineering, as well as a review of the structural report by Paul J. Ford & Company, Eversource accepts the proposed modification of the subject site.

Please contact Christopher Gelinas of Eversource Real Estate at 860-665-2008 to complete the site lease amendment if needed. Please contact me at 860-728-4503 for other questions regarding this site.

Sincerely,

Joel Szarkowicz
Transmission Line Engineering

REF: 17159.16 - CT43XC811 Structural Analysis Rev1 19.02.18
17159.16 CT43XC811 Trumbull - CD REV 0 19.07.11 (S&S)

Petition No. 516
Sprint Spectrum. L.P.
Trumbull, Connecticut
Staff Report
July 11, 2001

On July 9, 2001, Connecticut Siting Council (Council) member Gerald Heffernan and Christina Lepage, Fred Cunliffe and Gwenn Gregory of the Council staff met with Sprint Spectrum L.P. (Sprint) representatives Julie Donaldson, Laura Thoman, Kim Filomia, and John Lusi off of Quarry Road, Trumbull, Connecticut for inspection of an electric transmission line structure. Sprint has an agreement with CL&P for installation of antennas for telecommunications use and an agreement with AT&T for installation of associated equipment within AT&T's leased area. Sprint is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

On June 6, 2001, the Council approved use of this structure by AT&T that would install six panel antennas on a pipe extension approximately 12-feet above the existing 150-foot transmission line monopole structure (#844). Three antennas will be mounted at a centerline height of 160-feet agl and three antennas will be mounted at a centerline height of 153-feet agl. AT&T's equipment will be placed in a 12-foot by 20-foot equipment shelter near the base of the existing monopole. An 8-foot high chain link fence will surround the compound. A gravel access driveway will be installed from Quarry Road for direct access to the equipment shelter. An underground conduit from an adjacent utility pole will provide power and telephone service to the site.

Sprint proposes to install three panel antennas on standoff arm supports at the 100-foot level of the structure. Equipment is proposed to be installed on a 10-foot by 20-foot pier-mounted platform on a slope adjacent to the structure. Sprint and AT&T discussed the possibility of reorienting the site compound to have all equipment on a level area, however AT&T has received a building permit and has an equipment building ready for installation. Sprint would use the proposed access road and on-site utility connections both to be installed by AT&T to the site.

While an opportunity to coordinate efforts appears to have passed no construction has commenced, and Council may consider having Sprint and AT&T coordinate construction of this site by having all equipment on a level area or in the alternative a single equipment building.

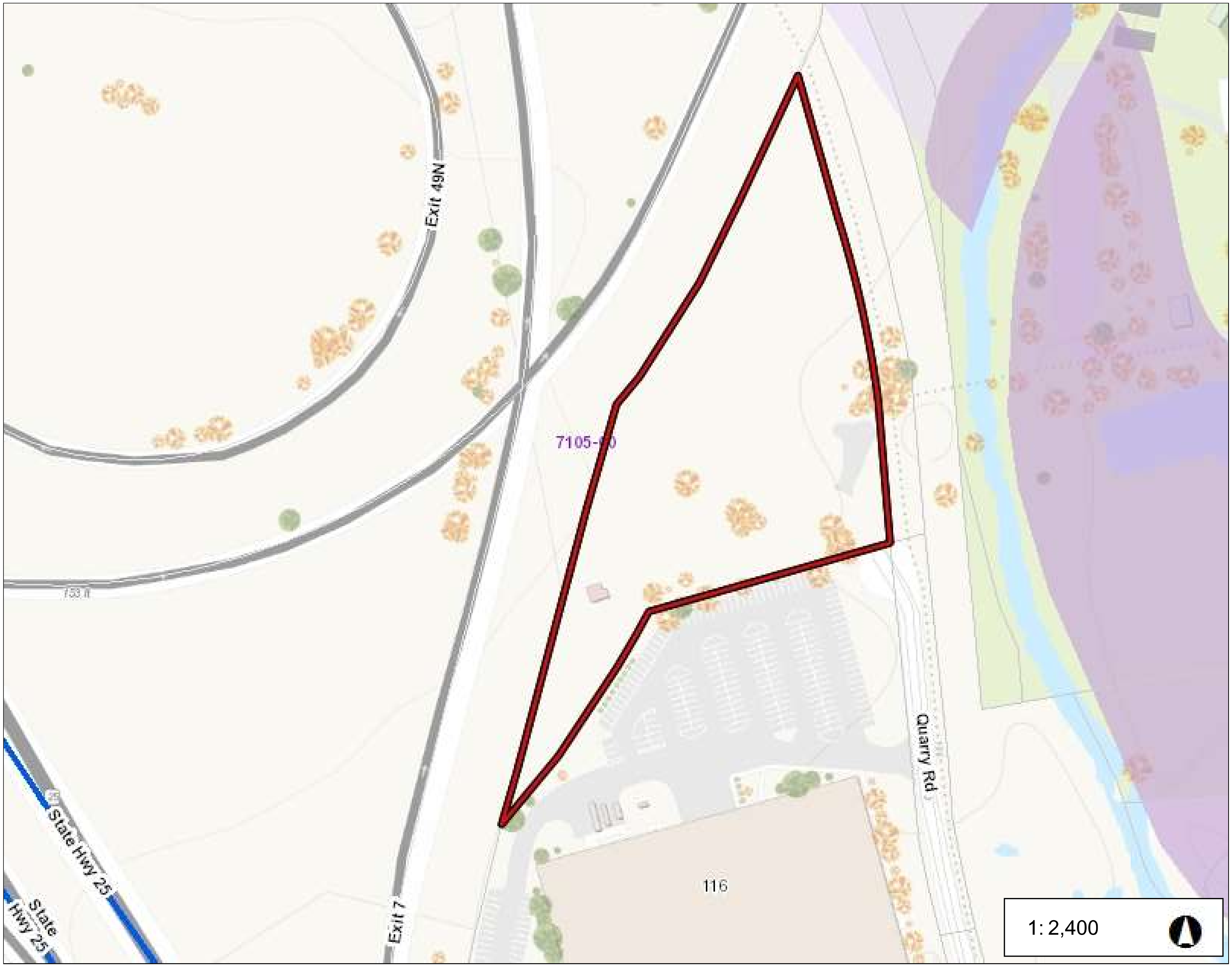
Surrounding land uses consist of transmission towers, a movie theater, a town park, undeveloped property and highways. There will be some clearing of vegetation for the proposed project.

The total worst-case power density for telecommunications operations at the site has been calculated to be 19.81% of the applicable standard for uncontrolled environments.

Sprint contends that the use of this monopole structure will not result in a substantial environmental effect. Sprint also states that they will not need to construct a telecommunications tower in this area.

Town of Trumbull

Map Title



Legend

Streetname

Roadways
- Local
- Collector
- Minor Collector
- Minor Arterial
- Major Collector
- PA Other
- PA Other Expwy
- PA Interstate

Inland Wetland Soils
- Poorly Drained and Very Poorly Dra
- Alluvial and Floodplain Soils

Local Basin Boundary
- Major
- Regional
- Subregional
- Local

Local Basin Area

Citations

400.0 0 200.00 400.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG Connecticut Metropolitan Council of Governments

ROCKY HILL ROAD

Location	ROCKY HILL ROAD	**Mblu**	H/10 / 00017/ 000/
Acct#		**Owner**	CMB TRUMBULL LLC
Assessment	$129,150	**Appraisal**	$184,500
PID	2546	**Building Count**	1
Fire District	T		

Current Value

Appraisal	
Valuation Year	**Total**
2015	$184,500

Assessment	
Valuation Year	**Total**
2015	$129,150

Owner of Record

Owner CMB TRUMBULL LLC
Co-Owner C/O DECO LLC
Address 25 NEW CANAAN AVE
NORWALK, CT 06851

Sale Price $305,532
Book & Page 1763/ 343
Sale Date 04/18/2018
Instrument 25

Ownership History

Ownership History				
Owner	**Sale Price**	**Book & Page**	**Instrument**	**Sale Date**
CMB TRUMBULL LLC	$305,532	1763/ 343	25	04/18/2018
CMB TRUMBULL LLC &	$916,596	1763/ 335	25	04/18/2018
DADDARIO F FRANCIS &	$0	661/ 562		06/24/1988

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0

Building Attributes	
Field	**Description**

Style	Vacant Land
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Floor Covering	
Alt. Floor Cover	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Total Kitchens	
Total Elec Meters	

Building Photo

H10-17 04/29/2015

(http://images.vgsi.com/photos2/TrumbullCTPhotos//\00\02\51/9

Building Layout

(http://images.vgsi.com/photos2/TrumbullCTPhotos//Sketches/25

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 390
Description Com Ld Dv
Zone IL2
Neighborhood 600
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 3.8
Frontage
Depth

Outbuildings

Outbuildings	Legend

No Data for Outbuildings

Valuation History

Appraisal	
Valuation Year	**Total**
2017	$184,500
2016	$184,500
2015	$184,500

Assessment	
Valuation Year	**Total**
2017	$129,150
2016	$129,150
2015	$129,150

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS 1 OF 1
DWT: 12,9,2

SHIP TO:
MELANIE A. BACHMAN
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE
NEW BRITAIN CT 06051-2655

CT 067 9-06

UPS GROUND
TRACKING #: 1Z V25 742 03 9135 1372

BILLING: P/P

Reference#1: CT43XC811

UIS 21.5.42. WNTNV50 15.0A 07/2019

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115 FRANKLIN TPKE
MAHWAH ,NJ 07430

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THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS 1 OF 1

DWT: 14,9,1

SHIP TO:
CHRIS GELINAS
860-665-2008
EVERSOURCE ENERGY
107 SELDEN ST.
BERLIN CT 06037-1616

CT 061 9-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9080 1360

BILLING: P/P

Reference#1: CT43XC811

UIS 21.5.42. WNTNV50 15.0A 07/2019

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RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS DWT: 14,9,1 1 OF 1

SHIP TO:
VICKI A. TESORO
TOWN OF TRUMBULL
5866 MAIN STREET
2ND FLOOR
TOWN HALL
TRUMBULL CT 06611-3113

CT 066 9-07

UPS GROUND
TRACKING #: 1Z V25 742 03 9317 5336

BILLING: P/P

Reference#1: CT43XC811

UIS 21.5.42. WNTNV50 15.0A 07/2019

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
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MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

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THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS 1 OF 1
DWT: 14,9,1

SHIP TO:
DOUGLAS WENZ
TOWN OF TRUMBULL
5866 MAIN STREET
2ND FLOOR
TOWN HALL
TRUMBULL CT 06611-3113

CT 066 9-07

UPS GROUND
TRACKING #: 1Z V25 742 03 9331 3347

BILLING: P/P

UIS 21.5.42. WNTNV50 15.0A 07/2019

EBI Consulting

environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT43XC811

Eversource Struct.: 844
124 Quarry Road
Trumbull, Connecticut 06611

August 7, 2019

EBI Project Number: 6219003707

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**6.92%**

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

EBI Consulting

environmental | engineering | due diligence

August 7, 2019

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

Emissions Analysis for Site: CT43XC811 - Eversource Struct.: 844

EBI Consulting was directed to analyze the proposed Sprint facility located at **124 Quarry Road** in **Trumbull, Connecticut** for the purpose of determining whether the emissions from the Proposed Sprint Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Sprint Wireless antenna facility located at 124 Quarry Road in Trumbull, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Sprint is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 CDMA channels (800 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.

2) 4 PCS channels (1900 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 8 BRS channels (2500 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antennas used in this modeling are the Commscope DHHTT65B-3XR for the 800 MHz / 1900 MHz / 2500 MHz channel(s) in Sector A, the Commscope DHHTT65B-3XR for the 800 MHz / 1900 MHz / 2500 MHz channel(s) in Sector B, the Commscope DHHTT65B-3XR for the 800 MHz / 1900 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline of the proposed antennas is 100 feet above ground level (AGL).

8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Sprint Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR
Frequency Bands:	800 MHz / 1900 MHz / 2500 MHz	Frequency Bands:	800 MHz / 1900 MHz / 2500 MHz	Frequency Bands:	800 MHz / 1900 MHz / 2500 MHz
Gain:	13.35 dBd / 15.25 dBd / 15.05 dBd	Gain:	13.35 dBd / 15.25 dBd / 15.05 dBd	Gain:	13.35 dBd / 15.25 dBd / 15.05 dBd
Height (AGL):	100 feet	Height (AGL):	100 feet	Height (AGL):	100 feet
Channel Count:	14	Channel Count:	14	Channel Count:	14
Total TX Power (W):	420 Watts	Total TX Power (W):	420 Watts	Total TX Power (W):	420 Watts
ERP (W):	12,640.40	ERP (W):	12,640.40	ERP (W):	12,640.40
Antenna A1 MPE %:	**5.23%**	Antenna B1 MPE %:	**5.23%**	Antenna C1 MPE %:	**5.23%**

Site Composite MPE %	
Carrier	**MPE %**
Sprint (Max at Sector A):	5.23%
AT&T	1.69%
Site Total MPE % :	6.92%

Sprint MPE % Per Sector	
Sprint Sector A Total:	5.23%
Sprint Sector B Total:	5.23%
Sprint Sector C Total:	5.23%
Site Total MPE % :	6.92%

Sprint Maximum MPE Power Values (Sector A)

Sprint Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (µW/cm²)	Frequency (MHz)	Allowable MPE (µW/cm²)	Calculated % MPE
Sprint 800 MHz CDMA	2	1081.36	100.0	7.78	800 MHz CDMA	533	1.46%
Sprint 1900 MHz PCS	4	1339.86	100.0	19.27	1900 MHz PCS	1000	1.93%
Sprint 2500 MHz BRS	8	639.78	100.0	18.40	2500 MHz BRS	1000	1.84%
						Total:	**5.23%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

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

The anticipated maximum composite contributions from the Sprint facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

Sprint Sector	Power Density Value (%)
Sector A:	5.23%
Sector B:	5.23%
Sector C:	5.23%
Sprint Maximum MPE % (Sector A):	5.23%
Site Total:	6.92%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.92%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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.

WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 844

SITE ID: CT43XC811

124 QUARRY ROAD

TRUMBULL, CT 06611

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2018 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 5 WAYSIDE ROAD
BURLINGTON, MA 01803

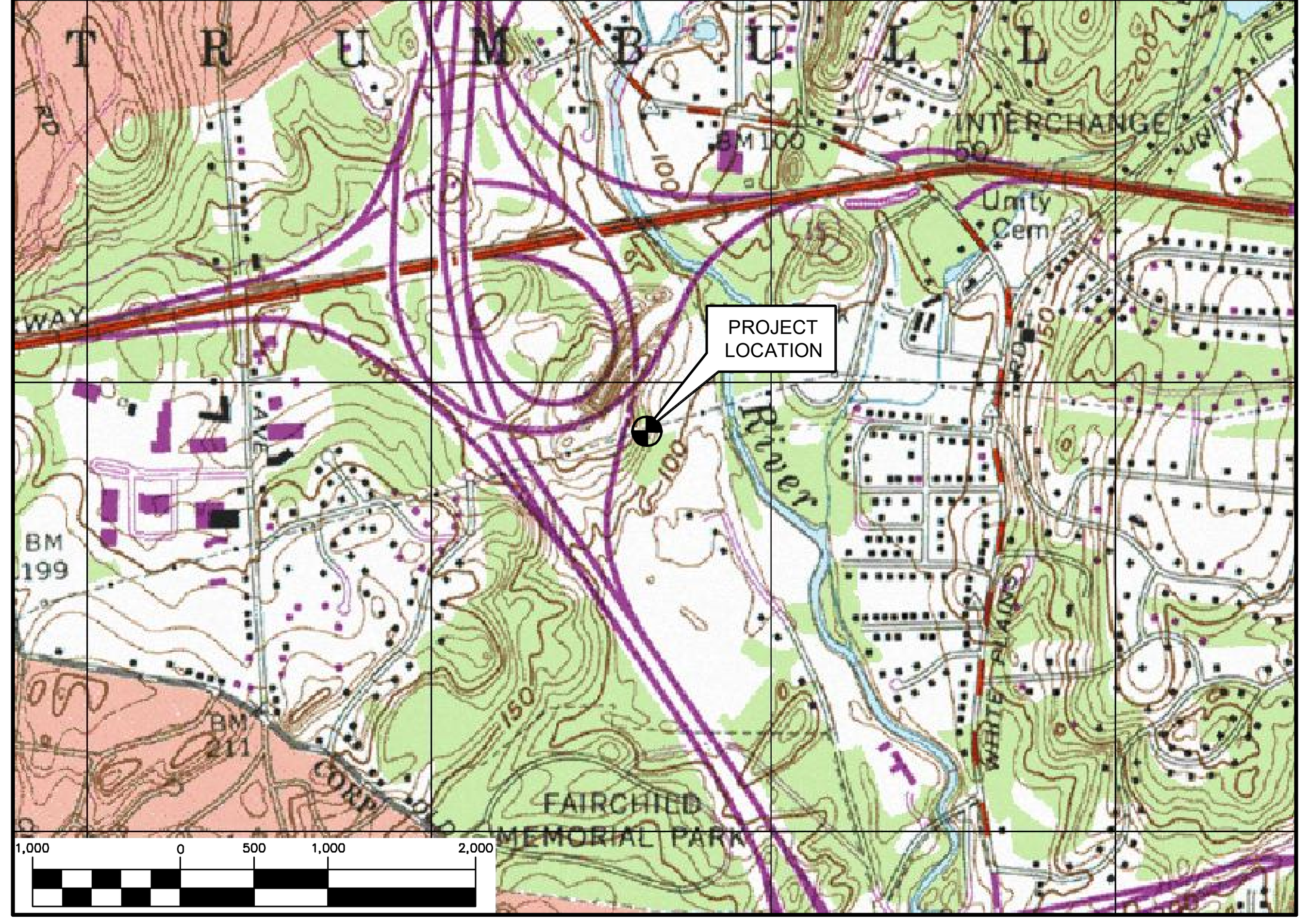
TO: 124 QUARRY RD
TRUMBULL, CT 06611

1.	START OUT BY GOING TO WAYSIDE ROAD.	0.12 MI.
2.	TURN LEFT ONTO CAMBRIDGE ST/US-3 N/MA	0.12 MI.
3.	MERGE ONTO I-95 S/MA-128 S/YANKEE DIVISION HWY S TOWARD WALTHAM/LOWELL	0.27 MI.
4.	TAKE THE I-90/MASS PIKE EXIT, EXIT 25, TOWARD BOSTON/ALBANY NY.	12.32 MI.
5.	MERGE ONTO I-90 W/MASSACHUSETTS TPKE W TOWARD WORCESTER (PORTIONS TOLL).	44.45 MI.
6.	MERGE ONTO I-84 W/WILBUR CROSS HWY S VIA EXIT 9 TOWARD US-20(PORTIONS TOLL).	40.90 MI.
7.	TAKE EXIT 57 FOR CT-15 S TOWARD I-91 S/CHARTER OAK BRIDGE/NYC.	0.60 MI.
8.	CONTINUE ON CT-15 S/US-5 S.	1.30 MI.
9.	TAKE EXIT 86 TO MERGE ONTO I-91 S TOWARD NEW HAVEN/NYC.	17.10 MI.
10.	TAKE EXIT 17 TO MERGE ONTO CT-15 S/WILBUR CROSS PKWY.	30.20 MI.
11.	TAKE EXIT 52 FOR STATE ROUTE 108 S/STATE ROUTE 8 S TOWARD BRIGDEPORT.	0.60 MI.
12.	KEEP LEFT, FOLLOW SIGNS FOR CT-8 S/BRIDGEPORT AND MERGE ONTO CT-8 S.	1.20 MI.
13.	TAKE EXIT 7 FOR CT-127/WHITE PLAINS RD.	0.30 MI.
14.	TURN LEFT AT QUARRY RD.	0.80 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. REMOVE (3) EXISTING PANEL ANTENNAS, (1) PER SECTOR.

   B. INSTALL (3) PROPOSED 10-PORT PANEL ANTENNAS, (1) PER SECTOR.

   C. INSTALL (6) PROPOSED DIPLEXERS ON TOWER.

   D. INSTALL 10' LONG HORIZONTAL PIPE 2' ABOVE EXISTING PIPE FOR ADDTIONAL ANTENNA MAST SUPPORT.

PROJECT INFORMATION

SITE NAME:	EVERSOURCE STRUCT.: 844
SITE ID:	CT43XC811
SITE ADDRESS:	124 QUARRY ROAD TRUMBULL, CT 06611
APPLICANT:	SPRINT 5 WAYSIDE ROAD BURLINGTON, MA 01803
CONTACT PERSON:	DOUG TALMADGE (PROJECT MANAGER) (475) 434-4292
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41° 13' 56.91"N LONGITUDE: 73° 11' 09.32"W GROUND ELEVATION: ±120' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/11/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 844

SITE ID: CT43XC811

124 QUARRY ROAD
TRUMBULL, CT 06611

DATE:	03/01/19
SCALE:	AS NOTED
JOB NO.	17159.16

TITLE SHEET

T-1

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

   ANTENNA MAST

   - WIND LOAD: PER ANSI/TIA 222 G (ANTENNA MOUNTS): 97 MPH

   TRANSMISSION TOWER – WIRE LOADS

   - WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250B – 4PSF
   - WIND LOAD: PER HISTORIC 1977 NESC 250C

   TRANSMISSION TOWER – TOWER AND TELECOMMUNICATIONS EQUIPMENT

   - WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250B – 4PSF
   - WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250C – 110MPH
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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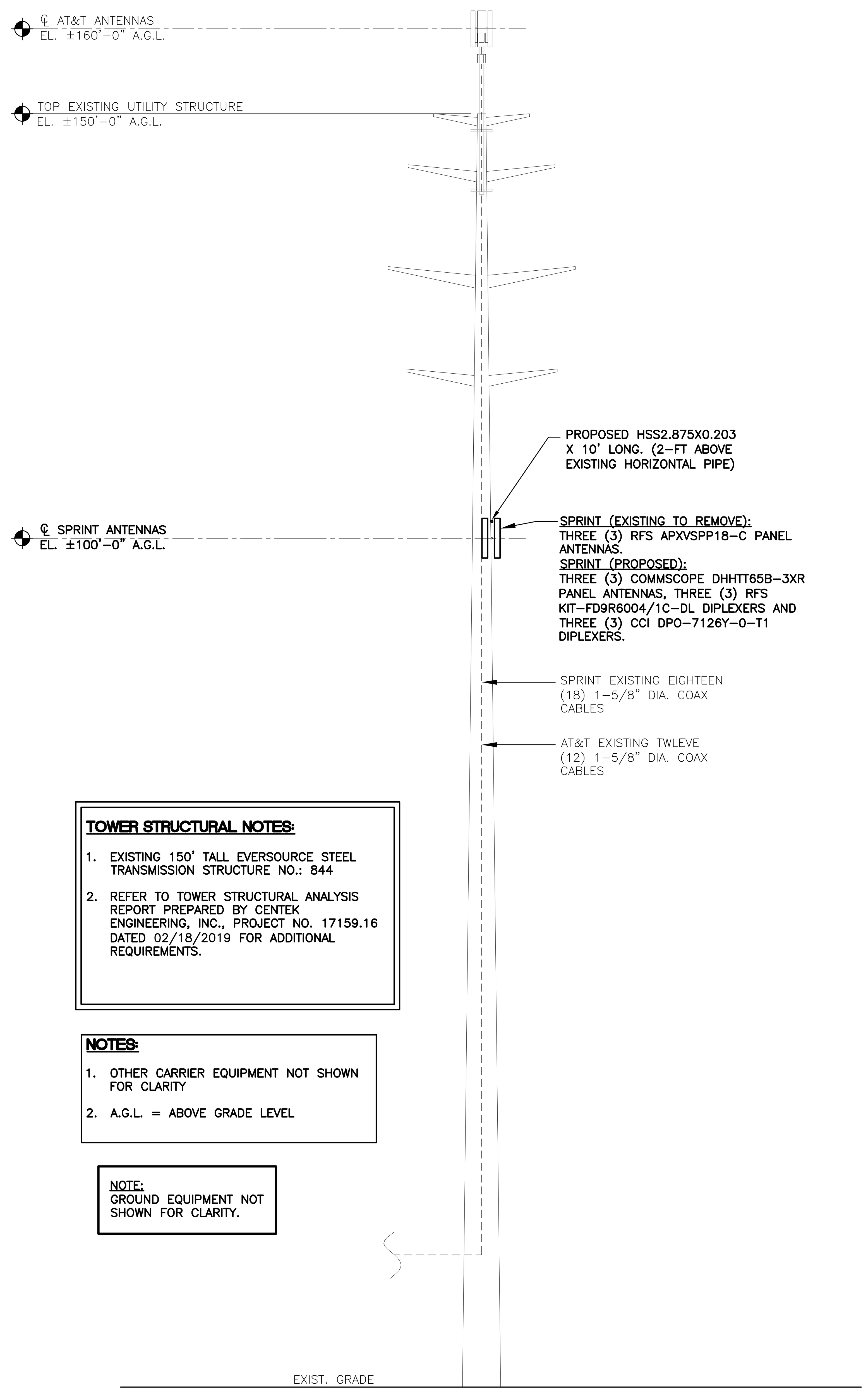
EVERSOURCE STRUCT: 844
SITE ID: CT43XC811
124 QUARRY ROAD
TRUMBULL, CT 06611

DATE: 03/01/19
SCALE: AS NOTED
JOB NO. 17159.16

DESIGN BASIS AND SITE NOTES

N-1



TOWER STRUCTURAL NOTES:

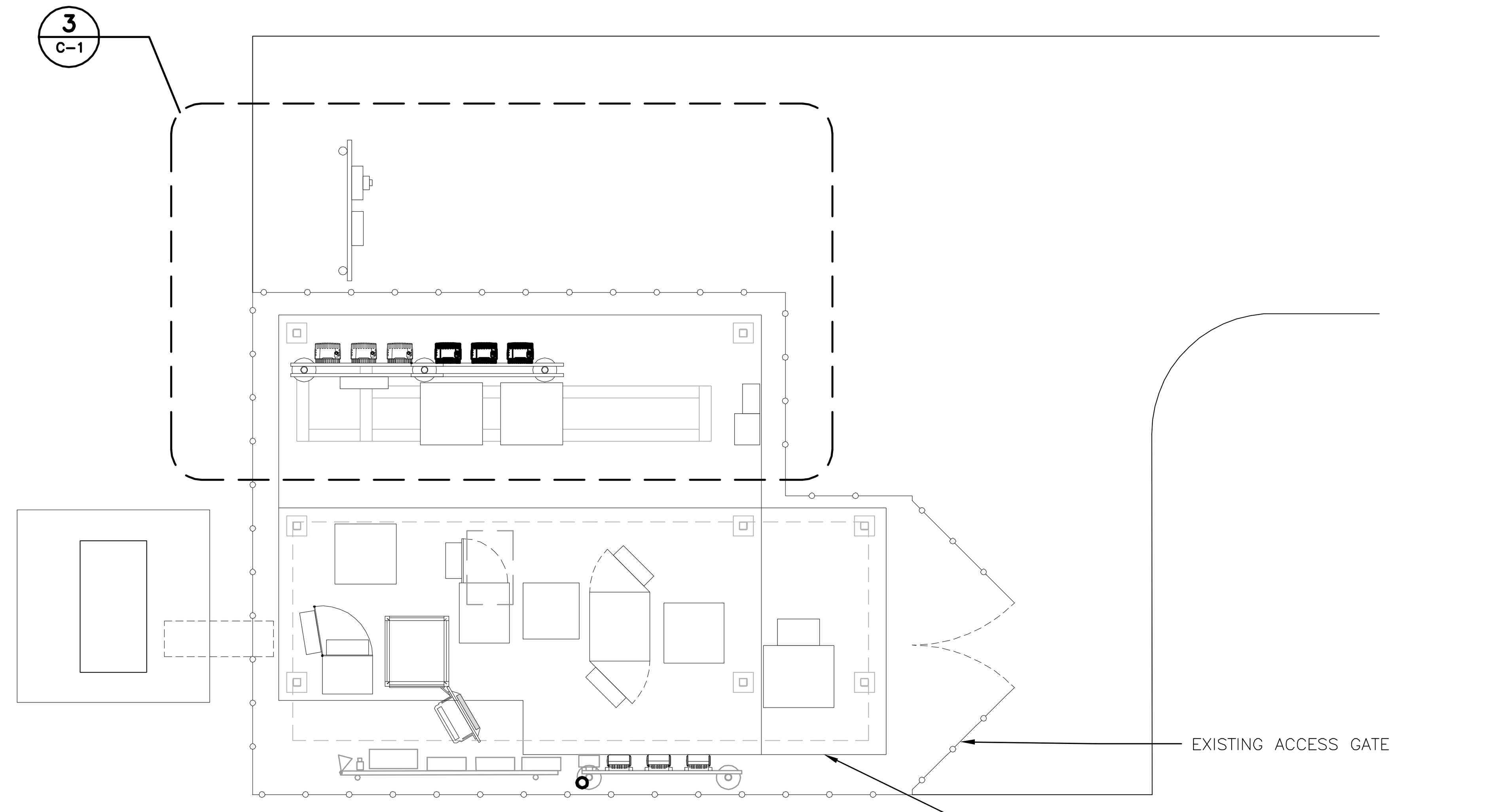
1. EXISTING 150' TALL EVERSOURCE STEEL TRANSMISSION STRUCTURE NO.: 844
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 17159.16 DATED 02/18/2019 FOR ADDITIONAL REQUIREMENTS.

NOTES:

1. OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
2. A.G.L. = ABOVE GRADE LEVEL

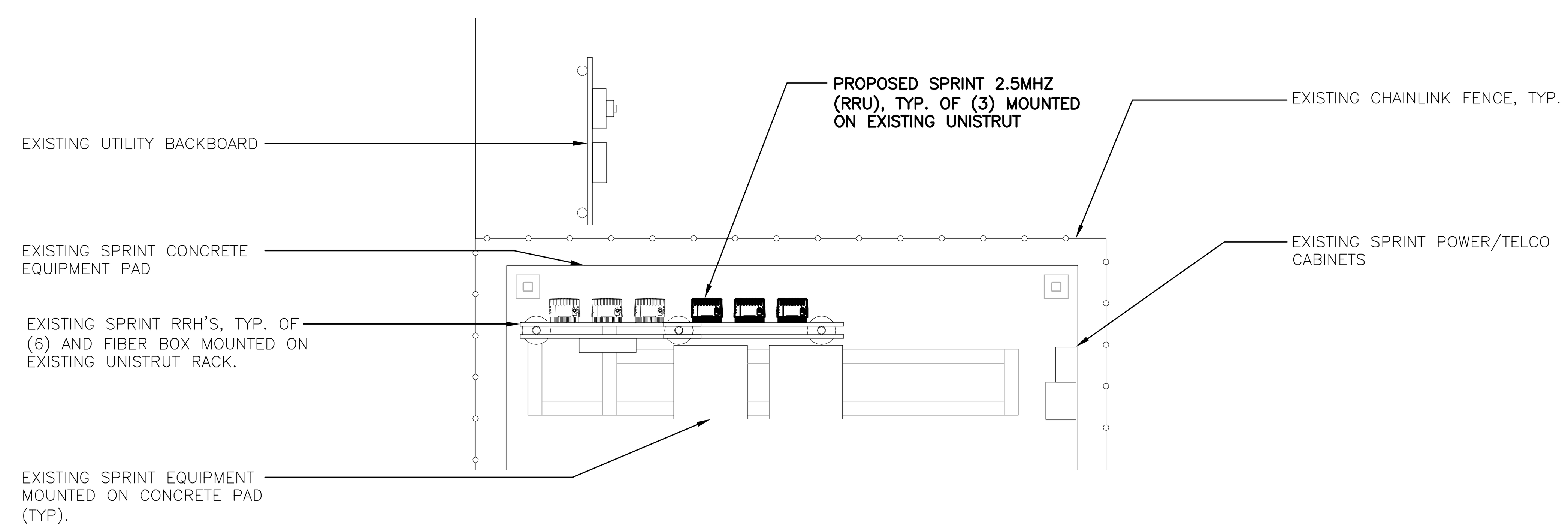
NOTE: GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

1 / C-1 **TOWER ELEVATION**
SCALE: 1" = 10'-0"



2 / C-1 **COMPOUND PLAN**
SCALE: 1" = 6'-0"

TRUE NORTH



3 / C-1 **EQUIPMENT PLAN**
SCALE: 1 = 4'-0"

TRUE NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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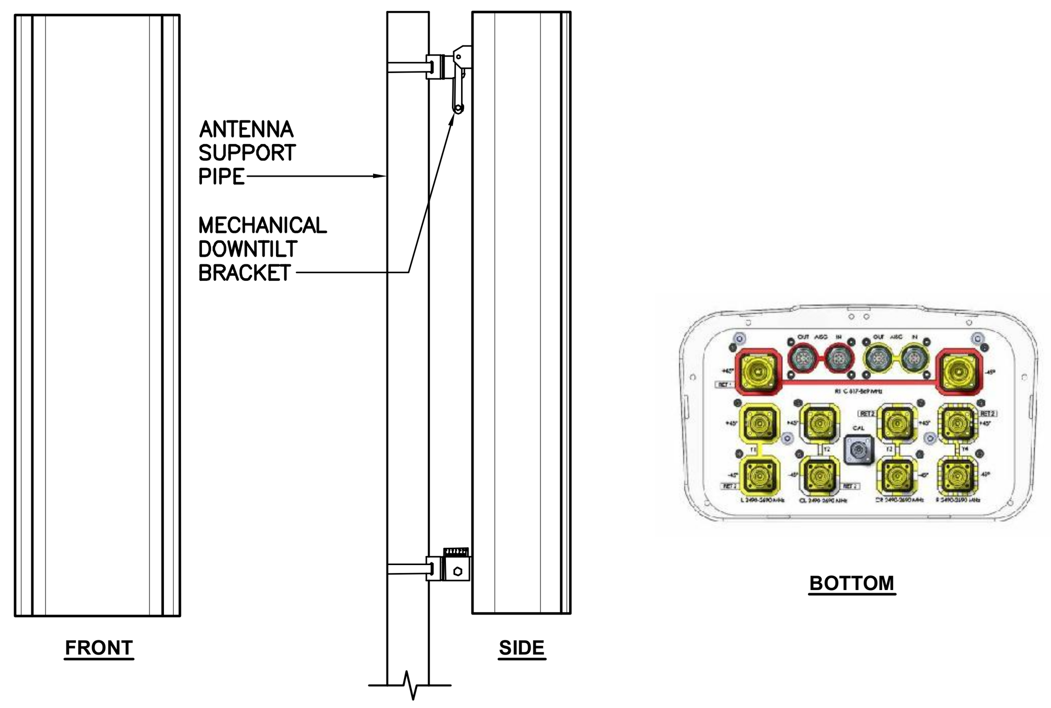
COMPOUND PLANS AND ELEVATION

C-1

Sheet No. 3 of 5

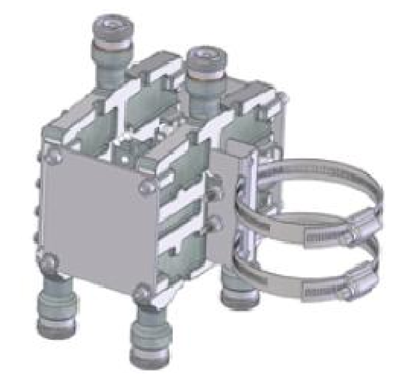


FRONT SIDE BOTTOM

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: DHHTT65B–3XR	71.9"L x 13.8"W x 8.2"D	58 LBS.

1 (C-2) PROPOSED ANTENNA DETAIL
SCALE: 1/2" = 1'-0"

DOP-7126Y-0-T1



KIT-FD9R6004/1C-DL

DIPLEXERS		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: KIT–FD9R6004/1C–DL	5.8"L x 6.5"W x 4.6"D	6.4 LBS.
MAKE: CCI MODEL: DPO–7126Y–0–T1	6.26"L x 7.42"W x 4.07"D	7.3 LBS.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH SPRINT CONSTRUCTION MANAGER PRIOR TO ORDERING.

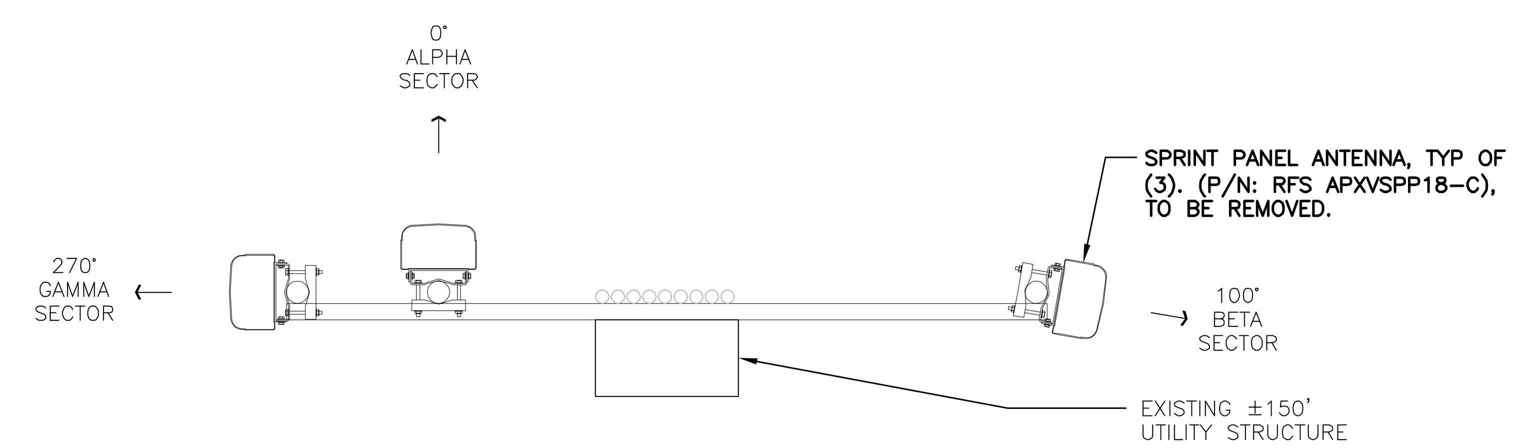
2 (C-2) DIPLEXER DETAIL
SCALE: NOT TO SCALE

TD-RRH8x20-25

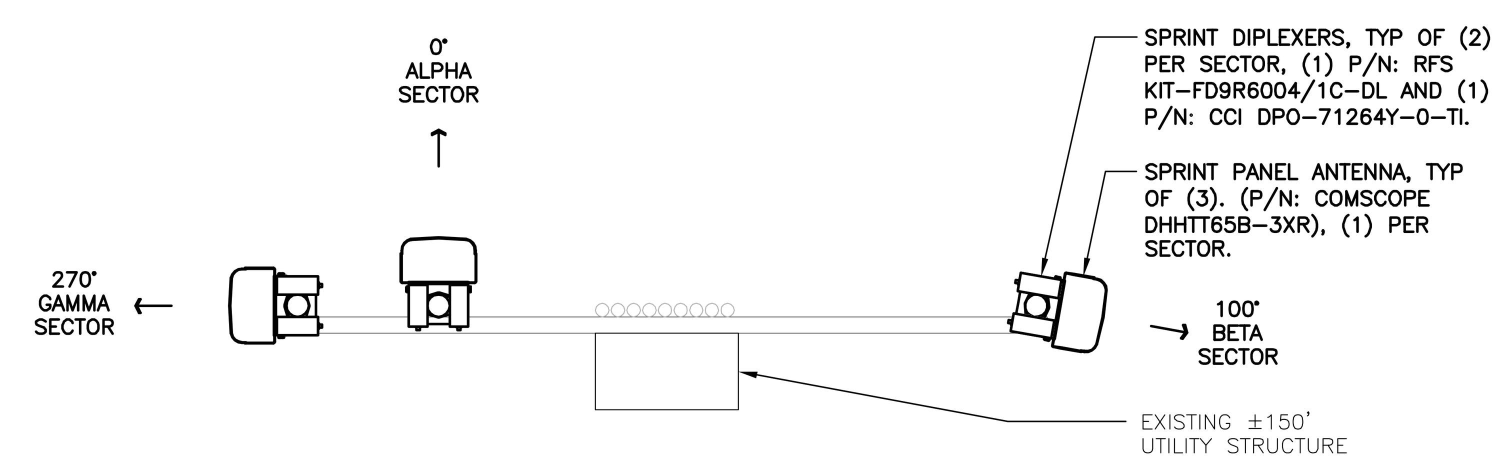
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ALCATEL–LUCENT MODEL: TD–RRH8x20–25	25.3"L x 17.5"W x 5.7"D	66 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH SPRINT CONSTRUCTION MANAGER PRIOR TO ORDERING.

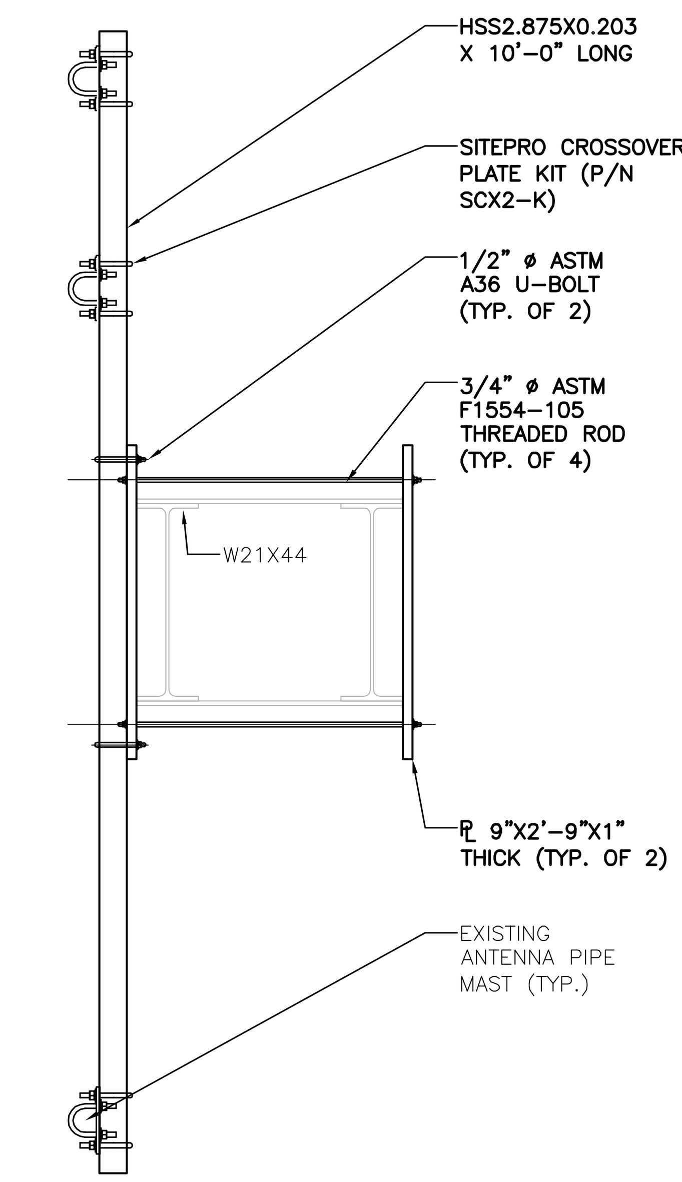
3 (C-2) REMOTE RADIO HEAD DETAIL
SCALE: NOT TO SCALE



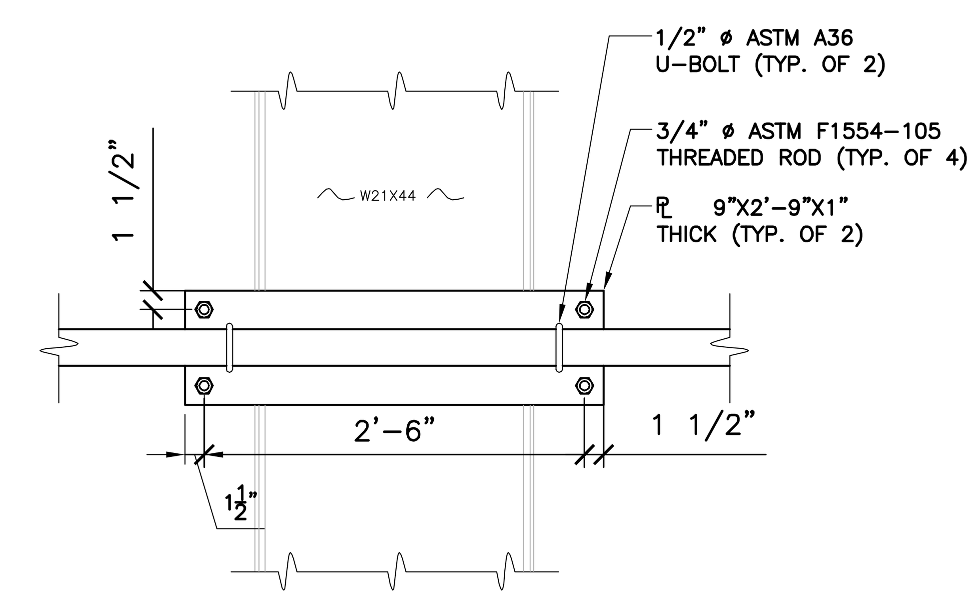
4 (C-2) EXISTING ANTENNA PLAN
SCALE: = 1/2" = 1'



5 (C-2) PROPOSED ANTENNA PLAN
SCALE: = 1/2" = 1'



6 (C-1) STANDOFF ARM DETAIL
SCALE: 3/4" = 1'-0"



7 (C-1) CONNECTION PLATE DETAIL
SCALE: 1" = 1'-0"

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TYPICAL DETAILS

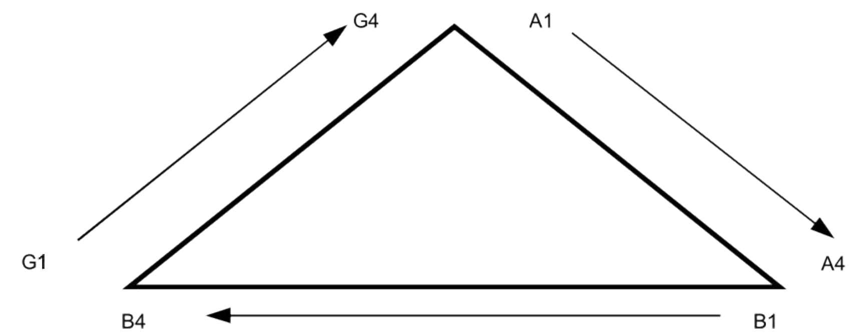
C-2

NV CABLES				
BAND	INDICATOR		PORT	COLOR
800-1	YEL	GRN	NV-1	GRN
1900-1	YEL	RED	NV-2	BLU
1900-2	YEL	BRN	NV-3	BRN
1900-3	YEL	BLU	NV-4	WHT
1900-4	YEL	SLT	NV-5	RED
800-2	YEL	ORG	NV-6	SLT
SPARE	YEL	WHT	NV-7	PPL
2500	YEL	PPL	NV-8	ORG

HYBRID	
HYBRID	COLOR
1	GRN
2	BLU
3	BRN
4	WHT
5	RED
6	SLT
7	PPL
8	ORG

2.5 Band		
2500 Radio 1		COLOR
YEL	WHT	GRN
YEL	WHT	BLU
YEL	WHT	BRN
YEL	WHT	WHT
YEL	WHT	RED
YEL	WHT	SLT
YEL	WHT	PPL
YEL	WHT	ORG

Figure 1: Antenna Orientation



NOTES

1. *All cables shall be marked at the top and bottom with 2" colored tape, stencil tag colored tape, or colored heat shrink tubing*
2. *Colored tape may be obtained from Graybar Electronic. UV stabilized tape or heat shrink are preferred.*
3. *The first ring shall be closest to the end of the cable, and there shall be a 1" space between each ring.*
4. *The cable color code shall be applied in accordance to Table 19-1.*
   A. Table 19-1 only shows 3 sectors, but additional sectors are easily supported by adding the appropriate number of colored rings to the cable color code.
5. *After the cable color code is applied, the frequency color code, Table 19-2, must be applied for the specific frequency band in use on a*
   A.2" gap shall separate the cable color code from the frequency color code.
   B. The 2" color rings for the frequency code shall be placed next to each other with no spaces.
6. *Wrap 2" colored tape a minimum of 3 times around the coax, and keep the tape in the same area as much as possible. This will allow remova*
7. *Examples of the cable and frequency color codes are shown in Figure 19-1 and Figure 19-2.*

FIGURE 19.1 CABLE COLOR CODE

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

FIGURE 19.2 COLOR CODE

FREQUENC	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

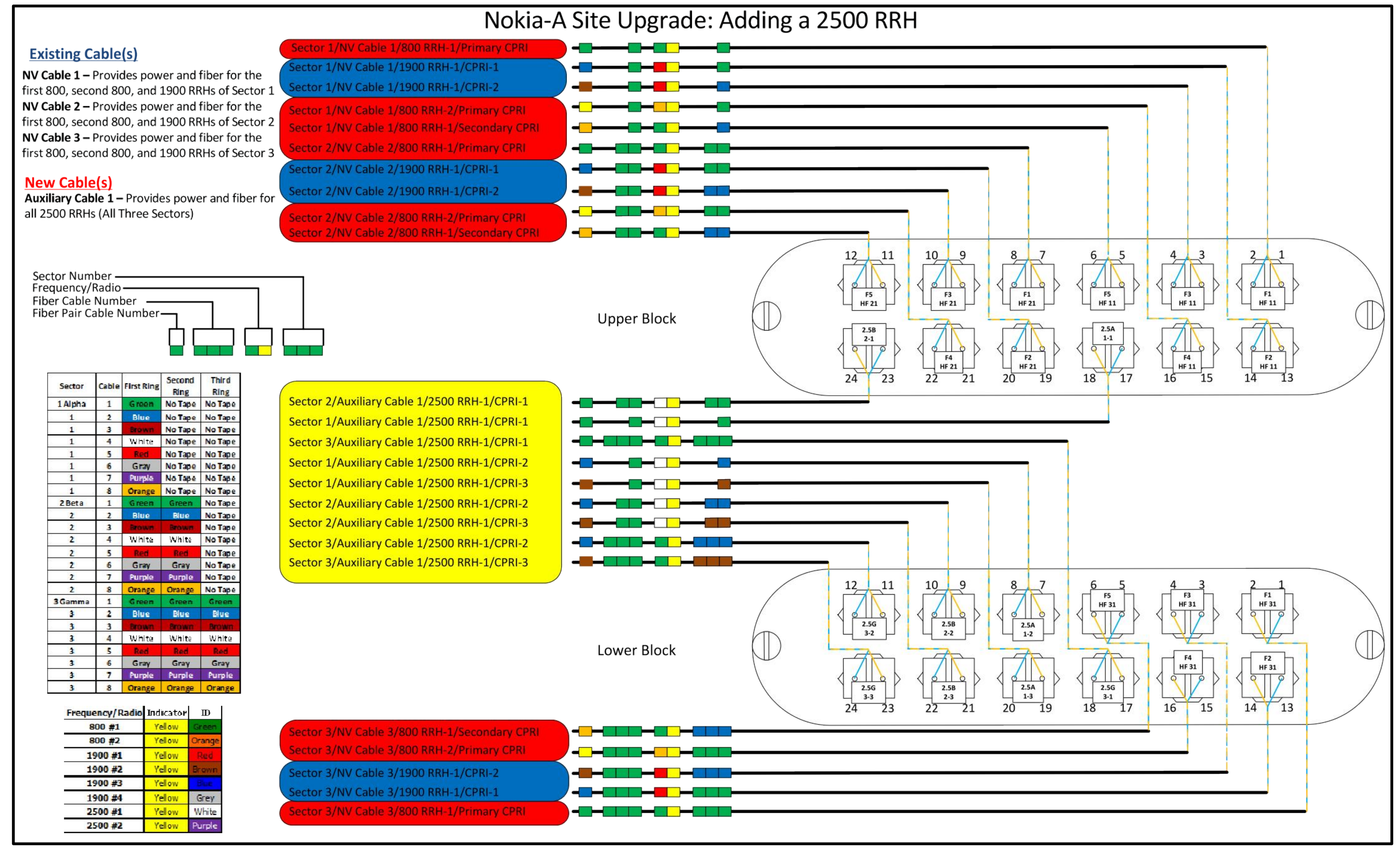
FREQUE	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

Example – Sector 2, Cable 2, 800mhz Radio #1

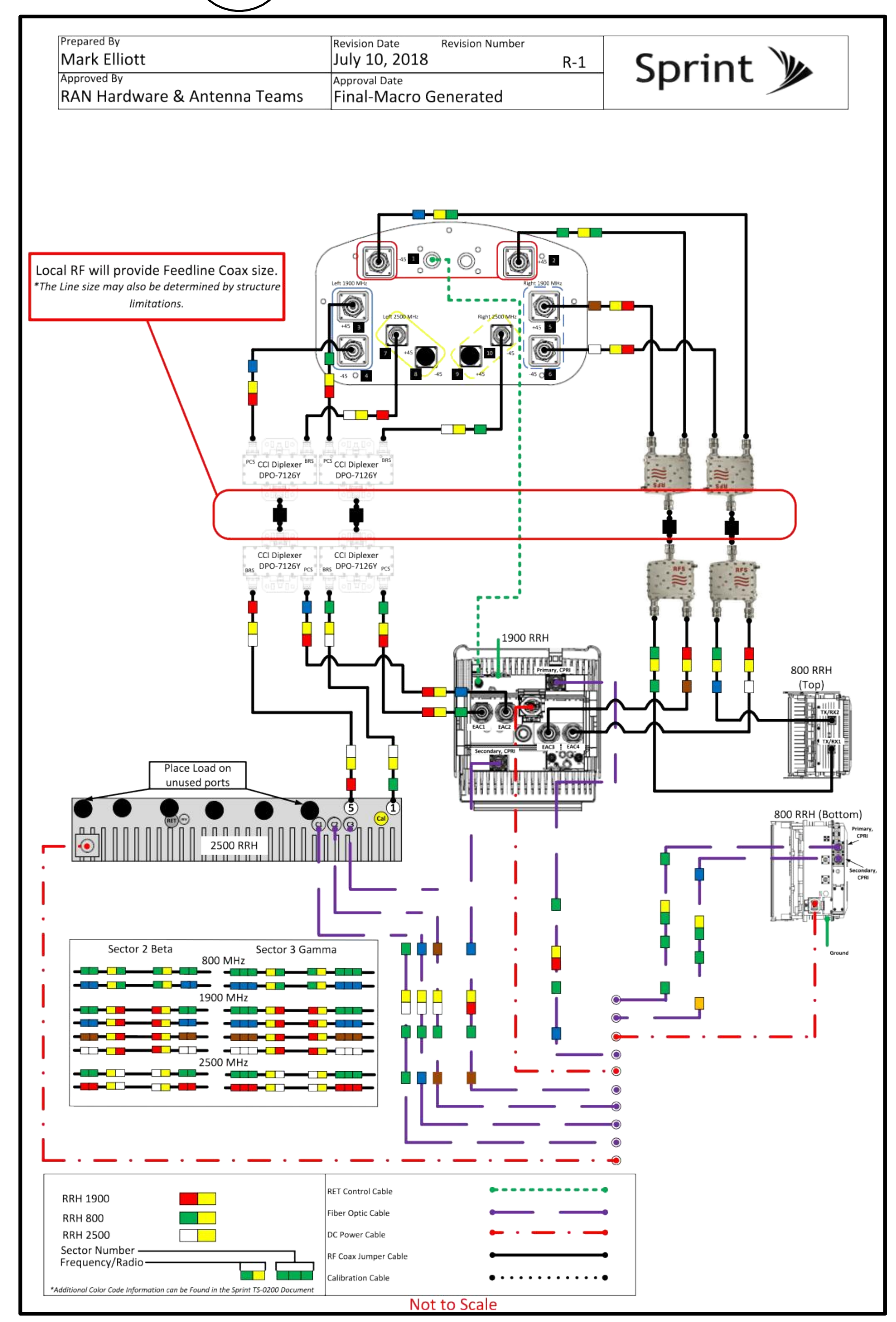
Example – Sector 3, Cable 1, 1900mhz Radio #1

Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

1 / C-3 **COLOR CODE DIAGRAM**
NOT TO SCALE



2 / C-3 **CPRI DIAGRAM**
NOT TO SCALE



3 / C-3 **PLUMBING DIAGRAM**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/11/19	TJL	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

Sprint

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SPRINT
WIRELESS COMMUNICATIONS FACILITY
EVERSOURCE STRUCT.: 844
SITE ID: CT43XC811
124 QUARRY ROAD
TRUMBULL, CT 06611

DATE: 03/01/19
SCALE: AS NOTED
JOB NO. 17159.16

COLOR CODE CPRI DETAILS AND PLUMBING DIAGRAM

C-3

Sheet No. 5 of 5

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Tower

Sprint Site Ref: CT43XC811

Eversource Structure No. 844
150' Electric Transmission Tower

124 Quarry road
Trumbull, CT

CENTEK Project No. 17159.16

~~Date: January 7, 2019~~
Rev 1: February 18, 2019

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:
Transcend Wireless
10 Industrial Ave, Suite 3
Mahwah, NJ 07430

Table of Contents

Introduction

The purpose of this report is to analyze the existing mast and 150' tower located at 124 Quarry Road in Trumbull, CT for the proposed antenna and equipment upgrade by Sprint.

The existing/proposed loads consist of the following:

- AT&T (Existing to Remain):
  Antennas: Three (3) Qunitel QS66512-2 panel antennas and six (6) Kaelus TMA2117F00V1-1 TMAs flush mounted on the existing mast with a RAD center elevation of 160-ft above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
  Mast: HSS 6.625"x0.432" x 21-ft long.
- SPRINT (Existing to Remain):
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
- SPRINT (Existing to Remove):
  Antennas: Three (3) RFS APXVSPP18-C panel antennas mounted to the existing mast with a RAD center elevation of 100-ft above grade.
- **SPRINT (Proposed):**
  Antennas: Three (3) Commscope DHHTT65B-3XR panel antennas, three (3) RFS KIT-FD9R6004/1C-DL Diplexers and three (3) CCI DPO-7126Y-0-T1 Diplexers mounted to the existing mast with a RAD center elevation of 100-ft above grade. (Additional horizontal pipe to be installed to provide additional lateral support for antenna mast. Refer to drawings in section 4).

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE 48-11, "Design of Steel Transmission Pole Structures", defines steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Structural analysis of the existing antenna mast was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The existing mast consisting of a HSS 2.875"x0.203" x 10' long pipe connected at two points to the existing pole was analyzed for its ability to resist loads prescribed by the TIA-222-G standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the pole structure.

The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized. The forces calculated in RISA-3D using NESC guidelines were then applied to the pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE 48-11, "Design of Steel Transmission Pole Structures", NESC C2-2012 and Northeast Utilities Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE 48-11.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.……………………………….. 4.0 psf
  Radial Ice Thickness………………………. 0.5"
  Vertical Overload Capacity Factor…………. 1.50
  Wind Overload Capacity Factor……………. 2.50
  Wire Tension Overload Capacity Factor…… 1.65

  Load Case 2: NESC Extreme
  Wind Speed..………………………………. 110 mph (1)
  Radial Ice Thickness………………………. 0"

  Note 1: NESC C2-2012, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the Eversource Design Criteria Table, TIA-222-G and AISC standards.

Load cases considered:

Load Case 1:
Wind Speed………………………………... 97 mph (2018 CSBC Appendix-N)
Radial Ice Thickness………………………. 0"

Load Case 2:
Wind Pressure.……………………………. 50 mph wind pressure
Radial Ice Thickness……………………….. 0.75"

Results

- MAST ASSEMBLY

The **modified** mast assembly was determined to be structurally **adequate**.

Member	Stress Ratio (% of capacity)	Result
HSS 2.875"x0.203"	66.5%	**PASS**
3/4" ∅ ASTM A36 Threaded Rod	8.5%	**PASS**

- UTILITY TOWER

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE 48-11, "Design of Steel Transmission Pole Structures" for the applied NESC Heavy and Extreme load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

A maximum usage of **94.5%** occurs in the utility tower under the **NESC Extreme** loading condition.

TOWER SECTION:

The utility tower was found to be within allowable limits.

Tower Section	Stress Ratio (% of capacity)	Result
Base	94.5%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft x 8-ft x 8.0-ft long reinforced concrete pier with twelve (12) rock anchors embedded 13-ft into rock. The base of the tower is connected to the foundation by means of twenty-six (26) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure. Foundation information was obtained from Northeast Utilities drawing 01064-60000.

BASE REACTIONS:

From analysis of pole based on NESC/NU prescribed loads.

Load Case	Transverse	Axial	Overturning Moment
NESC Heavy Wind x-direction	20.4 kips	94.6 kips	2796.9 ft-kips
NESC Extreme Wind x-direction	39.3 kips	52.9 kips	4413.9 ft-kips
NESC Heavy Wind y-direction	10.4 kips	94.6 kips	1146.2 ft-kips
NESC Extreme Wind y-direction	35.9 kips	52.9 kips	3287.4 ft-kips

FLANGE BOLTS / FLANGE PLATE:

The flange bolts and plate was found to be within allowable limits.

Component	Design Limit	Stress Ratio (percent of capacity)	Result
Flange Bolts	Tension	93.0%	**PASS**
Flange Plate	Bending	83.5%	**PASS**

ANCHOR BOLTS / BASE PLATE:

The anchor bolts and plate was found to be within allowable limits.

Component	Design Limit	Stress Ratio (percent of capacity)	Result
Anchor Bolts	Tension	75.7%	**PASS**
Base Plate	Bending	87.9%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading	Result
Reinf. Conc. Pier w/ Rock Anchors	OTM (1)	1.0 FS (2)	1.21 FS (2)	**PASS**

Note 1: OTM denote overturning moment.
Note 2: FS denotes Factor of Safety

Conclusion

This analysis shows that the subject utility pole **is adequate** to support the proposed Sprint equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource 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:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

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 are performed, results obtained, and recommendations made 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.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.

- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary "true to scale" rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
    - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts [(1)]

Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as “masts”), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222 covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in “unifying” both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

Note 1: *Prepared from documentation provide from Northeast Utilities.*

PCS Mast

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA 222-G:

ELECTRIC TRANSMISSION TOWER

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled “NU Design Criteria”. This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

Attachment A
Eversource Design Criteria

		Attachment A NU Design Criteria	Basic Wind Speed	Pressure	Height factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	____	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	____	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor Loads Provided by NU					
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor Loads Provided by NU					
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load 1.25 X Gust Response Factor Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor Loads Provided by NU					
		* Only for structures installed after 2007						

mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition

With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "Eversource Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by Eversource).

c) Electric Transmission Structure

   i) The loads from the wireless communication equipment components based on NESC and Eversource Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.

   ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2
Pole with Coaxial Cable	1.6

   iii) When Coaxial Cables are mounted alongside the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

d) The uniform loadings and factors specified for the above components in Attachment A, "Eversource Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

   Note: The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and Eversource will provide these loads).

e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

Project: *Lines 1714 & 1710, Structure 844*
Date: *10/03/2018*
Engineer: *TG*
Checked By: *JS*
Purpose *Recalculate wire loads.*

1714 Line
Conductor: *1590 Lapwing ACSR, sagged in PLS-CADD*
Shield Wire: *FOCAS 0.738" OPGW, sagged in PLS-CADD*

1710 Line
Conductor: *1590 Lapwing ACSR, sagged in PLS-CADD*
Shield Wire: *7#8 Alumoweld, sagged in PLS-CADD*

NESC 250B	*Vertical*	*Transverse*	*Longitudinal*
Conductor	5810	1860	0
Alumoweld	1514	999	0
OPGW	2558	1266	0

NESC 250C	*Vertical*	*Transverse*	*Longitudinal*
Conductor	2894	3158	100
Alumoweld	532	786	100
OPGW	1117	1514	100

HISTORICAL NESC 250C	*Vertical*	*Transverse*	*Longitudinal*
Conductor	2679	2346	100
Alumoweld	473	584	100
OPGW	994	1125	100

ANTENNA INSTALLATION

EVERSOURCE STRUCT. NO. 844
SPRINT SITE REF: CT43XC811
124 QUARRY ROAD
TRUMBULL, CT 06611

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	124 QUARRY ROAD TRUMBULL, CT 06611
PROJECT COORDINATES:	LAT: 41°-13'-57.00"N LON: 73°-11'-09.40"W ELEV:±118' AMSL
EVERSOURCE STRUCT NO:	844
EVERSOURCE CONTACT:	JOEL SZARKOWICZ 860.728.4503
SPRINT SITE REF.:	CT43XC811
SPRINT CONTACT:	DAN REID 203.592.8291
ANTENNA CL HEIGHT:	100'-0" AGL
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	TIMOTHY LYNN, PE 203-433-7507

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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N-2	STRUCTURAL STEEL NOTES	0
MI-1	MODIFICATION INSPECTION REQUIREMENTS	0
S-1	TOWER ELEVATION & FEEDLINE PLAN	0
S-2	ANTENNA MAST DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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TITLE SHEET

SHEET NO.
T-1
Sheet No. 1 of 6

DESIGN BASIS

1. GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE SUPPLEMENT.

2. TIA–222–G, ASCE MANUAL NO. 48–11 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2–2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN WIND SPEED (V) = 97 MPH (2018 CSBC: APPENDIX 'N')

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3–SECOND GUST) BASED ON NESC C2–2012, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS PREPARED BY CENTEK ENGINEERING, INC., FOR SPRINT DATED 2/18/19.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DOCUMENTS PREPARED BY THE FINNEY STEEL POLE CO. JOB NO. 1300.8 CIRCA 1971.

3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

4. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.

5. ALL REPLACEMENT STEEL MEMBERS SHALL BE INSTALLED WITH A325–N BOLTS (SIZE TO MATCH EXISTING). UNLESS OTHERWISE NOTED BELOW.

6. THE TOWER STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE & SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, UNDERPINNING, TEMPORARY ANCHORS, GUYING, BARRICADES, ETC. AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY. MAINTAIN EXISTING SITE OPERATIONS AND COORDINATE WORK WITH TOWER OWNER.

7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.

8. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

9. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

10. TOWER REINFORCEMENTS SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

11. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH THE TOWER REINFORCEMENT WORK.

12. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

13. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

14. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

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DESIGN BASIS AND GENERAL NOTES

SHEET NO.
N–1

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B. U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.

4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

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

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.

16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

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

19. FABRICATE BEAMS WITH MILL CAMBER UP.

20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.

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

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STRUCTURAL STEEL NOTES

SHEET NO.
N-2

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	–	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	–	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL-OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	–	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	–	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

NOTES:

1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "–" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR – ENGINEER OF RECORD
4. MPII – "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE

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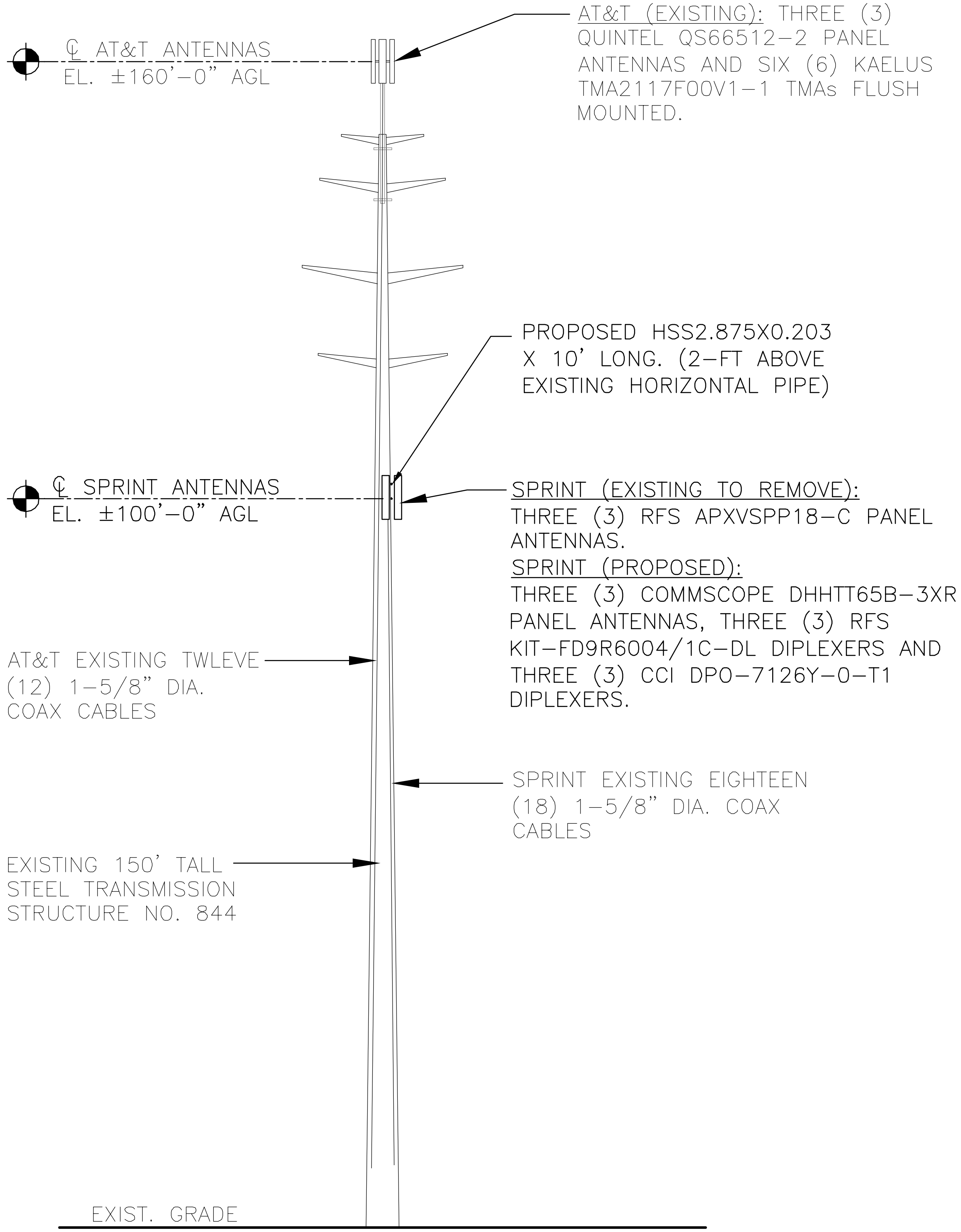
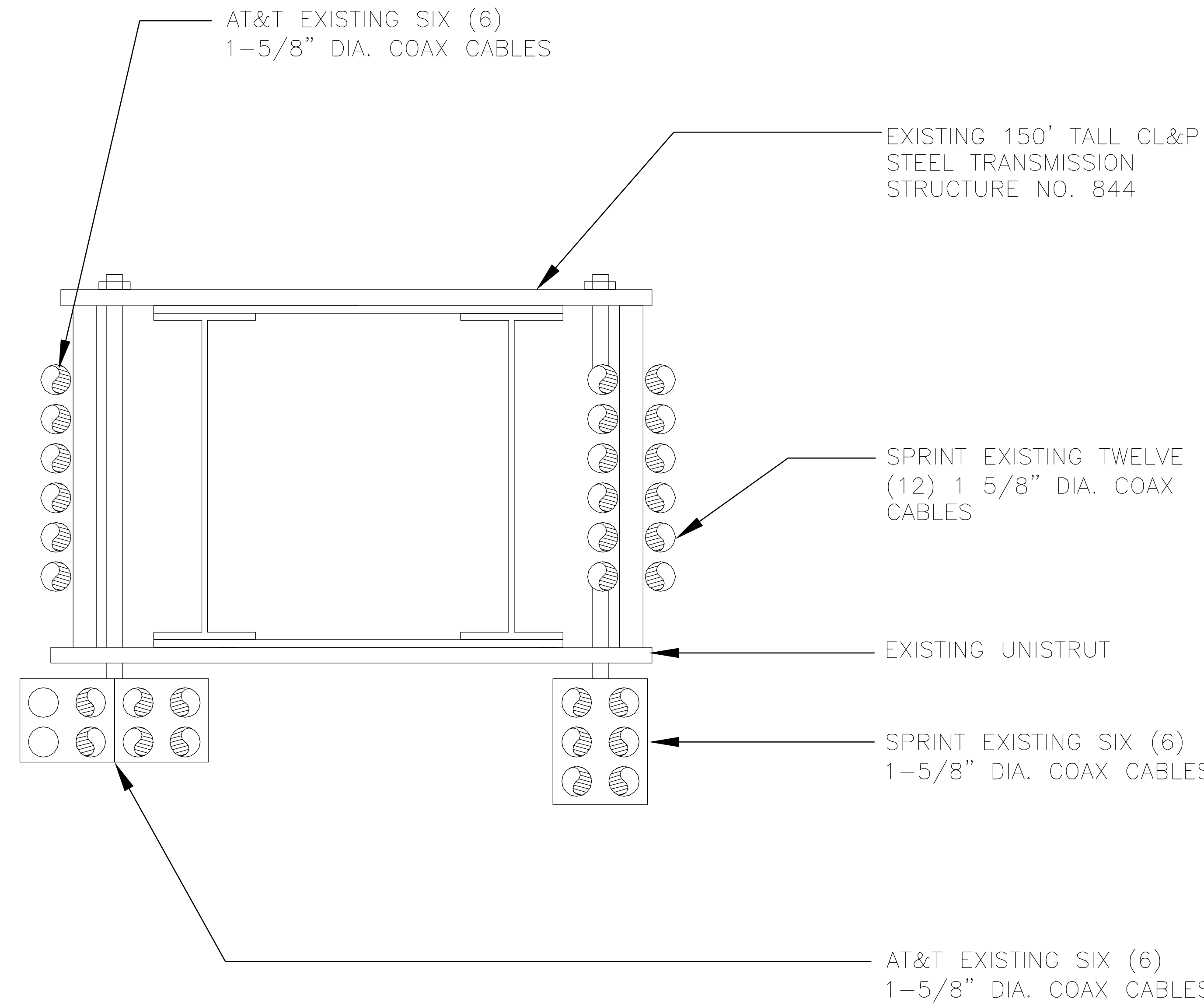
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI-1



1 S-1 **TOWER & ANTENNA MAST ELEVATION**

SCALE: NOT TO SCALE



2 S-1 **FEEDLINE PLAN**

SCALE: 1" = 1'-0"

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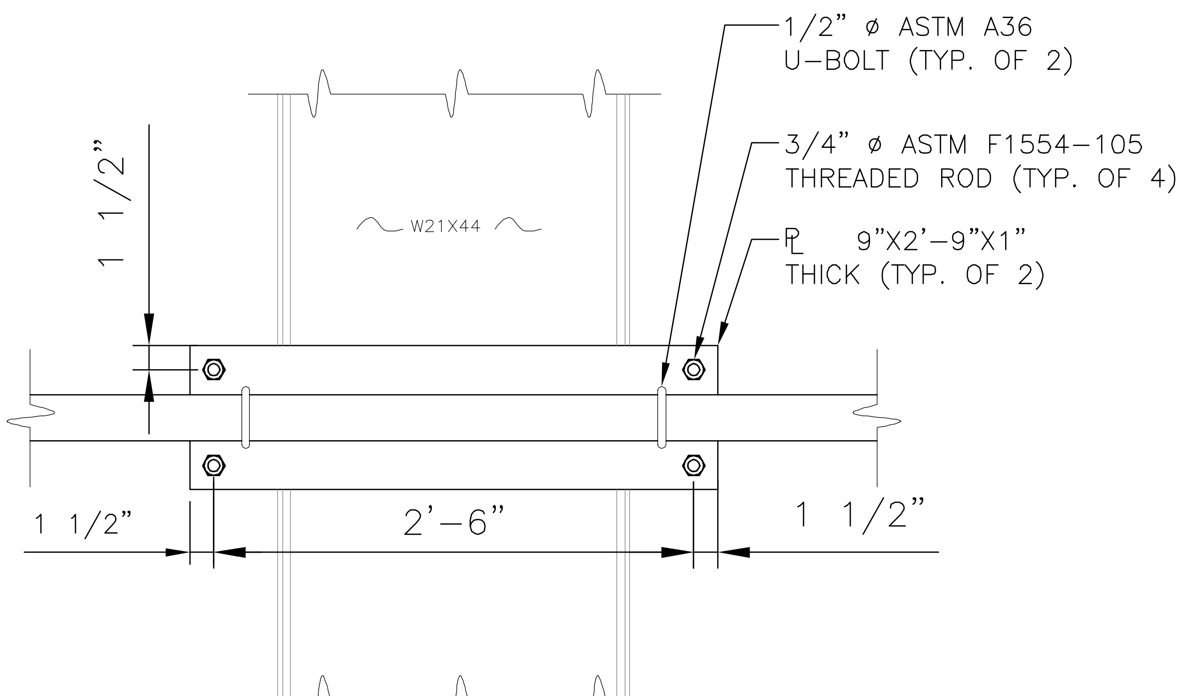
TOWER ELEVATION AND FEEDLINE PLAN

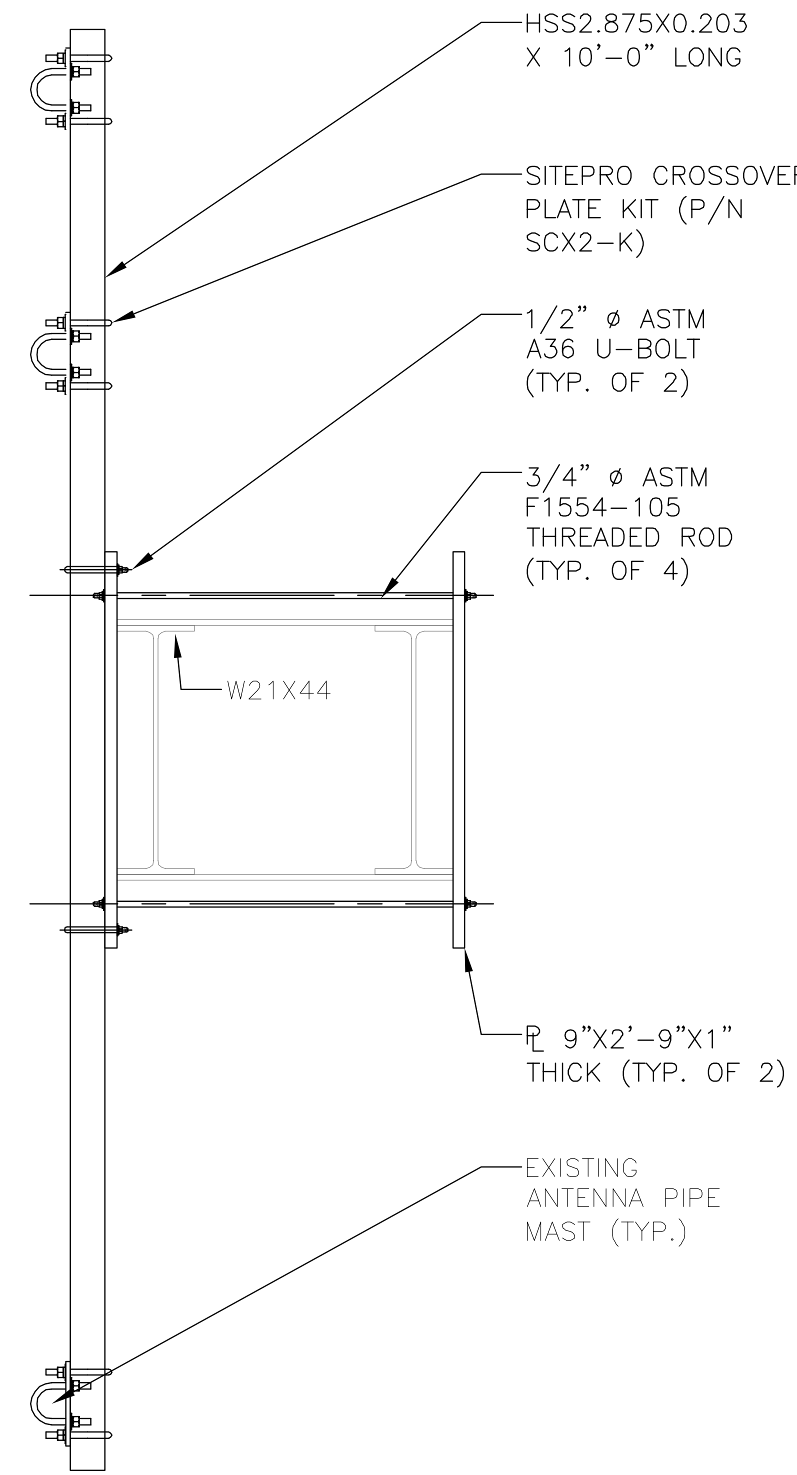
SHEET NO.
S-1
Sheet No. 5 of 6



2 / S-2

CONNECTION PLATE DETAIL

SCALE: 2" = 1'-0"



1 / S-2

STANDOFF ARM DETAIL

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

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ANTENNA MAST DETAILS

SHEET NO. S-2

Sheet No. 6 of 6

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = SC := III (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 150$ ft (User Input)

Height to Center of Antennas = $z_{ant} := 100$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H := 1.35$ (User Input)

Output

Wind Direction Probability Factor = $K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$ (Per Table 2-2 of TIA-222-G)

Importance Factors = $I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1.15$ (Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1.25$$

$$K_{iz} := \left(\frac{z_{ant}}{33}\right)^{0.1} = 1.117$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.095$$

Velocity Pressure Coefficient = $Kz_{ant} := 2.01 \left(\left(\frac{z_{ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.266$

Velocity Pressure w/o Ice = $qz_{ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot K_{zt} \cdot V^2 \cdot I_{Wind} = 33.305$

Velocity Pressure with Ice = $qz_{ice.ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot K_{zt} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.695$

Development of Wind & Ice Load on Mast

Existing Mast Data:	(HSS 2.875"x0.203")		(User Input)
Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 2.875$	in	(User Input)
Mast Length =	$L_{mast} := 10$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.203$	in	(User Input)
Mast Aspect Ratio =	$Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 41.7$		
Mast Force Coefficient =	$Ca_{mast} = 1.2$		

Wind Load (without ice)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 0.24$	sf/ft	
Total Mast Wind Force =	$qz_{ant} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 13$	plf	**BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{iz})}{12} = 0.589$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.ant} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 7$	plf	**BLC 4**

Gravity Loads (without ice)

Weight of the mast =	Self Weight	**(Computed internally by Risa-3D)**	plf	**BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + t_{iz} \cdot 2)^2 - D_{mast}^2\right] = 32.7$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 13$	plf	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope DHHTT65B-3XR			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 72.1$	in	(User Input)	
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 46$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 1$		(User Input)	Per Pipe Mast
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$			
Antenna Force Coefficient =	$Ca_{ant} = 1.36$			

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 6$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 364$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 8.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 120$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 46$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6092$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 7766$	cu	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 252$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 252$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS KIT-FD9R6004/1C-DL Diplexer			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 5.8$	in	(User Input)	
Antenna Width =	$W_{ant} := 6.5$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 4.6$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 7$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 1$		(User Input)	Per Pipe Mast
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 0.9$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.3$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 14$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 0.7$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 9$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 7$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 173$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 765$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 25$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 25$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI DPO-7126Y-0-T1 Diplexer			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 4.07$	in	(User Input)	
Antenna Width =	$W_{ant} := 7.42$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 6.26$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 8$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 1$		(User Input)	Per Pipe Mast
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 0.5$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.2$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.2$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 11$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 0.7$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 8$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 8$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 189$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 813$	cu	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 26$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 26$	lbs	**BLC 3**

Development of Wind & Ice Load on Mast

Pipe Mast Data:	(2 Std. Pipe)		(User Input)	
Mast Shape =	Round		(User Input)	
Mast Diameter =	$D_{mast} := 2.375$	in	(User Input)	
Mast Length =	$L_{mast} := 6$	ft	(User Input)	
Mast Thickness =	$t_{mast} := 0.154$	in	(User Input)	
Mast Aspect Ratio =	$Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 30.3$			
Mast Force Coefficient =	$Ca_{mast} = 1.2$			

Wind Load (without ice)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 0.198$	sf/ft	
Total Mast Wind Force =	$qz_{ant} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 11$	plf	**BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{iz})}{12} = 0.547$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.ant} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 7$	plf	**BLC 4**

Gravity Loads (without ice)

Weight of the mast =	Self Weight	**(Computed internally by Risa-3D)**	plf	**BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{iz} \cdot 2\right)^2 - D_{mast}^{\,2}\right] = 29.4$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 11$	plf	**BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Standard Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz Mast	HSS2.875X0.203	Beam	Pipe	A500 Gr.42	Typical	1.59	1.45	1.45	2.89
2	Pipe Mast	PIPE_2.0	Column	Wide Flange	A53 Gr. B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Horz Mast	10			Lbyy						Lateral
2	M2	Pipe Mast	6			Lbyy						Lateral
3	M3	Pipe Mast	6			Lbyy						Lateral
4	M4	Pipe Mast	6			Lbyy						Lateral
5	M5	Horz Mast	10			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N3			Horz Mast	Beam	Pipe	A500 Gr....	Typical
2	M2	N6	N5			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
3	M3	N8	N7			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
4	M4	N10	N9			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
5	M5	N12	N14			Horz Mast	Beam	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	4	0	0	0	
3	N3	10	0	0	0	
4	N4	2	0	0	0	
5	N5	0	3	0	0	
6	N6	0	-3	0	0	
7	N7	2	3	0	0	
8	N8	2	-3	0	0	
9	N9	10	3	0	0	
10	N10	10	-3	0	0	
11	N11	6	0	0	0	
12	N12	0	2	0	0	
13	N13	4	2	0	0	
14	N14	10	2	0	0	
15	N15	2	2	0	0	
16	N16	6	2	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N2	Reaction	Reaction	Reaction			
2	N11	Reaction	Reaction	Reaction			
3	N13	Reaction	Reaction	Reaction			
4	N16	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.023	.5
2	M3	Y	-.023	.5
3	M4	Y	-.023	.5
4	M2	Y	-.023	5.5
5	M3	Y	-.023	5.5
6	M4	Y	-.023	5.5
7	M2	Y	-.007	1.5
8	M3	Y	-.007	1.5
9	M4	Y	-.007	1.5
10	M2	Y	-.008	4.5
11	M3	Y	-.008	4.5
12	M4	Y	-.008	4.5

Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.126	.5
2	M3	Y	-.126	.5
3	M4	Y	-.126	.5
4	M2	Y	-.126	5.5
5	M3	Y	-.126	5.5
6	M4	Y	-.126	5.5
7	M2	Y	-.025	1.5
8	M3	Y	-.025	1.5
9	M4	Y	-.025	1.5
10	M2	Y	-.026	4.5
11	M3	Y	-.026	4.5
12	M4	Y	-.026	4.5

Member Point Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.06	.5
2	M3	X	.06	.5
3	M4	X	.06	.5
4	M2	X	.06	5.5
5	M3	X	.06	5.5
6	M4	X	.06	5.5
7	M2	X	.009	1.5
8	M3	X	.009	1.5
9	M4	X	.009	1.5
10	M2	X	.008	4.5
11	M3	X	.008	4.5
12	M4	X	.008	4.5

Member Point Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.182	.5
2	M3	X	.182	.5
3	M4	X	.182	.5
4	M2	X	.182	5.5

Member Point Loads (BLC 5 : (x) TIA Wind) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M3	X	.182	5.5
6	M4	X	.182	5.5
7	M2	X	.014	1.5
8	M3	X	.014	1.5
9	M4	X	.014	1.5
10	M2	X	.011	4.5
11	M3	X	.011	4.5
12	M4	X	.011	4.5

Member Point Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	.06	.5
2	M3	Z	.06	.5
3	M4	Z	.06	.5
4	M2	Z	.06	5.5
5	M3	Z	.06	5.5
6	M4	Z	.06	5.5
7	M2	Z	.009	1.5
8	M3	Z	.009	1.5
9	M4	Z	.009	1.5
10	M2	Z	.008	4.5
11	M3	Z	.008	4.5
12	M4	Z	.008	4.5

Member Point Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	.182	.5
2	M3	Z	.182	.5
3	M4	Z	.182	.5
4	M2	Z	.182	5.5
5	M3	Z	.182	5.5
6	M4	Z	.182	5.5
7	M2	Z	.014	1.5
8	M3	Z	.014	1.5
9	M4	Z	.014	1.5
10	M2	Z	.011	4.5
11	M3	Z	.011	4.5
12	M4	Z	.011	4.5

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M2	Y	-.011	-.011	0	0
2	M3	Y	-.011	-.011	0	0
3	M4	Y	-.011	-.011	0	0
4	M1	Y	-.013	-.013	0	0
5	M5	Y	-.013	-.013	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.007	.007	0	0
2	M5	Z	.007	.007	0	0

Member Distributed Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.013	.013	0	0
2	M5	Z	.013	.013	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					12			
3	Weight of Ice Only	None					12	5		
4	(x) TIA Wind with Ice	None					12			
5	(x) TIA Wind	None					12			
6	(z) TIA Wind with Ice	None					12	2		
7	(z) TIA Wind	None					12	2		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-direction)	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0Wi (X...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-direction)	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-direction)	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0Wi (Z...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	-.17	5	.556	6	0	3	0	6	0	6	0	6
2		min	-1.396	1	-.019	2	-2.007	5	0	1	0	1	0	1
3	N11	max	.541	6	.36	3	0	3	0	6	0	6	0	6
4		min	-.483	2	.064	5	-.077	5	0	1	0	1	0	1
5	N13	max	1.02	6	.616	3	0	3	0	6	0	6	0	6
6		min	.095	2	.095	5	-.069	4	0	1	0	1	0	1
7	N16	max	-.091	5	.339	6	0	3	0	6	0	6	0	6
8		min	-.551	3	-.191	2	-.131	4	0	1	0	1	0	1
9	Totals:	max	0	6	1.791	6	0	3						
10		min	-1.867	1	.318	2	-2.283	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	.001	1	-.021	5	1.045	4	0	3	2.416e-02	4	2.066e-03	1
2		min	0	5	-.136	3	0	1	-1.97e-02	4	0	1	2.198e-04	5
3	N2	max	0	6	0	6	0	6	0	3	1.093e-02	4	2.322e-03	3

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
4		min	0	1	0	1	0	1	-1.772e-02	4	0	1	3.866e-04	5
5	N3	max	0	2	-.007	2	.9	4	0	3	0	3	2.037e-03	2
6		min	0	6	-.178	6	0	1	-2.11e-02	4	-2.186e-02	4	-1.931e-03	6
7	N4	max	0	1	-.013	5	.464	4	0	3	2.334e-02	4	2.59e-03	3
8		min	0	5	-.078	3	0	1	-1.659e-02	4	0	1	3.895e-04	5
9	N5	max	-.003	5	-.021	5	.55	4	0	3	2.007e-02	4	1.336e-03	3
10		min	-.017	3	-.136	3	0	1	-1.045e-02	4	0	1	1.899e-04	2
11	N6	max	.319	1	-.021	5	1.997	4	0	3	2.416e-02	4	1.131e-02	1
12		min	.008	5	-.136	3	0	1	-2.893e-02	5	0	1	2.197e-04	5
13	N7	max	-.005	5	-.013	5	.149	5	0	3	1.532e-02	4	2.385e-03	3
14		min	-.029	3	-.078	3	0	1	-7.339e-03	4	0	1	3.895e-04	5
15	N8	max	.306	1	-.013	5	1.305	4	0	3	2.334e-02	4	1.096e-02	1
16		min	.014	5	-.078	3	0	1	-2.583e-02	5	0	1	3.892e-04	5
17	N9	max	.026	3	-.007	2	.373	4	0	3	0	3	-3.242e-04	5
18		min	.004	5	-.178	6	0	1	-1.184e-02	4	-1.514e-02	4	-2.11e-03	3
19	N10	max	.317	2	-.007	2	1.902	4	0	3	0	3	1.129e-02	2
20		min	-.07	6	-.178	6	0	1	-3.033e-02	5	-2.186e-02	4	-1.921e-03	6
21	N11	max	0	6	0	6	0	6	0	3	0	3	-3.946e-04	5
22		min	0	1	0	1	0	1	-1.885e-02	4	-9.319e-03	4	-2.348e-03	3
23	N12	max	0	2	-.021	5	.676	4	0	3	2.007e-02	4	1.41e-03	3
24		min	0	6	-.136	3	0	1	-1.081e-02	4	0	1	2.199e-04	5
25	N13	max	0	6	0	6	0	6	0	3	4.727e-03	4	2.33e-03	3
26		min	0	1	0	1	0	1	-8.825e-03	4	0	1	3.864e-04	5
27	N14	max	0	3	-.007	2	.515	4	0	3	0	3	-3.242e-04	5
28		min	0	5	-.178	6	0	1	-1.22e-02	4	-1.514e-02	4	-2.035e-03	3
29	N15	max	0	2	-.013	5	.238	4	0	3	1.532e-02	4	2.458e-03	3
30		min	0	6	-.078	3	0	1	-7.699e-03	4	0	1	3.894e-04	5
31	N16	max	0	6	0	6	0	6	0	3	0	3	-1.235e-04	2
32		min	0	1	0	1	0	1	-9.951e-03	4	-4.432e-03	4	-2.306e-03	6

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	M1	HSS2.875X0.203	.665	4.0...	4	.114	3.9...		4	22.748	60.102	4.316	4.316	...	H1-...
2	M2	PIPE_2.0	.412	3	2	.151	3		4	20.867	32.13	1.872	1.872	...	H1-...
3	M3	PIPE_2.0	.757	3	4	.316	3		4	20.867	32.13	1.872	1.872	...	H3-6
4	M4	PIPE_2.0	.412	3	4	.228	3		4	20.867	32.13	1.872	1.872	...	H1-...
5	M5	HSS2.875X0.203	.306	2.0...	4	.113	1.9...		4	22.748	60.102	4.316	4.316	...	H1-...

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	-1.396	.012	0	0	0	0
2	1	N11	-.453	.204	0	0	0	0
3	1	N13	.151	.378	0	0	0	0
4	1	N16	-.169	-.17	0	0	0	0
5	1	Totals:	-1.867	.424	0			
6	1	COG (ft):	X: 4.306	Y: .319	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	-1.339	-.019	0	0	0	0
2	2	N11	-.483	.183	0	0	0	0
3	2	N13	.095	.346	0	0	0	0
4	2	N16	-.139	-.191	0	0	0	0
5	2	Totals:	-1.867	.318	0			
6	2	COG (ft):	X: 4.306	Y: .319	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N2	-1.277	.532	0	0	0	0
2	3	N11	.414	.36	0	0	0	0
3	3	N13	1.003	.616	0	0	0	0
4	3	N16	-.551	.284	0	0	0	0
5	3	Totals:	-.411	1.791	0			
6	3	COG (ft):	X: 4.218	Y: .223	Z: 0			

Joint Reactions (By Combination)

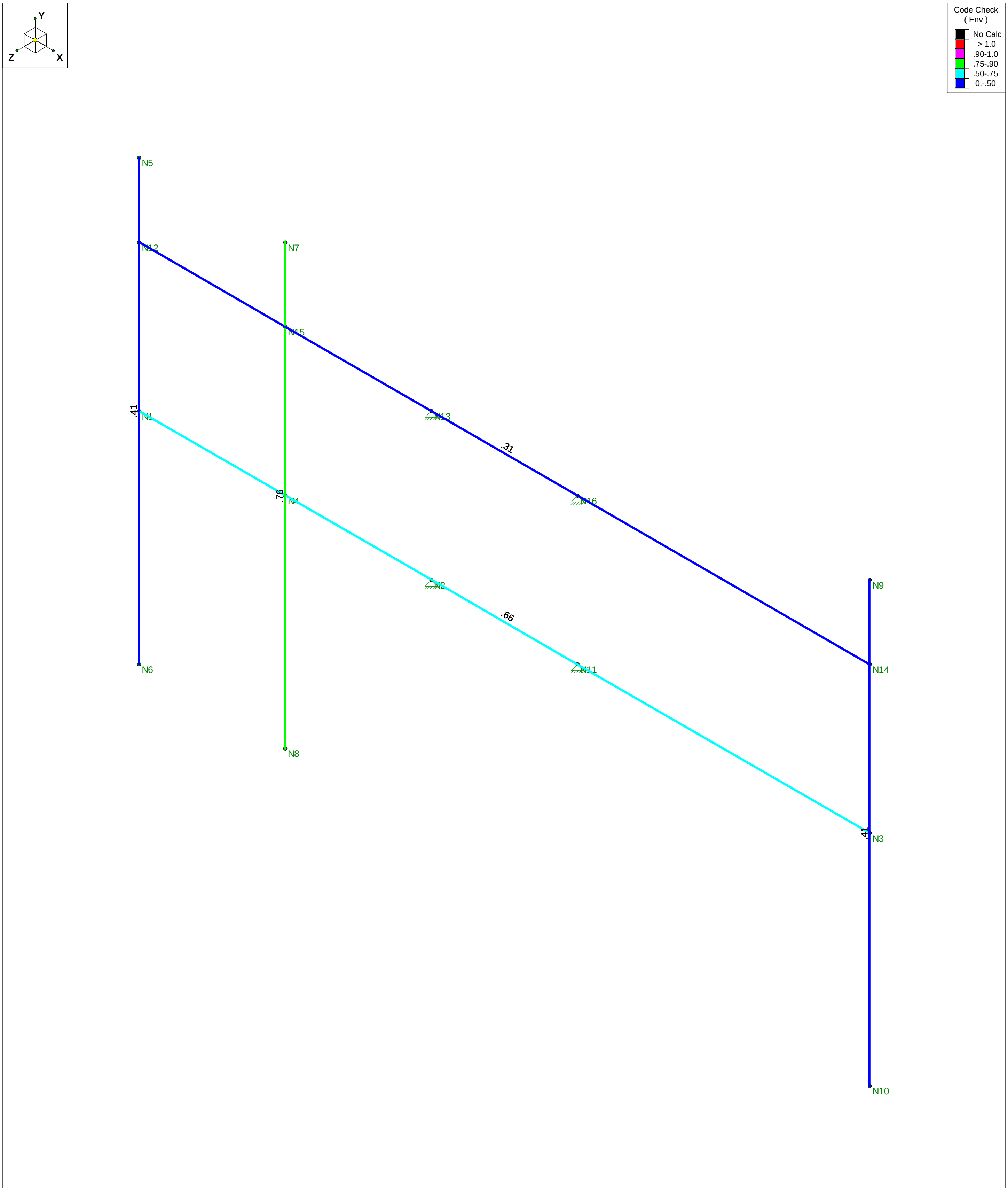
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N2	-.226	.127	-2.007	0	0	0
2	4	N11	.121	.085	-.076	0	0	0
3	4	N13	.226	.127	-.069	0	0	0
4	4	N16	-.121	.085	-.131	0	0	0
5	4	Totals:	0	.424	-2.283			
6	4	COG (ft):	X: 4.306	Y: .319	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	5	N2	-.17	.095	-2.007	0	0	0
2	5	N11	.091	.064	-.077	0	0	0
3	5	N13	.17	.095	-.069	0	0	0
4	5	N16	-.091	.064	-.131	0	0	0
5	5	Totals:	0	.318	-2.283			
6	5	COG (ft):	X: 4.306	Y: .319	Z: 0			

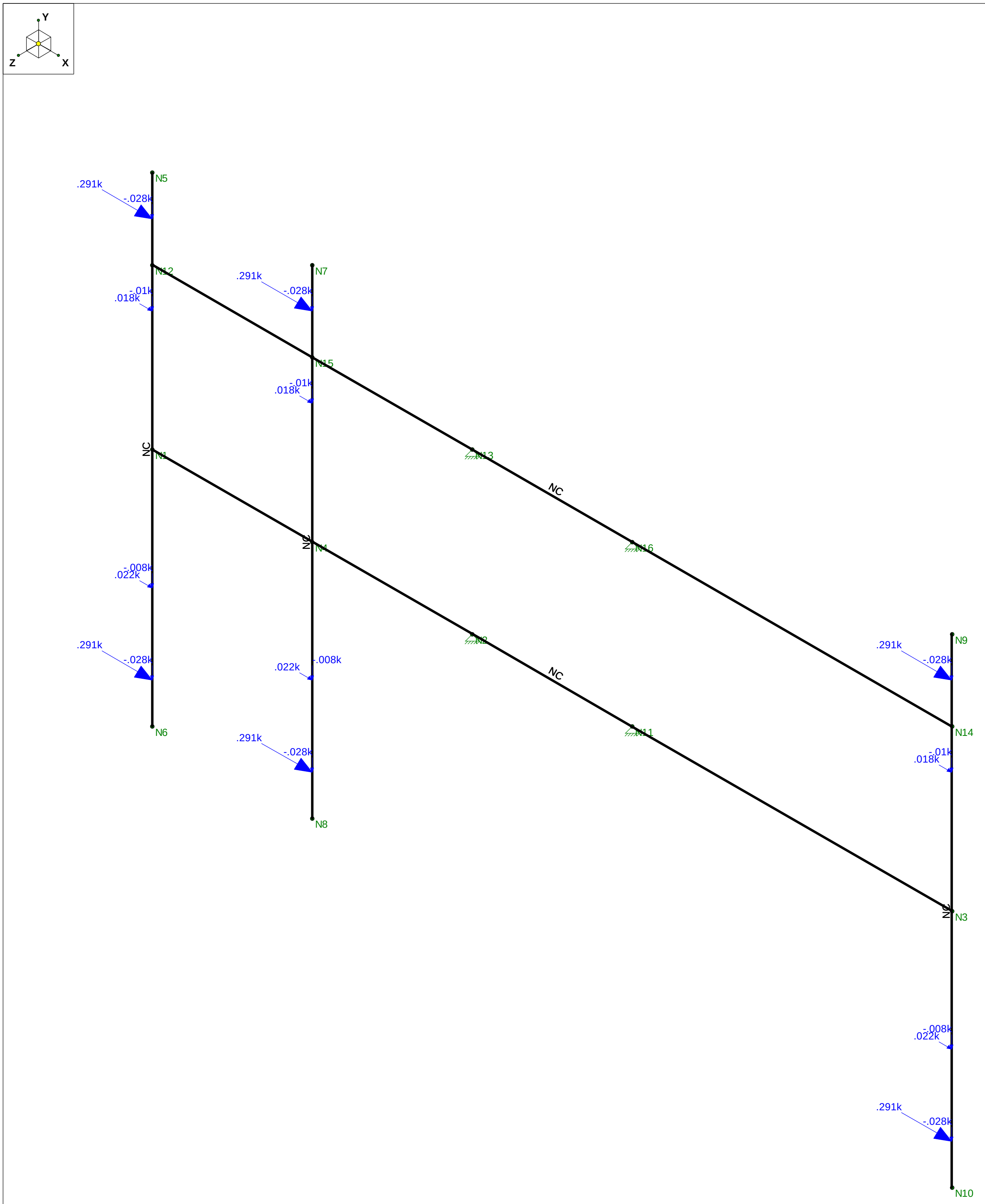
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	6	N2	-1.02	.556	-.453	0	0	0
2	6	N11	.541	.335	-.027	0	0	0
3	6	N13	1.02	.562	-.028	0	0	0
4	6	N16	-.541	.339	-.042	0	0	0
5	6	Totals:	0	1.791	-.551			
6	6	COG (ft):	X: 4.218	Y: .223	Z: 0			



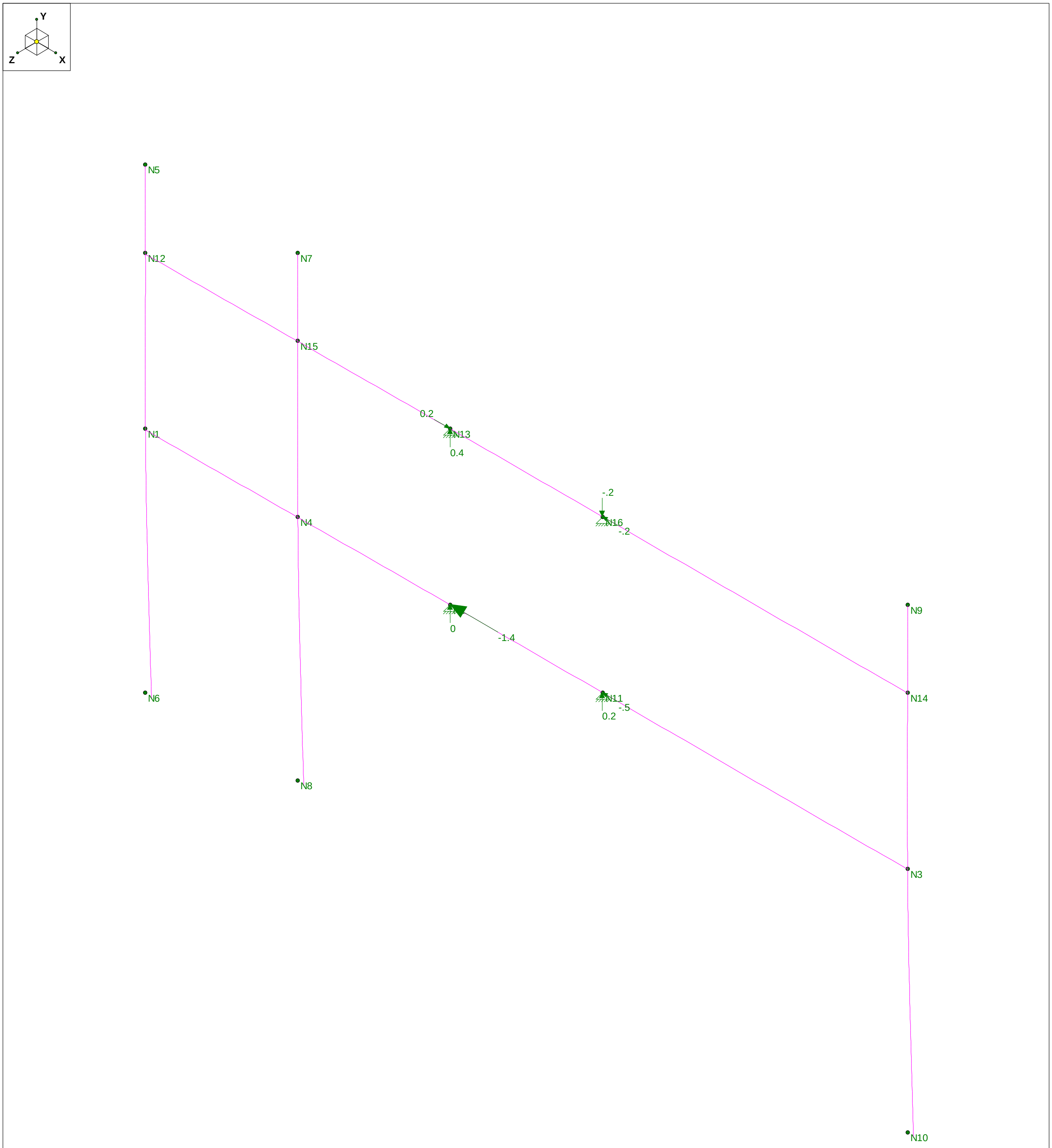
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:27 PM
17159.16 - CT43XC811	Unity Check	TIA - Sprint.r3d



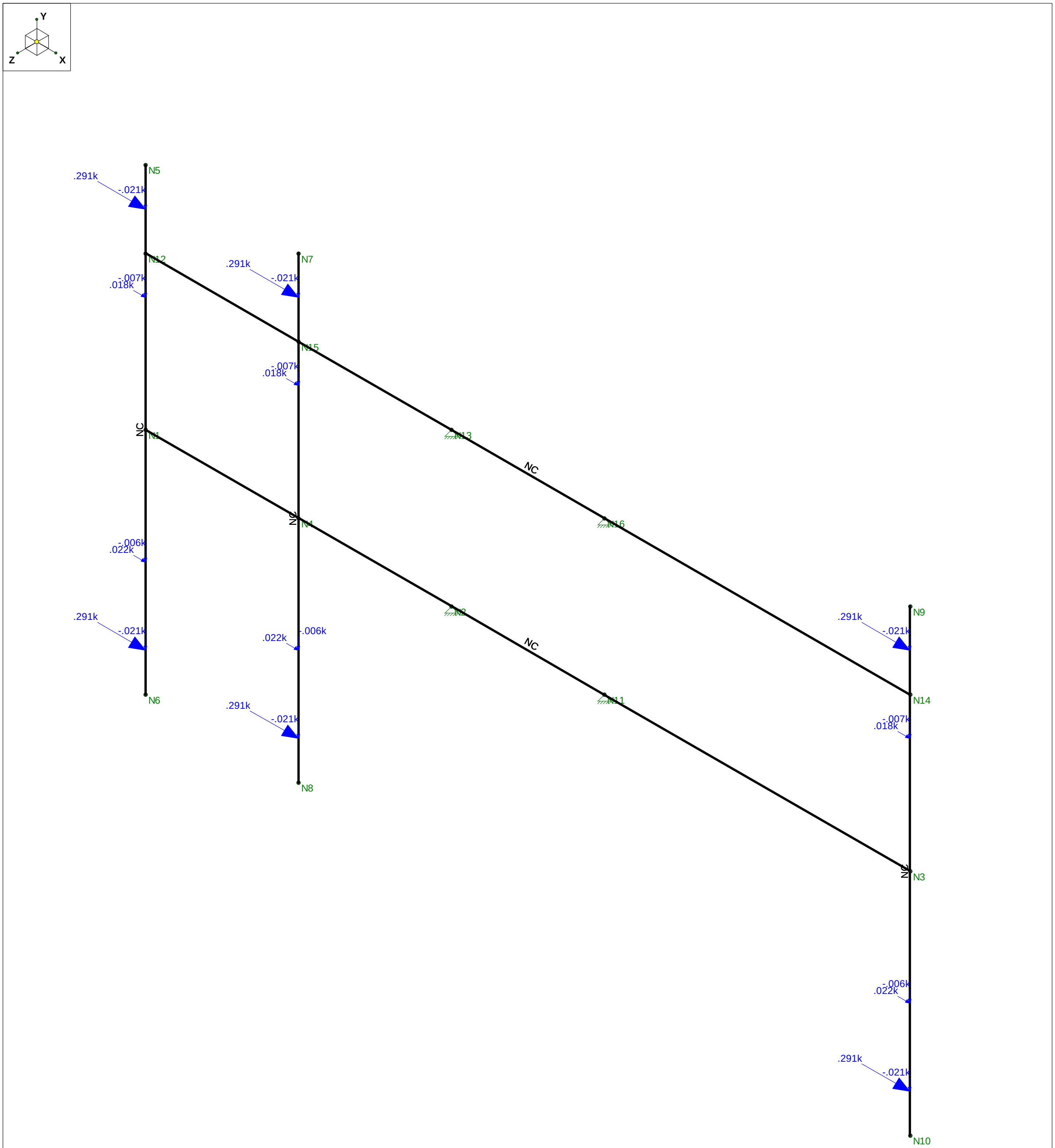
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W (X-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:28 PM
17159.16 - CT43XC811	LC #1 Loads	TIA - Sprint.r3d



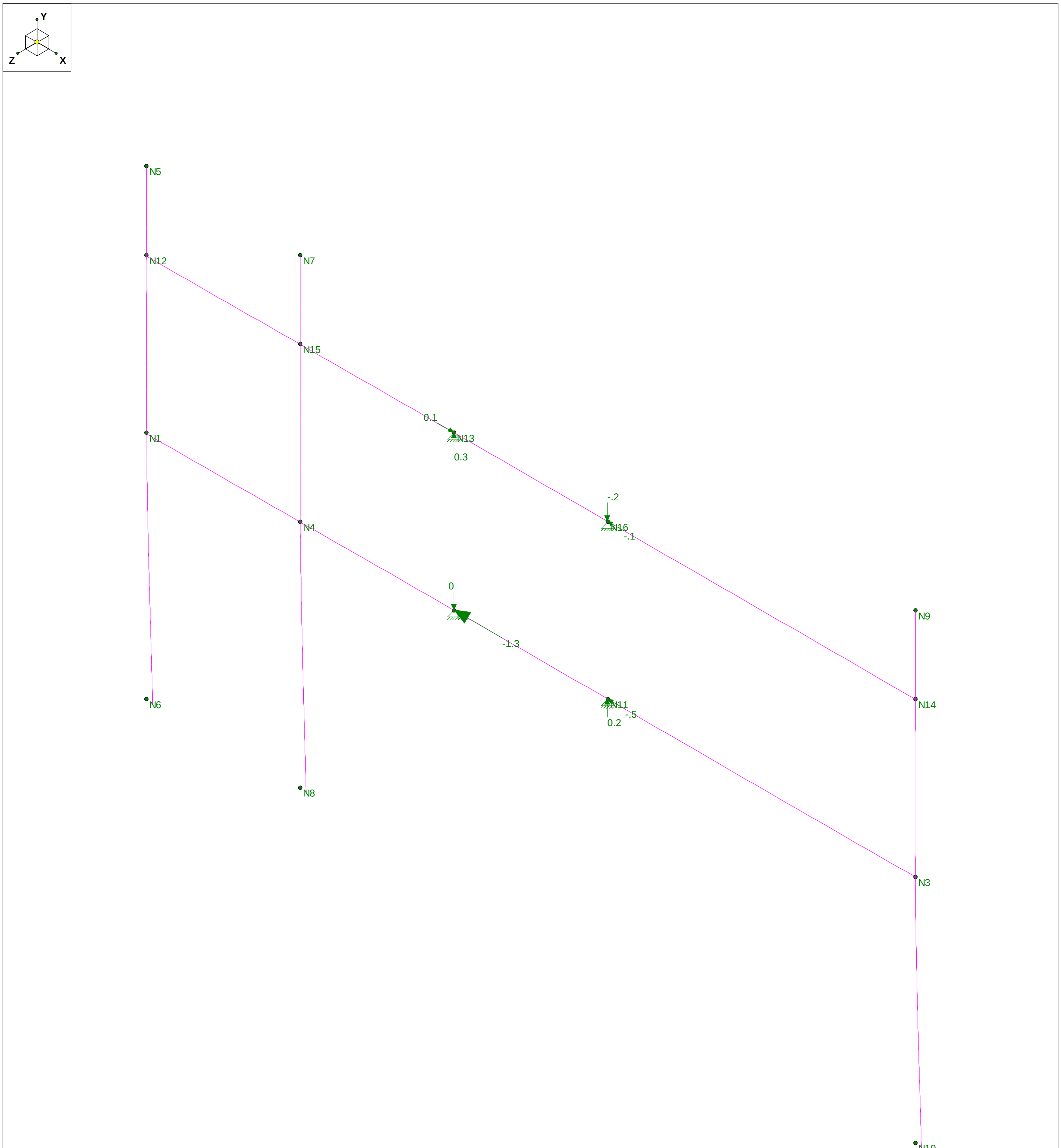
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:29 PM
17159.16 - CT43XC811	LC #1 Reactions and Deflected Shape	TIA - Sprint.r3d



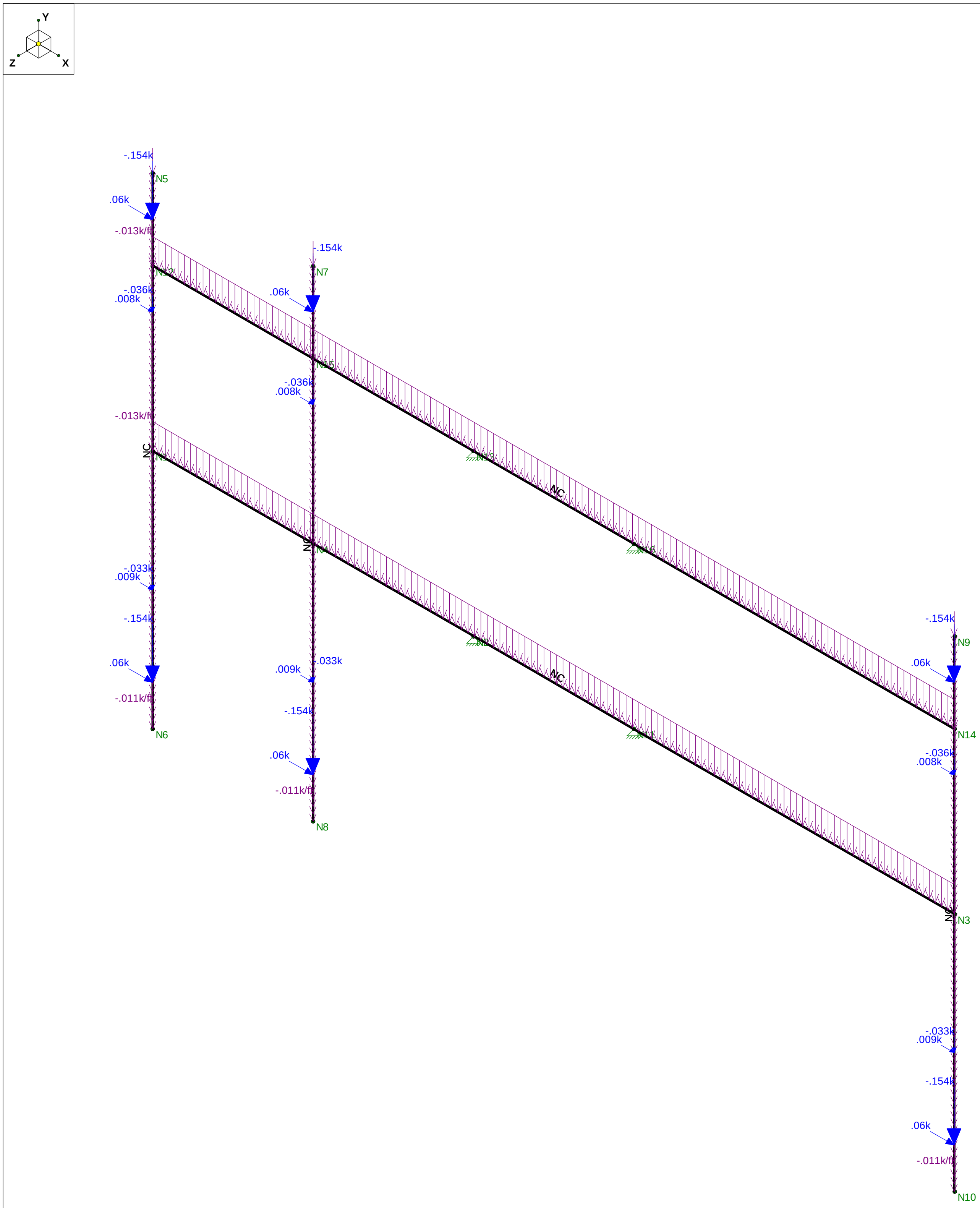
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W (X-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:28 PM
17159.16 - CT43XC811	LC #2 Loads	TIA - Sprint.r3d



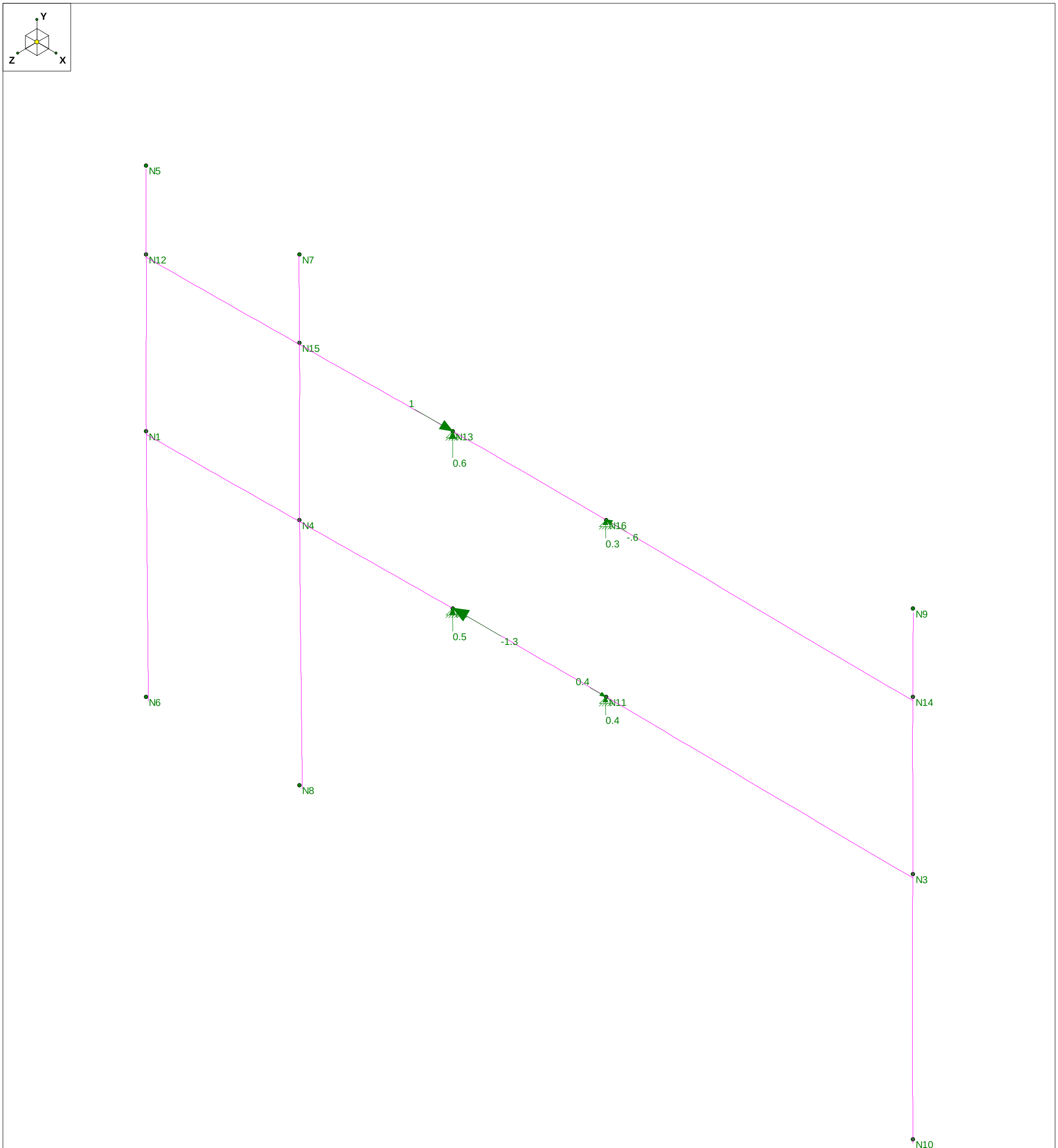
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:31 PM
17159.16 - CT43XC811	LC #2 Reactions and Deflected Shape	TIA - Sprint.r3d



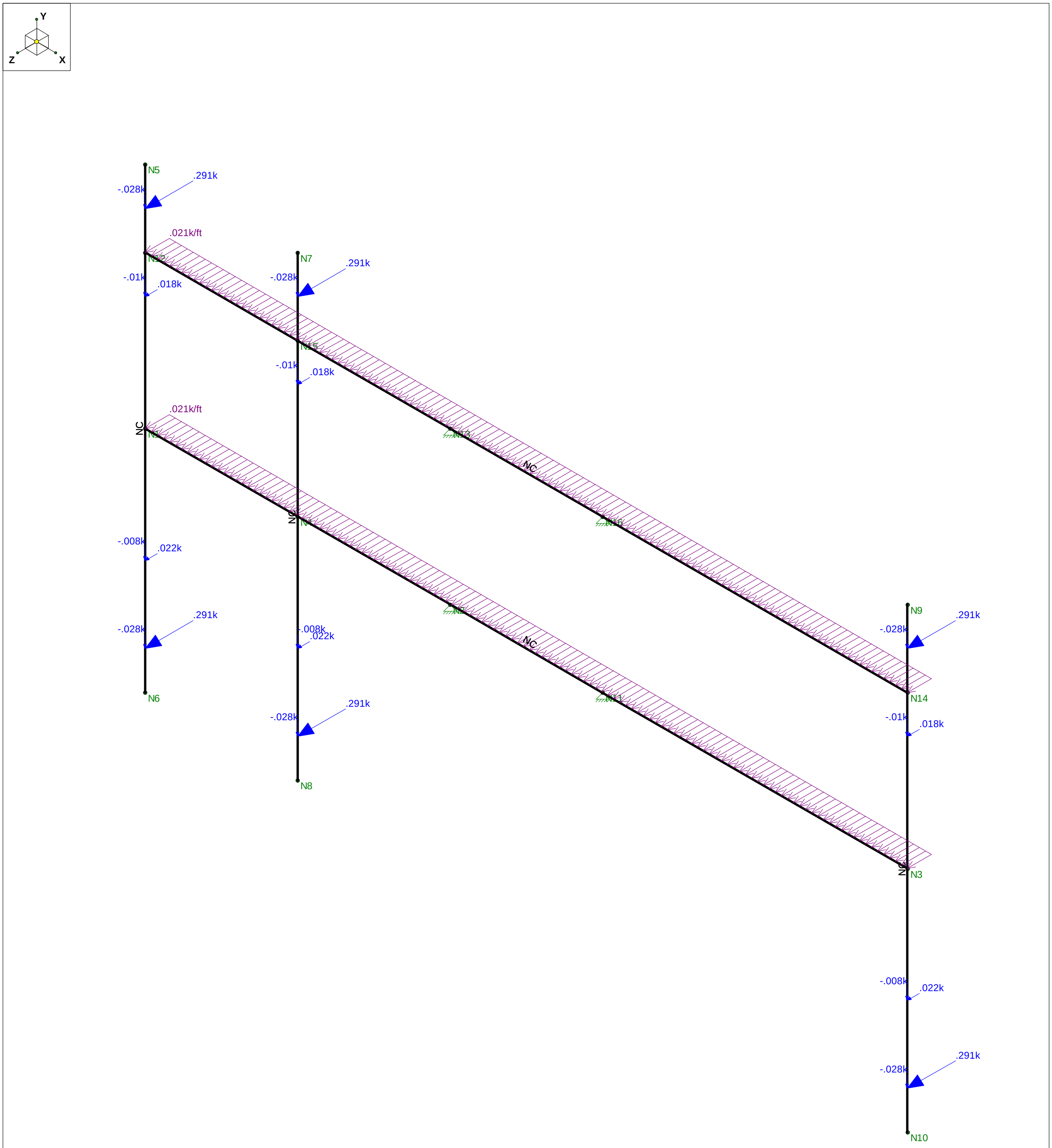
Member Code Checks Displayed
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

CENTEK Engineering, INC.	Tower # 844 - Sprint Mast	
TJL		Feb 15, 2019 at 1:28 PM
17159.16 - CT43XC811	LC #3 Loads	TIA - Sprint.r3d



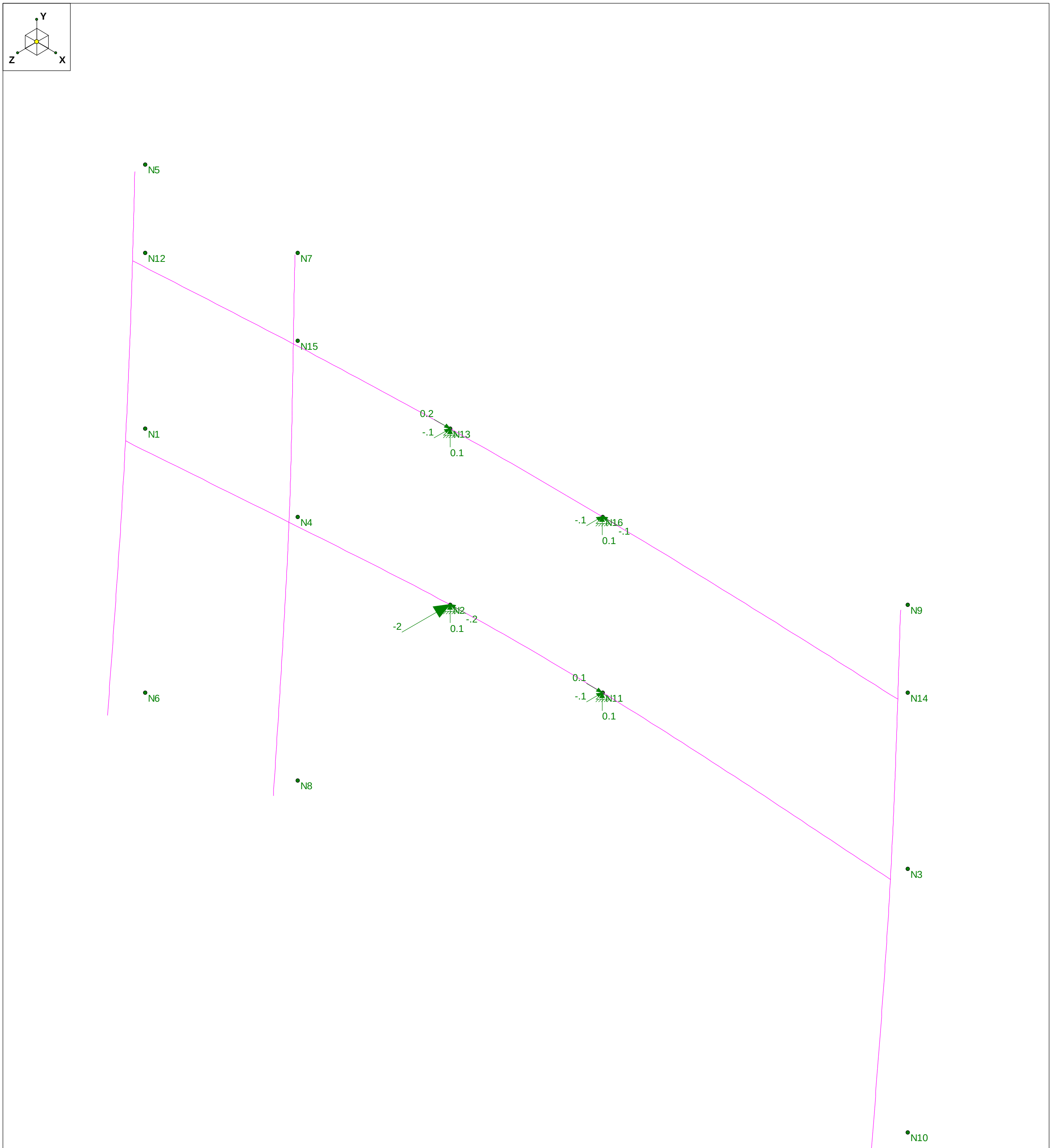
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:31 PM
17159.16 - CT43XC811	LC #3 Reactions and Deflected Shape	TIA - Sprint.r3d



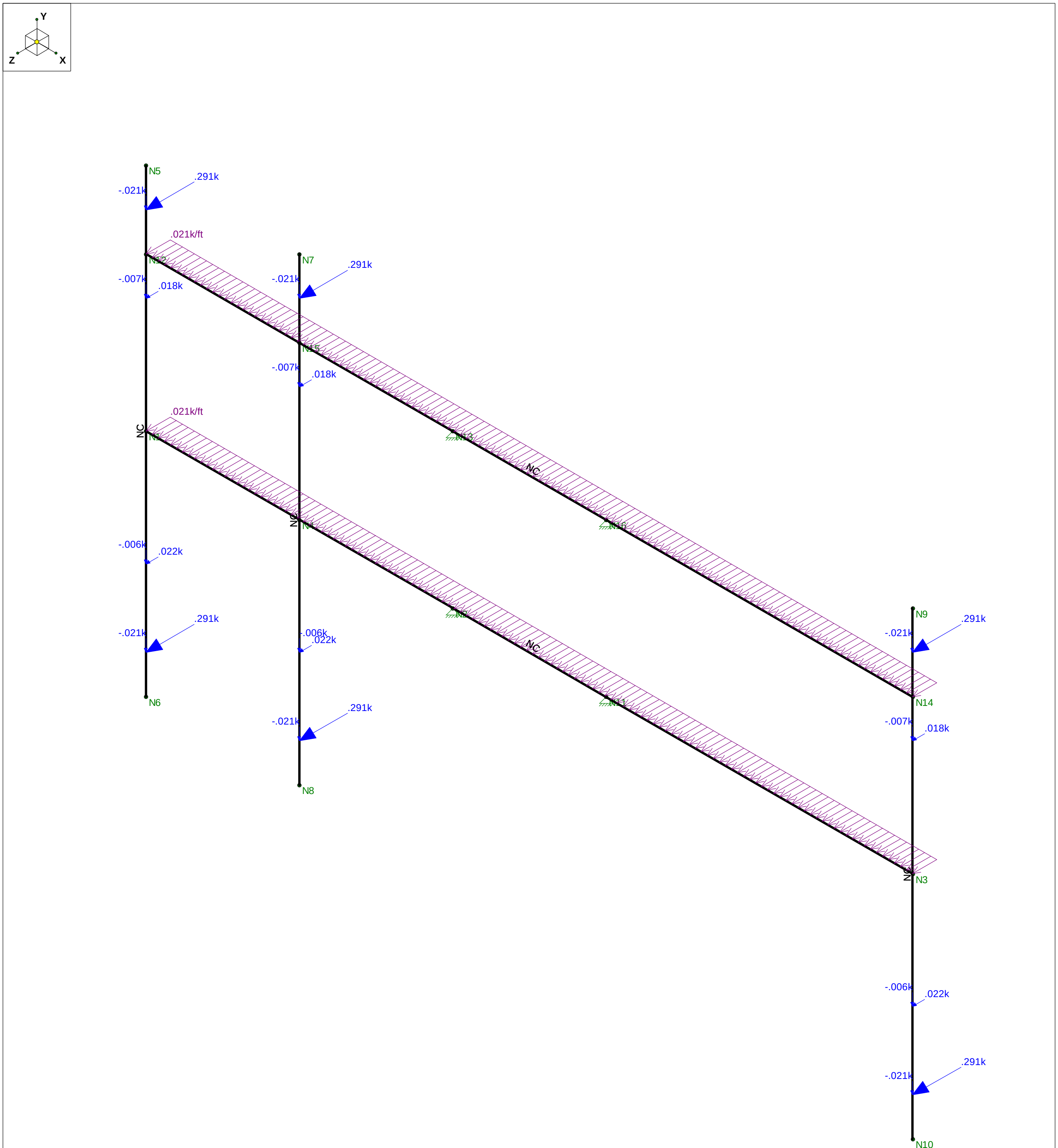
Member Code Checks Displayed
Loads: LC 4, 1.2D + 1.6W (Z-direction)

CENTEK Engineering, INC.	Tower # 844 - Sprint Mast	
TJL		Feb 15, 2019 at 1:28 PM
17159.16 - CT43XC811	LC #4 Loads	TIA - Sprint.r3d



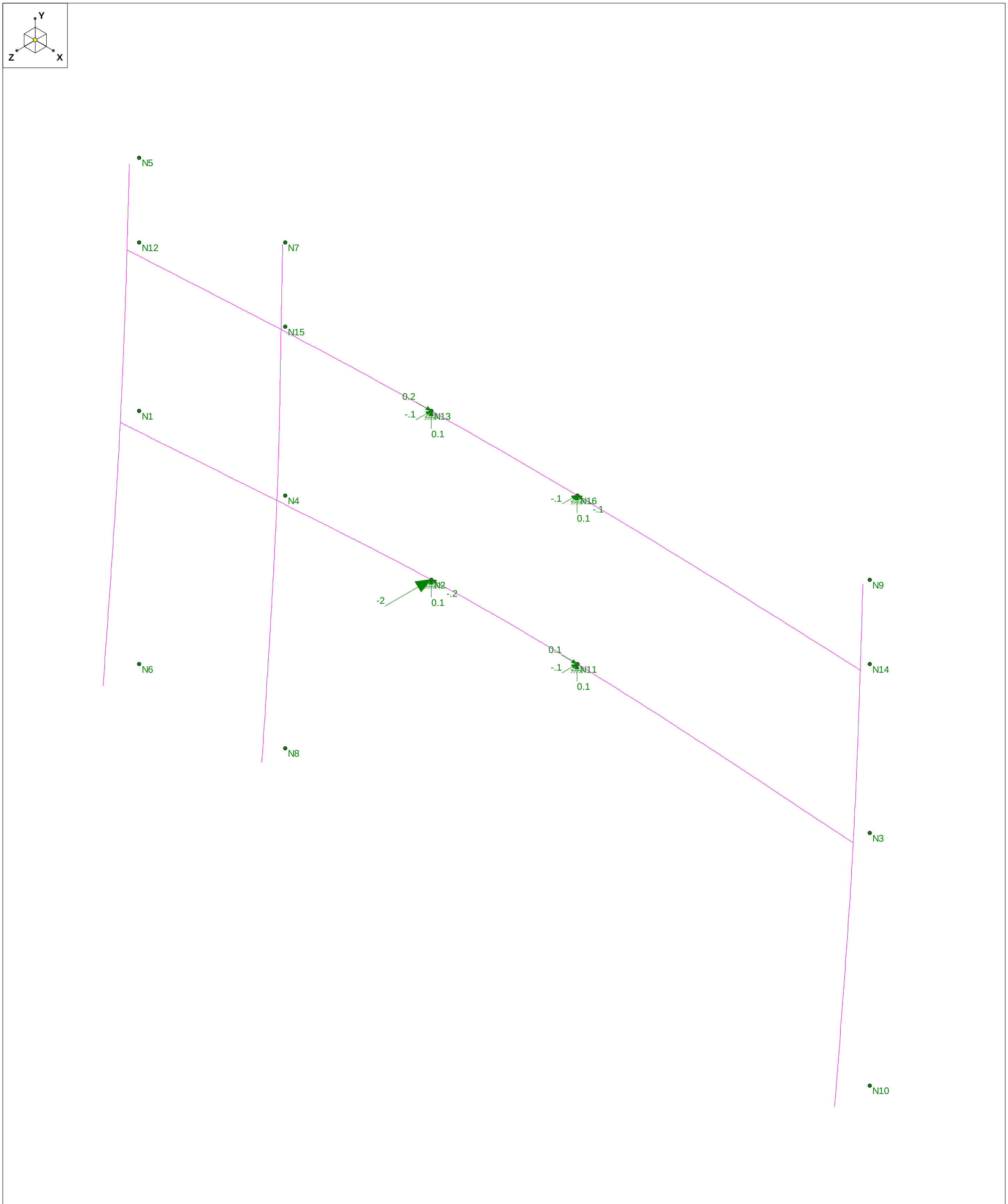
Results for LC 4, 1.2D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:31 PM
17159.16 - CT43XC811	LC #4 Reactions and Deflected Shape	TIA - Sprint.r3d



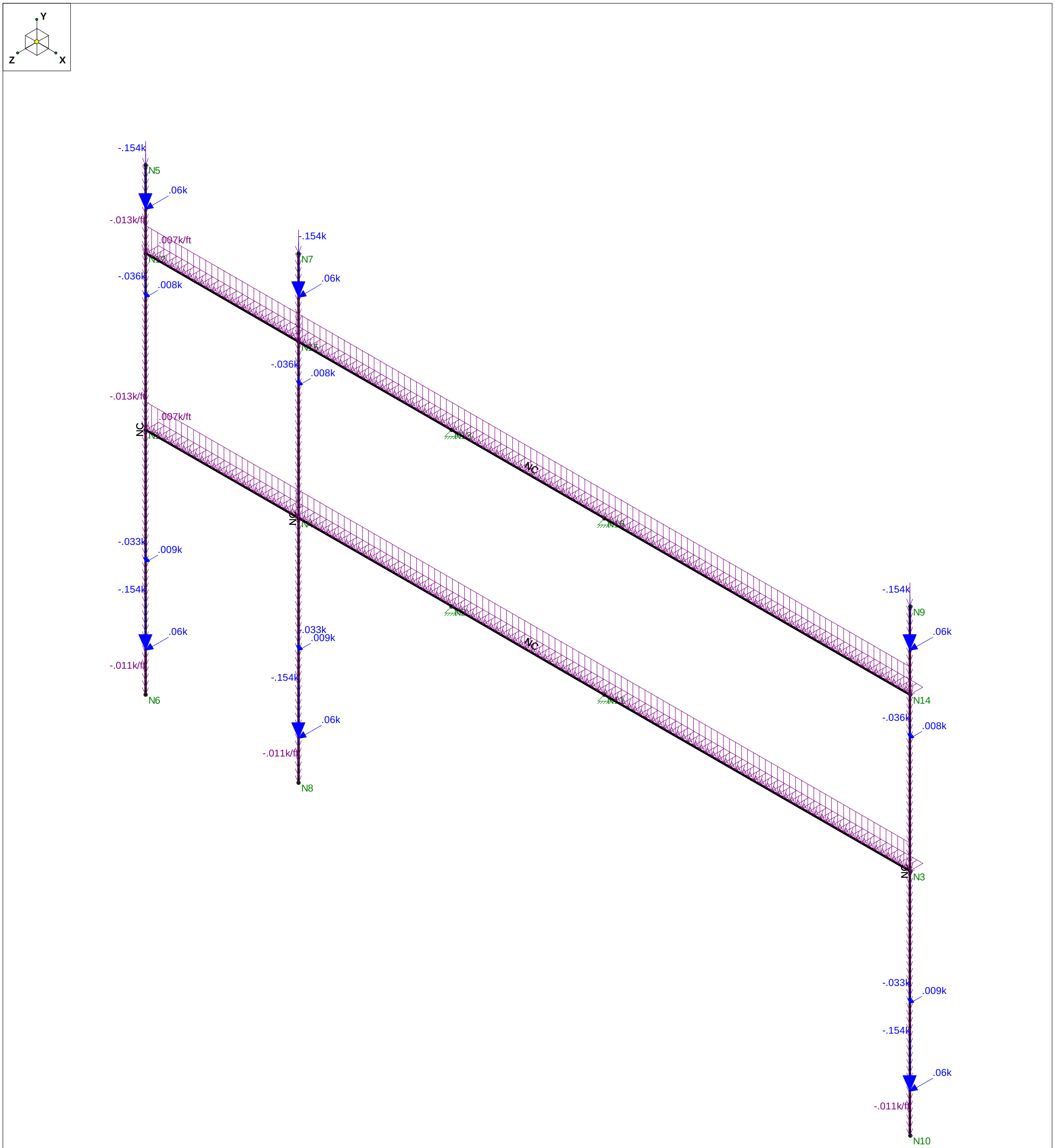
Member Code Checks Displayed
Loads: LC 5, 0.9D + 1.6W (Z-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:28 PM
17159.16 - CT43XC811	LC #5 Loads	TIA - Sprint.r3d



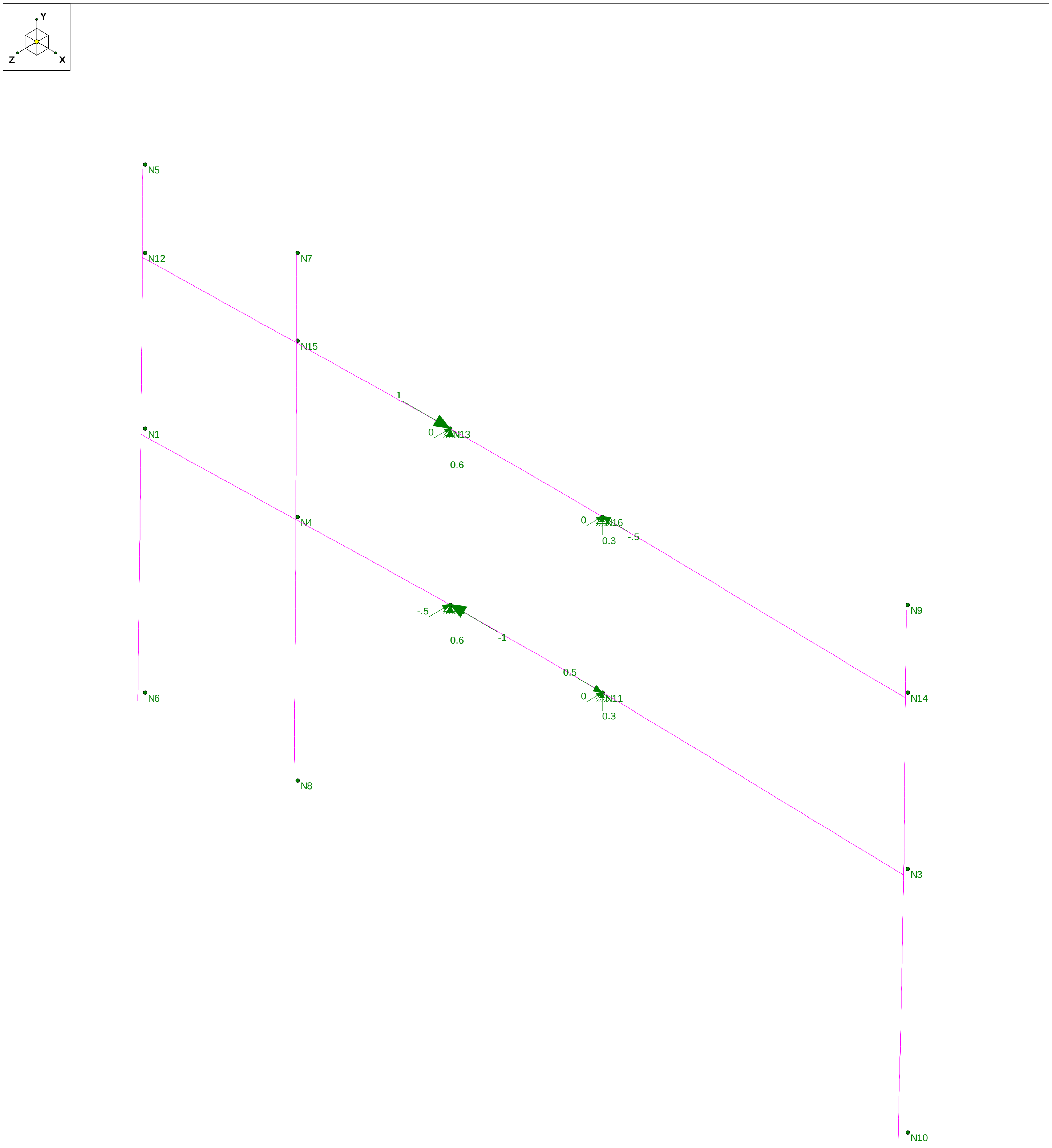
Results for LC 5, 0.9D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:32 PM
17159.16 - CT43XC811	LC #5 Reactions and Deflected Shape	TIA - Sprint.r3d



Member Code Checks Displayed
Loads: LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:29 PM
17159.16 - CT43XC811	LC #6 Loads	TIA - Sprint.r3d



Results for LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - Sprint Mast	Feb 15, 2019 at 1:32 PM
17159.16 - CT43XC811	LC #6 Reactions and Deflected Shape	TIA - Sprint.r3d

Mast Connection to Tower:

Reactions:

Vertical =	$Vertical := 0.62 \cdot kips$	(Input From Risa-3D)
Horizontal x-dir =	$Horizontal_x := 1.4 \cdot kips$	(Input From Risa-3D)
Horizontal z-dir =	$Horizontal_z := 2.1 \cdot kips$	(Input From Risa-3D)

Bolt Data:

Bolt Type =	A36 Threaded Rod	(User Input - Assumed Grade)
Bolt Diameter =	$D := 0.75 \cdot in$	(User Input)
Number of Bolts =	$N_b := 2$	(User Input)
Design Tensile Strength =	$F_t := 14.9 \cdot kips$	(User Input)
Design Shear Strength =	$F_v := 8.97 \cdot kips$	(User Input)

Shear Force = $f_v := \frac{\sqrt{Horizontal_x^2 + Vertical^2}}{N_b} = 0.8 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 8.53 \cdot \%$

Check Bolt Shear = $Bolt\_Shear := if\left(\frac{f_v}{F_v} \leq 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

$Bolt\_Shear = \text{"OK"}$

Tension Force = $f_t := \frac{Horizontal_z}{N_b} = 1.1 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 7.05 \cdot \%$

Check Bolt Tension = $Bolt\_Tension := if\left(\frac{f_t}{F_t} \leq 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

$Bolt\_Tension = \text{"OK"}$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2012 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade = $TME := 163$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2012 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.403$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.292$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.783$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.83$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36$ psf (NESC 2012 Section 250.C.2)

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on Mast (AT&T)

Mast Data: (HSS6.625x0.432)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 6.625$ in (User Input)

Mast Length = $L_{mast} := 21$ ft (User Input)

Mast Thickness = $t_{mast} := 0.432$ in (User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.552$ sf/ft

Total Mast Wind Force (Above NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 40$ plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} = 32$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.635$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_{coax} \cdot AICE_{mast} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 11.2$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 4$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (AT&T)

Antenna Model =	Qunitel QS66512-2		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 12$	in	(User Input)
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 111$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 18$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1298$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 127$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 333$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1765$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 57$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 172$	lbs	**BLC 3**

Development of Wind & Ice Load on TMA's

TMA Data: (AT&T)

TMA Model =	Kaelus TMA2117F00V1-1		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 8.46$	in	(User Input)
TMA Width =	$W_{TMA} := 11.81$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.21$	in	(User Input)
TMA Weight =	$WT_{TMA} := 18$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 6$		(User Input)

Wind Load (NESC Extreme)

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.7$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 4.2$ sf

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 300$ lbs **BLC 5**

Wind Load (NESC Heavy)

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 0.8$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 32$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 108$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 421$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 211$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 7$ lbs

Weight of Ice on All TMA's $W_{ICETMA} \cdot N_{TMA} = 41$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (AT&T)

Mount Type: Site Pro Tri-Sector Chain Mount w/ 3 Pipes

Mount Shape = Round (User Input)

Pipe Mount Length = $L_{mnt} := 60$ in (User Input)

2 inch Pipe Mount Linear Weight = $W_{mnt} := 3.66$ plf (User Input)

Pipe Mount Outside Diameter = $D_{mnt} := 2.375$ in (User Input)

Number of Mounting Pipes = $N_{mnt} := 3$ (User Input)

Tri Sector Chain Mount Weight = $W_{tsc.mnt} := 101$ lbs (User Input)

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0.0$ sf

Total Mount Wind Force = $F_{mnt} := qz \cdot Cd_F \cdot A_{mnt} \cdot m = 0$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice = $A_{ICEmnt} := 0.0$ sf

Total Mount Wind Force = $Fi_{mnt} := p \cdot Cd_F \cdot A_{ICEmnt} = 0$ lbs **BLC 4**

Gravity Loads (without ice)

(per TIA/EIA-222-F-1996)

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 18$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{tsc.mnt} = 156$ lbs **BLC 2**

Gravity Load (ice only)

(per TIA/EIA-222-F-1996)

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 266$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 280$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 9$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 32$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (AT&T - on mast)

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 21$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 3$		(User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 36$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 29$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^{\ 2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 18$ plf **BLC 3**

Development of Wind & Ice Load on Mast (Sprint)

Mast Data: (HSS2.875x0.203)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 2.875$	in	(User Input)
Mast Length =	$L_{mast} := 10$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.203$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.24$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 11$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.323$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 2$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 5.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 2$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model =	Commscope DHHTT65B-3XR		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72.1$	in	(User Input)
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 46$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 46$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6092$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1546$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 50$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 42$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 6$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} = 344$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = RFS KIT-FD9R6004/1C-DL Diplexer

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.8$ in (User Input)

Antenna Width = $W_{ant} := 6.5$ in (User Input)

Antenna Thickness = $T_{ant} := 4.6$ in (User Input)

Antenna Weight = $WT_{ant} := 7$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 7$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 173$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 112$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 4$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.4$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.4$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 2$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.3$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} = 15$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = CCI DPO-7126Y-0-T1 Diplexer

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 4.07$ in (User Input)

Antenna Width = $W_{ant} := 7.42$ in (User Input)

Antenna Thickness = $T_{ant} := 6.26$ in (User Input)

Antenna Weight = $WT_{ant} := 8$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 8$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 189$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 121$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 4$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 2$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.2$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.2$ sf

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} = 12$ lbs

Development of Wind & Ice Load on Mast (Sprint)

Mast Data: (2 Std. Pipe)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 2.375$	in	(User Input)
Mast Length =	$L_{mast} := 6$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.154$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.198$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 9$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.281$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 1$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 4.5$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 2$ plf **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Standard Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz Mast	HSS2.875X0.203	Beam	Pipe	A500 Gr.42	Typical	1.59	1.45	1.45	2.89
2	Pipe Mast	PIPE_2.0	Column	Wide Flange	A53 Gr. B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Horz Mast	10			Lbyy									Lateral
2	M2	Pipe Mast	6			Lbyy									Lateral
3	M3	Pipe Mast	6			Lbyy									Lateral
4	M4	Pipe Mast	6			Lbyy									Lateral
5	M5	Horz Mast	10			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N3			Horz Mast	Beam	Pipe	A500 Gr....	Typical
2	M2	N6	N5			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
3	M3	N8	N7			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
4	M4	N10	N9			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
5	M5	N12	N14			Horz Mast	Beam	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	4	0	0	0	
3	N3	10	0	0	0	
4	N4	2	0	0	0	
5	N5	0	3	0	0	
6	N6	0	-3	0	0	
7	N7	2	3	0	0	
8	N8	2	-3	0	0	
9	N9	10	3	0	0	
10	N10	10	-3	0	0	
11	N11	6	0	0	0	
12	N12	0	2	0	0	
13	N13	4	2	0	0	
14	N14	10	2	0	0	
15	N15	2	2	0	0	
16	N16	6	2	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N2	Reaction	Reaction	Reaction			
2	N11	Reaction	Reaction	Reaction			
3	N13	Reaction	Reaction	Reaction			
4	N16	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.023	.5
2	M3	Y	-.023	.5
3	M4	Y	-.023	.5
4	M2	Y	-.023	5.5
5	M3	Y	-.023	5.5
6	M4	Y	-.023	5.5
7	M2	Y	-.007	1.5
8	M3	Y	-.007	1.5
9	M4	Y	-.007	1.5
10	M2	Y	-.008	4.5
11	M3	Y	-.008	4.5
12	M4	Y	-.008	4.5

Member Point Loads (BLC 3 : Weight of Ice Only on PCS Struct)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.025	.5
2	M3	Y	-.025	.5
3	M4	Y	-.025	.5
4	M2	Y	-.025	5.5
5	M3	Y	-.025	5.5
6	M4	Y	-.025	5.5
7	M2	Y	-.004	1.5
8	M3	Y	-.004	1.5
9	M4	Y	-.004	1.5
10	M2	Y	-.004	4.5
11	M3	Y	-.004	4.5
12	M4	Y	-.004	4.5

Member Point Loads (BLC 4 : x-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.021	.5
2	M3	X	.021	.5
3	M4	X	.021	.5
4	M2	X	.021	5.5
5	M3	X	.021	5.5
6	M4	X	.021	5.5
7	M2	X	.002	1.5
8	M3	X	.002	1.5
9	M4	X	.002	1.5
10	M2	X	.002	4.5
11	M3	X	.002	4.5
12	M4	X	.002	4.5

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.172	.5
2	M3	X	.172	.5
3	M4	X	.172	.5
4	M2	X	.172	5.5

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind on PCS S) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M3	X	.172	5.5
6	M4	X	.172	5.5
7	M2	X	.015	1.5
8	M3	X	.015	1.5
9	M4	X	.015	1.5
10	M2	X	.012	4.5
11	M3	X	.012	4.5
12	M4	X	.012	4.5

Member Point Loads (BLC 6 : z-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	.021	.5
2	M3	Z	.021	.5
3	M4	Z	.021	.5
4	M2	Z	.021	5.5
5	M3	Z	.021	5.5
6	M4	Z	.021	5.5
7	M2	Z	.002	1.5
8	M3	Z	.002	1.5
9	M4	Z	.002	1.5
10	M2	Z	.002	4.5
11	M3	Z	.002	4.5
12	M4	Z	.002	4.5

Member Point Loads (BLC 7 : z-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	.172	.5
2	M3	Z	.172	.5
3	M4	Z	.172	.5
4	M2	Z	.172	5.5
5	M3	Z	.172	5.5
6	M4	Z	.172	5.5
7	M2	Z	.015	1.5
8	M3	Z	.015	1.5
9	M4	Z	.015	1.5
10	M2	Z	.012	4.5
11	M3	Z	.012	4.5
12	M4	Z	.012	4.5

Member Distributed Loads (BLC 3 : Weight of Ice Only on PCS Struct)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.002	-.002	0	0
2	M5	Y	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : z-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.002	.002	0	0
2	M5	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : z-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.011	.011	0	0
2	M5	Z	.011	.011	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Appurtenances	None					12			
3	Weight of Ice Only on PCS Struct	None					12	2		
4	x-dir NESC Heavy Wind on PCS Str	None					12			
5	x-dir NESC Extreme Wind on PCS S	None					12			
6	z-dir NESC Heavy Wind on PCS Str	None					12	2		
7	z-dir NESC Extreme Wind on PCS S	None					12	2		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-dir NESC Heavy Wind...	Yes			1	1.5	2	1.5	3	1.5	4	2.5												
2	x-dir NESC Extreme Wi...	Yes			1	1	2	1	5	1														
3	z-dir NESC Heavy Wind...	Yes			1	1.5	2	1.5	3	1.5	6	2.5												
4	z-dir NESC Extreme Wi...	Yes			1	1	2	1	7	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	-.188	4	.261	3	0	2	0	4	0	4	0	4
2		min	-.885	2	.039	2	-1.187	4	0	1	0	1	0	1
3	N11	max	.25	3	.186	1	0	2	0	4	0	4	0	4
4		min	-.242	2	.071	4	-.043	4	0	1	0	1	0	1
5	N13	max	.469	3	.306	1	0	2	0	4	0	4	0	4
6		min	.143	2	.106	4	-.036	4	0	1	0	1	0	1
7	N16	max	-.101	4	.165	3	0	2	0	4	0	4	0	4
8		min	-.259	1	-.08	2	-.067	4	0	1	0	1	0	1
9	Totals:	max	0	4	.852	3	0	2						
10		min	-1.113	2	.354	2	-1.333	4						

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	-.684	.24	0	0	0	0
2	1	N11	.144	.186	0	0	0	0
3	1	N13	.454	.306	0	0	0	0
4	1	N16	-.259	.119	0	0	0	0
5	1	Totals:	-.345	.852	0			
6	1	COG (ft):	X: 4.261	Y: .269	Z: 0			

Joint Reactions (By Combination)

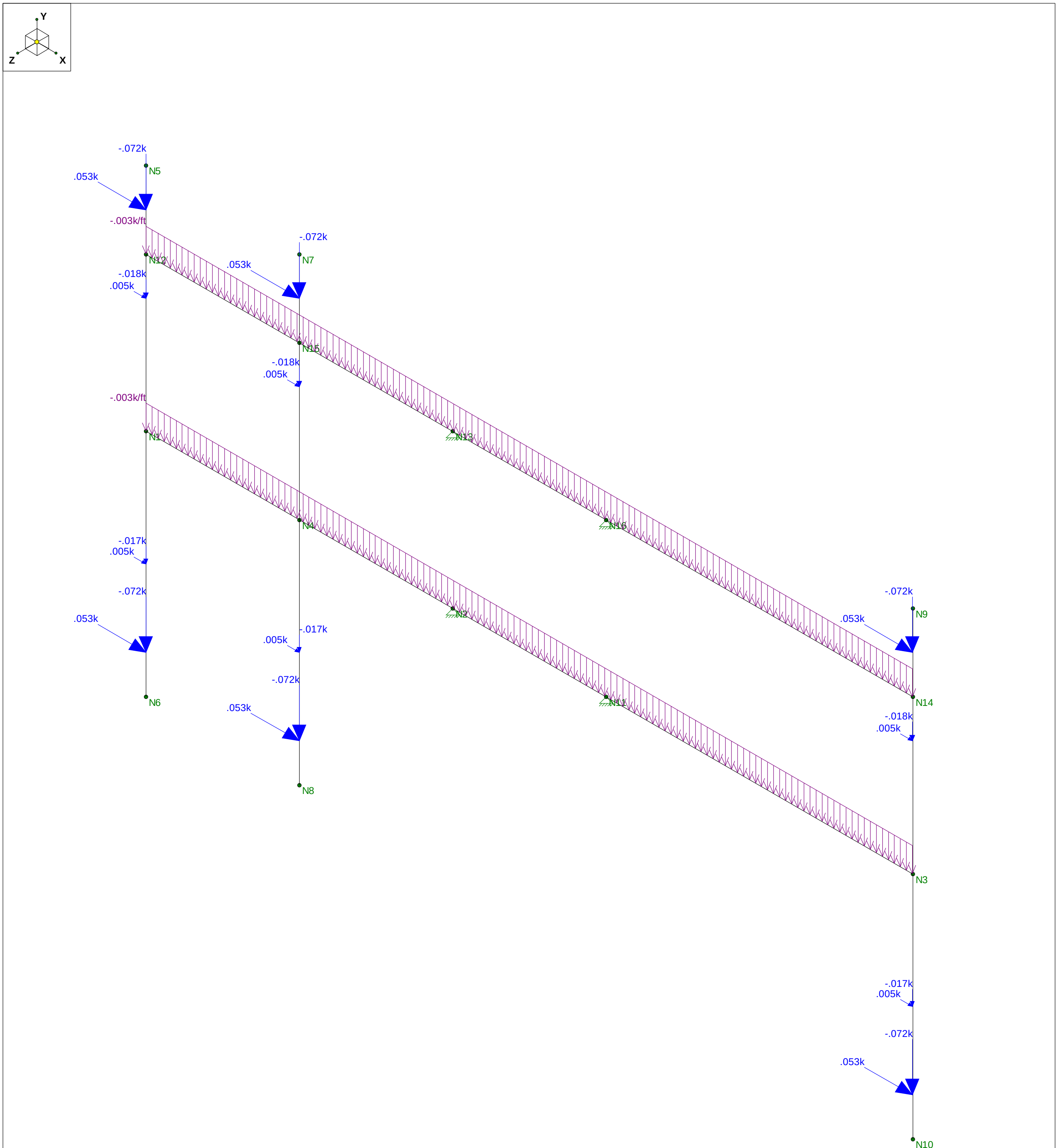
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	-.885	.039	0	0	0	0
2	2	N11	-.242	.141	0	0	0	0
3	2	N13	.143	.254	0	0	0	0
4	2	N16	-.129	-.08	0	0	0	0
5	2	Totals:	-1.113	.354	0			
6	2	COG (ft):	X: 4.306	Y: .319	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N2	-.469	.261	-.374	0	0	0
2	3	N11	.25	.165	-.021	0	0	0
3	3	N13	.469	.261	-.021	0	0	0
4	3	N16	-.25	.165	-.029	0	0	0
5	3	Totals:	0	.852	-.445			
6	3	COG (ft):	X: 4.261	Y: .269	Z: 0			

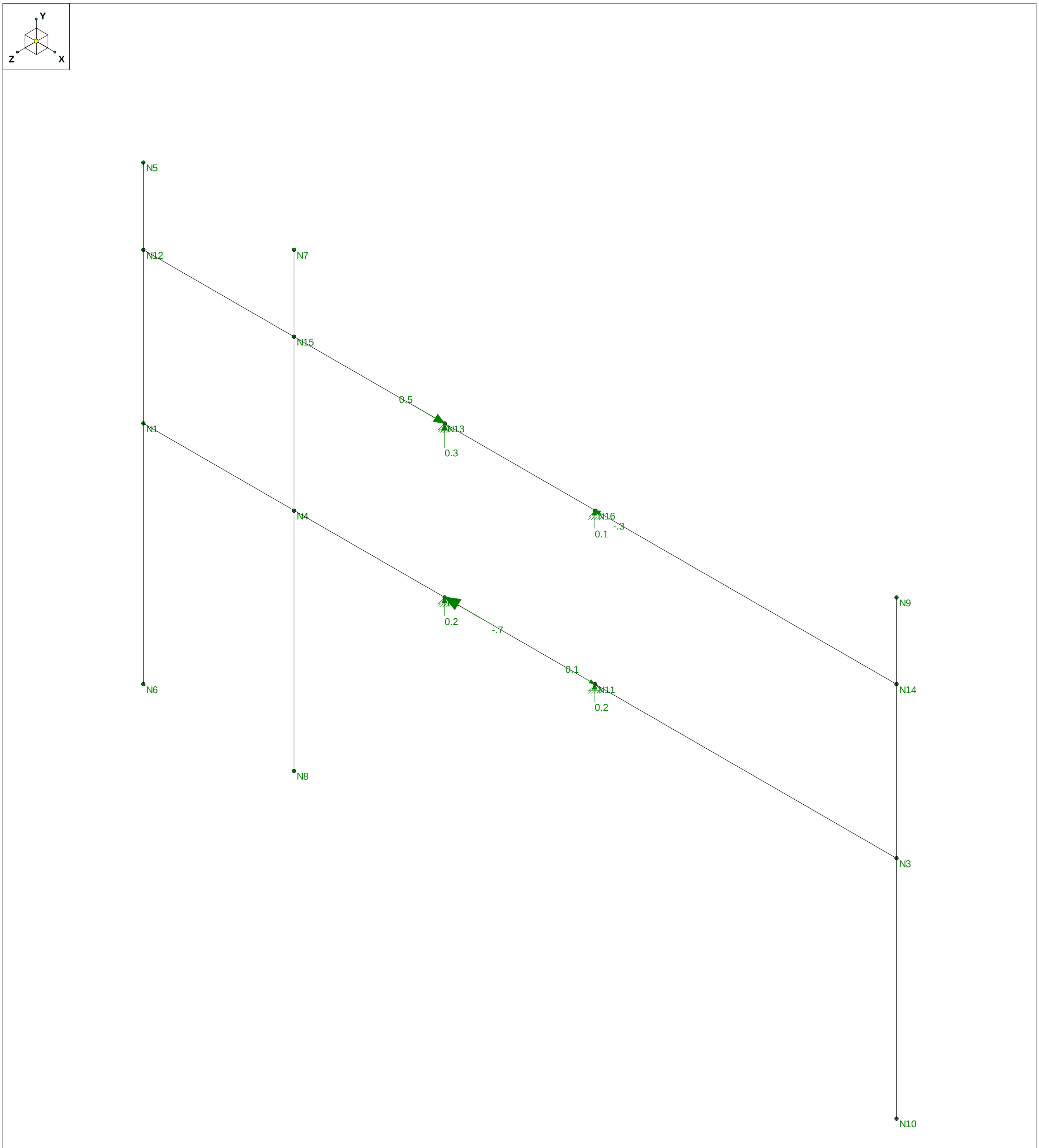
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N2	-.188	.106	-1.187	0	0	0
2	4	N11	.101	.071	-.043	0	0	0
3	4	N13	.188	.106	-.036	0	0	0
4	4	N16	-.101	.071	-.067	0	0	0
5	4	Totals:	0	.354	-1.333			
6	4	COG (ft):	X: 4.306	Y: .319	Z: 0			



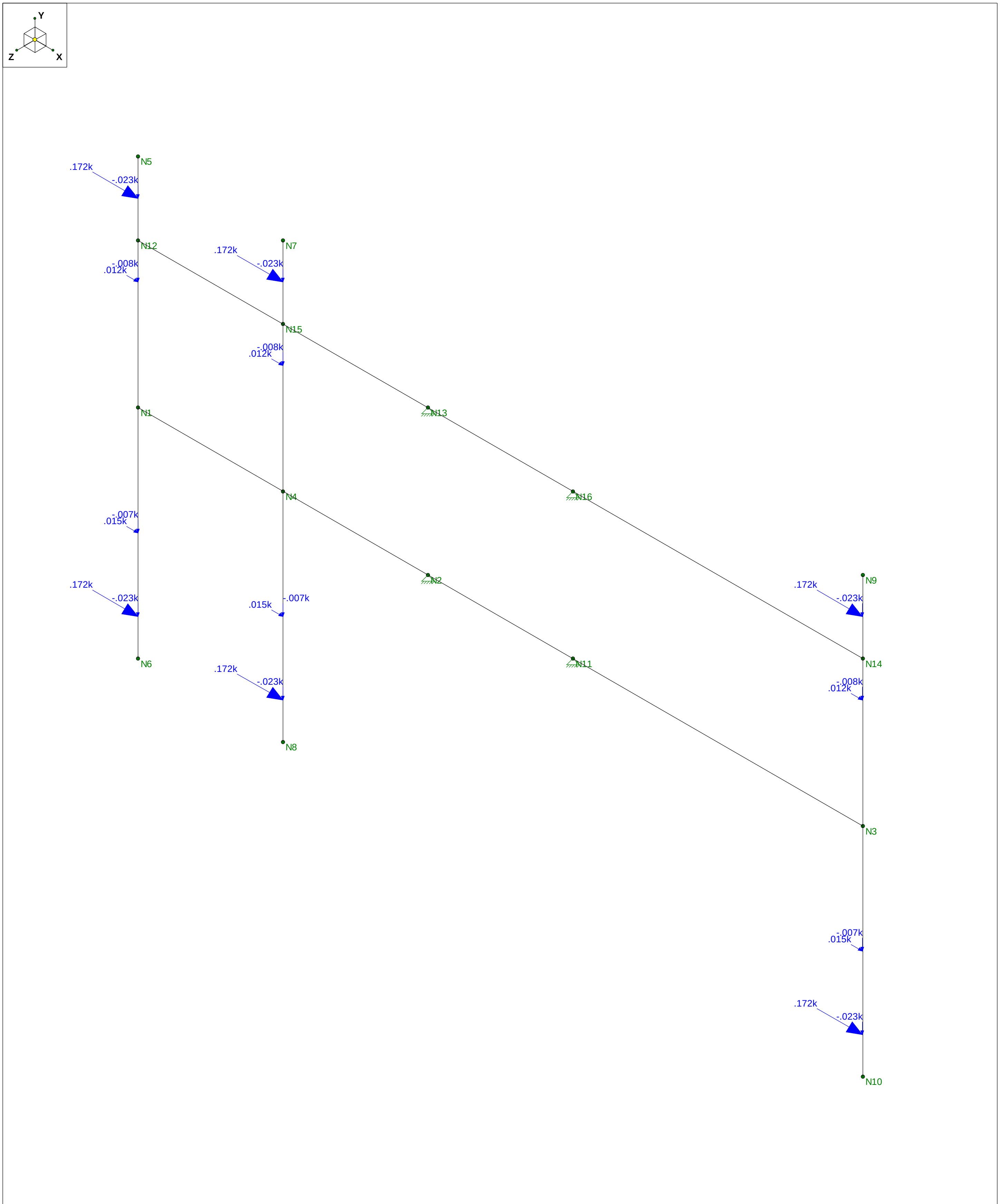
Loads: LC 1, x-dir NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:16 PM
17159.16 - CT43XC811	LC #1 Loads	NESC - Sprint.r3d



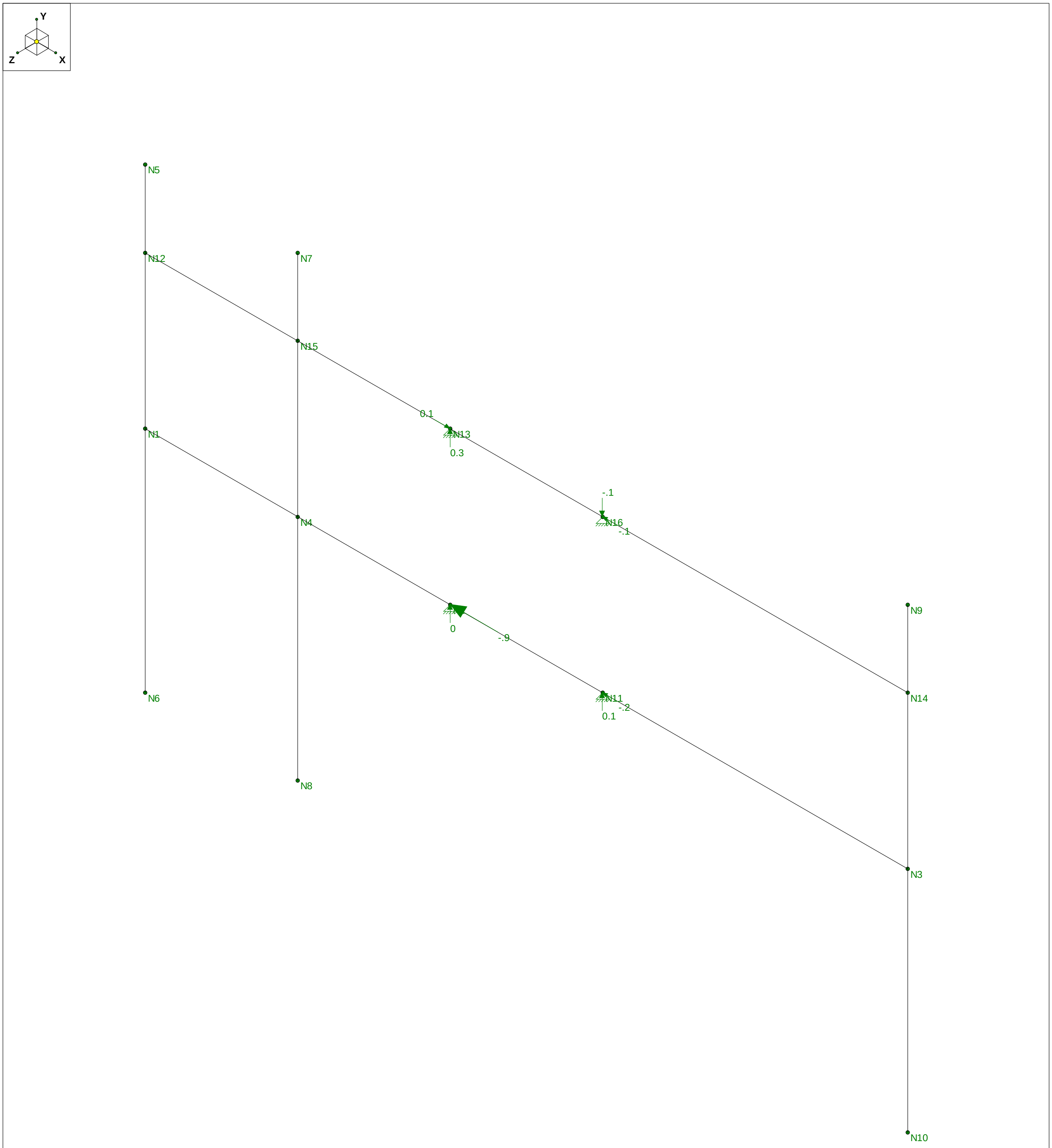
Results for LC 1, x-dir NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:19 PM
17159.16 - CT43XC811	LC #1 Reactions	NESC - Sprint.r3d



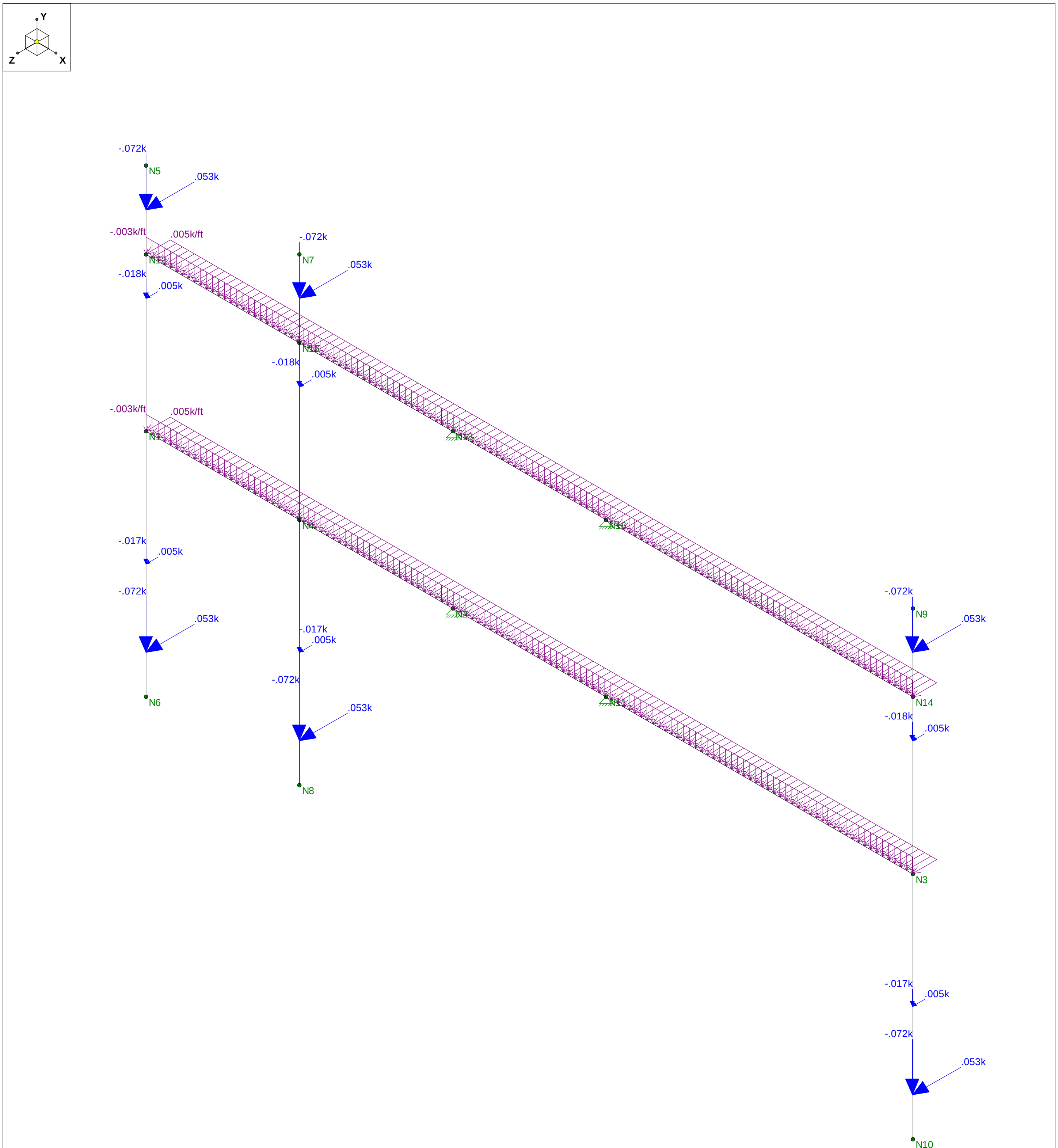
Loads: LC 2, x-dir NESC Extreme Wind on PCS Structure

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:16 PM
17159.16 - CT43XC811	LC #2 Loads	NESC - Sprint.r3d



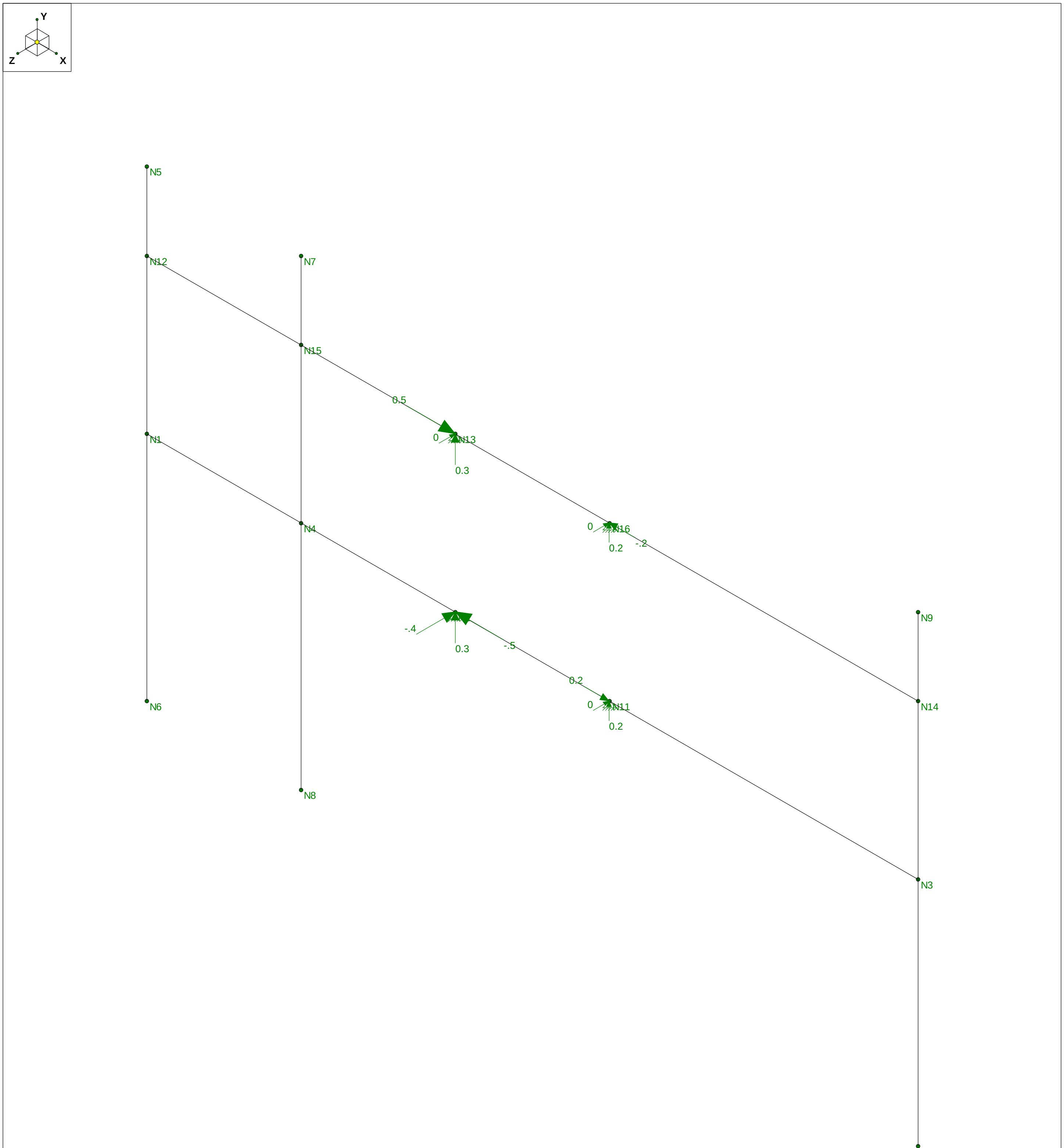
Results for LC 2, x-dir NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.	Tower # 844 - Sprint	
TJL		Feb 15, 2019 at 12:19 PM
17159.16 - CT43XC811	LC #2 Reactions	NESC - Sprint.r3d



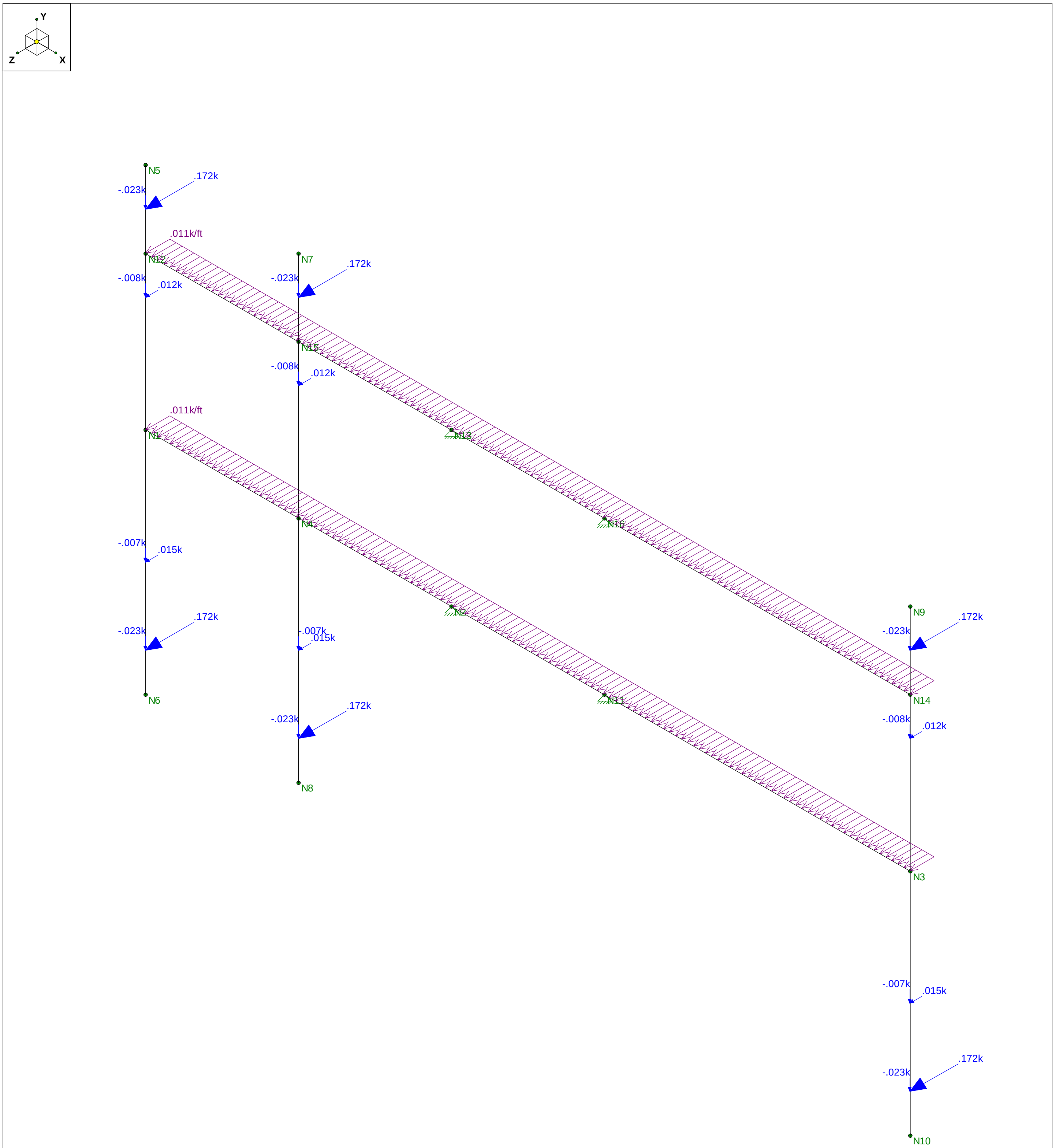
Loads: LC 3, z-dir NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:16 PM
17159.16 - CT43XC811	LC #3 Loads	NESC - Sprint.r3d



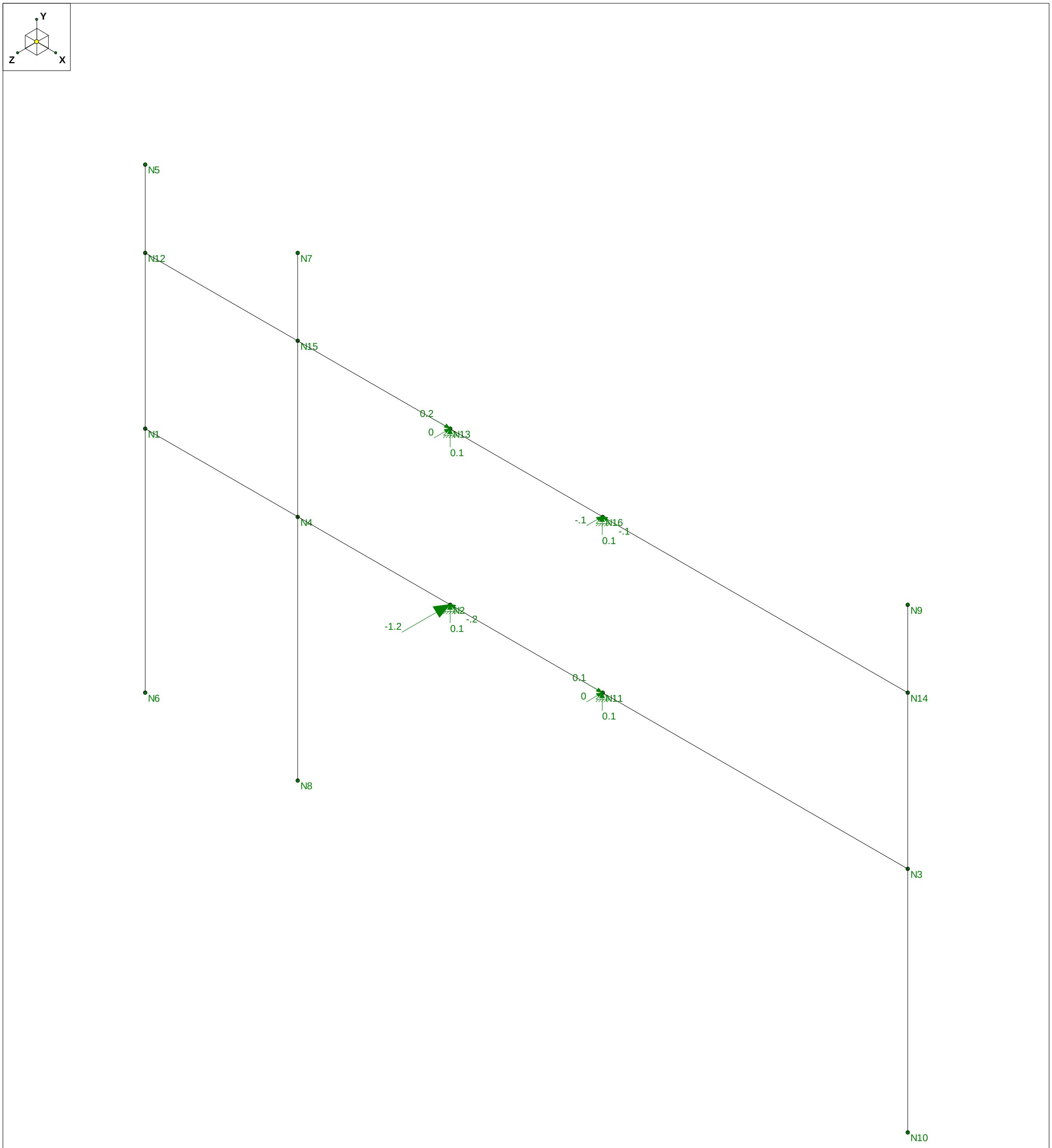
Results for LC 3, z-dir NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.	Tower # 844 - Sprint	
TJL		Feb 15, 2019 at 12:20 PM
17159.16 - CT43XC811	LC #3 Reactions	NESC - Sprint.r3d



Loads: LC 4, z-dir NESC Extreme Wind on PCS Structure

CENTEK Engineering, Inc.	Tower # 844 - Sprint	
TJL		Feb 15, 2019 at 12:17 PM
17159.16 - CT43XC811	LC #4 Loads	NESC - Sprint.r3d



Results for LC 4, z-dir NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:20 PM
17159.16 - CT43XC811	LC #4 Reactions	NESC - Sprint.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Mast	HSS6.625X0.432	Column	Pipe	A500 Gr.42	Typical	7.86	38.2	38.2	76.4

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Existing ...	21.5			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTTO...	TOP-MA...			Existing Mast	Column	Pipe	A500 Gr...	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-MAST	0	0	0	0	
2	BOTTOM-BRACE	0	.5	0	0	
3	TOP-BRACE	0	7.5	0	0	
4	ANTENNA-CL	0	19.5	0	0	
5	TOP-MAST	0	21.5	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTTOM-BRACE	Reaction	Reaction	Reaction		Reaction	
2	TOP-BRACE	Reaction	Reaction	Reaction		Reaction	

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.004	-.004	0	0
2	M1	Y	-.018	-.018	0	0

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	0
2	M1	X	.004	.004	0	0

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.032	.032	0	9
2	M1	X	.04	.04	9	21.5
3	M1	X	.029	.029	0	9
4	M1	X	.036	.036	9	21.5

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None				3		1		
3	Weight of Ice Only	None				3		2		
4	NESC Heavy Wind	None				2		2		
5	NESC Extreme Wind	None				2		4		

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind on PC..	Yes			1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind on ...	Yes			1	1	2	1	5	1														
3	Self Weight				1	1																		

Envelope Joint Reactions

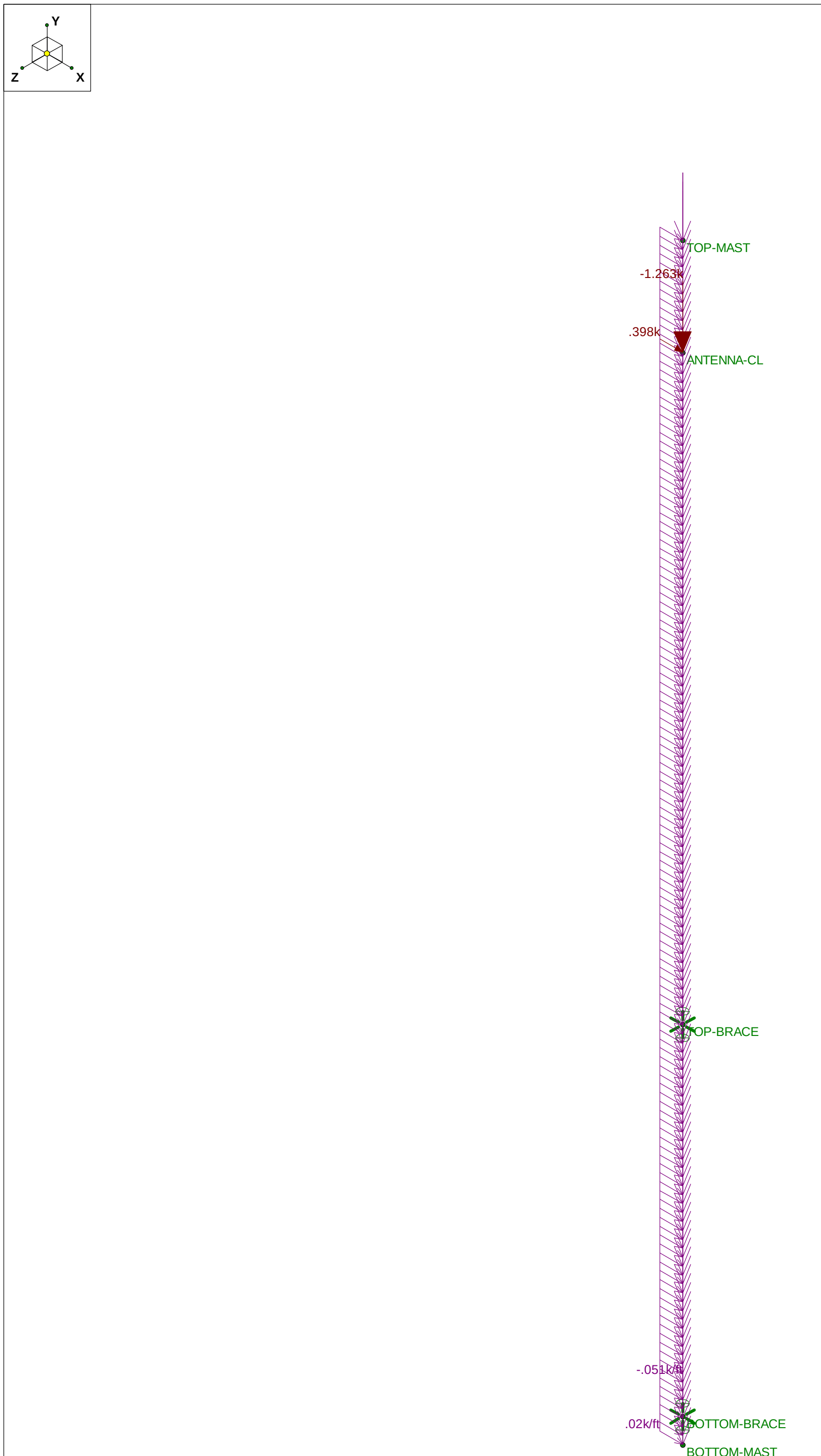
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTTOM-BRA...	max	3.556	2	.364	1	0	2	0	2	0	2	0	2
2		min	.881	1	.155	2	0	1	0	1	0	1	0	1
3	TOP-BRACE	max	-1.709	1	2.858	1	0	2	0	2	0	2	0	2
4		min	-6.653	2	1.275	2	0	1	0	1	0	1	0	1
5	Totals:	max	-.828	1	3.222	1	0	2						
6		min	-3.097	2	1.43	2	0	1						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-BRACE	.881	.364	0	0	0	0
2	1	TOP-BRACE	-1.709	2.858	0	0	0	0
3	1	Totals:	-.828	3.222	0			
4	1	COG (ft):	X: 0	Y: 14.18	Z: 0			

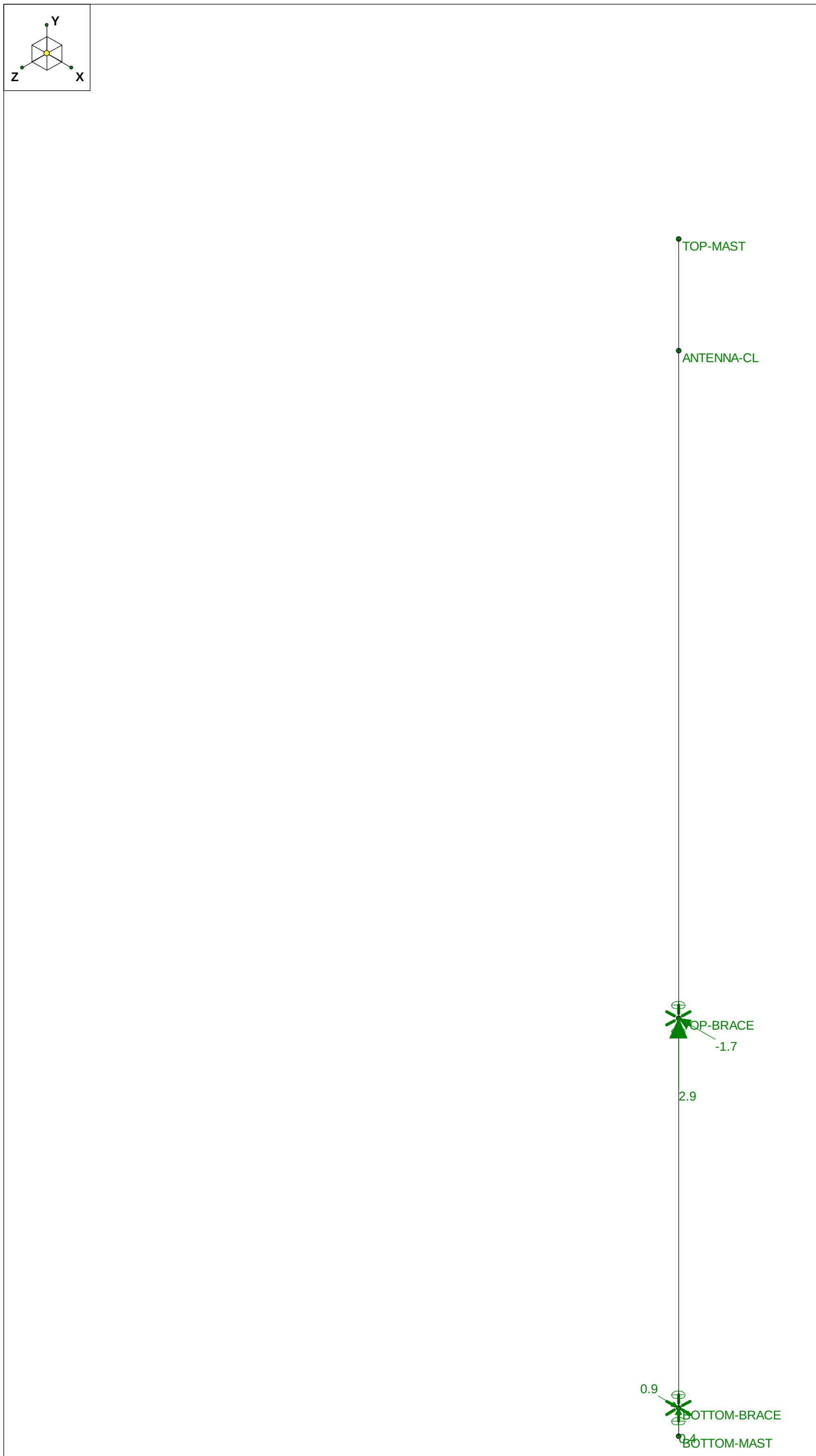
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-BRACE	3.556	.155	0	0	0	0
2	2	TOP-BRACE	-6.653	1.275	0	0	0	0
3	2	Totals:	-3.097	1.43	0			
4	2	COG (ft):	X: 0	Y: 14.403	Z: 0			



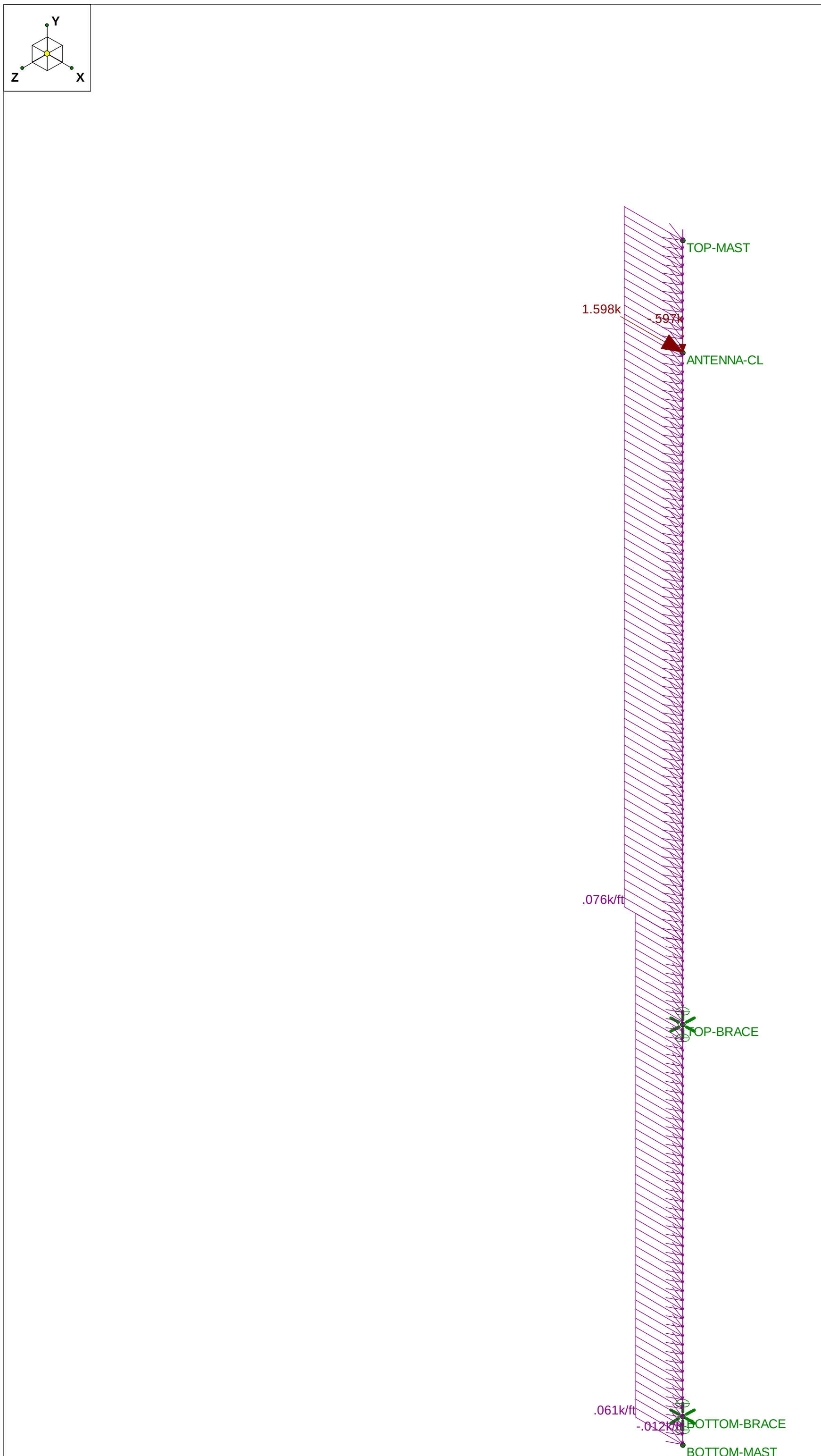
Loads: LC 1, NESC Heavy Wind on PCS Structure

Centek Engineering	Structure # 844 AT&T Mast	
TJL		Jan 3, 2019 at 3:29 PM
17159.16 / CT43Xc811	LC #1 Loads	NESC.r3d



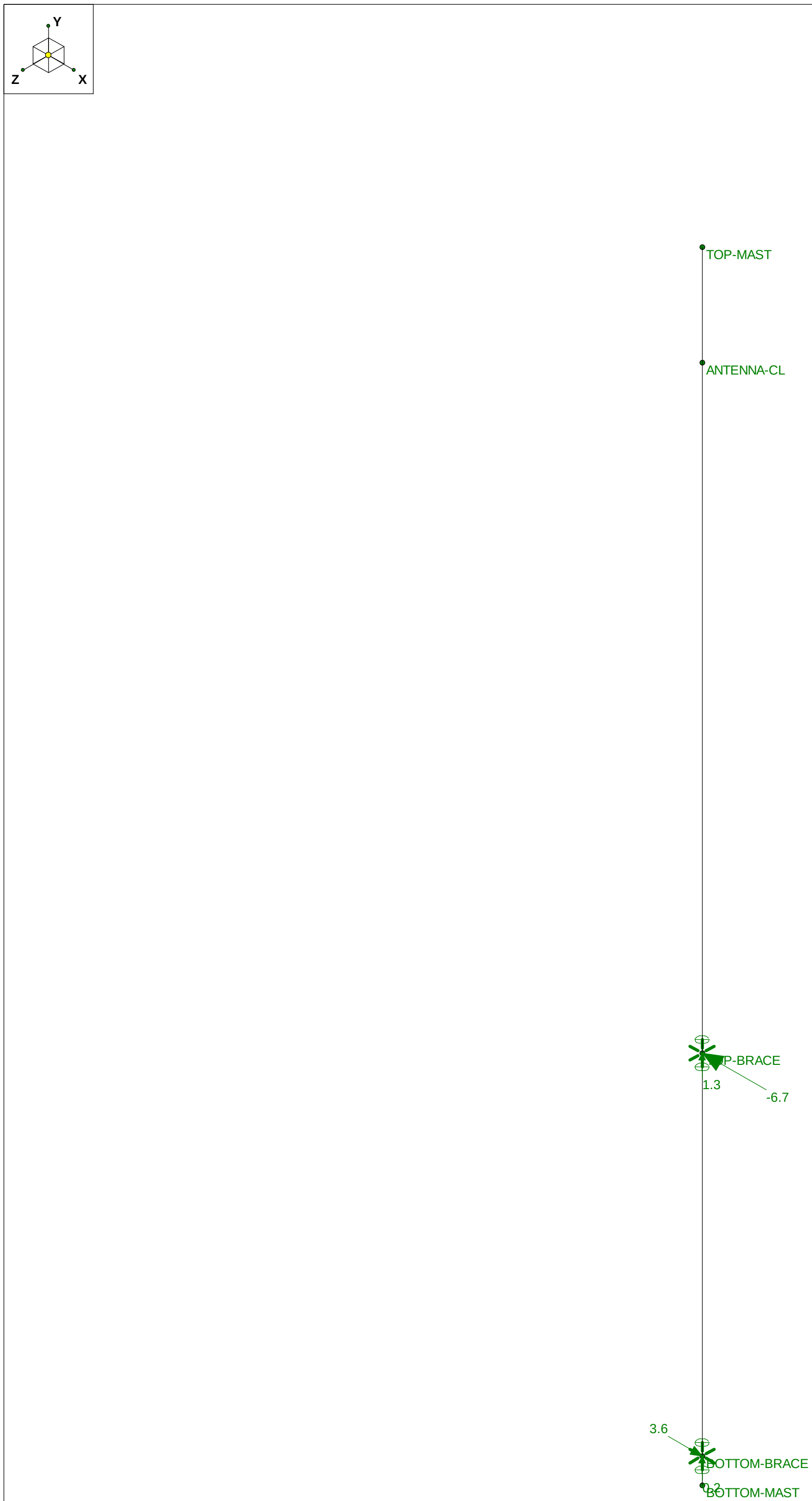
Results for LC 1, NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

Centek Engineering		
TJL	Structure # 844 AT&T Mast	Jan 3, 2019 at 3:30 PM
17159.16 / CT43Xc811	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

Centek Engineering		
TJL	Structure # 844 AT&T Mast	Jan 3, 2019 at 3:29 PM
17159.16 / CT43Xc811	LC #2 Loads	NESC.r3d



Results for LC 2, NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

Centek Engineering		
TJL	Structure # 844 AT&T Mast	Jan 3, 2019 at 3:30 PM
17159.16 / CT43Xc811	LC #2 Reactions	NESC.r3d

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2012 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade = $TME := 163$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2012 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.403$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.292$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.783$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.83$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36$ psf (NESC 2012 Section 250.C.2)

Shape Factors

Shape Factor for Round Members = $Cd_R := 1.3$ (User Input)

Shape Factor for Flat Members = $Cd_F := 1.6$ (User Input)

Shape Factor for Coax Cables Attached to Outside of Pole = $Cd_{coax} := 1.6$ (User Input)

Overload Factors

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

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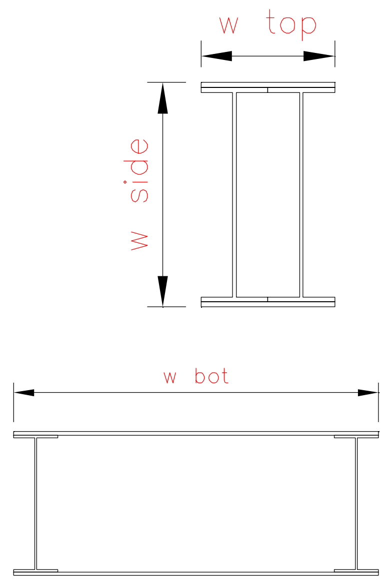
Development of Wind & Ice Load on CL&P Pole



Pole Data:

Shape =	Flat	
Width Side =	$W_{side} := 21.7$	in
Width Top =	$W_{top} := 12$	in
Width Bottom =	$W_{bot} := 54$	in
Length =	$L := 150$	ft
Area Top =	$A_{top} := 30.9$	sq in
Area Bottom =	$A_{bot} := 80.0$	sq in
Weight of Steel =	$W_{steel} := 490$	pcf
Area Top w/ Ice =	$Ai_{top} := 40$	sq in
Area Bottom w/ Ice =	$Ai_{bot} := 112$	sq in

Gravity Loads (without ice)

Weight Pole Top =	$Wt_{top} := \frac{A_{top}}{144} \cdot W_{steel} = 105$	plf	**BLC 2**
Weight Pole Bottom =	$Wt_{bot} := \frac{A_{bot}}{144} \cdot W_{steel} = 272$	plf	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on Pole Top =	$W_{ICE.top} := Id \cdot \frac{Ai_{top}}{144} = 16$	plf	**BLC 3**
Weight of Ice on Pole Bottom =	$W_{ICE.bot} := Id \cdot \frac{Ai_{bot}}{144} = 44$	plf	**BLC 3**

Wind Load (NESC Extreme)

Pole Projected Surface Area Top =	$A_{top} := \frac{W_{top}}{12} = 1$	sq ft/ft	
Pole Projected Surface Area Bottom =	$A_{bot} := \frac{W_{bot}}{12} = 4.5$	sq ft/ft	
Pole Projected Surface Area Side =	$A_{side} := \frac{W_{side}}{12} = 1.808$	sq ft/ft	
Total Pole Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 58$	plf	**BLC 7**
Total Pole Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 260$	plf	**BLC 7**
Total Pole Wind Force Side =	$qz \cdot Cd_F \cdot A_{side} = 104$	plf	**BLC 5**

Wind Load (NESE Heavy)

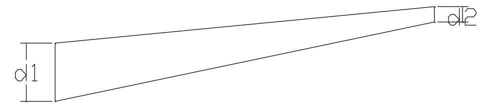
Pole Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(W_{top} + 2 \cdot Ir)}{12} = 1.083$	sq ft/ft	
Pole Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(W_{bot} + 2 \cdot Ir)}{12} = 4.583$	sq ft/ft	
Pole Projected Surface Area w/ Ice Side =	$AICE_{side} := \frac{(W_{side} + 2 \cdot Ir)}{12} = 1.892$	sq ft/ft	
Total Pole Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 7$	plf	**BLC 6**
Total Pole Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 29$	plf	**BLC 6**
Total Pole Wind Force w/ Ice Side =	$p \cdot Cd_F \cdot AICE_{side} = 12$	plf	**BLC 4**

Development of Wind & Ice Load on CL&P Pole Arms

ARM Data:

Shape = Flat

Depth of Arm at Top = $ARM_{d1} := 12$



Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 8$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := \left(ARM_{d1} \cdot ARM_{W1}\right) - \left[\left(ARM_{W1} - 2ARM_t\right) \cdot \left(ARM_{d1} - 2ARM_t\right)\right]$

Arm Area Bottom = $A_{armbot} := \left(ARM_{d2} \cdot ARM_{W2}\right) - \left[\left(ARM_{W2} - 2ARM_t\right) \cdot \left(ARM_{d2} - 2ARM_t\right)\right]$

Weight Arm Top =	$Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 33$	plf	**BLC 2**
Weight Arm Bottom =	$Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$	plf	**BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := \left(ARM_{d1} + 2 \cdot Ir\right) \cdot \left(ARM_{W1} + 2 \cdot Ir\right) - ARM_{d1} \cdot ARM_{W1} = 21$

Arm Area w/ Ice Bottom = $Ai_{armbot} := \left(ARM_{d2} + 2 \cdot Ir\right) \cdot \left(ARM_{W2} + 2 \cdot Ir\right) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top =	$W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 8$	plf	**BLC 3**
Weight of Ice on Arm Bottom =	$W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$	plf	**BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 58$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 19$	plf	**BLC 7**

Wind Load (NESE Heavy)

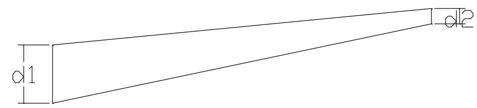
Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.083$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 7$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on CL&P Pole Arms

ARM Data:

Shape = Flat

Depth of Arm at Top = $ARM_{d1} := 15$



Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 10$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := \left(ARM_{d1} \cdot ARM_{W1}\right) - \left[\left(ARM_{W1} - 2ARM_t\right) \cdot \left(ARM_{d1} - 2ARM_t\right)\right]$

Arm Area Bottom = $A_{armbot} := \left(ARM_{d2} \cdot ARM_{W2}\right) - \left[\left(ARM_{W2} - 2ARM_t\right) \cdot \left(ARM_{d2} - 2ARM_t\right)\right]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 42$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := \left(ARM_{d1} + 2 \cdot Ir\right) \cdot \left(ARM_{W1} + 2 \cdot Ir\right) - ARM_{d1} \cdot ARM_{W1} = 26$

Arm Area w/ Ice Bottom = $Ai_{armbot} := \left(ARM_{d2} + 2 \cdot Ir\right) \cdot \left(ARM_{W2} + 2 \cdot Ir\right) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 10$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1.25$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 72$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 19$	plf	**BLC 7**

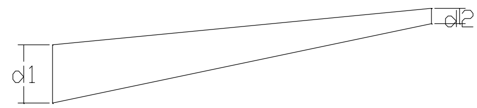
Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.333$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 9$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on CL&P Pole Arms

ARM Data:

Shape = Flat



Depth of Arm at Top = $ARM_{d1} := 18$

Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 12$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := \left(ARM_{d1} \cdot ARM_{W1}\right) - \left[\left(ARM_{W1} - 2ARM_t\right)\cdot\left(ARM_{d1} - 2ARM_t\right)\right]$

Arm Area Bottom = $A_{armbot} := \left(ARM_{d2} \cdot ARM_{W2}\right) - \left[\left(ARM_{W2} - 2ARM_t\right)\cdot\left(ARM_{d2} - 2ARM_t\right)\right]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 50$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := \left(ARM_{d1} + 2 \cdot Ir\right)\cdot\left(ARM_{W1} + 2 \cdot Ir\right) - ARM_{d1} \cdot ARM_{W1} = 31$

Arm Area w/ Ice Bottom = $Ai_{armbot} := \left(ARM_{d2} + 2 \cdot Ir\right)\cdot\left(ARM_{W2} + 2 \cdot Ir\right) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 12$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

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Subject: Load Analysis of Pole #844

Location: Trumbull, CT

Rev. 0: 1/7/19

Prepared by: T.J.L Checked by: C.A.G.
Job No. 17159.16

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1.5$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 87$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 19$	plf	**BLC 7**

Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.583$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 10$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (0-ft to 100-ft)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 100$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 30$ (User Input) (12 AT&T and 18 Sprint)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 3$ (User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ ft

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 29$ plf **BLC 19 & 21**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 4$ plf **BLC 18 & 20**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 31$ plf **BLC 16**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}{}^2\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 45$ plf **BLC 17**

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Subject:	Load Analysis of Pole #844
Location:	Trumbull, CT
Rev. 0: 1/7/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.16

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (100-ft to 140-ft)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 40$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 12$ (User Input) (12 AT&T)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 2$ (User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.3$ ft

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 19$ plf **BLC 19 & 21**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.4$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 3$ plf **BLC 18 & 20**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 16**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^{\,2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 18$ plf **BLC 17**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.2
3	A572 Gr.60	29000	11154	.3	.65	.49	60	1.5	75	1.2
4	A992	29000	11154	.3	.65	.49	50	1.1	65	1.2
5	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
6	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
7	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pole 0'	0'	Column	Wide Flange	A572 Gr.60	Typical	79.56	27580.7	7721	13783.6
2	Pole 5'	5'	Column	Wide Flange	A572 Gr.60	Typical	78.189	25786.2	7566.93	13245.5
3	Pole 10'	10'	Column	Wide Flange	A572 Gr.60	Typical	76.818	24065.1	7412.85	12710.5
4	Pole 15'	15	Column	Wide Flange	A572 Gr.60	Typical	75.447	22416.3	7258.78	12178.9
5	Pole 20'	20'	Column	Wide Flange	A572 Gr.60	Typical	74.076	20881.3	7104.7	11681.1
6	Pole 25'	25'	Column	Wide Flange	A572 Gr.60	Typical	72.705	19329.9	6950.63	11125.1
7	Pole 30'	30'	Column	Wide Flange	A572 Gr.60	Typical	59.89	15891.8	5464.86	8906
8	Pole 35'	35'	Column	Wide Flange	A572 Gr.60	Typical	58.866	14697.5	5351.08	8498.88
9	Pole 40'	40'	Column	Wide Flange	A572 Gr.60	Typical	57.842	13558.4	5237.4	8092.32
10	Pole 45'	45'	Column	Wide Flange	A572 Gr.60	Typical	56.818	12472.9	5123.63	7689.9
11	Pole 50'	50'	Column	Wide Flange	A572 Gr.60	Typical	55.793	11440.4	5009.85	7288.87
12	Pole 55'	55'	Column	Wide Flange	A572 Gr.60	Typical	54.77	10460.3	4896.17	6891.98
13	Pole 60'	60'	Column	Wide Flange	A572 Gr.60	Typical	49.078	8981.09	4248.65	5847.37
14	Pole 65'	65'	Column	Wide Flange	A572 Gr.60	Typical	48.224	8159.94	4154.34	5508.5
15	Pole 70'	70'	Column	Wide Flange	A572 Gr.60	Typical	47.369	7383.44	4059.95	5172.75
16	Pole 75'	75'	Column	Wide Flange	A572 Gr.60	Typical	46.515	6651.33	3965.65	4839.63
17	Pole 80'	80'	Column	Wide Flange	A572 Gr.60	Typical	45.66	5962.43	3871.25	4510.21
18	Pole 85'	85'	Column	Wide Flange	A572 Gr.60	Typical	44.805	5316.3	3776.94	4183.58
19	Pole 90'	90'	Column	Wide Flange	A572 Gr.60	Typical	40.254	4445.95	3264.77	3431.03
20	Pole 95'	95'	Column	Wide Flange	A572 Gr.60	Typical	39.571	3917.71	3189.81	3161.77
21	Pole 100'	100'	Column	Wide Flange	A572 Gr.60	Typical	38.888	3426.45	3114.94	2895.62
22	Pole 105'	105'	Column	Wide Flange	A572 Gr.60	Typical	38.205	2971.38	3039.98	2632.46
23	Pole 110'	110'	Column	Wide Flange	A572 Gr.60	Typical	37.522	2551.93	2965.03	2373.18
24	Pole 115'	115'	Column	Wide Flange	A572 Gr.60	Typical	36.84	2167.55	2890.15	2117.95
25	Pole 120'	120'	Column	Wide Flange	A572 Gr.60	Typical	33.523	1718.78	2521.02	1659.03
26	Pole 125'	125'	Column	Wide Flange	A572 Gr.60	Typical	33.009	1420.3	2465	1457.02
27	Pole 130'	130'	Column	Wide Flange	A572 Gr.60	Typical	32.496	1152.64	2409.03	1259.46
28	Pole 135'	135'	Column	Wide Flange	A572 Gr.60	Typical	31.983	915.275	2353.07	1065.44
29	Pole 140'	140'	Column	Wide Flange	A572 Gr.60	Typical	31.47	707.682	2297.04	876.406
30	Pole 145'	145'	Column	Wide Flange	A572 Gr.60	Typical	30.956	529.465	2241.07	694.633
31	5' Arm Base	5' Arm Base	Beam	Tube	A36 Gr.36	Typical	9.75	107.703	201.453	215.555
32	5' Arm Mid	5' Arm Mid	Beam	Tube	A36 Gr.36	Typical	6.75	40.016	62.641	75.013
33	8' Arm Base	8' Arm Base	Beam	Tube	A36 Gr.36	Typical	12.25	214.005	399.005	426.748
34	8' Arm Mid	8' Arm Mid	Beam	Tube	A36 Gr.36	Typical	8	65.573	105.26	123.877
35	10.5' Arm Base	10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical	14.75	374.057	695.932	743.994
36	10.5 Arm Mid	10.5' Arm Mid	Beam	Tube	A36 Gr.36	Typical	9.25	100.193	163.818	190.317

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Pole 0'	5			Lbyy									Lateral
2	M2	8' Arm Mid	4.503			Lbyy									Lateral
3	M3	8' Arm Mid	4.503			Lbyy									Lateral
4	M4	10.5 Arm...	5.427			Lbyy									Lateral
5	M5	10.5 Arm...	5.427			Lbyy									Lateral
6	M6	8' Arm Mid	4.37			Lbyy									Lateral
7	M7	8' Arm Mid	4.37			Lbyy									Lateral
8	M8	5' Arm Mid	2.815			Lbyy									Lateral
9	M9	5' Arm Mid	2.815			Lbyy									Lateral
10	M10	Pole 5'	5			Lbyy									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
11	M11	Pole 10'	5			Lbyy									Lateral
12	M12	Pole 15'	5			Lbyy									Lateral
13	M13	Pole 20'	5			Lbyy									Lateral
14	M14	Pole 25'	5			Lbyy									Lateral
15	M15	Pole 30'	5			Lbyy									Lateral
16	M16	Pole 35'	5			Lbyy									Lateral
17	M17	Pole 40'	5			Lbyy									Lateral
18	M18	Pole 45'	5			Lbyy									Lateral
19	M19	Pole 50'	5			Lbyy									Lateral
20	M20	Pole 55'	5			Lbyy									Lateral
21	M21	Pole 60'	5			Lbyy									Lateral
22	M22	Pole 65'	5			Lbyy									Lateral
23	M23	Pole 70'	5			Lbyy									Lateral
24	M24	Pole 75'	5			Lbyy									Lateral
25	M25	Pole 80'	5			Lbyy									Lateral
26	M26	Pole 85'	5			Lbyy									Lateral
27	M27	Pole 90'	5			Lbyy									Lateral
28	M28	Pole 95'	5			Lbyy									Lateral
29	M29	Pole 100'	5			Lbyy									Lateral
30	M30	Pole 105'	5			Lbyy									Lateral
31	M31	Pole 110'	5			Lbyy									Lateral
32	M32	Pole 115'	5			Lbyy									Lateral
33	M33	Pole 120'	5			Lbyy									Lateral
34	M34	Pole 125'	5			Lbyy									Lateral
35	M35	Pole 130'	5			Lbyy									Lateral
36	M36	Pole 135'	5			Lbyy									Lateral
37	M37	Pole 140'	5			Lbyy									Lateral
38	M38	Pole 145'	5			Lbyy									Lateral
39	M39	8' Arm B...	4.503			Lbyy									Lateral
40	M40	8' Arm B...	4.503			Lbyy									Lateral
41	M41	10.5' Arm...	5.427			Lbyy									Lateral
42	M42	10.5' Arm...	5.427			Lbyy									Lateral
43	M43	8' Arm B...	4.37			Lbyy									Lateral
44	M44	8' Arm B...	4.37			Lbyy									Lateral
45	M45	5' Arm B...	2.815			Lbyy									Lateral
46	M46	5' Arm B...	2.815			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTTO...	N19		90	Pole 0'	Column	Wide Flange	A572 Gr....	Typical
2	M2	ARM1-L...	N47			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
3	M3	ARM1-R...	N48			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
4	M4	ARM2-L...	N49			10.5 Arm Mid	Beam	Tube	A36 Gr.36	Typical
5	M5	ARM2-R...	N50			10.5 Arm Mid	Beam	Tube	A36 Gr.36	Typical
6	M6	ARM3-L...	N51			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
7	M7	ARM3-R...	N52			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
8	M8	ARM4-R...	N53			5' Arm Mid	Beam	Tube	A36 Gr.36	Typical
9	M9	ARM4-L...	N54			5' Arm Mid	Beam	Tube	A36 Gr.36	Typical
10	M10	N19	N20		90	Pole 5'	Column	Wide Flange	A572 Gr....	Typical
11	M11	N20	N21		90	Pole 10'	Column	Wide Flange	A572 Gr....	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
12	M12	N21	N22		90	Pole 15'	Column	Wide Flange	A572 Gr....	Typical
13	M13	N22	N23		90	Pole 20'	Column	Wide Flange	A572 Gr....	Typical
14	M14	N23	N24		90	Pole 25'	Column	Wide Flange	A572 Gr....	Typical
15	M15	N24	N25		90	Pole 30'	Column	Wide Flange	A572 Gr....	Typical
16	M16	N25	N26		90	Pole 35'	Column	Wide Flange	A572 Gr....	Typical
17	M17	N26	N27		90	Pole 40'	Column	Wide Flange	A572 Gr....	Typical
18	M18	N27	N28		90	Pole 45'	Column	Wide Flange	A572 Gr....	Typical
19	M19	N28	N29		90	Pole 50'	Column	Wide Flange	A572 Gr....	Typical
20	M20	N29	N30		90	Pole 55'	Column	Wide Flange	A572 Gr....	Typical
21	M21	N30	N31		90	Pole 60'	Column	Wide Flange	A572 Gr....	Typical
22	M22	N31	N32		90	Pole 65'	Column	Wide Flange	A572 Gr....	Typical
23	M23	N32	N33		90	Pole 70'	Column	Wide Flange	A572 Gr....	Typical
24	M24	N33	N34		90	Pole 75'	Column	Wide Flange	A572 Gr....	Typical
25	M25	N34	N35		90	Pole 80'	Column	Wide Flange	A572 Gr....	Typical
26	M26	N35	POLE-C...		90	Pole 85'	Column	Wide Flange	A572 Gr....	Typical
27	M27	POLE-C...	N36		90	Pole 90'	Column	Wide Flange	A572 Gr....	Typical
28	M28	N36	N37		90	Pole 95'	Column	Wide Flange	A572 Gr....	Typical
29	M29	N37	N38		90	Pole 100'	Column	Wide Flange	A572 Gr....	Typical
30	M30	N38	N39		90	Pole 105'	Column	Wide Flange	A572 Gr....	Typical
31	M31	N39	N40		90	Pole 110'	Column	Wide Flange	A572 Gr....	Typical
32	M32	N40	N41		90	Pole 115'	Column	Wide Flange	A572 Gr....	Typical
33	M33	N41	N42		90	Pole 120'	Column	Wide Flange	A572 Gr....	Typical
34	M34	N42	N43		90	Pole 125'	Column	Wide Flange	A572 Gr....	Typical
35	M35	N43	N44		90	Pole 130'	Column	Wide Flange	A572 Gr....	Typical
36	M36	N44	N45		90	Pole 135'	Column	Wide Flange	A572 Gr....	Typical
37	M37	N45	N46		90	Pole 140'	Column	Wide Flange	A572 Gr....	Typical
38	M38	N46	TOP-PO...		90	Pole 145'	Column	Wide Flange	A572 Gr....	Typical
39	M39	N47	ARM1			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
40	M40	N48	ARM1			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
41	M41	N49	ARM2			10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical
42	M42	N50	ARM2			10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical
43	M43	N51	ARM3			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
44	M44	N52	ARM3			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
45	M45	N53	ARM4			5' Arm Base	Beam	Tube	A36 Gr.36	Typical
46	M46	N54	ARM4			5' Arm Base	Beam	Tube	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-POLE	0	0	0	0	
2	POLE-CONNECTION	0	90	0	0	
3	ARM1-LEFT	-8.88	120	0	0	
4	ARM2-LEFT	-10.75	132	0	0	
5	ARM3-LEFT	-8.61	144	0	0	
6	ARM4-LEFT	-5.54	150	0	0	
7	TOP-POLE	0	150	0	0	
8	ARM1-RIGHT	8.88	120	0	0	
9	ARM2-RIGHT	10.75	132	0	0	
10	ARM3-RIGHT	8.61	144	0	0	
11	ARM4-RIGHT	5.54	150	0	0	
12	ARM1	0	118.5	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
13	ARM2	0	130.5	0	0	
14	ARM3	0	142.5	0	0	
15	ARM4	0	149	0	0	
16	BOTTOM-BRACE	0	141	0	0	
17	TOP-BRACE	0	148	0	0	
18	SPRINTBOT	0	101	0	0	
19	N19	0	5	0	0	
20	N20	0	10	0	0	
21	N21	0	15	0	0	
22	N22	0	20	0	0	
23	N23	0	25	0	0	
24	N24	0	30	0	0	
25	N25	0	35	0	0	
26	N26	0	40	0	0	
27	N27	0	45	0	0	
28	N28	0	50	0	0	
29	N29	0	55	0	0	
30	N30	0	60	0	0	
31	N31	0	65	0	0	
32	N32	0	70	0	0	
33	N33	0	75	0	0	
34	N34	0	80	0	0	
35	N35	0	85	0	0	
36	N36	0	95	0	0	
37	N37	0	100	0	0	
38	N38	0	105	0	0	
39	N39	0	110	0	0	
40	N40	0	115	0	0	
41	N41	0	120	0	0	
42	N42	0	125	0	0	
43	N43	0	130	0	0	
44	N44	0	135	0	0	
45	N45	0	140	0	0	
46	N46	0	145	0	0	
47	N47	-4.44	119.25	0	0	
48	N48	4.44	119.25	0	0	
49	N49	-5.375	131.25	0	0	
50	N50	5.375	131.25	0	0	
51	N51	-4.305	143.25	0	0	
52	N52	4.305	143.25	0	0	
53	N53	2.77	149.5	0	0	
54	N54	-2.77	149.5	0	0	
55	SPRINTTOP	0	103	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTTOM-POLE	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	POLE-CONNECTION						
3	ARM2-LEFT						
4	ARM1-LEFT						

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight Pole and Arms)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M9	Y	-.013	-.023	0	0
2	M8	Y	-.013	-.023	0	0
3	M6	Y	-.013	-.028	0	0
4	M7	Y	-.013	-.028	0	0
5	M3	Y	-.013	-.028	0	0
6	M2	Y	-.013	-.028	0	0
7	M4	Y	-.013	-.032	0	0
8	M5	Y	-.013	-.032	0	0
9	M39	Y	-.028	-.042	0	4.503
10	M40	Y	-.028	-.042	0	4.503
11	M41	Y	-.032	-.05	0	5.427
12	M42	Y	-.032	-.05	0	5.427
13	M43	Y	-.028	-.042	0	4.37
14	M44	Y	-.028	-.042	0	4.37
15	M45	Y	-.023	-.033	0	2.815
16	M46	Y	-.023	-.033	0	2.815

Member Distributed Loads (BLC 3 : Weight of Ice Only on Pole and A)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.044	-.043	0	0
2	M9	Y	-.004	-.006	0	0
3	M8	Y	-.004	-.006	0	0
4	M6	Y	-.004	-.007	0	0
5	M7	Y	-.004	-.007	0	0
6	M3	Y	-.004	-.007	0	0
7	M2	Y	-.004	-.007	0	0
8	M4	Y	-.004	-.008	0	0
9	M5	Y	-.004	-.008	0	0
10	M10	Y	-.043	-.042	0	0
11	M11	Y	-.042	-.041	0	0
12	M12	Y	-.041	-.04	0	0
13	M13	Y	-.04	-.039	0	0
14	M14	Y	-.039	-.038	0	0
15	M15	Y	-.038	-.037	0	0
16	M16	Y	-.037	-.037	0	0
17	M17	Y	-.037	-.036	0	0
18	M18	Y	-.036	-.035	0	0
19	M19	Y	-.035	-.034	0	0
20	M20	Y	-.034	-.033	0	0
21	M21	Y	-.033	-.032	0	0
22	M22	Y	-.032	-.031	0	0
23	M23	Y	-.031	-.03	0	0
24	M24	Y	-.03	-.029	0	0
25	M25	Y	-.029	-.028	0	0
26	M26	Y	-.028	-.027	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only on Pole and A) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
27	M27	Y	-.027	-.026	0	0
28	M28	Y	-.026	-.025	0	0
29	M29	Y	-.025	-.024	0	0
30	M30	Y	-.024	-.023	0	0
31	M31	Y	-.023	-.023	0	0
32	M32	Y	-.023	-.022	0	0
33	M33	Y	-.022	-.021	0	0
34	M34	Y	-.021	-.02	0	0
35	M35	Y	-.02	-.019	0	0
36	M36	Y	-.019	-.018	0	0
37	M37	Y	-.018	-.017	0	0
38	M38	Y	-.017	-.016	0	5
39	M39	Y	-.007	-.01	0	4.503
40	M40	Y	-.007	-.01	0	4.503
41	M41	Y	-.008	-.012	0	5.427
42	M42	Y	-.008	-.012	0	5.427
43	M43	Y	-.007	-.01	0	4.37
44	M44	Y	-.007	-.01	0	4.37
45	M45	Y	-.006	-.008	0	2.815
46	M46	Y	-.006	-.008	0	2.815

Member Distributed Loads (BLC 4 : x-direction NESC Heavy Wind on P)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.012	.012	0	0
2	M10	X	.012	.012	0	0
3	M11	X	.012	.012	0	0
4	M12	X	.012	.012	0	0
5	M13	X	.012	.012	0	0
6	M14	X	.012	.012	0	0
7	M15	X	.012	.012	0	0
8	M16	X	.012	.012	0	0
9	M17	X	.012	.012	0	0
10	M18	X	.012	.012	0	0
11	M19	X	.012	.012	0	0
12	M20	X	.012	.012	0	0
13	M21	X	.012	.012	0	0
14	M22	X	.012	.012	0	0
15	M23	X	.012	.012	0	0
16	M24	X	.012	.012	0	0
17	M25	X	.012	.012	0	0
18	M26	X	.012	.012	0	0
19	M27	X	.012	.012	0	0
20	M28	X	.012	.012	0	0
21	M29	X	.012	.012	0	0
22	M30	X	.012	.012	0	0
23	M31	X	.012	.012	0	0
24	M32	X	.012	.012	0	0
25	M33	X	.012	.012	0	0
26	M34	X	.012	.012	0	0
27	M35	X	.012	.012	0	0
28	M36	X	.012	.012	0	0

Member Distributed Loads (BLC 4 : x-direction NESC Heavy Wind on P) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
29	M37	X	.012	.012	0	0
30	M38	X	.012	.012	0	5

Member Distributed Loads (BLC 5 : x-direction NESC Extreme Wind on)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.104	.104	0	0
2	M10	X	.104	.104	0	0
3	M11	X	.104	.104	0	0
4	M12	X	.104	.104	0	0
5	M13	X	.104	.104	0	0
6	M14	X	.104	.104	0	0
7	M15	X	.104	.104	0	0
8	M16	X	.104	.104	0	0
9	M17	X	.104	.104	0	0
10	M18	X	.104	.104	0	0
11	M19	X	.104	.104	0	0
12	M20	X	.104	.104	0	0
13	M21	X	.104	.104	0	0
14	M22	X	.104	.104	0	0
15	M23	X	.104	.104	0	0
16	M24	X	.104	.104	0	0
17	M25	X	.104	.104	0	0
18	M26	X	.104	.104	0	0
19	M27	X	.104	.104	0	0
20	M28	X	.104	.104	0	0
21	M29	X	.104	.104	0	0
22	M30	X	.104	.104	0	0
23	M31	X	.104	.104	0	0
24	M32	X	.104	.104	0	0
25	M33	X	.104	.104	0	0
26	M34	X	.104	.104	0	0
27	M35	X	.104	.104	0	0
28	M36	X	.104	.104	0	0
29	M37	X	.104	.104	0	0
30	M38	X	.104	.104	0	5

Member Distributed Loads (BLC 6 : z-direction NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.028	0	0
2	M8	Z	.003	.005	0	0
3	M9	Z	.003	.005	0	0
4	M7	Z	.003	.006	0	0
5	M6	Z	.003	.006	0	0
6	M3	Z	.003	.006	0	0
7	M2	Z	.003	.006	0	0
8	M5	Z	.003	.006	0	0
9	M4	Z	.003	.006	0	0
10	M10	Z	.028	.028	0	0
11	M11	Z	.028	.027	0	0
12	M12	Z	.027	.026	0	0
13	M13	Z	.026	.025	0	0

Member Distributed Loads (BLC 6 : z-direction NESC Heavy Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
14	M14	Z	.025	.025	0	0
15	M15	Z	.025	.024	0	0
16	M16	Z	.024	.023	0	0
17	M17	Z	.023	.022	0	0
18	M18	Z	.022	.022	0	0
19	M19	Z	.022	.021	0	0
20	M20	Z	.021	.02	0	0
21	M21	Z	.02	.019	0	0
22	M22	Z	.019	.019	0	0
23	M23	Z	.019	.018	0	0
24	M24	Z	.018	.017	0	0
25	M25	Z	.017	.017	0	0
26	M26	Z	.017	.016	0	0
27	M27	Z	.016	.015	0	0
28	M28	Z	.015	.014	0	0
29	M29	Z	.014	.014	0	0
30	M30	Z	.014	.013	0	0
31	M31	Z	.013	.012	0	0
32	M32	Z	.012	.011	0	0
33	M33	Z	.011	.011	0	0
34	M34	Z	.011	.01	0	0
35	M35	Z	.01	.009	0	0
36	M36	Z	.009	.008	0	0
37	M37	Z	.008	.008	0	0
38	M38	Z	.008	.007	0	5
39	M39	Z	.006	.009	0	4.503
40	M40	Z	.006	.009	0	4.503
41	M41	Z	.006	.01	0	5.427
42	M42	Z	.006	.01	0	5.427
43	M43	Z	.006	.009	0	4.37
44	M44	Z	.006	.009	0	4.37
45	M45	Z	.005	.007	0	2.815
46	M46	Z	.005	.007	0	2.815

Member Distributed Loads (BLC 7 : z-direction NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.26	.253	0	0
2	M8	Z	.019	.038	0	0
3	M9	Z	.019	.038	0	0
4	M7	Z	.019	.045	0	0
5	M6	Z	.019	.045	0	0
6	M2	Z	.019	.045	0	0
7	M3	Z	.019	.045	0	0
8	M5	Z	.019	.053	0	0
9	M4	Z	.019	.053	0	0
10	M10	Z	.253	.247	0	0
11	M11	Z	.247	.24	0	0
12	M12	Z	.24	.233	0	0
13	M13	Z	.233	.226	0	0
14	M14	Z	.226	.22	0	0
15	M15	Z	.22	.213	0	0

Member Distributed Loads (BLC 7 : z-direction NESC Extreme Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
16	M16	Z	.213	.206	0	0
17	M17	Z	.206	.199	0	0
18	M18	Z	.199	.193	0	0
19	M19	Z	.193	.186	0	0
20	M20	Z	.186	.179	0	0
21	M21	Z	.179	.172	0	0
22	M22	Z	.172	.166	0	0
23	M23	Z	.166	.159	0	0
24	M24	Z	.159	.152	0	0
25	M25	Z	.152	.146	0	0
26	M26	Z	.146	.139	0	0
27	M27	Z	.139	.132	0	0
28	M28	Z	.132	.125	0	0
29	M29	Z	.125	.119	0	0
30	M30	Z	.119	.112	0	0
31	M31	Z	.112	.105	0	0
32	M32	Z	.105	.098	0	0
33	M33	Z	.098	.092	0	0
34	M34	Z	.092	.085	0	0
35	M35	Z	.085	.078	0	0
36	M36	Z	.078	.071	0	0
37	M37	Z	.071	.065	0	0
38	M38	Z	.065	.058	0	5
39	M39	Z	.045	.072	0	4.503
40	M40	Z	.045	.072	0	4.503
41	M41	Z	.053	.087	0	5.427
42	M42	Z	.053	.087	0	5.427
43	M43	Z	.045	.072	0	4.37
44	M44	Z	.045	.072	0	4.37
45	M45	Z	.038	.058	0	2.815
46	M46	Z	.038	.058	0	2.815

Member Distributed Loads (BLC 16 : Weight of Coax Cables)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.031	-.031	0	0
2	M29	Y	-.012	-.012	0	0
3	M10	Y	-.031	-.031	0	0
4	M11	Y	-.031	-.031	0	0
5	M12	Y	-.031	-.031	0	0
6	M13	Y	-.031	-.031	0	0
7	M14	Y	-.031	-.031	0	0
8	M15	Y	-.031	-.031	0	0
9	M16	Y	-.031	-.031	0	0
10	M17	Y	-.031	-.031	0	0
11	M18	Y	-.031	-.031	0	0
12	M19	Y	-.031	-.031	0	0
13	M20	Y	-.031	-.031	0	0
14	M21	Y	-.031	-.031	0	0
15	M22	Y	-.031	-.031	0	0
16	M23	Y	-.031	-.031	0	0
17	M24	Y	-.031	-.031	0	0

Member Distributed Loads (BLC 16 : Weight of Coax Cables) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
18	M25	Y	-.031	-.031	0	0
19	M26	Y	-.031	-.031	0	0
20	M27	Y	-.031	-.031	0	0
21	M28	Y	-.031	-.031	0	5
22	M30	Y	-.012	-.012	0	0
23	M31	Y	-.012	-.012	0	0
24	M32	Y	-.012	-.012	0	0
25	M33	Y	-.012	-.012	0	0
26	M34	Y	-.012	-.012	0	0
27	M35	Y	-.012	-.012	0	0
28	M36	Y	-.012	-.012	0	5

Member Distributed Loads (BLC 17 : Weight of Ice on Coax Cables)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.045	-.045	0	0
2	M29	Y	-.018	-.018	0	0
3	M10	Y	-.045	-.045	0	0
4	M11	Y	-.045	-.045	0	0
5	M12	Y	-.045	-.045	0	0
6	M13	Y	-.045	-.045	0	0
7	M14	Y	-.045	-.045	0	0
8	M15	Y	-.045	-.045	0	0
9	M16	Y	-.045	-.045	0	0
10	M17	Y	-.045	-.045	0	0
11	M18	Y	-.045	-.045	0	0
12	M19	Y	-.045	-.045	0	0
13	M20	Y	-.045	-.045	0	0
14	M21	Y	-.045	-.045	0	0
15	M22	Y	-.045	-.045	0	0
16	M23	Y	-.045	-.045	0	0
17	M24	Y	-.045	-.045	0	0
18	M25	Y	-.045	-.045	0	0
19	M26	Y	-.045	-.045	0	0
20	M27	Y	-.045	-.045	0	0
21	M28	Y	-.045	-.045	0	5
22	M30	Y	-.018	-.018	0	0
23	M31	Y	-.018	-.018	0	0
24	M32	Y	-.018	-.018	0	0
25	M33	Y	-.018	-.018	0	0
26	M34	Y	-.018	-.018	0	0
27	M35	Y	-.018	-.018	0	0
28	M36	Y	-.018	-.018	0	5

Member Distributed Loads (BLC 18 : x-direction NESC Heavy Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	0
2	M29	X	.003	.003	0	0
3	M10	X	.004	.004	0	0
4	M11	X	.004	.004	0	0
5	M12	X	.004	.004	0	0
6	M13	X	.004	.004	0	0

Member Distributed Loads (BLC 18 : x-direction NESC Heavy Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
7	M14	X	.004	.004	0	0
8	M15	X	.004	.004	0	0
9	M16	X	.004	.004	0	0
10	M17	X	.004	.004	0	0
11	M18	X	.004	.004	0	0
12	M19	X	.004	.004	0	0
13	M20	X	.004	.004	0	0
14	M21	X	.004	.004	0	0
15	M22	X	.004	.004	0	0
16	M23	X	.004	.004	0	0
17	M24	X	.004	.004	0	0
18	M25	X	.004	.004	0	0
19	M26	X	.004	.004	0	0
20	M27	X	.004	.004	0	0
21	M28	X	.004	.004	0	5
22	M30	X	.003	.003	0	0
23	M31	X	.003	.003	0	0
24	M32	X	.003	.003	0	0
25	M33	X	.003	.003	0	0
26	M34	X	.003	.003	0	0
27	M35	X	.003	.003	0	0
28	M36	X	.003	.003	0	5

Member Distributed Loads (BLC 19 : x-direction NESC Extreme Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.029	.029	0	0
2	M29	X	.019	.019	0	0
3	M10	X	.029	.029	0	0
4	M11	X	.029	.029	0	0
5	M12	X	.029	.029	0	0
6	M13	X	.029	.029	0	0
7	M14	X	.029	.029	0	0
8	M15	X	.029	.029	0	0
9	M16	X	.029	.029	0	0
10	M17	X	.029	.029	0	0
11	M18	X	.029	.029	0	0
12	M19	X	.029	.029	0	0
13	M20	X	.029	.029	0	0
14	M21	X	.029	.029	0	0
15	M22	X	.029	.029	0	0
16	M23	X	.029	.029	0	0
17	M24	X	.029	.029	0	0
18	M25	X	.029	.029	0	0
19	M26	X	.029	.029	0	0
20	M27	X	.029	.029	0	0
21	M28	X	.029	.029	0	5
22	M30	X	.019	.019	0	0
23	M31	X	.019	.019	0	0
24	M32	X	.019	.019	0	0
25	M33	X	.019	.019	0	0
26	M34	X	.019	.019	0	0

Member Distributed Loads (BLC 19 : x-direction NESC Extreme Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
27	M35	X	.019	.019	0	0
28	M36	X	.019	.019	0	5

Member Distributed Loads (BLC 20 : z-direction NESC Heavy Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.004	.004	0	0
2	M29	Z	.003	.003	0	0
3	M10	Z	.004	.004	0	0
4	M11	Z	.004	.004	0	0
5	M12	Z	.004	.004	0	0
6	M13	Z	.004	.004	0	0
7	M14	Z	.004	.004	0	0
8	M15	Z	.004	.004	0	0
9	M16	Z	.004	.004	0	0
10	M17	Z	.004	.004	0	0
11	M18	Z	.004	.004	0	0
12	M19	Z	.004	.004	0	0
13	M20	Z	.004	.004	0	0
14	M21	Z	.004	.004	0	0
15	M22	Z	.004	.004	0	0
16	M23	Z	.004	.004	0	0
17	M24	Z	.004	.004	0	0
18	M25	Z	.004	.004	0	0
19	M26	Z	.004	.004	0	0
20	M27	Z	.004	.004	0	0
21	M28	Z	.004	.004	0	5
22	M30	Z	.003	.003	0	0
23	M31	Z	.003	.003	0	0
24	M32	Z	.003	.003	0	0
25	M33	Z	.003	.003	0	0
26	M34	Z	.003	.003	0	0
27	M35	Z	.003	.003	0	0
28	M36	Z	.003	.003	0	5

Member Distributed Loads (BLC 21 : z-direction NESC Extreme Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.029	0	0
2	M29	Z	.019	.019	0	0
3	M10	Z	.029	.029	0	0
4	M11	Z	.029	.029	0	0
5	M12	Z	.029	.029	0	0
6	M13	Z	.029	.029	0	0
7	M14	Z	.029	.029	0	0
8	M15	Z	.029	.029	0	0
9	M16	Z	.029	.029	0	0
10	M17	Z	.029	.029	0	0
11	M18	Z	.029	.029	0	0
12	M19	Z	.029	.029	0	0
13	M20	Z	.029	.029	0	0
14	M21	Z	.029	.029	0	0
15	M22	Z	.029	.029	0	0

Member Distributed Loads (BLC 21 : z-direction NESC Extreme Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
16	M23	Z	.029	.029	0	0
17	M24	Z	.029	.029	0	0
18	M25	Z	.029	.029	0	0
19	M26	Z	.029	.029	0	0
20	M27	Z	.029	.029	0	0
21	M28	Z	.029	.029	0	5
22	M30	Z	.019	.019	0	0
23	M31	Z	.019	.019	0	0
24	M32	Z	.019	.019	0	0
25	M33	Z	.019	.019	0	0
26	M34	Z	.019	.019	0	0
27	M35	Z	.019	.019	0	0
28	M36	Z	.019	.019	0	5

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight (Not Used)	None		-1						
2	Weight Pole and Arms	None						16		
3	Weight of Ice Only on Pole and A	None						46		
4	x-direction NESC Heavy Wind on P	None						30		
5	x-direction NESC Extreme Wind on	None						30		
6	z-direction NESC Heavy Wind	None						46		
7	z-direction NESC Extreme Wind	None						46		
8	x-direction NESC Heavy Wire Load	None				16				
9	x-driection NESC Extreme Wire Lo	None				24				
10	z-direction NESC Heavy Wire Lo	None				8				
11	z-direction NESC Extreme Wire Lo	None				16				
12	x-direction NESC Heavy Mast Reac	None				8				
13	x-direction NESC Extreme Mast Re	None				8				
14	z-direction NESC Heavy Mast Reac	None				10				
15	z-direction NESC Extreme Mast Re	None				10				
16	Weight of Coax Cables	None						28		
17	Weight of Ice on Coax Cables	None						28		
18	x-direction NESC Heavy Coax	None						28		
19	x-direction NESC Extreme Coax	None						28		
20	z-direction NESC Heavy Coax	None						28		
21	z-direction NESC Extreme Coax	None						28		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-direction NESC Heavy...	Yes	Y		2	1.5	3	1.5	4	2.5	8	1	12	1	16	1.5	17	1.5	18	2.5	1	1		
2	x-direction NESC Extre...	Yes	Y		2	1	5	1	9	1	13	1	16	1	19	1	1	1						
3	z-direction NESC Heavy...	Yes	Y		2	1.5	3	1.5	6	2.5	10	1	14	1	16	1.5	17	1.5	20	2.5	1	1		
4	z-direction NESC Extre...	Yes	Y		2	1	7	1	11	1	15	1	16	1	21	1	1	1						

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTTOM-POLE	max	0	4	94.636	3	0	1	0	1	.017	4	4413.857	2
2		min	-39.255	2	52.891	2	-35.939	4	-3287.315	4	-.216	2	3.176	4
3	Totals:	max	0	4	94.636	3	0	1						
4		min	-39.255	2	52.891	2	-35.939	4						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-POLE	-20.398	94.635	0	0	0	2796.935
2	1	Totals:	-20.398	94.635	0			
3	1	COG (ft):	X: .061	Y: 99.15	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	1	M21	1	1.441	0	-.883	0	0	39.293	-39.293
2			2	1.432	0	-.881	0	0	38.642	-38.642
3			3	1.424	0	-.879	0	0	37.993	-37.993
4			4	1.416	0	-.877	0	0	37.345	-37.345
5			5	1.407	0	-.875	0	0	36.699	-36.699
6	1	M22	1	1.432	0	-.917	0	0	38.925	-38.925
7			2	1.424	0	-.915	0	0	38.233	-38.233
8			3	1.415	0	-.913	0	0	37.544	-37.544
9			4	1.407	0	-.911	0	0	36.856	-36.856
10			5	1.399	0	-.909	0	0	36.17	-36.17
11	1	M23	1	1.424	0	-.954	0	0	38.466	-38.466
12			2	1.415	0	-.952	0	0	37.73	-37.73
13			3	1.407	0	-.95	0	0	36.996	-36.996
14			4	1.398	0	-.947	0	0	36.264	-36.264
15			5	1.39	0	-.945	0	0	35.533	-35.533
16	1	M24	1	1.415	0	-.994	0	0	37.899	-37.899
17			2	1.407	0	-.991	0	0	37.114	-37.114
18			3	1.398	0	-.989	0	0	36.331	-36.331
19			4	1.39	0	-.987	0	0	35.549	-35.549
20			5	1.381	0	-.984	0	0	34.77	-34.77
21	1	M15	1	1.362	0	-.601	0	0	37.725	-37.725
22			2	1.354	0	-.599	0	0	37.28	-37.28
23			3	1.347	0	-.598	0	0	36.836	-36.836
24			4	1.339	0	-.596	0	0	36.393	-36.393
25			5	1.331	0	-.595	0	0	35.951	-35.951
26	1	M16	1	1.354	0	-.62	0	0	37.713	-37.713
27			2	1.346	0	-.619	0	0	37.246	-37.246
28			3	1.338	0	-.617	0	0	36.779	-36.779
29			4	1.331	0	-.616	0	0	36.314	-36.314
30			5	1.323	0	-.614	0	0	35.85	-35.85
31	1	M17	1	1.346	0	-.641	0	0	37.667	-37.667
32			2	1.338	0	-.639	0	0	37.175	-37.175
33			3	1.33	0	-.638	0	0	36.684	-36.684
34			4	1.323	0	-.636	0	0	36.194	-36.194
35			5	1.315	0	-.635	0	0	35.706	-35.706
36	1	M18	1	1.338	0	-.663	0	0	37.581	-37.581
37			2	1.33	0	-.661	0	0	37.063	-37.063
38			3	1.322	0	-.659	0	0	36.546	-36.546
39			4	1.315	0	-.658	0	0	36.03	-36.03
40			5	1.307	0	-.656	0	0	35.515	-35.515
41	1	M19	1	1.331	0	-.686	0	0	37.452	-37.452
42			2	1.323	0	-.684	0	0	36.905	-36.905
43			3	1.315	0	-.682	0	0	36.359	-36.359

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	1.307	0	-.681	0	0	35.814	-35.814
45			5	1.299	0	-.679	0	0	35.271	-35.271
46	1	M27	1	1.519	0	-1.417	0	0	37.433	-37.433
47			2	1.51	0	-1.414	0	0	36.402	-36.402
48			3	1.501	0	-1.41	0	0	35.373	-35.373
49			4	1.492	0	-1.407	0	0	34.347	-34.347
50			5	1.483	0	-1.404	0	0	33.323	-33.323
51	1	M20	1	1.323	0	-.71	0	0	37.269	-37.269
52			2	1.315	0	-.709	0	0	36.69	-36.69
53			3	1.307	0	-.707	0	0	36.113	-36.113
54			4	1.299	0	-.705	0	0	35.537	-35.537
55			5	1.291	0	-.703	0	0	34.963	-34.963
56	1	M25	1	1.407	0	-1.036	0	0	37.205	-37.205
57			2	1.399	0	-1.034	0	0	36.364	-36.364
58			3	1.39	0	-1.031	0	0	35.526	-35.526
59			4	1.382	0	-1.029	0	0	34.69	-34.69
60			5	1.373	0	-1.026	0	0	33.855	-33.855
61	1	M26	1	1.399	0	-1.082	0	0	36.356	-36.356
62			2	1.391	0	-1.079	0	0	35.454	-35.454
63			3	1.382	0	-1.077	0	0	34.554	-34.554
64			4	1.373	0	-1.074	0	0	33.655	-33.655
65			5	1.365	0	-1.072	0	0	32.76	-32.76
66	1	M28	1	1.509	0	-1.486	0	0	36.059	-36.059
67			2	1.5	0	-1.483	0	0	34.943	-34.943
68			3	1.49	0	-1.479	0	0	33.83	-33.83
69			4	1.481	0	-1.476	0	0	32.72	-32.72
70			5	1.472	0	-1.472	0	0	31.612	-31.612
71	1	M29	1	1.498	0	-1.556	0	0	34.383	-34.383
72			2	1.48	0	-1.514	0	0	33.181	-33.181
73			3	1.473	0	-1.511	0	0	32.005	-32.005
74			4	1.456	0	-1.525	0	0	30.823	-30.823
75			5	1.449	0	-1.522	0	0	29.638	-29.638
76	1	M14	1	1.151	0	-.437	0	0	33.444	-33.444
77			2	1.144	0	-.436	0	0	33.068	-33.068
78			3	1.137	0	-.435	0	0	32.692	-32.692
79			4	1.129	0	-.434	0	0	32.318	-32.318
80			5	1.122	0	-.433	0	0	31.944	-31.944
81	1	M13	1	1.158	0	-.424	0	0	33.343	-33.343
82			2	1.151	0	-.423	0	0	32.984	-32.984
83			3	1.144	0	-.422	0	0	32.626	-32.626
84			4	1.137	0	-.421	0	0	32.269	-32.269
85			5	1.13	0	-.42	0	0	31.912	-31.912
86	1	M12	1	1.166	0	-.413	0	0	33.253	-33.253
87			2	1.159	0	-.412	0	0	32.91	-32.91
88			3	1.152	0	-.411	0	0	32.567	-32.567
89			4	1.145	0	-.41	0	0	32.226	-32.226
90			5	1.137	0	-.409	0	0	31.885	-31.885
91	1	M11	1	1.174	0	-.401	0	0	33.133	-33.133
92			2	1.167	0	-.4	0	0	32.805	-32.805
93			3	1.159	0	-.399	0	0	32.478	-32.478
94			4	1.152	0	-.398	0	0	32.151	-32.151
95			5	1.145	0	-.397	0	0	31.826	-31.826

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	1	M10	1	1.182	0	-.39	0	0	33.001	-33.001
97			2	1.174	0	-.389	0	0	32.687	-32.687
98			3	1.167	0	-.388	0	0	32.373	-32.373
99			4	1.16	0	-.387	0	0	32.061	-32.061
100			5	1.153	0	-.387	0	0	31.749	-31.749
101	1	M1	1	1.189	0	-.38	0	0	32.857	-32.857
102			2	1.182	0	-.379	0	0	32.556	-32.556
103			3	1.175	0	-.378	0	0	32.255	-32.255
104			4	1.168	0	-.377	0	0	31.956	-31.956
105			5	1.161	0	-.376	0	0	31.657	-31.657
106	1	M30	1	1.475	0	-1.615	0	0	32.426	-32.426
107			2	1.468	0	-1.611	0	0	31.124	-31.124
108			3	1.461	0	-1.607	0	0	29.825	-29.825
109			4	1.454	0	-1.604	0	0	28.529	-28.529
110			5	1.447	0	-1.6	0	0	27.236	-27.236
111	1	M31	1	1.473	0	-1.706	0	0	30	-30
112			2	1.466	0	-1.702	0	0	28.567	-28.567
113			3	1.46	0	-1.698	0	0	27.137	-27.137
114			4	1.453	0	-1.694	0	0	25.711	-25.711
115			5	1.446	0	-1.69	0	0	24.287	-24.287
116	1	M32	1	1.473	0	-1.805	0	0	26.962	-26.962
117			2	1.466	0	-1.8	0	0	25.376	-25.376
118			3	1.459	0	-1.796	0	0	23.792	-23.792
119			4	1.094	0	-1.36	0	0	21.84	-21.84
120			5	1.087	0	-1.356	0	0	20.644	-20.644
121	1	M33	1	1.195	0	-1.927	0	0	24.458	-24.458
122			2	1.188	0	-1.921	0	0	23.04	-23.04
123			3	1.181	0	-1.915	0	0	21.627	-21.627
124			4	1.174	0	-1.909	0	0	20.219	-20.219
125			5	1.166	0	-1.903	0	0	18.814	-18.814
126	1	M34	1	1.185	0	-2.043	0	0	21.301	-21.301
127			2	1.177	0	-2.037	0	0	19.709	-19.709
128			3	1.17	0	-2.031	0	0	18.122	-18.122
129			4	1.163	0	-2.024	0	0	16.54	-16.54
130			5	1.156	0	-2.018	0	0	14.963	-14.963
131	1	M35	1	1.174	0	-2.171	0	0	17.168	-17.168
132			2	.743	0	-1.426	0	0	15.02	-15.02
133			3	.736	0	-1.419	0	0	13.834	-13.834
134			4	.729	0	-1.412	0	0	12.654	-12.654
135			5	.722	0	-1.405	0	0	11.48	-11.48
136	1	M36	1	.733	0	-1.513	0	0	13.388	-13.388
137			2	.726	0	-1.506	0	0	12.029	-12.029
138			3	.719	0	-1.498	0	0	10.676	-10.676
139			4	.712	0	-1.491	0	0	9.33	-9.33
140			5	.705	0	-1.484	0	0	7.99	-7.99
141	1	M37	1	.716	0	-1.609	0	0	9.508	-9.508
142			2	.699	0	-1.744	0	0	7.897	-7.897
143			3	.694	0	-1.738	0	0	6.181	-6.181
144			4	.272	0	-.86	0	0	4.332	-4.332
145			5	.266	0	-.853	0	0	3.488	-3.488
146	1	M38	1	.271	0	-.928	0	0	4.257	-4.257
147			2	.266	0	-.921	0	0	3.241	-3.241

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.26	0	-.914	0	0	2.232	-2.232
149			4	.163	0	-.528	0	0	1.481	-1.481
150			5	0	0	-.001	0	0	0	0
151	1	M3	1	-.108	-1.254	0	0	0	0	0
152			2	-.107	-1.267	0	-3.65	3.65	0	0
153			3	-.106	-1.282	0	-7.341	7.341	0	0
154			4	-.104	-1.298	0	-11.076	11.076	0	0
155			5	-.102	-1.316	0	-14.86	14.86	0	0
156	1	M7	1	-.104	-1.253	0	0	0	0	0
157			2	-.103	-1.266	0	-3.539	3.539	0	0
158			3	-.102	-1.28	0	-7.116	7.116	0	0
159			4	-.1	-1.296	0	-10.734	10.734	0	0
160			5	-.098	-1.313	0	-14.399	14.399	0	0
161	1	M5	1	-.112	-1.074	0	0	0	0	0
162			2	-.111	-1.089	0	-3.25	3.25	0	0
163			3	-.11	-1.106	0	-6.548	6.548	0	0
164			4	-.108	-1.125	0	-9.9	9.9	0	0
165			5	-.106	-1.146	0	-13.312	13.312	0	0
166	1	M2	1	.35	-1.089	0	0	0	0	0
167			2	.352	-1.102	0	-3.171	3.171	0	0
168			3	.353	-1.116	0	-6.382	6.382	0	0
169			4	.355	-1.132	0	-9.637	9.637	0	0
170			5	.356	-1.15	0	-12.941	12.941	0	0
171	1	M40	1	-.067	-.834	0	-6.19	6.19	0	0
172			2	-.065	-.849	0	-7.793	7.793	0	0
173			3	-.064	-.864	0	-9.423	9.423	0	0
174			4	-.062	-.88	0	-11.084	11.084	0	0
175			5	-.06	-.898	0	-12.777	12.777	0	0
176	1	M6	1	.354	-1.075	0	0	0	0	0
177			2	.355	-1.088	0	-3.039	3.039	0	0
178			3	.356	-1.102	0	-6.116	6.116	0	0
179			4	.358	-1.118	0	-9.235	9.235	0	0
180			5	.36	-1.135	0	-12.4	12.4	0	0
181	1	M44	1	-.064	-.833	0	-5.998	5.998	0	0
182			2	-.063	-.847	0	-7.549	7.549	0	0
183			3	-.061	-.861	0	-9.127	9.127	0	0
184			4	-.059	-.877	0	-10.734	10.734	0	0
185			5	-.058	-.894	0	-12.37	12.37	0	0
186	1	M4	1	.286	-.952	0	0	0	0	0
187			2	.287	-.967	0	-2.884	2.884	0	0
188			3	.289	-.984	0	-5.816	5.816	0	0
189			4	.29	-1.003	0	-8.803	8.803	0	0
190			5	.292	-1.024	0	-11.849	11.849	0	0
191	1	M39	1	.233	-.727	0	-5.391	5.391	0	0
192			2	.234	-.741	0	-6.788	6.788	0	0
193			3	.236	-.756	0	-8.213	8.213	0	0
194			4	.237	-.773	0	-9.669	9.669	0	0
195			5	.239	-.79	0	-11.156	11.156	0	0
196	1	M42	1	-.067	-.701	0	-5.128	5.128	0	0
197			2	-.065	-.718	0	-6.473	6.473	0	0
198			3	-.064	-.737	0	-7.851	7.851	0	0
199			4	-.062	-.756	0	-9.265	9.265	0	0

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	-.06	-.777	0	-10.717	10.717	0	0
201	1	M43	1	.235	-.717	0	-5.165	5.165	0	0
202			2	.236	-.731	0	-6.503	6.503	0	0
203			3	.238	-.746	0	-7.867	7.867	0	0
204			4	.24	-.761	0	-9.26	9.26	0	0
205			5	.242	-.778	0	-10.682	10.682	0	0
206	1	M41	1	.183	-.624	0	-4.564	4.564	0	0
207			2	.185	-.641	0	-5.763	5.763	0	0
208			3	.186	-.66	0	-6.996	6.996	0	0
209			4	.188	-.679	0	-8.264	8.264	0	0
210			5	.19	-.7	0	-9.57	9.57	0	0
211	1	M8	1	-.117	-.664	0	0	0	0	0
212			2	-.116	-.673	0	-1.442	1.442	0	0
213			3	-.115	-.682	0	-2.903	2.903	0	0
214			4	-.114	-.693	0	-4.386	4.386	0	0
215			5	-.113	-.704	0	-5.893	5.893	0	0
216	1	M45	1	-.078	-.47	0	-2.748	2.748	0	0
217			2	-.077	-.479	0	-3.465	3.465	0	0
218			3	-.076	-.489	0	-4.195	4.195	0	0
219			4	-.075	-.499	0	-4.94	4.94	0	0
220			5	-.074	-.51	0	-5.701	5.701	0	0
221	1	M46	1	.131	-.222	0	-1.259	1.259	0	0
222			2	.132	-.231	0	-1.6	1.6	0	0
223			3	.133	-.24	0	-1.956	1.956	0	0
224			4	.135	-.251	0	-2.326	2.326	0	0
225			5	.136	-.261	0	-2.712	2.712	0	0
226	1	M9	1	.185	-.294	0	0	0	0	0
227			2	.186	-.303	0	-.643	.643	0	0
228			3	.187	-.312	0	-1.306	1.306	0	0
229			4	.189	-.323	0	-1.991	1.991	0	0
230			5	.19	-.334	0	-2.698	2.698	0	0

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-POLE	-39.255	52.891	-.8	-132.611	-.216	4413.857
2	2	Totals:	-39.255	52.891	-.8			
3	2	COG (ft):	X: .055	Y: 93.987	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	2	M15	1	.738	-.061	-1.062	2.517	-2.517	56.667	-56.667
2			2	.733	-.061	-1.057	2.49	-2.49	55.881	-55.881
3			3	.728	-.061	-1.052	2.463	-2.463	55.099	-55.099
4			4	.723	-.061	-1.047	2.436	-2.436	54.321	-54.321
5			5	.718	-.061	-1.042	2.409	-2.409	53.546	-53.546
6	2	M16	1	.731	-.062	-1.08	2.46	-2.46	56.17	-56.17
7			2	.726	-.062	-1.075	2.432	-2.432	55.357	-55.357
8			3	.721	-.062	-1.07	2.404	-2.404	54.547	-54.547
9			4	.716	-.062	-1.065	2.376	-2.376	53.741	-53.741
10			5	.711	-.062	-1.06	2.348	-2.348	52.939	-52.939
11	2	M21	1	.762	-.067	-1.423	2.357	-2.357	56.044	-56.044
12			2	.757	-.067	-1.416	2.319	-2.319	54.996	-54.996
13			3	.752	-.067	-1.409	2.281	-2.281	53.954	-53.954
14			4	.747	-.067	-1.402	2.244	-2.244	52.917	-52.917
15			5	.742	-.067	-1.395	2.206	-2.206	51.885	-51.885
16	2	M17	1	.724	-.063	-1.099	2.399	-2.399	55.623	-55.623
17			2	.719	-.063	-1.094	2.369	-2.369	54.78	-54.78
18			3	.714	-.063	-1.089	2.34	-2.34	53.941	-53.941
19			4	.709	-.063	-1.084	2.311	-2.311	53.106	-53.106
20			5	.704	-.063	-1.078	2.282	-2.282	52.275	-52.275
21	2	M22	1	.755	-.067	-1.454	2.257	-2.257	55.033	-55.033
22			2	.75	-.067	-1.447	2.218	-2.218	53.938	-53.938
23			3	.745	-.067	-1.439	2.179	-2.179	52.85	-52.85
24			4	.74	-.067	-1.432	2.14	-2.14	51.767	-51.767
25			5	.735	-.067	-1.425	2.102	-2.102	50.689	-50.689
26	2	M18	1	.717	-.064	-1.119	2.333	-2.333	55.022	-55.022
27			2	.712	-.064	-1.114	2.302	-2.302	54.147	-54.147
28			3	.707	-.064	-1.109	2.272	-2.272	53.277	-53.277
29			4	.702	-.064	-1.103	2.242	-2.242	52.41	-52.41
30			5	.697	-.064	-1.098	2.212	-2.212	51.548	-51.548
31	2	M19	1	.71	-.065	-1.14	2.262	-2.262	54.359	-54.359
32			2	.705	-.065	-1.135	2.231	-2.231	53.45	-53.45
33			3	.7	-.065	-1.129	2.199	-2.199	52.545	-52.545
34			4	.695	-.065	-1.124	2.168	-2.168	51.645	-51.645
35			5	.69	-.065	-1.118	2.137	-2.137	50.749	-50.749
36	2	M23	1	.748	-.068	-1.487	2.15	-2.15	53.907	-53.907
37			2	.743	-.068	-1.48	2.11	-2.11	52.762	-52.762
38			3	.738	-.068	-1.472	2.07	-2.07	51.623	-51.623
39			4	.733	-.068	-1.464	2.03	-2.03	50.489	-50.489
40			5	.728	-.068	-1.457	1.99	-1.99	49.362	-49.362
41	2	M20	1	.703	-.066	-1.163	2.186	-2.186	53.625	-53.625
42			2	.698	-.066	-1.157	2.154	-2.154	52.678	-52.678
43			3	.693	-.066	-1.152	2.122	-2.122	51.737	-51.737

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	.688	-.066	-1.146	2.089	-2.089	50.8	-50.8
45			5	.683	-.066	-1.14	2.057	-2.057	49.868	-49.868
46	2	M24	1	.741	-.069	-1.523	2.038	-2.038	52.649	-52.649
47			2	.736	-.069	-1.515	1.996	-1.996	51.447	-51.447
48			3	.731	-.069	-1.507	1.955	-1.955	50.251	-50.251
49			4	.726	-.069	-1.499	1.914	-1.914	49.062	-49.062
50			5	.721	-.069	-1.491	1.873	-1.873	47.879	-47.879
51	2	M1	1	.665	-.053	-.729	2.236	-2.236	51.851	-51.851
52			2	.66	-.053	-.726	2.219	-2.219	51.274	-51.274
53			3	.655	-.053	-.723	2.202	-2.202	50.7	-50.7
54			4	.651	-.053	-.72	2.185	-2.185	50.128	-50.128
55			5	.646	-.053	-.717	2.168	-2.168	49.559	-49.559
56	2	M10	1	.657	-.055	-.739	2.212	-2.212	51.662	-51.662
57			2	.652	-.055	-.736	2.194	-2.194	51.068	-51.068
58			3	.648	-.055	-.733	2.176	-2.176	50.476	-50.476
59			4	.643	-.055	-.729	2.158	-2.158	49.887	-49.887
60			5	.638	-.055	-.726	2.14	-2.14	49.301	-49.301
61	2	M11	1	.65	-.056	-.749	2.185	-2.185	51.451	-51.451
62			2	.645	-.056	-.746	2.166	-2.166	50.838	-50.838
63			3	.64	-.056	-.743	2.147	-2.147	50.229	-50.229
64			4	.635	-.056	-.74	2.129	-2.129	49.622	-49.622
65			5	.631	-.056	-.736	2.11	-2.11	49.017	-49.017
66	2	M25	1	.734	-.069	-1.561	1.918	-1.918	51.232	-51.232
67			2	.729	-.069	-1.553	1.876	-1.876	49.968	-49.968
68			3	.724	-.069	-1.545	1.833	-1.833	48.71	-48.71
69			4	.719	-.069	-1.536	1.791	-1.791	47.459	-47.459
70			5	.714	-.069	-1.528	1.748	-1.748	46.214	-46.214
71	2	M12	1	.642	-.057	-.76	2.155	-2.155	51.215	-51.215
72			2	.637	-.057	-.757	2.135	-2.135	50.583	-50.583
73			3	.632	-.057	-.754	2.116	-2.116	49.954	-49.954
74			4	.628	-.057	-.75	2.096	-2.096	49.328	-49.328
75			5	.623	-.057	-.747	2.077	-2.077	48.705	-48.705
76	2	M13	1	.634	-.058	-.77	2.122	-2.122	50.932	-50.932
77			2	.63	-.058	-.767	2.102	-2.102	50.28	-50.28
78			3	.625	-.058	-.764	2.081	-2.081	49.631	-49.631
79			4	.62	-.058	-.76	2.061	-2.061	48.985	-48.985
80			5	.615	-.058	-.757	2.041	-2.041	48.341	-48.341
81	2	M14	1	.627	-.059	-.784	2.086	-2.086	50.662	-50.662
82			2	.622	-.059	-.78	2.065	-2.065	49.988	-49.988
83			3	.617	-.059	-.777	2.044	-2.044	49.317	-49.317
84			4	.613	-.059	-.773	2.023	-2.023	48.648	-48.648
85			5	.608	-.059	-.769	2.002	-2.002	47.983	-47.983
86	2	M27	1	.787	-.07	-2.062	1.86	-1.86	50.658	-50.658
87			2	.782	-.07	-2.051	1.809	-1.809	49.16	-49.16
88			3	.777	-.07	-2.04	1.759	-1.759	47.67	-47.67
89			4	.771	-.07	-2.028	1.708	-1.708	46.188	-46.188
90			5	.766	-.07	-2.017	1.657	-1.657	44.715	-44.715
91	2	M26	1	.728	-.069	-1.603	1.792	-1.792	49.628	-49.628
92			2	.723	-.069	-1.594	1.748	-1.748	48.294	-48.294
93			3	.717	-.069	-1.585	1.704	-1.704	46.967	-46.967
94			4	.712	-.069	-1.577	1.661	-1.661	45.646	-45.646
95			5	.707	-.069	-1.568	1.617	-1.617	44.334	-44.334

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	2	M28	1	.78	-.07	-2.124	1.696	-1.696	48.386	-48.386
97			2	.774	-.07	-2.112	1.644	-1.644	46.793	-46.793
98			3	.769	-.07	-2.101	1.593	-1.593	45.21	-45.21
99			4	.764	-.07	-2.089	1.541	-1.541	43.636	-43.636
100			5	.759	-.07	-2.077	1.489	-1.489	42.071	-42.071
101	2	M29	1	.772	-.07	-2.188	1.525	-1.525	45.759	-45.759
102			2	.763	-.07	-2.094	1.471	-1.471	44.074	-44.074
103			3	.758	-.07	-2.082	1.418	-1.418	42.451	-42.451
104			4	.749	-.07	-2.073	1.365	-1.365	40.835	-40.835
105			5	.744	-.07	-2.062	1.312	-1.312	39.227	-39.227
106	2	M30	1	.758	-.07	-2.179	1.344	-1.344	42.916	-42.916
107			2	.753	-.07	-2.167	1.29	-1.29	41.162	-41.162
108			3	.748	-.07	-2.155	1.235	-1.235	39.418	-39.418
109			4	.744	-.07	-2.143	1.181	-1.181	37.684	-37.684
110			5	.739	-.07	-2.131	1.126	-1.126	35.959	-35.959
111	2	M31	1	.752	-.07	-2.26	1.155	-1.155	39.608	-39.608
112			2	.748	-.07	-2.247	1.099	-1.099	37.713	-37.713
113			3	.743	-.07	-2.234	1.043	-1.043	35.828	-35.828
114			4	.738	-.07	-2.222	.987	-.987	33.954	-33.954
115			5	.734	-.07	-2.209	.931	-.931	32.091	-32.091
116	2	M32	1	.747	-.07	-2.348	.955	-.955	35.626	-35.626
117			2	.743	-.07	-2.335	.898	-.898	33.564	-33.564
118			3	.738	-.07	-2.321	.84	-.84	31.515	-31.515
119			4	.558	-.053	-1.819	.773	-.773	29.055	-29.055
120			5	.553	-.053	-1.806	.73	-.73	27.459	-27.459
121	2	M33	1	.608	-.053	-2.559	.831	-.831	32.532	-32.532
122			2	.603	-.053	-2.54	.782	-.782	30.654	-30.654
123			3	.598	-.053	-2.521	.733	-.733	28.79	-28.79
124			4	.594	-.053	-2.501	.685	-.685	26.94	-26.94
125			5	.589	-.053	-2.482	.636	-.636	25.104	-25.104
126	2	M34	1	.598	-.053	-2.656	.65	-.65	28.423	-28.423
127			2	.593	-.053	-2.635	.6	-.6	26.358	-26.358
128			3	.589	-.053	-2.614	.55	-.55	24.31	-24.31
129			4	.584	-.053	-2.594	.5	-.5	22.278	-22.278
130			5	.579	-.053	-2.573	.45	-.45	20.262	-20.262
131	2	M35	1	.588	-.053	-2.764	.461	-.461	23.248	-23.248
132			2	.37	-.035	-1.921	.405	-.405	20.568	-20.568
133			3	.366	-.035	-1.899	.371	-.371	18.976	-18.976
134			4	.361	-.035	-1.876	.338	-.338	17.402	-17.402
135			5	.356	-.035	-1.854	.304	-.304	15.847	-15.847
136	2	M36	1	.362	-.034	-1.996	.311	-.311	18.481	-18.481
137			2	.357	-.034	-1.972	.278	-.278	16.695	-16.695
138			3	.353	-.034	-1.948	.244	-.244	14.93	-14.93
139			4	.348	-.034	-1.924	.21	-.21	13.187	-13.187
140			5	.343	-.034	-1.9	.176	-.176	11.466	-11.466
141	2	M37	1	.349	-.034	-2.06	.18	-.18	13.644	-13.644
142			2	.34	-.034	-2.633	.146	-.146	11.507	-11.507
143			3	.335	-.034	-2.611	.111	-.111	8.921	-8.921
144			4	.126	-.016	-1.626	.078	-.078	6.197	-6.197
145			5	.122	-.016	-1.604	.062	-.062	4.605	-4.605
146	2	M38	1	.124	-.016	-1.749	.063	-.063	5.621	-5.621
147			2	.12	-.016	-1.725	.047	-.047	3.712	-3.712

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.116	-.016	-1.701	.03	-.03	1.83	-1.83
149			4	.07	-.015	-.403	.014	-.014	.814	-.814
150			5	0	0	-.001	0	0	0	0
151	2	M2	1	.345	-.399	.03	0	0	0	0
152			2	.346	-.409	.03	-1.169	1.169	.075	-.075
153			3	.347	-.419	.03	-2.367	2.367	.151	-.151
154			4	.348	-.431	.03	-3.598	3.598	.226	-.226
155			5	.349	-.443	.03	-4.863	4.863	.302	-.302
156	2	M6	1	.346	-.383	.03	0	0	0	0
157			2	.347	-.392	.03	-1.089	1.089	.074	-.074
158			3	.348	-.403	.03	-2.205	2.205	.147	-.147
159			4	.35	-.414	.03	-3.352	3.352	.221	-.221
160			5	.351	-.426	.03	-4.531	4.531	.294	-.294
161	2	M4	1	.291	-.354	.026	0	0	0	0
162			2	.292	-.365	.026	-1.081	1.081	.068	-.068
163			3	.293	-.378	.026	-2.197	2.197	.135	-.135
164			4	.294	-.391	.026	-3.353	3.353	.203	-.203
165			5	.296	-.406	.026	-4.552	4.552	.27	-.27
166	2	M39	1	.228	-.28	.021	-2.026	2.026	.132	-.132
167			2	.229	-.29	.021	-2.568	2.568	.165	-.165
168			3	.23	-.301	.021	-3.131	3.131	.198	-.198
169			4	.232	-.313	.021	-3.715	3.715	.231	-.231
170			5	.233	-.325	.021	-4.322	4.322	.264	-.264
171	2	M43	1	.229	-.268	.021	-1.887	1.887	.129	-.129
172			2	.23	-.279	.021	-2.393	2.393	.161	-.161
173			3	.231	-.289	.021	-2.917	2.917	.193	-.193
174			4	.233	-.301	.021	-3.462	3.462	.225	-.225
175			5	.234	-.312	.021	-4.028	4.028	.257	-.257
176	2	M9	1	.098	-.065	.034	0	0	0	0
177			2	.098	-.071	.034	-.147	.147	.064	-.064
178			3	.099	-.078	.034	-.308	.308	.128	-.128
179			4	.1	-.086	.034	-.485	.485	.192	-.192
180			5	.101	-.093	.034	-.677	.677	.256	-.256
181	2	M46	1	.07	-.062	.025	-.316	.316	.127	-.127
182			2	.07	-.068	.025	-.414	.414	.159	-.159
183			3	.071	-.075	.025	-.522	.522	.19	-.19
184			4	.072	-.082	.025	-.64	.64	.222	-.222
185			5	.073	-.09	.025	-.77	.77	.254	-.254
186	2	M41	1	.185	-.247	.017	-1.753	1.753	.109	-.109
187			2	.186	-.26	.017	-2.234	2.234	.136	-.136
188			3	.188	-.273	.017	-2.738	2.738	.163	-.163
189			4	.189	-.287	.017	-3.268	3.268	.19	-.19
190			5	.19	-.301	.017	-3.826	3.826	.217	-.217
191	2	M3	1	-.233	-.587	-.028	0	0	0	0
192			2	-.232	-.597	-.028	-1.714	1.714	-.07	.07
193			3	-.231	-.608	-.028	-3.457	3.457	-.14	.14
194			4	-.23	-.619	-.028	-5.233	5.233	-.21	.21
195			5	-.229	-.631	-.028	-7.043	7.043	-.28	.28
196	2	M5	1	-.211	-.491	-.024	0	0	0	0
197			2	-.21	-.502	-.024	-1.492	1.492	-.063	.063
198			3	-.209	-.515	-.024	-3.02	3.02	-.127	.127
199			4	-.208	-.528	-.024	-4.587	4.587	-.19	.19

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	-.207	-.543	-.024	-6.198	6.198	-.253	.253
201	2	M7	1	-.231	-.581	-.028	0	0	0	0
202			2	-.23	-.591	-.028	-1.646	1.646	-.068	.068
203			3	-.229	-.601	-.028	-3.321	3.321	-.136	.136
204			4	-.228	-.612	-.028	-5.025	5.025	-.204	.204
205			5	-.227	-.624	-.028	-6.762	6.762	-.272	.272
206	2	M8	1	-.138	-.259	-.033	0	0	0	0
207			2	-.137	-.266	-.033	-.566	.566	-.062	.062
208			3	-.136	-.273	-.033	-1.146	1.146	-.125	.125
209			4	-.136	-.28	-.033	-1.742	1.742	-.187	.187
210			5	-.135	-.288	-.033	-2.354	2.354	-.249	.249
211	2	M42	1	-.13	-.333	-.016	-2.387	2.387	-.102	.102
212			2	-.129	-.346	-.016	-3.03	3.03	-.127	.127
213			3	-.127	-.359	-.016	-3.697	3.697	-.153	.153
214			4	-.126	-.373	-.016	-4.391	4.391	-.178	.178
215			5	-.125	-.387	-.016	-5.111	5.111	-.204	.204
216	2	M44	1	-.148	-.397	-.019	-2.817	2.817	-.119	.119
217			2	-.147	-.407	-.019	-3.559	3.559	-.149	.149
218			3	-.146	-.417	-.019	-4.321	4.321	-.178	.178
219			4	-.145	-.429	-.019	-5.102	5.102	-.208	.208
220			5	-.144	-.44	-.019	-5.906	5.906	-.238	.238
221	2	M40	1	-.15	-.401	-.019	-2.934	2.934	-.123	.123
222			2	-.148	-.412	-.019	-3.707	3.707	-.153	.153
223			3	-.147	-.423	-.019	-4.502	4.502	-.184	.184
224			4	-.146	-.434	-.019	-5.317	5.317	-.215	.215
225			5	-.145	-.446	-.019	-6.156	6.156	-.246	.246
226	2	M45	1	-.093	-.192	-.025	-1.098	1.098	-.124	.124
227			2	-.093	-.199	-.025	-1.393	1.393	-.154	.154
228			3	-.092	-.206	-.025	-1.699	1.699	-.185	.185
229			4	-.091	-.213	-.025	-2.015	2.015	-.216	.216
230			5	-.09	-.221	-.025	-2.342	2.342	-.247	.247

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTTOM-POLE	0	94.636	-10.349	-1146.164	.013	7.387
2	3	Totals:	0	94.636	-10.349			
3	3	COG (ft):	X: .061	Y: 99.15	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	3	M15	1	1.362	-.654	0	19.883	-19.883	.127	-.127
2			2	1.354	-.648	0	19.595	-19.595	.127	-.127
3			3	1.347	-.642	0	19.31	-19.31	.126	-.126
4			4	1.339	-.636	0	19.028	-19.028	.126	-.126
5			5	1.331	-.63	0	18.748	-18.748	.126	-.126
6	3	M1	1	1.189	-.693	0	19.328	-19.328	.087	-.087
7			2	1.182	-.686	0	19.107	-19.107	.087	-.087
8			3	1.175	-.679	0	18.888	-18.888	.087	-.087
9			4	1.168	-.673	0	18.672	-18.672	.087	-.087
10			5	1.161	-.666	0	18.458	-18.458	.087	-.087
11	3	M16	1	1.354	-.647	0	19.146	-19.146	.132	-.132
12			2	1.346	-.641	0	18.856	-18.856	.132	-.132
13			3	1.338	-.635	0	18.568	-18.568	.132	-.132
14			4	1.331	-.629	0	18.282	-18.282	.132	-.132
15			5	1.323	-.624	0	17.999	-17.999	.132	-.132
16	3	M10	1	1.182	-.687	0	18.833	-18.833	.09	-.09
17			2	1.174	-.681	0	18.61	-18.61	.09	-.09
18			3	1.167	-.674	0	18.389	-18.389	.09	-.09
19			4	1.16	-.667	0	18.17	-18.17	.09	-.09
20			5	1.153	-.661	0	17.953	-17.953	.09	-.09
21	3	M17	1	1.346	-.639	0	18.39	-18.39	.139	-.139
22			2	1.338	-.633	0	18.097	-18.097	.139	-.139
23			3	1.33	-.627	0	17.806	-17.806	.138	-.138
24			4	1.323	-.622	0	17.518	-17.518	.138	-.138
25			5	1.315	-.616	0	17.233	-17.233	.138	-.138
26	3	M11	1	1.174	-.68	0	18.326	-18.326	.094	-.094
27			2	1.167	-.674	0	18.1	-18.1	.094	-.094
28			3	1.16	-.667	0	17.876	-17.876	.094	-.094
29			4	1.152	-.661	0	17.655	-17.655	.094	-.094
30			5	1.145	-.655	0	17.435	-17.435	.094	-.094
31	3	M12	1	1.166	-.673	0	17.806	-17.806	.098	-.098
32			2	1.159	-.666	0	17.578	-17.578	.098	-.098
33			3	1.152	-.66	0	17.352	-17.352	.098	-.098
34			4	1.145	-.654	0	17.128	-17.128	.098	-.098
35			5	1.137	-.648	0	16.906	-16.906	.098	-.098
36	3	M18	1	1.338	-.63	0	17.615	-17.615	.145	-.145
37			2	1.33	-.624	0	17.32	-17.32	.145	-.145
38			3	1.323	-.619	0	17.027	-17.027	.145	-.145
39			4	1.315	-.613	0	16.736	-16.736	.145	-.145
40			5	1.307	-.608	0	16.449	-16.449	.145	-.145
41	3	M13	1	1.159	-.664	0	17.273	-17.273	.103	-.103
42			2	1.151	-.658	0	17.043	-17.043	.103	-.103
43			3	1.144	-.652	0	16.815	-16.815	.103	-.103

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	1.137	-.646	0	16.59	-16.59	.103	-.103
45			5	1.13	-.639	0	16.366	-16.366	.103	-.103
46	3	M21	1	1.441	-.602	0	16.991	-16.991	.179	-.179
47			2	1.432	-.597	0	16.654	-16.654	.179	-.179
48			3	1.424	-.592	0	16.32	-16.32	.178	-.178
49			4	1.416	-.587	0	15.989	-15.989	.178	-.178
50			5	1.407	-.582	0	15.66	-15.66	.178	-.178
51	3	M19	1	1.331	-.62	0	16.822	-16.822	.153	-.153
52			2	1.323	-.614	0	16.525	-16.525	.152	-.152
53			3	1.315	-.609	0	16.23	-16.23	.152	-.152
54			4	1.307	-.604	0	15.937	-15.937	.152	-.152
55			5	1.299	-.599	0	15.648	-15.648	.152	-.152
56	3	M14	1	1.151	-.654	0	16.729	-16.729	.108	-.108
57			2	1.144	-.648	0	16.497	-16.497	.107	-.107
58			3	1.137	-.642	0	16.268	-16.268	.107	-.107
59			4	1.129	-.637	0	16.04	-16.04	.107	-.107
60			5	1.122	-.631	0	15.815	-15.815	.107	-.107
61	3	M22	1	1.432	-.591	0	16.016	-16.016	.189	-.189
62			2	1.424	-.586	0	15.678	-15.678	.188	-.188
63			3	1.415	-.581	0	15.342	-15.342	.188	-.188
64			4	1.407	-.577	0	15.009	-15.009	.188	-.188
65			5	1.399	-.572	0	14.679	-14.679	.187	-.187
66	3	M20	1	1.323	-.609	0	16.011	-16.011	.16	-.16
67			2	1.315	-.604	0	15.712	-15.712	.16	-.16
68			3	1.307	-.599	0	15.415	-15.415	.16	-.16
69			4	1.299	-.593	0	15.121	-15.121	.16	-.16
70			5	1.291	-.588	0	14.83	-14.83	.159	-.159
71	3	M23	1	1.424	-.58	0	15.02	-15.02	.199	-.199
72			2	1.415	-.575	0	14.681	-14.681	.199	-.199
73			3	1.407	-.57	0	14.344	-14.344	.198	-.198
74			4	1.398	-.566	0	14.01	-14.01	.198	-.198
75			5	1.39	-.561	0	13.679	-13.679	.197	-.197
76	3	M24	1	1.415	-.568	0	14.004	-14.004	.21	-.21
77			2	1.407	-.563	0	13.664	-13.664	.21	-.21
78			3	1.398	-.559	0	13.326	-13.326	.209	-.209
79			4	1.39	-.554	0	12.991	-12.991	.209	-.209
80			5	1.381	-.55	0	12.659	-12.659	.208	-.208
81	3	M25	1	1.407	-.555	0	12.967	-12.967	.223	-.223
82			2	1.399	-.55	0	12.627	-12.627	.222	-.222
83			3	1.39	-.546	0	12.289	-12.289	.222	-.222
84			4	1.382	-.542	0	11.953	-11.953	.221	-.221
85			5	1.373	-.537	0	11.621	-11.621	.221	-.221
86	3	M27	1	1.519	-.531	-.001	12.149	-12.149	.267	-.267
87			2	1.51	-.527	-.001	11.767	-11.767	.266	-.266
88			3	1.501	-.523	-.001	11.388	-11.388	.266	-.266
89			4	1.492	-.518	-.001	11.012	-11.012	.265	-.265
90			5	1.483	-.514	-.001	10.638	-10.638	.264	-.264
91	3	M26	1	1.399	-.541	0	11.911	-11.911	.237	-.237
92			2	1.391	-.537	0	11.57	-11.57	.236	-.236
93			3	1.382	-.533	0	11.232	-11.232	.235	-.235
94			4	1.373	-.528	0	10.897	-10.897	.235	-.235
95			5	1.365	-.524	0	10.564	-10.564	.234	-.234

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	3	M28	1	1.509	-.517	-.001	10.888	-10.888	.285	-.285
97			2	1.5	-.513	-.001	10.507	-10.507	.284	-.284
98			3	1.49	-.509	-.001	10.129	-10.129	.283	-.283
99			4	1.481	-.505	-.001	9.754	-9.754	.282	-.282
100			5	1.472	-.501	-.001	9.382	-9.382	.281	-.281
101	3	M29	1	1.498	-.503	-.002	9.607	-9.607	.306	-.306
102			2	1.48	-.471	.015	9.232	-9.232	.307	-.307
103			3	1.473	-.468	.015	8.877	-8.877	.319	-.319
104			4	1.456	-.46	-.002	8.526	-8.526	.322	-.322
105			5	1.449	-.456	-.002	8.179	-8.179	.321	-.321
106	3	M30	1	1.475	-.457	-.002	8.38	-8.38	.351	-.351
107			2	1.468	-.454	-.002	8.027	-8.027	.35	-.35
108			3	1.461	-.45	-.002	7.676	-7.676	.348	-.348
109			4	1.454	-.447	-.002	7.327	-7.327	.347	-.347
110			5	1.447	-.444	-.002	6.982	-6.982	.345	-.345
111	3	M31	1	1.473	-.444	-.002	7.158	-7.158	.38	-.38
112			2	1.466	-.441	-.002	6.806	-6.806	.378	-.378
113			3	1.46	-.438	-.002	6.456	-6.456	.376	-.376
114			4	1.453	-.434	-.002	6.109	-6.109	.374	-.374
115			5	1.446	-.431	-.002	5.765	-5.765	.372	-.372
116	3	M32	1	1.473	-.431	-.003	5.914	-5.914	.413	-.413
117			2	1.466	-.428	-.003	5.563	-5.563	.411	-.411
118			3	1.459	-.425	-.003	5.215	-5.215	.409	-.409
119			4	1.094	-.345	-.002	4.874	-4.874	.406	-.406
120			5	1.087	-.342	-.002	4.593	-4.593	.404	-.404
121	3	M33	1	1.195	-.342	-.003	5.235	-5.235	.478	-.478
122			2	1.188	-.339	-.003	4.92	-4.92	.476	-.476
123			3	1.181	-.336	-.003	4.607	-4.607	.474	-.474
124			4	1.174	-.333	-.003	4.298	-4.298	.471	-.471
125			5	1.166	-.33	-.003	3.99	-3.99	.469	-.469
126	3	M34	1	1.185	-.328	-.004	4.081	-4.081	.531	-.531
127			2	1.177	-.325	-.004	3.772	-3.772	.528	-.528
128			3	1.17	-.323	-.004	3.465	-3.465	.525	-.525
129			4	1.163	-.32	-.004	3.162	-3.162	.522	-.522
130			5	1.156	-.317	-.004	2.86	-2.86	.519	-.519
131	3	M35	1	1.174	-.316	-.004	2.927	-2.927	.595	-.595
132			2	.743	-.224	-.003	2.662	-2.662	.59	-.59
133			3	.736	-.221	-.003	2.446	-2.446	.588	-.588
134			4	.729	-.219	-.003	2.233	-2.233	.585	-.585
135			5	.722	-.216	-.003	2.022	-2.022	.583	-.583
136	3	M36	1	.733	-.213	-.004	2.07	-2.07	.68	-.68
137			2	.726	-.21	-.004	1.861	-1.861	.676	-.676
138			3	.719	-.208	-.004	1.654	-1.654	.673	-.673
139			4	.712	-.205	-.004	1.449	-1.449	.67	-.67
140			5	.705	-.203	-.004	1.247	-1.247	.667	-.667
141	3	M37	1	.716	-.201	-.004	1.277	-1.277	.793	-.793
142			2	.699	-.256	-.004	1.063	-1.063	.789	-.789
143			3	.694	-.254	-.004	.804	-.804	.785	-.785
144			4	.272	-.173	-.002	.616	-.616	.78	-.78
145			5	.266	-.171	-.002	.442	-.442	.778	-.778
146	3	M38	1	.271	-.17	-.002	.453	-.453	.95	-.95
147			2	.266	-.168	-.002	.277	-.277	.947	-.947

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.26	-.166	-.002	.103	-.103	.945	-.945
149			4	.163	-.035	-.001	.012	-.012	.943	-.943
150			5	0	0	0	0	0	0	0
151	3	M2	1	.121	-1.207	.003	0	0	0	0
152			2	.122	-1.22	.006	-3.513	3.513	.011	-.011
153			3	.124	-1.235	.009	-7.066	7.066	.03	-.03
154			4	.125	-1.251	.013	-10.664	10.664	.058	-.058
155			5	.127	-1.268	.018	-14.311	14.311	.096	-.096
156	3	M3	1	.121	-1.207	-.003	0	0	0	0
157			2	.122	-1.22	-.006	-3.514	3.514	-.011	.011
158			3	.124	-1.235	-.009	-7.068	7.068	-.03	.03
159			4	.125	-1.251	-.013	-10.666	10.666	-.058	.058
160			5	.127	-1.269	-.018	-14.314	14.314	-.096	.096
161	3	M4	1	.087	-1.047	.002	0	0	0	0
162			2	.088	-1.062	.005	-3.169	3.169	.009	-.009
163			3	.089	-1.079	.009	-6.385	6.385	.026	-.026
164			4	.091	-1.098	.013	-9.656	9.656	.054	-.054
165			5	.093	-1.119	.018	-12.988	12.988	.094	-.094
166	3	M5	1	.087	-1.047	-.002	0	0	0	0
167			2	.088	-1.062	-.005	-3.169	3.169	-.009	.009
168			3	.089	-1.079	-.009	-6.387	6.387	-.026	.026
169			4	.091	-1.098	-.013	-9.659	9.659	-.054	.054
170			5	.093	-1.119	-.018	-12.991	12.991	-.094	.094
171	3	M6	1	.125	-1.206	.003	0	0	0	0
172			2	.126	-1.218	.006	-3.405	3.405	.012	-.012
173			3	.127	-1.232	.009	-6.848	6.848	.03	-.03
174			4	.129	-1.248	.013	-10.333	10.333	.058	-.058
175			5	.131	-1.265	.017	-13.864	13.864	.095	-.095
176	3	M7	1	.125	-1.206	-.003	0	0	0	0
177			2	.126	-1.219	-.006	-3.407	3.407	-.012	.012
178			3	.127	-1.233	-.009	-6.851	6.851	-.03	.03
179			4	.129	-1.249	-.013	-10.338	10.338	-.058	.058
180			5	.131	-1.266	-.017	-13.87	13.87	-.095	.095
181	3	M8	1	.067	-.63	-.002	0	0	0	0
182			2	.068	-.638	-.004	-1.367	1.367	-.005	.005
183			3	.069	-.648	-.006	-2.755	2.755	-.015	.015
184			4	.07	-.658	-.009	-4.163	4.163	-.028	.028
185			5	.072	-.669	-.011	-5.595	5.595	-.047	.047
186	3	M9	1	.04	-.372	.001	0	0	0	0
187			2	.041	-.381	.003	-.813	.813	.004	-.004
188			3	.042	-.391	.005	-1.645	1.645	.012	-.012
189			4	.043	-.401	.008	-2.499	2.499	.024	-.024
190			5	.044	-.412	.011	-3.376	3.376	.041	-.041
191	3	M46	1	.031	-.275	.008	-1.575	1.575	.021	-.021
192			2	.032	-.284	.01	-1.996	1.996	.032	-.032
193			3	.033	-.294	.013	-2.432	2.432	.046	-.046
194			4	.034	-.304	.016	-2.882	2.882	.064	-.064
195			5	.035	-.314	.019	-3.348	3.348	.086	-.086
196	3	M45	1	.05	-.446	-.009	-2.61	2.61	-.023	.023
197			2	.051	-.455	-.011	-3.29	3.29	-.036	.036
198			3	.052	-.465	-.013	-3.984	3.984	-.051	.051
199			4	.053	-.475	-.016	-4.694	4.694	-.069	.069

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	.054	-.486	-.019	-5.419	5.419	-.091	.091
201	3	M41	1	.058	-.683	.012	-5.003	5.003	.038	-.038
202			2	.06	-.7	.016	-6.314	6.314	.06	-.06
203			3	.061	-.719	.02	-7.658	7.658	.088	-.088
204			4	.063	-.738	.025	-9.039	9.039	.124	-.124
205			5	.065	-.759	.031	-10.457	10.457	.168	-.168
206	3	M42	1	.058	-.684	-.012	-5.004	5.004	-.038	.038
207			2	.06	-.701	-.016	-6.315	6.315	-.06	.06
208			3	.061	-.719	-.02	-7.66	7.66	-.088	.088
209			4	.063	-.738	-.025	-9.041	9.041	-.124	.124
210			5	.065	-.759	-.031	-10.459	10.459	-.168	.168
211	3	M43	1	.085	-.801	.012	-5.775	5.775	.042	-.042
212			2	.087	-.815	.016	-7.268	7.268	.063	-.063
213			3	.088	-.83	.02	-8.787	8.787	.09	-.09
214			4	.09	-.845	.024	-10.335	10.335	.124	-.124
215			5	.092	-.862	.029	-11.913	11.913	.164	-.164
216	3	M44	1	.085	-.801	-.012	-5.777	5.777	-.042	.042
217			2	.087	-.815	-.016	-7.271	7.271	-.063	.063
218			3	.088	-.83	-.02	-8.791	8.791	-.09	.09
219			4	.09	-.846	-.024	-10.34	10.34	-.124	.124
220			5	.092	-.862	-.029	-11.918	11.918	-.164	.164
221	3	M39	1	.083	-.803	.012	-5.961	5.961	.042	-.042
222			2	.085	-.817	.016	-7.504	7.504	.065	-.065
223			3	.086	-.833	.02	-9.074	9.074	.093	-.093
224			4	.088	-.849	.024	-10.675	10.675	.128	-.128
225			5	.09	-.866	.029	-12.308	12.308	.17	-.17
226	3	M40	1	.083	-.803	-.012	-5.962	5.962	-.042	.042
227			2	.085	-.817	-.016	-7.505	7.505	-.065	.065
228			3	.086	-.833	-.02	-9.076	9.076	-.093	.093
229			4	.088	-.849	-.024	-10.677	10.677	-.128	.128
230			5	.09	-.866	-.029	-12.31	12.31	-.171	.171

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTTOM-POLE	0	52.891	-35.939	-3287.315	.017	3.176
2	4	Totals:	0	52.891	-35.939			
3	4	COG (ft):	X: .055	Y: 93.987	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	4	M1	1	.665	-2.385	0	55.434	-55.434	.037	-.037
2			2	.66	-2.361	0	54.675	-54.675	.037	-.037
3			3	.655	-2.337	0	53.922	-53.922	.037	-.037
4			4	.651	-2.314	0	53.178	-53.178	.037	-.037
5			5	.646	-2.291	0	52.441	-52.441	.037	-.037
6	4	M15	1	.738	-2.035	0	53.966	-53.966	.055	-.055
7			2	.733	-2.014	0	53.071	-53.071	.055	-.055
8			3	.728	-1.994	0	52.185	-52.185	.055	-.055
9			4	.723	-1.974	0	51.308	-51.308	.055	-.055
10			5	.718	-1.953	0	50.441	-50.441	.055	-.055
11	4	M10	1	.657	-2.324	0	53.508	-53.508	.039	-.039
12			2	.652	-2.301	0	52.753	-52.753	.039	-.039
13			3	.648	-2.278	0	52.005	-52.005	.039	-.039
14			4	.643	-2.255	0	51.265	-51.265	.039	-.039
15			5	.638	-2.232	0	50.532	-50.532	.039	-.039
16	4	M11	1	.65	-2.262	0	51.582	-51.582	.041	-.041
17			2	.645	-2.239	0	50.831	-50.831	.041	-.041
18			3	.64	-2.217	0	50.088	-50.088	.041	-.041
19			4	.635	-2.195	0	49.353	-49.353	.041	-.041
20			5	.631	-2.172	0	48.625	-48.625	.041	-.041
21	4	M16	1	.731	-1.976	0	51.513	-51.513	.057	-.057
22			2	.726	-1.956	0	50.625	-50.625	.057	-.057
23			3	.721	-1.936	0	49.747	-49.747	.057	-.057
24			4	.716	-1.917	0	48.877	-48.877	.057	-.057
25			5	.711	-1.897	0	48.017	-48.017	.057	-.057
26	4	M12	1	.642	-2.199	0	49.657	-49.657	.042	-.042
27			2	.637	-2.177	0	48.912	-48.912	.042	-.042
28			3	.632	-2.155	0	48.174	-48.174	.042	-.042
29			4	.628	-2.134	0	47.443	-47.443	.042	-.042
30			5	.623	-2.112	0	46.72	-46.72	.042	-.042
31	4	M17	1	.724	-1.917	0	49.059	-49.059	.06	-.06
32			2	.719	-1.898	0	48.179	-48.179	.06	-.06
33			3	.714	-1.878	0	47.308	-47.308	.06	-.06
34			4	.709	-1.859	0	46.447	-46.447	.06	-.06
35			5	.704	-1.84	0	45.594	-45.594	.06	-.06
36	4	M13	1	.634	-2.136	0	47.734	-47.734	.044	-.044
37			2	.63	-2.115	0	46.994	-46.994	.044	-.044
38			3	.625	-2.093	0	46.262	-46.262	.044	-.044
39			4	.62	-2.072	0	45.537	-45.537	.044	-.044
40			5	.615	-2.051	0	44.82	-44.82	.044	-.044
41	4	M18	1	.717	-1.858	0	46.606	-46.606	.063	-.063
42			2	.712	-1.839	0	45.735	-45.735	.063	-.063
43			3	.707	-1.82	0	44.872	-44.872	.063	-.063

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	.702	-1.801	0	44.019	-44.019	.063	-.063
45			5	.697	-1.783	0	43.174	-43.174	.063	-.063
46	4	M14	1	.627	-2.072	0	45.814	-45.814	.046	-.046
47			2	.622	-2.051	0	45.08	-45.08	.046	-.046
48			3	.617	-2.031	0	44.354	-44.354	.046	-.046
49			4	.613	-2.01	0	43.636	-43.636	.046	-.046
50			5	.608	-1.989	0	42.925	-42.925	.046	-.046
51	4	M19	1	.71	-1.798	0	44.155	-44.155	.066	-.066
52			2	.705	-1.779	0	43.292	-43.292	.066	-.066
53			3	.7	-1.761	0	42.439	-42.439	.066	-.066
54			4	.695	-1.743	0	41.594	-41.594	.066	-.066
55			5	.69	-1.725	0	40.758	-40.758	.066	-.066
56	4	M21	1	.762	-1.69	0	43.932	-43.932	.078	-.078
57			2	.757	-1.672	0	42.987	-42.987	.078	-.078
58			3	.752	-1.655	0	42.052	-42.052	.078	-.078
59			4	.747	-1.638	0	41.127	-41.127	.078	-.078
60			5	.742	-1.621	0	40.211	-40.211	.078	-.078
61	4	M20	1	.703	-1.738	0	41.704	-41.704	.07	-.07
62			2	.698	-1.72	0	40.851	-40.851	.07	-.07
63			3	.693	-1.703	0	40.007	-40.007	.07	-.07
64			4	.688	-1.685	0	39.171	-39.171	.07	-.07
65			5	.683	-1.668	0	38.344	-38.344	.07	-.07
66	4	M22	1	.755	-1.632	0	41.124	-41.124	.083	-.083
67			2	.75	-1.616	0	40.191	-40.191	.083	-.083
68			3	.745	-1.599	0	39.267	-39.267	.083	-.083
69			4	.74	-1.582	0	38.353	-38.353	.082	-.082
70			5	.735	-1.566	0	37.448	-37.448	.082	-.082
71	4	M23	1	.748	-1.575	0	38.319	-38.319	.088	-.088
72			2	.743	-1.559	0	37.397	-37.397	.088	-.088
73			3	.738	-1.543	0	36.485	-36.485	.087	-.087
74			4	.733	-1.527	0	35.582	-35.582	.087	-.087
75			5	.728	-1.511	0	34.689	-34.689	.087	-.087
76	4	M24	1	.741	-1.518	0	35.514	-35.514	.093	-.093
77			2	.736	-1.503	0	34.604	-34.604	.093	-.093
78			3	.731	-1.487	0	33.704	-33.704	.093	-.093
79			4	.726	-1.472	0	32.814	-32.814	.093	-.093
80			5	.721	-1.457	0	31.932	-31.932	.093	-.093
81	4	M25	1	.734	-1.462	0	32.711	-32.711	.099	-.099
82			2	.729	-1.447	0	31.814	-31.814	.099	-.099
83			3	.724	-1.432	0	30.926	-30.926	.099	-.099
84			4	.719	-1.417	0	30.048	-30.048	.099	-.099
85			5	.714	-1.402	0	29.178	-29.178	.098	-.098
86	4	M27	1	.787	-1.359	0	30.39	-30.39	.12	-.12
87			2	.782	-1.345	0	29.413	-29.413	.12	-.12
88			3	.777	-1.331	0	28.446	-28.446	.12	-.12
89			4	.771	-1.318	0	27.489	-27.489	.119	-.119
90			5	.766	-1.304	0	26.541	-26.541	.119	-.119
91	4	M26	1	.728	-1.406	0	29.907	-29.907	.106	-.106
92			2	.723	-1.391	0	29.023	-29.023	.106	-.106
93			3	.717	-1.377	0	28.148	-28.148	.105	-.105
94			4	.712	-1.363	0	27.282	-27.282	.105	-.105
95			5	.707	-1.348	0	26.425	-26.425	.105	-.105

Member Section Stresses (By Combination) (Continued)

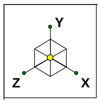
	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	4	M28	1	.78	-1.306	0	27.165	-27.165	.129	-.129
97			2	.774	-1.293	0	26.204	-26.204	.129	-.129
98			3	.769	-1.279	0	25.253	-25.253	.129	-.129
99			4	.764	-1.266	0	24.311	-24.311	.128	-.128
100			5	.759	-1.253	0	23.38	-23.38	.128	-.128
101	4	M29	1	.772	-1.253	0	23.942	-23.942	.139	-.139
102			2	.763	-1.157	.006	23.01	-23.01	.14	-.14
103			3	.758	-1.145	.006	22.138	-22.138	.145	-.145
104			4	.749	-1.124	0	21.279	-21.279	.147	-.147
105			5	.744	-1.113	0	20.432	-20.432	.146	-.146
106	4	M30	1	.758	-1.112	0	20.936	-20.936	.16	-.16
107			2	.753	-1.101	0	20.077	-20.077	.16	-.16
108			3	.748	-1.09	0	19.226	-19.226	.159	-.159
109			4	.744	-1.078	0	18.385	-18.385	.159	-.159
110			5	.739	-1.067	0	17.552	-17.552	.159	-.159
111	4	M31	1	.752	-1.066	0	17.996	-17.996	.175	-.175
112			2	.748	-1.055	0	17.152	-17.152	.174	-.174
113			3	.743	-1.044	0	16.317	-16.317	.174	-.174
114			4	.738	-1.033	0	15.491	-15.491	.173	-.173
115			5	.734	-1.023	0	14.672	-14.672	.173	-.173
116	4	M32	1	.747	-1.021	0	15.053	-15.053	.192	-.192
117			2	.743	-1.01	0	14.224	-14.224	.191	-.191
118			3	.738	-1	0	13.403	-13.403	.191	-.191
119			4	.558	-.844	0	12.578	-12.578	.19	-.19
120			5	.553	-.834	0	11.893	-11.893	.19	-.19
121	4	M33	1	.608	-.836	0	13.554	-13.554	.225	-.225
122			2	.603	-.826	0	12.786	-12.786	.224	-.224
123			3	.598	-.816	0	12.026	-12.026	.224	-.224
124			4	.594	-.807	0	11.276	-11.276	.223	-.223
125			5	.589	-.797	0	10.534	-10.534	.223	-.223
126	4	M34	1	.598	-.792	0	10.774	-10.774	.252	-.252
127			2	.593	-.783	0	10.029	-10.029	.251	-.251
128			3	.589	-.774	0	9.292	-9.292	.251	-.251
129			4	.584	-.765	0	8.564	-8.564	.25	-.25
130			5	.579	-.756	0	7.845	-7.845	.249	-.249
131	4	M35	1	.588	-.753	-.001	8.027	-8.027	.286	-.286
132			2	.37	-.566	0	7.353	-7.353	.285	-.285
133			3	.366	-.557	0	6.81	-6.81	.285	-.285
134			4	.361	-.549	0	6.275	-6.275	.284	-.284
135			5	.356	-.54	0	5.748	-5.748	.283	-.283
136	4	M36	1	.362	-.534	0	5.885	-5.885	.33	-.33
137			2	.357	-.526	0	5.359	-5.359	.33	-.33
138			3	.353	-.518	0	4.842	-4.842	.329	-.329
139			4	.348	-.51	0	4.333	-4.333	.328	-.328
140			5	.343	-.502	0	3.831	-3.831	.327	-.327
141	4	M37	1	.349	-.498	0	3.925	-3.925	.39	-.39
142			2	.34	-.73	0	3.374	-3.374	.389	-.389
143			3	.335	-.724	0	2.636	-2.636	.388	-.388
144			4	.126	-.569	0	2.009	-2.009	.387	-.387
145			5	.122	-.564	0	1.434	-1.434	.386	-.386
146	4	M38	1	.124	-.56	0	1.47	-1.47	.472	-.472
147			2	.12	-.555	0	.89	-.89	.471	-.471

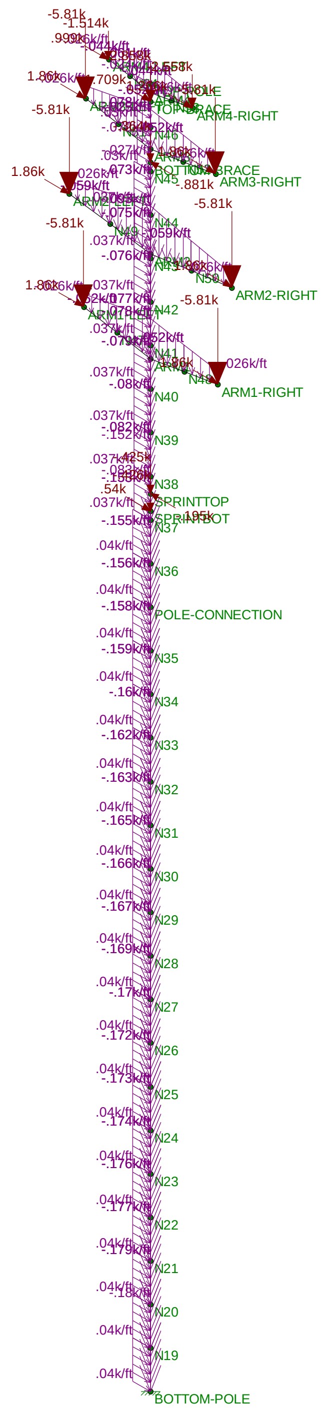
Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.116	-.549	0	.316	-.316	.471	-.471
149			4	.07	-.075	0	.04	-.04	.47	-.47
150			5	0	0	0	0	0	0	0
151	4	M2	1	.056	-.556	.032	0	0	0	0
152			2	.057	-.566	.04	-1.625	1.625	.09	-.09
153			3	.058	-.577	.049	-3.279	3.279	.202	-.202
154			4	.059	-.588	.06	-4.966	4.966	.339	-.339
155			5	.06	-.601	.074	-6.687	6.687	.508	-.508
156	4	M3	1	.056	-.556	-.032	0	0	0	0
157			2	.057	-.566	-.04	-1.625	1.625	-.09	.09
158			3	.058	-.577	-.049	-3.28	3.28	-.202	.202
159			4	.059	-.588	-.06	-4.966	4.966	-.339	.339
160			5	.06	-.601	-.074	-6.688	6.688	-.508	.508
161	4	M4	1	.04	-.483	.027	0	0	0	0
162			2	.041	-.494	.035	-1.468	1.468	.081	-.081
163			3	.042	-.507	.046	-2.971	2.971	.186	-.186
164			4	.043	-.52	.06	-4.514	4.514	.323	-.323
165			5	.044	-.535	.076	-6.1	6.1	.499	-.499
166	4	M5	1	.04	-.483	-.027	0	0	0	0
167			2	.041	-.494	-.035	-1.468	1.468	-.081	.081
168			3	.042	-.507	-.046	-2.971	2.971	-.186	.186
169			4	.043	-.52	-.06	-4.515	4.515	-.323	.323
170			5	.044	-.535	-.076	-6.101	6.101	-.499	.499
171	4	M6	1	.057	-.556	.033	0	0	0	0
172			2	.058	-.565	.04	-1.575	1.575	.089	-.089
173			3	.06	-.576	.049	-3.178	3.178	.197	-.197
174			4	.061	-.587	.06	-4.811	4.811	.329	-.329
175			5	.062	-.599	.073	-6.476	6.476	.492	-.492
176	4	M7	1	.057	-.556	-.033	0	0	0	0
177			2	.058	-.565	-.04	-1.575	1.575	-.089	.089
178			3	.06	-.576	-.049	-3.178	3.178	-.197	.197
179			4	.061	-.587	-.06	-4.812	4.812	-.33	.33
180			5	.062	-.599	-.073	-6.478	6.478	-.492	.492
181	4	M8	1	.026	-.245	-.035	0	0	0	0
182			2	.027	-.251	-.04	-.534	.534	-.072	.072
183			3	.028	-.258	-.047	-1.083	1.083	-.154	.154
184			4	.028	-.265	-.054	-1.647	1.647	-.249	.249
185			5	.029	-.273	-.062	-2.228	2.228	-.359	.359
186	4	M9	1	.012	-.116	.034	0	0	0	0
187			2	.013	-.123	.039	-.258	.258	.07	-.07
188			3	.014	-.13	.046	-.53	.53	.15	-.15
189			4	.015	-.137	.053	-.818	.818	.244	-.244
190			5	.015	-.145	.061	-1.121	1.121	.352	-.352
191	4	M46	1	.011	-.096	.046	-.523	.523	.174	-.174
192			2	.011	-.103	.053	-.674	.674	.237	-.237
193			3	.012	-.11	.061	-.834	.834	.309	-.309
194			4	.013	-.117	.07	-1.006	1.006	.391	-.391
195			5	.014	-.125	.08	-1.188	1.188	.486	-.486
196	4	M45	1	.02	-.182	-.047	-1.039	1.039	-.178	.178
197			2	.021	-.189	-.054	-1.319	1.319	-.241	.241
198			3	.022	-.196	-.062	-1.608	1.608	-.314	.314
199			4	.023	-.203	-.071	-1.909	1.909	-.398	.398

Member Section Stresses (By Combination) (Continued)

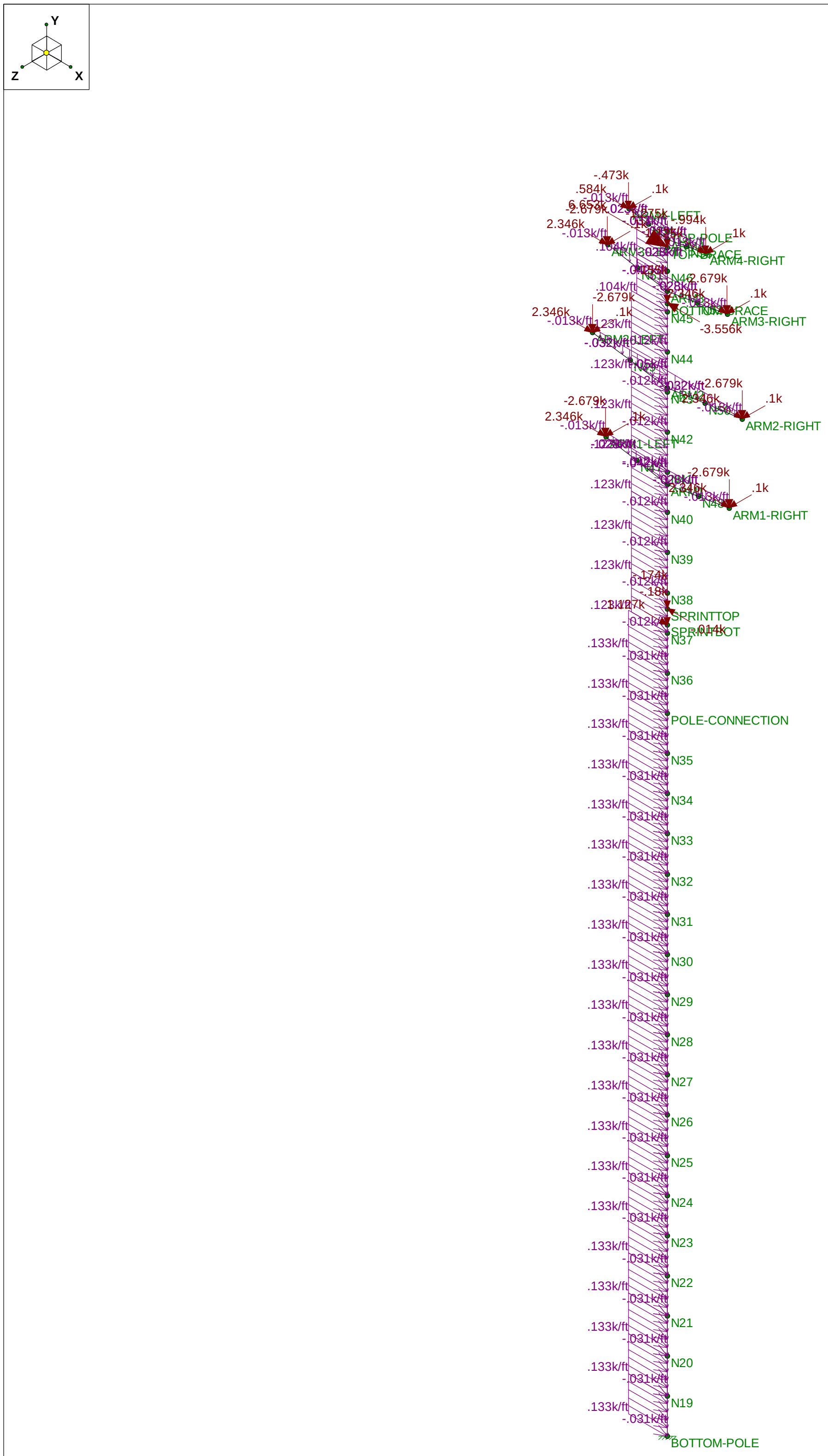
	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	.023	-.21	-.081	-2.22	2.22	-.493	.493
201	4	M41	1	.028	-.327	.051	-2.35	2.35	.201	-.201
202			2	.029	-.339	.064	-2.981	2.981	.291	-.291
203			3	.03	-.353	.079	-3.637	3.637	.402	-.402
204			4	.031	-.367	.096	-4.318	4.318	.539	-.539
205			5	.032	-.381	.114	-5.027	5.027	.703	-.703
206	4	M42	1	.028	-.327	-.051	-2.35	2.35	-.201	.201
207			2	.029	-.339	-.064	-2.981	2.981	-.291	.291
208			3	.03	-.353	-.079	-3.637	3.637	-.402	.402
209			4	.031	-.367	-.096	-4.319	4.319	-.539	.539
210			5	.032	-.381	-.114	-5.027	5.027	-.703	.703
211	4	M43	1	.04	-.379	.051	-2.698	2.698	.215	-.215
212			2	.042	-.389	.062	-3.408	3.408	.302	-.302
213			3	.043	-.4	.074	-4.137	4.137	.406	-.406
214			4	.044	-.411	.088	-4.887	4.887	.53	-.53
215			5	.045	-.423	.103	-5.658	5.658	.676	-.676
216	4	M44	1	.04	-.379	-.051	-2.698	2.698	-.215	.215
217			2	.042	-.389	-.062	-3.408	3.408	-.302	.302
218			3	.043	-.4	-.074	-4.138	4.138	-.406	.406
219			4	.044	-.411	-.088	-4.888	4.888	-.53	.53
220			5	.045	-.423	-.103	-5.659	5.659	-.676	.676
221	4	M39	1	.039	-.38	.052	-2.785	2.785	.222	-.222
222			2	.04	-.391	.063	-3.52	3.52	.313	-.313
223			3	.042	-.402	.075	-4.274	4.274	.422	-.422
224			4	.043	-.413	.089	-5.051	5.051	.552	-.552
225			5	.044	-.426	.105	-5.85	5.85	.705	-.705
226	4	M40	1	.039	-.38	-.052	-2.786	2.786	-.222	.222
227			2	.04	-.391	-.063	-3.52	3.52	-.313	.313
228			3	.042	-.402	-.075	-4.275	4.275	-.422	.422
229			4	.043	-.414	-.089	-5.051	5.051	-.552	.552
230			5	.044	-.426	-.105	-5.85	5.85	-.705	.705





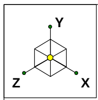
Loads: LC 1, x-direction NESC Heavy Wind

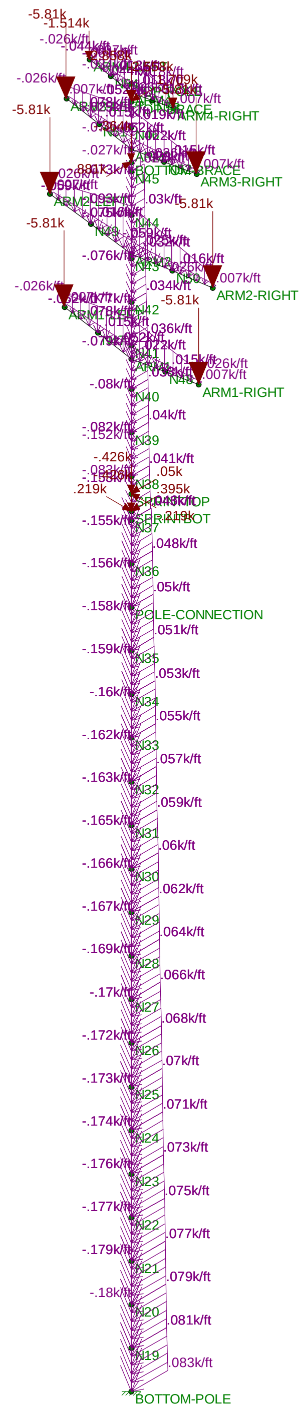
Centek Engineering		
TJL	Pole # 844	Feb 15, 2019 at 12:37 PM
17159.16 / CT43XC811	LC #1 Loads	NESC - Pole.r3d



Loads: LC 2, x-direction NESC Extreme Wind

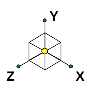
Centek Engineering		
TJL	Pole # 844	Feb 15, 2019 at 12:37 PM
17159.16 / CT43XC811	LC #2 Loads	NESC - Pole.r3d

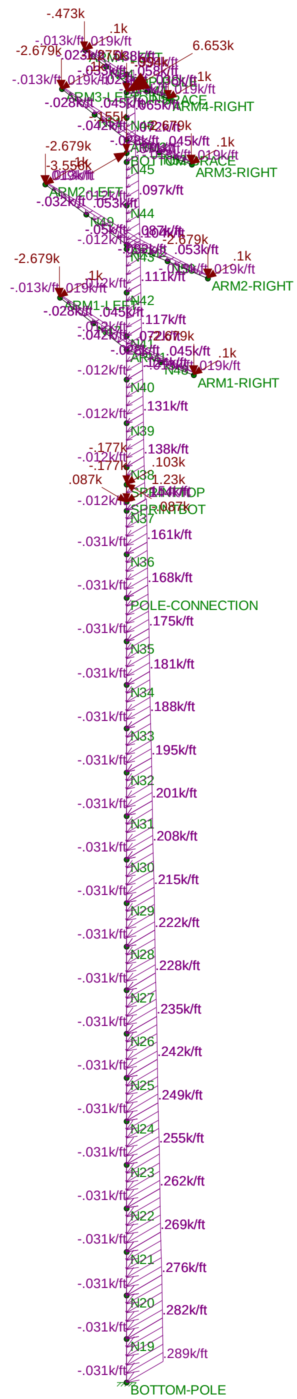




Loads: LC 3, z-direction NESC Heavy Wind

Centek Engineering		
TJL	Pole # 844	Feb 15, 2019 at 12:38 PM
17159.16 / CT43XC811	LC #3 Loads	NESC - Pole.r3d





Loads: LC 4, z-direction NESC Extreme Wind

Centek Engineering		
TJL	Pole # 844	Feb 15, 2019 at 12:38 PM
17159.16 / CT43XC811	LC #4 Loads	NESC - Pole.r3d

Pole Analysis:

Pole Properties:

Wide Flange Moment of Inertia Iy =	$I_{yy} := 20.7 \cdot in^4$	(User Input)
Wide Flange Moment of Inertia Ix =	$I_{xx} := 843 \cdot in^4$	(User Input)
Wide Flange Area =	$A_{wf} := 13.0 \cdot in^2$	(User Input)
Flange Wdith =	$b_f := 6.5 \cdot in$	(User Input)
Wide Flange Depth =	$d_{wf} := 20.7 \cdot in$	(User Input)
Tower Width Top =	$W_{TTop} := 13 \cdot in$	(User Input)
Tower Width Base =	$W_{TBase} := 54 \cdot in$	(User Input)
Plate Thickness Top =	$Plt_{tTop} := 0.1875 \cdot in$	(User Input)
Plate Thickness Base =	$Plt_{tBase} := 0.5 \cdot in$	(User Input)
Length of Pole =	$L_{pole} := 150 \cdot ft$	(User Input)
Nominal Bending Stress =	$F_b := 60 \cdot ksi$	(User Input)
Modulus of Elasticity =	$E := 29000 \cdot ksi$	(User Input)

Member Forces:

Maximum Bending Stress x-direction = $f_{bxmax} := 56.7 \cdot ksi$ From Risa3D

Percent Stressed = $\frac{f_{bxmax}}{F_b} = 94.5 \cdot \%$

Bending_Check_x := if$\left(f_{bxmax} < F_b, \text{"OK"}, \text{"NG"}\right)$

Bending_Check_x = "OK"

Maximum Bending Stress y-direction = $f_{bymax} := 55.5 \cdot ksi$ From Risa3D

Percent Stressed = $\frac{f_{bymax}}{F_b} = 92.5 \cdot \%$

Bending_Check_y := if$\left(f_{bymax} < F_b, \text{"OK"}, \text{"NG"}\right)$

Bending_Check_y = "OK"

Flange Bolts and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 1278 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 31.7 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 30.3 \cdot kips$	(Input From Risa-3D)

Flange Bolt Data:

Use ASTM A490

Number of Flange Bolts =	$N := 24$	(User Input)
Bolt Ultimate Strength =	$F_u := 150 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 125 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 0.875 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Flange Plate Data:

Use ASTM A572 Gr 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 2.0in$ (User Input)

$d_2 := 7.0in$ (User Input)

$d_3 := 12.0in$ (User Input)

$d_4 := 15.5in$ (User Input)

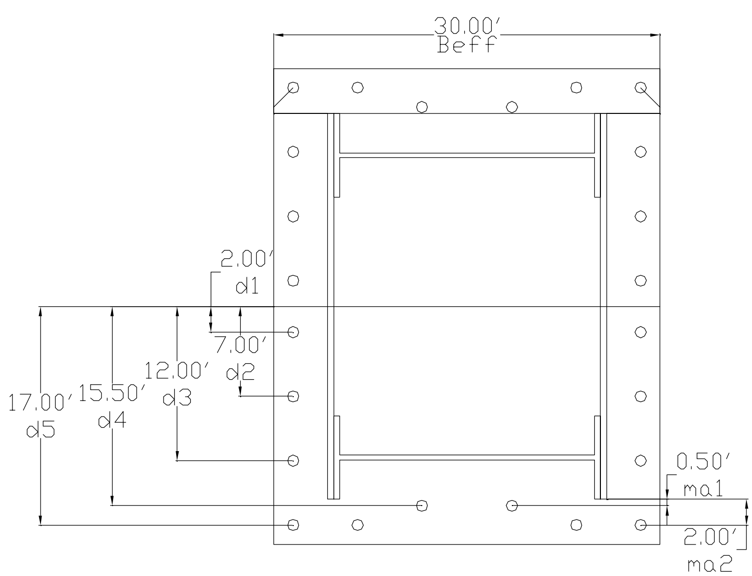
$d_5 := 17.0in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 0.5in$ (User Input)

$ma_2 := 2.0in$ (User Input)

Effective Width of Flange Plate for Bending = $B_{eff} := 30.0in$ (User Input)



FLANGE BOLT AND PLATE GEOMETRY

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4 + (d_4)^2 \cdot 4 + (d_5)^2 \cdot 8\right] = 4.061 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.601 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.341 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.658 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.165 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.028 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_5}{I_p} - \frac{Axial}{N} = 62.9 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL.Gross} := 0.75 \cdot A_g \cdot F_u = 67.6 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} \cdot 100 = 93$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Note Shear stress is negligible

Flange Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_4}{I_p} + \frac{Axial}{N} = 59.8 \cdot kips$

$C_2 := \frac{OM \cdot d_5}{I_p} + \frac{Axial}{N} = 65.5 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot (2C_1 \cdot ma_1 + 4 \cdot C_2 \cdot ma_2)}{B_{eff} \cdot t_{bp}^2} = 38.11 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 70.6$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

$Condition2 = "Ok"$

Flange Bolts and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 780 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 20.2 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 31.7 \cdot kips$	(Input From Risa-3D)

Flange Bolt Data:

Use ASTM A490

Number of Flange Bolts =	$N := 24$	(User Input)
Bolt Ultimate Strength =	$F_u := 150 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 125 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 0.875 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Flange Plate Data:

Use ASTM A572 Gr 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 3.5in$ (User Input)

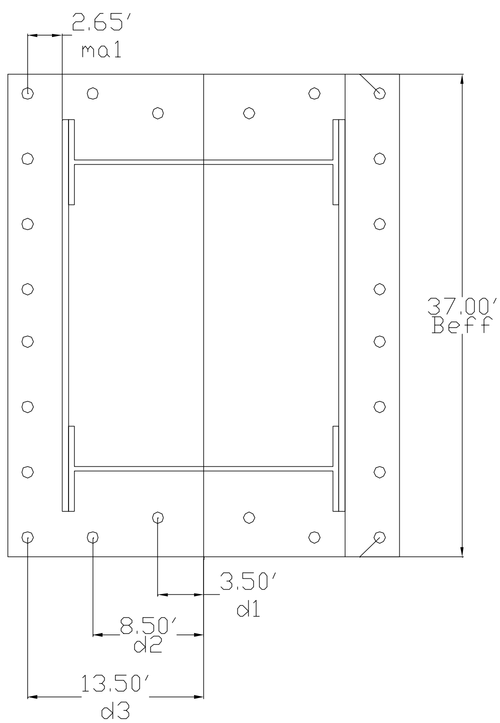
$d_2 := 8.5in$ (User Input)

$d_3 := 13.5in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.65in$ (User Input)

Effective Width of Flange Plate for Bending = $B_{eff} := 37.0in$ (User Input)



FLANGE BOLT AND PLATE GEOMETRY

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 16\right] = 3.254 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.601 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.341 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.658 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.165 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.028 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_3}{I_p} - \frac{Axial}{N} = 37.5 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL.Gross} := \left(.75 A_g \cdot F_u\right) = 67.6 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} \cdot 100 = 55.5$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Note Shear stress is negligible

Flange Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_3}{I_p} + \frac{Axial}{N} = 40.2 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot \left(8C_1 \cdot ma_1\right)}{B_{eff} \, t_{bp}^{\;2}} = 45.07 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 83.5$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

$Condition2 = "Ok"$

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 4414 \cdot ft \cdot kips$	(Input From Risa3D)
Shear Force =	$Shear := 39.3 \cdot kips$	(Input From Risa3D)
Axial Force =	$Axial := 52.9 \cdot kips$	(Input From Risa3D)

Anchor Bolt Data:

Use ASTM A615 Grade 60

Number of Anchor Bolts =	$N := 26$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Base Plate Data:

Use ASTM A572 Grade 42

Plate Yield Strength =	$Fy_{bp} := 42 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 3.0 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 7.5in$ (User Input)

$d_2 := 15.0in$ (User Input)

$d_3 := 22.5in$ (User Input)

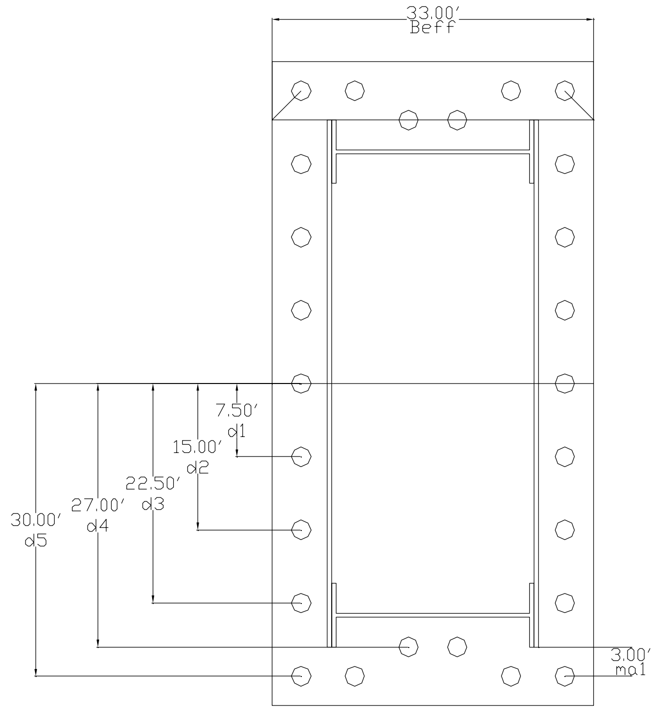
$d_4 := 27.0in$ (User Input)

$d_5 := 30in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 3.0in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 33.0in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4 + (d_4)^2 \cdot 4 + (d_5)^2 \cdot 8\right] = 1.327 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_5}{I_p} - \frac{Axial}{N} = 117.7 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL} := (A_n \cdot F_y) = 194.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} \cdot 100 = 60.4$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Note Shear stress is negligible

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_5}{I_p} + \frac{Axial}{N} = 121.8 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot (4C_1 \cdot ma_1)}{B_{eff} \cdot t_{bp}^2} = 29.53 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := Fy_{bp} = 42 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 70.3$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "Ok"

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 3288 \cdot ft \cdot kips$	(Input From RISA-3D)
Shear Force =	$Shear := 36.0 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 52.9 \cdot kips$	(Input From Risa-3D)

Anchor Bolt Data:

Use ASTM A615 Grade 60

Number of Anchor Bolts =	$N := 26$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Base Plate Data:

Use ASTM A572 Grade 42

Plate Yield Strength =	$Fy_{bp} := 42 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 3.0 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 2.5in$ (User Input)

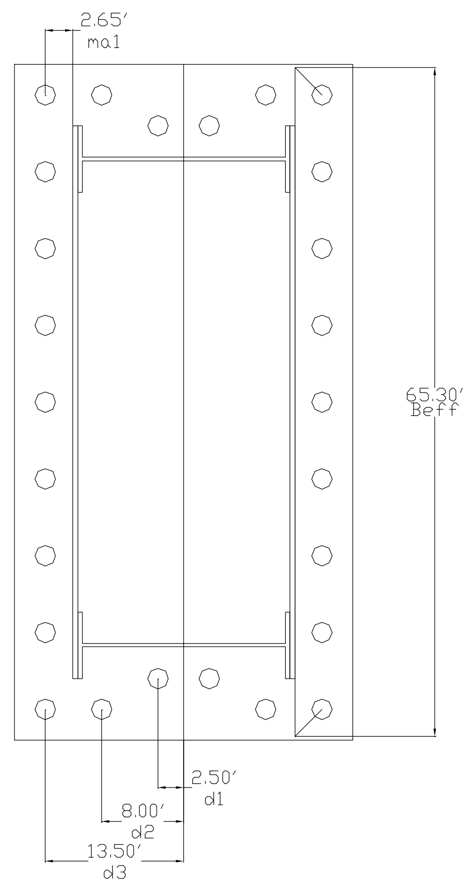
$d_2 := 8.0in$ (User Input)

$d_3 := 13.5in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.65in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 65.3in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 18\right] = 3.562 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_3}{I_p} - \frac{Axial}{N} = 147.5 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL} := (A_n \cdot F_y) = 194.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} \cdot 100 = 75.7$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Note Shear stress is negligible

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_3}{I_p} + \frac{Axial}{N} = 151.594 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot (9C_1 \cdot ma_1)}{B_{eff} \, t_{bp}^{\ 2}} = 36.91 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := Fy_{bp} = 42 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 87.9$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition3 = "Ok"

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 4414 \cdot 1.1 \cdot ft \cdot kips = 4855 \cdot ft \cdot kips$	(User Input from PLS-Pole)	
Shear Force =	$Shear := 39.3 \cdot kip \cdot 1.1 = 43.23 \cdot kips$	(User Input from PLS-Pole)	
Axial Force =	$Axial := 52.9 \cdot kip \cdot 1.1 = 58.19 \cdot kips$	(User Input from PLS-Pole)	
Tower Height =	$H_t := 150 \cdot ft$	(User Input)	

Footing Data:

Depth to Bottom of Footing =	$D_f := 20.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 8 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Width of Pier =	$W_p := 8 \cdot ft$	(User Input)	
Depth of Soil =	$D_{soil} := 8 \cdot ft$	(User Input)	
Depth of Rock =	$D_{rock} := 13 \cdot ft$	(User Input)	

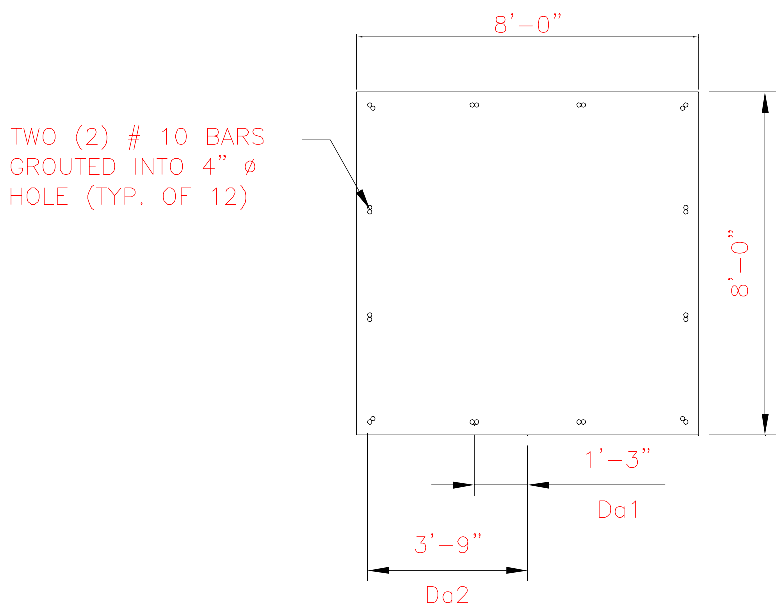
Material Properties:

Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Internal Friction Angle of Rock =	$\Phi_r := 35 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4000 \cdot psf$	(User Input)	
Allowable Rock Bearing Capacity =	$q_{rock} := 50000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Unit Weight of Rock =	$\gamma_{rock} := 160 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Rock Anchor Properties:

ASTM A615 Grade 60

Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)	
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)	
Anchor Diameter =	$d_{ra} := 2.54 \cdot in$	(User Input)	(2 # 10 Bars)
Hole Diameter =	$d_{Hole} := 4 \cdot in$	(User Input)	
Grout Strength =	$\tau := 120 \cdot psi$	(User Input)	(Assumed Conservative Value)
Distance to Rock Anchor Group 1 =	$D_{a1} := 15 \cdot in$	(User Input)	
Distance to Rock Anchor Group 2 =	$D_{a2} := 45 \cdot in$	(User Input)	
Number of Rock Anchors in Group 1 =	$N_{a1} := 4$	(User Input)	
Number of Rock Anchors in Group 2 =	$N_{a2} := 8$	(User Input)	
Total Number of Rock Anchors =	$N_{atot} := 12$	(User Input)	



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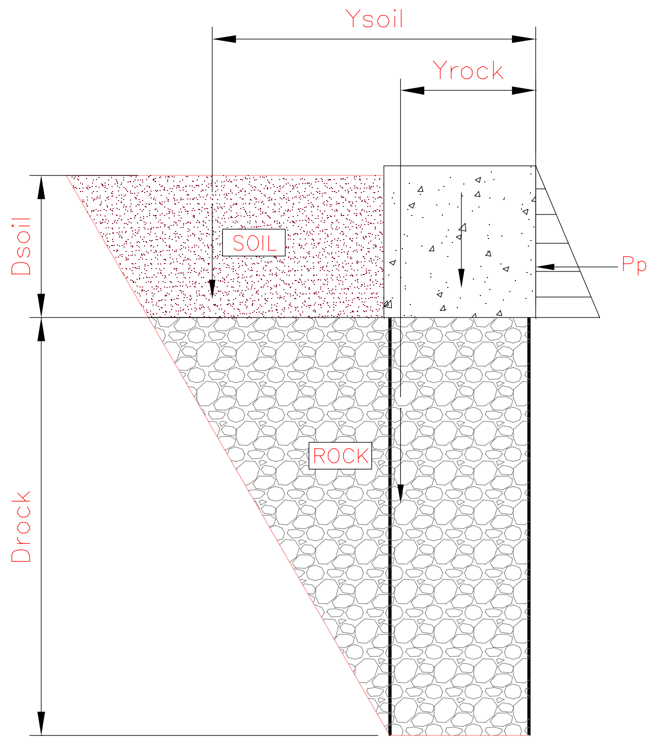
Subject: FOUNDATION ANALYSIS

Location: Trumbull, CT

Rev. 1: 2/15/19

Prepared by: T.J.L. Checked by: C.A.G.
Job No. 17159.16



Area 1 =	$A1 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{soil}^{2} = 18.475\,ft^2$	sf
Area 2 =	$A2 := \tan(\Phi_r) \cdot D_{rock} \cdot D_{soil} = 72.822\,ft^2$	sf
Distance to Centroid 1 =	$Y1 := \tan(\Phi_r) \cdot D_{rock} + \frac{1}{3} \cdot \tan(\Phi_s) \cdot D_{soil} = 10.642\,ft$	ft
Distance to Centroid 2 =	$Y2 := \frac{1}{2} \cdot \tan(\Phi_r) \cdot D_{rock} = 4.551\,ft$	ft
Distance from Toe to Centroid of Soil =	$Y_{soil} := \frac{(A1 \cdot Y1 + A2 \cdot Y2)}{(A1 + A2)} + W_p = 13.78\,ft$	ft
Area 1 =	$A1 := \frac{1}{2} \cdot \tan(\Phi_r) \cdot D_{rock}^{2} = 59.168\,ft^2$	sf
Area 2 =	$A2 := W_p \cdot D_{rock} = 104\,ft^2$	sf
Distance to Centroid 1 =	$Y1 := W_p + \frac{1}{3} \cdot \tan(\Phi_r) \cdot D_{rock} = 11.034\,ft$	ft
Distance to Centroid 2 =	$Y2 := \frac{W_p}{2} = 4\,ft$	ft
Distance from Toe to Centroid of Rock =	$Y_{rock} := \frac{(A1 \cdot Y1 + A2 \cdot Y2)}{(A1 + A2)} = 6.55\,ft$	ft

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}\left(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}\right) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}\left(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}\right) = 120 \cdot \text{pcf}$

Coefficient of Lateral Soil Pressure = $K_p := \dfrac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Passive Pressure = $P_{top} := 0 = 0 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_{soil} + c \cdot 2 \cdot \sqrt{K_p} = 2.88 \cdot \text{ksf}$

$P_{ave} := \dfrac{P_{top} + P_{bot}}{2} = 1.44 \cdot \text{ksf}$

$A_p := W_p \cdot \left(L_p - L_{pag}\right) = 60\,\text{ft}^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 86.4 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := \left(W_p^{\,2} \cdot L_p\right) \cdot \gamma_c = 76.8 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s1} := \left[W_p \cdot D_{soil} \cdot \tan(\Phi_s) \cdot \left(\dfrac{D_{soil}}{2} + D_{rock}\right)\right] \cdot \gamma_s = 75.379 \cdot \text{kip}$

Weight of Soil Wedge at Back Face Corners = $WT_{s2} := 2 \cdot \left[\dfrac{\left(D_f^{\,3} - D_{rock}^{\,3}\right)}{3} \cdot \left(\tan(\Phi_s)\right)^2\right] \cdot \gamma_s = 171.15 \cdot \text{kips}$

Total Weight of Soil = $WT_{Stot} := WT_{s1} + WT_{s2} = 246.5 \cdot \text{kips}$

Weight of Rock Between Rock Anchors = $WT_{R1} := \left(W_p^{\,2} \cdot D_{rock}\right) \cdot \gamma_{rock} = 133.12 \cdot \text{kip}$

Weight of Rock Wedge at Back Face = $WT_{R2} := \left(\dfrac{D_{rock}^{\,2} \cdot \tan(\Phi_r)}{2} \cdot W_p\right) \cdot \gamma_{rock} = 75.734 \cdot \text{kip}$

Weight of Rock at Back Face Corners = $WT_{R3} := 2 \cdot \left[\dfrac{D_{rock}}{3} \cdot \left(\tan(\Phi_r) \cdot D_{rock}\right)^2\right] \cdot \gamma_{rock} = 114.898 \cdot \text{kips}$

Total Weight of Rock = $WT_{Rtot} := WT_{R1} + WT_{R2} + WT_{R3} = 323.8 \cdot \text{kips}$

Resisting Moment = $M_r := \left(WT_c + \text{Axial}\right) \cdot \dfrac{W_p}{2} + S_u \cdot \dfrac{\left(L_p - L_{pag}\right)}{3} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 6275 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := OM + \text{Shear} \cdot L_p = 5201 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \dfrac{M_r}{M_{ot}} = 1.21$

Factor of Safety Required = $FS_{req} := 1.0$

OverTurning_Moment_Check := if$\left(FS \geq FS_{req}\right.$, "Okay" , "No Good"$\left.\right)$

OverTurning_Moment_Check = "Okay"

Rock Anchor Check

Polar Moment of Inertia = $I_p := \left(D_{a1}{}^2 \cdot N_{a1} + D_{a2}{}^2 \cdot N_{a2}\right) = 17100 \cdot in^2$

Maximum Tension Force = $T_{Max} := \frac{OM \cdot D_{a2}}{I_p} - \frac{Axial + WT_c}{N_{atot}} = 142.1 \cdot kips$

Gross Area of Bolt Group = $A_g := \frac{\pi}{4} \cdot d_{ra}{}^2 = 5.067 \cdot in^2$

Allowable Tension = $T_{all} := A_g \cdot F_y = 304 \cdot kips$

$\frac{T_{Max}}{T_{all}} = 46.7 \cdot \%$

Condition1 := if($T_{Max} < T_{all}$, "OK", "NG")

Condition1 = "OK"

Check Bond Strength:

Bond Strength = Bond_Strength := $d_{Hole} \cdot \pi \cdot D_{rock} \cdot \tau = 235 \cdot kips$

$\frac{T_{Max}}{Bond\_Strength} = 60.4 \cdot \%$

Condition2 := if(T_{Max} < Bond_Strength, "OK", "NG")

Condition2 = "OK"

Augment ID: CT43XC811Q17.1

RFDS ID: 111285

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT43XC811
SMS Schedule ID	12456379
SMS Schedule Name	DO Macro Upgrade
PID	
RRU OEM	ALU
Switch OEM	Alcatel Lucent
RFDS Issue Date	2017-08-15 00:00:00.0
RFDS Revision Date	2017-11-08 00:00:00.0
RFDS Revision	3

Filter Analysis Complete	YES
RFDS - Issue Date	08/15/2017
Design Status	Complete
Project Description	DO Macro Upgrade - Add 2500 MHz

Contact Information	
Engineer Email	Bill.M.Hastings@sprint.com
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RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	3
1900 LTE	1
1900 EVDO	
1900 Voice	1
800 LTE	1
800 Voice	1

Location Details	
Latitude	41.23249444
Longitude	-73.18595277
Market	Southern Connecticut
Region	Northeast
City	Trumbull
State	CT
Zip Code	CT/06611
County	Fairfield

2500MHz	3
1900MHz	3
800MHz	3

Battery Backup Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

UE Relay Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
UE Relay Azimuth	
Manufacturer	
UE Relay CL Height (meters)	

GPS Antenna Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
GPS Antenna needed at site	

Repeater Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

Junction Box Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Junction Boxes needed at site	

ALU Top Hat Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Top Hat Quantity	

Growth Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Needed at site	

Power Protection Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Power Protection Cabinet	

BTS #1 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Number of BTS #1	

A&E Drawing Requirements

10/19/2017 (WR): RFDS revised to replace existing NV dual band antenna with Commscope 10 port tri-band antenna and add 6 twin diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes Special Construction Requirements

10/19/2017 (WR): RFDS revised to replace existing NV dual band antenna with Commscope 10 port tri-band antenna and add 6 twin diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes

Keep Existing NV Antenna for 800/1900 and add 1 800/2500 antenna for LTE2.5 8T8R and enhance 2R for 800 MHz

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	76.2	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	Hybriflex	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	1	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	1.54	N/A	N/A	N/A	N/A	N/A
Manufacturer	ALU	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Number of RRUs needed	0	0	0	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 2500	**Alpha**	**Beta**	**Gamma**	**Delta**	**Epsilon**	**Zeta**
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band			
Weight (lbs)	0	0	0	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A
Manufacturer	-	-	-	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	2.5 Jumper 8	2.5 Jumper 8	2.5 Jumper 8	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	0	100	270	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	99.9671948	99.9671948	99.9671948	N/A	N/A	N/A
Antenna 1 Electrical DT	2	2	2	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Top Jumper Make/Mode/Qtyl	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

SprintVision

RF Design Sheet

Band: 1900	**Alpha**	**Beta**	**Gamma**	**Delta**	**Epsilon**	**Zeta**
Antenna1						
Model Number	DHHTT65B-3XR	DHHTT65B-3XR	DHHTT65B-3XR			
Weight (lbs)	48.5	48.5	48.5	N/A	N/A	N/A
Dimensions	72 x 12 x 7.1	72 x 12 x 7.1	72 x 12 x 7.1	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper 8	800/1900 Jumper 8	800/1900 Jumper 8	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	0	100	270	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	0	N/A	N/A	N/A
Antenna 1 Center Line (ft)	99.9671948	99.9671948	99.9671948	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	3	N/A	N/A	N/A
Antenna 1 Electrical DT 2	0	0	0	N/A	N/A	N/A
Antenna 1 Electrical DT 3	0	0	0	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	
Ant2 Top Jumper Make/Mode/Qtyl	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0	N/A
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

Band: 800	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
Antenna1												
Model Number	Antenna assigned on a different band		Antenna assigned on a different band		Antenna assigned on a different band							
Weight (lbs)	0		0		0		N/A		N/A		N/A	
Dimensions	0 x 0 x 0		0 x 0 x 0		0 x 0 x 0		N/A		N/A		N/A	
Manufacturer	-		-		-		N/A		N/A		N/A	
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper	4	800/1900 Jumper	4	800/1900 Jumper	4	N/A	0	N/A	0	N/A	0
Ant 1 RF requested Diameter	1/2"		1/2"		1/2"		N/A		N/A		N/A	
Ant 1 RF requested Top Jumper Length(ft)	8		8		8		N/A		N/A		N/A	
Antenna 1 Azimuth	0		100		270		N/A		N/A		N/A	
Antenna 1 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Center Line (ft)	99.9671948		99.9671948		99.9671948		N/A		N/A		N/A	
Antenna 1 Electrical DT	5		5		5		N/A		N/A		N/A	
Antenna 1 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Twist	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna2												
Model Number												
Weight (lbs)	N/A		N/A		N/A		N/A		N/A		N/A	
Dimensions	N/A		N/A		N/A		N/A		N/A		N/A	
Manufacturer	N/A		N/A		N/A		N/A		N/A			
Ant2 Top Jumper Make/Mode/Qtyl	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	
Ant 2 RF Top Jumper Diameter	N/A		N/A		N/A		N/A		N/A		N/A	
Ant 2 RF Top Jumper Length(ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Azimuth	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Center Line (ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Twist	N/A		N/A		N/A		N/A		N/A		N/A	

SprintVision **RF Design Sheet**

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	1900MHz	1900MHz	1900MHz			
Antenna 1 Lower Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	1900MHz	1900MHz	1900MHz			
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL			
Weight (lbs)	6.4	6.4	6.4	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	800MHz	800MHz	800MHz			
Antenna 1 Lower Passive Component Model						
Model Number	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL			
Weight (lbs)	6.4	6.4	6.4	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	800MHz	800MHz	800MHz			
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Upper Pass Comp band combi with						
Antenna 1 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Low Pass Comp band comb with						
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

Product Specifications

COMMSCOPE®

DHHTT65B-3XR

Multiband Antenna, 790–960, 2 x 1710–2180 and 2 x 2490-2690 MHz, 65° horizontal beamwidth, internal electrical tilt with individual tilt available for the 850 MHz band, 1900 MHz bands and 2500 MHz bands.

Electrical Specifications

Frequency Band, MHz	790–896	870–960	1710–1880	1850–1990	1920–2180	2490–2690
Connector Interface	7-16 DIN Female	7-16 DIN Female	7-16 DIN Female	7-16 DIN Female	7-16 DIN Female	4.1-9.5 DIN Female
Connector Location	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Gain, dBi	15.5	15.5	17.3	17.4	17.5	17.2
Beamwidth, Horizontal, degrees	64	63	71	69	66	60
Beamwidth, Vertical, degrees	11.2	10.3	5.6	5.4	5.1	4.3
Beam Tilt, degrees	0–10	0–10	0–8	0–8	0–8	0–8
USLS (First Lobe), dB	15	16	15	16	15	18
Front-to-Back Ratio at 180°, dB	28	31	31	29	25	26
CPR at Boresight, dB	20	19	20	20	18	16
CPR at Sector, dB	9	9	9	9	7	4
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-150
Input Power per Port, maximum, watts	350	350	300	300	300	250
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	790–896	870–960	1710–1880	1850–1990	1920–2180	2490–2690
Gain by all Beam Tilts, average, dBi	15.0	15.1	17.0	17.1	17.1	17.1
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.3	±0.3	±0.3	±0.6
Gain by Beam Tilt, average, dBi	0 ° | 15.0 5 ° | 15.1 10 ° | 15.0	0 ° | 15.0 5 ° | 15.1 10 ° | 15.0	0 ° | 16.8 4 ° | 17.0 8 ° | 17.0	0 ° | 17.0 4 ° | 17.1 8 ° | 17.1	0 ° | 17.0 4 ° | 17.1 8 ° | 17.1	0 ° | 17.1 4 ° | 17.2 8 ° | 17.0
Beamwidth, Horizontal Tolerance, degrees	±2.5	±1.8	±3.2	±2.7	±5	±6.6
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6	±0.2	±0.2	±0.4	±0.3
USLS, beampeak to 20° above beampeak, dB	16	17	16	17	16	19
Front-to-Back Total Power at 180° ± 30°, dB	24	26	26	25	23	23
CPR at Boresight, dB	21	20	22	22	21	16
CPR at Sector, dB	9	10	13	10	8	5

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol®

Operating Frequency Band	1710 – 2180 MHz | 2490 – 2690 MHz | 790 – 960 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Copper | Low loss circuit board
Radome Material	ASA, UV stabilized
Reflector Material	Aluminum
RF Connector Interface	4.1-9.5 DIN Female | 7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	10
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1832.0 mm | 72.1 in
Width	301.0 mm | 11.9 in
Net Weight	20.6 kg | 45.4 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male

Packed Dimensions

Depth	299.0 mm | 11.8 in
Length	1954.0 mm | 76.9 in
Width	409.0 mm | 16.1 in
Shipping Weight	33.2 kg | 73.2 lb

Regulatory Compliance/Certifications

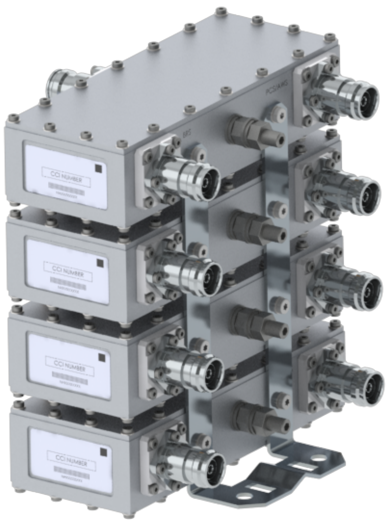
Agency	**Classification**
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	

Filters & Combiners

DATA SHEET

Outdoor Diplexer

DPO-7126Y-0x1



- Combines the frequencies covering PCS/AWS (1695-2180 MHz) with BRS (2496-2690 MHz)
- High power 250 W per port with low insertion loss in a small, lightweight enclosure
- Low intermodulation with isolation of >50 dB port to port
- High reliability of >500K Hours MTBF and multi-strike lightning protection
- Designed and produced to ISO 9001:2008 certification standards
- Weatherproof enclosure (IP67) with available outdoor pole or wall mounting options

Overview

The CCI Outdoor Diplexer passes the PCS and AWS bands covering 1695-2180 MHz on its low band input port and the full BRS band which covers 2496-2690 MHz on its high band input port. The Diplexer combines the low band and high band signals on to a common port and is specifically intended for use in multi-band systems with limited feeder lines. The Diplexer facilitates the addition of new technologies including LTE and new spectrum to existing sites while providing a high degree of isolation between systems. Decreasing the number of feeder lines lowers tower loading, leasing and installation expenditures and significantly reduces the total cost to upgrade a site.

The CCI Outdoor Diplexer provides full band performance for each band with low insertion loss, low Intermodulation, and high 250 W per port power handling. Excellent return loss performance delivers the best match to the antennas and base station, saving precious transmit power. The CCI Diplexer is available in a single, twin or quad unit configuration.

Technical Description:

The CCI Outdoor Diplexer consists of multiple filters and can be used as either a splitter or combiner to aggregate the PCS/AWS with the BRS bands on to a common feeder line. The fully weatherproof tower mount Diplexer has internal multi-strike lightning protection using a multi-stage surge protection circuit.

The unit has been designed to minimize insertion loss while maximizing isolation. Particular attention has been given to the intermodulation performance of the Diplexer to minimize any passive intermodulation products from occurring. The Diplexer housing is constructed from die cast aluminum and consists of an IP67 moisture proof enclosure, with IP68 immersion proof connectors suited to long-life masthead mounting. The Diplexer can be pole or wall mounted with the included bracket. The RF ports are configured with DIN 7-16.

CCI filter and combiner products are designed and produced to ISO 9001:2008 certification standards for reliability and quality at our state-of-the-art engineering and manufacturing facilities.

SPECIFICATIONS

Outdoor Diplexer

DPO-7126Y-0x1

Electrical

RF Parameters	Ports	Frequency(MHz)	Specification
Return Loss	COMMON	1695 - 2180	18 dB minimum, 20 dB typical
		2496 - 2690	18 dB minimum, 20 dB typical
	PCS/AWS	1695 - 2180	18 dB minimum, 20 dB typical
	BRS	2496 - 2690	18 dB minimum, 20 dB typical
Insertion Loss	COMMON to PCS/AWS	1695 - 2180	0.2 dB typical, 0.25 dB maximum
	COMMON to BRS	2496 - 2690	0.2 dB typical, 0.25 dB maximum
Rejection	COMMON to PCS/AWS	2496 - 2690	50 dB minimum
	COMMON to BRS	1695 - 2180	50 dB minimum
Isolation	PCS/AWS to BRS	1695 - 2180	50 dB minimum
	BRS to PCS/AWS	2496 - 2690	50 dB minimum

General Characteristics	
General Impedance	50 ohms
Continuous Average Power	250 W maximum (input ports), 500 W maximum (Common port)
Peak Envelope Power	1 kW maximum (input ports), 3 kW maximum (Common port)
Intermodulation Performance	<-117 dBm (-160 dBc) at 2 x +43 dBm tones all bands

Environmental

Operating Temperature	-40˚C to +65˚C
Enclosure	Enclosure IP67, Connectors IP68
MTBF	>500,000 hours
Lightning Protection	8/20us, ±20KA maximum, 10 strikes per IEC61000-4-5

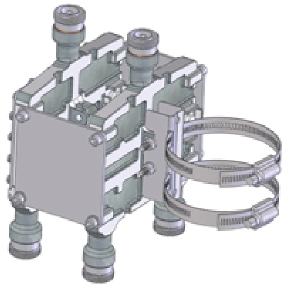
Mechanical

Model	DPO-7126Y-0-S1	DPO-7126Y-0-T1	DPO-7126Y-0-Q1
Modularity	Single	Twin	Quad
Weight with brackets	3.7 lbs (1.6 Kg)	7.3 lbs (3.3 Kg)	14.4 lbs (6.6 Kg)
Dimensions with brackets	6.26 x 7.42 x 2.02 in. (159 x 188.5 x 51.4 mm)	6.26 x 7.42 x 4.07 in. (159 x 188.5 x 103.4 mm)	6.26x 7.42 x 8.17 in. (159 x 188.5 x 207.4 mm)
Dimensions enclosure only	2.95 x 7.42 x 1.95 in. (75 x 188.5 x 48.8 mm)		
Connectors	3 x 7-16 DIN female long neck		
Mounting	Pole/Wall mounting bracket		

RADIO FREQUENCY SYSTEMS
The Clear Choice®

ShareLite^{TM} Wideband Diplexer Kit – In-line 698-960 MHz/1710-2200 MHz, full DC/AISG pass

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range, including all the new AWS-3 paired spectrum blocks (G, H, I, J).. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



FEATURES / BENEFITS

- LTE and AWS-3 ready design
- Extremely Low Insertion Loss
- High level of Rejection between bands – Protection against interferences
- Extremely High Power Handling Capability
- DC/AISG 1.1/2.0 pass through all ports
- Very compact & small size design – Easy installation and reduced tower load
- In-line long-neck connectors for easy connection & waterproofing
- Exceptional reliability & environmental protection (IP 67)
- Equipped with 1 * Breathable Vent – Prevent any humidity inside the product
- Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)
- Grounding already provided through the mounting bracket

Technical Features

GENERAL SPECIFICATIONS		
Product Type		Diplexer/Cross Band Combiner
Application		LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS, AWS-1, AWS-3
Configuration		ShareLite Kit consisting of (2) in-line long neck connector diplexers (Full DC Pass), (1) mounting hardware SEM2-1A, & (1) assembly kit SEM2-3 disassembled
ELECTRICAL SPECIFICATIONS		
Frequency Range 1	MHz	698 - 960
Frequency Range 2	MHz	1710 - 2200
Return Loss All Ports	dB	19 Min/23 Typ.
Power Handling Continuous, Max	W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max	W	15000 in low frequency path & 8000 in high frequency path
Impedance	Ω	50.0
Insertion Loss, Path 1	dB	0.07 typ.
Insertion Loss, Path 2	dB	0.13 typ.
Rejection Between Bands Min/Typ	dB	58/64@698-960MHz 57/70@1710-2200MHz
Group Delay, Path 1	ns	3 Max.
Group Delay, Path 2	ns	3 Max.
IMP Level at the COM Port	dBm (dBc)	-112 (-155) @2x43 typ.
DC Pass in Path 1		Yes
DC Pass in Path 2		Yes

MECHANICAL SPECIFICATIONS		
Mounting		Wall Mounting: With 4 screws (maximum 6mm diameter) Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
RF Connectors		In-line long-neck 7-16-Female
Weight	kg (lb)	2.9 (6.4)
Dimensions, H x W x D	mm (in)	147 x 164 x 118 (5.8 x 6.5 x 4.6)
Shipping Dimensions, H x W x D	mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 1 * Dual unit in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 3 * Dual units = 3 * Boxes in 1 * overwrap
Housing		Aluminum
TESTING AND ENVIRONMENTAL		
Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Environmental		ETSI 300-019-2-4 Class 4.1E
Ingress Protection		IP 67
Lightning Protection		EN/IEC61000-4-5 Level 4

External Document Links

RFS Diplexer Field Test Procedure

KIT-FD9R6004/1C-DL Installation Instructions

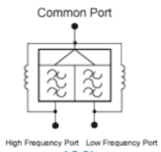
Notes

RADIO FREQUENCY SYSTEMS
The Clear Choice®

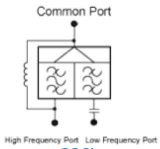
ShareLite™ Wideband Diplexer Kit – In-line 698-960 MHz/1710-2200 MHz, full DC/AISG pass

Selection Guide Diplexer 698-960 / 1710-2200MHz

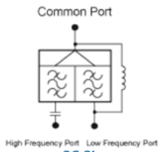
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



1C-3L



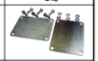
2C-3L



3C-3L

The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information

Model Number	Description	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 3m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	