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
18 Hilltop View Lane New Milford, CT 06776
Latitude: 41.538144
Longitude: - 73.425861
Sprint Site#: CT33XC095 – DO Macro

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 155.5-foot level of the existing 173-foot transmission tower at Keeney Street Manchester, CT. The 173-foot transmission tower and property are owned by The Connecticut Light & Power Company, d/b/a Eversource Energy. 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 165-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. 517 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 Mayor Pete Bass, Elected Official, and Laura Regan, Zoning Enforcement Officer for the Town of New Milford, as well as the owner.

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: Pete Bass – Town of New Milford Mayor
Laura Regan – Town of New Milford Zoning Enforcement Officer
The Connecticut Light & Power Company, d/b/a Eversource Energy – tower and property owner

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

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

August 29, 2019

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

RE: Sprint Antenna Site, CT-33XC095, Hilltop View Lane, New Milford, CT, structure 10184

Dear Mr. Shappy:

Based on the structural report and construction drawings provided by Centek Engineering, as well as a review of the structural report performed 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: 17159.11 - CT33XC095 - Structural Analysis Rev4 19.02.07
17159.11 CT33XC095 New Milford - CD Rev.2 19.04.15 (S&S)

Petition No. 517
Sprint Spectrum. L.P.
New Milford, 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 Hilltop View Lane, New Milford, Connecticut for inspection of an electric transmission line structure. Sprint has an agreement with Connecticut Light & Power (CL&P) Company for installation of antennas and associated equipment for telecommunications use. Sprint is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

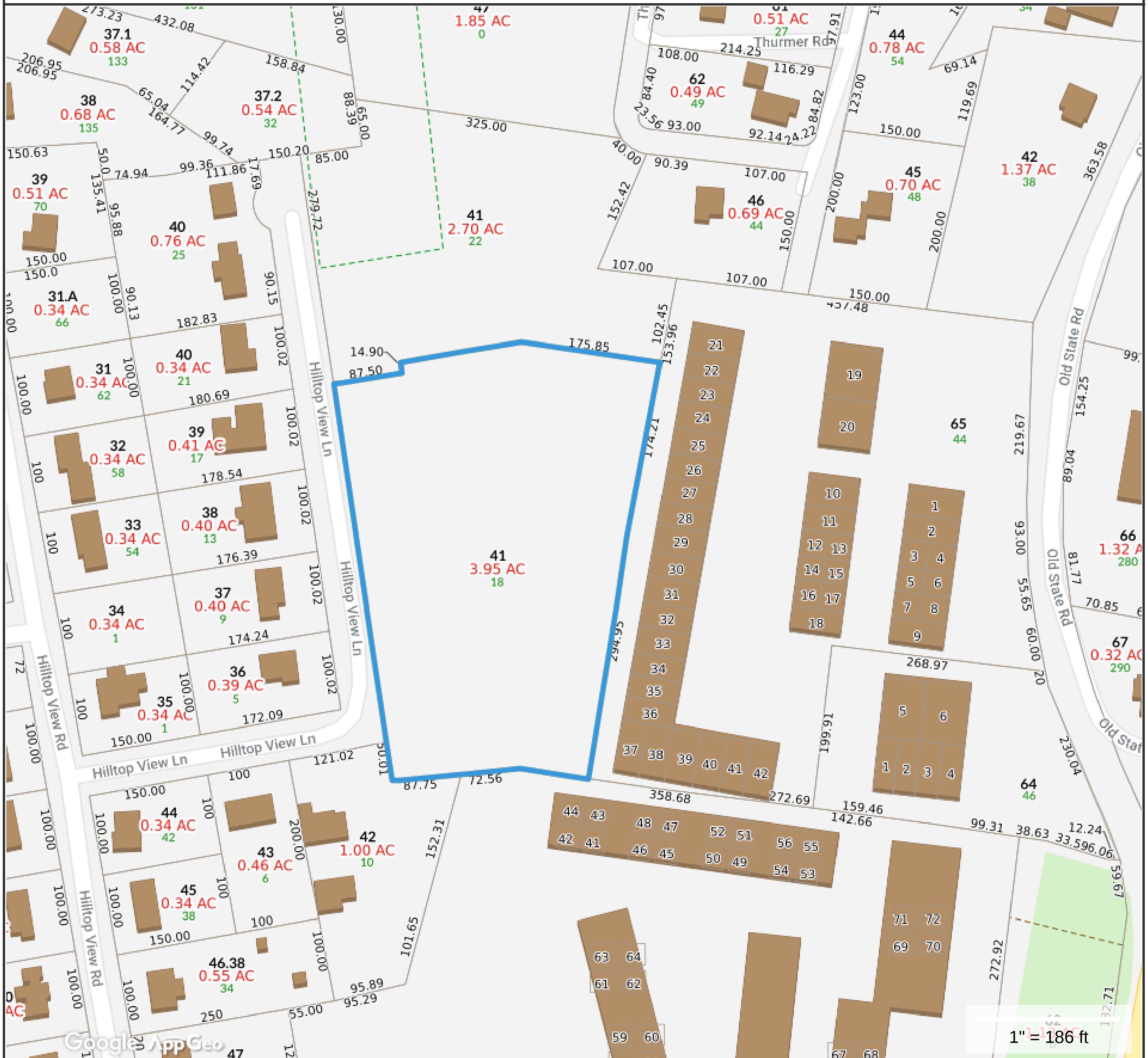
Sprint proposes to install three panel antennas as a cluster mount on a pipe extension at the top of the 150-foot monopole structure (#10184). This antenna installation would increase the total height of the tower by 7.5 feet. Equipment that was initially proposed to be installed on a 10-foot by 20-foot pier-mounted platform down slope of the structure within a vegetative buffer of mature cedar trees will now consist of a 10-foot by 20-foot concrete pad up slope of the structure. An underground duct bank will be installed to the structure for the antenna coaxial. Sprint would improve a gravel drive and install utilities underground from a distribution line along Hilltop View Lane. Understory vegetation would need to be cleared for construction of the site. Erosion and sediment controls would be installed around the site and transmission structure prior to construction.

Placements of equipment at the base of the structure are not feasible because of an existing pass and repass easement retained by the Osbournes within the CL&P right-of-way. Furthermore, use of a CL&P tower one span north would not provide adequate handoff coverage to the south and would require a lease from another landowner.

Surrounding land uses to the CL&P-owned 3.92 acre property consist of transmission towers, undeveloped property, and several residences.

The total worst-case power density for telecommunications operations at the site has been calculated to be 5.98% 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.



Property Information

Property ID	14.1/41
Location	18 HILLTOP VIEW LN
Owner	CONNECTICUT LIGHT + POWER

NEW MILFORD 1707 CONNECTICUT

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Geometry updated 6/25/2019
Data updated 6/25/2019

18 HILLTOP VIEW LN

Location	18 HILLTOP VIEW LN	**Mblu**	14/1 / 41/ /
Acct#	001963	**Owner**	CONNECTICUT LIGHT + POWER
Assessment	$396,170	**Appraisal**	$622,100
PID	1858	**Building Count**	1

Current Value

Appraisal					
Valuation Year	**Building**	**Extra Features**	**Outbuildings**	**Land**	**Total**
2015	$0	$0	$565,000	$57,100	$622,100

Assessment					
Valuation Year	**Building**	**Extra Features**	**Outbuildings**	**Land**	**Total**
2015	$0	$0	$395,500	$670	$396,170

Parcel Addresses

Additional Addresses
No Additional Addresses available for this parcel

Owner of Record

Owner	CONNECTICUT LIGHT + POWER	**Sale Price**	$0
Co-Owner	PROPERTY TAX	**Certificate**	
Address	BOX 270 HARTFORD, CT 06141-0270	**Book & Page**	0242/0354
		Sale Date	10/12/1975

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CONNECTICUT LIGHT + POWER	$0		0242/0354	10/12/1975

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0

Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type	
AC Type	
Total Bedrooms	
Full Bathrooms	
Half Bathrooms	
Total Xtra Fixtrs	
Total Rooms	
Bath Style	
Kitchen Style	
Num Kitchens	
Whirlpool Tub	
Fireplaces	
Usrfld 104	
Fin Bsmt Area	
Usrfld 106	
Usrfld 107	
Bsmt Garages	
Fireplaces_1	
Usrfld 108	
Solar	
Insp. Letter	

Building Photo

(http://images.vgsi.com/photos/NewMilfordCTPhotos//\00\02\48

Building Layout

Building Layout (ParcelSketch.ashx?pid=1858&bid=1893)

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

Multi-House	
Usrfld 300	
Usrfld 301	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Parcel Information

Use Code	600
Description	Forest
Deeded Acres	3.95

Land

Land Use

Use Code	600
Description	Forest
Zone	B2/R20
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	3.95
Frontage	0
Depth	0
Assessed Value	$670
Appraised Value	$57,100

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal

Valuation Year	Building	Extra Features	Outbuildings	Land	Total
2018	$0	$0	$565,000	$57,100	$622,100
2014	$0	$0	$600,200	$57,100	$657,300

Assessment

Valuation Year	Building	Extra Features	Outbuildings	Land	Total
2018	$0	$0	$395,500	$670	$396,170
2014	$0	$0	$420,140	$360	$420,500

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

2 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 9116 1425

BILLING: P/P

Reference#1: CT33XC095

UIS 21.5.42. WNTNV50 15.0A 07/2019

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UPS Access Point[TM]
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
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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 DWT: 14,9,1 1 OF 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 9459 1410

BILLING: P/P

Reference#1: CT33XC095

UIS 21.5.42. WNTNV50 15.0A 07/2019

UPS Internet Shipping: View/Print Label

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   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.
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UPS Access Point[TM]	UPS Access Point[TM]	UPS Access Point[TM]
MICHAELS STORE # 7773	THE UPS STORE	THE UPS STORE
75 INTERSTATE SHOP CTR	115 FRANKLIN TPKE	120 E MAIN ST
RAMSEY ,NJ 07446	MAHWAH ,NJ 07430	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:
PETE BASS
TOWN OF NEW MILFORD
10 MAIN STREET
TOWN HALL
NEW MILFORD CT 06776-2843

CT 068 0-03

UPS GROUND
TRACKING #: 1Z V25 742 03 9491 3447

BILLING: P/P

Reference#1: CT33XC095

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.
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UPS Access Point™	UPS Access Point™	UPS Access Point™
MICHAELS STORE # 7773	THE UPS STORE	THE UPS STORE
75 INTERSTATE SHOP CTR	115 FRANKLIN TPKE	120 E MAIN ST
RAMSEY ,NJ 07446	MAHWAH ,NJ 07430	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:
LAURA REGAN
TOWN OF NEW MILFORD
10 MAIN STREET
TOWN HALL LOWER LEVEL
NEW MILFORD CT 06776-2843

CT 068 0-03

UPS GROUND
TRACKING #: 1Z V25 742 03 9073 5432

BILLING: P/P

Reference#1: CT33XC095

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: CT33XC095

Eversource Struct.: 10184
18 Hilltop View Lane
New Milford, Connecticut 06776

October 10, 2019

EBI Project Number: 6219005248

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**2.13%**

October 10, 2019

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

Emissions Analysis for Site: CT33XC095 - Eversource Struct.: 10184

EBI Consulting was directed to analyze the proposed Sprint facility located at **18 Hilltop View Lane** in **New Milford, 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 (μW/cm^2). The number of μW/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 (μW/cm^2). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 μW/cm^2 and 467 μW/cm^2, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 μW/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 18 Hilltop View Lane in New Milford, 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) 0 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 165 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):	165 feet	Height (AGL):	165 feet	Height (AGL):	165 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 %:	**1.92%**	Antenna B1 MPE %:	**1.92%**	Antenna C1 MPE %:	**1.92%**

Site Composite MPE %	
Carrier	**MPE %**
Sprint (Max at Sector A):	1.92%
Nextel	0.21%
Site Total MPE % :	2.13%

Sprint MPE % Per Sector	
Sprint Sector A Total:	1.92%
Sprint Sector B Total:	1.92%
Sprint Sector C Total:	1.92%
Site Total MPE % :	2.13%

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	165.0	2.86	800 MHz CDMA	533	0.54%
Sprint 1900 MHz PCS	4	1339.86	165.0	7.08	1900 MHz PCS	1000	0.71%
Sprint 2500 MHz BRS	8	639.78	165.0	6.76	2500 MHz BRS	1000	0.68%
						Total:	**1.92%**

• 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:	1.92%
Sector B:	1.92%
Sector C:	1.92%
Sprint Maximum MPE % (Sector A):	1.92%
Site Total:	2.13%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **2.13%** 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.: 10184

SITE ID: CT33XC095

18 HILLTOP VIEW LANE

NEW MILFORD, CT 06776

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

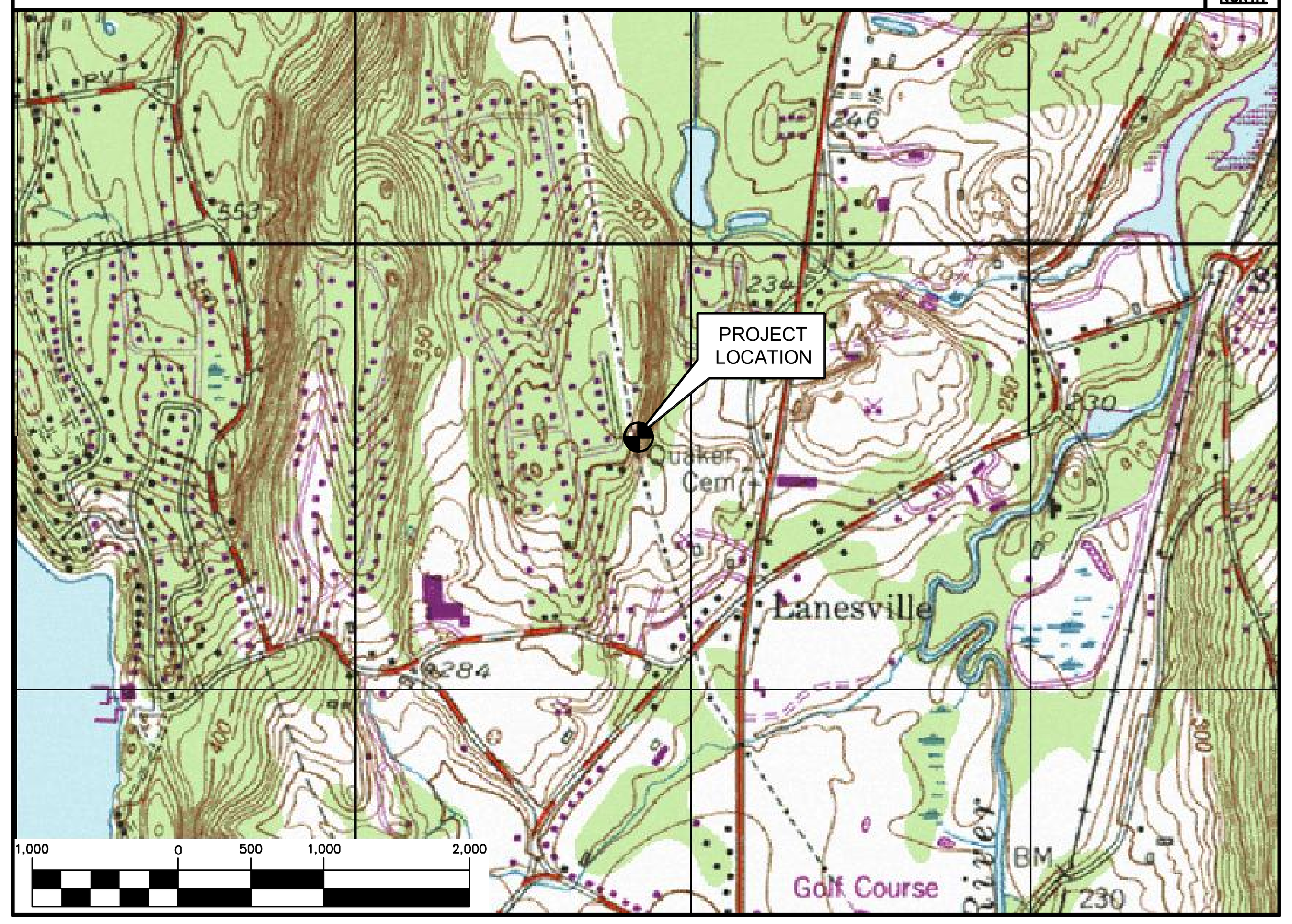
TO: 18 HILLTOP VIEW LANE
NEW MILFORD, CT 06776

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/US-3 N TOWARD WALTHAM/LOWELL	0.27 MI.
4.	TAKE THE I-90/MASS PIKE EXIT, EXIT 25, TOWARD BOSTON/ALBANY NY.	12.10 MI.
5.	MERGE ONTO I-90 W/MASSACHUSETTS TPKE W TOWARD WORCESTER.	44.45 MI.
6.	MERGE ONTO I-84 W/WILBUR CROSS HWY S VIA EXIT 9 TOWARD US-20.	98.40 MI.
7.	TAKE EXIT 7 FOR US-7 N/US202 E TOWARD NEW MILFORD/BROOKFIELD.	8.9 MI.
8.	TURN LEFT ONTO SULLIVAN ROAD.	0.10 MI.
9.	TURN RIGHT ONTO OLD TOWN PARK ROAD.	<0.10 MI.
10.	TURN RIGHT ONTO HILLTOP VIEW ROAD.	0.20 MI.
11.	TURN RIGHT ONTO HILLTOP VIEW LANE.	0.10 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 FROM EXISTING TOWER MOUNT.
   B. INSTALL (3) PROPOSED 10-PORT PANEL ANTENNAS, (1) PER SECTOR.
   C. INSTALL (6) PROPOSED DIPLEXERS ON TOWER.
   D. INSTALL (6) PROPOSED DIPLEXERS ON PROPOSED UNISTRUT RACK.
   E. INSTALL (3) PROPOSED RRH'S ON PROPOSED UNISTRUT RACK.

PROJECT INFORMATION

SITE NAME:	EVERSOURCE STRUCT.: 10184
SITE ID:	CT33XC095
SITE ADDRESS:	18 HILLTOP VIEW LANE NEW MILFORD, CT 06776
APPLICANT:	SPRINT 5 WAYSIDE ROAD BURLINGTON, MA 01803
CONTACT PERSON:	MIKE KITHCART (PROJECT MANAGER) (973)626-5792
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41° 32' 17.32"N LONGITUDE: 73° 25' 33.10"W GROUND ELEVATION: ±352' AMSL SITE COORDINATES REFERENCED AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	DESIGN BASIS AND SITE NOTES	1
C-1	COMPOUND PLANS AND ELEVATION	1
C-2	TYPICAL DETAILS	1
C-3	COLOR CODE AND CPRI DETAILS	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	04/15/19	TJL	CAG	ISSUED FOR CONSTRUCTION – CORRECTED RAD CENTER ELEVATION
1	04/15/19	TJL	CAG	ISSUED FOR CONSTRUCTION
0	03/02/18	TJL	CAG	REVISED PER CLIENT COMMENTS

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WIRELESS COMMUNICATIONS FACILITY
EVERSOURCE STRUCT.: 10184
SITE ID: CT33CX095
18 HILLTOP VIEW LANE
NEW MILFORD, CT 06776

DATE:	01/30/18
SCALE:	AS NOTED
JOB NO.	17159.11

TITLE SHEET

T-1

Sheet No. 1 of 5

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): 89 MPH

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 – 100MPH
- 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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0	03/02/18	TJL	CAG	REVISED PER CLIENT COMMENTS

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WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 10184

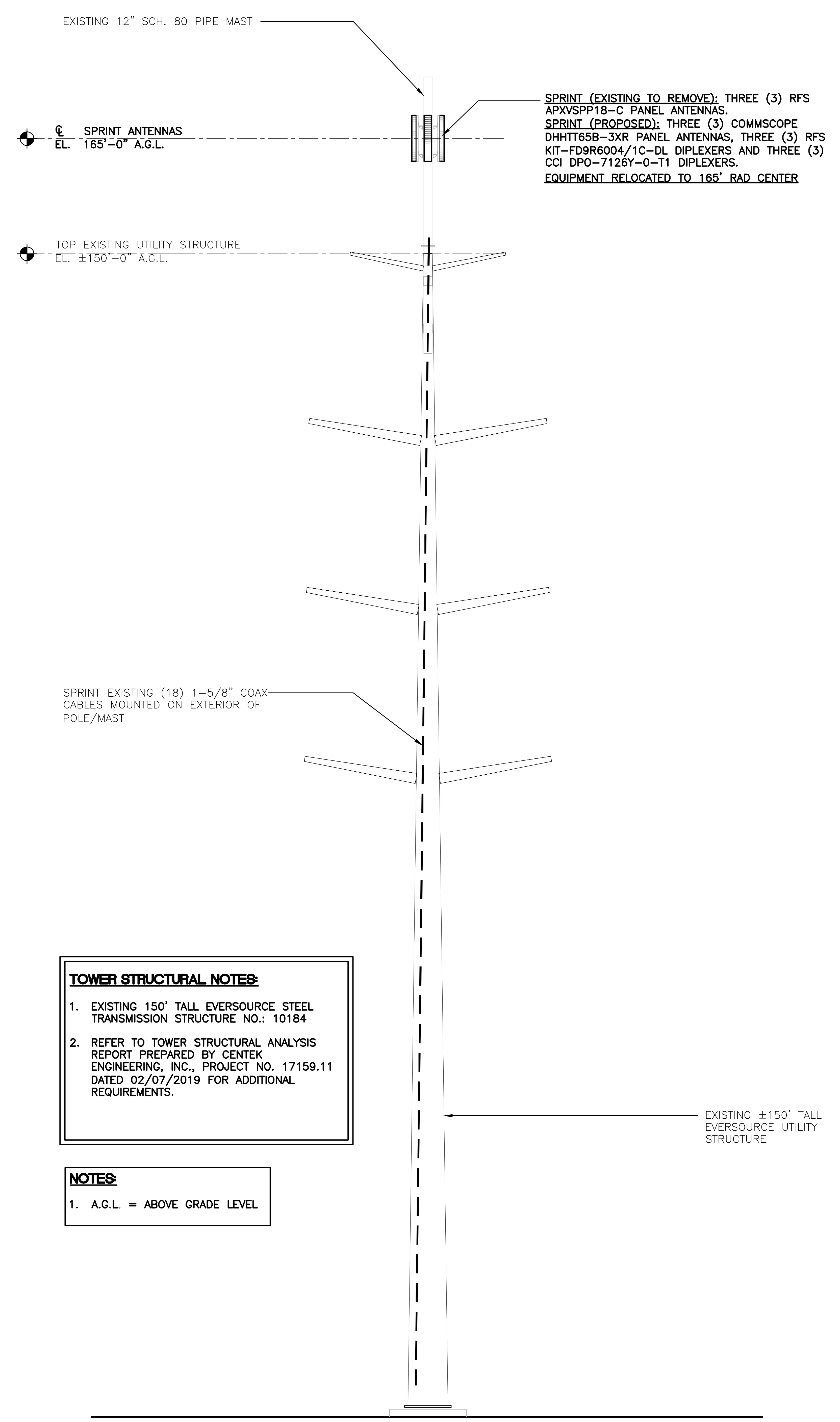
SITE ID: CT33CX095

18 HILLTOP VIEW LANE
NEW MILFORD, CT 06776

DATE:	01/30/18
SCALE:	AS NOTED
JOB NO.	17159.11

DESIGN BASIS AND SITE NOTES

N–1



TOWER STRUCTURAL NOTES:

1. EXISTING 150' TALL EVERSOURCE STEEL TRANSMISSION STRUCTURE NO.: 10184
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 17159.11 DATED 02/07/2019 FOR ADDITIONAL REQUIREMENTS.

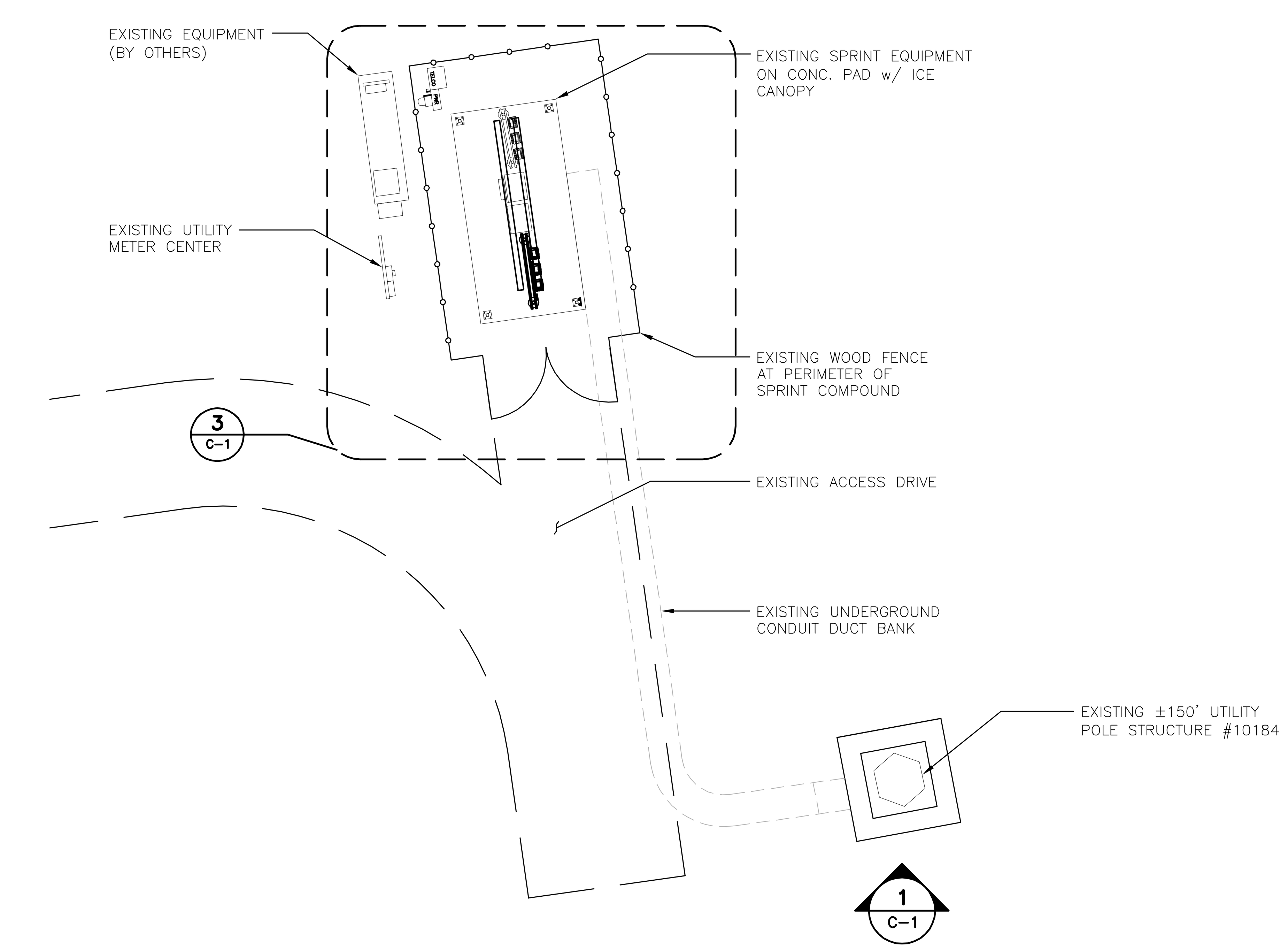
NOTES:

1. A.G.L. = ABOVE GRADE LEVEL

1 C-1 SOUTH TOWER ELEVATION

SCALE: 1" = 10'-0"

GRAPHIC SCALE: 10 0 5 10 20 40 (IN FEET) 1 inch = 10 ft.

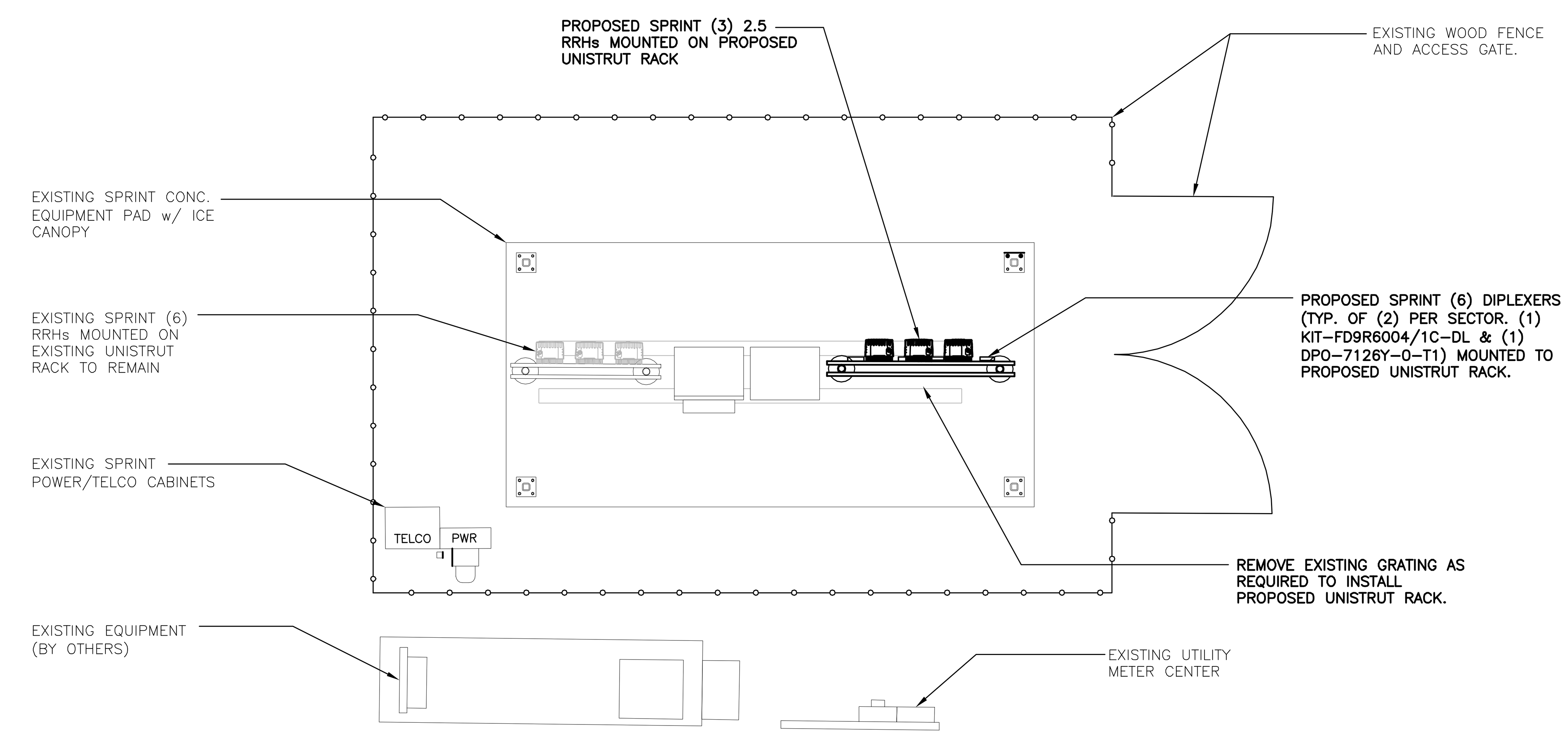


2 C-1 COMPOUND PLAN

SCALE: 1" = 10'

APPROX. NORTH

GRAPHIC SCALE: 10 0 5 10 20 40 (IN FEET) 1 inch = 10 ft.



3 C-1 EQUIPMENT PLAN

SCALE: 1/4 = 1'-0"

APPROX. NORTH

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

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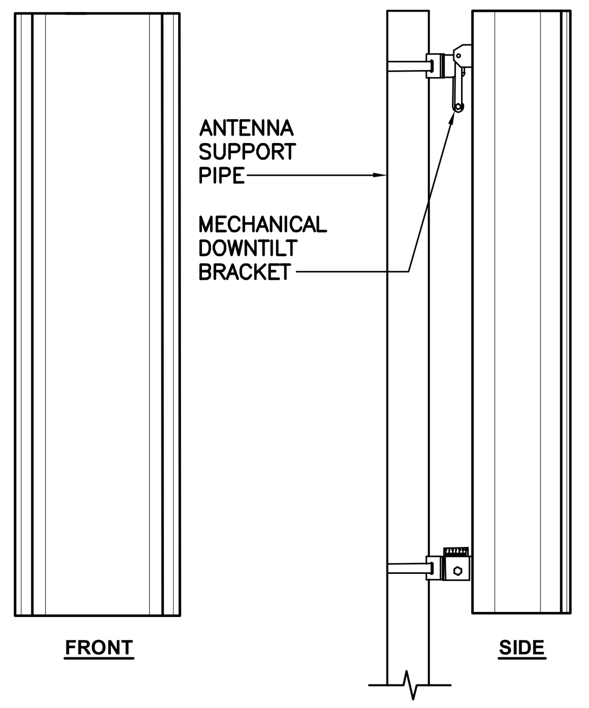
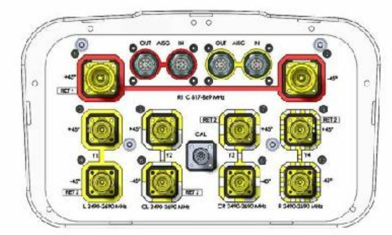
COMPOUND PLANS AND ELEVATION

C-1

Sheet No. 3 of 5





ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: DHHT65B–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"

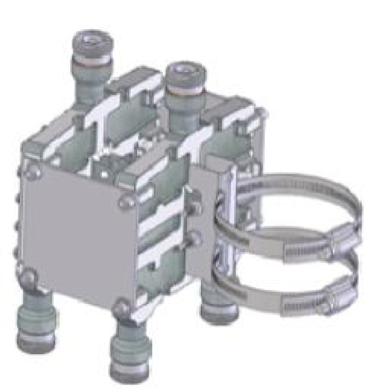
TD-RRH8x20-25

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.

2 C–2 REMOTE RADIO HEAD DETAIL
SCALE: NOT TO SCALE

DOP-7126Y-0-T1

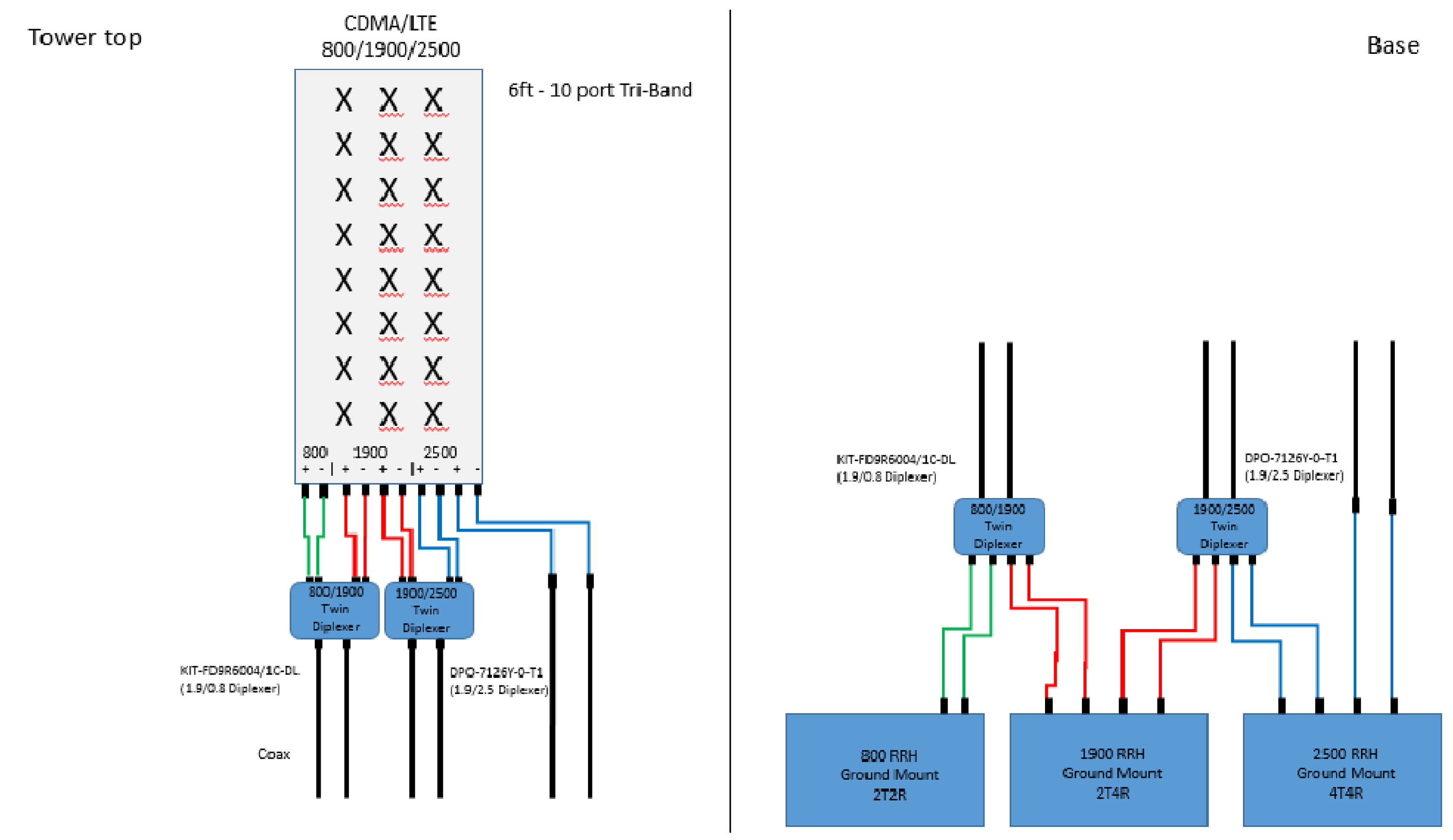


KIT-FD9R6004/1C-DL

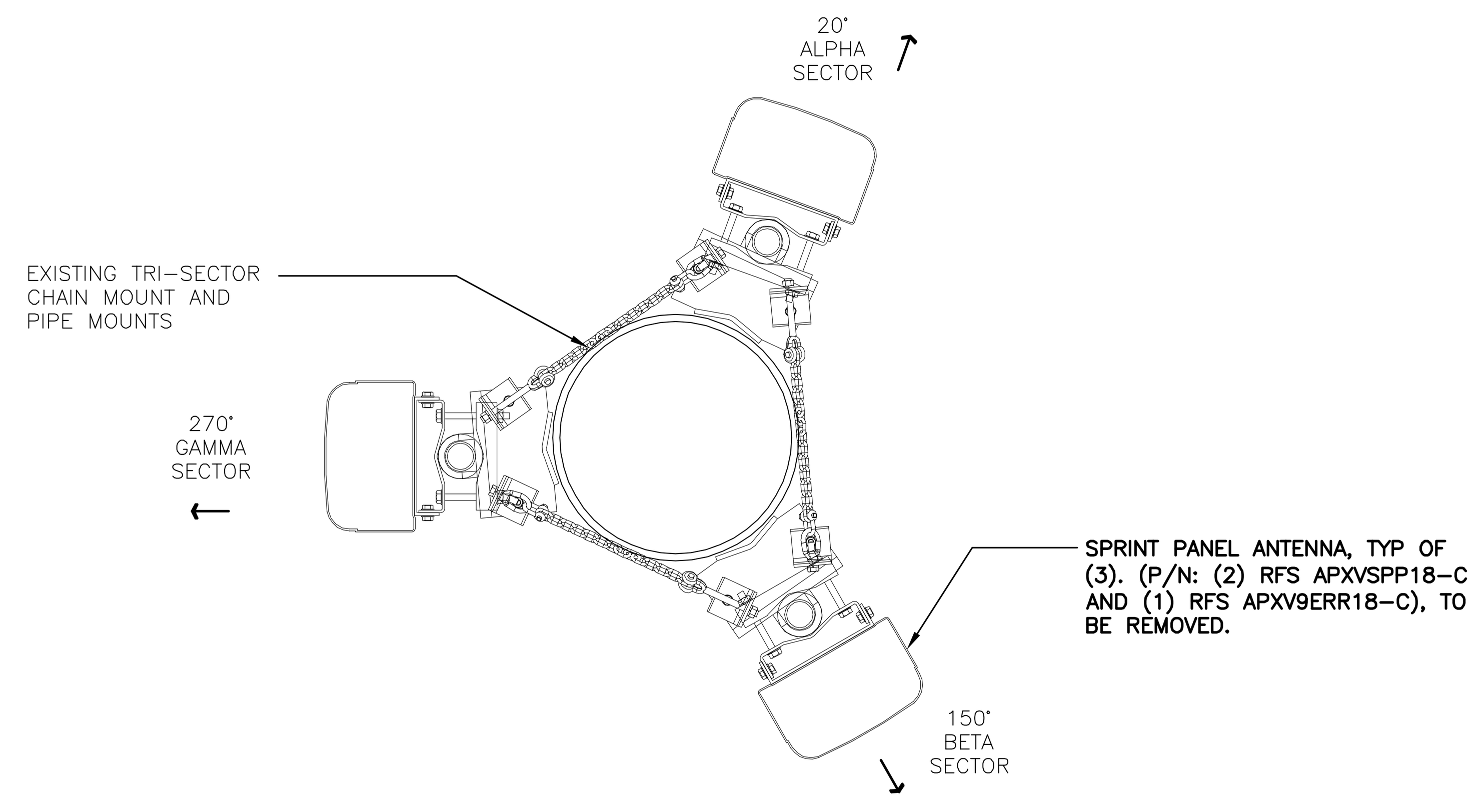
DIPLEXERS		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: KIT–FD9R6004/1C–DL	5.8"L x 6.5"W x 4.6"D	6.4 LBS.
MAKE: CCI MODEL: DPO–7126Y–0–T1	6.26"L x 7.42"W x 4.07"D	7.3 LBS.

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

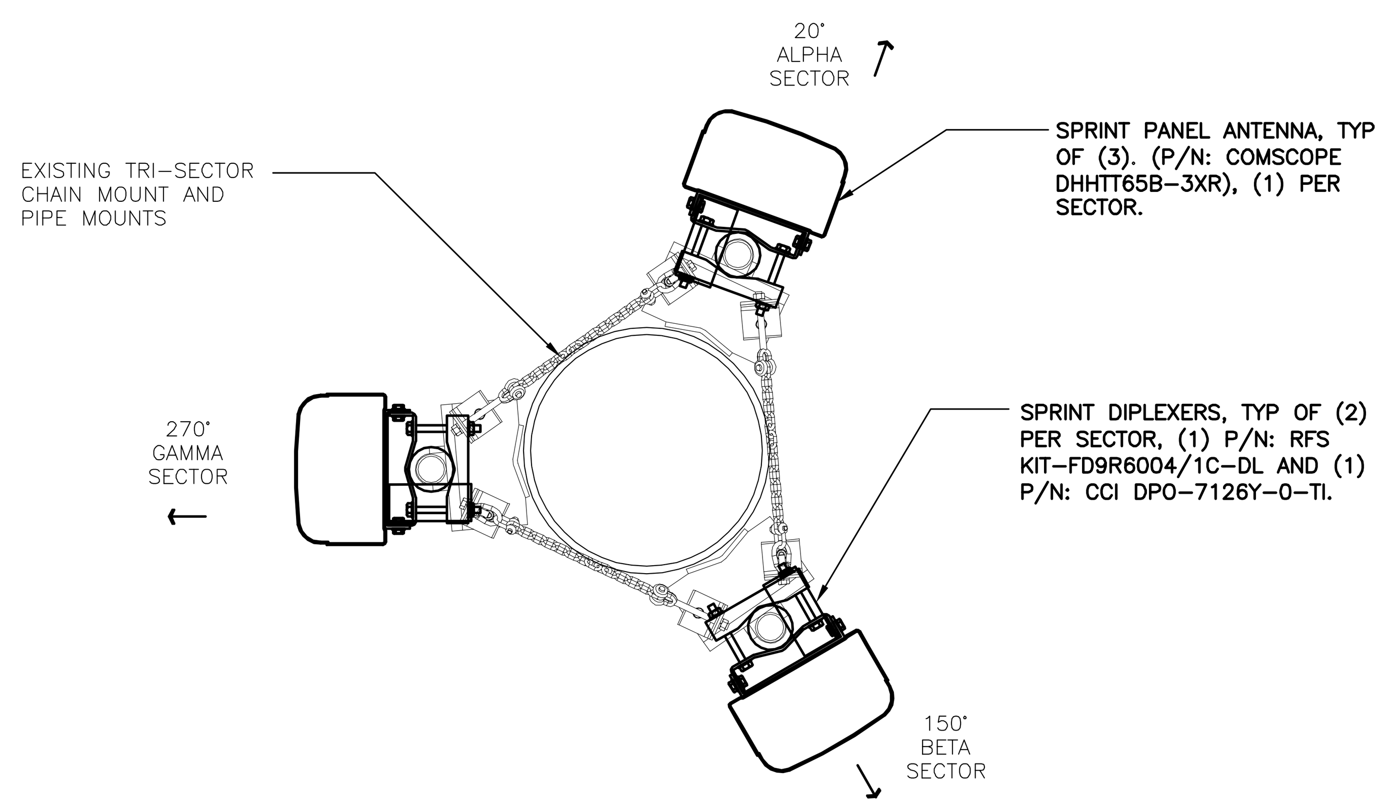
3 C–2 DIPLEXER DETAIL
SCALE: NOT TO SCALE



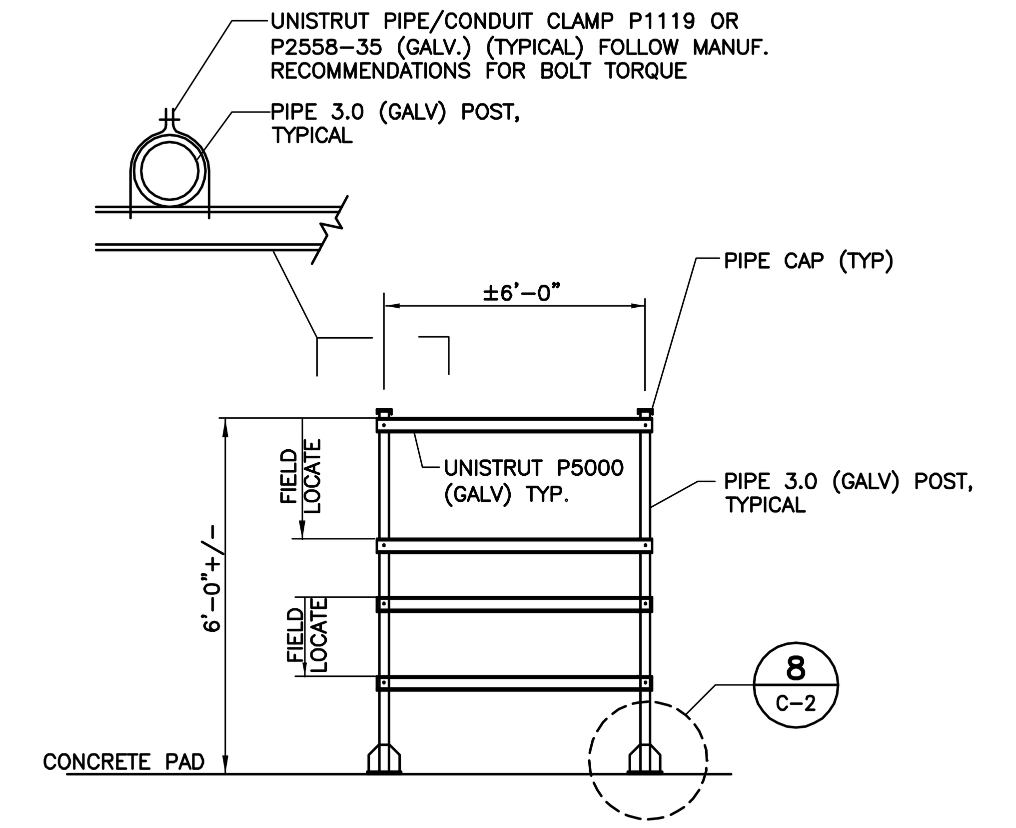
4 C–2 PLUMBING DIAGRAM
NOT TO SCALE



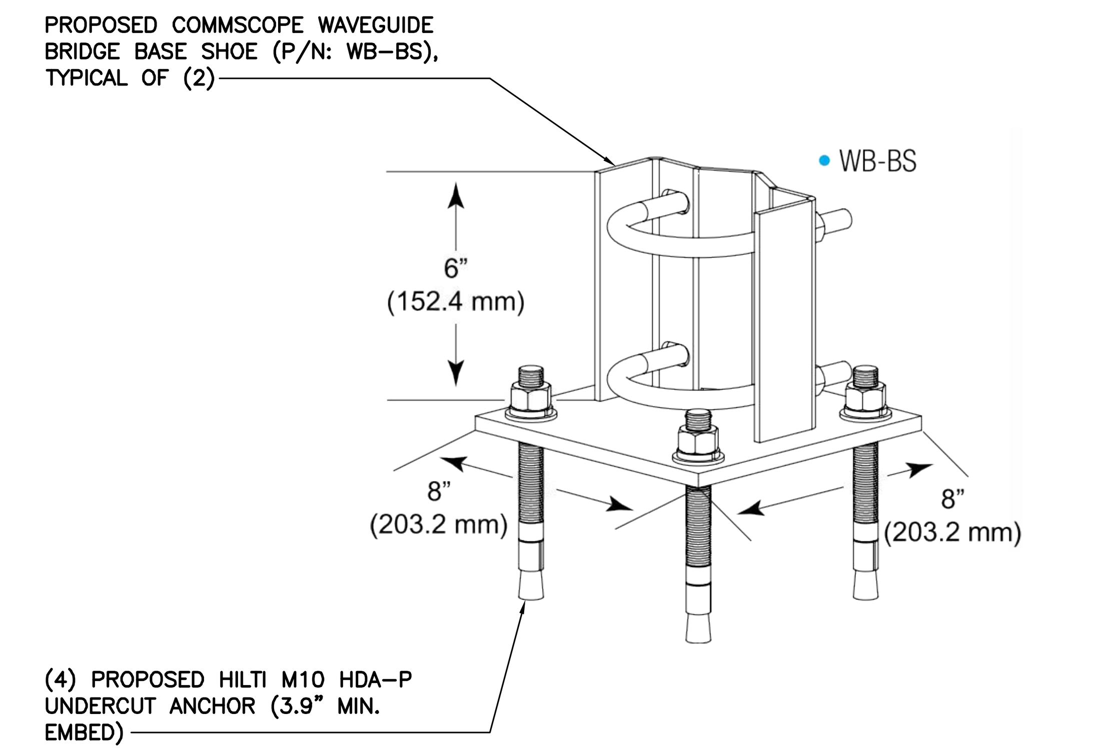
5 C–2 EXISTING ANTENNA PLAN
SCALE: = 1/4" = 1'



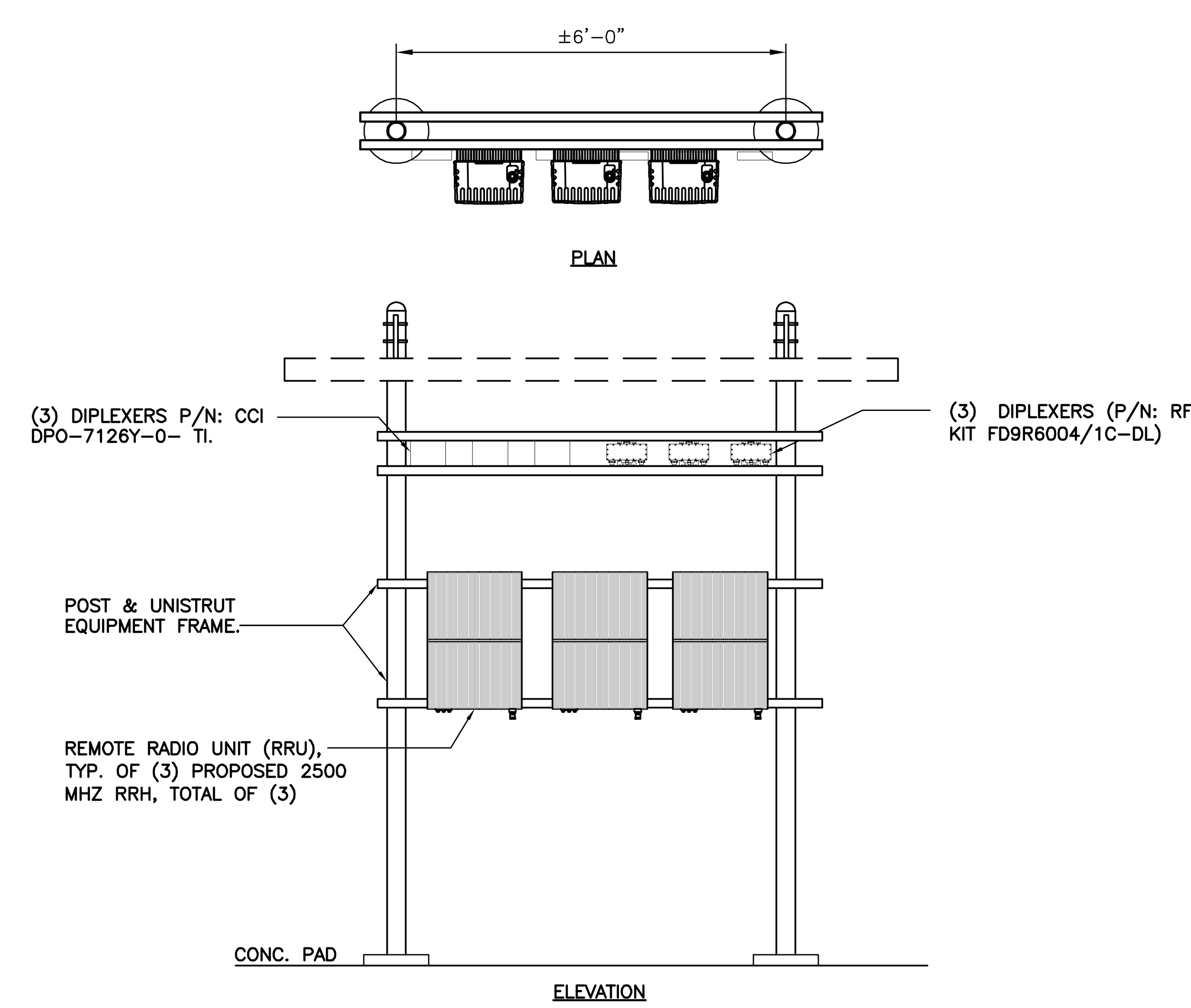
6 C–2 PROPOSED ANTENNA PLAN
SCALE: = 1/4" = 1'



7 C–2 PROPOSED EQUIPMENT MOUNTING FRAME DETAIL
SCALE: NOT TO SCALE



8 C–2 EQUIPMENT FRAME POST ATTACHMENT DETAIL
SCALE: NOT TO SCALE



9 C–2 RRU MOUNTING CONFIG.
SCALE: 1/2" = 1'– 0"

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SPRINT
WIRELESS COMMUNICATIONS FACILITY
EVERSOURCE STRUCT.: 10184
SITE ID: CT33CX095
18 HILLTOP VIEW LANE
NEW MILFORD, CT 06776

DATE: 01/30/18
SCALE: AS NOTED
JOB NO. 17159.11

TYPICAL DETAILS

C–2

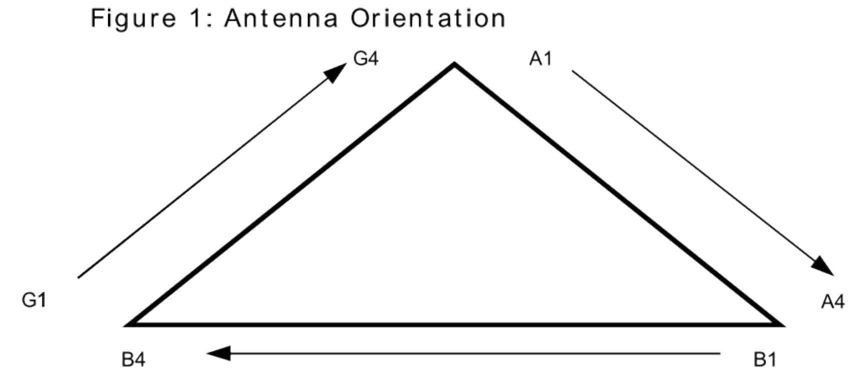
Sheet No. 4 of 5

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

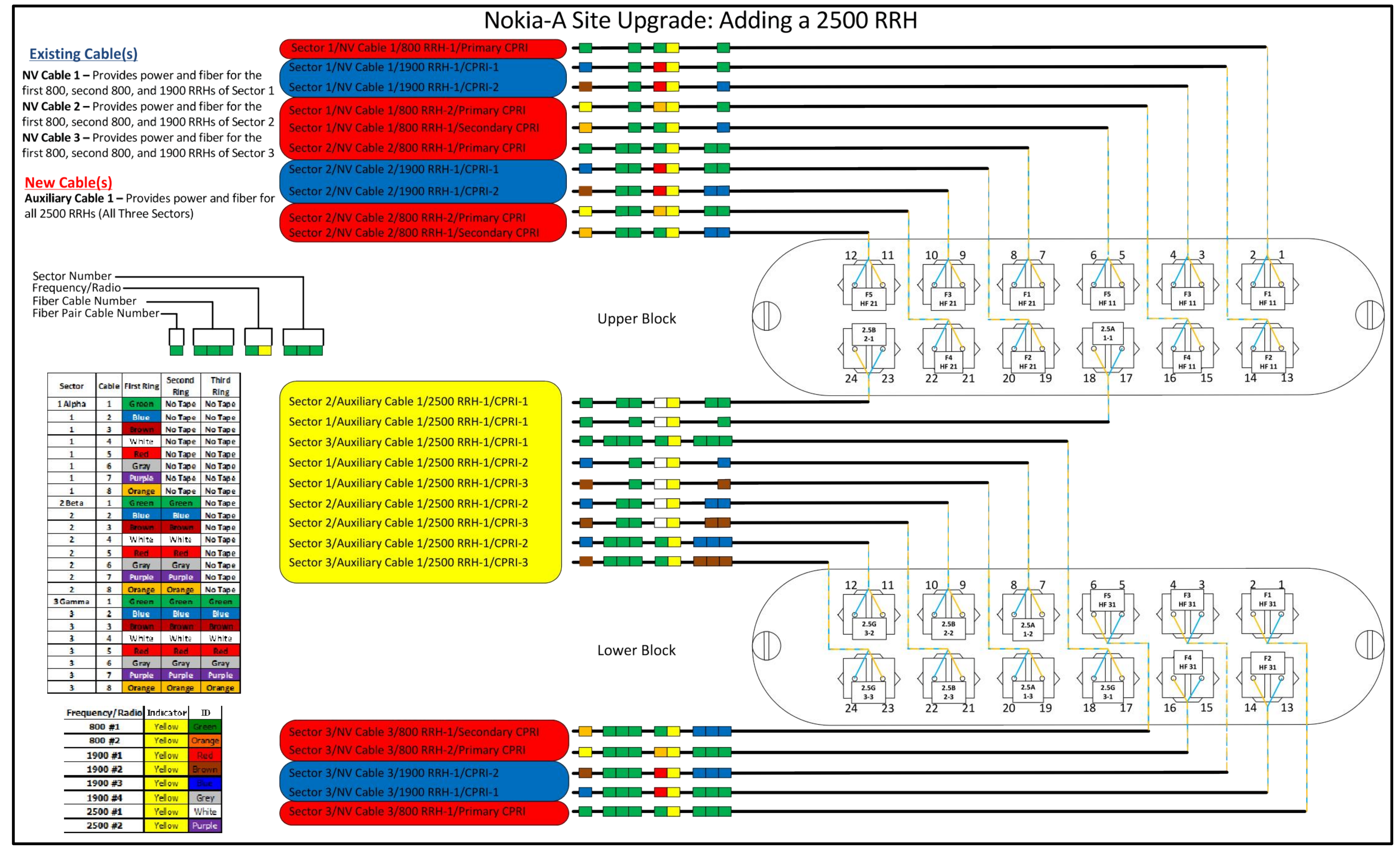
Example – Sector 2, Cable 2, 800mhz Radio #1

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

Nokia-A Site Upgrade: Adding a 2500 RRH



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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	04/15/19	TJL	CAG	ISSUED FOR CONSTRUCTION – CORRECTED RAD CENTER ELEVATION
1	04/15/19	TJL	CAG	ISSUED FOR CONSTRUCTION
0	03/02/18	TJL	CAG	REVISED PER CLIENT COMMENTS

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COLOR CODE AND CPRI DETAILS

C-3

Sheet No. 5 of 5

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Pole

Sprint Site Ref: CT33XC095

Eversource Structure No. 10184
150' Electric Transmission Pole

18 Hilltop View Lane
New Milford, CT

CENTEK Project No. 17159.11

~~Date: February 1, 2018~~
Rev 4: February 7, 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' utility pole located at 18 Hilltop View Lane in New Milford, CT for the proposed antenna and equipment upgrade by Sprint.

The existing/proposed loads consist of the following:

- SPRINT (Existing to Remain):
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables running on the exterior of the pole and antenna mast.
- SPRINT (Existing to Remove):
  Antennas: Three (3) RFS APXVSPP18-C panel antennas flush mounted to the existing 12-in Sch. 80 pipe mast with RAD center elevation of 155-ft 6-in 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 flush mounted to the existing 12-in Sch. 80 pipe mast with RAD center elevation of 165-ft above grade.

Primary assumptions used in the analysis

- ASCE 48-05, "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 12-in x 36-ft long SCH. 80 pipe (O.D. = 12.75") connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA-222G 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-222-G 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 using PLS-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 48-05, "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 NU Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE 48-05.

  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.………………………………… 100 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……………………………….... 89 mph (2016 CSBC Appendix-N)
Radial Ice Thickness………………………. 0”

Load Case 2:
Wind Pressure.……………………………. 40 mph wind pressure
Radial Ice Thickness……………………….. 1.00”

Results

- MAST ASSEMBLY

The existing pipe mast was determined to be structurally adequate.

Component	Stress Ratio (percentage of capacity)	Result
12” Sch. 80 Pipe	36.5%	**PASS**
Connection to Tower	31.5%	**PASS**

Horizontal Displacement (% of Cantilever Height)	Allowable	Result
0.30 %	1.5 %	**PASS**

- UTILITY POLE

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 48-05, “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 **82.52%** occurs in the utility pole under the **NESC Heavy** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 5	0.00’ -40.0’ (AGL)	82.52%	**PASS**

BASE PLATE:
The base plate was found to be within allowable limits from the PLS output based on 24 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	76.2%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 10-ft square x 9.0-ft long reinforced concrete pier with sixteen (16) rock anchors embedded 24-ft into rock. The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615 Gr. 75 anchor bolts embedded approximately 8-ft-9-in into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01143-600001 Sheet 1.

BASE REACTIONS:

From PLS-Pole analysis of utility pole based on NESC/EVERSOURCE prescribed loads.

Load Case	Shear	Axial	Moment
NESC Heavy Wind	57.71 kips	151.91 kips	6425.66 ft-kips
NESC Extreme Wind	62.09 kips	82.49 kips	6406.21 ft-kips

Note 1 – 10% increase will be applied to tower base reactions per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	73.08%	**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)	1.78 FS (2)	**PASS**
	Rock Anchor Tension	100%	83.9%	**PASS**

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

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

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.*

P C S   M a s t

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:

E L E C T R I C   T R A N S M I S S I O N   T O W E R

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

Condition	Code	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
Ice Condition	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
Ice Condition	NESC Heavy	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
Ice Condition	NESC Heavy	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
High Wind Condition	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
High Wind Condition	NESC Extreme Wind	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
High Wind Condition	NESC Extreme Wind	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
NESC Extreme Ice with Wind Condition *		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
NESC Extreme Ice with Wind Condition *		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.

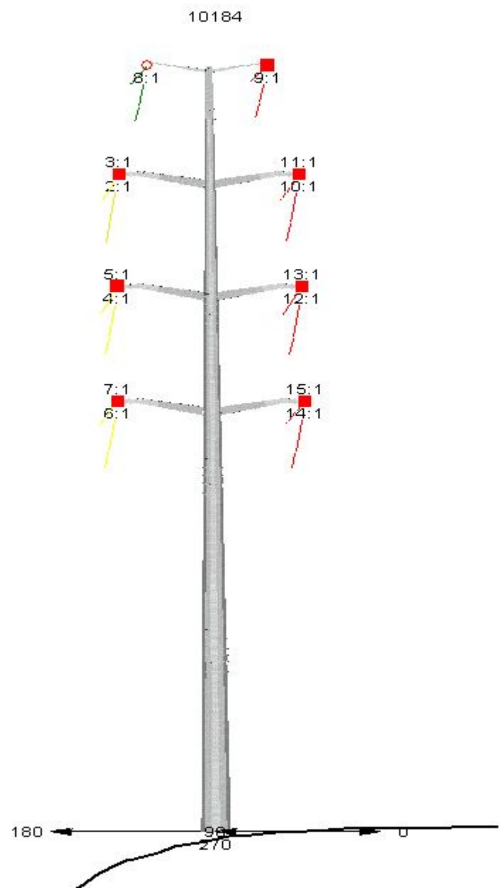
Project: 321/1887 Lines, Structure 10184
Date: 10/12/18
Engineer: JS
Purpose: Recalculate wire loads for Sprint site.

Shield Wires:
321: AFL DNO-4963 0.457" OPGW, sagged to 4200# NESC 250B Final
1618: 7#8 Alumoweld, sagged in PLS-CADD

Conductors:
Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250B

321 Line			**1618 Line**	
Shield Wire				
	V:	1626	**V:**	1626
	T:	-1927	**T:**	-1896
	L:	0	**L:**	-753
Top Phase				
	V:	10631	**V:**	10734
	T:	-7054	**T:**	-7350
	L:	-1946	**L:**	-708
Mid Phase				
	V:	10639	**V:**	10640
	T:	-7128	**T:**	-7212
	L:	-1713	**L:**	-1784
Bot Phase				
	V:	10634	**V:**	10655
	T:	-7310	**T:**	-7653
	L:	1430	**L:**	5287



Looking south. OPGW attached on top left arm. Alumoweld attached on top right arm.
Positive transverse loads are in the 0 degree direction.
Positive longitudinal loads are to the north (90 degree direction)

Project: 321/1887 Lines, Structure 10184
Date: 10/12/18
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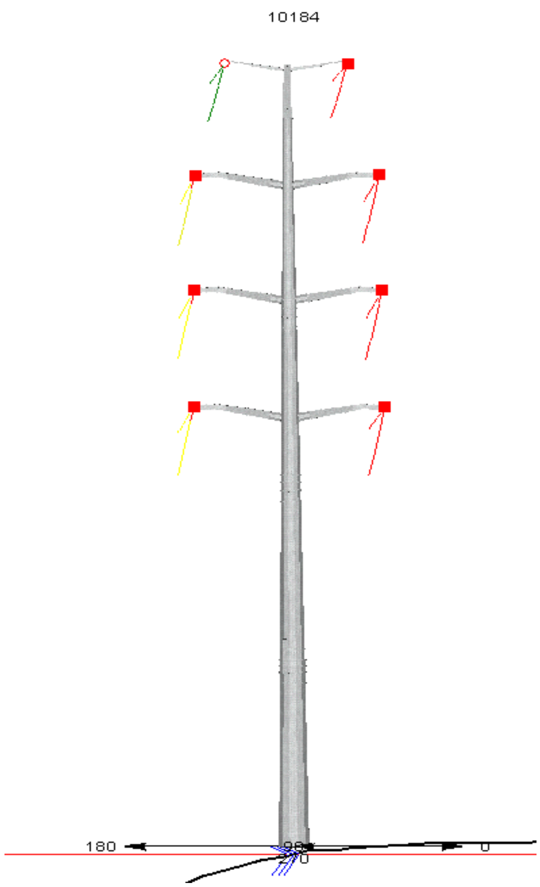
Conductors:
Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250C

321 Line			**1618 Line**	
OPGW			**Alumoweld**	
	V:	512	**V:**	-523
	T:	-1202	**T:**	-1045
	L:	0	**L:**	-211
Top Phase				
	V:	4906	**V:**	4964
	T:	-6753	**T:**	-6902
	L:	-1294	**L:**	-795
Mid Phase				
	V:	4874	**V:**	4871
	T:	-6589	**T:**	-6640
	L:	-1169	**L:**	-1193
Bot Phase				
	V:	4831	**V:**	4838
	T:	-6427	**T:**	-6588
	L:	213	**L:**	1835



Looking south. OPGW attached on top left arm. Alumoweld attached on top right arm.
Positive transverse loads are in the 0 degree direction.
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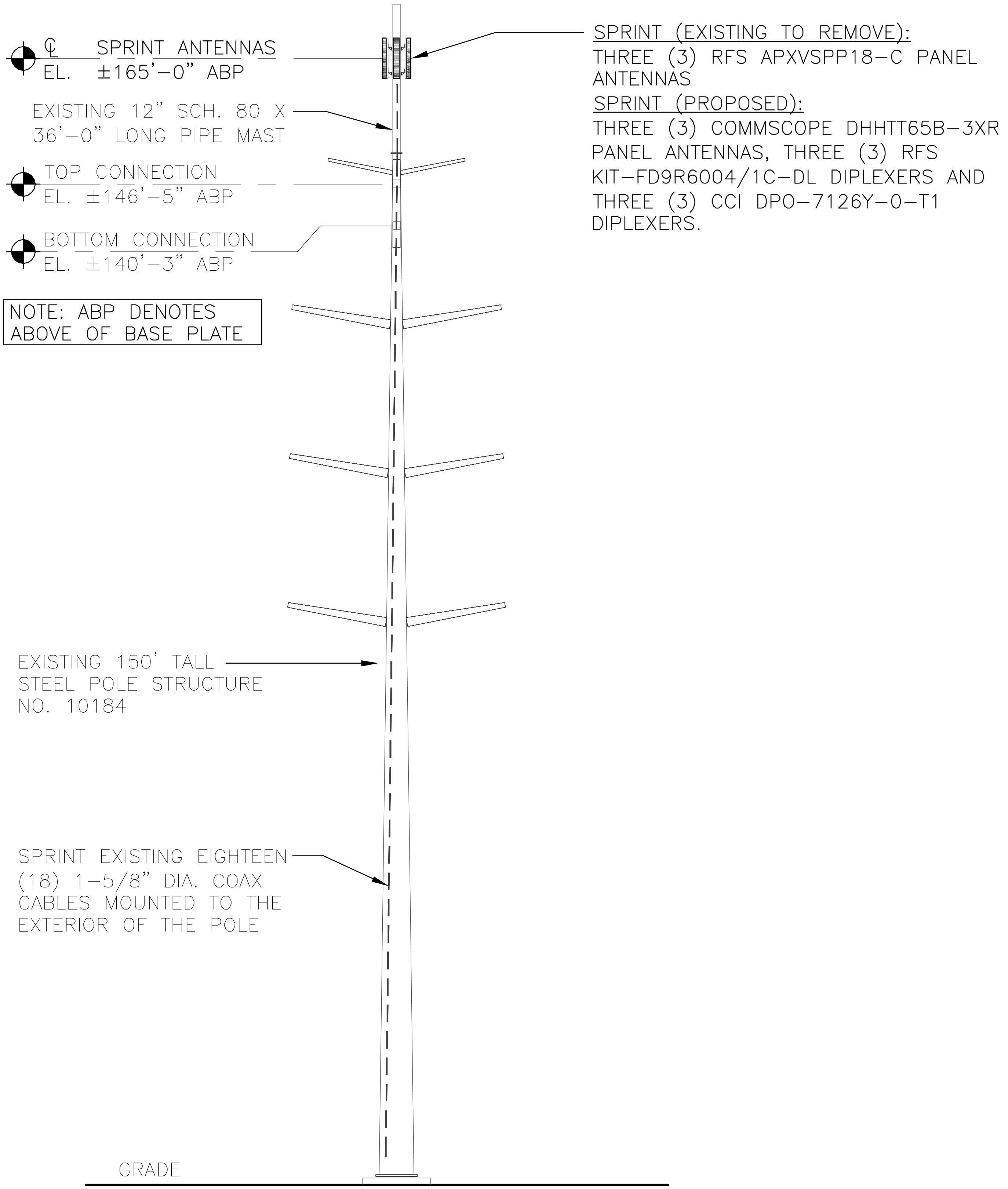

1 / EL–1 **TOWER & MAST ELEVATION**

SCALE: NOT TO SCALE

REVISIONS		
00	1/31/18	ISSUED FOR REVIEW
01	2/7/19	CONSTRUCTION

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CT33XC095
EVERSOURCE 10184

18 HILLTOP VIEW LANE
NEW MILFORD, CT 06776

PROJECT NO:	17159.11
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	1/31/18

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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

Wind Speeds

Basic Wind Speed	$V := 89$	mph	(User Input - 2016 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 40$	mph	(User Input per Annex B of TIA-222-G)
Basic Wind Speed Service Loads	$V_{Ser} := 60$	mph	(User Input - TIA-222-G Section 2.8.3)

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 =	$z_{Sprint} := 165$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 158$	ft	(User Input)
Radial Ice Thickness =	$t_i := 1.00$	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)

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

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

Wind Direction Probability Factor (Service) = $K_{dSer} := 0.85$ (Per Section 2.8.3 of TIA-222-G)

Importance Factor (Service) = $I_{Ser} := 1$ (Per Section 2.8.3 of TIA-222-G)

$K_{iz} := \left(\frac{z_{Sprint}}{33}\right)^{0.1} = 1.175$ $t_{izSprint} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.937$

Velocity Pressure Coefficient Antennas = $Kz_{Sprint} := 2.01\left(\left(\frac{z_{Sprint}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.406$

Velocity Pressure w/o Ice Antennas = $qz_{Sprint} := 0.00256 \cdot K_d \cdot Kz_{Sprint} \cdot V^2 \cdot I_{Wind} = 31.155$

Velocity Pressure with Ice Antennas = $qz_{ice.Sprint} := 0.00256 \cdot K_d \cdot Kz_{Sprint} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 5.472$

Velocity Pressure Service = $qz_{Sprint.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Sprint} \cdot V_{Ser}^2 \cdot I_{Ser} = 11.017$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.17$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.924$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.394$

Velocity Pressure w/o Ice Mast= $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 30.872$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 5.423$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.917$

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Branford, CT 06405 F: (203) 488-8587

Subject:	Loads on Equipmnet Structure 10184
Location:	New Milford, CT
Rev. 4: 2/7/19	Prepared by: T.J.L. Checked by: C.A.G. Job No. 17159.11

Development of Wind & Ice Load on Mast

Mast Data: (Pipe 12" SCH. 80) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 12.75$ in (User Input)

Mast Length = $L_{mast} := 36$ ft (User Input)

Mast Thickness = $t_{mast} := 0.5$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 33.9$

Mast Force Coefficient = $Ca_{mast} = 1.2$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.063$ sf/ft

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 53$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.55$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 14$ plf **BLC 4**

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 19$ plf **BLC 6**

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 = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 144$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 56$ 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 =	$N_{ant} := 3$		(User Input)
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 =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.9$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1021$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 9.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 28.9$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 290$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 361$	lbs	**BLC 6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 138$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 1 \times 10^4$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 385$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 1156$	lbs	**BLC 3**

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 = $N_{ant} := 3$ (User Input)

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 = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.8$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 40$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 27$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 14$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 21$ 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 = $V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 1339$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 43$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 130$ lbs **BLC 3**

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 = $N_{ant} := 3$ (User Input)

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 = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.6$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 32$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 0.9$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2.8$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 24$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 11$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 24$ 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 = $V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 1415$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 46$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 138$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (Sprint)

Mount Type: Tri-Sector Chain Mount

Platform Weight = $WT_{mnt} := 160$ lbs (User Input)

Platform Weight w/ Ice = $WT_{ICE.mnt} := 200$ lbs (User Input)

Wind Load (without ice)

Total Platform Wind Force = $F_{mnt} := 0$ lbs **BLC 5**

Wind Load (with ice)

Total Platform Wind Force w/ Ice = $Fi_{mnt} := 0$ lbs **BLC 4**

Wind Load (Service)

Total Platform Wind Force Service Loads = $F_{mnt.Ser} := 0$ lbs **BLC 6**

Gravity Load (without ice)

Weight of Platform = $WT_{mnt} = 160$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{ICE.mnt} - WT_{mnt} = 40$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 25$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 3$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 151.5$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 25$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 9$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 9$ plf **BLC 6**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{izMast1})^2 - D_{coax}^{\ 2}\right] = 45$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 315$ 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	Mast	PIPE_12.0X	Column	Pipe	A53 Gr. B	Typical	17.5	339	339	678

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	Mast	14			Lbyy						Lateral
2	M2	Mast	22			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	N4			Mast	Column	Pipe	A53 Gr. B	Typical
2	M2	N4	N5			Mast	Column	Pipe	A53 Gr. B	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	0	3.25	0	0	
3	N3	0	9.417	0	0	
4	N4	0	14	0	0	
5	N5	0	36	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	N1						
2	N2	Reaction	Reaction	Reaction		Reaction	
3	N3	Reaction	Reaction	Reaction		Reaction	
4	N4						

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.138	14
2	M2	Y	-.021	14
3	M2	Y	-.024	14
4	M2	Y	-.16	14

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-1.156	14
2	M2	Y	-.13	14
3	M2	Y	-.138	14
4	M2	Y	-.04	14

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.29	14
2	M2	X	.027	14
3	M2	X	.024	14

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	1.021	14
2	M2	X	.04	14
3	M2	X	.032	14

Member Point Loads (BLC 6 : TIA Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.361	14
2	M2	X	.014	14
3	M2	X	.011	14

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	-.019	-.019	0	0
2	M2	Y	-.019	-.019	0	11

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	-.056	-.056	0	0
2	M2	Y	-.056	-.056	0	0
3	M1	Y	-.315	-.315	0	0
4	M2	Y	-.315	-.315	0	11

Member Distributed Loads (BLC 4 : TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.014	.014	0	0
2	M2	X	.014	.014	0	0
3	M1	X	.009	.009	0	0
4	M2	X	.009	.009	0	11

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.053	.053	0	0
2	M2	X	.053	.053	0	0
3	M1	X	.025	.025	0	0
4	M2	X	.025	.025	0	11

Member Distributed Loads (BLC 6 : TIA Service)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.019	.019	0	0
2	M2	X	.019	.019	0	0
3	M1	X	.009	.009	0	0

Member Distributed Loads (BLC 6 : TIA Service) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
4	M2	X	.009	.009	0	11

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None								
2	Weight of Appurtenances	None					4	2		
3	Weight of Ice Only	None					4	4		
4	TIA Wind with Ice	None					3	4		
5	TIA Wind	None					3	4		
6	TIA Service	None					3	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	1.2D + 1.6W	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D +1.0Di + 1.0Wi	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.0D + 1.0WService	Yes	Y		1	1	2	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	10.035	1	2.494	3	0	4	0	4	0	4	0	4
2		min	1.875	3	.108	2	0	1	0	1	0	1	0	1
3	N3	max	-2.945	3	9.842	3	0	4	0	4	0	4	0	4
4		min	-15.837	1	.628	2	0	1	0	1	0	1	0	1
5	Totals:	max	-1.07	3	12.337	3	0	4						
6		min	-5.802	1	.736	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	.046	1	0	2	0	4	0	4	0	4	1.18e-03	1
2		min	.009	3	0	3	0	1	0	1	0	1	2.201e-04	3
3	N2	max	0	4	0	4	0	4	0	4	0	4	1.167e-03	1
4		min	0	1	0	1	0	1	0	1	0	1	2.177e-04	3
5	N3	max	0	4	0	4	0	4	0	4	0	4	-4.911e-04	3
6		min	0	1	0	1	0	1	0	1	0	1	-2.632e-03	1
7	N4	max	.287	1	0	2	0	4	0	4	0	4	-1.388e-03	3
8		min	.054	3	-.001	3	0	1	0	1	0	1	-7.436e-03	1
9	N5	max	3.495	1	0	2	0	4	0	4	0	4	-2.526e-03	3
10		min	.653	3	-.003	3	0	1	0	1	0	1	-1.351e-02	1

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	PIPE_12.0X	.365	9.4...	1	.068	9.3...		1	511....	551.25	184....	184....	...	H1-...
2	M2	PIPE_12.0X	.259	0	1	.025	0		1	458....	551.25	184....	184....	...	H1-...

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	10.035	.144	0	0	0	0
2	1	N3	-15.837	.837	0	0	0	0
3	1	Totals:	-5.802	.982	0			
4	1	COG (ft):	X: 0	Y: 18.999	Z: 0			

Joint Reactions

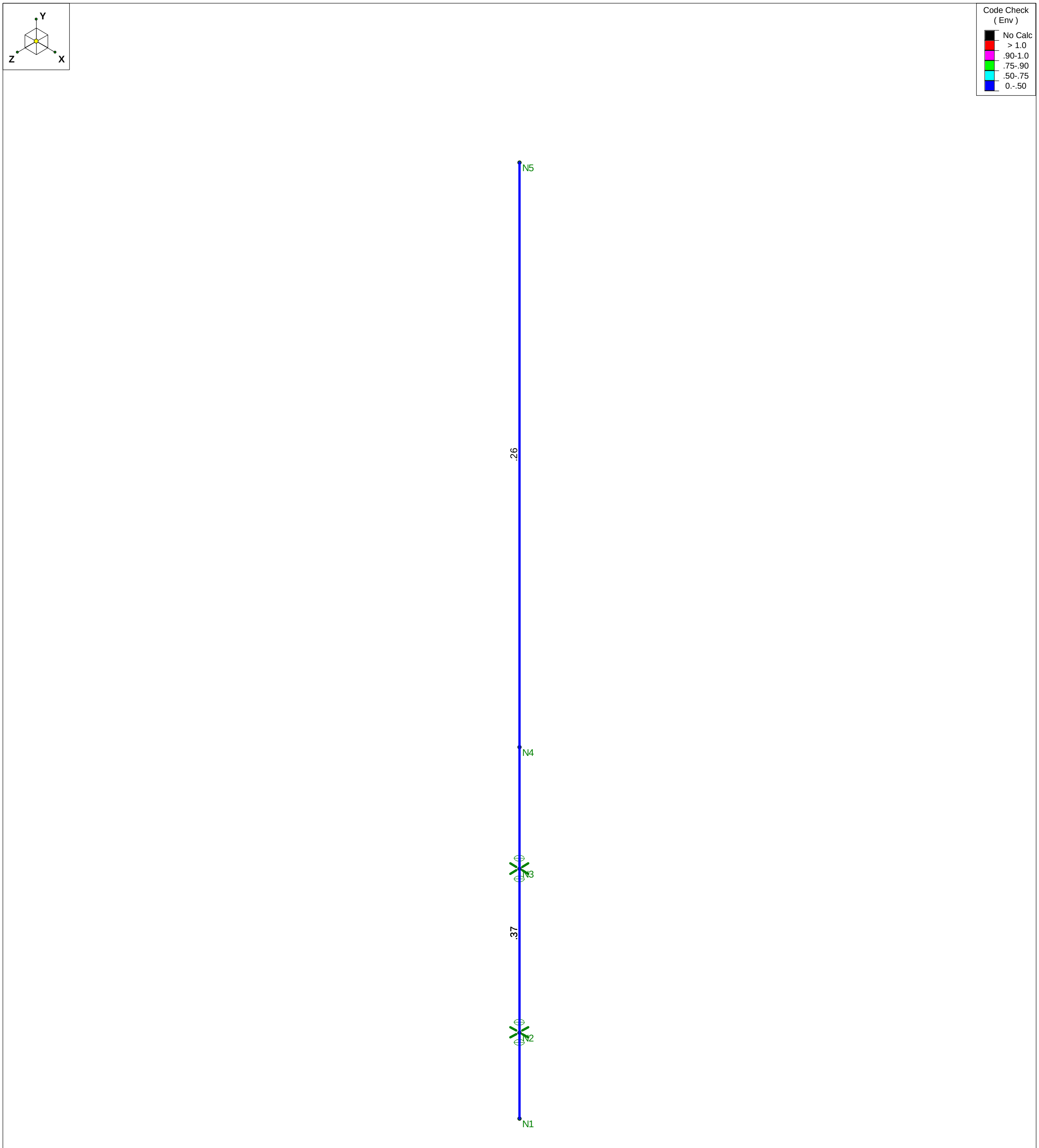
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	10.031	.108	0	0	0	0
2	2	N3	-15.833	.628	0	0	0	0
3	2	Totals:	-5.802	.736	0			
4	2	COG (ft):	X: 0	Y: 18.999	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N2	1.875	2.494	0	0	0	0
2	3	N3	-2.945	9.842	0	0	0	0
3	3	Totals:	-1.07	12.337	0			
4	3	COG (ft):	X: 0	Y: 15.755	Z: 0			

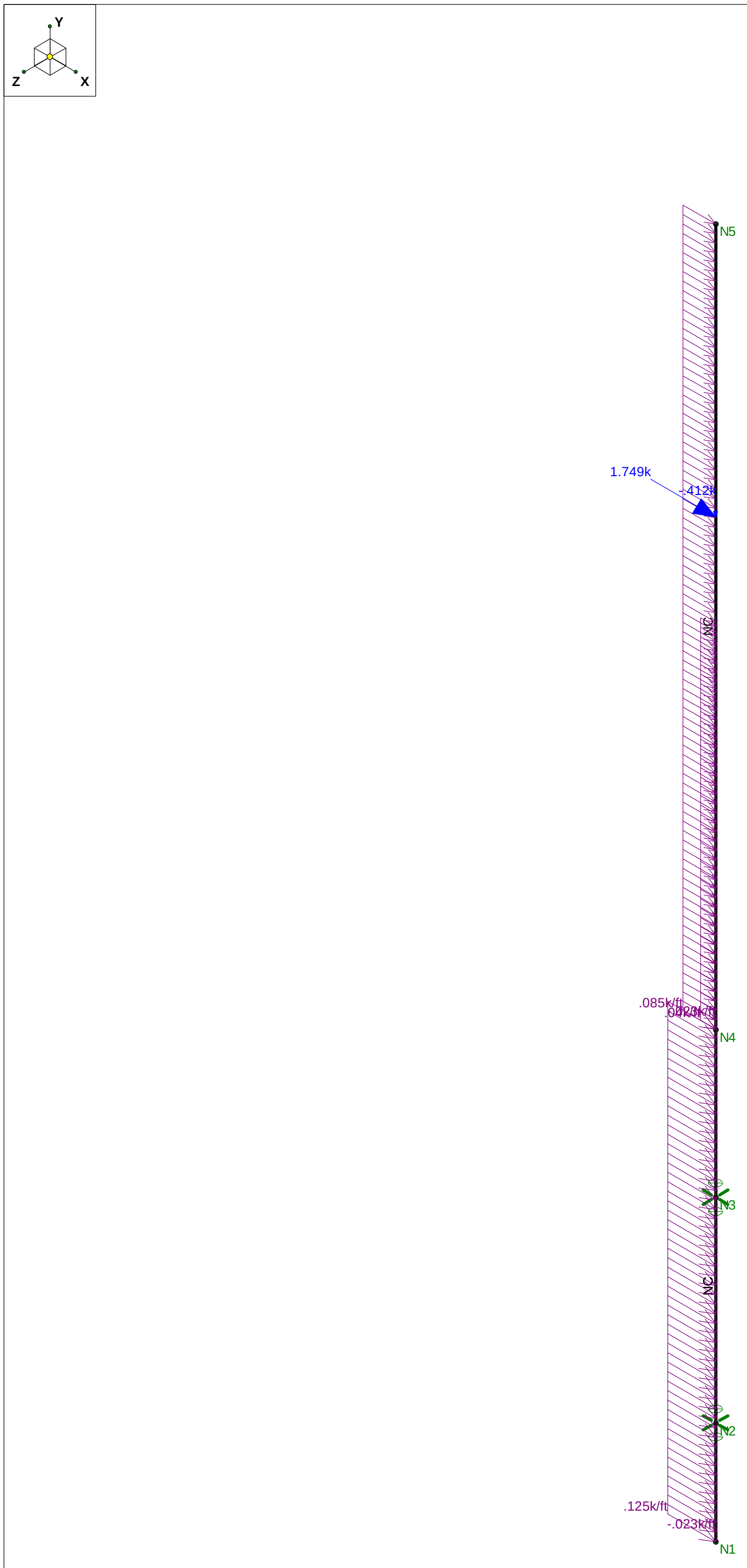
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N2	2.231	.12	0	0	0	0
2	4	N3	-3.526	.698	0	0	0	0
3	4	Totals:	-1.295	.818	0			
4	4	COG (ft):	X: 0	Y: 18.999	Z: 0			



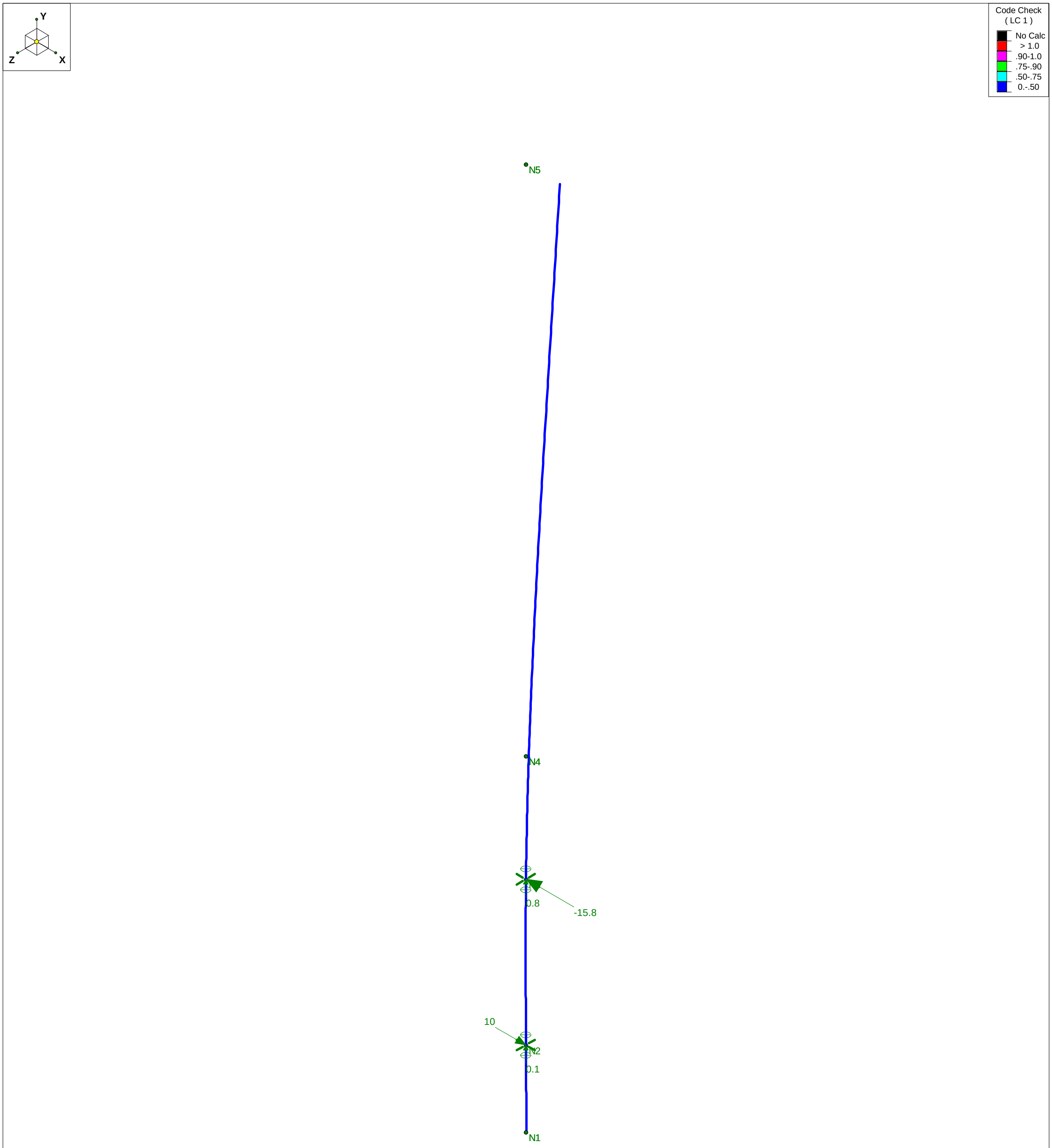
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:20 PM
17159.11/ Sprint CT33XC0...	Unity Check	TIA.r3d



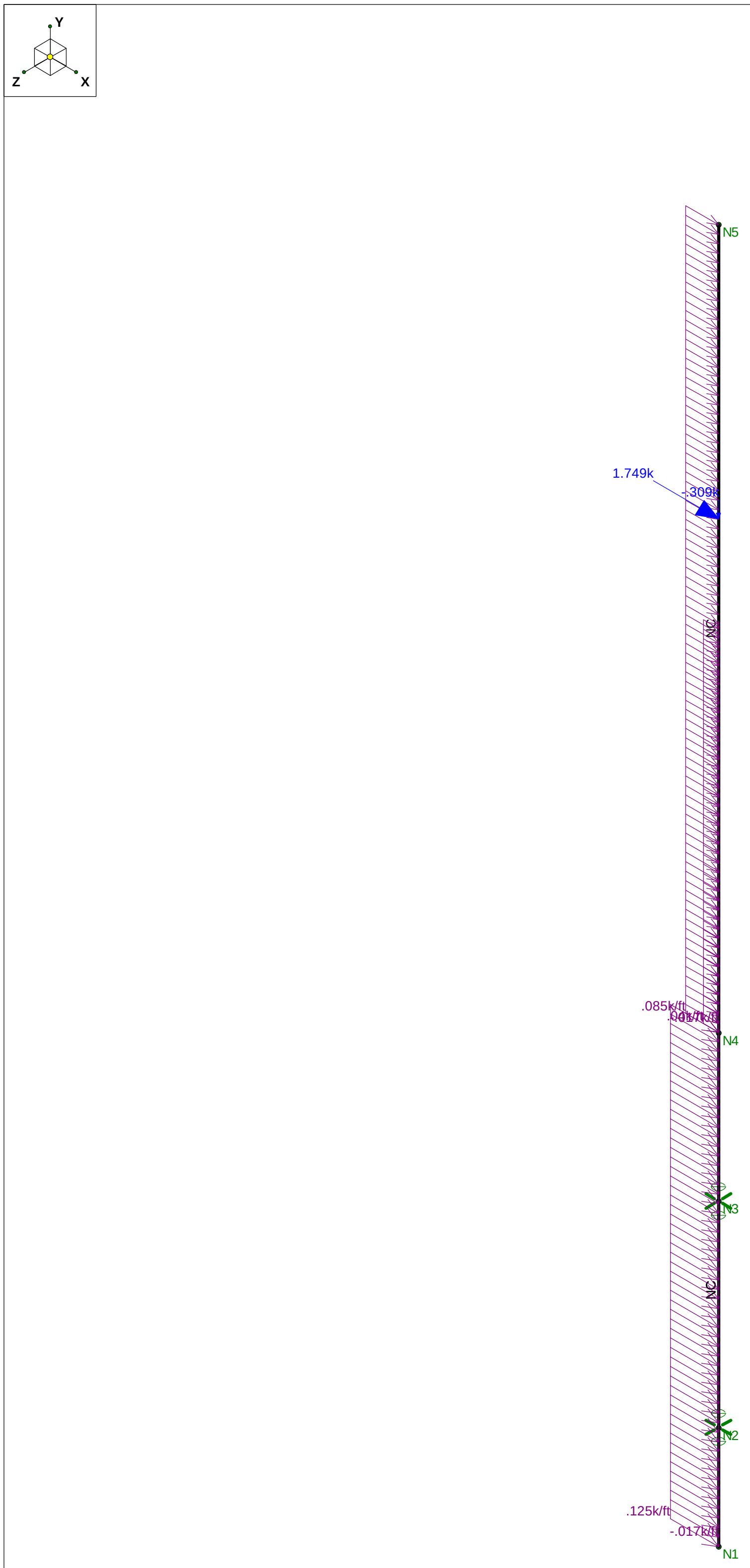
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:20 PM
17159.11/ Sprint CT33XC0...	LC #1 Loads	TIA.r3d



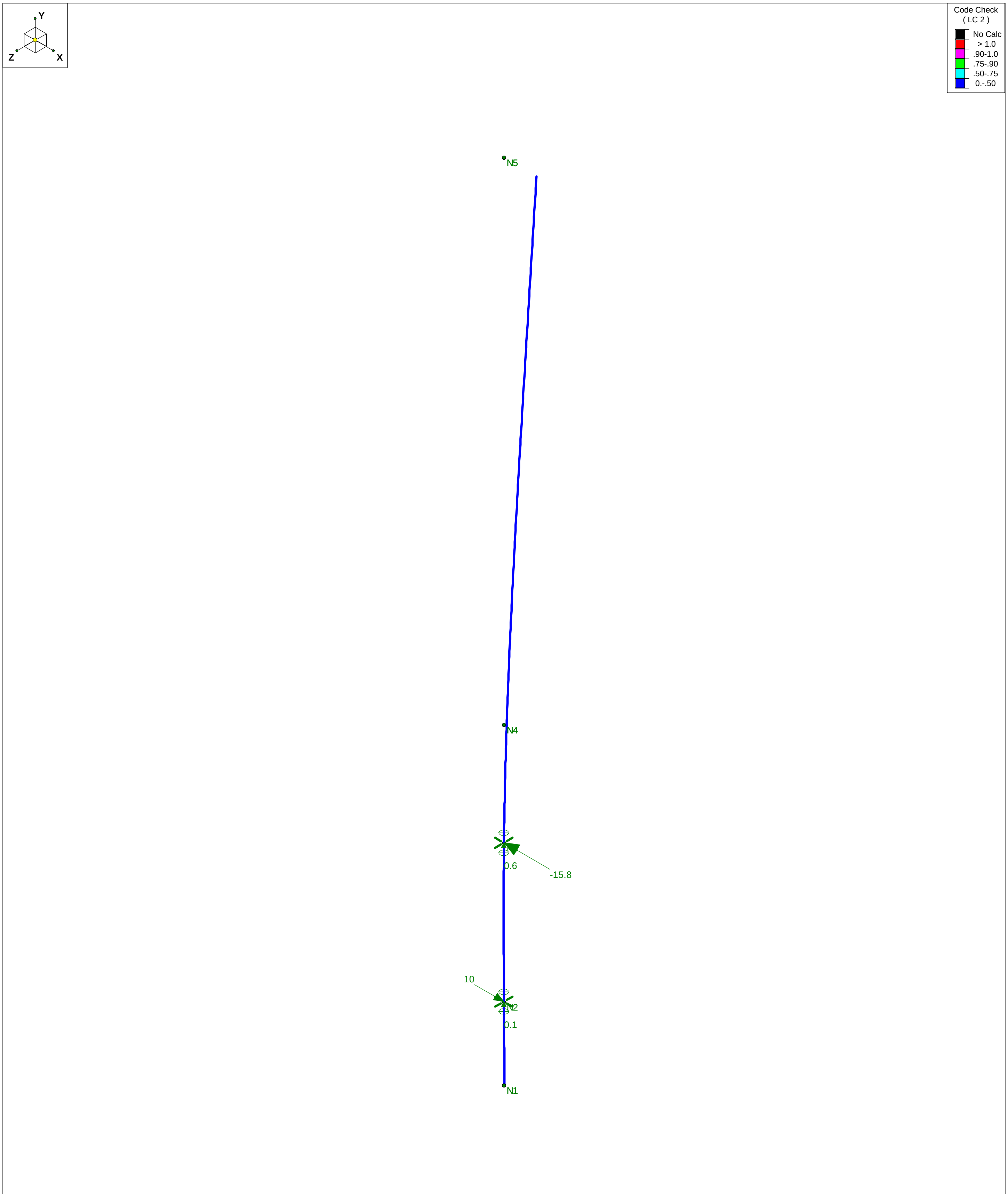
Member Code Checks Displayed
Results for LC 1, 1.2D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:22 PM
17159.11/ Sprint CT33XC0...	LC #1 Reactions and Deflected Shape	TIA.r3d



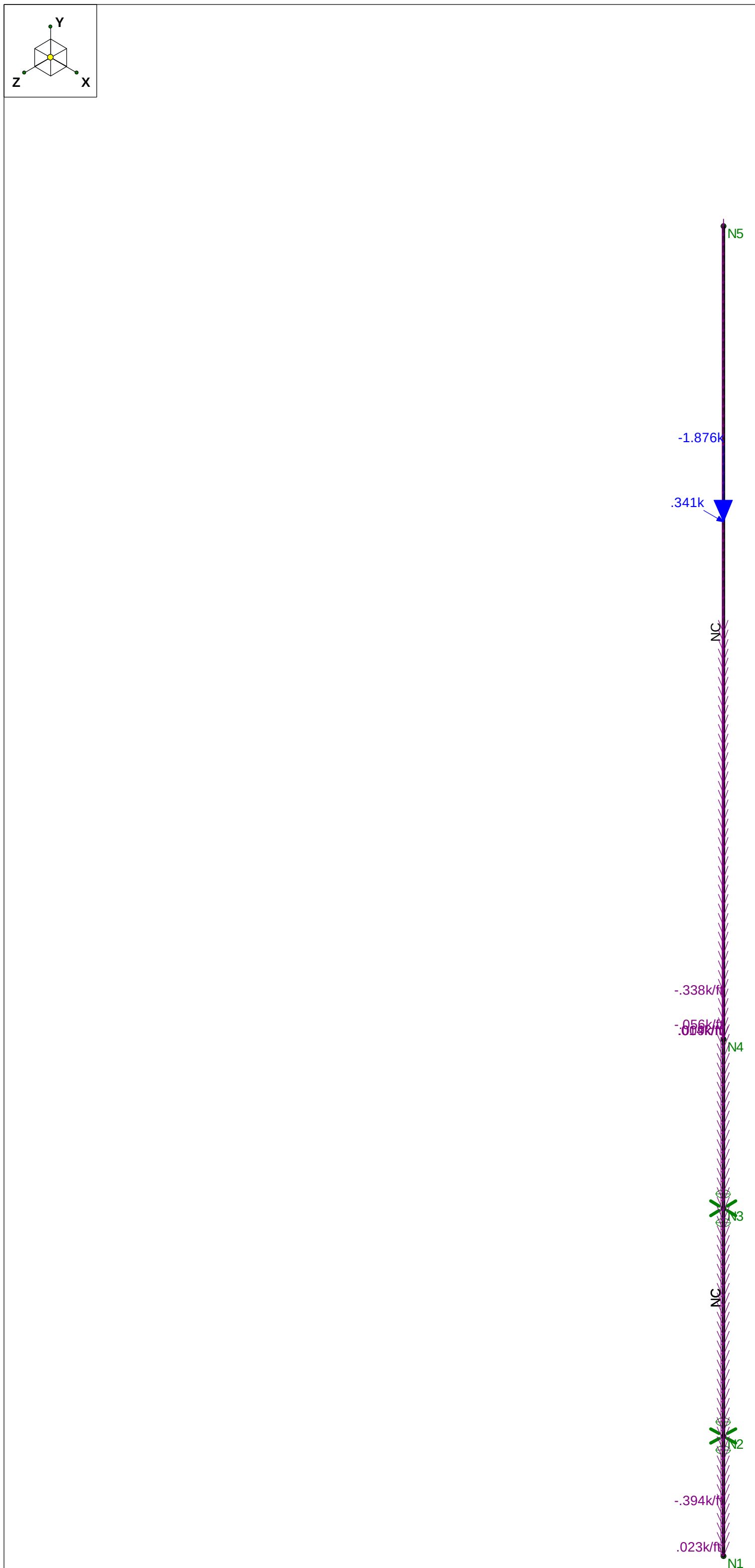
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:21 PM
17159.11/ Sprint CT33XC0...	LC #2 Loads	TIA.r3d



Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:23 PM
17159.11/ Sprint CT33XC0...	LC #2 Reactions and Deflected Shape	TIA.r3d



Member Code Checks Displayed
Loads: LC 3, 1.2D +1.0Di + 1.0Wi

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:21 PM
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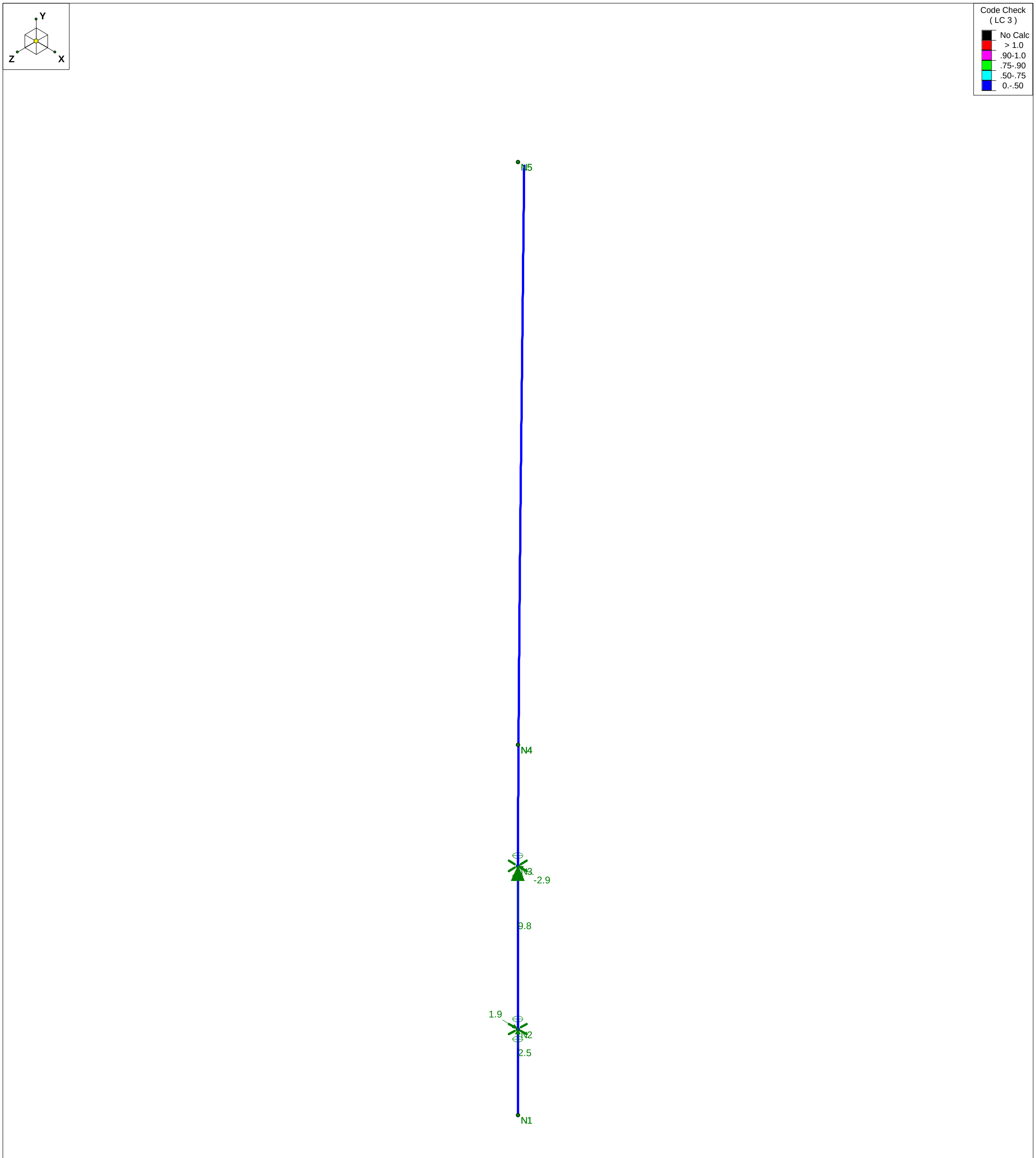
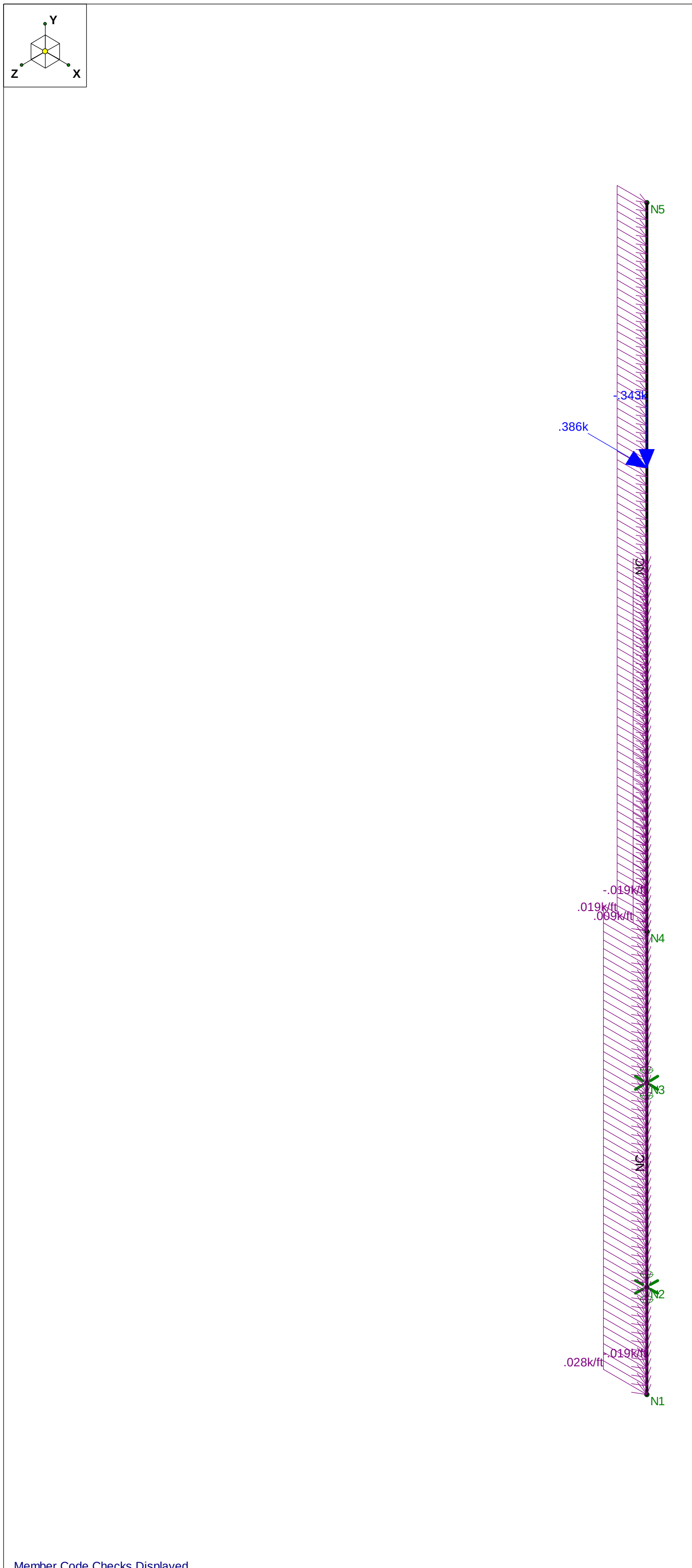


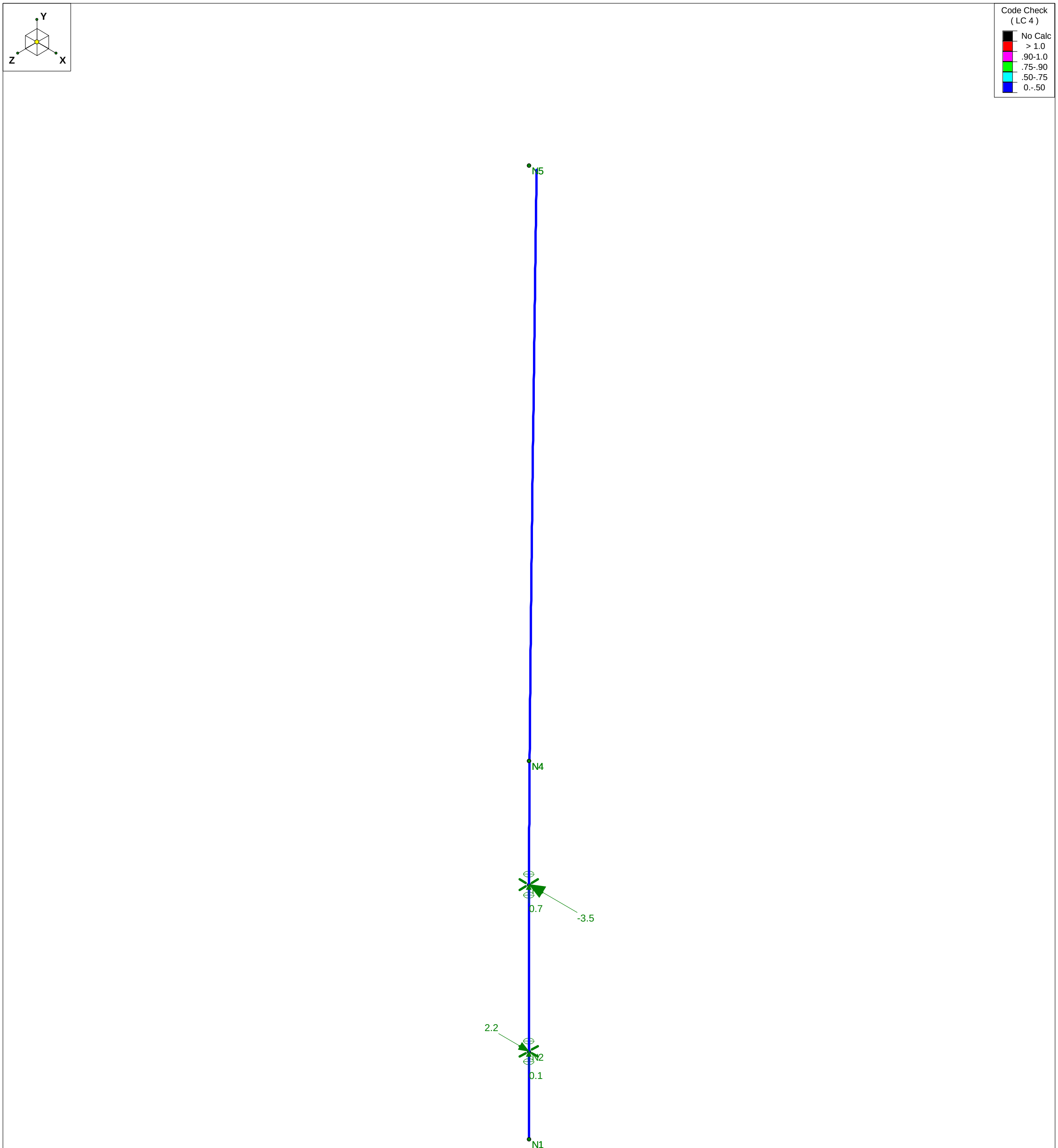
Member Code Checks Displayed
Results for LC 3, 1.2D +1.0Di + 1.0Wi
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:23 PM
17159.11/ Sprint CT33XC0...	LC #3 Reactions and Deflected Shape	TIA.r3d



Member Code Checks Displayed
Loads: LC 4, 1.0D + 1.0WService

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:21 PM
17159.11/ Sprint CT33XC0...	LC #4 Loads	TIA.r3d



Member Code Checks Displayed
Results for LC 4, 1.0D + 1.0WService
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:23 PM
17159.11/ Sprint CT33XC0...	LC #4 Reactions and Deflected Shape	TIA.r3d

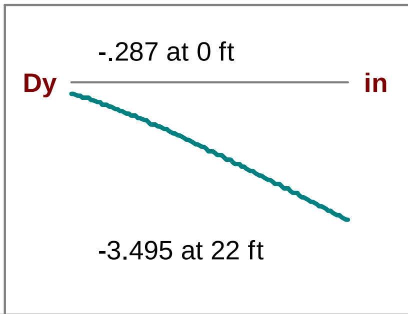
Column: ***M2***

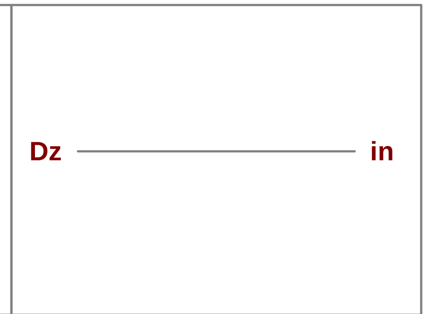
Shape:	**PIPE_12.0X**
Material:	**A53 Gr. B**
Length:	**22 ft**
I Joint:	**N4**
J Joint:	**N5**

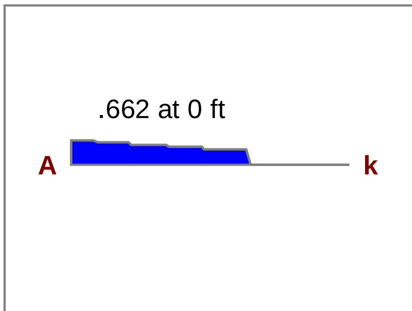
LC 1: 1.2D + 1.6W

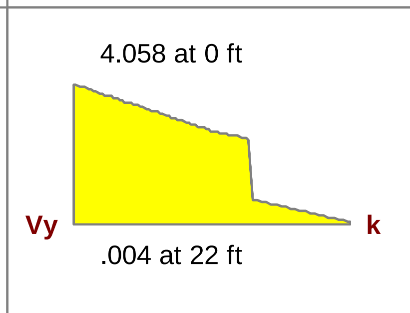
Code Check: **0.259 (bending)**

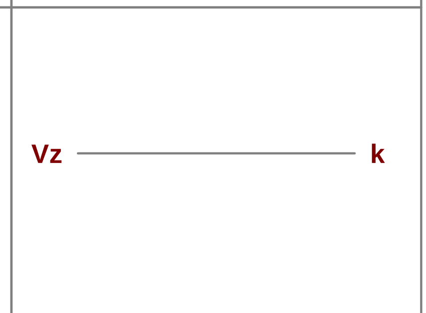
Report Based On 97 Sections

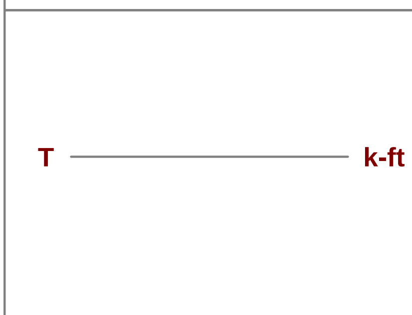


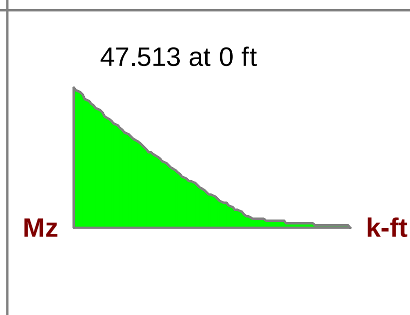


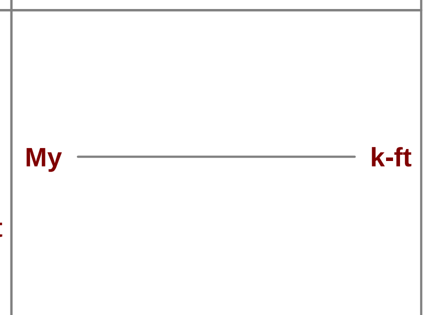


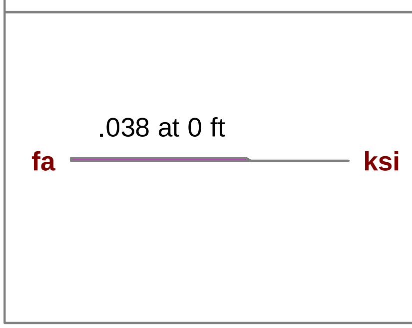


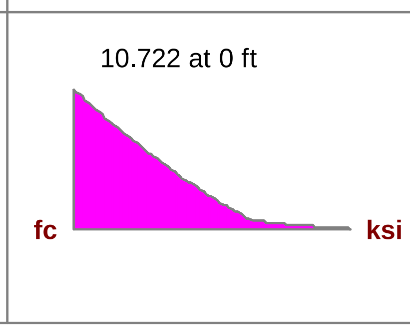


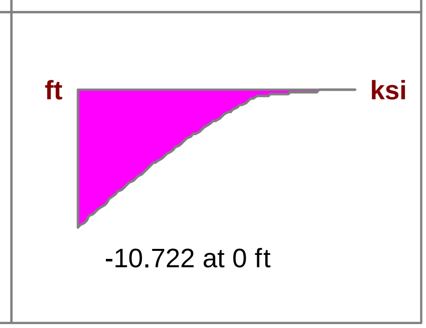












AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.259**	Max Shear Check	**0.025 (s)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/82**

Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**22 ft**	**22 ft**
phi*Pnc	**458.537 k**	KL/r	**59.982**	**59.982**
phi*Pnt	**551.25 k**			
phi*Mny	**184.275 k-ft**	L Comp Flange	**22 ft**	
phi*Mnz	**184.275 k-ft**	L-torque	**22 ft**	
phi*Vny	**165.375 k**	Tau_b	**1**	
phi*Vnz	**165.375 k**			
phi*Tn	**173.622 k-ft**			
Cb	**2.418**			

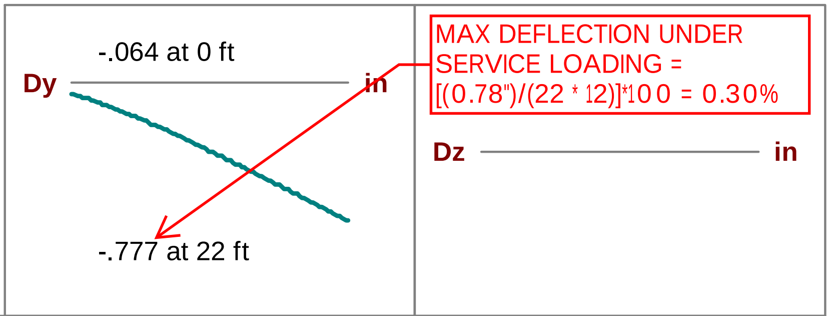
Column: ***M2***

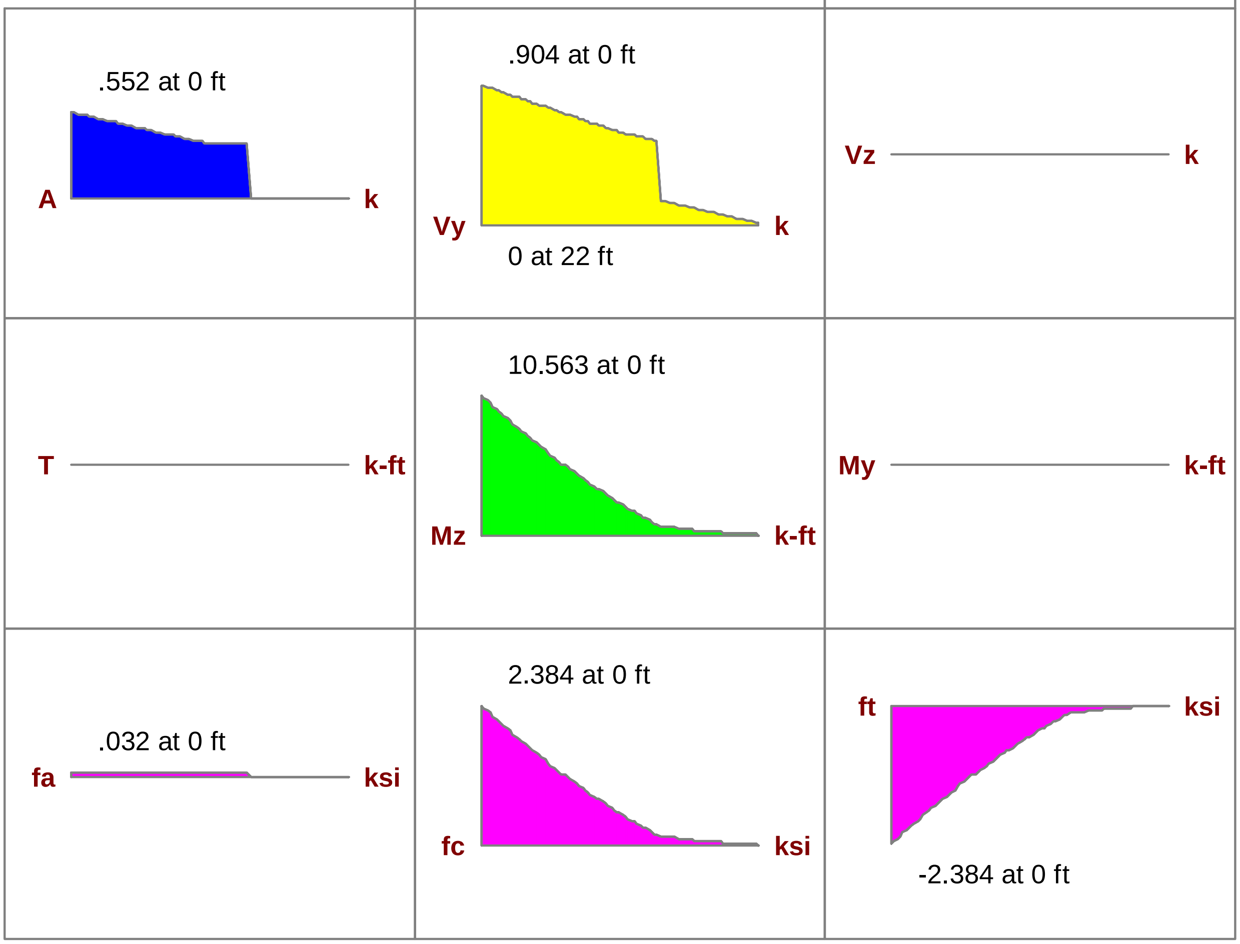
Shape:	**PIPE_12.0X**
Material:	**A53 Gr. B**
Length:	**22 ft**
I Joint:	**N4**
J Joint:	**N5**

LC 4: 1.0D + 1.0WService

Code Check: **0.058 (bending)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.058**	Max Shear Check	**0.005 (s)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/370**

Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**22 ft**	**22 ft**
phi*Pnc	**458.537 k**	KL/r	**59.982**	**59.982**
phi*Pnt	**551.25 k**			
phi*Mny	**184.275 k-ft**	L Comp Flange	**22 ft**	
phi*Mnz	**184.275 k-ft**	L-torque	**22 ft**	
phi*Vny	**165.375 k**	Tau_b	**1**	
phi*Vnz	**165.375 k**			
phi*Tn	**173.622 k-ft**			
Cb	**2.419**			

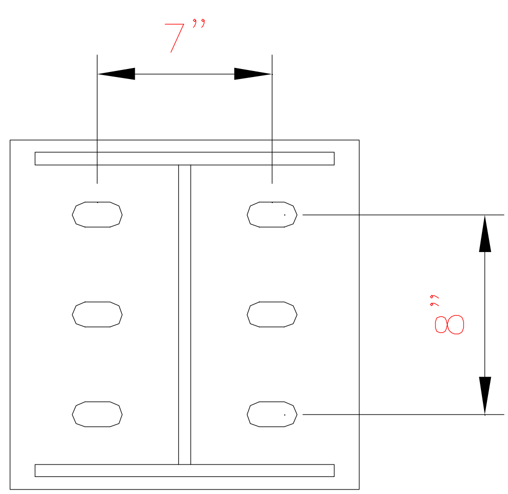
Mast Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 10 \cdot kips$	(User Input)
Horizontal =	$Horz := 16 \cdot kips$	(User Input)
Moment =	$Moment := 0$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 1.0in$	(User Input)
Nominal Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nominal Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 12 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 8 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 7 \cdot in$	(User Input)
Bolt Area =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.785 \cdot in^2$	



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 2.122 \cdot ksi$

$Condition1 := if\left(f_v < \phi \cdot F_{nv}, "OK", "Overstressed"\right)$ $\frac{f_v}{(\phi \cdot F_{nv})} = 5.2 \cdot \%$

Condition1 = "OK"

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 10.167 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 12.9 \cdot ksi$

$Condition2 := if\left(f_t < \phi \cdot F'_{nt}, "OK", "Overstressed"\right)$ $\frac{f_t}{(\phi \cdot F'_{nt})} = 19.2 \cdot \%$

Condition2 = "OK"

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 4.004 \cdot ksi$

$Condition3 := if\left(f_v < \phi \cdot F_{nv}, "OK", "Overstressed"\right)$ $\frac{f_v}{(\phi \cdot F_{nv})} = 9.9 \cdot \%$

Condition3 = "OK"

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 16.643 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 21.19 \cdot ksi$

$Condition4 := if\left(f_t < \phi \cdot F'_{nt}, "OK", "Overstressed"\right)$ $\frac{f_t}{(\phi \cdot F'_{nt})} = 31.4 \cdot \%$

Condition4 = "OK"

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 47.5 \cdot ft \cdot kips$	(Input From Risa3D)
Shear Force =	$Shear := 4.1 \cdot kips$	(Input From Risa3D)
Axial Force =	$Axial := 0.7 \cdot kips$	(Input From Risa3D)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 8$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 17 \cdot in$	(User Input)
Bolt Minimum Tensile Strength =	$F_{ub} := 120 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1.00 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A572 Grade 50

Plate Yield Strength =	$Fy_{bp} := 50 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.0 \cdot in$	(User Input)
Flange Plate Diameter =	$D_{bp} := 20 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 12.8 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 8.5 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \begin{array}{|l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array}$$

$d_1 = 6.01 \cdot in$ $d_7 = -6.01 \cdot in$

$d_2 = 8.50 \cdot in$ $d_8 = -0.00 \cdot in$

$d_3 = 6.01 \cdot in$ $d_9 = ∎ \cdot in$

$d_4 = 0.00 \cdot in$ $d_{10} = ∎ \cdot in$

$d_5 = -6.01 \cdot in$ $d_{11} = ∎ \cdot in$

$d_6 = -8.50 \cdot in$ $d_{12} = ∎ \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 6.4 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := \text{if}\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 2.10 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = ∎ \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = ∎ \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = ∎ \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = ∎ \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 12.3 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 289 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n{}^3}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 16.7 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 0.5 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := \left(0.75 \cdot F_{ub} \cdot 0.75 \cdot A_g\right) = 53 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 31.46 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{\Phi R_{nt}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := \left(0.75 \cdot 0.45 \cdot F_{ub} \cdot A_g\right) = 31.8 \cdot kips$

Condition2 = $Condition2 := if\left[\left(\frac{V_{Max}}{\Phi R_{nv}}\right)^2 + \left(\frac{T_{Max}}{\Phi R_{nt}}\right)^2 \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition2 = "OK"

Flange Plate Analysis:

Force from Bolts =

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

$C_1 = 11.9 \cdot kips$

$C_2 = 16.9 \cdot kips$

$C_3 = 11.9 \cdot kips$

$C_4 = 0.1 \cdot kips$

$C_5 = -11.8 \cdot kips$

$C_6 = -16.7 \cdot kips$

$C_7 = -11.8 \cdot kips$

$C_8 = 0.1 \cdot kips$

$C_9 = ■ \cdot kips$

$C_{10} = ■ \cdot kips$

$C_{11} = ■ \cdot kips$

$C_{12} = ■ \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\ 2}\right)} = 11.5 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} = 25.6 \cdot \%$$

Condition3 =

$$Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$$

Condition3 = "Ok"

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 100$	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 =	$TME := 173$	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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.42$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.289$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.772$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.825$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 30$ psf (NESC 2012 Section 250.C.2)

Shape Factors

Eversource Design Criteria

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 PCS Mast

Mast Data: (Pipe 12" Sch. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)
Mast Length =	$L_{mast} := 36$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.063$ sf/ft

Total Mast Wind Force (Above Tower) = $qz \cdot Cd_R \cdot A_{mast} \cdot m = 52$ plf **BLC 5**

Total Mast Wind Force (Above Tower) = $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 64$ (Coax on Mast) plf **BLC 5**

Total Mast Wind Force (Below Tower) = $qz \cdot Cd_{coax} \cdot A_{mast} = 51$ (Coax on Mast) plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.146$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 6$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 20.8$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$ plf **BLC 3**

Development of Wind & Ice Load on Antennas (Sprint)

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 = $N_{ant} := 3$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 138$ lbs **BLC 2**

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 = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 150$ lbs **BLC 3**

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 = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 126$ lbs **BLC 4**

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 = $A_{ant} := SA_{ant} \cdot N_{ant} = 17.9$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1072$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas (Sprint)

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 =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 21$ lbs **BLC 2**

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 = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 11$ lbs **BLC 3**

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 = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 7$ lbs **BLC 4**

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 = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.8$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 47$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas

(Sprint)

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 =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 24$ lbs **BLC 2**

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 = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 12$ lbs **BLC 3**

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 = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 6$ lbs **BLC 4**

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 = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.6$ sf

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 38$ lbs **BLC 5**

Development of Wind & Ice Load on Mounts

Mount Data: (Sprint)

Mount Type = Tri-Sector Chain Mount

Mount Weight = $WT_{mnt} := 160$ lbs (User Input)

Mount Weight w/ Ice = $WT_{ICEmnt} := 200$ lbs (User Input)

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{mnt} := 0$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{mnt} := 0$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{mnt} = 160$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEmnt} - WT_{mnt} = 40$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

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

Coax Cable Length = $L_{coax} := 25$ ft (User Input)

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

Total Number of Coax = $N_{coax} := 18$ (User Input)

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

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 30$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 24$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 0.7$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 5$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$ 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 = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 27$ plf **BLC 3**

Coax Cable on Pole

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Basic Windspeed = $V := 100$ mph (User Input NESC 2007 Figure 250-2(e))

Height to Top of Coax Above Grade = $TC := 173$ ft (User Input)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.306$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346\left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.289$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.772$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.825$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 27.6$ psf (NESC 2007 Section 250.C.2)

Distance Between Coax Cable Attach Points =

Coaxial Cable Span $Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.98 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 1.04 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 18$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 3$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Transverse Load = $OF_{HWT} := 2.5$ *(User Input)*

Overload Factor for NESC Heavy Wind Vertical Load = $OF_{HWV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Transverse Load = $OF_{EWT} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Wind Vertical Load = $OF_{EWV} := 1.0$ *(User Input)*

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 5.94 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 6.94 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}{}^2\right] = 0.027\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 27.269 \cdot plf$

Heavy Wind Vertical Load =

$Heavy\_WInd_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HWV}\right]}$

Heavy Wind Transverse Load =

$Heavy\_Wind_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HWT}\right)}$

$Heavy\_WInd_{Vert} = \begin{pmatrix} 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \end{pmatrix} lb$ $\quad Heavy\_Wind_{Trans} = \begin{pmatrix} 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \end{pmatrix} lb$

Extreme Wind Vertical Load =

$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$

Extreme Wind Transverse Load =

$Extreme\_Wind_{Trans} := \overrightarrow{\left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EWT}\right]}$

$Extreme\_Wind_{Vert} = \begin{pmatrix} 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \end{pmatrix} lb$ $\quad Extreme\_Wind_{Trans} = \begin{pmatrix} 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \end{pmatrix} ft^2$

(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	Mast	PIPE_12.0X	Column	Pipe	A53 Gr. B	Typical	17.5	339	339	678

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	Mast	14			Lbyy									Lateral
2	M2	Mast	22			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	N4			Mast	Column	Pipe	A53 Gr. B	Typical
2	M2	N4	N5			Mast	Column	Pipe	A53 Gr. B	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	0	3.25	0	0	
3	N3	0	9.417	0	0	
4	N4	0	14	0	0	
5	N5	0	36	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	N1						
2	N2	Reaction	Reaction	Reaction		Reaction	
3	N3	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.138	14
2	M2	Y	-.021	14
3	M2	Y	-.024	14
4	M2	Y	-.16	14

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.15	14
2	M2	Y	-.011	14
3	M2	Y	-.012	14
4	M2	Y	-.04	14

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.126	14

Member Point Loads (BLC 4 : NESC Heavy Wind) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	M2	X	.007	14
3	M2	X	.006	14

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	1.072	14
2	M2	X	.047	14
3	M2	X	.038	14

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	-.019	-.019	0	0
2	M2	Y	-.019	-.019	0	11

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	-.008	-.008	0	0
2	M2	Y	-.008	-.008	0	0
3	M1	Y	-.027	-.027	0	0
4	M2	Y	-.027	-.027	0	11

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	.006	.006	0	0
2	M2	X	.006	.006	0	0
3	M1	X	.005	.005	0	0
4	M2	X	.005	.005	0	11

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	.051	.051	0	0
2	M2	X	.064	.064	0	11
3	M2	X	.052	.052	11	0
4	M1	X	.024	.024	0	0
5	M2	X	.03	.03	0	11

Basic Load Cases

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

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	Y		1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind on ...	Yes	Y		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	N2	max	6.747	2	1.079	1	0	2	0	2	0	2	0	2
2		min	1.971	1	.497	2	0	1	0	1	0	1	0	1
3	N3	max	-3.171	1	5.128	1	0	2	0	2	0	2	0	2
4		min	-10.56	2	2.464	2	0	1	0	1	0	1	0	1
5	Totals:	max	-1.2	1	6.207	1	0	2						
6		min	-3.813	2	2.962	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	.024	2	0	2	0	2	0	2	0	2	6.143e-04	2
2		min	.007	1	0	1	0	1	0	1	0	1	1.834e-04	1
3	N2	max	0	2	0	2	0	2	0	2	0	2	6.081e-04	2
4		min	0	1	0	1	0	1	0	1	0	1	1.811e-04	1
5	N3	max	0	2	0	2	0	2	0	2	0	2	-4.215e-04	1
6		min	0	1	0	1	0	1	0	1	0	1	-1.418e-03	2
7	N4	max	.154	2	0	2	0	2	0	2	0	2	-1.18e-03	1
8		min	.046	1	0	1	0	1	0	1	0	1	-3.973e-03	2
9	N5	max	1.855	2	0	2	0	2	0	2	0	2	-2.123e-03	1
10		min	.551	1	-.001	1	0	1	0	1	0	1	-7.143e-03	2

Envelope AISC ASD Steel Code Checks

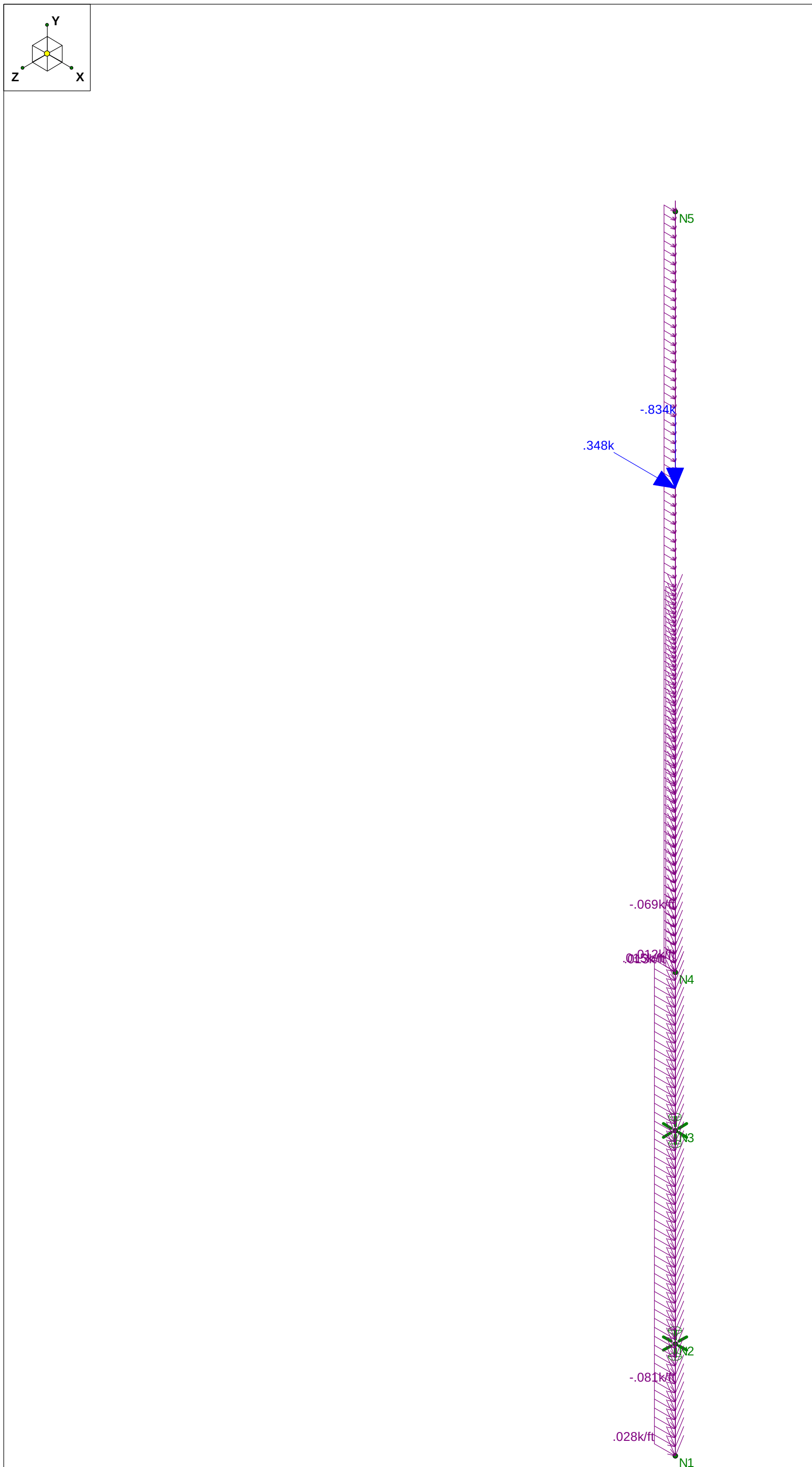
	Mem...	Shape	Code Check	Loc[ft]	LC	She...	Lo...	...	...	Fa [...	Ft [...	Fb y...	Fb z...	...	C...	C...	AS...
1	M1	PIPE_12....	.443	9.479	2	.061	9.3...		2	18.8...	21	23.1	23.1	1	.6	.85	H1-2
2	M2	PIPE_12....	.312	0	2	.023	0		2	17.0...	21	23.1	23.1	...	.6	.85	H1-2

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	1.971	1.079	0	0	0	0
2	1	N3	-3.171	5.128	0	0	0	0
3	1	Totals:	-1.2	6.207	0			
4	1	COG (ft):	X: 0	Y: 17.815	Z: 0			

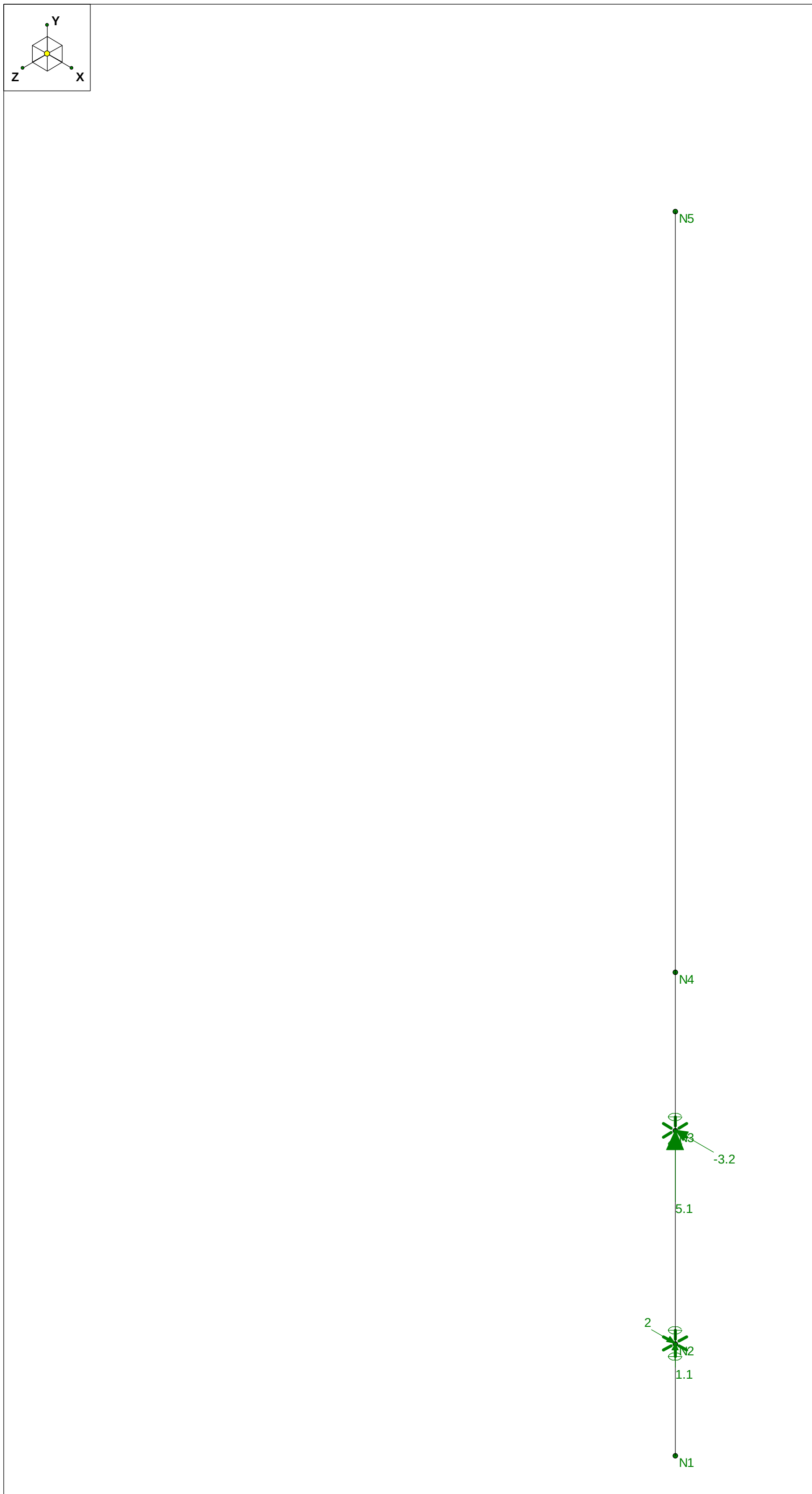
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	6.747	.497	0	0	0	0
2	2	N3	-10.56	2.464	0	0	0	0
3	2	Totals:	-3.813	2.962	0			
4	2	COG (ft):	X: 0	Y: 18.276	Z: 0			



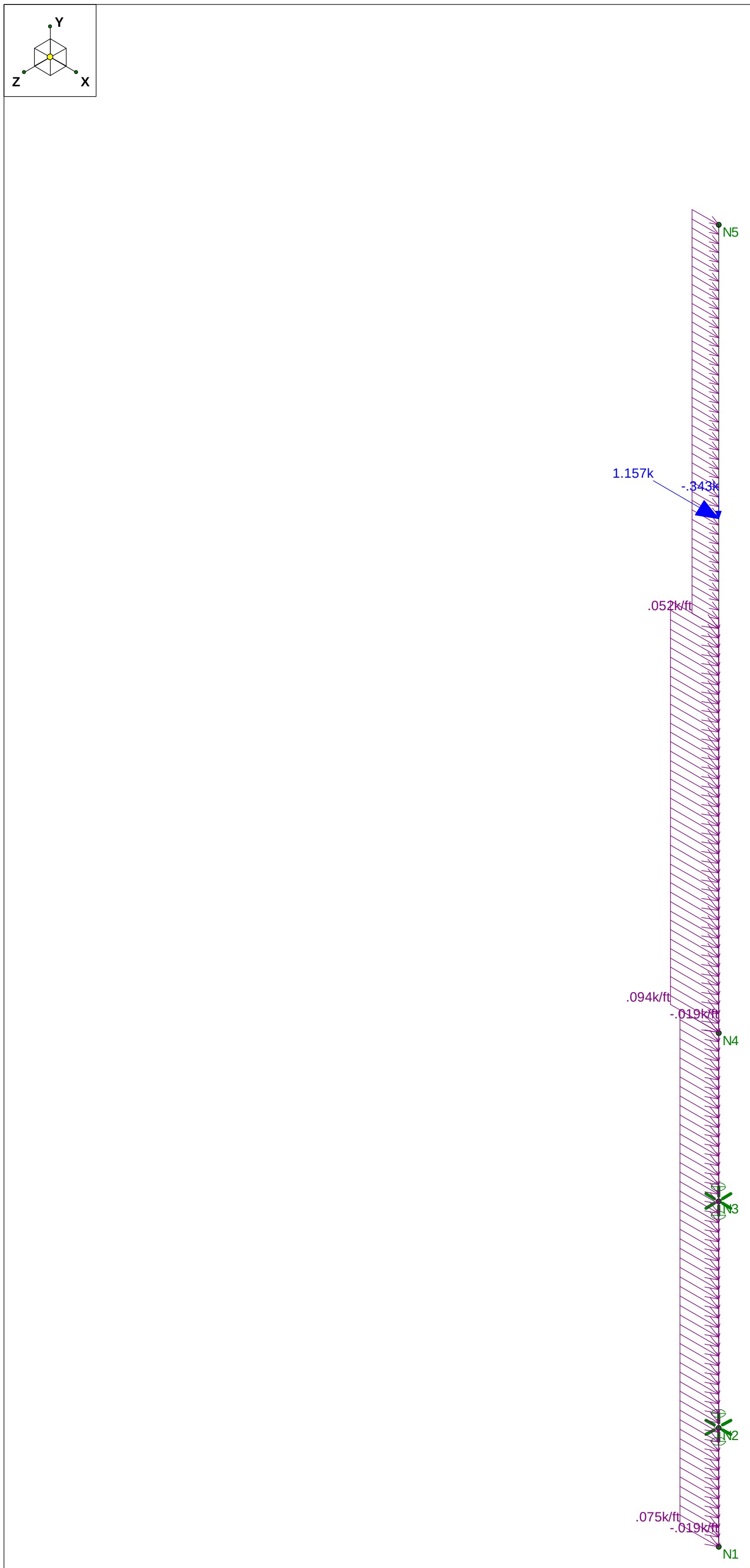
Loads: LC 1, NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:10 PM
17159.11 - CT33XC095	LC #1 Loads	NESC.r3d



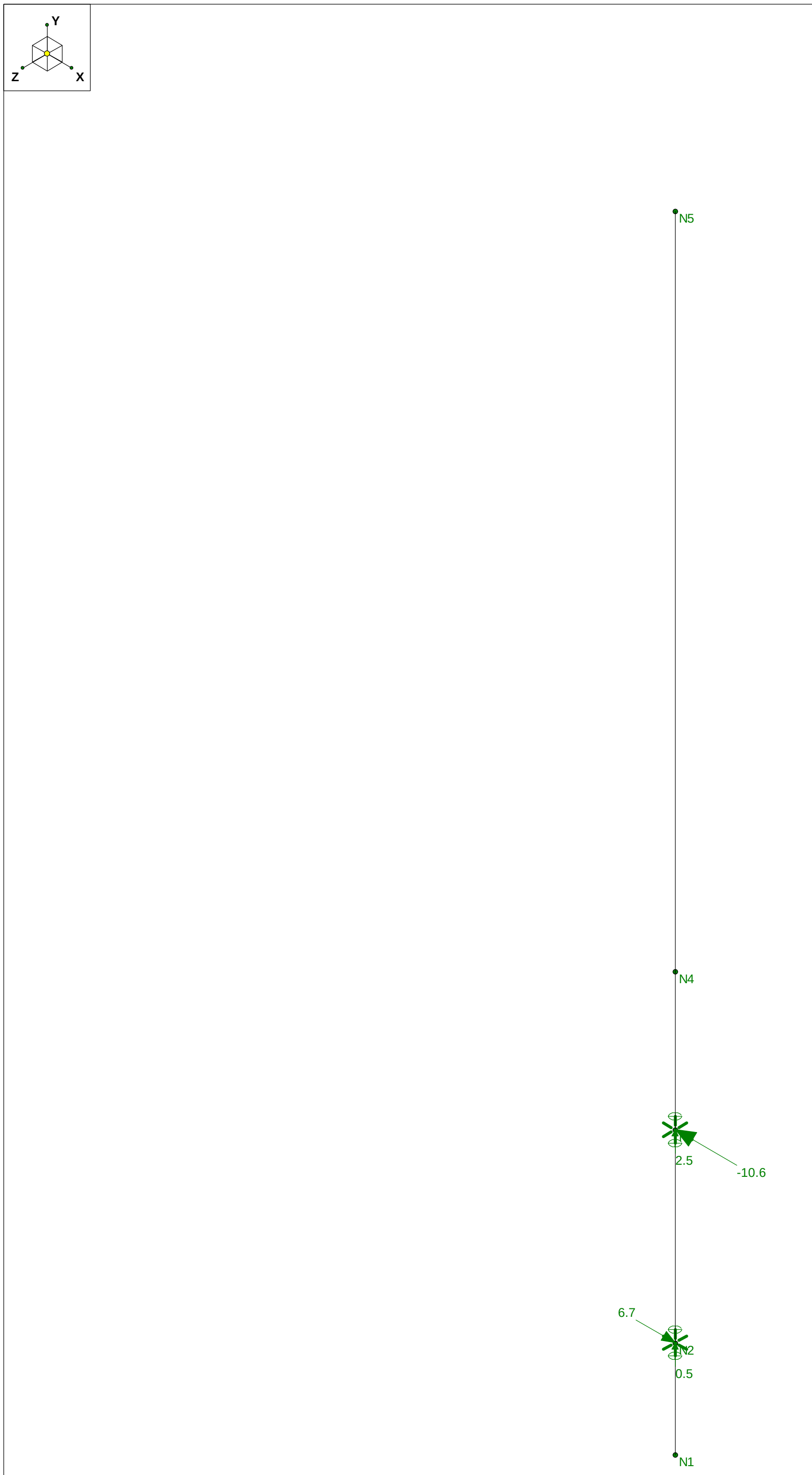
Results for LC 1, NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.	Structure # 10184 - Mast	
tjl, cfc		Feb 7, 2019 at 5:11 PM
17159.11 - CT33XC095	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

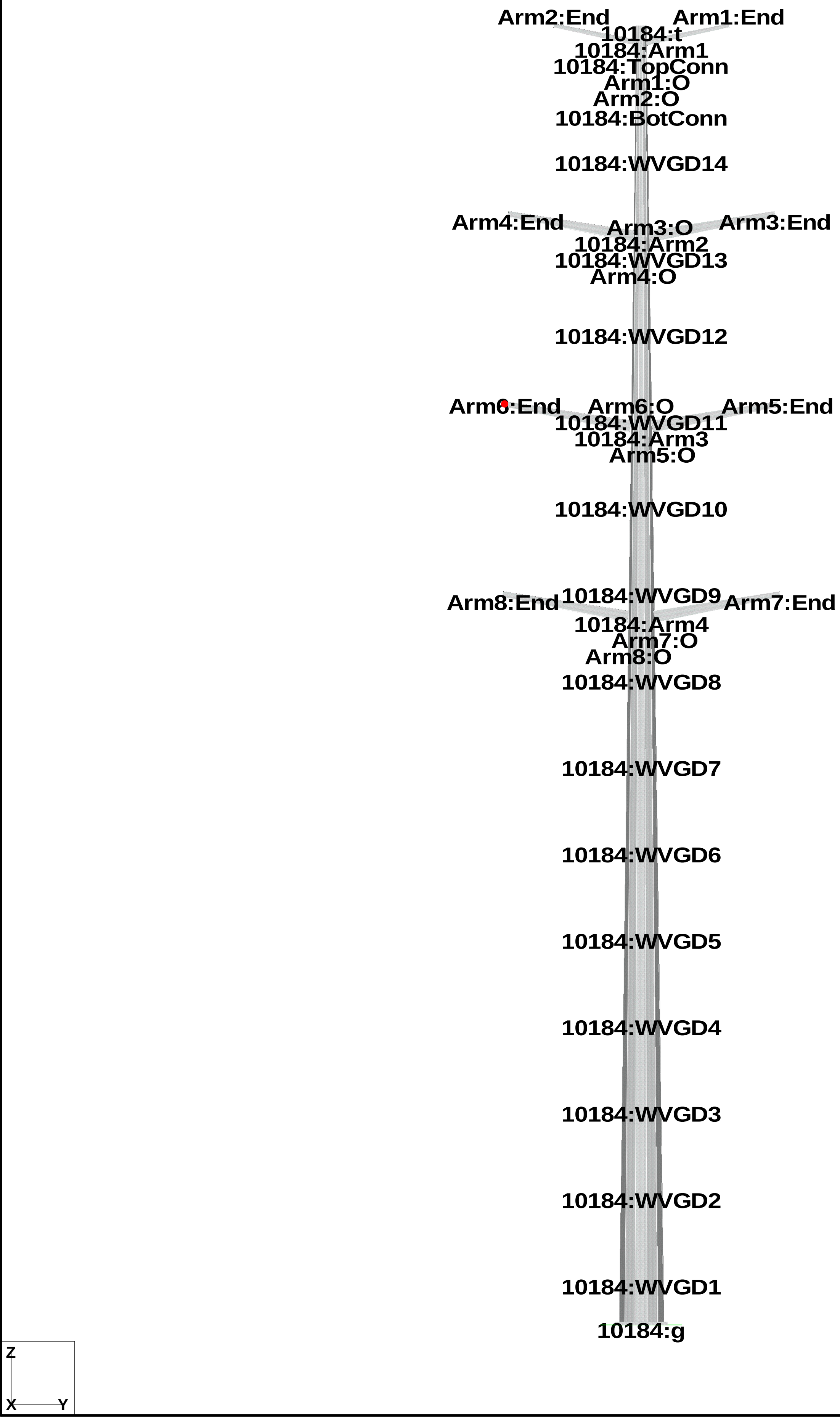
CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:10 PM
17159.11 - CT33XC095	LC #2 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10184 - Mast	Feb 7, 2019 at 5:12 PM
17159.11 - CT33XC095	LC #2 Reactions	NESC.r3d

Centek Engineering Inc, Project: "cl&p structure # 10184"
PLS-POLE Version 12.50, 10:40:15 AM Tuesday, November 06, 2018
Undeformed geometry displayed



Project Name : 17159.11 - New Milford, CT
Project Notes: Structure # 10184/ Sprint - CT33XC095
Project File : J:\Jobs\1715900.WI\11_CT33XC095 New Milford\04_Structural\Backup Documentation\Rev (4)\Calcs\PLS-Pole\cl&p structure # 10184.pol
Date run : 5:05:36 PM Thursday, February 07, 2019
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1715900.wi\11_ct33xc095 new milford\04_structural\backup documentation\rev (4)\calcs\pls-pole\cl&p #10184.lca

*** Analysis Results:

Maximum element usage is 82.52% for Steel Pole "10184" in load case "NESC Heavy"
Maximum insulator usage is 17.68% for Clamp "7" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	10184:g	-0.02	-57.71	-151.91	57.71	6419.23	287.37	6425.66	72.03	0.00
NESC Extreme	10184:g	2.61	-62.04	-82.49	62.09	6393.95	396.19	6406.21	31.37	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	10184:t	-8.70	97.15	-3.63	97.60	-0.63	-5.79	-0.03
NESC Extreme	10184:t	-7.30	95.63	-3.48	95.97	-0.44	-5.75	-0.04

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
10184	1	257	NESC Extreme	29.76	60.01
10184	2	4527	NESC Heavy	48.60	690.31
10184	3	7896	NESC Heavy	67.38	2196.86
10184	4	10996	NESC Heavy	78.98	4122.10
10184	5	13516	NESC Heavy	82.52	4409.83

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
10184	82.52	NESC Heavy	34	41645.5

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Arm1	35.11	NESC Heavy	1	156.1
Arm2	15.17	NESC Heavy	1	156.1
Arm3	31.81	NESC Heavy	1	873.6
Arm4	28.08	NESC Heavy	1	873.6
Arm5	34.31	NESC Heavy	1	873.6
Arm6	27.79	NESC Heavy	1	873.6
Arm7	43.01	NESC Heavy	1	873.6
Arm8	27.05	NESC Heavy	1	873.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	82.52	10184	Steel Pole
NESC Extreme	79.35	10184	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	82.52	10184	34
NESC Extreme	79.35	10184	34

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	10184	2	34.600	147.459	6419.233	287.259	45.721	197.741	6	178.261	2.619	76.20
NESC Extreme	10184	2	34.600	78.035	6393.954	396.145	45.294	195.894	6	175.781	2.607	75.49

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	43.01	Arm7	1
NESC Extreme	19.57	Arm7	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	3.26	NESC Heavy	0.0

2	Clamp	3.15	NESC Heavy	0.0
3	Clamp	16.29	NESC Heavy	0.0
4	Clamp	16.13	NESC Heavy	0.0
5	Clamp	16.22	NESC Heavy	0.0
6	Clamp	16.15	NESC Heavy	0.0
7	Clamp	17.68	NESC Heavy	0.0
8	Clamp	16.23	NESC Heavy	0.0
9	Clamp	13.55	NESC Extreme	0.0
10	Clamp	8.46	NESC Extreme	0.0
11	Clamp	0.87	NESC Heavy	0.0
12	Clamp	0.87	NESC Heavy	0.0
13	Clamp	0.87	NESC Heavy	0.0
14	Clamp	0.87	NESC Heavy	0.0
15	Clamp	0.87	NESC Heavy	0.0
16	Clamp	0.87	NESC Heavy	0.0
17	Clamp	0.87	NESC Heavy	0.0
18	Clamp	0.87	NESC Heavy	0.0
19	Clamp	0.87	NESC Heavy	0.0
20	Clamp	0.87	NESC Heavy	0.0
21	Clamp	0.87	NESC Heavy	0.0
22	Clamp	0.87	NESC Heavy	0.0
23	Clamp	0.87	NESC Heavy	0.0
24	Clamp	0.87	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	5553.7
Weight of Steel Poles:	41645.5
Total:	47199.2

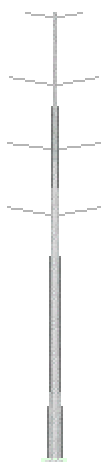
*** End of Report

```
**************************************************************************
*                                                                        *
*                                 PLS-POLE                               *
*                     POLE AND FRAME ANALYSIS AND DESIGN                 *
*                Copyright Power Line Systems, Inc. 1999-2011            *
*                                                                        *
**************************************************************************
```

Project Name : 17159.11 - New Milford, CT
Project Notes: Structure # 10184/ Sprint - CT33XC095
Project File : J:\Jobs\1715900.WI\11_CT33XC095 New Milford\04_Structural\Backup Documentation\Rev (4)\Calcs\PLS-Pole\cl&p structure # 10184.pol
Date run   : 5:05:36 PM Thursday, February 07, 2019
by   : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.



Modeling options:
  Offset Arms from Pole/Mast: Yes
  Offset Braces from Pole/Mast: Yes
  Offset Guys from Pole/Mast: Yes
  Offset Posts from Pole/Mast: Yes
  Offset Strains from Pole/Mast: Yes
  Use Alternate Convergence Process: No
  Steel poles checked with ASCE/SEI 48-05

Default Modulus of Elasticity for Steel = 29000.00 (ksi)
Default Weight Density for Steel = 490.00 (lbs/ft^3)

Steel Pole Properties:

Steel Pole Stock Length Default Base Shape Tip Base Taper Default Tubes Modulus of Weight Shape Strength Distance
Ultimate Ultimate
Property Number Embedded Plate Diameter Diameter Drag Elasticity Density At Check From

Label		(ft)	Length (ft)			(in)	(in)	(in/ft)	Coef.		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
10184	10184	150.00	0	Yes	12T	14	62.25	0	1.6	5 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

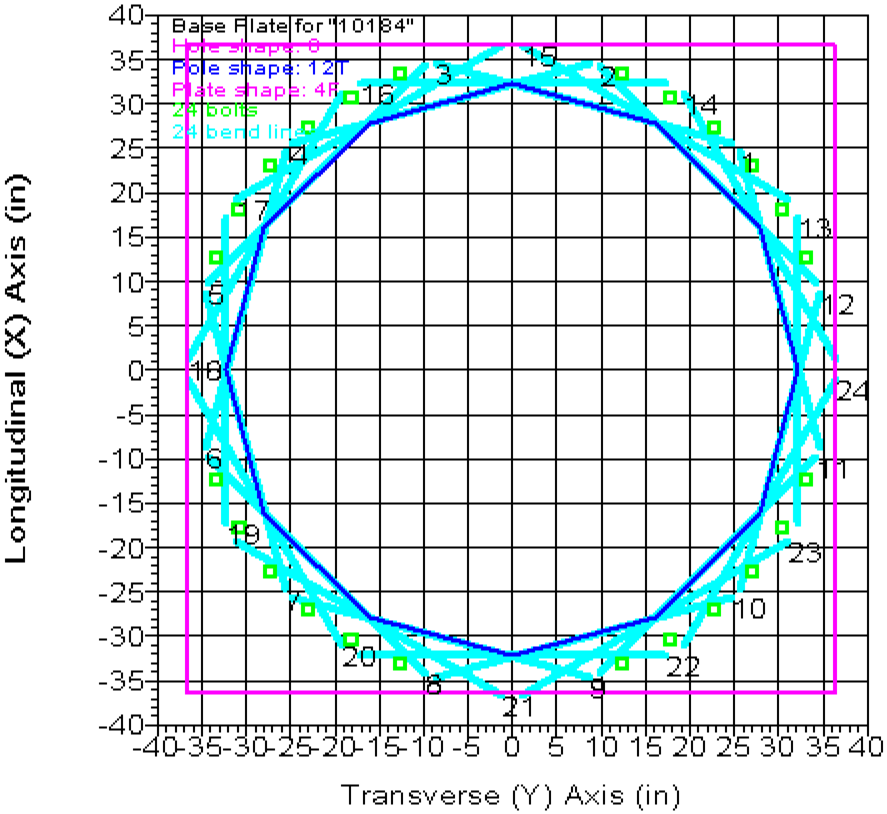
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
10184	1	8.25	0.1875	0.000	0.000	0.000	60.000	0.000	257	4.25	0.33917	14.00	16.80	2.053	0.000
10184	2	40	0.4375	3.833	0.000	0.000	60.000	0.000	4527	21.91	0.33917	17.30	30.86	3.749	3.833
10184	3	37.25	0.5625	5.167	0.000	0.000	60.000	0.000	7896	19.76	0.33917	28.69	41.32	5.025	5.167
10184	4	40	0.5625	6.500	0.000	0.000	60.000	0.000	10996	21.01	0.33917	38.45	52.01	6.361	6.500
10184	5	40	0.5625	0.000	0.000	0.000	60.000	0.000	13516	20.82	0.33917	48.68	62.25	0.000	0.000

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
10184	73.000	4F	3.000	4452	34.600	0.000	0	490.00	60.000	2.250	71.000	24	60162.19	60162.19

Base Plate Bolt Coordinates for Property "10184":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.3521	0.9366	0
0.507	0.8627	0
0.6444	0.7641	0
0.7641	0.6444	0
0.8627	0.507	0
0.9366	0.3521	0



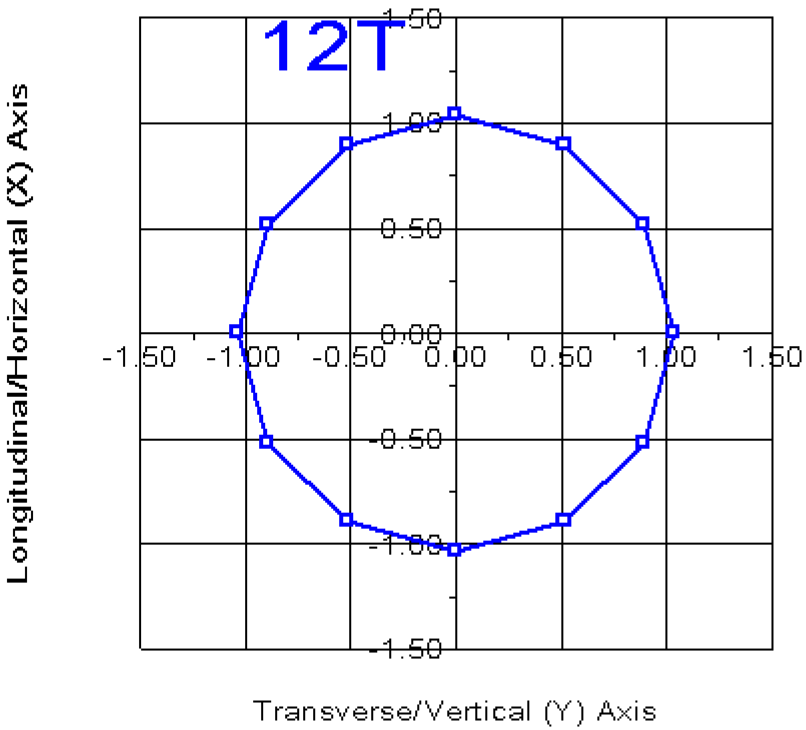
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
10184			0	0	0	0	0	10184	20 labels		0.00	0

Relative Attachment Labels for Steel Pole "10184":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
10184:Arm1	0.00	148.08
10184:Arm2	0.00	125.66
10184:Arm3	0.00	103.66
10184:Arm4	0.00	81.66
10184:WVGD1	0.00	5.00

10184:WVGD2	0.00	15.00
10184:WVGD3	0.00	25.00
10184:WVGD4	0.00	35.00
10184:WVGD5	0.00	45.00
10184:WVGD6	0.00	55.00
10184:WVGD7	0.00	65.00
10184:WVGD8	0.00	75.00
10184:WVGD9	0.00	85.00
10184:WVGD10	0.00	95.00
10184:WVGD11	0.00	105.00
10184:WVGD12	0.00	115.00
10184:WVGD13	0.00	125.00
10184:TopConn	3.58	0.00
10184:BotConn	9.75	0.00
10184:WVGD14	0.00	135.00



Pole Steel Properties:

Warning: Capacities and usages printed in splices are listed for the inner tube except at the splice top which uses the outer tube. ??

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)

10184	10184:t	10184:t	Ori	0.00	14.00	8.33	203.38	203.38	0.00	17.3	60.00	60.00	140.32	140.32
10184	10184:Arm1	10184:Arm1	End	1.92	14.65	8.72	233.46	233.46	0.00	18.3	60.00	60.00	153.93	153.93
10184	10184:Arm1	10184:Arm1	Ori	1.92	14.65	8.72	233.46	233.46	0.00	18.3	60.00	60.00	153.93	153.93
10184	10184:TopConn	10184:TopConn	End	3.58	15.22	9.06	261.91	261.91	0.00	19.1	60.00	60.00	166.27	166.27
10184	10184:TopConn	10184:TopConn	Ori	3.58	15.22	9.06	261.91	261.91	0.00	19.1	60.00	60.00	166.27	166.27
10184	#10184:0	SpliceT	End	8.25	16.80	10.01	353.69	353.69	0.00	21.3	60.00	60.00	203.38	203.38
10184	#10184:0	SpliceT	Ori	8.25	17.30	23.72	863.50	863.50	0.00	7.9	60.00	60.00	482.18	482.18
10184	10184:BotConn	10184:BotConn	End	9.75	17.81	24.43	944.02	944.02	0.00	8.2	60.00	60.00	512.08	512.08
10184	10184:BotConn	10184:BotConn	Ori	9.75	17.81	24.43	944.02	944.02	0.00	8.2	60.00	60.00	512.08	512.08
10184	#10184:1	Tube 2	End	12.38	18.70	25.69	1096.70	1096.70	0.00	8.8	60.00	60.00	566.57	566.57
10184	#10184:1	Tube 2	Ori	12.38	18.70	25.69	1096.70	1096.70	0.00	8.8	60.00	60.00	566.57	566.57
10184	10184:WVGD14	10184:WVGD14	End	15.00	19.59	26.94	1265.02	1265.02	0.00	9.3	60.00	60.00	623.82	623.82
10184	10184:WVGD14	10184:WVGD14	Ori	15.00	19.59	26.94	1265.02	1265.02	0.00	9.3	60.00	60.00	623.82	623.82
10184	#10184:2	Tube 2	End	19.67	21.17	29.17	1605.63	1605.63	0.00	10.3	60.00	60.00	732.53	732.53
10184	#10184:2	Tube 2	Ori	19.67	21.17	29.17	1605.63	1605.63	0.00	10.3	60.00	60.00	732.53	732.53
10184	10184:Arm2	10184:Arm2	End	24.34	22.76	31.40	2002.49	2002.49	0.00	11.3	60.00	60.00	849.97	849.97
10184	10184:Arm2	10184:Arm2	Ori	24.34	22.76	31.40	2002.49	2002.49	0.00	11.3	60.00	60.00	849.97	849.97
10184	10184:WVGD13	10184:WVGD13	End	25.00	22.98	31.71	2062.98	2062.98	0.00	11.4	60.00	60.00	867.17	867.17
10184	10184:WVGD13	10184:WVGD13	Ori	25.00	22.98	31.71	2062.99	2062.99	0.00	11.4	60.00	60.00	867.17	867.17
10184	#10184:3	Tube 2	End	30.00	24.67	34.10	2564.38	2564.38	0.00	12.4	60.00	60.00	1003.85	1003.85
10184	#10184:3	Tube 2	Ori	30.00	24.68	34.10	2564.38	2564.38	0.00	12.4	60.00	60.00	1003.85	1003.85
10184	10184:WVGD12	10184:WVGD12	End	35.00	26.37	36.48	3141.08	3141.08	0.00	13.5	60.00	60.00	1150.53	1150.53
10184	10184:WVGD12	10184:WVGD12	Ori	35.00	26.37	36.48	3141.08	3141.08	0.00	13.5	60.00	60.00	1150.53	1150.53
10184	#10184:4	Tube 2	End	39.71	27.97	38.73	3757.72	3757.72	0.00	14.4	60.00	60.00	1297.80	1297.80
10184	#10184:4	Tube 2	Ori	39.71	27.97	38.73	3757.72	3757.72	0.00	14.4	60.00	60.00	1297.80	1297.80
10184	#10184:5	SpliceT	End	44.42	29.56	40.97	4450.21	4450.21	0.00	15.4	60.00	60.00	1453.94	1453.94
10184	#10184:5	SpliceT	Ori	44.42	29.56	40.97	4450.21	4450.21	0.00	15.4	60.00	60.00	1453.94	1453.94
10184	10184:WVGD11	10184:WVGD11	End	45.00	28.89	51.23	5262.58	5262.58	0.00	11.1	60.00	60.00	1759.67	1759.67
10184	10184:WVGD11	10184:WVGD11	Ori	45.00	28.89	51.23	5262.58	5262.58	0.00	11.1	60.00	60.00	1759.67	1759.67
10184	10184:Arm3	10184:Arm3	End	46.34	29.34	52.05	5520.66	5520.66	0.00	11.3	60.00	60.00	1817.29	1817.29
10184	10184:Arm3	10184:Arm3	Ori	46.34	29.34	52.05	5520.66	5520.66	0.00	11.3	60.00	60.00	1817.29	1817.29
10184	#10184:6	SpliceB	End	48.25	29.99	53.22	5901.05	5901.05	0.00	11.6	60.00	60.00	1900.63	1900.63
10184	#10184:6	SpliceB	Ori	48.25	29.99	53.22	5901.05	5901.05	0.00	11.6	60.00	60.00	1900.63	1900.63
10184	#10184:7	Tube 3	End	51.63	31.13	55.29	6616.66	6616.66	0.00	12.2	60.00	60.00	2052.76	2052.76
10184	#10184:7	Tube 3	Ori	51.63	31.13	55.29	6616.66	6616.66	0.00	12.2	60.00	60.00	2052.76	2052.76
10184	10184:WVGD10	10184:WVGD10	End	55.00	32.28	57.36	7387.92	7387.92	0.00	12.7	60.00	60.00	2210.76	2210.76
10184	10184:WVGD10	10184:WVGD10	Ori	55.00	32.28	57.36	7387.92	7387.92	0.00	12.7	60.00	60.00	2210.76	2210.76
10184	#10184:8	Tube 3	End	60.00	33.97	60.43	8637.23	8637.23	0.00	13.5	60.00	60.00	2455.60	2455.60
10184	#10184:8	Tube 3	Ori	60.00	33.98	60.43	8637.24	8637.24	0.00	13.5	60.00	60.00	2455.60	2455.60
10184	10184:WVGD9	10184:WVGD9	End	65.00	35.67	63.50	10020.02	10020.02	0.00	14.3	60.00	60.00	2713.29	2713.29
10184	10184:WVGD9	10184:WVGD9	Ori	65.00	35.67	63.50	10020.02	10020.02	0.00	14.3	60.00	60.00	2713.29	2713.29
10184	10184:Arm4	10184:Arm4	End	68.34	36.80	65.55	11022.58	11022.58	0.00	14.9	60.00	60.00	2892.80	2892.80
10184	10184:Arm4	10184:Arm4	Ori	68.34	36.80	65.55	11022.59	11022.59	0.00	14.9	60.00	60.00	2892.80	2892.80
10184	#10184:9	Tube 3	End	71.67	37.93	67.59	12084.75	12084.75	0.00	15.4	60.00	60.00	3077.19	3077.19
10184	#10184:9	Tube 3	Ori	71.67	37.93	67.59	12084.76	12084.76	0.00	15.4	60.00	60.00	3077.19	3077.19
10184	10184:WVGD8	10184:WVGD8	End	75.00	39.06	69.63	13213.06	13213.06	0.00	15.9	60.00	60.00	3267.27	3267.27
10184	10184:WVGD8	10184:WVGD8	Ori	75.00	39.06	69.63	13213.06	13213.06	0.00	15.9	60.00	60.00	3267.27	3267.27
10184	#10184:10	SpliceT	End	76.50	39.57	70.55	13743.75	13743.75	0.00	16.2	60.00	60.00	3354.80	3354.80
10184	#10184:10	SpliceT	Ori	76.50	39.57	70.55	13743.75	13743.75	0.00	16.2	60.00	60.00	3354.80	3354.80
10184	#10184:11	Tube 3	End	79.08	39.32	70.10	13482.52	13482.52	0.00	16.1	60.00	60.00	3311.86	3311.86
10184	#10184:11	Tube 3	Ori	79.08	39.32	70.10	13482.52	13482.52	0.00	16.1	60.00	60.00	3311.86	3311.86
10184	#10184:12	SpliceB	End	81.67	40.20	71.69	14417.62	14417.62	0.00	16.5	60.00	60.00	3464.36	3464.36
10184	#10184:12	SpliceB	Ori	81.67	40.20	71.69	14417.62	14417.62	0.00	16.5	60.00	60.00	3464.36	3464.36
10184	10184:WVGD7	10184:WVGD7	End	85.00	41.33	73.73	15686.57	15686.57	0.00	17.0	60.00	60.00	3666.17	3666.17
10184	10184:WVGD7	10184:WVGD7	Ori	85.00	41.33	73.73	15686.57	15686.57	0.00	17.0	60.00	60.00	3666.17	3666.17
10184	#10184:13	Tube 4	End	90.00	43.02	76.80	17726.51	17726.51	0.00	17.8	60.00	60.00	3979.64	3979.64
10184	#10184:13	Tube 4	Ori	90.00	43.03	76.80	17726.52	17726.52	0.00	17.8	60.00	60.00	3979.64	3979.64
10184	10184:WVGD6	10184:WVGD6	End	95.00	44.72	79.87	19936.07	19936.07	0.00	18.6	60.00	60.00	4305.97	4305.97
10184	10184:WVGD6	10184:WVGD6	Ori	95.00	44.72	79.87	19936.07	19936.07	0.00	18.6	60.00	60.00	4305.97	4305.97

10184	#10184:14	Tube 4	End	100.00	46.42	82.93	22322.01	22322.01	0.00	19.4	60.00	60.00	4645.16	4645.16
10184	#10184:14	Tube 4	Ori	100.00	46.42	82.93	22322.01	22322.01	0.00	19.4	60.00	60.00	4645.16	4645.16
10184	10184:WVGD5	10184:WVGD5	End	105.00	48.11	86.00	24891.11	24891.11	0.00	20.2	60.00	60.00	4997.21	4997.21
10184	10184:WVGD5	10184:WVGD5	Ori	105.00	48.11	86.00	24891.12	24891.12	0.00	20.2	60.00	60.00	4997.21	4997.21
10184	#10184:15	SpliceT	End	110.00	49.81	89.07	27650.15	27650.15	0.00	21.0	60.00	60.00	5362.13	5362.13
10184	#10184:15	SpliceT	Ori	110.00	49.81	89.07	27650.16	27650.16	0.00	21.0	60.00	60.00	5362.13	5362.13
10184	10184:WVGD4	10184:WVGD4	End	115.00	50.38	90.10	28622.78	28622.78	0.00	21.3	60.00	60.00	5487.85	5487.85
10184	10184:WVGD4	10184:WVGD4	Ori	115.00	50.38	90.10	28622.79	28622.79	0.00	21.3	60.00	60.00	5487.85	5487.85
10184	#10184:16	SpliceB	End	116.50	50.89	91.02	29508.63	29508.63	0.00	21.6	60.00	60.00	5601.13	5601.13
10184	#10184:16	SpliceB	Ori	116.50	50.89	91.02	29508.63	29508.63	0.00	21.6	60.00	60.00	5601.13	5601.13
10184	#10184:17	Tube 5	End	120.75	52.33	93.63	32117.37	32117.37	0.00	22.2	60.00	60.00	5928.38	5928.38
10184	#10184:17	Tube 5	Ori	120.75	52.33	93.63	32117.38	32117.38	0.00	22.2	60.00	60.00	5928.38	5928.38
10184	10184:WVGD3	10184:WVGD3	End	125.00	53.77	96.24	34875.51	34875.51	0.00	22.9	60.00	60.00	6264.92	6264.92
10184	10184:WVGD3	10184:WVGD3	Ori	125.00	53.77	96.24	34875.52	34875.52	0.00	22.9	60.00	60.00	6264.92	6264.92
10184	#10184:18	Tube 5	End	130.00	55.47	99.30	38317.30	38317.30	0.00	23.7	60.00	60.00	6672.74	6672.74
10184	#10184:18	Tube 5	Ori	130.00	55.47	99.30	38317.30	38317.30	0.00	23.7	60.00	60.00	6672.74	6672.74
10184	10184:WVGD2	10184:WVGD2	End	135.00	57.16	102.37	41978.39	41978.39	0.00	24.6	60.00	60.00	7093.43	7093.43
10184	10184:WVGD2	10184:WVGD2	Ori	135.00	57.16	102.37	41978.39	41978.39	0.00	24.6	60.00	60.00	7093.43	7093.43
10184	#10184:19	Tube 5	End	140.00	58.86	105.44	45865.56	45865.56	0.00	25.4	60.00	60.00	7526.97	7526.97
10184	#10184:19	Tube 5	Ori	140.00	58.86	105.44	45865.57	45865.57	0.00	25.4	60.00	60.00	7526.97	7526.97
10184	10184:WVGD1	10184:WVGD1	End	145.00	60.55	108.50	49985.60	49985.60	0.00	26.2	60.00	60.00	7973.38	7973.38
10184	10184:WVGD1	10184:WVGD1	Ori	145.00	60.55	108.50	49985.60	49985.60	0.00	26.2	60.00	60.00	7973.38	7973.38
10184	10184:g	10184:g	End	150.00	62.25	111.57	54345.27	54345.27	0.00	27.0	60.00	60.00	8432.65	8432.65

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density Override (lbs/ft^3)	Steel Shape At End
ARM D		4F	0.1875	8	5	0	1.6	29000	1 point	Calculated	0	0	0	0	60	0	
ARM E		4F	0.375	16	8	0	1.6	29000	1 point	Calculated	0	0	0	0	60	0	

Intermediate Joints for Davit Property "ARM D":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	9.5	-1.917

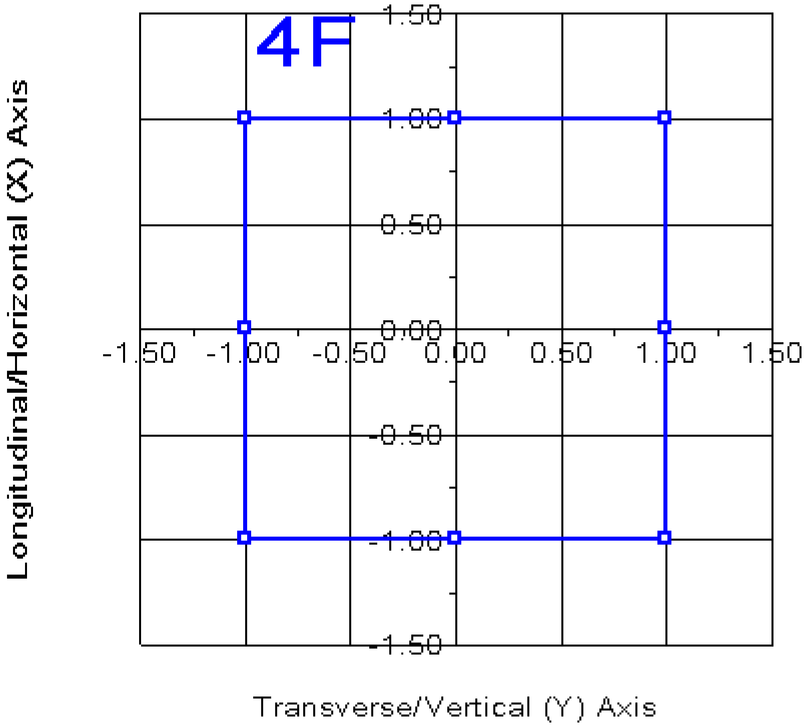
Intermediate Joints for Davit Property "ARM E":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	14.5	-2.55

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property	Azimuth

		Set	(deg)
Arm1	10184:Arm1	ARM D	0
Arm2	10184:Arm1	ARM D	180
Arm3	10184:Arm2	ARM E	0
Arm4	10184:Arm2	ARM E	180
Arm5	10184:Arm3	ARM E	0
Arm6	10184:Arm3	ARM E	180
Arm7	10184:Arm4	ARM E	0
Arm8	10184:Arm4	ARM E	180



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Arm1	Arm1:O	Origin	0.00	8.00	5.86	59.64	59.64	0.00	32.7	60.00	60.00	74.55	74.55
Arm1	#Arm1:0	End	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Arm1	#Arm1:0	Origin	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Arm1	Arm1:End	End	9.69	5.00	3.61	13.95	13.95	0.00	16.7	60.00	60.00	27.91	27.91
Arm2	Arm2:O	Origin	0.00	8.00	5.86	59.64	59.64	0.00	32.7	60.00	60.00	74.55	74.55
Arm2	#Arm2:0	End	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42

Arm2	#Arm2:0	Origin	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Arm2	Arm2:End	End	9.69	5.00	3.61	13.95	13.95	0.00	16.7	60.00	60.00	27.91	27.91
Arm3	Arm3:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Arm3	#Arm3:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm3	#Arm3:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm3	#Arm3:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm3	#Arm3:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm3	Arm3:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Arm4	Arm4:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Arm4	#Arm4:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm4	#Arm4:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm4	#Arm4:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm4	#Arm4:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm4	Arm4:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Arm5	Arm5:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Arm5	#Arm5:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm5	#Arm5:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm5	#Arm5:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm5	#Arm5:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm5	Arm5:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Arm6	Arm6:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Arm6	#Arm6:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm6	#Arm6:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm6	#Arm6:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm6	#Arm6:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm6	Arm6:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Arm7	Arm7:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Arm7	#Arm7:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm7	#Arm7:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm7	#Arm7:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm7	#Arm7:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm7	Arm7:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Arm8	Arm8:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Arm8	#Arm8:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm8	#Arm8:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Arm8	#Arm8:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm8	#Arm8:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Arm8	Arm8:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
clamp1	clamp1	8e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip	Property Set	Min. Required Vertical Load

	Attach		(uplift) (lbs)
1	Arm1:End	clamp1	No Limit
2	Arm2:End	clamp1	No Limit
3	Arm3:End	clamp1	No Limit
4	Arm4:End	clamp1	No Limit
5	Arm5:End	clamp1	No Limit
6	Arm6:End	clamp1	No Limit
7	Arm7:End	clamp1	No Limit
8	Arm8:End	clamp1	No Limit
9	10184:TopConn	clamp1	No Limit
10	10184:BotConn	clamp1	No Limit
11	10184:WVGD1	clamp1	No Limit
12	10184:WVGD2	clamp1	No Limit
13	10184:WVGD3	clamp1	No Limit
14	10184:WVGD4	clamp1	No Limit
15	10184:WVGD5	clamp1	No Limit
16	10184:WVGD6	clamp1	No Limit
17	10184:WVGD7	clamp1	No Limit
18	10184:WVGD8	clamp1	No Limit
19	10184:WVGD9	clamp1	No Limit
20	10184:WVGD10	clamp1	No Limit
21	10184:WVGD11	clamp1	No Limit
22	10184:WVGD12	clamp1	No Limit
23	10184:WVGD13	clamp1	No Limit
24	10184:WVGD14	clamp1	No Limit

*** Loads Data

Loads from file: j:\jobs\1715900.wi\11_ct33xc095 new milford\04_structural\backup documentation\rev (4)\calcs\pls-pole\cl&p #10184.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):
  Z of ground for wind height adjust   0.00 (ft) and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.
  Ground elevation shift   0.00 (ft)
  Z of ground with shift   0.00 (ft)
  Z of structure top (highest joint)   150.00 (ft)
  Structure height   150.00 (ft)
  Structure height above ground   150.00 (ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	24 loads	Wind on All	4	0	0.000	56.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	24 loads	NESC 2012	25.6	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Arm1:End	1626	1896	-753	Shield Wire
Arm2:End	1626	1927	0	Shield Wire
Arm3:End	10734	7350	-708	Conductor
Arm4:End	10631	7054	-1946	Conductor
Arm5:End	10640	7212	-1784	Conductor
Arm6:End	10639	7128	-1713	Conductor
Arm7:End	10655	7653	5287	Conductor
Arm8:End	10634	7310	1430	Conductor
10184:TopConn	5128	3171	0	Mast Connection
10184:BotConn	1079	-1971	0	Mast Connection
10184:WVGD14	690	93	0	Coax Cable
10184:WVGD13	690	93	0	Coax Cable
10184:WVGD12	690	93	0	Coax Cable
10184:WVGD11	690	93	0	Coax Cable
10184:WVGD10	690	93	0	Coax Cable
10184:WVGD9	690	93	0	Coax Cable

10184:WVGD8	690	93	0	Coax Cable
10184:WVGD7	690	93	0	Coax Cable
10184:WVGD6	690	93	0	Coax Cable
10184:WVGD5	690	93	0	Coax Cable
10184:WVGD4	690	93	0	Coax Cable
10184:WVGD3	690	93	0	Coax Cable
10184:WVGD2	690	93	0	Coax Cable
10184:WVGD1	690	93	0	Coax Cable

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Arm1:End	-523	1045	-211	Shield Wire
Arm2:End	512	1202	0	Shield Wire
Arm3:End	4964	6902	-795	Conductor
Arm4:End	4906	6753	-1294	Conductor
Arm5:End	4871	6640	-1193	Conductor
Arm6:End	4874	6589	-1169	Conductor
Arm7:End	4838	6588	1835	Conductor
Arm8:End	4831	6427	213	Conductor
10184:TopConn	2464	10560	0	Mast Connection
10184:BotConn	497	-6747	0	Mast Connection
10184:WVGD14	187	218	0	Coax Cable
10184:WVGD13	187	218	0	Coax Cable
10184:WVGD12	187	218	0	Coax Cable
10184:WVGD11	187	218	0	Coax Cable
10184:WVGD10	187	218	0	Coax Cable
10184:WVGD9	187	218	0	Coax Cable
10184:WVGD8	187	218	0	Coax Cable
10184:WVGD7	187	218	0	Coax Cable
10184:WVGD6	187	218	0	Coax Cable
10184:WVGD5	187	218	0	Coax Cable
10184:WVGD4	187	218	0	Coax Cable
10184:WVGD3	187	218	0	Coax Cable
10184:WVGD2	187	218	0	Coax Cable
10184:WVGD1	187	218	0	Coax Cable

Detailed Pole Loading Data for Load Case "NESC Extreme":

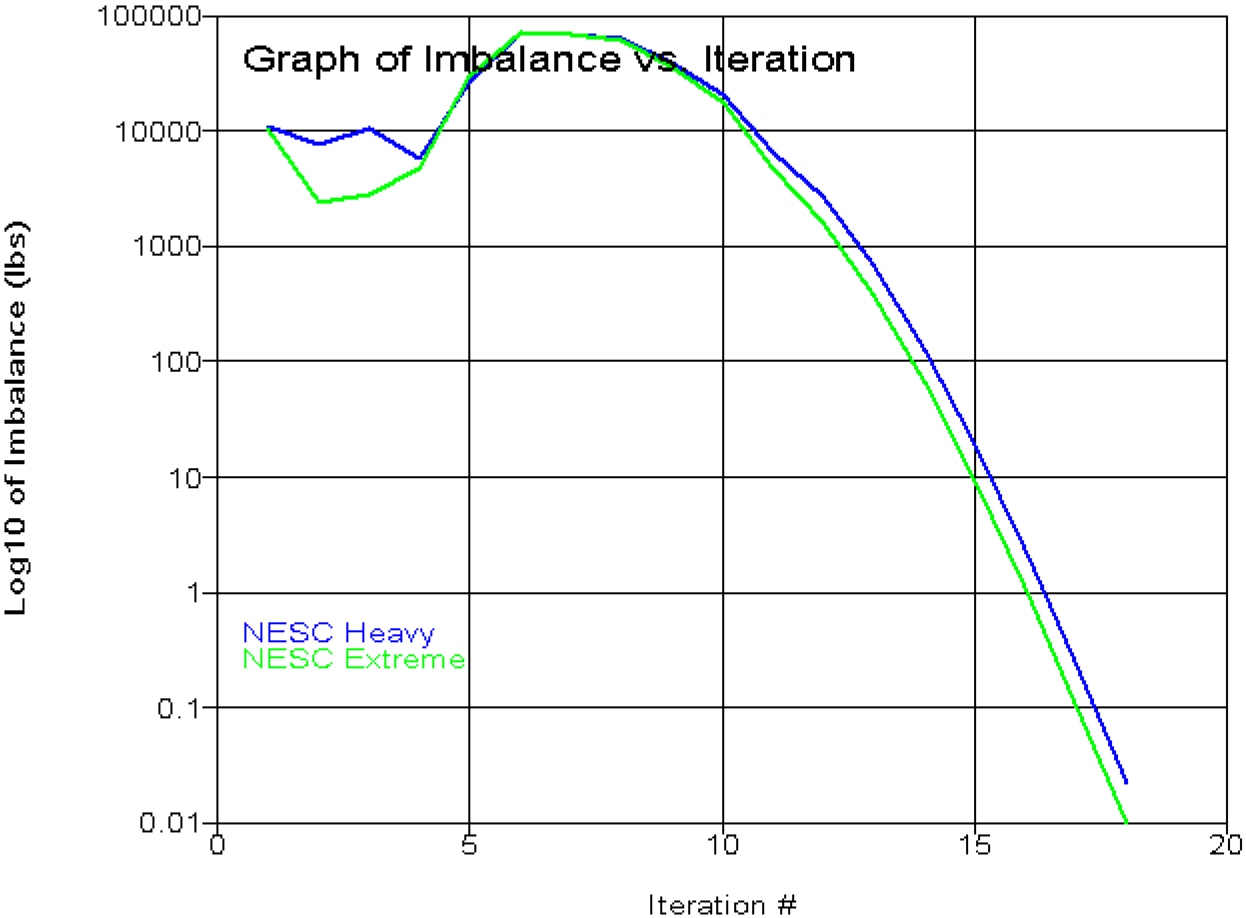
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
10184	10184:t	10184:Arm1	150.00	148.08	149.04	14.325	1.12e+006	1.000	27.11	0.00	55.59	62.04	0.00	0.00	62.04	0.00
10184	10184:Arm1	10184:TopConn	148.08	146.42	147.25	14.933	1.16e+006	1.000	27.11	0.00	50.40	56.22	0.00	0.00	56.22	0.00
10184	10184:TopConn		146.42	141.75	144.08	16.007	1.25e+006	1.000	27.11	0.00	151.49	168.79	0.00	0.00	168.79	0.00
10184		10184:BotConn	141.75	140.25	141.00	17.553	1.37e+006	1.000	27.11	0.00	122.89	59.49	0.00	0.00	59.49	0.00
10184	10184:BotConn		140.25	137.63	138.94	18.252	1.42e+006	1.000	27.11	0.00	223.85	108.26	0.00	0.00	108.26	0.00
10184		10184:WVGD14	137.63	135.00	136.31	19.142	1.49e+006	1.000	27.11	0.00	235.03	113.54	0.00	0.00	113.54	0.00
10184	10184:WVGD14		135.00	130.33	132.66	20.380	1.59e+006	1.000	27.11	0.00	445.98	215.13	0.00	0.00	215.13	0.00
10184		10184:Arm2	130.33	125.66	127.99	21.964	1.71e+006	1.000	27.11	0.00	481.41	231.86	0.00	0.00	231.86	0.00
10184	10184:Arm2	10184:WVGD13	125.66	125.00	125.33	22.868	1.78e+006	1.000	27.11	0.00	70.46	33.91	0.00	0.00	33.91	0.00

10184	10184:WVGD13		125.00	120.00	122.50	23.827	1.86e+006	1.000	27.11	0.00	559.81	269.19	0.00	0.00	269.19	0.00
10184		10184:WVGD12	120.00	115.00	117.50	25.523	1.99e+006	1.000	27.11	0.00	600.39	288.35	0.00	0.00	288.35	0.00
10184	10184:WVGD12		115.00	110.29	112.65	27.169	2.12e+006	1.000	27.11	0.00	602.50	289.05	0.00	0.00	289.05	0.00
10184			110.29	105.58	107.94	28.766	2.24e+006	1.000	27.11	0.00	638.49	306.04	0.00	0.00	306.04	0.00
10184		10184:WVGD11	105.58	105.00	105.29	29.226	2.28e+006	1.000	27.11	0.00	182.84	38.50	0.00	0.00	38.50	0.00
10184	10184:WVGD11	10184:Arm3	105.00	103.66	104.33	29.115	2.27e+006	1.000	27.11	0.00	426.23	88.40	0.00	0.00	88.40	0.00
10184	10184:Arm3		103.66	101.75	102.70	29.667	2.31e+006	1.000	27.11	0.00	616.14	127.78	0.00	0.00	127.78	0.00
10184			101.75	98.37	100.06	30.562	2.38e+006	1.000	27.11	0.00	623.13	233.06	0.00	0.00	233.06	0.00
10184		10184:WVGD10	98.37	95.00	96.69	31.707	2.47e+006	1.000	27.11	0.00	646.91	241.79	0.00	0.00	241.79	0.00
10184	10184:WVGD10		95.00	90.00	92.50	33.127	2.58e+006	1.000	27.11	0.00	1002.09	374.26	0.00	0.00	374.26	0.00
10184		10184:WVGD9	90.00	85.00	87.50	34.823	2.71e+006	1.000	27.11	0.00	1054.27	393.42	0.00	0.00	393.42	0.00
10184	10184:WVGD9	10184:Arm4	85.00	81.66	83.33	36.238	2.83e+006	1.000	27.11	0.00	734.16	273.79	0.00	0.00	273.79	0.00
10184	10184:Arm4		81.66	78.33	79.99	37.369	2.91e+006	1.000	27.11	0.00	753.91	281.02	0.00	0.00	281.02	0.00
10184		10184:WVGD8	78.33	75.00	76.66	38.498	3e+006	1.000	27.11	0.00	777.03	289.51	0.00	0.00	289.51	0.00
10184	10184:WVGD8		75.00	73.50	74.25	39.317	3.07e+006	1.000	27.11	0.00	357.77	133.26	0.00	0.00	133.26	0.00
10184			73.50	70.92	72.21	39.447	3.08e+006	1.000	27.11	0.00	1236.52	230.27	0.00	0.00	230.27	0.00
10184			70.92	68.33	69.62	39.761	3.1e+006	1.000	27.11	0.00	1263.94	232.10	0.00	0.00	232.10	0.00
10184		10184:WVGD7	68.33	65.00	66.67	40.764	3.18e+006	1.000	27.11	0.00	824.87	306.99	0.00	0.00	306.99	0.00
10184	10184:WVGD7		65.00	60.00	62.50	42.177	3.29e+006	1.000	27.11	0.00	1280.57	476.50	0.00	0.00	476.50	0.00
10184		10184:WVGD6	60.00	55.00	57.50	43.873	3.42e+006	1.000	27.11	0.00	1332.76	495.66	0.00	0.00	495.66	0.00
10184	10184:WVGD6		55.00	50.00	52.50	45.569	3.55e+006	1.000	27.11	0.00	1384.94	514.82	0.00	0.00	514.82	0.00
10184		10184:WVGD5	50.00	45.00	47.50	47.265	3.68e+006	1.000	27.11	0.00	1437.13	533.98	0.00	0.00	533.98	0.00
10184	10184:WVGD5		45.00	40.00	42.50	48.960	3.82e+006	1.000	27.11	0.00	1489.31	553.14	0.00	0.00	553.14	0.00
10184		10184:WVGD4	40.00	35.00	37.50	50.094	3.91e+006	1.000	27.11	0.00	3048.38	565.94	0.00	0.00	565.94	0.00
10184	10184:WVGD4		35.00	33.50	34.25	50.634	3.95e+006	1.000	27.11	0.00	934.41	171.61	0.00	0.00	171.61	0.00
10184			33.50	29.25	31.37	51.609	4.02e+006	1.000	27.11	0.00	1335.41	495.60	0.00	0.00	495.60	0.00
10184		10184:WVGD3	29.25	25.00	27.12	53.050	4.14e+006	1.000	27.11	0.00	1372.89	509.44	0.00	0.00	509.44	0.00
10184	10184:WVGD3		25.00	20.00	22.50	54.619	4.26e+006	1.000	27.11	0.00	1663.43	617.06	0.00	0.00	617.06	0.00
10184		10184:WVGD2	20.00	15.00	17.50	56.315	4.39e+006	1.000	27.11	0.00	1715.62	636.22	0.00	0.00	636.22	0.00
10184	10184:WVGD2		15.00	10.00	12.50	58.010	4.52e+006	1.000	27.11	0.00	1767.80	655.38	0.00	0.00	655.38	0.00
10184		10184:WVGD1	10.00	5.00	7.50	59.706	4.65e+006	1.000	27.11	0.00	1819.99	674.54	0.00	0.00	674.54	0.00
10184	10184:WVGD1	10184:g	5.00	0.00	2.50	61.402	4.79e+006	1.000	27.11	0.00	1872.17	693.70	0.00	0.00	693.70	0.00

*** Analysis Results:

Maximum element usage is 82.52% for Steel Pole "10184" in load case "NESC Heavy"
Maximum insulator usage is 17.68% for Clamp "7" in load case "NESC Heavy"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 18

Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
10184:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10184:t	-0.7251	8.096	-0.3025	-5.7941	-0.6268	-0.0280	-0.7251	8.096	149.7
10184:Arm1	-0.7043	7.902	-0.2926	-5.7940	-0.6268	-0.0280	-0.7043	7.902	147.8

10184:TopConn	-0.6836	7.734	-0.284	-5.7723	-0.6227	-0.0472	-0.6836	7.734	146.1
10184:BotConn	-0.6125	7.123	-0.2531	-5.6004	-0.5985	-0.0950	-0.6125	7.123	140
10184:WVGD14	-0.5575	6.615	-0.2281	-5.4911	-0.5846	-0.1086	-0.5575	6.615	134.8
10184:Arm2	-0.4644	5.738	-0.1862	-5.2801	-0.5575	-0.1254	-0.4644	5.738	125.5
10184:WVGD13	-0.4583	5.677	-0.1834	-5.2609	-0.5548	-0.1241	-0.4583	5.677	124.8
10184:WVGD12	-0.369	4.789	-0.1431	-4.8934	-0.5014	-0.1082	-0.369	4.789	114.9
10184:WVGD11	-0.2892	3.972	-0.1089	-4.4669	-0.4377	-0.0985	-0.2892	3.972	104.9
10184:Arm3	-0.2793	3.868	-0.1048	-4.4163	-0.4301	-0.0976	-0.2793	3.868	103.6
10184:WVGD10	-0.2198	3.227	-0.0805	-4.0548	-0.3726	-0.0939	-0.2198	3.227	94.92
10184:WVGD9	-0.1622	2.557	-0.05741	-3.6197	-0.3009	-0.0915	-0.1622	2.557	84.94
10184:Arm4	-0.1457	2.35	-0.05081	-3.4750	-0.2768	-0.0910	-0.1457	2.35	81.61
10184:WVGD8	-0.1171	1.963	-0.03916	-3.1775	-0.2354	-0.0773	-0.1171	1.963	74.96
10184:WVGD7	-0.08199	1.449	-0.02534	-2.6995	-0.1813	-0.0595	-0.08199	1.449	64.97
10184:WVGD6	-0.05501	1.018	-0.01552	-2.2255	-0.1373	-0.0450	-0.05501	1.018	54.98
10184:WVGD5	-0.03464	0.6685	-0.008893	-1.7755	-0.1018	-0.0333	-0.03464	0.6685	44.99
10184:WVGD4	-0.0197	0.3954	-0.004664	-1.3455	-0.0724	-0.0237	-0.0197	0.3954	35
10184:WVGD3	-0.009461	0.1971	-0.002197	-0.9241	-0.0469	-0.0153	-0.009461	0.1971	25
10184:WVGD2	-0.003219	0.06955	-0.0008994	-0.5333	-0.0256	-0.0084	-0.003219	0.06955	15
10184:WVGD1	-0.0003413	0.007758	-0.0002347	-0.1711	-0.0078	-0.0026	-0.0003413	0.007758	5
Arm1:O	-0.7033	7.899	-0.3564	-5.7940	-0.6268	-0.0280	-0.7033	8.531	147.7
Arm1:End	-0.7363	8.05	-1.395	-6.4777	-0.6539	0.2443	-0.7363	18.18	148.6
Arm2:O	-0.7053	7.905	-0.2288	-5.7940	-0.6268	-0.0280	-0.7053	7.273	147.9
Arm2:End	-0.7412	8.136	0.6816	-5.4031	-0.6291	-0.0306	-0.7412	-1.996	150.7
Arm3:O	-0.4613	5.734	-0.2765	-5.2801	-0.5575	-0.1254	-0.4613	6.715	125.4
Arm3:End	-0.4465	5.915	-1.731	-6.0414	-0.5602	-0.0785	-0.4465	21.4	126.5
Arm4:O	-0.4674	5.742	-0.09587	-5.2801	-0.5575	-0.1254	-0.4674	4.76	125.6
Arm4:End	-0.5546	6.017	1.146	-4.7013	-0.5948	-0.2522	-0.5546	-9.465	129.4
Arm5:O	-0.2763	3.864	-0.2052	-4.4163	-0.4301	-0.0976	-0.2763	5.168	103.5
Arm5:End	-0.278	4.028	-1.438	-5.1770	-0.4407	0.0191	-0.278	19.83	104.8
Arm6:O	-0.2823	3.872	-0.004441	-4.4163	-0.4301	-0.0976	-0.2823	2.568	103.7
Arm6:End	-0.3502	4.091	1.022	-3.8286	-0.4609	-0.2094	-0.3502	-11.71	107.2
Arm7:O	-0.1427	2.347	-0.147	-3.4750	-0.2768	-0.0910	-0.1427	3.934	81.51
Arm7:End	-0.07738	2.487	-1.14	-4.2463	-0.2369	-0.4344	-0.07738	18.57	83.07
Arm8:O	-0.1486	2.353	0.04542	-3.4750	-0.2768	-0.0910	-0.1486	0.765	81.7
Arm8:End	-0.1743	2.515	0.8362	-2.8799	-0.2566	0.0001	-0.1743	-13.57	85.04

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
10184:g	-0.02	0.0	-57.71	0.0	0.0	-151.91	0.0	0.0	162.50	0.0	6419.23	0.0	287.4	0.0	0.0	72.03	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
10184	10184:t	Origin	0.00	97.15	-8.70	-3.63	0.00	0.00	-0.0	-0.04	0.02	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	4
10184	10184:Arm1	End	1.92	94.82	-8.45	-3.51	0.04	-0.00	-0.0	-0.04	0.02	-0.00	-0.00	0.02	0.00	0.00	0.02	0.0	1
10184	10184:Arm1	Origin	1.92	94.82	-8.45	-3.51	7.77	1.51	7.6	-3.42	4.24	0.80	-0.39	2.92	0.52	1.48	4.79	8.0	

2	10184	10184:TopConn	End	3.58	92.81	-8.20	-3.41	14.84	2.84	7.6	-3.42	4.24	0.80	-0.38	5.15	0.50	1.37	6.41	10.7
2	10184	10184:TopConn	Origin	3.58	92.81	-8.20	-3.41	14.84	2.84	7.6	-8.36	7.99	0.86	-0.92	5.15	0.92	1.37	7.25	12.1
2	10184	SpliceT	End	8.25	87.24	-7.54	-3.12	52.10	6.90	7.6	-8.36	7.99	0.86	-0.84	15.37	0.18	1.12	16.36	27.3
1	10184	SpliceT	Origin	8.25	87.24	-7.54	-3.12	52.11	6.89	7.5	-8.58	8.06	0.86	-0.36	6.48	0.07	0.47	6.91	11.5
1	10184	10184:BotConn	End	9.75	85.48	-7.35	-3.04	64.20	8.18	7.5	-8.58	8.06	0.86	-0.35	7.52	0.07	0.44	7.92	13.2
1	10184	10184:BotConn	Origin	9.75	85.48	-7.35	-3.04	64.20	8.18	7.5	-10.11	6.27	0.87	-0.41	7.52	0.07	0.44	7.99	13.3
1	10184	Tube 2	End	12.38	82.41	-7.02	-2.89	80.65	10.47	7.5	-10.11	6.27	0.87	-0.39	8.54	0.07	0.40	8.97	15.0
1	10184	Tube 2	Origin	12.38	82.41	-7.02	-2.89	80.65	10.46	7.5	-10.46	6.36	0.87	-0.41	8.54	0.07	0.40	8.99	15.0
1	10184	10184:WVGD14	End	15.00	79.38	-6.69	-2.74	97.34	12.76	7.5	-10.46	6.36	0.87	-0.39	9.36	0.07	0.36	9.78	16.3
1	10184	10184:WVGD14	Origin	15.00	79.38	-6.69	-2.74	97.34	12.74	7.5	-11.66	6.65	0.88	-0.43	9.36	0.07	0.36	9.82	16.4
1	10184	Tube 2	End	19.67	74.07	-6.12	-2.48	128.38	16.87	7.5	-11.66	6.65	0.88	-0.40	10.52	0.06	0.31	10.93	18.2
1	10184	Tube 2	Origin	19.67	74.07	-6.12	-2.48	128.39	16.85	7.5	-12.36	6.82	0.88	-0.42	10.52	0.06	0.31	10.96	18.3
1	10184	10184:Arm2	End	24.34	68.85	-5.57	-2.23	160.24	20.98	7.5	-12.36	6.82	0.88	-0.39	11.31	0.06	0.27	11.72	19.5
1	10184	10184:Arm2	Origin	24.34	68.85	-5.57	-2.23	202.05	28.38	-11.9	-35.30	23.46	3.79	-1.12	14.26	0.25	0.42	15.43	25.7
1	10184	10184:WVGD13	End	25.00	68.13	-5.50	-2.20	217.45	30.87	-11.9	-35.30	23.46	3.79	-1.11	15.05	0.24	0.41	16.20	27.0
1	10184	10184:WVGD13	Origin	25.00	68.13	-5.50	-2.20	217.45	30.88	-11.9	-36.49	23.70	3.79	-1.15	15.05	0.24	0.41	16.24	27.1
1	10184	Tube 2	End	30.00	62.70	-4.95	-1.95	335.93	49.78	-11.9	-36.49	23.70	3.79	-1.07	20.08	0.23	0.36	21.17	35.3
1	10184	Tube 2	Origin	30.00	62.70	-4.95	-1.95	335.93	49.80	-11.9	-37.43	23.82	3.77	-1.10	20.08	0.23	0.35	21.20	35.3
1	10184	10184:WVGD12	End	35.00	57.47	-4.43	-1.72	455.02	68.62	-11.9	-37.43	23.82	3.77	-1.03	23.73	0.21	0.31	24.77	41.3
1	10184	10184:WVGD12	Origin	35.00	57.47	-4.43	-1.72	455.02	68.64	-11.9	-39.10	24.08	3.76	-1.07	23.73	0.21	0.31	24.82	41.4
1	10184	Tube 2	End	39.71	52.74	-3.96	-1.51	568.42	86.30	-11.9	-39.10	24.08	3.76	-1.01	26.28	0.20	0.27	27.30	45.5
1	10184	Tube 2	Origin	39.71	52.74	-3.96	-1.51	568.42	86.32	-11.8	-40.11	24.19	3.74	-1.04	26.28	0.20	0.27	27.33	45.5
1	10184	SpliceT	End	44.42	48.21	-3.52	-1.33	682.34	103.89	-11.8	-40.11	24.19	3.74	-0.98	28.16	0.19	0.24	29.15	48.6
1	10184	SpliceT	Origin	44.42	48.21	-3.52	-1.33	682.34	103.90	-11.8	-40.78	24.26	3.73	-1.00	28.16	0.19	0.24	29.16	48.6
1	10184	10184:WVGD11	End	45.00	47.66	-3.47	-1.31	696.48	106.07	-11.8	-40.78	24.26	3.73	-0.80	23.75	0.15	0.20	24.55	40.9
1	10184	10184:WVGD11	Origin	45.00	47.66	-3.47	-1.31	696.48	106.07	-11.8	-41.93	24.45	3.73	-0.82	23.75	0.15	0.20	24.57	41.0
1	10184	10184:Arm3	End	46.34	46.41	-3.35	-1.26	729.34	111.08	-11.8	-41.93	24.45	3.73	-0.81	24.08	0.15	0.19	24.89	41.5
1	10184	10184:Arm3	Origin	46.34	46.41	-3.35	-1.26	768.74	120.49	-10.9	-65.43	40.65	7.43	-1.26	25.38	0.29	0.18	26.65	44.4
1	10184	SpliceB	End	48.25	44.67	-3.19	-1.19	846.23	134.63	-10.9	-65.43	40.65	7.43	-1.23	26.71	0.28	0.17	27.95	46.6
1																			

	10184	SpliceB	Origin	48.25	44.67	-3.19	-1.19	846.23	134.63	-10.9	-66.44	40.70	7.41	-1.25	26.71	0.28	0.17	27.97	46.6
1	10184	Tube 3	End	51.63	41.65	-2.90	-1.07	983.60	159.61	-10.9	-66.44	40.70	7.41	-1.20	28.75	0.27	0.16	29.96	49.9
1	10184	Tube 3	Origin	51.63	41.65	-2.90	-1.07	983.60	159.62	-10.9	-67.49	40.75	7.39	-1.22	28.75	0.27	0.16	29.98	50.0
1	10184	10184:WVGD10	End	55.00	38.73	-2.64	-0.97	1121.12	184.51	-10.9	-67.49	40.75	7.39	-1.18	30.43	0.26	0.15	31.61	52.7
1	10184	10184:WVGD10	Origin	55.00	38.73	-2.64	-0.97	1121.12	184.52	-10.9	-69.54	40.94	7.36	-1.21	30.43	0.26	0.15	31.65	52.7
1	10184	Tube 3	End	60.00	34.59	-2.27	-0.82	1325.83	221.25	-10.9	-69.54	40.94	7.36	-1.15	32.40	0.25	0.13	33.55	55.9
1	10184	Tube 3	Origin	60.00	34.59	-2.27	-0.82	1325.83	221.26	-10.9	-71.24	41.00	7.31	-1.18	32.40	0.25	0.13	33.58	56.0
1	10184	10184:WVGD9	End	65.00	30.68	-1.95	-0.69	1530.84	257.78	-10.9	-71.24	41.00	7.31	-1.12	33.85	0.23	0.12	34.98	58.3
1	10184	10184:WVGD9	Origin	65.00	30.68	-1.95	-0.69	1530.84	257.79	-10.9	-73.39	41.19	7.28	-1.16	33.85	0.23	0.12	35.01	58.4
1	10184	10184:Arm4	End	68.34	28.20	-1.75	-0.61	1668.57	282.09	-10.9	-73.39	41.19	7.28	-1.12	34.61	0.23	0.11	35.73	59.6
1	10184	10184:Arm4	Origin	68.34	28.20	-1.75	-0.61	1709.03	265.40	-72.6	-97.61	57.61	0.66	-1.49	35.45	0.02	0.75	36.96	61.6
1	10184	Tube 3	End	71.67	25.82	-1.57	-0.54	1900.78	267.34	-72.6	-97.61	57.61	0.66	-1.44	37.06	0.02	0.71	38.53	64.2
1	10184	Tube 3	Origin	71.67	25.82	-1.57	-0.54	1900.75	267.51	-72.5	-98.91	57.59	0.62	-1.46	37.06	0.02	0.71	38.55	64.2
1	10184	10184:WVGD8	End	75.00	23.55	-1.40	-0.47	2092.43	269.31	-72.5	-98.91	57.59	0.62	-1.42	38.43	0.02	0.67	39.86	66.4
1	10184	10184:WVGD8	Origin	75.00	23.55	-1.40	-0.47	2092.42	269.43	-72.5	-100.55	57.70	0.59	-1.44	38.43	0.02	0.67	39.89	66.5
1	10184	SpliceT	End	76.50	22.56	-1.33	-0.44	2178.97	270.20	-72.5	-100.55	57.70	0.59	-1.43	38.97	0.02	0.65	40.41	67.4
1	10184	SpliceT	Origin	76.50	22.56	-1.33	-0.44	2178.96	270.31	-72.5	-101.84	57.70	0.57	-1.44	38.97	0.02	0.65	40.43	67.4
1	10184	Tube 3	End	79.08	20.91	-1.22	-0.40	2328.06	271.57	-72.5	-101.84	57.70	0.57	-1.45	42.18	0.02	0.66	43.65	72.7
1	10184	Tube 3	Origin	79.08	20.91	-1.22	-0.40	2328.04	271.71	-72.4	-103.84	57.71	0.54	-1.48	42.18	0.02	0.66	43.67	72.8
1	10184	SpliceB	End	81.67	19.33	-1.11	-0.35	2477.16	272.90	-72.4	-103.84	57.71	0.54	-1.45	42.90	0.02	0.63	44.37	73.9
1	10184	SpliceB	Origin	81.67	19.33	-1.11	-0.35	2477.15	273.06	-72.4	-105.55	57.69	0.51	-1.47	42.90	0.01	0.63	44.39	74.0
1	10184	10184:WVGD7	End	85.00	17.38	-0.98	-0.30	2669.44	274.49	-72.4	-105.55	57.69	0.51	-1.43	43.69	0.01	0.59	45.13	75.2
1	10184	10184:WVGD7	Origin	85.00	17.38	-0.98	-0.30	2669.42	274.71	-72.3	-108.01	57.75	0.47	-1.46	43.69	0.01	0.59	45.16	75.3
1	10184	Tube 4	End	90.00	14.68	-0.81	-0.24	2958.17	276.65	-72.3	-108.01	57.75	0.47	-1.41	44.60	0.01	0.55	46.02	76.7
1	10184	Tube 4	Origin	90.00	14.68	-0.81	-0.24	2958.14	276.92	-72.3	-110.21	57.66	0.42	-1.44	44.60	0.01	0.54	46.04	76.7
1	10184	10184:WVGD6	End	95.00	12.22	-0.66	-0.19	3246.48	278.62	-72.3	-110.21	57.66	0.42	-1.38	45.24	0.01	0.50	46.63	77.7
1	10184	10184:WVGD6	Origin	95.00	12.22	-0.66	-0.19	3246.46	278.88	-72.2	-113.17	57.71	0.37	-1.42	45.24	0.01	0.50	46.66	77.8
1	10184	Tube 4	End	100.00	10.00	-0.53	-0.14	3535.03	280.36	-72.2	-113.17	57.71	0.37	-1.36	45.66	0.01	0.47	47.03	78.4
1	10184	Tube 4	Origin	100.00	10.00	-0.53	-0.14	3535.01	280.61	-72.2	-115.51	57.64	0.33	-1.39	45.66	0.01	0.47	47.06	78.4
1	10184	10184:WVGD5	End	105.00	8.02	-0.42	-0.11	3823.23	281.88	-72.2	-115.51	57.64	0.33	-1.34	45.90	0.01	0.43	47.25	78.8

1																			
	10184	10184:WVGD5	Origin	105.00	8.02	-0.42	-0.11	3823.22	282.13	-72.2	-118.61	57.70	0.29	-1.38	45.90	0.01	0.43	47.29	78.8
1																			
	10184	SpliceT	End	110.00	6.27	-0.32	-0.08	4111.72	283.21	-72.2	-118.61	57.70	0.29	-1.33	46.01	0.01	0.40	47.35	78.9
1																			
	10184	SpliceT	Origin	110.00	6.27	-0.32	-0.08	4111.71	283.45	-72.1	-122.23	57.67	0.25	-1.37	46.01	0.01	0.40	47.39	79.0
1																			
	10184	10184:WVGD4	End	115.00	4.74	-0.24	-0.06	4400.06	284.34	-72.1	-122.23	57.67	0.25	-1.36	48.11	0.01	0.39	49.47	82.4
1																			
	10184	10184:WVGD4	Origin	115.00	4.74	-0.24	-0.06	4400.05	284.50	-72.1	-126.05	57.76	0.22	-1.40	48.11	0.01	0.39	49.51	82.5
1																			
	10184	SpliceB	End	116.50	4.33	-0.21	-0.05	4486.70	284.73	-72.1	-126.05	57.76	0.22	-1.38	48.06	0.00	0.39	49.45	82.4
1																			
	10184	SpliceB	Origin	116.50	4.33	-0.21	-0.05	4486.69	284.87	-72.1	-127.87	57.73	0.20	-1.40	48.06	0.00	0.39	49.47	82.5
1																			
	10184	Tube 5	End	120.75	3.27	-0.16	-0.04	4732.03	285.43	-72.1	-127.87	57.73	0.20	-1.37	47.89	0.00	0.36	49.26	82.1
1																			
	10184	Tube 5	Origin	120.75	3.27	-0.16	-0.04	4732.02	285.64	-72.1	-130.08	57.66	0.17	-1.39	47.89	0.00	0.36	49.29	82.1
1																			
	10184	10184:WVGD3	End	125.00	2.37	-0.11	-0.03	4977.08	286.06	-72.1	-130.08	57.66	0.17	-1.35	47.67	0.00	0.35	49.02	81.7
1																			
	10184	10184:WVGD3	Origin	125.00	2.37	-0.11	-0.03	4977.07	286.29	-72.1	-133.24	57.70	0.14	-1.38	47.67	0.00	0.35	49.05	81.8
1																			
	10184	Tube 5	End	130.00	1.50	-0.07	-0.02	5265.59	286.63	-72.1	-133.24	57.70	0.14	-1.34	47.35	0.00	0.32	48.69	81.2
1																			
	10184	Tube 5	Origin	130.00	1.50	-0.07	-0.02	5265.58	286.86	-72.1	-135.97	57.65	0.10	-1.37	47.35	0.00	0.32	48.72	81.2
1																			
	10184	10184:WVGD2	End	135.00	0.83	-0.04	-0.01	5553.81	287.04	-72.1	-135.97	57.65	0.10	-1.33	46.98	0.00	0.30	48.31	80.5
1																			
	10184	10184:WVGD2	Origin	135.00	0.83	-0.04	-0.01	5553.80	287.26	-72.0	-139.46	57.70	0.06	-1.36	46.98	0.00	0.30	48.34	80.6
1																			
	10184	Tube 5	End	140.00	0.37	-0.02	-0.01	5842.29	287.27	-72.0	-139.46	57.70	0.06	-1.32	46.57	0.00	0.29	47.90	79.8
1																			
	10184	Tube 5	Origin	140.00	0.37	-0.02	-0.01	5842.28	287.50	-72.0	-142.33	57.66	0.03	-1.35	46.57	0.00	0.29	47.92	79.9
1																			
	10184	10184:WVGD1	End	145.00	0.09	-0.00	-0.00	6130.59	287.35	-72.0	-142.33	57.66	0.03	-1.31	46.13	0.00	0.27	47.45	79.1
1																			
	10184	10184:WVGD1	Origin	145.00	0.09	-0.00	-0.00	6130.58	287.56	-72.0	-145.96	57.73	-0.00	-1.35	46.13	0.00	0.27	47.48	79.1
1																			
	10184	10184:g	End	150.00	0.00	0.00	0.00	6419.23	287.26	-72.0	-145.96	57.73	-0.00	-1.31	45.67	0.00	0.26	46.98	78.3
1																			

Detailed Tubular Davit Arm Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Arm1	Arm1:O	Origin	0.00	94.79	-8.44	-4.28	-18.34	7.44	0.0	1.72	1.96	-0.77	0.29	20.75	0.55	0.00	21.07	35.1	2
Arm1	#Arm1:0	End	4.85	95.68	-8.56	-10.33	-8.86	3.71	0.0	1.72	1.96	-0.77	0.36	15.58	0.69	0.00	15.98	26.6	2
Arm1	#Arm1:0	Origin	4.85	95.68	-8.56	-10.33	-8.86	3.71	-0.0	1.75	1.83	-0.76	0.37	15.58	0.65	0.00	15.98	26.6	2
Arm1	Arm1:End	End	9.69	96.61	-8.84	-16.74	0.00	-0.00	-0.0	1.75	1.83	-0.76	0.48	0.00	1.17	0.00	2.08	3.5	3
Arm2	Arm2:O	Origin	0.00	94.86	-8.46	-2.75	-10.61	-0.18	-0.0	-2.37	1.14	0.02	-0.40	8.68	0.30	0.00	9.10	15.2	2
Arm2	#Arm2:0	End	4.85	96.28	-8.68	2.82	-5.06	-0.09	-0.0	-2.37	1.14	0.02	-0.50	6.38	0.37	0.00	6.91	11.5	2
Arm2	#Arm2:0	Origin	4.85	96.28	-8.68	2.82	-5.06	-0.09	-0.0	-2.33	1.04	0.02	-0.49	6.38	0.34	0.00	6.90	11.5	2
Arm2	Arm2:End	End	9.69	97.63	-8.89	8.18	-0.00	-0.00	-0.0	-2.33	1.04	0.02	-0.65	0.00	0.67	0.00	1.32	2.2	3

Arm3	Arm3:O	Origin	0.00	68.80	-5.54	-3.32	-174.18	12.31	0.0	6.39	12.31	-0.84	0.27	18.76	0.81	0.00	19.09	31.8	2
Arm3	#Arm3:0	End	5.00	69.52	-5.46	-8.96	-112.63	8.10	0.0	6.39	12.31	-0.84	0.33	17.88	0.98	0.00	18.29	30.5	2
Arm3	#Arm3:0	Origin	5.00	69.52	-5.46	-8.96	-112.63	8.09	0.0	6.49	11.79	-0.83	0.34	17.88	0.94	0.00	18.29	30.5	2
Arm3	#Arm3:1	End	9.86	70.24	-5.40	-14.73	-55.31	4.03	0.0	6.49	11.79	-0.83	0.42	13.99	1.19	0.00	14.56	24.3	2
Arm3	#Arm3:1	Origin	9.86	70.24	-5.40	-14.73	-55.31	4.03	-0.0	6.57	11.38	-0.83	0.43	13.99	1.15	0.00	14.55	24.3	2
Arm3	Arm3:End	End	14.72	70.98	-5.36	-20.77	0.00	-0.00	-0.0	6.57	11.38	-0.83	0.57	0.00	2.30	0.00	4.03	6.7	3
Arm4	Arm4:O	Origin	0.00	68.90	-5.61	-1.15	-132.53	-30.42	-0.0	-9.85	9.39	2.06	-0.42	16.39	0.63	0.00	16.85	28.1	2
Arm4	#Arm4:0	End	5.00	70.08	-5.92	4.13	-85.56	-20.11	-0.0	-9.85	9.39	2.06	-0.51	15.65	0.77	0.00	16.21	27.0	2
Arm4	#Arm4:0	Origin	5.00	70.08	-5.92	4.13	-85.56	-20.09	-0.0	-9.68	8.97	2.06	-0.50	15.65	0.73	0.00	16.20	27.0	2
Arm4	#Arm4:1	End	9.86	71.17	-6.26	9.04	-41.98	-10.06	-0.0	-9.68	8.97	2.06	-0.63	12.26	0.93	0.00	12.99	21.7	2
Arm4	#Arm4:1	Origin	9.86	71.17	-6.26	9.04	-41.98	-10.04	-0.0	-9.55	8.64	2.07	-0.62	12.26	0.90	0.00	12.98	21.6	2
Arm4	Arm4:End	End	14.72	72.20	-6.66	13.76	-0.00	-0.00	-0.0	-9.55	8.64	2.07	-0.84	0.00	1.75	0.00	3.14	5.2	3
Arm5	Arm5:O	Origin	0.00	46.37	-3.32	-2.46	-173.95	27.62	0.0	6.08	12.29	-1.88	0.26	20.28	0.81	0.00	20.59	34.3	2
Arm5	#Arm5:0	End	5.00	47.01	-3.28	-7.20	-112.48	18.20	0.0	6.08	12.29	-1.88	0.31	19.35	0.99	0.00	19.74	32.9	2
Arm5	#Arm5:0	Origin	5.00	47.01	-3.28	-7.20	-112.49	18.17	0.0	6.18	11.77	-1.87	0.32	19.35	0.95	0.00	19.74	32.9	2
Arm5	#Arm5:1	End	9.86	47.66	-3.29	-12.10	-55.25	9.07	0.0	6.18	11.77	-1.87	0.40	15.16	1.20	0.00	15.70	26.2	2
Arm5	#Arm5:1	Origin	9.86	47.66	-3.29	-12.10	-55.25	9.07	-0.0	6.27	11.36	-1.87	0.41	15.16	1.16	0.00	15.70	26.2	2
Arm5	Arm5:End	End	14.72	48.33	-3.34	-17.26	0.00	-0.00	-0.0	6.27	11.36	-1.87	0.55	0.00	2.30	0.00	4.02	6.7	3
Arm6	Arm6:O	Origin	0.00	46.46	-3.39	-0.05	-134.61	-26.60	-0.0	-9.78	9.54	1.80	-0.42	16.22	0.64	0.00	16.67	27.8	2
Arm6	#Arm6:0	End	5.00	47.41	-3.62	4.35	-86.92	-17.59	-0.0	-9.78	9.54	1.80	-0.51	15.48	0.77	0.00	16.04	26.7	2
Arm6	#Arm6:0	Origin	5.00	47.41	-3.62	4.35	-86.92	-17.57	-0.0	-9.62	9.11	1.80	-0.50	15.48	0.74	0.00	16.02	26.7	2
Arm6	#Arm6:1	End	9.86	48.27	-3.89	8.41	-42.65	-8.80	-0.0	-9.62	9.11	1.80	-0.62	12.13	0.94	0.00	12.85	21.4	2
Arm6	#Arm6:1	Origin	9.86	48.27	-3.89	8.41	-42.65	-8.79	-0.0	-9.50	8.77	1.81	-0.62	12.12	0.90	0.00	12.84	21.4	2
Arm6	Arm6:End	End	14.72	49.09	-4.20	12.26	-0.00	-0.00	-0.0	-9.50	8.77	1.81	-0.83	0.00	1.78	0.00	3.19	5.3	3
Arm7	Arm7:O	Origin	0.00	28.16	-1.71	-1.76	-176.97	-76.41	0.0	6.32	12.50	5.20	0.27	25.49	0.89	0.00	25.81	43.0	2
Arm7	#Arm7:0	End	5.00	28.70	-1.58	-5.52	-114.48	-50.40	0.0	6.32	12.50	5.20	0.33	24.42	1.08	0.00	24.82	41.4	2
Arm7	#Arm7:0	Origin	5.00	28.70	-1.58	-5.52	-114.52	-50.31	0.0	6.45	11.98	5.18	0.33	24.41	1.04	0.00	24.81	41.3	2
Arm7	#Arm7:1	End	9.86	29.26	-1.32	-9.47	-56.26	-25.13	0.0	6.45	11.98	5.18	0.42	19.18	1.32	0.00	19.73	32.9	2
Arm7	#Arm7:1	Origin	9.86	29.26	-1.32	-9.47	-56.28	-25.09	0.0	6.56	11.58	5.16	0.43	19.18	1.28	0.00	19.73	32.9	2
Arm7	Arm7:End	End	14.72	29.84	-0.93	-13.69	0.00	-0.00	0.0	6.56	11.58	5.16	0.57	0.00	2.34	0.00	4.10	6.8	3
Arm8	Arm8:O	Origin	0.00	28.23	-1.78	0.54	-136.48	20.33	-0.0	-9.81	9.67	-1.37	-0.42	15.78	0.64	0.00	16.23	27.1	2
Arm8	#Arm8:0	End	5.00	28.94	-1.92	3.99	-88.14	13.46	-0.0	-9.81	9.67	-1.37	-0.51	15.05	0.78	0.00	15.61	26.0	2
Arm8	#Arm8:0	Origin	5.00	28.94	-1.92	3.99	-88.15	13.44	-0.0	-9.66	9.23	-1.38	-0.50	15.05	0.74	0.00	15.60	26.0	2
Arm8	#Arm8:1	End	9.86	29.58	-2.03	7.11	-43.26	6.74	-0.0	-9.66	9.23	-1.38	-0.63	11.78	0.94	0.00	12.52	20.9	2
Arm8	#Arm8:1	Origin	9.86	29.58	-2.03	7.11	-43.26	6.73	0.0	-9.54	8.90	-1.38	-0.62	11.78	0.91	0.00	12.50	20.8	2
Arm8	Arm8:End	End	14.72	30.17	-2.09	10.03	-0.00	-0.00	0.0	-9.54	8.90	-1.38	-0.83	0.00	1.80	0.00	3.23	5.4	3

Summary of Clamp Capacities and Usages for Load Case "NESC Heavy":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	2.609	80.00	80.00	3.26
2	2.521	80.00	80.00	3.15
3	13.029	80.00	80.00	16.29
4	12.906	80.00	80.00	16.13
5	12.977	80.00	80.00	16.22
6	12.920	80.00	80.00	16.15
7	14.144	80.00	80.00	17.68
8	12.983	80.00	80.00	16.23
9	6.029	80.00	80.00	7.54

10	2.247	80.00	80.00	2.81
11	0.696	80.00	80.00	0.87
12	0.696	80.00	80.00	0.87
13	0.696	80.00	80.00	0.87
14	0.696	80.00	80.00	0.87
15	0.696	80.00	80.00	0.87
16	0.696	80.00	80.00	0.87
17	0.696	80.00	80.00	0.87
18	0.696	80.00	80.00	0.87
19	0.696	80.00	80.00	0.87
20	0.696	80.00	80.00	0.87
21	0.696	80.00	80.00	0.87
22	0.696	80.00	80.00	0.87
23	0.696	80.00	80.00	0.87
24	0.696	80.00	80.00	0.87

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 18

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
10184:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10184:t	-0.6079	7.969	-0.2901	-5.7453	-0.4409	-0.0363	-0.6079	7.969	149.7
10184:Arm1	-0.5933	7.777	-0.2804	-5.7452	-0.4409	-0.0363	-0.5933	7.777	147.8
10184:TopConn	-0.5799	7.611	-0.2719	-5.7525	-0.4398	-0.0415	-0.5799	7.611	146.1
10184:BotConn	-0.5318	6.999	-0.2413	-5.5942	-0.4332	-0.0537	-0.5318	6.999	140
10184:WVGD14	-0.4924	6.493	-0.2167	-5.4615	-0.4294	-0.0567	-0.4924	6.493	134.8
10184:Arm2	-0.4233	5.623	-0.1758	-5.2143	-0.4219	-0.0600	-0.4233	5.623	125.5
10184:WVGD13	-0.4186	5.563	-0.1731	-5.1931	-0.4208	-0.0592	-0.4186	5.563	124.8
10184:WVGD12	-0.3488	4.689	-0.1344	-4.8071	-0.3937	-0.0504	-0.3488	4.689	114.9
10184:WVGD11	-0.2842	3.888	-0.1018	-4.3729	-0.3574	-0.0448	-0.2842	3.888	104.9
10184:Arm3	-0.276	3.786	-0.0979	-4.3217	-0.3530	-0.0443	-0.276	3.786	103.6
10184:WVGD10	-0.2258	3.159	-0.07489	-3.9619	-0.3180	-0.0419	-0.2258	3.159	94.93
10184:WVGD9	-0.1746	2.505	-0.0531	-3.5334	-0.2732	-0.0402	-0.1746	2.505	84.95
10184:Arm4	-0.1593	2.303	-0.04688	-3.3913	-0.2579	-0.0399	-0.1593	2.303	81.61
10184:WVGD8	-0.1314	1.925	-0.03594	-3.1013	-0.2295	-0.0338	-0.1314	1.925	74.96
10184:WVGD7	-0.09547	1.423	-0.02301	-2.6378	-0.1883	-0.0260	-0.09547	1.423	64.98
10184:WVGD6	-0.06618	1.002	-0.01384	-2.1790	-0.1509	-0.0196	-0.06618	1.002	54.99
10184:WVGD5	-0.04293	0.6592	-0.007679	-1.7427	-0.1176	-0.0145	-0.04293	0.6592	44.99
10184:WVGD4	-0.02511	0.3908	-0.003806	-1.3244	-0.0874	-0.0103	-0.02511	0.3908	35
10184:WVGD3	-0.01239	0.1952	-0.001625	-0.9126	-0.0590	-0.0067	-0.01239	0.1952	25
10184:WVGD2	-0.00433	0.06909	-0.0005692	-0.5285	-0.0336	-0.0036	-0.00433	0.06909	15
10184:WVGD1	-0.0004766	0.007737	-0.0001267	-0.1701	-0.0106	-0.0011	-0.0004766	0.007737	5
Arm1:O	-0.5924	7.774	-0.3436	-5.7452	-0.4409	-0.0363	-0.5924	8.406	147.7
Arm1:End	-0.6017	7.917	-1.291	-5.6113	-0.4485	0.0403	-0.6017	18.05	148.7
Arm2:O	-0.5942	7.781	-0.2171	-5.7452	-0.4409	-0.0363	-0.5942	7.149	147.9
Arm2:End	-0.6223	8.018	0.7175	-5.6801	-0.4415	-0.0376	-0.6223	-2.114	150.7
Arm3:O	-0.4217	5.619	-0.265	-5.2143	-0.4219	-0.0600	-0.4217	6.6	125.4
Arm3:End	-0.4224	5.795	-1.647	-5.5901	-0.4260	-0.0079	-0.4224	21.28	126.6
Arm4:O	-0.425	5.627	-0.08659	-5.2143	-0.4219	-0.0600	-0.425	4.645	125.6
Arm4:End	-0.4808	5.911	1.191	-5.0043	-0.4453	-0.1441	-0.4808	-9.571	129.4
Arm5:O	-0.2744	3.782	-0.1961	-4.3217	-0.3530	-0.0443	-0.2744	5.086	103.5
Arm5:End	-0.2829	3.938	-1.35	-4.6964	-0.3606	0.0336	-0.2829	19.74	104.9
Arm6:O	-0.2776	3.789	0.0003273	-4.3217	-0.3530	-0.0443	-0.2776	2.486	103.7
Arm6:End	-0.3222	4.015	1.055	-4.1029	-0.3729	-0.1203	-0.3222	-11.79	107.3
Arm7:O	-0.1578	2.3	-0.1408	-3.3913	-0.2579	-0.0399	-0.1578	3.887	81.52
Arm7:End	-0.1377	2.432	-1.057	-3.7700	-0.2440	-0.1591	-0.1377	18.52	83.15
Arm8:O	-0.1608	2.305	0.04703	-3.3913	-0.2579	-0.0399	-0.1608	0.7177	81.7
Arm8:End	-0.1841	2.474	0.8683	-3.1646	-0.2552	-0.0269	-0.1841	-13.61	85.07

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
10184:g	2.61	0.0	-62.04	0.0	0.0	-82.49	0.0	0.0	103.24	0.0	6393.95	0.0	396.2	0.0	0.0	31.37	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
10184	10184:t	Origin	0.00	95.63	-7.30	-3.48	0.00	-0.00	0.0	-0.03	0.03	0.00	-0.00	0.00	0.01	0.00	0.01	0.0	4
10184	10184:Arm1	End	1.92	93.33	-7.12	-3.36	0.06	0.00	0.0	-0.03	0.03	0.00	-0.00	0.03	0.00	0.00	0.03	0.0	1
10184	10184:Arm1	Origin	1.92	93.33	-7.12	-3.36	-5.80	0.41	2.0	-0.14	2.37	0.22	-0.02	2.26	0.05	0.40	2.40	4.0	1
10184	10184:TopConn	End	3.58	91.33	-6.96	-3.26	-1.85	0.77	2.0	-0.14	2.37	0.22	-0.02	0.28	0.53	0.37	1.59	2.6	4
10184	10184:TopConn	Origin	3.58	91.33	-6.96	-3.26	-1.85	0.77	2.0	-1.64	13.24	0.24	-0.18	0.28	2.97	0.37	5.80	9.7	4
10184	SpliceT	End	8.25	85.75	-6.52	-2.98	59.95	1.91	2.0	-1.64	13.24	0.24	-0.16	17.69	0.05	0.30	17.86	29.8	1
10184	SpliceT	Origin	8.25	85.75	-6.52	-2.98	59.95	1.91	2.0	-1.80	13.36	0.25	-0.08	7.46	0.02	0.13	7.54	12.6	1
10184	10184:BotConn	End	9.75	83.99	-6.38	-2.90	79.99	2.28	2.0	-1.80	13.36	0.25	-0.07	9.37	0.02	0.12	9.45	15.7	1
10184	10184:BotConn	Origin	9.75	83.99	-6.38	-2.90	79.99	2.28	2.0	-3.13	6.80	0.25	-0.13	9.37	0.02	0.12	9.50	15.8	1
10184	Tube 2	End	12.38	80.93	-6.14	-2.75	97.83	2.93	2.0	-3.13	6.80	0.25	-0.12	10.36	0.02	0.11	10.48	17.5	1
10184	Tube 2	Origin	12.38	80.93	-6.14	-2.75	97.83	2.92	2.0	-3.37	6.92	0.25	-0.13	10.36	0.02	0.11	10.49	17.5	1
10184	10184:WVGD14	End	15.00	77.91	-5.91	-2.60	116.01	3.58	2.0	-3.37	6.92	0.25	-0.13	11.16	0.02	0.10	11.28	18.8	1
10184	10184:WVGD14	Origin	15.00	77.91	-5.91	-2.60	116.01	3.57	2.0	-3.88	7.35	0.25	-0.14	11.16	0.02	0.10	11.30	18.8	1
10184	Tube 2	End	19.67	72.63	-5.49	-2.35	150.34	4.76	2.0	-3.88	7.35	0.25	-0.13	12.31	0.02	0.08	12.45	20.7	1
10184	Tube 2	Origin	19.67	72.63	-5.49	-2.35	150.34	4.75	2.0	-4.36	7.60	0.26	-0.15	12.31	0.02	0.08	12.46	20.8	1
10184	10184:Arm2	End	24.34	67.47	-5.08	-2.11	185.87	5.95	2.0	-4.36	7.60	0.26	-0.14	13.12	0.02	0.07	13.26	22.1	1
10184	10184:Arm2	Origin	24.34	67.47	-5.08	-2.11	223.51	11.52	-5.9	-14.92	22.41	2.45	-0.48	15.78	0.16	0.21	16.27	27.1	1
10184	10184:WVGD13	End	25.00	66.76	-5.02	-2.08	238.22	13.12	-5.9	-14.92	22.41	2.45	-0.47	16.48	0.16	0.20	16.96	28.3	1
10184	10184:WVGD13	Origin	25.00	66.76	-5.02	-2.08	238.22	13.13	-5.9	-15.44	22.80	2.45	-0.49	16.48	0.16	0.20	16.98	28.3	1
10184	Tube 2	End	30.00	61.41	-4.60	-1.84	352.22	25.33	-5.9	-15.44	22.80	2.45	-0.45	21.05	0.15	0.18	21.51	35.9	1
10184	Tube 2	Origin	30.00	61.41	-4.60	-1.84	352.22	25.35	-5.9	-16.10	23.07	2.45	-0.47	21.05	0.15	0.17	21.53	35.9	1
10184	10184:WVGD12	End	35.00	56.27	-4.19	-1.61	467.60	37.55	-5.9	-16.10	23.07	2.45	-0.44	24.39	0.14	0.15	24.83	41.4	1
10184	10184:WVGD12	Origin	35.00	56.27	-4.19	-1.61	467.60	37.55	-5.8	-16.95	23.59	2.45	-0.46	24.39	0.14	0.15	24.85	41.4	1
10184	Tube 2	End	39.71	51.63	-3.81	-1.42	578.65	49.04	-5.8	-16.95	23.59	2.45	-0.44	26.75	0.13	0.14	27.19	45.3	1
10184	Tube 2	Origin	39.71	51.63	-3.81	-1.42	578.65	49.05	-5.8	-17.65	23.87	2.44	-0.46	26.75	0.13	0.13	27.21	45.4	1
10184	SpliceT	End	44.42	47.19	-3.45	-1.24	691.04	60.52	-5.8	-17.65	23.87	2.44	-0.43	28.52	0.12	0.12	28.95	48.3	1
10184	SpliceT	Origin	44.42	47.19	-3.45	-1.24	691.04	60.52	-5.8	-18.11	24.04	2.44	-0.44	28.52	0.12	0.12	28.96	48.3	1
10184	10184:WVGD11	End	45.00	46.65	-3.41	-1.22	705.05	61.94	-5.8	-18.11	24.04	2.44	-0.35	24.04	0.10	0.10	24.40	40.7	1
10184	10184:WVGD11	Origin	45.00	46.65	-3.41	-1.22	705.05	61.95	-5.8	-18.60	24.34	2.44	-0.36	24.04	0.10	0.10	24.41	40.7	1
10184	10184:Arm3	End	46.34	45.43	-3.31	-1.17	737.76	65.22	-5.8	-18.60	24.34	2.44	-0.36	24.36	0.10	0.10	24.72	41.2	1
10184	10184:Arm3	Origin	46.34	45.43	-3.31	-1.17	773.08	71.44	-5.6	-29.57	38.52	4.89	-0.57	25.52	0.19	0.09	26.10	43.5	1
10184	SpliceB	End	48.25	43.72	-3.17	-1.11	846.52	80.74	-5.6	-29.57	38.52	4.89	-0.56	26.72	0.19	0.09	27.28	45.5	1
10184	SpliceB	Origin	48.25	43.72	-3.17	-1.11	846.52	80.75	-5.6	-30.26	38.69	4.89	-0.57	26.72	0.19	0.09	27.30	45.5	1
10184	Tube 3	End	51.63	40.77	-2.94	-1.00	977.10	97.21	-5.6	-30.26	38.69	4.89	-0.55	28.56	0.18	0.08	29.11	48.5	1
10184	Tube 3	Origin	51.63	40.77	-2.94	-1.00	977.10	97.21	-5.6	-30.99	38.90	4.88	-0.56	28.56	0.18	0.08	29.12	48.5	1
10184	10184:WVGD10	End	55.00	37.91	-2.71	-0.90	1108.38	113.66	-5.6	-30.99	38.90	4.88	-0.54	30.08	0.17	0.08	30.62	51.0	1
10184	10184:WVGD10	Origin	55.00	37.91	-2.71	-0.90	1108.38	113.66	-5.6	-32.11	39.39	4.88	-0.56	30.08	0.17	0.08	30.64	51.1	1
10184	Tube 3	End	60.00	33.87	-2.39	-0.76	1305.36	138.01	-5.6	-32.11	39.39	4.88	-0.53	31.90	0.16	0.07	32.43	54.0	1
10184	Tube 3	Origin	60.00	33.87	-2.39	-0.76	1305.36	138.00	-5.6	-33.29	39.72	4.87	-0.55	31.90	0.16	0.07	32.45	54.1	1
10184	10184:WVGD9	End	65.00	30.06	-2.10	-0.64	1503.97	162.31	-5.6	-33.29	39.72	4.87	-0.52	33.26	0.16	0.06	33.78	56.3	1
10184	10184:WVGD9	Origin	65.00	30.06	-2.10	-0.64	1503.97	162.30	-5.6	-34.48	40.23	4.86	-0.54	33.26	0.16	0.06	33.80	56.3	1
10184	10184:Arm4	End	68.34	27.63	-1.91	-0.56	1638.50	178.53	-5.6	-34.48	40.23	4.86	-0.53	33.98	0.15	0.06	34.51	57.5	1
10184	10184:Arm4	Origin	68.34	27.63	-1.91	-0.56	1673.05	173.49	-31.6	-45.95	54.13	2.86	-0.70	34.70	0.09	0.33	35.41	59.0	1
10184	Tube 3	End	71.67	25.31	-1.74	-0.49	1853.21	182.91	-31.6	-45.95	54.13	2.86	-0.68	36.13	0.09	0.31	36.82	61.4	1
10184	Tube 3	Origin	71.67	25.31	-1.74	-0.49	1853.20	182.97	-31.6	-46.85	54.34	2.85	-0.69	36.13	0.09	0.31	36.83	61.4	1
10184	10184:WVGD8	End	75.00	23.10	-1.58	-0.43	2034.07	192.35	-31.6	-46.85	54.34	2.85	-0.67	37.35	0.08	0.29	38.03	63.4	1
10184	10184:WVGD8	Origin	75.00	23.10	-1.58	-0.43	2034.06	192.39	-31.6	-47.70	54.72	2.84	-0.68	37.35	0.08	0.29	38.04	63.4	1
10184	SpliceT	End	76.50	22.13	-1.51	-0.40	2116.15	196.61	-31.6	-47.70	54.72	2.84	-0.68	37.85	0.08	0.28	38.53	64.2	1
10184	SpliceT	Origin	76.50	22.13	-1.51	-0.40	2116.15	196.64	-31.5	-48.58	54.87	2.84	-0.69	37.85	0.08	0.28	38.54	64.2	1
10184	Tube 3	End	79.08	20.52	-1.39	-0.36	2257.91	203.89	-31.5	-48.58	54.87	2.84	-0.69	40.91	0.08	0.29	41.60	69.3	1
10184	Tube 3	Origin	79.08	20.52	-1.39	-0.36	2257.90	203.94	-31.5	-49.94	55.06	2.83	-0.71	40.91	0.08	0.29	41.62	69.4	1
10184	SpliceB	End	81.67	18.98	-1.28	-0.32	2400.16	211.16	-31.5	-49.94	55.06	2.83	-0.70	41.57	0.08	0.27	42.27	70.4	1
10184	SpliceB	Origin	81.67	18.98	-1.28	-0.32	2400.15	211.22	-31.5	-51.12	55.26	2.82	-0.71	41.57	0.08	0.27	42.29	70.5	1
10184	10184:WVGD7	End	85.00	17.08	-1.15	-0.28	2584.33	220.50	-31.5	-51.12	55.26	2.82	-0.69	42.29	0.08	0.26	42.99	71.7	1
10184	10184:WVGD7	Origin	85.00	17.08	-1.15	-0.28	2584.32	220.58	-31.5	-52.54	55.75	2.81	-0.71	42.29	0.08	0.26	43.01	71.7	1

10184	Tube 4	End	90.00	14.43	-0.96	-0.22	2863.07	234.45	-31.5	-52.54	55.75	2.81	-0.68	43.17	0.07	0.24	43.85	73.1	1
10184	Tube 4	Origin	90.00	14.43	-0.96	-0.22	2863.06	234.54	-31.5	-54.07	56.07	2.79	-0.70	43.17	0.07	0.24	43.87	73.1	1
10184	10184:WVGD6	End	95.00	12.02	-0.79	-0.17	3143.44	248.33	-31.5	-54.07	56.07	2.79	-0.68	43.80	0.07	0.22	44.48	74.1	1
10184	10184:WVGD6	Origin	95.00	12.02	-0.79	-0.17	3143.43	248.42	-31.4	-55.83	56.64	2.78	-0.70	43.80	0.07	0.22	44.50	74.2	1
10184	Tube 4	End	100.00	9.85	-0.65	-0.13	3426.64	262.13	-31.4	-55.83	56.64	2.78	-0.67	44.26	0.07	0.20	44.94	74.9	1
10184	Tube 4	Origin	100.00	9.85	-0.65	-0.13	3426.64	262.22	-31.4	-57.45	57.00	2.76	-0.69	44.26	0.07	0.20	44.96	74.9	1
10184	10184:WVGD5	End	105.00	7.91	-0.52	-0.09	3711.63	275.86	-31.4	-57.45	57.00	2.76	-0.67	44.56	0.07	0.19	45.23	75.4	1
10184	10184:WVGD5	Origin	105.00	7.91	-0.52	-0.09	3711.62	275.94	-31.4	-59.31	57.59	2.74	-0.69	44.56	0.06	0.19	45.26	75.4	1
10184	SpliceT	End	110.00	6.19	-0.40	-0.07	3999.59	289.51	-31.4	-59.31	57.59	2.74	-0.67	44.75	0.06	0.18	45.42	75.7	1
10184	SpliceT	Origin	110.00	6.19	-0.40	-0.07	3999.58	289.60	-31.4	-61.79	57.99	2.73	-0.69	44.75	0.06	0.18	45.45	75.7	1
10184	10184:WVGD4	End	115.00	4.69	-0.30	-0.05	4289.55	303.09	-31.4	-61.79	57.99	2.73	-0.69	46.90	0.06	0.17	47.59	79.3	1
10184	10184:WVGD4	Origin	115.00	4.69	-0.30	-0.05	4289.54	303.15	-31.4	-64.10	58.48	2.72	-0.71	46.90	0.06	0.17	47.61	79.4	1
10184	SpliceB	End	116.50	4.28	-0.27	-0.04	4377.26	307.19	-31.4	-64.10	58.48	2.72	-0.70	46.89	0.06	0.17	47.60	79.3	1
10184	SpliceB	Origin	116.50	4.28	-0.27	-0.04	4377.26	307.24	-31.4	-65.36	58.70	2.71	-0.72	46.89	0.06	0.17	47.61	79.3	1
10184	Tube 5	End	120.75	3.24	-0.21	-0.03	4626.74	318.64	-31.4	-65.36	58.70	2.71	-0.70	46.83	0.06	0.16	47.53	79.2	1
10184	Tube 5	Origin	120.75	3.24	-0.21	-0.03	4626.74	318.71	-31.4	-66.89	59.03	2.70	-0.71	46.83	0.06	0.16	47.54	79.2	1
10184	10184:WVGD3	End	125.00	2.34	-0.15	-0.02	4877.61	330.06	-31.4	-66.89	59.03	2.70	-0.70	46.71	0.06	0.15	47.41	79.0	1
10184	10184:WVGD3	Origin	125.00	2.34	-0.15	-0.02	4877.61	330.14	-31.4	-68.79	59.62	2.68	-0.71	46.71	0.06	0.15	47.43	79.0	1
10184	Tube 5	End	130.00	1.49	-0.09	-0.01	5175.71	343.41	-31.4	-68.79	59.62	2.68	-0.69	46.54	0.05	0.14	47.23	78.7	1
10184	Tube 5	Origin	130.00	1.49	-0.09	-0.01	5175.70	343.51	-31.4	-70.68	60.03	2.67	-0.71	46.54	0.05	0.14	47.25	78.8	1
10184	10184:WVGD2	End	135.00	0.83	-0.05	-0.01	5475.87	356.71	-31.4	-70.68	60.03	2.67	-0.69	46.32	0.05	0.13	47.01	78.3	1
10184	10184:WVGD2	Origin	135.00	0.83	-0.05	-0.01	5475.87	356.80	-31.4	-72.80	60.68	2.65	-0.71	46.32	0.05	0.13	47.03	78.4	1
10184	Tube 5	End	140.00	0.37	-0.02	-0.00	5779.29	369.93	-31.4	-72.80	60.68	2.65	-0.69	46.07	0.05	0.13	46.76	77.9	1
10184	Tube 5	Origin	140.00	0.37	-0.02	-0.00	5779.28	370.02	-31.4	-74.78	61.13	2.64	-0.71	46.07	0.05	0.13	46.78	78.0	1
10184	10184:WVGD1	End	145.00	0.09	-0.01	-0.00	6084.92	383.07	-31.4	-74.78	61.13	2.64	-0.69	45.79	0.05	0.12	46.48	77.5	1
10184	10184:WVGD1	Origin	145.00	0.09	-0.01	-0.00	6084.92	383.16	-31.4	-77.00	61.81	2.62	-0.71	45.79	0.05	0.12	46.50	77.5	1
10184	10184:g	End	150.00	0.00	0.00	0.00	6393.95	396.15	-31.4	-77.00	61.81	2.62	-0.69	45.49	0.05	0.11	46.19	77.0	1

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Arm1	Arm1:O	Origin	0.00	93.29	-7.11	-4.12	3.33	2.01	0.0	1.08	-0.30	-0.21	0.18	4.29	0.10	0.00	4.48	7.5	2
Arm1	#Arm1:0	End	4.85	94.15	-7.14	-9.84	1.85	1.00	0.0	1.08	-0.30	-0.21	0.23	3.53	0.12	0.00	3.77	6.3	2
Arm1	#Arm1:0	Origin	4.85	94.15	-7.14	-9.84	1.85	1.00	-0.0	1.09	-0.38	-0.21	0.23	3.53	0.14	0.00	3.77	6.3	2
Arm1	Arm1:End	End	9.69	95.01	-7.22	-15.49	0.00	-0.00	-0.0	1.09	-0.38	-0.21	0.30	0.00	0.24	0.00	0.52	0.9	3
Arm2	Arm2:O	Origin	0.00	93.37	-7.13	-2.61	-1.90	-0.05	-0.0	-1.33	0.23	0.01	-0.23	1.57	0.06	0.00	1.80	3.0	2
Arm2	#Arm2:0	End	4.85	94.80	-7.30	3.02	-0.80	-0.02	-0.0	-1.33	0.23	0.01	-0.28	1.02	0.07	0.00	1.30	2.2	2
Arm2	#Arm2:0	Origin	4.85	94.80	-7.30	3.02	-0.80	-0.02	-0.0	-1.31	0.16	0.00	-0.28	1.02	0.05	0.00	1.30	2.2	2
Arm2	Arm2:End	End	9.69	96.22	-7.47	8.61	-0.00	-0.00	-0.0	-1.31	0.16	0.00	-0.36	0.00	0.11	0.00	0.41	0.7	3
Arm3	Arm3:O	Origin	0.00	67.43	-5.06	-3.18	-86.61	12.35	0.0	6.42	6.20	-0.84	0.27	9.96	0.41	0.00	10.25	17.1	2
Arm3	#Arm3:0	End	5.00	68.13	-5.04	-8.67	-55.62	8.13	0.0	6.42	6.20	-0.84	0.33	9.44	0.50	0.00	9.81	16.4	2
Arm3	#Arm3:0	Origin	5.00	68.13	-5.04	-8.67	-55.62	8.13	0.0	6.46	5.86	-0.84	0.33	9.44	0.47	0.00	9.81	16.3	2
Arm3	#Arm3:1	End	9.86	68.83	-5.05	-14.15	-27.15	4.06	0.0	6.46	5.86	-0.84	0.42	7.36	0.60	0.00	7.84	13.1	2
Arm3	#Arm3:1	Origin	9.86	68.83	-5.05	-14.15	-27.15	4.06	-0.0	6.49	5.59	-0.83	0.42	7.36	0.57	0.00	7.84	13.1	2
Arm3	Arm3:End	End	14.72	69.54	-5.07	-19.77	0.00	-0.00	-0.0	6.49	5.59	-0.83	0.57	0.00	1.13	0.00	2.04	3.4	3
Arm4	Arm4:O	Origin	0.00	67.52	-5.10	-1.04	-49.08	-19.77	-0.0	-7.98	3.60	1.34	-0.34	6.93	0.25	0.00	7.28	12.1	2
Arm4	#Arm4:0	End	5.00	68.70	-5.29	4.24	-31.09	-13.07	-0.0	-7.98	3.60	1.34	-0.41	6.54	0.31	0.00	6.97	11.6	2
Arm4	#Arm4:0	Origin	5.00	68.70	-5.29	4.24	-31.09	-13.06	-0.0	-7.89	3.31	1.34	-0.41	6.54	0.28	0.00	6.96	11.6	2
Arm4	#Arm4:1	End	9.86	69.83	-5.52	9.30	-15.00	-6.54	-0.0	-7.89	3.31	1.34	-0.51	5.08	0.36	0.00	5.62	9.4	2
Arm4	#Arm4:1	Origin	9.86	69.83	-5.52	9.30	-15.00	-6.53	-0.0	-7.82	3.09	1.34	-0.51	5.08	0.34	0.00	5.62	9.4	2
Arm4	Arm4:End	End	14.72	70.93	-5.77	14.29	-0.00	-0.00	-0.0	-7.82	3.09	1.34	-0.68	0.00	0.63	0.00	1.28	2.1	3

Arm5	Arm5:O	Origin	0.00	45.38	-3.29	-2.35	-86.34	18.05	0.0	6.07	6.18	-1.23	0.26	10.50	0.41	0.00	10.78	18.0	2
Arm5	#Arm5:0	End	5.00	46.01	-3.30	-6.91	-55.44	11.89	0.0	6.07	6.18	-1.23	0.31	9.97	0.50	0.00	10.32	17.2	2
Arm5	#Arm5:0	Origin	5.00	46.01	-3.30	-6.91	-55.44	11.89	0.0	6.11	5.84	-1.23	0.32	9.97	0.48	0.00	10.32	17.2	2
Arm5	#Arm5:1	End	9.86	46.63	-3.33	-11.49	-27.07	5.94	0.0	6.11	5.84	-1.23	0.40	7.78	0.60	0.00	8.24	13.7	2
Arm5	#Arm5:1	Origin	9.86	46.63	-3.33	-11.49	-27.07	5.94	-0.0	6.15	5.57	-1.22	0.40	7.78	0.57	0.00	8.24	13.7	2
Arm5	Arm5:End	End	14.72	47.26	-3.39	-16.20	0.00	-0.00	-0.0	6.15	5.57	-1.22	0.54	0.00	1.13	0.00	2.03	3.4	3
Arm6	Arm6:O	Origin	0.00	45.47	-3.33	0.00	-51.08	-17.80	-0.0	-7.75	3.74	1.21	-0.33	6.93	0.26	0.00	7.27	12.1	2
Arm6	#Arm6:0	End	5.00	46.41	-3.48	4.38	-32.40	-11.77	-0.0	-7.75	3.74	1.21	-0.40	6.54	0.31	0.00	6.96	11.6	2
Arm6	#Arm6:0	Origin	5.00	46.41	-3.48	4.38	-32.40	-11.76	-0.0	-7.67	3.45	1.21	-0.40	6.54	0.29	0.00	6.96	11.6	2
Arm6	#Arm6:1	End	9.86	47.31	-3.66	8.56	-15.65	-5.89	-0.0	-7.67	3.45	1.21	-0.50	5.08	0.37	0.00	5.61	9.4	2
Arm6	#Arm6:1	Origin	9.86	47.31	-3.66	8.56	-15.65	-5.88	-0.0	-7.60	3.22	1.21	-0.49	5.08	0.35	0.00	5.60	9.3	2
Arm6	Arm6:End	End	14.72	48.18	-3.87	12.66	-0.00	-0.00	-0.0	-7.60	3.22	1.21	-0.66	0.00	0.65	0.00	1.31	2.2	3
Arm7	Arm7:O	Origin	0.00	27.60	-1.89	-1.69	-87.47	-26.48	0.0	5.92	6.26	1.80	0.25	11.46	0.43	0.00	11.74	19.6	2
Arm7	#Arm7:0	End	5.00	28.12	-1.86	-5.28	-56.19	-17.47	0.0	5.92	6.26	1.80	0.31	10.91	0.52	0.00	11.25	18.8	2
Arm7	#Arm7:0	Origin	5.00	28.12	-1.86	-5.28	-56.20	-17.46	0.0	5.97	5.91	1.80	0.31	10.91	0.49	0.00	11.25	18.7	2
Arm7	#Arm7:1	End	9.86	28.64	-1.78	-8.92	-27.44	-8.72	0.0	5.97	5.91	1.80	0.39	8.52	0.62	0.00	8.98	15.0	2
Arm7	#Arm7:1	Origin	9.86	28.64	-1.78	-8.92	-27.45	-8.71	0.0	6.02	5.65	1.79	0.39	8.52	0.60	0.00	8.97	15.0	2
Arm7	Arm7:End	End	14.72	29.18	-1.65	-12.69	0.00	-0.00	0.0	6.02	5.65	1.79	0.53	0.00	1.14	0.00	2.05	3.4	3
Arm8	Arm8:O	Origin	0.00	27.66	-1.93	0.56	-52.98	2.77	-0.0	-7.53	3.87	-0.19	-0.32	5.61	0.25	0.00	5.95	9.9	2
Arm8	#Arm8:0	End	5.00	28.37	-2.03	4.00	-33.64	1.84	-0.0	-7.53	3.87	-0.19	-0.39	5.25	0.31	0.00	5.67	9.4	2
Arm8	#Arm8:0	Origin	5.00	28.37	-2.03	4.00	-33.64	1.84	-0.0	-7.45	3.57	-0.19	-0.38	5.25	0.29	0.00	5.66	9.4	2
Arm8	#Arm8:1	End	9.86	29.04	-2.12	7.25	-16.26	0.92	-0.0	-7.45	3.57	-0.19	-0.48	4.05	0.36	0.00	4.58	7.6	2
Arm8	#Arm8:1	Origin	9.86	29.04	-2.12	7.25	-16.26	0.92	0.0	-7.38	3.35	-0.19	-0.48	4.05	0.34	0.00	4.57	7.6	2
Arm8	Arm8:End	End	14.72	29.69	-2.21	10.42	-0.00	-0.00	0.0	-7.38	3.35	-0.19	-0.65	0.00	0.68	0.00	1.34	2.2	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	1.187	80.00	80.00	1.48
2	1.307	80.00	80.00	1.63
3	8.539	80.00	80.00	10.67
4	8.447	80.00	80.00	10.56
5	8.321	80.00	80.00	10.40
6	8.279	80.00	80.00	10.35
7	8.377	80.00	80.00	10.47
8	8.043	80.00	80.00	10.05
9	10.844	80.00	80.00	13.55
10	6.765	80.00	80.00	8.46
11	0.287	80.00	80.00	0.36
12	0.287	80.00	80.00	0.36
13	0.287	80.00	80.00	0.36
14	0.287	80.00	80.00	0.36
15	0.287	80.00	80.00	0.36
16	0.287	80.00	80.00	0.36
17	0.287	80.00	80.00	0.36
18	0.287	80.00	80.00	0.36
19	0.287	80.00	80.00	0.36
20	0.287	80.00	80.00	0.36
21	0.287	80.00	80.00	0.36
22	0.287	80.00	80.00	0.36
23	0.287	80.00	80.00	0.36

24	0.287	80.00	80.00	0.36

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
10184	82.52	NESC Heavy	34	41645.5

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
10184	NESC Heavy	1	2.064	2.132	-0.721	2.879	34.600	27.364	118.350	3	178.261	2.026	3.000	45.61
10184	NESC Heavy	2	2.853	0.815	0.815	2.853	34.600	45.721	197.741	6	178.261	2.619	3.000	76.20
10184	NESC Heavy	3	2.879	-0.721	2.132	2.064	34.600	15.063	65.147	3	128.785	1.503	3.000	25.10
10184	NESC Heavy	4	2.132	-2.064	2.879	0.721	34.600	10.779	46.620	3	-104.137	1.272	3.000	17.97
10184	NESC Heavy	5	0.815	-2.853	2.853	-0.815	34.600	37.854	163.720	6	-160.278	2.383	3.000	63.09
10184	NESC Heavy	6	-0.721	-2.879	2.064	-2.132	34.600	24.233	104.808	3	-160.278	1.907	3.000	40.39
10184	NESC Heavy	7	-2.064	-2.132	0.721	-2.879	34.600	25.390	109.810	3	-165.973	1.952	3.000	42.32
10184	NESC Heavy	8	-2.853	-0.815	-0.815	-2.853	34.600	41.594	179.895	6	-165.973	2.498	3.000	69.32
10184	NESC Heavy	9	-2.879	0.721	-2.132	-2.064	34.600	13.088	56.606	3	-116.496	1.401	3.000	21.81
10184	NESC Heavy	10	-2.132	2.064	-2.879	-0.721	34.600	12.754	55.160	3	116.425	1.383	3.000	21.26
10184	NESC Heavy	11	-0.815	2.853	-2.853	0.815	34.600	41.981	181.566	6	172.566	2.509	3.000	69.97
10184	NESC Heavy	12	0.721	2.879	-2.064	2.132	34.600	26.208	113.348	3	172.566	1.983	3.000	43.68
10184	NESC Heavy	13	1.442	2.685	-1.442	2.685	34.600	6.937	30.002	2	178.261	1.020	3.000	11.56
10184	NESC Heavy	14	2.591	1.605	0.094	3.046	34.600	30.905	133.664	4	178.261	2.153	3.000	51.51
10184	NESC Heavy	15	3.046	0.094	1.605	2.591	34.600	20.896	90.375	4	149.450	1.770	3.000	34.83
10184	NESC Heavy	16	2.685	-1.442	2.685	1.442	34.600	2.516	10.884	2	77.353	0.614	3.000	4.19
10184	NESC Heavy	17	1.605	-2.591	3.046	-0.094	34.600	15.947	68.970	4	-126.738	1.547	3.000	26.58
10184	NESC Heavy	18	0.094	-3.046	2.591	-1.605	34.600	26.894	116.314	4	-160.278	2.008	3.000	44.82
10184	NESC Heavy	19	-1.442	-2.685	1.442	-2.685	34.600	6.451	27.900	2	-165.973	0.984	3.000	10.75
10184	NESC Heavy	20	-2.591	-1.605	-0.094	-3.046	34.600	28.542	123.445	4	-165.973	2.069	3.000	47.57
10184	NESC Heavy	21	-3.046	-0.094	-1.605	-2.591	34.600	18.533	80.157	4	-137.161	1.667	3.000	30.89
10184	NESC Heavy	22	-2.685	1.442	-2.685	-1.442	34.600	2.516	10.884	2	-65.065	0.614	3.000	4.19
10184	NESC Heavy	23	-1.605	2.591	-3.046	0.094	34.600	18.310	79.189	4	139.026	1.657	3.000	30.52
10184	NESC Heavy	24	-0.094	3.046	-2.591	1.605	34.600	29.256	126.533	4	172.566	2.095	3.000	48.76
10184	NESC Extreme	1	2.064	2.132	-0.721	2.879	34.600	27.017	116.848	3	175.781	2.013	3.000	45.03
10184	NESC Extreme	2	2.853	0.815	0.815	2.853	34.600	45.294	195.894	6	175.781	2.607	3.000	75.49
10184	NESC Extreme	3	2.879	-0.721	2.132	2.064	34.600	14.985	64.809	3	127.776	1.499	3.000	24.97
10184	NESC Extreme	4	2.132	-2.064	2.879	0.721	34.600	10.756	46.518	3	-104.229	1.270	3.000	17.93
10184	NESC Extreme	5	0.815	-2.853	2.853	-0.815	34.600	37.952	164.144	6	-161.424	2.386	3.000	63.25
10184	NESC Extreme	6	-0.721	-2.879	2.064	-2.132	34.600	24.377	105.431	3	-161.424	1.912	3.000	40.63
10184	NESC Extreme	7	-2.064	-2.132	0.721	-2.879	34.600	25.972	112.329	3	-169.278	1.974	3.000	43.29
10184	NESC Extreme	8	-2.853	-0.815	-0.815	-2.853	34.600	43.110	186.450	6	-169.278	2.543	3.000	71.85
10184	NESC Extreme	9	-2.879	0.721	-2.132	-2.064	34.600	13.940	60.289	3	-121.273	1.446	3.000	23.23
10184	NESC Extreme	10	-2.132	2.064	-2.879	-0.721	34.600	11.801	51.037	3	110.732	1.330	3.000	19.67
10184	NESC Extreme	11	-0.815	2.853	-2.853	0.815	34.600	40.136	173.588	6	167.927	2.454	3.000	66.89
10184	NESC Extreme	12	0.721	2.879	-2.064	2.132	34.600	25.422	109.951	3	167.927	1.953	3.000	42.37
10184	NESC Extreme	13	1.442	2.685	-1.442	2.685	34.600	6.796	29.393	2	175.781	1.010	3.000	11.33
10184	NESC Extreme	14	2.591	1.605	0.094	3.046	34.600	30.547	132.117	4	175.781	2.141	3.000	50.91
10184	NESC Extreme	15	3.046	0.094	1.605	2.591	34.600	20.758	89.776	4	147.989	1.765	3.000	34.60
10184	NESC Extreme	16	2.685	-1.442	2.685	1.442	34.600	2.507	10.841	2	77.081	0.613	3.000	4.18
10184	NESC Extreme	17	1.605	-2.591	3.046	-0.094	34.600	15.940	68.942	4	-127.111	1.546	3.000	26.57

10184	NESC Extreme	18	0.094	-3.046	2.591	-1.605	34.600	27.023	116.876	4	-161.424	2.013	3.000	45.04
10184	NESC Extreme	19	-1.442	-2.685	1.442	-2.685	34.600	6.539	28.281	2	-169.278	0.990	3.000	10.90
10184	NESC Extreme	20	-2.591	-1.605	-0.094	-3.046	34.600	29.297	126.710	4	-169.278	2.096	3.000	48.83
10184	NESC Extreme	21	-3.046	-0.094	-1.605	-2.591	34.600	19.507	84.369	4	-141.486	1.711	3.000	32.51
10184	NESC Extreme	22	-2.685	1.442	-2.685	-1.442	34.600	2.507	10.841	2	-70.578	0.613	3.000	4.18
10184	NESC Extreme	23	-1.605	2.591	-3.046	0.094	34.600	17.191	74.350	4	133.614	1.606	3.000	28.65
10184	NESC Extreme	24	-0.094	3.046	-2.591	1.605	34.600	28.274	122.284	4	167.927	2.059	3.000	47.12

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Arm1	35.11	NESC Heavy	1	156.1
Arm2	15.17	NESC Heavy	1	156.1
Arm3	31.81	NESC Heavy	1	873.6
Arm4	28.08	NESC Heavy	1	873.6
Arm5	34.31	NESC Heavy	1	873.6
Arm6	27.79	NESC Heavy	1	873.6
Arm7	43.01	NESC Heavy	1	873.6
Arm8	27.05	NESC Heavy	1	873.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	82.52	10184	Steel Pole
NESC Extreme	79.35	10184	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	82.52	10184	34
NESC Extreme	79.35	10184	34

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	10184	2	34.600	147.459	6419.233	287.259	45.721	197.741	6	178.261	2.619	76.20
NESC Extreme	10184	2	34.600	78.035	6393.954	396.145	45.294	195.894	6	175.781	2.607	75.49

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	43.01	Arm7	1
NESC Extreme	19.57	Arm7	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	3.26	NESC Heavy	0.0
2	Clamp	3.15	NESC Heavy	0.0
3	Clamp	16.29	NESC Heavy	0.0
4	Clamp	16.13	NESC Heavy	0.0
5	Clamp	16.22	NESC Heavy	0.0
6	Clamp	16.15	NESC Heavy	0.0
7	Clamp	17.68	NESC Heavy	0.0
8	Clamp	16.23	NESC Heavy	0.0
9	Clamp	13.55	NESC Extreme	0.0
10	Clamp	8.46	NESC Extreme	0.0
11	Clamp	0.87	NESC Heavy	0.0
12	Clamp	0.87	NESC Heavy	0.0
13	Clamp	0.87	NESC Heavy	0.0
14	Clamp	0.87	NESC Heavy	0.0
15	Clamp	0.87	NESC Heavy	0.0
16	Clamp	0.87	NESC Heavy	0.0
17	Clamp	0.87	NESC Heavy	0.0
18	Clamp	0.87	NESC Heavy	0.0
19	Clamp	0.87	NESC Heavy	0.0
20	Clamp	0.87	NESC Heavy	0.0
21	Clamp	0.87	NESC Heavy	0.0
22	Clamp	0.87	NESC Heavy	0.0
23	Clamp	0.87	NESC Heavy	0.0
24	Clamp	0.87	NESC Heavy	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	1	Clamp	Arm1:End	-0.753	1.896	1.626	2.609
NESC Heavy	2	Clamp	Arm2:End	0.000	1.927	1.626	2.521
NESC Heavy	3	Clamp	Arm3:End	-0.708	7.350	10.734	13.029
NESC Heavy	4	Clamp	Arm4:End	-1.946	7.054	10.631	12.906
NESC Heavy	5	Clamp	Arm5:End	-1.784	7.212	10.640	12.977
NESC Heavy	6	Clamp	Arm6:End	-1.713	7.128	10.639	12.920
NESC Heavy	7	Clamp	Arm7:End	5.287	7.653	10.655	14.144
NESC Heavy	8	Clamp	Arm8:End	1.430	7.310	10.634	12.983
NESC Heavy	9	Clamp	10184:TopConn	0.000	3.171	5.128	6.029
NESC Heavy	10	Clamp	10184:BotConn	0.000	-1.971	1.079	2.247
NESC Heavy	11	Clamp	10184:WVGD1	0.000	0.093	0.690	0.696
NESC Heavy	12	Clamp	10184:WVGD2	0.000	0.093	0.690	0.696
NESC Heavy	13	Clamp	10184:WVGD3	0.000	0.093	0.690	0.696
NESC Heavy	14	Clamp	10184:WVGD4	0.000	0.093	0.690	0.696
NESC Heavy	15	Clamp	10184:WVGD5	0.000	0.093	0.690	0.696
NESC Heavy	16	Clamp	10184:WVGD6	0.000	0.093	0.690	0.696
NESC Heavy	17	Clamp	10184:WVGD7	0.000	0.093	0.690	0.696
NESC Heavy	18	Clamp	10184:WVGD8	0.000	0.093	0.690	0.696
NESC Heavy	19	Clamp	10184:WVGD9	0.000	0.093	0.690	0.696
NESC Heavy	20	Clamp	10184:WVGD10	0.000	0.093	0.690	0.696

NESC Heavy	21	Clamp	10184:WVGD11	0.000	0.093	0.690	0.696
NESC Heavy	22	Clamp	10184:WVGD12	0.000	0.093	0.690	0.696
NESC Heavy	23	Clamp	10184:WVGD13	0.000	0.093	0.690	0.696
NESC Heavy	24	Clamp	10184:WVGD14	0.000	0.093	0.690	0.696
NESC Extreme	1	Clamp	Arm1:End	-0.211	1.045	-0.523	1.187
NESC Extreme	2	Clamp	Arm2:End	0.000	1.202	0.512	1.307
NESC Extreme	3	Clamp	Arm3:End	-0.795	6.902	4.964	8.539
NESC Extreme	4	Clamp	Arm4:End	-1.294	6.753	4.906	8.447
NESC Extreme	5	Clamp	Arm5:End	-1.193	6.640	4.871	8.321
NESC Extreme	6	Clamp	Arm6:End	-1.169	6.589	4.874	8.279
NESC Extreme	7	Clamp	Arm7:End	1.835	6.588	4.838	8.377
NESC Extreme	8	Clamp	Arm8:End	0.213	6.427	4.831	8.043
NESC Extreme	9	Clamp	10184:TopConn	0.000	10.560	2.464	10.844
NESC Extreme	10	Clamp	10184:BotConn	0.000	-6.747	0.497	6.765
NESC Extreme	11	Clamp	10184:WVGD1	0.000	0.218	0.187	0.287
NESC Extreme	12	Clamp	10184:WVGD2	0.000	0.218	0.187	0.287
NESC Extreme	13	Clamp	10184:WVGD3	0.000	0.218	0.187	0.287
NESC Extreme	14	Clamp	10184:WVGD4	0.000	0.218	0.187	0.287
NESC Extreme	15	Clamp	10184:WVGD5	0.000	0.218	0.187	0.287
NESC Extreme	16	Clamp	10184:WVGD6	0.000	0.218	0.187	0.287
NESC Extreme	17	Clamp	10184:WVGD7	0.000	0.218	0.187	0.287
NESC Extreme	18	Clamp	10184:WVGD8	0.000	0.218	0.187	0.287
NESC Extreme	19	Clamp	10184:WVGD9	0.000	0.218	0.187	0.287
NESC Extreme	20	Clamp	10184:WVGD10	0.000	0.218	0.187	0.287
NESC Extreme	21	Clamp	10184:WVGD11	0.000	0.218	0.187	0.287
NESC Extreme	22	Clamp	10184:WVGD12	0.000	0.218	0.187	0.287
NESC Extreme	23	Clamp	10184:WVGD13	0.000	0.218	0.187	0.287
NESC Extreme	24	Clamp	10184:WVGD14	0.000	0.218	0.187	0.287

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy	50.032	-0.187	83.052	5484.054	-258.999	-72.465
NESC Extreme	49.011	-2.614	34.852	5392.667	-377.878	-31.302

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	5553.7
Weight of Steel Poles:	41645.5
Total:	47199.2

*** End of Report

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force =	$T_{Max} := 178 \cdot kips$	(User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	$N := 24$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yeild Strength=	$F_y := 75 \cdot ksi$	(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)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Net Area of Bolt =

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$$

Bolt Tension Check:

Allowable Tensile Force (Net Area) =

$$T_{ALL.Net} := 1.0 \cdot \left(A_n \cdot F_y\right) = 243.576 \cdot kips$$

Bolt Tension % of Capacity =

$$\frac{T_{Max}}{T_{ALL.Net}} = 73.08 \cdot \%$$

Condition1 =

$$Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition1 = "OK"

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 6425.66 \cdot ft \cdot kips \cdot 1.1 = 7068 \cdot ft \cdot kips$	(User Input from PLSPole)
Shear Force =	$Shear := 57.71 \cdot kip \cdot 1.1 = 63.481 \cdot kips$	(User Input from PLSPole)
Axial Force =	$Axial := 152 \cdot kip \cdot 1.1 = 167.2 \cdot kips$	(User Input from PLSPole)
Tower Height =	$H_t := 150 \cdot ft$	(User Input)

Footing Data:

Depth to Bottom of Footing =	$D_f := 6 \cdot ft$	(User Input)
Length of Pier =	$L_p := 9 \cdot ft$	(User Input)
Extension of Pier Above Grade =	$L_{pag} := 3 \cdot ft$	(User Input)
Width of Pier =	$W_p := 10 \cdot ft$	(User Input)
Depth of Soil =	$D_{soil} := 6 \cdot ft$	(User Input)
Depth of Rock =	$D_{rock} := 24 \cdot ft$	(User Input)

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(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)	
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 =	$\gamma_{soil} := 100 \cdot pcf$	(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 =	$n := 1.0 \cdot ft$	(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

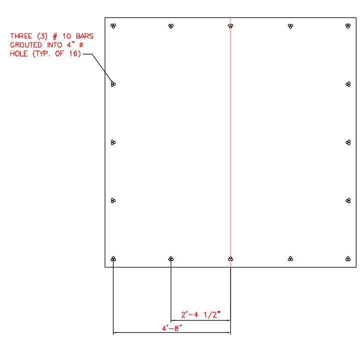
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Anchor Diameter =	$d_{ra} := 1.27 \cdot in$	(User Input)
Hole Diameter =	$d_{Hole} := 4 \cdot in$	(User Input)
Grout Strength =	$\tau := 120 \cdot psi$	(User Input)
Total Number of Rock Bolts =	$N_{atot} := 16$	(User Input)

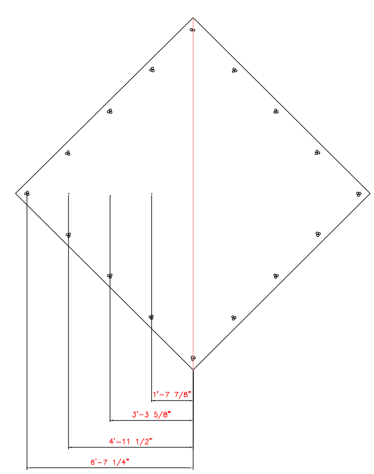
Perpendicular Direction:

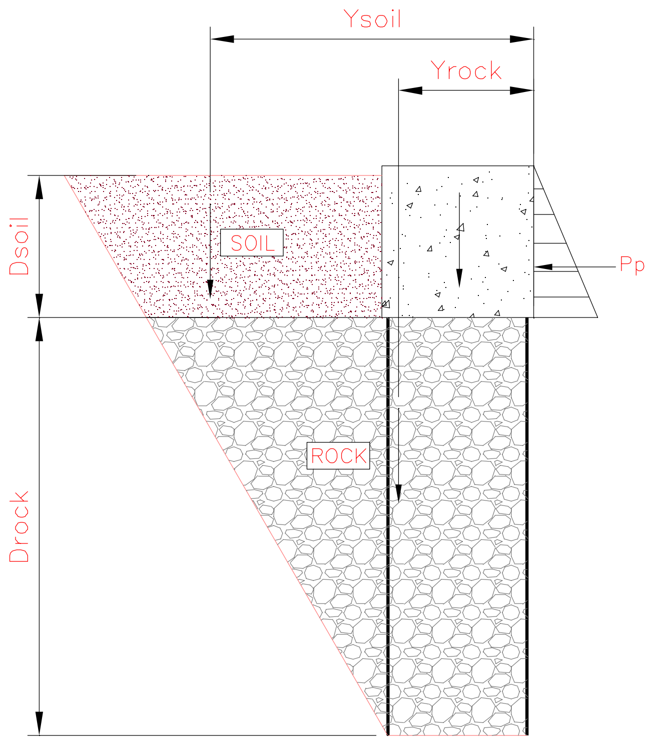
Distance to Rock Anchor Group 1 =	$D_{a1} := 28.5 \cdot in$	(User Input)
Distance to Rock Anchor Group 2 =	$D_{a2} := 56 \cdot in$	(User Input)
Number of Rock Anchors in Group 1 =	$N_{a1} := 4$	(User Input)
Number of Rock Anchors in Group 2 =	$N_{a2} := 10$	(User Input)

Diagonal Direction:

Distance to Rock Anchor Group 3 =	$D_{a3} := 19.875 \cdot in$	(User Input)
Distance to Rock Anchor Group 4 =	$D_{a4} := 39.625 \cdot in$	(User Input)
Distance to Rock Anchor Group 5 =	$D_{a5} := 59.5 \cdot in$	(User Input)
Distance to Rock Anchor Group 6 =	$D_{a6} := 79.25 \cdot in$	(User Input)
Number of Rock Anchors in Group 3 =	$N_{a3} := 4$	(User Input)
Number of Rock Anchors in Group 4 =	$N_{a4} := 4$	(User Input)
Number of Rock Anchors in Group 4 =	$N_{a5} := 4$	(User Input)
Number of Rock Anchors in Group 4 =	$N_{a6} := 2$	(User Input)







Area 1 = $A1 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{soil}^2 = 10.392\,ft^2$ sf

Area 2 = $A2 := \tan(\Phi_s) \cdot D_{rock} \cdot D_{soil} = 83.138\,ft^2$ sf

Distance to Centroid 1 = $Y1 := \tan(\Phi_s) \cdot D_{rock} + \frac{1}{3} \cdot \tan(\Phi_s) \cdot D_{soil} = 15.011\,ft$ ft

Distance to Centroid 2 = $Y2 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{rock} = 6.928\,ft$ ft

Distance from Toe to Centroid of Soil = $Y_{soil} := \frac{(A1 \cdot Y1 + A2 \cdot Y2)}{(A1 + A2)} + W_p = 17.83\,ft$ ft

Area 1 = $A1 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{rock}^2 = 166.277\,ft^2$ sf

Area 2 = $A2 := W_p \cdot D_{rock} = 240\,ft^2$ sf

Distance to Centroid 1 = $Y1 := W_p + \frac{1}{3} \cdot \tan(\Phi_s) \cdot D_{rock} = 14.619\,ft$ ft

Distance to Centroid 2 = $Y2 := \frac{W_p}{2} = 5\,ft$ ft

Distance from Toe to Centroid of Rock = $Y_{rock} := \frac{(A1 \cdot Y1 + A2 \cdot Y2)}{(A1 + A2)} = 8.94\,ft$ ft

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 100 \cdot \text{pcf}$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Passive Pressure = $P_{top} := 0 = 0 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.8 \cdot \text{ksf}$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.9 \cdot \text{ksf}$

$A_p := W_p \cdot (L_p - L_{pag}) = 60 \text{ft}^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 54 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := (W_p^2 \cdot L_p) \cdot \gamma_c = 135 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s1} := \left[W_p \cdot D_{soil} \cdot \tan(\Phi_s) \cdot \left(\frac{D_{soil}}{2} + D_{rock}\right)\right] \cdot \gamma_s = 93.531 \cdot \text{kip}$

Weight of Soil Wedge at Back Face Corners = $WT_{s2} := 2 \cdot \left[\frac{D_{soil}}{3} \cdot (\tan(\Phi_s) \cdot D_{soil})^2\right] \cdot \gamma_s = 4.8 \cdot \text{kips}$

Total Weight of Soil = $WT_{Stot} := WT_{s1} + WT_{s2} = 98.3 \cdot \text{kips}$

Weight of Rock Between Rock Anchors = $WT_{R1} := (W_p^2 \cdot D_{rock}) \cdot \gamma_{rock} = 384 \cdot \text{kip}$

Weight of Rock Wedge at Back Face = $WT_{R2} := \left(\frac{D_{rock}^2 \cdot \tan(\Phi_s)}{2} \cdot W_p\right) \cdot \gamma_{rock} = 266.043 \cdot \text{kip}$

Weight of Rock at Back Face Corners = $WT_{R3} := 2 \cdot \left[\frac{D_{rock}}{3} \cdot (\tan(\Phi_s) \cdot D_{rock})^2\right] \cdot \gamma_{rock} = 491.52 \cdot \text{kips}$

Total Weight of Rock = $WT_{Rtot} := WT_{R1} + WT_{R2} + WT_{R3} = 1142 \cdot \text{kips}$

Resisting Moment = $M_r := (WT_c + \text{Axial}) \cdot \frac{W_p}{2} + S_u \cdot \frac{L_p}{3} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 13628 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := OM + \text{Shear} \cdot L_p = 7640 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.78$

Factor of Safety Required = $FS_{req} := 1.0$

OverTurning_Moment_Check := if$(FS \geq FS_{req}$, "Okay" , "No Good")

OverTurning_Moment_Check = "Okay"

Rock Anchor Check:

Area of Bolt Group = $A_n := \frac{\pi}{4} \cdot d_{ra}^2 \cdot 3 = 3.8 \cdot in^2$

Allowable Tension = $T_{all} := A_n \cdot F_y = 228 \cdot kips$

Perpendicular Direction:

Polar Moment of Inertia = $I_p := \left(D_{a1}^2 \cdot N_{a1} + D_{a2}^2 \cdot N_{a2}\right) = 34609 \cdot in^2$

Maximum Tension Force = $T_{perp} := \frac{M_{ot} \cdot D_{a2}}{I_p} - \frac{Axial + WT_c}{N_{atot}} = 129.4 \cdot kips$

$\frac{T_{perp}}{T_{all}} = 56.8 \cdot \%$

Condition1 := if($T_{perp} < T_{all}$, "OK", "NG")

Condition1 = "OK"

Diagonal Direction:

Polar Moment of Inertia = $I_p := \left(D_{a3}^2 \cdot N_{a3} + D_{a4}^2 \cdot N_{a4} + D_{a5}^2 \cdot N_{a5} + D_{a6}^2 \cdot N_{a6}\right) = 34583 \cdot in^2$

Maximum Tension Force = $T_{diag} := \frac{M_{ot} \cdot D_{a6}}{I_p} - \frac{Axial + WT_c}{N_{atot}} = 191.2 \cdot kips$

$\frac{T_{diag}}{T_{all}} = 83.9 \cdot \%$

Condition2 := if($T_{diag} < T_{all}$, "OK", "NG")

Condition2 = "OK"

Bond Strength Check:

Bond Strength = Bond_Strength := $d_{Hole} \cdot \pi \cdot D_{rock} \cdot \tau = 434 \cdot kips$

Perpendicular Direction:

$\frac{T_{perp}}{Bond\_Strength} = 29.8 \cdot \%$

Condition1 := if(T_{perp} < Bond_Strength, "OK", "NG")

Condition1 = "OK"

Diagonal Direction:

$\frac{T_{diag}}{Bond\_Strength} = 44 \cdot \%$

Condition2 := if(T_{diag} < Bond_Strength, "OK", "NG")

Condition2 = "OK"

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

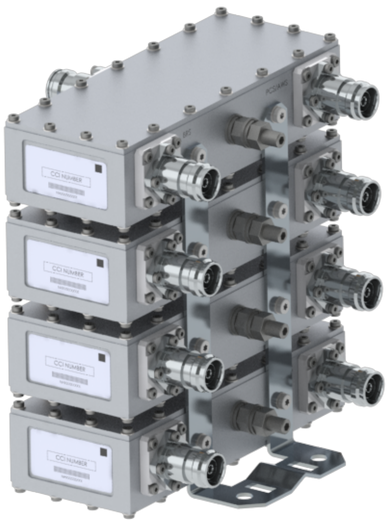
Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	

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

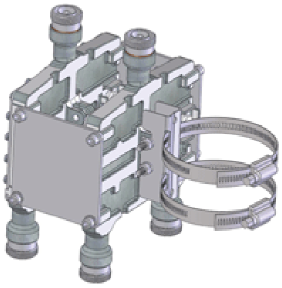
Mechanical

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

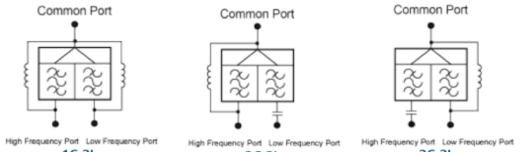
KIT-FD9R6004/1C-DL Installation Instructions

Notes

RADIO FREQUENCY SYSTEMS
The Clear Choice®

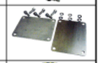
ShareLite™ Wideband Diplexer Kit – In-line 698-960 MHz/1710-2200 MHz, full DC/AISG pass

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)	