Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

February 14, 2020

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

RE: Notice of Exempt Modification
153 Old Salem Rd. Norwich, CT 06360
Latitude: 41.509928
Longitude: - 72.124936
Sprint Site#: CT54XC775 – DO Macro

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 85-foot level of the existing 87-foot transmission tower at Keeney Street Manchester, CT. The 87-foot transmission tower is owned by The Connecticut Light & Power Company, d/b/a Eversource Energy and they have an easement for the property. Sprint now intends to replace three (3) of its existing antennas with three (3) new 800/1900/2500 MHz antennas. The new antennas will be installed at the same 85-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
(6) RET 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. 595 dated December 19, 2002. 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 – Peter A. Nystrom, Elected Official, and James Davis, Zoning Enforcement Officer for the City of Norwich, 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: Peter A. Nystrom – City of Norwich Mayor
Richard Shuck – City of Norwich Zoning Enforcement Officer
The Connecticut Light & Power Company, d/b/a Eversource Energy – tower and property owner

Petition No. 595
Sprint Spectrum, L.P. d/b/a Sprint PCS
Staff Report
December 19, 2002

On December 12, 2002, Connecticut Siting Council (Council) member Brian Emerick and Christina Lepage of the Council staff met with Sprint PCS (Sprint) representative Thomas J. Regan at 153 Old Salem Road, Norwich, Connecticut for the inspection of an electric transmission structure. The structure is owned by Connecticut Light and Power (CL&P). Sprint, with the agreement of CL&P, proposes to modify the structure by installing antennas and associated equipment for telecommunications use and 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 replace one side of the existing 57-foot transmission pole with an 88-foot laminated wood pole. Three panel antennas would be attached to the pole with a centerline of 83 feet above ground level (agl), and a GPS antenna would be installed at the 75 feet agl on the southwest side of the structure.

The proposed equipment would be housed in equipment cabinets and installed on a 10-foot by 20-foot platform within a 390-foot lease area. The proposed equipment cabinets would be covered by an ice canopy and ice bridge, which would connect the equipment cabinets to the monopole. An 8-foot chain-link fence would surround the equipment compound.

Access to the site would be via an existing access road, which crosses a wetland area. Surface water runs down the existing access road and ponding occurs at various locations along the road. Sprint proposes to upgrade the existing access road to a 12-foot wide gravel surface drive with rip rap lined roadside swales and install culverts to allow water flow. Sprint would install sedimentation and erosion controls to protect regulated wetland areas. An underground conduit from an existing utility pole will provide power and telephone service to the site.

The calculated cumulative worst case power density would not exceed 35.1% of the applicable standard.

Sprint contends that the proposed modification of the existing transmission structure would not cause a significant change or alteration in the physical and environmental characteristics of the site, and would not cause a substantial adverse environmental effect.

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

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

November 8, 2019

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

RE: Sprint Antenna Site, CT-54XC775, Old Salem Road, Norwich, CT, structure 6347.5

Dear Mr. Shappy:

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

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

Sincerely,

Joel Szarkowicz
Transmission Line Engineering

REF: 17159.21 - CT54XC775 Structural Analysis Rev0 19.03.08.pdf
17159.21 – CT54XC775 Norwich – CD Rev.0 19.11.08 (SS).pdf

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: CT54XC775

Eversource Struct.: 6347.5
153 Old Salem Road
Norwich, Connecticut 06360

December 5, 2019

EBI Project Number: 6219006154

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**7.23%**

December 5, 2019

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

Emissions Analysis for Site: CT54XC775 - Eversource Struct.: 6347.5

EBI Consulting was directed to analyze the proposed Sprint facility located at **153 Old Salem Road** in **Norwich, Connecticut** for the purpose of determining whether the emissions from the Proposed Sprint Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Sprint Wireless antenna facility located at 153 Old Salem Road in Norwich, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Sprint is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

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

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

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

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

7) The antenna mounting height centerline of the proposed antennas is 85 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) Emissions from additional carriers were not included because emissions data for the site location are not available.

10) 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):	85 feet	Height (AGL):	85 feet	Height (AGL):	85 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 %:	**7.23%**	Antenna B1 MPE %:	**7.23%**	Antenna C1 MPE %:	**7.23%**

Site Composite MPE %	
Carrier	**MPE %**
Sprint (Max at Sector A):	7.23%
no additional carriers	N/A
Site Total MPE % :	7.23%

Sprint MPE % Per Sector	
Sprint Sector A Total:	7.23%
Sprint Sector B Total:	7.23%
Sprint Sector C Total:	7.23%
Site Total MPE % :	7.23%

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	85.0	10.76	800 MHz CDMA	533	2.02%
Sprint 1900 MHz PCS	4	1339.86	85.0	26.67	1900 MHz PCS	1000	2.67%
Sprint 2500 MHz BRS	8	639.78	85.0	25.47	2500 MHz BRS	1000	2.55%
						Total:	**7.23%**

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

Summary

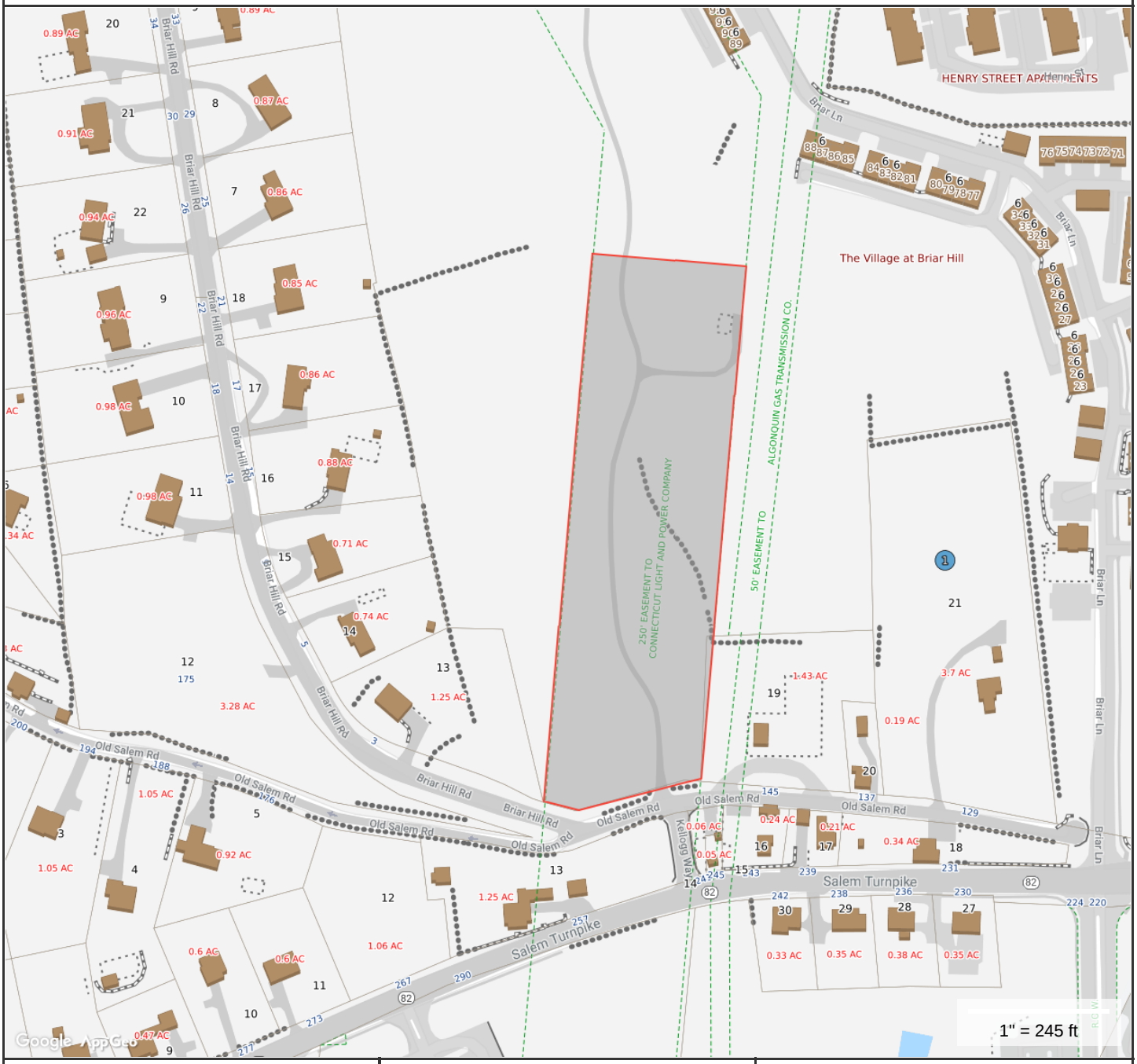
All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

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

Sprint Sector	Power Density Value (%)
Sector A:	7.23%
Sector B:	7.23%
Sector C:	7.23%
Sprint Maximum MPE % (Sector A):	7.23%
Site Total:	7.23%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.23%** 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.



MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Norwich, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 1/22/2019
Data updated 1/22/2019

NV - CT54XC775

RIGHT OF WAY GRANT

19

TO ALL PEOPLE TO WHOM THESE PRESENTS SHALL COME, GREETING: 10-57. 226-A-23

KNOW YE that I we RICHARD M. HARDING

of NORWICH, County of New London and State of Connecticut

for the consideration of a valuable sum in dollars

hereby acknowledged received to my our full satisfaction of The Connecticut Light and Power Company, a Connecticut corporation located in Hartford, Connecticut, do give, grant, bargain, sell, and confirm unto the said Connecticut Light and Power Company the following rights and rights of way:

The right to construct, maintain, rebuild, and relocate, at all times, forever, on, over, or/and under any part of a strip of land 250 feet in width, said strip being bounded and described as follows:

A certain parcel of land situated in the Town of Norwich, lying between parallel lines, said parallel lines being 125 feet distant on each side (measuring at right angles) from the center line of location of said strip as surveyed and staked out this date, said center line, at each angle point being considered to extend to the outside of said strip.

Said center line is described as follows: Beginning at a point in the northerly boundary line of the Back Road (so called) leading from the Salem Turnpike to Leffingwell, said point being about two feet southerly as measured along the line being described from an iron pin and being about 136 feet westerly as measured along the northerly boundary of said road from the intersection of said northerly boundary of said road, the westerly boundary of land now or formerly of A. H. Beebe and the easterly boundary of land of Grantor; thence N.18° - 55' E about 1079 feet to an iron pin; thence N.15° - 10' W. about 2953 feet to land of Cipryan Szablinski

any number and all kinds and sizes of poles, towers, wires, guy wires, and all fixtures and things, except buildings, useful at this time or hereafter for the transmission of electricity of every voltage and for telephone, telegraph, and signal purposes, and the right to transmit by the same, for any and every purpose, electricity of every voltage and use the same for telephone, telegraph, and signal purposes; and the right to cut, fell, trim, and remove any tree on my our land which, if it fell, could fall within ten feet of anything hereafter located on said strip of land by virtue of this grant, and the right to cut and remove all trees, brush, or other growth on said strip, all wood cut to be the property of the owner of the land at the time the same is cut; and the right to travel on and carry materials over said strip in exercising all rights which said The Connecticut Light and Power Company now has or may hereafter have in other lands, doing no damage thereby.

TO HAVE AND TO HOLD the above granted and bargained rights and rights of way unto it, the said grantee, its successors and assigns, forever, to its and their own proper use and behoof. And also I we the said grantor~~s~~ do for myself ~~ourselves~~, my our heirs, executors, and administrators, covenant with the said grantee, its successors and assigns, that at and until the ensealing of these presents I we am ~~are~~ well seized of said strip of land as a good indefeasible estate in fee simple and have good right to grant, bargain, and sell said rights and rights of way in manner and form as is above written, and that said strip of land and said rights and rights of way are free from all encumbrances whatsoever.

AND FURTHERMORE I we, the said grantor~~s~~ do by these presents bind myself ~~ourselves~~ and my ~~our~~ heirs, forever, to warrant and defend the above granted and bargained rights and rights of way to the said grantee, its successors and assigns, against all claims and demands whatsoever.

IN WITNESS WHEREOF I we have hereunto set my our hand~~s~~ and seal~~s~~ this 7th day of October, A. D. 19 30.

Signed, sealed and delivered in presence of

William B. Mitchell
Freda E. Barker

Richard M. Harding (SEAL)

(SEAL)

(SEAL)

STATE OF CONNECTICUT

COUNTY OF New London ss. Norwich, Connecticut, October 7th, 1930.

Personally appeared RICHARD M. HARDING signer and ~~sealer~~ of the foregoing instrument, and acknowledged the same to be his free act and deed, before me,

William B. Mitchell
Notary Public

NV - CT54XC775

1

Right of Way Grant

FROM

RICHARD M. HARDING

THE CONNECTICUT LIGHT & POWER COMPANY.

TO

TOWN OF NORWICH CONN.
Received for Record OCT 17 1930
at 11.30 o'clock A M. and Recorded in
Norwich Land Records, Vol 197 Page 18
H. Edward Cox

Compared and Found Correct
Harold L. Burt, Town Clerk

2.75

State of Connecticut, County of New London, ss. May 24th, 1930. Then and there before me a Justice of the Peace within and for the County and State aforesaid, duly commissioned and acting as such, personally appeared Mr.Eli Jacobson, signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed. Maurice W.Meyer, Justice of the Peace (Seal). Commission expires January 1st, 1931. Approved as to: Terms, R.W.Swenson; Description, A.U.Hersey, Form, A.U.Hersey, Jun 28, 1930. A.U.H. to R.H. A.U.H. 7/10,1930. R.H. to A.U.H. R.H. 7/10,1930. Abstracted on Aug. 2, 1930. By H.D.F.

Vol 197 P. 18

Received for Record October 17, 1930, at 9.02 o'clock A.M.

Harold Burt Town Clerk.

V 164 P. 43

TO ALL PEOPLE TO WHOM THESE PRESENTS SHALL COME, GREETING: KNOW YE, THAT I, RICHARD M.HARDING of Norwich, County of New London and State of Connecticut, for the consideration of a valuable sum in dollars hereby acknowledged received to my full satisfaction of The CONNECTICUT LIGHT AND POWER COMPANY, a Connecticut corporation located in Hartford, Connecticut, do give, grant, bargain, sell, and confirm unto the said Connecticut Light and Power Company the following rights and rights of way: The right to construct, maintain, rebuild, and relocate, at all times, forever, on, over, or/and under any part of a strip of land 250 feet in width, said strip being bounded and described as follows: A certain parcel of land situated in the Town of Norwich, lying between parallel lines, said parallel lines being 125 feet distant on each side (measuring at right angles) from the center line of location of said strip as surveyed and staked out this date, said center line, at each angle point being considered to extend to the outside of said strip. Said center line is described as follows: Beginning at a point in the northerly boundary line of the Back Road (so called) leading from the Salem Turnpike to Leffingwell, said point being about two feet southerly as measured along the line being described from an iron pin and being about 136 feet westerly as measured along the northerly boundary of said road from the intersection of said northerly boundary of said road, the westerly boundary of land now or formerly of A.H.Beebe and the easterly boundary of land of Grantor; thence N.18°55' E about 1079 feet to an iron pin; thence N. 15° 10' W. about 2953 feet to land of Cipryan Szablinski, any number and all kinds and sizes of poles, towers, wires, guy wires, and all fixtures and things, except buildings, useful at this time or hereafter for the transmission of electricity of every voltage and for telephone, telegraph, and signal purposes, and the right to transmit by the same, for any and every purpose electricity of every voltage and use the same for telephone, telegraph, and signal purposes; and the right to ~~transmit by the same, for any and every purpose, electricity of every voltage and use the same for telephone, telegraph, and signal purposes; and the~~ right to cut, fell, trim, and remove any tree on my land which, if it fell, could fall within ten feet of anything hereafter located on said strip of land by virtue of this grant, and the right to cut and remove all trees, brush, or other growth on said strip, all wood cut to be the property of the owner of the land at the time the same is cut; and the right to travel on and carry materials over said strip in exercising all rights which said The Connecticut Light and Power Company now has or may hereafter have in other lands, doing no damage thereby.

TO HAVE AND TO HOLD the above granted and bargained rights and rights of way unto it, the said grantee, its successors and assigns forever, to its and their own proper use and behoof. And also, I, the said grantor, do for myself, my heirs, executors, and administrators, covenant with the said grantee, its successors and assigns, that at and until the ensealing of these presents, I am well seized of said strip of land as a good indefeasible estate in fee simple and have good right to

MISCELLANEOUS No. 197

grant, bargain, and sell said rights and rights of way in manner and form as is above written, and that said strip of land and said rights and rights of way are free from all encumbrances whatsoever. And Furthermore, I, the said grantor, do by these presents bind myself and my heirs, forever, to warrant and defend the above granted and bargained rights and rights of way to the said grantee, its successors and assigns, against all claims and demands whatsoever.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 7th day of October, A.D.1930. Signed, sealed and delivered in presence of

William B.Mitchell Richard M.Harding (Seal)

Fred E.Gerber

State of Connecticut, County of New London, ss. Norwich, Connecticut, October 7th, 1930. Personally appeared Richard M.Harding, signer and sealer of the foregoing instrument, and acknowledged the same to be his free act and deed, before me, William B.Mitchell, Notary Public (Seal).

Received for Record October 17, 1930, at 11.30 o'clock A.M.

Town Clerk.

KNOW ALL MEN BY THESE PRESENTS: THAT the subscriber, EUNICE HARDING MARVIN, of Lyme, in the County of New London, State of Connecticut, for the consideration of a valuable sum in dollars, received to the subscriber's full satisfaction of THE CONNECTICUT LIGHT AND POWER COMPANY, a Connecticut corporation, does hereby release and forever quit-claim to said The Connecticut Light and Power Company, all the right, and interest of the subscriber in or to a certain easement and right of way granted the said The Connecticut Light and Power Company by Richard M.Harding, of Norwich, the grant of which easement and right of way is dated October 7, 1930.

The intention of this instrument is to release such easement and right of way above described from the burden of a certain Mortgage dated April 3, 1928, recorded in the land records of the Town of Norwich, in Volume 186, at Page 302, but not to release any other part of the property of the grantor of such easement and right of way from the burden of such encumbrance.

IN WITNESS WHEREOF, the subscriber has hereunto set her hand and seal at Norwich this seventh day of October, 1930.

Witnessed by: William B.Mitchell Eunice Harding Marvin (L.S.)

(Mrs.) Emma Harding

State of Connecticut, County of New London, ss. Norwich, October 7, 1930. Personally appeared before me Eunice Harding Marvin, and acknowledged the foregoing to be her free act and deed, William B.Mitchell, Notary Public (Seal).

Received for Record October 17, 1930, at 11.32 o'clock A.M.

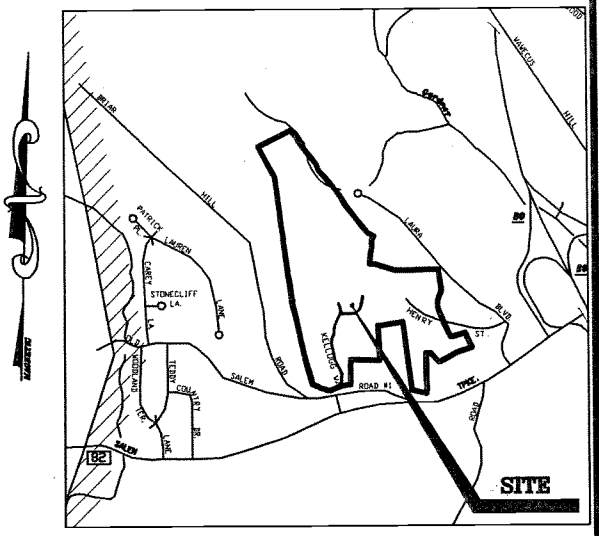
Town Clerk.

TO ALL PEOPLE TO WHOM THESE PRESENTS SHALL COME, GREETING: KNOW YE, THAT I, CHARLES C.BROWNING of the Town of Norwich, County of New London and State of Connecticut, for the consideration of a valuable sum in dollars, hereby acknowledged received to my full satisfaction of THE CONNECTICUT LIGHT AND POWER COMPANY, a Connecticut corporation located in Hartford, Connecticut, do give, grant, bargain,

PROJECT INFORMATION

SITE NAME:	MONTVILLE NORTH – CL&P POLE # 6347 ½
SITE NUMBER:	CT54XC775
DATE PREPARED:	APRIL 29, 2002
TYPE OF BUILD:	CO–LOCATION
SITE ADDRESS:	153 OLD SALEM ROAD NORWICH, CT 06360
COUNTY:	NEW LONDON
MAP/BLOCK/LOT:	201/4/12
LATITUDE:	N 41°30'36"
LONGITUDE:	W 72°07'30"
SITE OWNER:	CONN. LIGHT & POWER P.O. BOX 270 HARTFORD, CT 06141–0270
APPLICANT:	SPRINT PCS CROSSROADS CORPORATE CENTER 1 INTERNATIONAL BLVD. 8TH FLOOR MAHWAH, NJ 07495 CONTACT: JEFF GUTOWSKI PHONE: 201/684–4078
ARCHITECT/ENGINEER:	MCFARLAND–JOHNSON, INC. 400 BAYONET STREET SUITE 301 NEW LONDON, CT 06320 CONTACT: PAUL BISCUTI PHONE: 860/447–2844 FAX: 860/447–1622

LOCATION MAP



NOTE:
SPRINT PCS RESERVES THE RIGHT TO MODIFY THIS LEASE EXHIBIT.

REVISED: 6/19/02
OWNER'S INITIALS:
DATE:

SHEET: L1

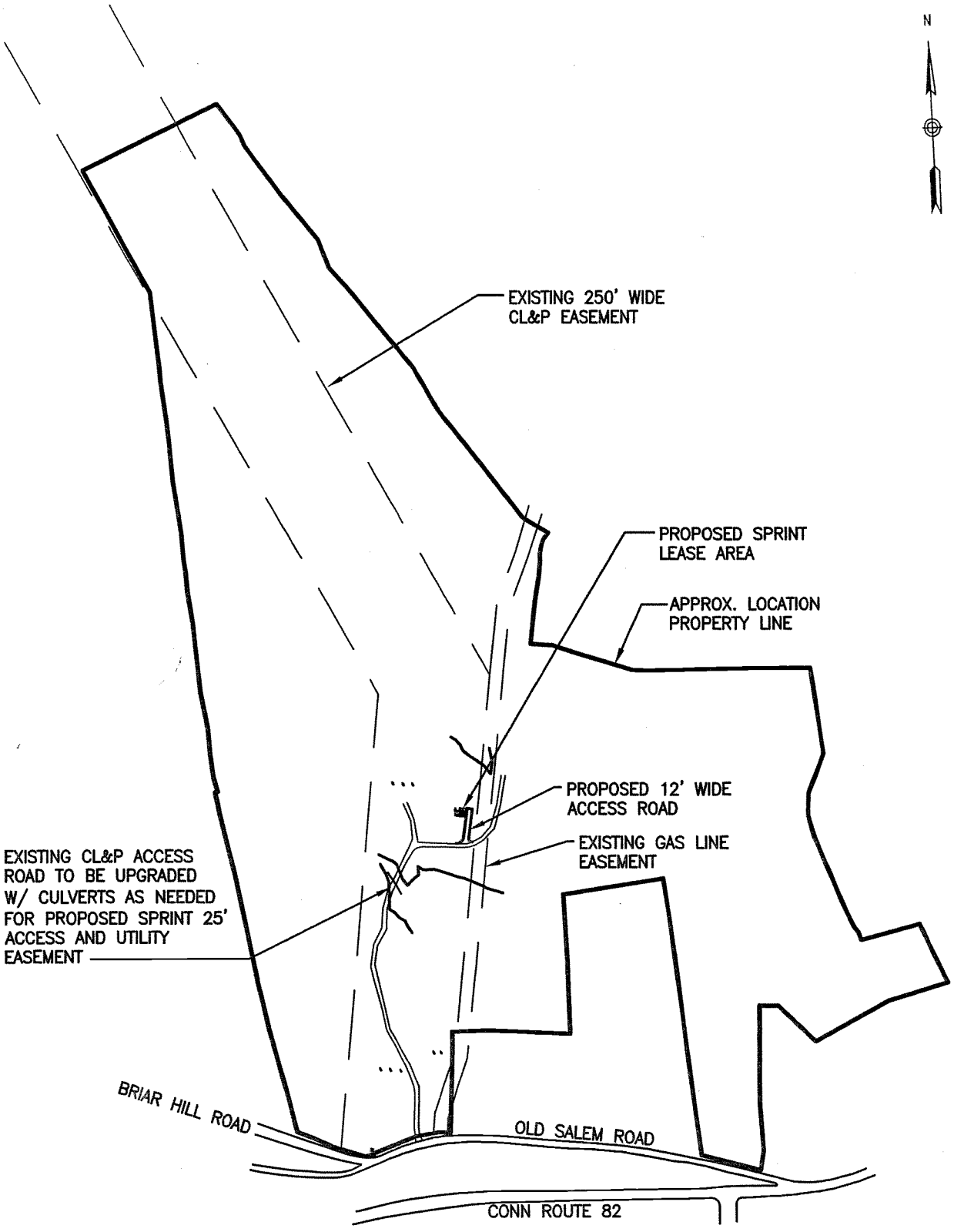
PROJECT: 15805.36
SCALE: NONE
DATE: APR 29, 2002

Sprint PCS
SITE NO. CT54XC775

LEASE EXHIBIT

MONTVILLE NORTH NU
153 OLD SALEM ROAD
NORWICH, CONNECTICUT

McFARLAND – JOHNSON, INC.
400 BAYONET STREET SUITE 301 NEW LONDON, CT 06320
PHONE (860) 447–2844 FAX (860) 447–1622



REVISED: 6/19/02
OWNER'S INITIALS:
DATE:

SITE PLAN

NTS

SHEET: L2

PROJECT: 15805.36
SCALE: NONE
DATE: APR 29, 2002

Sprint PCS

SITE NO. CT54XC775

LEASE EXHIBIT

MONTVILLE NORTH NU
153 OLD SALEM ROAD
NORWICH, CONNECTICUT

McFARLAND - JOHNSON, INC.
400 BAYONET STREET SUITE 301 NEW LONDON, CT 06320
PHONE (860) 447-2844 FAX (860) 447-1622

WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 6347.5

SITE ID: CT54XC775

153 OLD SALEM RD

NORWICH, CT 06360

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." 2016 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.

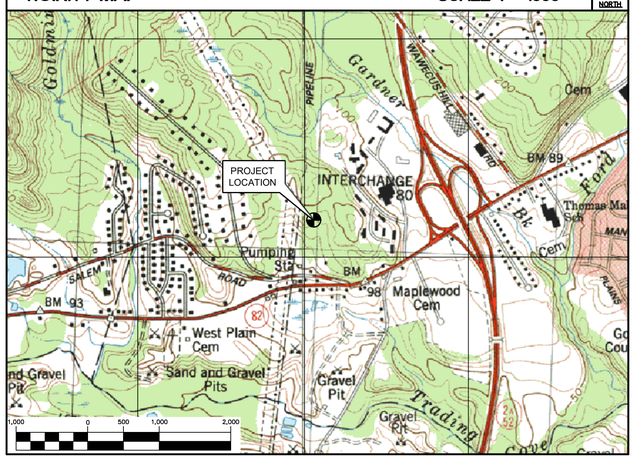
SITE DIRECTIONS

FROM: 5 WAYSIDE ROAD, BURLINGTON, MA 01803 **TO:** 153 OLD SALEM RD, NORWICH, CT 06360

1.	START OUT GOING SOUTHWEST TOWARD S BEDFORD ST.	0.11 MI.
2.	TURN LEFT ONTO S BEDFORD ST.	0.10 MI.
3.	TAKE THE 1ST RIGHT ONTO BLANCHARD RD.	0.93 MI.
4.	BLANCHARD RD BECOMES WHEELER RD.	0.35 MI.
5.	TURN RIGHT ONTO MIDDLESEX TURNPIKE.	0.23 MI.
6.	TAKE THE US-3 N RAMP TOWARD I-95 S/LOWELL/WALTHAM.	0.33 MI.
7.	MERGE ONTO I-95 S/MA-128 S VIA THE RAMP ON THE LEFT.	10.62 MI.
8.	TAKE THE I-90/MASS PIKE EXIT, EXIT 25, TOWARD ALBANY NY/BOSTON.	0.32 MI.
9.	MERGE ONTO I-90 W TOWARD WORCESTER (PORTIONS TOLL).	33.00 MI.
10.	TAKE THE I-290 EXIT, EXIT 10, TOWARD I-395/WORCESTER/AUBURN/MA-12.	0.70 MI.
11.	KEEP LEFT TO TAKE THE MA-12 N RAMP TOWARD I-395 S/WORCESTER/I-290 E/US-20 E/OXFORD/AUBURN/WEBSTER/PROVIDENCE/MA-146 S.	0.15 MI.
12.	KEEP LEFT TO TAKE THE I-290 E RAMP TOWARD I-395 S/US-20/OXFORD/WORCESTER.	0.24 MI.
13.	MERGE ONTO I-395 S TOWARD NORWICH CT (CROSSING INTO CONNECTICUT).	55.08 MI.
14.	TAKE THE CT-82 EXIT, EXIT 11, TOWARD DOWNTOWN NORWICH/SALEM.	0.27 MI.
15.	TURN RIGHT ONTO SALEM TURNPIKE/CT-82.	0.29 MI.
16.	TAKE THE 2ND RIGHT ONTO BRIAR LN.	0.35 MI.
17.	TAKE THE 2ND LEFT TO STAY ON BRIAR LN.	0.04 MI.
18.	153 OLD SALEM RD, NORWICH, CT 06360-6437, 153 OLD SALEM RD.	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. INSTALLATION OF A PROPOSED UNISTRUT EQUIPMENT RACK MOUNTED AT GRADE.
   - B. REMOVE (3) EXISTING PANEL ANTENNAS FROM EXISTING TOWER MOUNT.
   - C. INSTALL (3) PROPOSED 10-PORT PANEL ANTENNAS, (1) PER SECTOR.
   - D. INSTALL (6) PROPOSED DIPLEXERS ON TOWER.
   - E. INSTALL (6) PROPOSED DIPLEXERS ON PROPOSED UNISTRUT RACK.
   - F. INSTALL (3) PROPOSED RRH'S ON PROPOSED UNISTRUT RACK.
   - G. INSTALL PROPOSED HANDRAIL ON EXISTING PLATFORM.

PROJECT INFORMATION

SITE NAME:	EVERSOURCE STRUCT.: 6347.5
SITE ID:	CT54XC775
SITE ADDRESS:	153 OLD SALEM RD NORWICH, CT 06360
APPLICANT:	SPRINT 5 WAYSIDE ROAD BURLINGTON, MA 01803
CONTACT PERSON:	JAKE SHAPPY (845)553-3330
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41° 30' 35.74"N LONGITUDE: 72° 07' 29.77"W GROUND ELEVATION: ±129' AMSL SITE COORDINATES REFERENCED AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	COMPOUND PLANS AND ELEVATION	0
C-2	TYPICAL DETAILS	0
C-3	COLOR CODE, CPRI DETAILS AND PLUMBING DIAGRAM	0

REV.	DATE	DRAWN BY	CHK'D BY	ISSUED FOR CONSTRUCTION
0	11/8/19	KAWJR	TJL	

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — TIMOTHY J. LYNCH — LICENSED PROFESSIONAL ENGINEER

Sprint

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

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WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 6347.5

SITE ID: CT54XC775

153 OLD NORWICH RD

NORWICH, CT 06360

DATE: 10/14/19

SCALE: AS NOTED

JOB NO. 17159.21

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:

   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 – 120MPH
   - 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
0	11/8/19	KAWJR	TJL	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT — TIMOTHY J. LYNCH — LICENSED PROFESSIONAL ENGINEER

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WIRELESS COMMUNICATIONS FACILITY

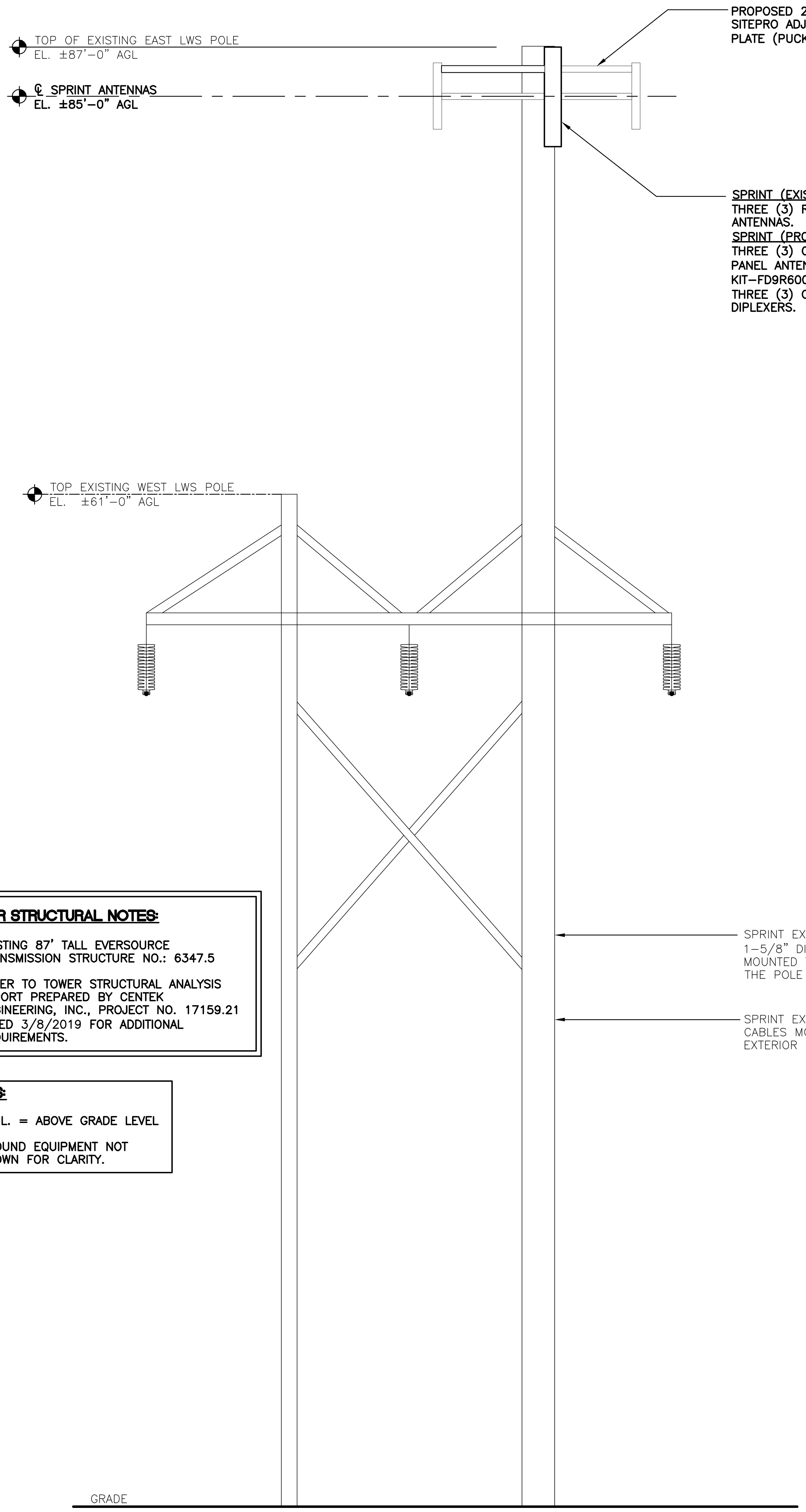
EVERSOURCE STRUCT.: 6347.5
SITE ID: CT54XC775
153 OLD NORWICH RD
NORWICH, CT 06360

DATE:	10/14/19
SCALE:	AS NOTED
JOB NO.	17159.21

DESIGN BASIS AND SITE NOTES

N–1

Sheet No. 2 of 5



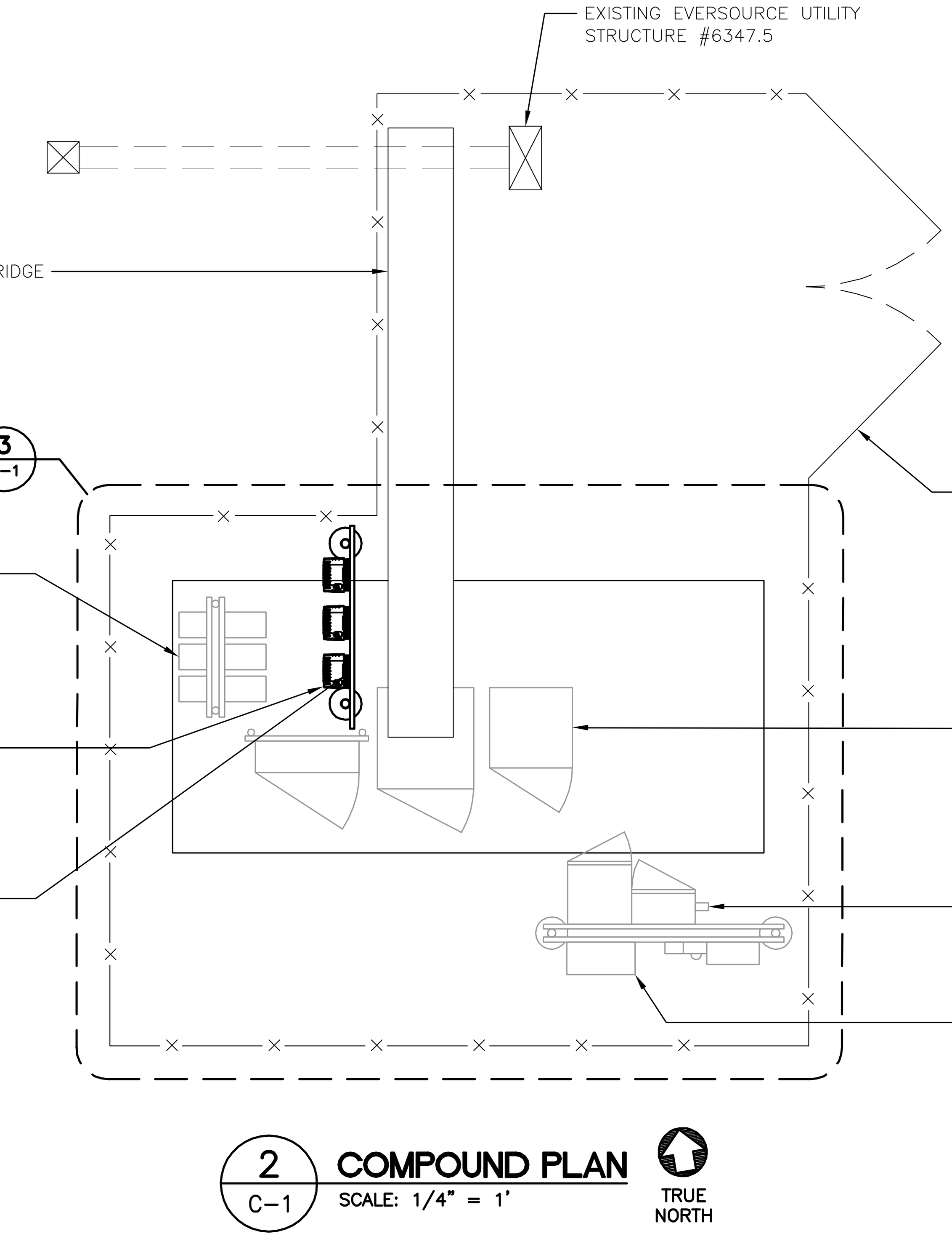
TOWER STRUCTURAL NOTES:

1. EXISTING 87' TALL EVERSOURCE TRANSMISSION STRUCTURE NO.: 6347.5
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 17159.21 DATED 3/8/2019 FOR ADDITIONAL REQUIREMENTS.

NOTES:

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

1 / C-1 **TOWER ELEVATION**
SCALE: 1" = 5'-0"



2 / C-1 **COMPOUND PLAN**
SCALE: 1/4" = 1'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/8/19	KAW/JR	TJL	ISSUED FOR CONSTRUCTION

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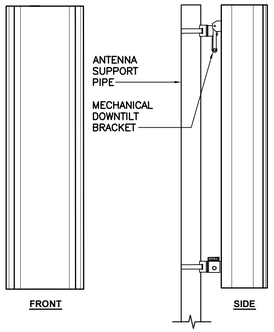
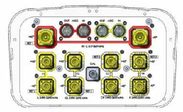
DATE: 10/14/19
SCALE: AS NOTED
JOB NO. 17159.21

COMPOUND PLANS AND ELEVATION

C-1

Sheet No. 3 of 5





BOTTOM

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: DHHTT65B-3XR	72.1"L x 11.9"W x 7.1"D	46 LBS.

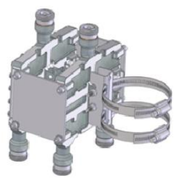
1 / C-2 PROPOSED ANTENNA DETAIL
SCALE: 1/2" = 1'-0"

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

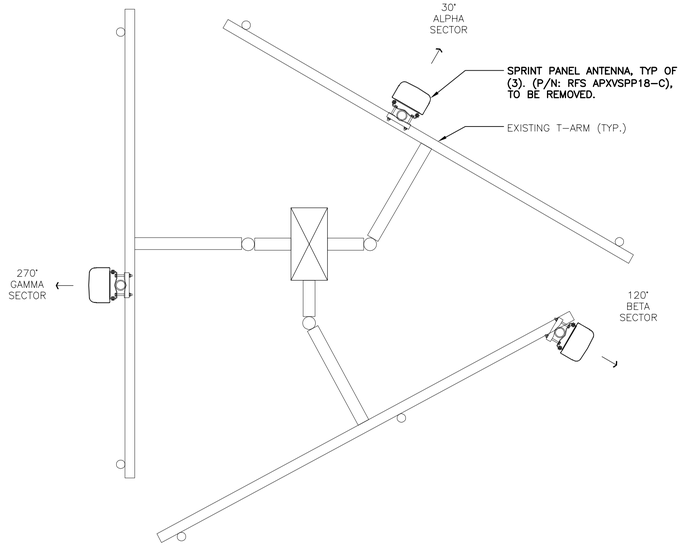
DOP-7126Y-0-T1



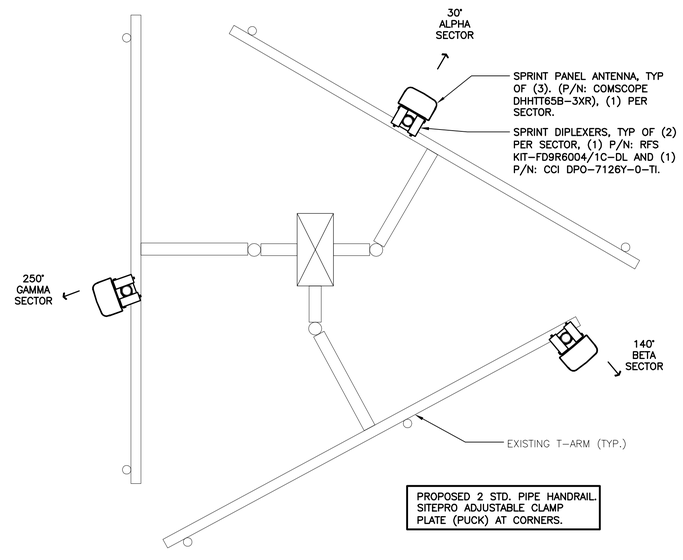
KIT-FD9R6004/1C-DL

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	5.94"L x 7.94"W x 4.07"D	7.3 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH SPRINT CONSTRUCTION MANAGER PRIOR TO ORDERING.		

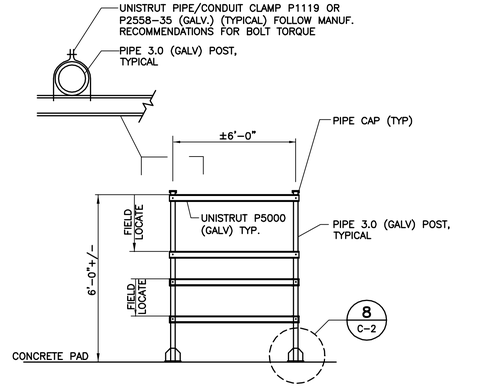
3 / C-2 DIPLEXER DETAIL



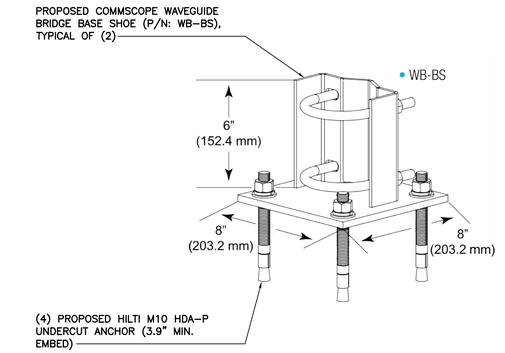
4 / C-2 EXISTING ANTENNA PLAN
SCALE: = 1/2" = 1'



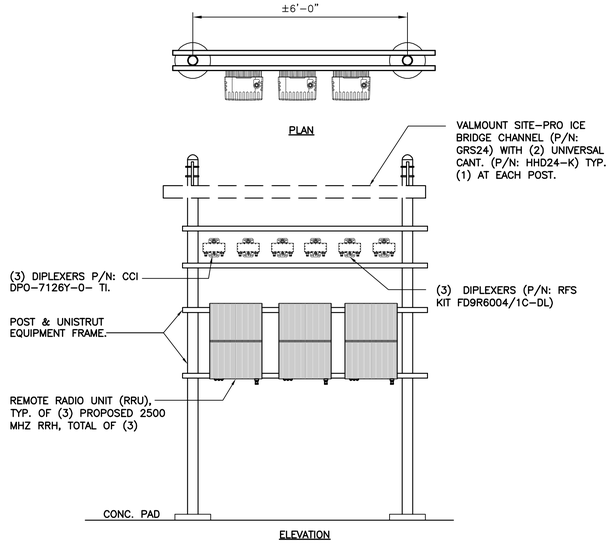
5 / C-2 PROPOSED ANTENNA PLAN
SCALE: = 1/2" = 1'



6 / C-2 PROPOSED EQUIPMENT MOUNTING FRAME DETAIL
SCALE: NOT TO SCALE



7 / C-2 EQUIPMENT FRAME POST ATTACHMENT DETAIL
SCALE: NOT TO SCALE



8 / C-2 RRU MOUNTING CONFIG.
SCALE: 1/2" = 1'- 0"

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0	11/8/19	KAWJR	TJL	

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SPRINT
WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 6347.5
SITE ID: CT54XC775
153 OLD NORWICH RD
NORWICH, CT 06360

DATE: 10/14/19
SCALE: AS NOTED
JOB NO. 17159.21

TYPICAL DETAILS

C-2

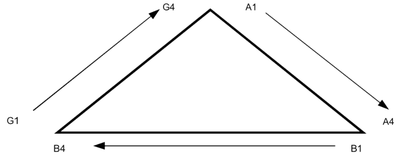
Sheet No. 4 of 5

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.

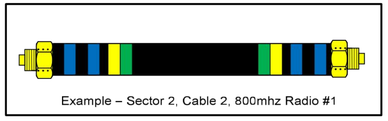
FIGURE 19.1 CABLE COLOR CODE

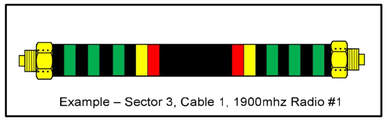
Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue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

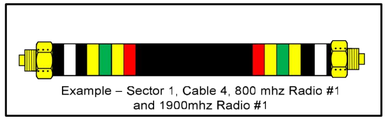
FIGURE 19.2 COLOR CODE

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

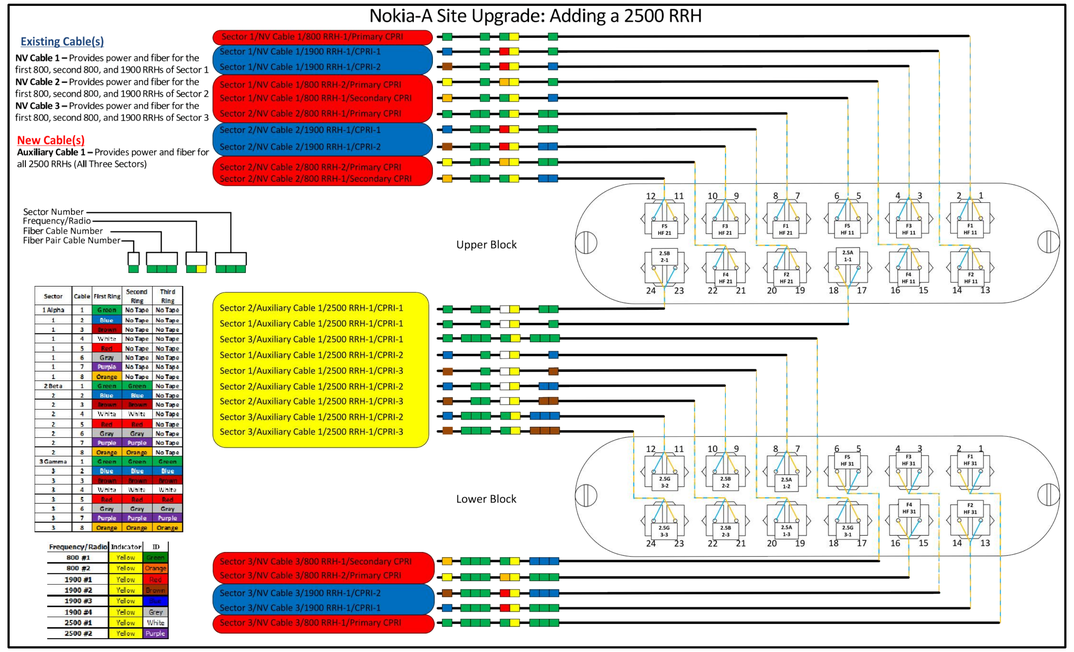
FREQUE	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL


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



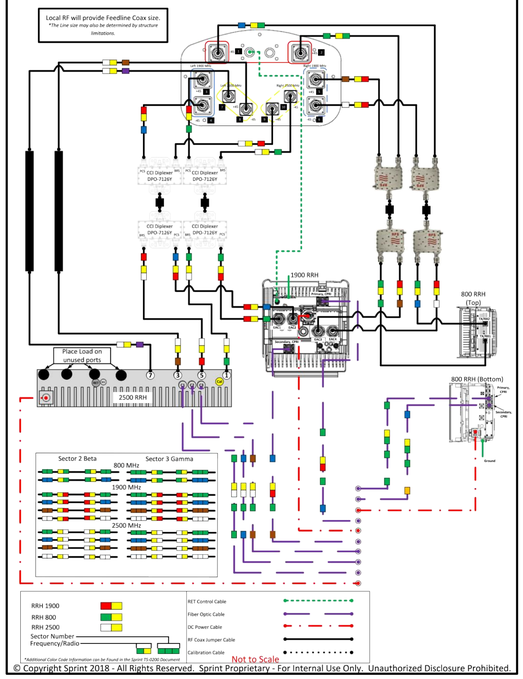
Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue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

Frequency/Radio	Indicator	ID
800 #1	Yellow	Green
800 #2	Yellow	Orange
1900 #1	Yellow	Red
1900 #2	Yellow	Brown
1900 #3	Yellow	Blue
1900 #4	Yellow	Grey
2500 #1	Yellow	White
2500 #2	Yellow	Purple

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

Prepared By: Mark Elliott	Revision Date: August 13, 2018	Revision Number: R-3
Approved By: RAN Hardware & Antenna Teams	Approval Date: Final-Macro Generated	Sprint

ALU 111 DHHTT65B-3XR wo Filters



*Additional Color Code Information can be Found in the Sprint TX-CDD Document
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3 / C-3 **PLUMBING DIAGRAM**
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DATE:	10/14/19
SCALE:	AS NOTED
JOB NO.	17159.21

COLOR CODE
CPRI DETAILS AND
PLUMBING DIAGRAM

C-3

Sheet No. 5 of 5

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Structural Analysis of Transmission Tower

Sprint Site Ref: CT54XC775

Eversource Structure No. 6347.5
87' (AGL) Electric Transmission LWS Pole

153 Old Salem Road
Norwich, CT

CENTEK Project No. 17159.21

Date: March 8, 2019

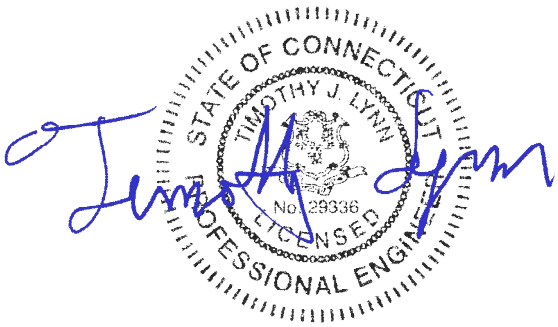

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Table of Contents

Introduction

The purpose of this report is to analyze the existing 87' AGL utility pole located at 153 Old Salem Road in Norwich, 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 and six (6) RET cables running on the exterior of the pole.
- SPRINT (Existing to Remove):
  Antennas: Three (3) RFS APXVSPP18-C panel antennas mounted on three (3) T-Arms with a RAD center elevation of 85-ft above grade level.
- **SPRINT (Proposed):**
  Antennas: Three (3) Commscope DHHTT65B-3XR panel antennas, three (3) RFS KIT-FD9R6004/1C-DL Diplexers and three (3) CCI DPO-7126Y-0-T1 Diplexers mounted on three (3) T-Arms with a RAD center elevation of 85-ft above grade level. (Handrail to be installed on existing T-Arms. Refer to section 4 for details)

Primary assumptions used in the analysis

- All antenna mounts are modeled as listed above.
- All coaxial cable will be installed as indicated in Section 4 of this report.
- No residual stresses exist due to incorrect tower erection.
- Utility tower 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 utility pole was completed using the current version of PLS-Pole computer program licensed to CENTEK Engineering. Loading was developed per the requirements of the NESC standard and Northeast Utilities Design Criteria. These loads are developed in Section 5 of this report.

Design Basis

Our analysis was performed in accordance with NESC C2-2012 and Northeast Utilities Design Criteria.

- UTILITY TOWER ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure 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.

  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..... 120 mph (1)
  Radial Ice Thickness..... 0”

Results

- UTILITY POLE

  This analysis finds that the subject utility pole is adequate to support the proposed antenna configuration. A maximum usage of **90.6%** occurs in the utility pole under the **NESC Extreme** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Stress Ratio (% of capacity)	Result
Brace VEER	90.6%	**PASS**

- FOUNDATION

  The pole is directly embedded in the ground.

Tower Section	Uplift	Result
North Pole	75.7%	**PASS**
South Pole	14.4%	**PASS**

C o n c l u s i o n

This analysis shows that the subject utility tower **is adequate** to support the proposed equipment installation.

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

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/EIA-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/EIA Standard 222 with two exceptions:

1. An 85 mph extreme wind speed shall be used for locations in all counties throughout the NU system.
2. The stress increase of TIA Section 3.1.1.1 is disallowed. The combined wind and ice condition shall consider ½" radial ice in combination with the wind load (0.75 Wi) as specified in TIA section 2.3.16.

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

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

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

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

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

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

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

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

c) Electric Transmission Structure

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

   ii) Shape Factor Multiplier:

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

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

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

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

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

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

Project: Line 1080, Structure 6347.5
Date: 11/21/2018
Engineer: JS
Purpose Recalculate wire loads for Sprint PCS H-frame structure.

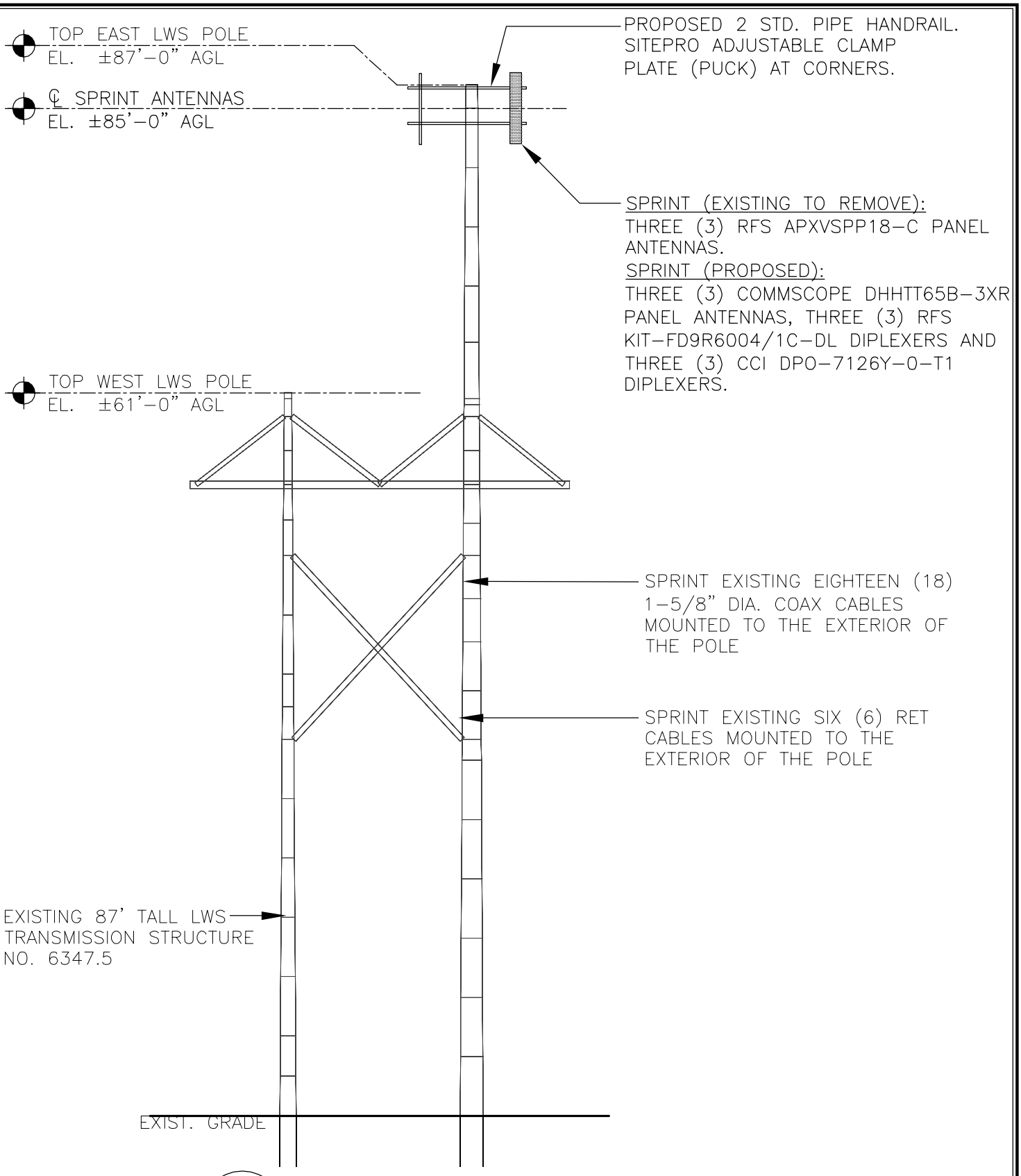
Shield Wire: 7 No. 8 Alumoweld, sagged to 4200# @ NESC 250B Final
Conductor: 1272 45/7 "Bittern" ACSR, sagged to 10,000# @ NESC 250B Final

NESC 250B

	Vertical	*Transverse*	*Longitudinal*
7 No. 8 Alumoweld	**747**	**713**	**0**
Bittern ACSR	**2385**	**964**	**0**

NESC 250C

	Vertical	*Transverse*	*Longitudinal*
7 No. 8 Alumoweld	**248**	**546**	**0**
Bittern ACSR	**1085**	**1590**	**0**



1 / EL-1 **TOWER ELEVATION**

SCALE: NOT TO SCALE

REVISIONS		
00	3/8/19	ISSUED FOR REVIEW

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63-2 North Branford Road, Branford, CT 06405

CT54XC775
EVERSOURCE 6347.5

153 OLD SALEM ROAD
NORWICH, CT 06360

PROJECT NO:	17159.21
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	3/8/19

TOWER ELEVATION

EL-1

DWG. 1 OF 1

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Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Load Analysis of Equipment on Tower # 6347.5
Location:	Norwich, CT
Rev. 0: 1/11/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.21

Basic Components

Heavy Wind Pressure =	p := 4.00	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	V := 120	mph	(User Input NESC 2012 Figure 250-2(e))
Radial Ice Thickness =	Ir := 0.50	in	(User Input)
Radial Ice Density =	Id := 57.0	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	TME := 85	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 =	$Kz := 2.01\cdot\left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.223$		(NESC 2012 Table 250-2)
Exposure Factor =	$Es := 0.346\left[\frac{33}{(0.67\cdot TME)}\right]^{\frac{1}{7}} = 0.32$		(NESC 2012 Table 250-3)
Response Term =	$Bs := \frac{1}{\left(1 + 0.375\cdot\frac{TME}{220}\right)} = 0.873$		(NESC 2012 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(2.7\cdot Es\cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.884$		(NESC 2012 Table 250-3)
Wind Pressure =	$qz := 0.00256\cdot Kz\cdot V^2\cdot Grf\cdot I = 39.9$	psf	(NESC 2012 Section 250.C.2)

Shape Factors

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

Overload Factors

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

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Subject:	Load Analysis of Equipment on Tower # 6347.5
Location:	Norwich, CT
Rev. 0: 1/11/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.21

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

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 = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 1546$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 51$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 153$ lbs

Wind Load (NESC Heavy)

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

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot \left(SA_{ICEant} \cdot N_{ant}\right) = 126$ lbs

Wind Load (NESC Extreme)

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

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot \left(SA_{ICEant} \cdot N_{ant}\right) = 1253$ lbs

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Subject:	Load Analysis of Equipment on Tower # 6347.5
Location:	Norwich, CT
Rev. 0: 1/11/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.21

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

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 = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 112$ 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

Wind Load (NESC Heavy)

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

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot \left(SA_{ICEant} \cdot N_{ant}\right) = 7$ lbs

Wind Load (NESC Extreme)

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

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot \left(SA_{ICEant} \cdot N_{ant}\right) = 68$ lbs

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Subject:	Load Analysis of Equipment on Tower # 6347.5
Location:	Norwich, CT
Rev. 0: 1/11/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.21

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

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

Wind Load (NESC Heavy)

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

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot (SA_{ICEant} \cdot N_{ant}) = 6$ lbs

Wind Load (NESC Extreme)

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

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot (SA_{ICEant} \cdot N_{ant}) = 57$ lbs

Development of Wind & Ice Load on Antenna Mounts (Sprint)

Mount Type:	T-Arms with Handrail		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 14$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 17.5$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 650$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 875$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 650$ lbs

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := WT_{mnt.ice} - WT_{mnt} = 225$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 70$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa = 558$ lbs

Sprint @ 85-ft AGL

NESC Heavy Wind Vertical = $\left(Wt_{ant1} + Wt_{ice.ant1} + Wt_{ant2} + Wt_{ice.ant2} + Wt_{ant3} + Wt_{ice.ant3} + Wt_{mnt1} + Wt_{ice.mnt1}\right) \cdot 1.5 = 1851$

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant1} + Fi_{ant2} + Fi_{ant3} + Fi_{mnt1}\right) \cdot 2.5 = 521$

NESC Extreme Wind Vertical = $\left(Wt_{ant1} + Wt_{ant2} + Wt_{ant3} + Wt_{mnt1}\right) = 833$

NESC Extreme Wind Trasnsverse = $\left(F_{ant1} + F_{ant2} + F_{ant3} + F_{mnt1}\right) = 1935$

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Subject:	Coax Cable Loads Tower # 6347.5
Location:	Norwich, CT
Rev. 0: 1/11/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.21

Coax Cable on Tower

Heavy Wind Pressure =	$p := 4 \cdot psf$		*(User Input)*
Radial Ice Thickness =	$Ir := 0.5 \cdot in$		*(User Input)*
Radial Ice Density =	$Id := 57 \cdot pcf$		*(User Input)*
Basic Windspeed =	$V := 120$	mph	(User Input NESC 2007 Figure 250-2(e))
Height to Top of Coax Above Grade =	$TC := 85$	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 =	$Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.124$		(NESC 2007 Table 250-2)
Exposure Factor =	$Es := 0.346\left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.32$		(NESC 2007 Table 250-3)
Response Term =	$Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.873$		(NESC 2007 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.884$		(NESC 2007 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36.6$	psf	(NESC 2007 Section 250.C.2)
Coax Cable Span =	$Coax_{Span} := 10 \cdot ft$		*(Typ. User Input)*
Diameter of Coax Cable =	$D_{coax} := 1.11 \cdot in$		*(User Input)*
Weight of Coax Cable =	$W_{coax} := 0.54 \cdot plf$		*(User Input)*
Number of Coax Cables =	$N_{coax} := 18$		*(User Input)*
Number of Projected Coax Cables Transverse =	$NP_{Tcoax} := 3$		*(User Input)*
Number of Projected Coax Cables Long =	$NP_{Lcoax} := 4$		*(User Input)*
Diameter of RET Cable =	$D_{RET} := 0.315 \cdot in$		*(User Input)*
Weight of RET Cable =	$W_{RET} := 0.06 \cdot plf$		*(User Input)*
Number of RET Cables =	$N_{RET} := 6$		*(User Input)*
Number of Projected RET Cables Transverse =	$NP_{TRET} := 0$		*(User Input)*
Number of Projected RET Cables Long =	$NP_{LRET} := 0$		*(User Input)*

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Subject:	Coax Cable Loads Tower # 6347.5
Location:	Norwich, CT
Rev. 0: 1/11/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.21

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

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

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

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

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

Wind Area with Ice Transverse = $A_{Tice} := \left(NP_{Tcoax} \cdot D_{coax} + 2 \cdot Ir\right) = 4.33 \cdot in$

Wind Area with Ice Long = $A_{Lice} := \left(NP_{Lcoax} \cdot D_{coax} + 2 \cdot Ir\right) = 5.44 \cdot in$

Wind Area without Ice Transverse = $A_T := \left(NP_{Tcoax} \cdot D_{coax}\right) = 3.33 \cdot in$

Wind Area without Ice Long = $A_L := \left(NP_{Lcoax} \cdot D_{coax}\right) = 4.44 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 0.018\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 18.019 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + N_{RET} \cdot W_{RET} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

$Heavy_{Vert} = 421\,lb$

Heavy Transverse Load =

$$Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$Heavy_{Trans} = 58\,lb$

Heavy Transverse Load =

$$Heavy_{Long} := \overrightarrow{\left(p \cdot A_{Lice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$Heavy_{Long} = 73\,lb$

Extreme Vertical Load =

$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + N_{RET} \cdot W_{RET}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

$Extreme_{Vert} = 101\,lb$

Extreme Transverse Load =

$$Extreme_{Trans} := \overrightarrow{\left[\left(qz \cdot psf \cdot A_T \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

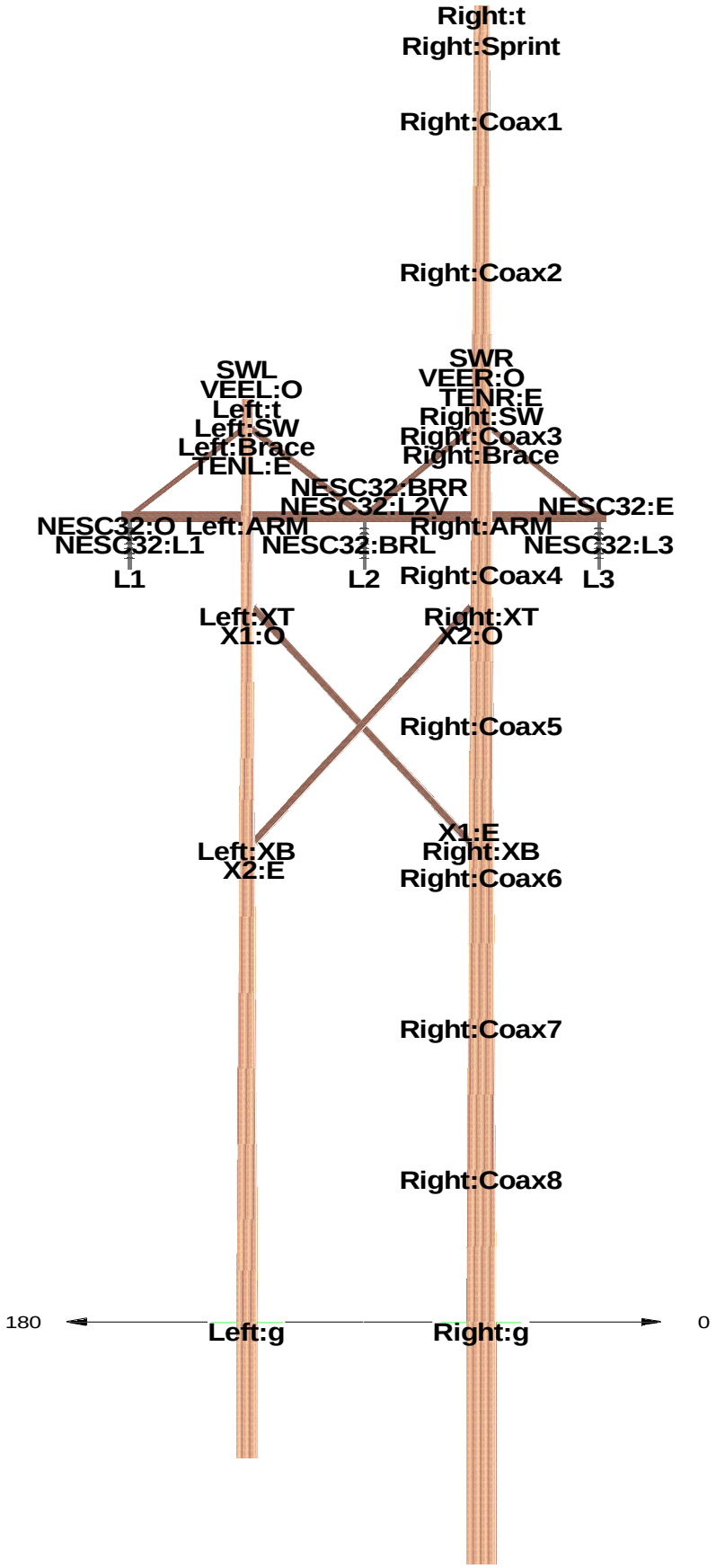
$Extreme_{Trans} = 163\,lb$

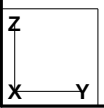
Extreme Long Load =

$$Extreme_{Long} := \overrightarrow{\left[\left(qz \cdot psf \cdot A_L \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$Extreme_{Long} = 217\,lb$

Centek Engineering Inc, Project: "Structure 6347.5"
PLS-POLE Version 14.21, 9:41:06 AM Monday, January 14, 2019
Undeformed geometry displayed





Project Name : 17159.21 - Norwich, CT
Project Notes: Structure 6347.5 / Sprint CT54XC775
Project File : J:\Jobs\1715900.WI\21_CT54XC775 Norwich\04_Structural\Calcs\PLS Pole\Structure 6347.5.pol
Date run : 9:39:32 AM Monday, January 14, 2019
by : PLS-POLE Version 14.21
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1715900.wi\21_ct54xc775 norwich\04_structural\calcs\pls pole\6347.5.lca

*** Analysis Results:

Maximum element usage is 90.60% for Brace "VEER" in load case "Ext. Wind T"
Maximum insulator usage is 24.62% for Clamp "C1" in load case "Ext. Wind T"

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 T	Left:g	-0.01	-2.15	8.83	2.15	37.15	-0.30	37.15	-0.03	0.00
NESC Heavy T	Right:g	-0.03	-6.93	-44.90	6.93	141.50	-1.42	141.51	-0.05	0.00
NESC Heavy L	Left:g	-1.07	0.03	-9.19	1.07	-0.70	-33.72	33.73	-2.39	0.00
NESC Heavy L	Right:g	-3.96	-0.07	-26.89	3.96	-0.18	-205.61	205.61	-3.19	0.00
Ext. Wind T	Left:g	-0.01	-5.71	37.98	5.71	90.84	-0.28	90.84	-0.02	0.00
Ext. Wind T	Right:g	-0.03	-17.24	-58.17	17.24	342.73	-1.22	342.73	-0.03	0.00
Ext. Wind L	Left:g	-4.00	-0.10	-5.06	4.00	0.58	-118.50	118.50	-7.93	0.00
Ext. Wind L	Right:g	-14.09	0.02	-15.20	14.09	-0.00	-707.37	707.37	-11.35	0.00

Summary of Tip Deflections For All Load Cases:

Note: positive 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 T	Left:t	0.08	1.36	0.01	1.36	0.01	0.24	0.00
NESC Heavy T	Right:t	0.10	3.80	-0.03	3.80	0.01	-0.40	0.00
NESC Heavy L	Left:t	10.21	-0.09	-0.10	10.21	1.11	0.09	0.32
NESC Heavy L	Right:t	15.55	0.45	-0.15	15.56	1.20	-0.06	0.05
Ext. Wind T	Left:t	0.06	3.17	0.03	3.18	0.01	0.58	0.00
Ext. Wind T	Right:t	0.09	10.25	-0.10	10.25	0.01	-1.23	0.00
Ext. Wind L	Left:t	34.80	0.18	-0.96	34.82	3.74	0.09	1.05
Ext. Wind L	Right:t	53.11	0.61	-1.59	53.14	4.10	-0.05	0.17

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

Summary of Laminated Wood Pole Usages:

Laminated Wood Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Left	70.90	Ext. Wind T	5	3445.6
Right	73.84	Ext. Wind L	23	13597.7

Summary of X-Arm Usages:

X-Arm Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
NESC32	60.09	Ext. Wind L	9	393.0

Summary of Brace Usages:

Brace Label	Maximum Usage %	Load Case	Weight (lbs)
TENL	21.24	NESC Heavy T	47.0
TENR	20.33	NESC Heavy T	47.0
VEEL	64.43	Ext. Wind T	58.0
VEER	90.60	Ext. Wind T	58.0
X1	70.95	Ext. Wind T	200.0
X2	50.50	Ext. Wind T	200.0

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy T	50.08	VEER	Brace
NESC Heavy L	25.63	Right Laminated	Wood
Ext. Wind T	90.60	VEER	Brace
Ext. Wind L	73.84	Right Laminated	Wood

Summary of Laminated Wood Pole Usages by Load Case:

Load Case	Maximum Usage %	Laminated Wood Pole Segment Label	Number
NESC Heavy T	36.03	Left	5
NESC Heavy L	25.63	Right	23
Ext. Wind T	70.90	Left	5
Ext. Wind L	73.84	Right	23

Summary of X-Arm Usages by Load Case:

Load Case	Maximum Usage %	X-Arm Label	Segment Number
NESC Heavy T	13.16	NESC32	6
NESC Heavy L	19.59	NESC32	9
Ext. Wind T	31.89	NESC32	6
Ext. Wind L	60.09	NESC32	9

Summary of Brace Usages by Load Case:

Load Case	Maximum Usage %	Brace Label

```
---------------------------
 NESC Heavy T   50.08   VEER
 NESC Heavy L   25.26   VEEL
  Ext. Wind T   90.60   VEER
  Ext. Wind L   11.39   VEEL
```

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	24.62	Ext. Wind T	0.0
C2	Clamp	7.15	Ext. Wind T	0.0
C3	Clamp	7.02	Ext. Wind T	0.0
C4	Clamp	4.30	NESC Heavy L	0.0
C5	Clamp	5.00	Ext. Wind T	0.0
C6	Clamp	5.94	Ext. Wind T	0.0
C7	Clamp	5.51	Ext. Wind L	0.0
C8	Clamp	7.33	Ext. Wind L	0.0
C9	Clamp	7.64	Ext. Wind L	0.0
SUSSWL	Suspension	1.72	NESC Heavy T	3.0
SUSSWR	Suspension	1.72	NESC Heavy T	3.0
L1	Suspension	4.29	NESC Heavy T	50.0
L2	Suspension	4.29	NESC Heavy T	50.0
L3	Suspension	4.29	NESC Heavy T	50.0

```
*** Weight of structure (lbs):
    Weight of Braces:                    610.0
    Weight of X-Arms:                    393.0
    Weight of Laminated Wood Poles:    17043.3
    Weight of Suspensions:               156.0
    Total:                             18202.3


*** End of Report
```

```
**************************************************************************
*                                                                        *
*                              PLS-POLE                                  *
*                   POLE AND FRAME ANALYSIS AND DESIGN                   *
*               Copyright Power Line Systems, Inc. 1999-2016             *
*                                                                        *
**************************************************************************

Project Name : 17159.21 - Norwich, CT
Project Notes: Structure 6347.5 / Sprint CT54XC775
Project File : J:\Jobs\1715900.WI\21_CT54XC775 Norwich\04_Structural\Calcs\PLS Pole\Structure 6347.5.pol
Date run     : 9:39:31 AM Monday, January 14, 2019
by           : PLS-POLE Version 14.21
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.
```

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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
```

Laminated Wood Pole Properties:

Laminated Pole Property Label	Stock Pole Number	Length (ft)	Default Embedded Length (ft)	Stop Dist. From Butt (ft)	Taper Tip Dim. (in)	Trans. Tip Dim. (in)	Long. Base Dim. (in)	Trans. Base Dim. (in)	Long. Default Drag Coef.	Modulus of Elasticity (ksi)	Density (lbs/ft^3)	Trans. MOR (ksi)	Long. MOR (ksi)

AP870I160T17P	SYP (LWS)	103.00	16	16.00	12	22.25	23.38	22.25	1.60	2400	46	7.68
PELR-1-70WC90	SYP (LWS)	70.00	9	9.00	7.5	12.25	16.5	12.25	1.60	2400	46	7.68

Laminated Wood Pole Connectivity:

Pole Label	Tip Joint	Base 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)
Left		0	-7.75	0	0	0	PELR-1-70WC90	5 labels	Fixed	0.00	0
Right		0	7.75	0	0	0	AP870I160T17P	14 labels	Fixed	0.00	0

Relative Attachment Labels for Laminated Wood Pole "Left":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
Left:SW	0.50	0.00
Left:Brace	2.00	0.00
Left:ARM	7.75	0.00
Left:XT	13.75	0.00
Left:XB	29.25	0.00

Relative Attachment Labels for Laminated Wood Pole "Right":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
Right:Sprint	2.00	0.00
Right:SW	26.50	0.00
Right:Brace	28.00	0.00
Right:ARM	33.75	0.00
Right:XT	39.75	0.00
Right:XB	55.25	0.00
Right:Coax1	0.00	80.00
Right:Coax2	0.00	70.00
Right:Coax3	0.00	60.00
Right:Coax4	0.00	50.00
Right:Coax5	0.00	40.00
Right:Coax6	0.00	30.00
Right:Coax7	0.00	20.00
Right:Coax8	0.00	10.00

Detailed Laminated Wood Properties:

Element Label	Pole Feature	Dist. Above Ground (ft)	Dist. From Tip (ft)	Trans. Dim. (in)	Long. Dim. (in)	Area (in^2)	Trans. Section Modulus (in^3)	Long. Section Modulus (in^3)	Trans. Inertia (in^4)	Long. Inertia (in^4)	Trans. MOR (ksi)	Long. MOR (ksi)	Trans. Moment Capacity (ft-k)	Long. Moment Capacity (ft-k)
Left	Left:t	61.00	0.00	7.50	12.25	91.88	114.84	187.58	430.66	1148.92	7.600	8.000	72.734	125.052
Left	Left:SW	60.50	0.50	7.57	12.25	92.78	117.11	189.42	443.50	1160.22	7.600	8.000	74.172	126.282

Left	Left:Brace	59.00	2.00	7.80	12.25	95.49	124.06	194.96	483.52	1194.12	7.600	8.000	78.570	129.972
Left		56.12	4.88	8.22	12.25	100.69	137.93	205.57	566.83	1259.10	7.600	8.000	87.354	137.045
Left	Left:ARM	53.25	7.75	8.64	12.25	105.88	152.53	216.18	659.20	1324.08	7.600	8.000	96.603	144.117
Left		50.25	10.75	9.09	12.25	111.30	168.55	227.25	765.74	1391.88	7.600	8.000	106.750	151.497
Left	Left:XT	47.25	13.75	9.53	12.25	116.73	185.37	238.32	883.19	1459.69	7.600	8.000	117.404	158.877
Left		42.25	18.75	10.27	12.25	125.76	215.19	256.77	1104.61	1572.70	7.600	8.000	136.286	171.178
Left		37.25	23.75	11.00	12.25	134.80	247.23	275.22	1360.25	1685.70	7.600	8.000	156.576	183.478
Left		34.50	26.50	11.41	12.25	139.77	265.79	285.36	1516.33	1747.86	7.600	8.000	168.335	190.243
Left	Left:XB	31.75	29.25	11.82	12.25	144.74	285.03	295.51	1683.91	1810.01	7.600	8.000	180.520	197.008
Left		26.75	34.25	12.55	12.25	153.78	321.74	313.96	2019.42	1923.02	7.600	8.000	203.766	209.308
Left		21.75	39.25	13.29	12.25	162.81	360.66	332.41	2396.77	2036.03	7.600	8.000	228.418	221.608
Left		16.75	44.25	14.03	12.25	171.85	401.81	350.86	2818.42	2149.04	7.600	8.000	254.478	233.909
Left		11.75	49.25	14.77	12.25	180.89	445.18	369.31	3286.84	2262.05	7.600	8.000	281.946	246.209
Left		6.75	54.25	15.50	12.25	189.93	490.77	387.76	3804.47	2375.05	7.600	8.000	310.820	258.509
Left		3.37	57.63	16.00	12.25	196.03	522.80	400.22	4182.94	2451.33	7.600	8.000	331.102	266.812
Left	Left:g	0.00	61.00	16.50	12.25	202.13	555.84	412.67	4585.71	2527.62	7.577	8.000	350.952	275.114
Right	Right:t	87.00	0.00	12.00	22.25	267.00	534.00	990.13	3204.00	11015.14	7.600	8.000	338.199	660.082
Right	Right:Sprint	85.00	2.00	12.26	22.25	272.82	557.54	1011.71	3418.15	11255.28	7.600	8.000	353.106	674.473
Right	Right:Coax1	80.00	7.00	12.92	22.25	287.37	618.60	1065.67	3994.81	11855.63	7.600	8.000	391.780	710.448
Right		75.00	12.00	13.57	22.25	301.92	682.84	1119.64	4632.92	12455.97	7.600	8.000	432.462	746.424
Right	Right:Coax2	70.00	17.00	14.22	22.25	316.48	750.24	1173.60	5335.62	13056.32	7.600	8.000	475.154	782.400
Right		65.25	21.75	14.85	22.25	330.30	817.22	1224.87	6065.82	13626.65	7.600	8.000	517.572	816.577
Right	Right:SW	60.50	26.50	15.47	22.25	344.13	887.06	1276.13	6859.78	14196.98	7.600	8.000	561.804	850.754
Right	Right:Coax3	60.00	27.00	15.53	22.25	345.58	894.58	1281.53	6947.17	14257.01	7.600	8.000	566.565	854.351
Right	Right:Brace	59.00	28.00	15.66	22.25	348.49	909.71	1292.32	7124.17	14377.08	7.600	8.000	576.148	861.547
Right		56.13	30.88	16.04	22.25	356.86	953.92	1323.35	7649.75	14722.28	7.598	8.000	604.002	882.233
Right	Right:ARM	53.25	33.75	16.41	22.25	365.23	999.18	1354.38	8200.57	15067.48	7.581	8.000	631.194	902.919
Right	Right:Coax4	50.00	37.00	16.84	22.25	374.68	1051.60	1389.46	8854.36	15457.70	7.561	8.000	662.615	926.303
Right	Right:XT	47.25	39.75	17.20	22.25	382.69	1097.01	1419.14	9433.98	15787.89	7.545	8.000	689.766	946.090
Right		43.63	43.38	17.67	22.25	393.24	1158.33	1458.26	10235.93	16223.14	7.525	8.000	726.344	972.172
Right	Right:Coax5	40.00	47.00	18.15	22.25	403.79	1221.31	1497.38	11082.10	16658.40	7.505	8.000	763.816	998.254
Right		35.88	51.13	18.69	22.25	415.79	1295.02	1541.90	12100.25	17153.68	7.483	8.000	807.541	1027.934
Right	Right:XB	31.75	55.25	19.23	22.25	427.80	1370.88	1586.42	13178.93	17648.97	7.462	8.000	852.418	1057.614
Right	Right:Coax6	30.00	57.00	19.46	22.25	432.89	1403.72	1605.31	13655.27	17859.09	7.453	8.000	871.803	1070.206
Right		25.00	62.00	20.11	22.25	447.44	1499.68	1659.27	15079.17	18459.43	7.428	8.000	928.326	1106.182
Right	Right:Coax7	20.00	67.00	20.76	22.25	462.00	1598.81	1713.24	16598.78	19059.78	7.404	8.000	986.529	1142.157
Right		15.00	72.00	21.42	22.25	476.55	1701.12	1767.20	18217.19	19660.13	7.382	8.000	1046.405	1178.133
Right	Right:Coax8	10.00	77.00	22.07	22.25	491.10	1806.59	1821.17	19937.52	20260.47	7.359	8.000	1107.949	1214.109
Right		5.00	82.00	22.73	22.25	505.65	1915.24	1875.13	21762.88	20860.82	7.338	8.000	1171.157	1250.085
Right	Right:g	0.00	87.00	23.38	22.25	520.21	2027.07	1929.09	23696.40	21461.17	7.317	8.000	1236.024	1286.060

Brace Properties:

Brace Property	Stock Number	Cross Section	Length	Depth	Width	Weight	Unit Wt. (If Length Unknown)	Modulus of Elasticity	Drag Coef.	Strength Check	Use Steel	Tension Capacity	Compres. Capacity	Net Area	Design Normal Stress	X-Moment Of Inertia	Z-Moment Of Inertia	Unbraced Length Ratio-X	Unbraced Length Ratio-Z
Label		Area								Type	S.F.								
		(in^2)	(ft)	(in)	(in)	(lbs)	(lbs/ft)	(ksi)				(lbs)	(lbs)	(in^2)	(ksi)	(in^4)	(in^4)		
ten2043	2043-75.7	14.76	9.1	4.375	3.375	47	0	1600	1.6	Nominal	No	30000	16505	0	0	0	0	0	0
vee2037	2037AEK103.7	18.1	9.5	5.375	3.375	58	0	1600	1.6	Nominal	No	20000	20278	0	0	0	0	0	0
x2121	2121-15-6	30.75	21.1	6	5.125	200	0	1600	1.6	Nominal	No	35000	66950	15.75	6.3	16.1	26.6		

1 1

Brace Connectivity:

Brace Label	Origin Label	End Label	Brace Property Set	Element Type	
TENL	**NESC32:L1**	**Left:Brace**	**ten2043**	**Standard**	**Brace "TENL" with property "ten2043" uses nominal strength based on a length of 9.10 (ft), but the actual geometric length is 9.39 (ft) ??**
TENR	NESC32:L3	Right:Brace	ten2043	Standard	
VEEL	Left:Brace	NESC32:L2V	vee2037	Standard	
VEER	**Right:Brace**	**NESC32:L2V**	**vee2037**	**Standard**	**Brace "VEER" with property "vee2037" uses nominal strength based on a length of 9.50 (ft), but the actual geometric length is 9.13 (ft) ??**
X1	Left:XT	Right:XB	x2121	Standard	
X2	Right:XT	Left:XB	x2121	Standard	

X-Arm Properties:

Cross Arm Property Label	Stock Number	Cross Section Area	X Inertia	Z Inertia	Weight	Depth	Width	Length	Modulus of Elasticity	Drag Coef.	Geometry Check	Strength Type	Use Steel S.F.	Vertical Capacity	Trans. Capacity	Long. Capacity	Design Normal Stress	X Section Modulus	Z Section Modulus
		(in^2)	(in^4)	(in^4)	(lbs)	(in)	(in)	(ft)	(ksi)					(lbs)	(lbs)	(lbs)	(psi)	(in^3)	(in^3)
nesc32		38.4	84.1	180.2	393	7.5	5.125	32	2100	1.6	7 points Calculated		No	0	0	0	8000	32.83	48.04

Intermediate Joints and Bolt Holes for Cross Arm Property "nesc32":

Joint Label	Offset (ft)	Horz. Hole Diameter (in)	Vert. Hole Diameter (in)
L1	0.5	0	0
PL	8.25	0	0
BRL	15	0	0
L2V	16	0	0
BRR	17	0	0
PR	23.75	0	0
L3	31.5	0	0

X-Arm Connectivity:

X-Arm Label	X-Arm Property Set	Azimuth (deg)	Slope (deg)	Attach. Labels	Connects
NESC32	nesc32	0	0		9 connections

X-Arm Connections for "NESC32":

Attach Label	Offset (ft)	Connect At	Connection Code Type
NESC32:O	0.000		Pinned X
NESC32:L1	0.500		Pinned X
NESC32:PL	8.250	Left:ARM	Pinned X
NESC32:BRL	15.000		Pinned X
NESC32:L2V	16.000		Pinned X
NESC32:BRR	17.000		Pinned X
NESC32:PR	23.750	Right:ARM	Pinned X
NESC32:L3	31.500		Pinned X
NESC32:E	32.000		Pinned X

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
Clamp 1		1e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
C1	Right:Sprint	Clamp 1	No Limit
C2	Right:Coax1	Clamp 1	No Limit
C3	Right:Coax2	Clamp 1	No Limit
C4	Right:Coax3	Clamp 1	No Limit
C5	Right:Coax4	Clamp 1	No Limit
C6	Right:Coax5	Clamp 1	No Limit
C7	Right:Coax6	Clamp 1	No Limit
C8	Right:Coax7	Clamp 1	No Limit
C9	Right:Coax8	Clamp 1	No Limit

Suspension Properties:

Label	Stock Number	Length (ft)	Weight (lbs)	Wind Area (ft^2)	Tension Capacity (lbs)	Top Rect Width (ft)	Top Rect Height (ft)	Bot. Rect Width (ft)	Bot. Rect Height (ft)	Vert. Rect Width (ft)	Vert. Rect Height (ft)
SUSSW		0.25	3	0.1	6e+004	0	0	0	0	0	0
SUS		3.5	50	2	6e+004	0	0	0	0	0	0

Suspension Insulator Connectivity:

Suspension Label	Structure Attach	Tip Label	Property Set	Cond. 1 Minimum Swing (deg)	Cond. 1 Maximum Swing (deg)	Cond. 2 Minimum Swing (deg)	Cond. 2 Maximum Swing (deg)	Cond. 3 Minimum Swing (deg)	Cond. 3 Maximum Swing (deg)	Cond. 4 Minimum Swing (deg)	Cond. 4 Maximum Swing (deg)	Min. Required Vertical Load (uplift) (lbs)

SUSSWL	Left:SW	SWL	SUSSW	-90.00	90.00	-90.00	90.00	-90.00	90.00	-180.00	180.00	No Limit
SUSSWR	Right:SW	SWR	SUSSW	-90.00	90.00	-90.00	90.00	-90.00	90.00	-180.00	180.00	No Limit
L1	NESC32:L1	L1	SUS	-90.00	90.00	-90.00	90.00	-90.00	90.00	-180.00	180.00	No Limit
L2	NESC32:L2V	L2	SUS	-90.00	90.00	-90.00	90.00	-90.00	90.00	-180.00	180.00	No Limit
L3	NESC32:L3	L3	SUS	-90.00	90.00	-90.00	90.00	-90.00	90.00	-180.00	180.00	No Limit

Material List

Stock Number	Item Description	Quantity	Unit of Measure
2043-75.7	Brace property: ten2043	2.00	Each
2037AEK103.7	Brace property: vee2037	2.00	Each
2121-15-6	Brace property: x2121	2.00	Each

*** Loads Data

Loads from file: j:\jobs\1715900.wi\21_ct54xc775 norwich\04_structural\calcs\pls pole\6347.5.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)   87.00 (ft)
  Structure height   87.00 (ft)
  Structure height above ground   87.00 (ft)

Vector Load Cases:

Load Case Description	Dead Load	Wind Area	SF for Steel Poles and Towers	SF for Wood Poles	SF for Conc. Poles First Crack	SF for Conc. Poles Ult.	SF for Conc. Poles Zero Tens.	SF for Guys and Cables	SF for Tubular Arms	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)	Ice Temperature (deg F)	Deflection Check	Deflection Limit % or (ft)
NESC Heavy T	1.5000	2.5000	1.00000	0.6500	0.0000	0.0000	0.0000	1.0000	0.6500	0.6500	1.0000	1.0000	14 loads	Wind on All	4	0	0.000	0.000	0.0	No Limit	0	
NESC Heavy L	1.5000	2.5000	1.00000	0.6500	0.0000	0.0000	0.0000	1.0000	0.6500	0.6500	1.0000	1.0000	14 loads	Wind on All	0	4	0.000	0.000	0.0	No Limit	0	
Ext. Wind T	1.0000	1.0000	1.00000	0.7500	0.0000	0.0000	0.0000	1.0000	0.7500	0.7500	1.0000	1.0000	14 loads	NESC 2012	36.9	0	0.000	0.000	0.0	No Limit	0	
Ext. Wind L	1.0000	1.0000	1.00000	0.7500	0.0000	0.0000	0.0000	1.0000	0.7500	0.7500	1.0000	1.0000	14 loads	NESC 2012	0	36.9	0.000	0.000	0.0	No Limit	0	

Point Loads for Load Case "NESC Heavy T":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
SWL	747	713	0	Shield Wire
SWR	747	713	0	Shield Wire
L1	2385	964	0	Conductor
L2	2385	964	0	Conductor
L3	2385	964	0	Conductor
Right:Sprint	1851	521	0	Sprint
Right:Coax1	421	58	0	Coax
Right:Coax2	421	58	0	Coax
Right:Coax3	421	58	0	Coax
Right:Coax4	421	58	0	Coax
Right:Coax5	421	58	0	Coax
Right:Coax6	421	58	0	Coax

Right:Coax7	421	58	0	Coax
Right:Coax8	421	58	0	Coax

Detailed Pole Loading Data for Load Case "NESC Heavy T":

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)
Left	Left:t	Left:SW	61.00	60.50	60.75	7.537	3.57e+005	1.600	10.00	0.00	22.12	8.17	0.00	0.00	8.17	0.05
Left	Left:SW	Left:Brace	60.50	59.00	59.75	7.684	3.64e+005	1.600	10.00	0.00	67.66	24.50	0.00	0.00	24.50	0.16
Left	Left:Brace		59.00	56.12	57.56	8.007	3.79e+005	1.600	10.00	0.00	135.13	46.96	0.00	0.00	46.96	0.32
Left		Left:ARM	56.12	53.25	54.69	8.431	3.99e+005	1.600	10.00	0.00	142.28	46.96	0.00	0.00	46.96	0.34
Left	Left:ARM		53.25	50.25	51.75	8.865	4.2e+005	1.600	10.00	0.00	156.10	49.00	0.00	0.00	49.00	0.37
Left		Left:XT	50.25	47.25	48.75	9.307	4.41e+005	1.600	10.00	0.00	163.90	49.00	0.00	0.00	49.00	0.39
Left	Left:XT		47.25	42.25	44.75	9.898	4.69e+005	1.600	10.00	0.00	290.48	81.67	0.00	0.00	81.67	0.69
Left			42.25	37.25	39.75	10.635	5.04e+005	1.600	10.00	0.00	312.13	81.67	0.00	0.00	81.67	0.74
Left			37.25	34.50	35.87	11.207	5.31e+005	1.600	10.00	0.00	180.90	44.92	0.00	0.00	44.92	0.43
Left		Left:XB	34.50	31.75	33.12	11.613	5.5e+005	1.600	10.00	0.00	187.45	44.92	0.00	0.00	44.92	0.44
Left	Left:XB		31.75	26.75	29.25	12.184	5.77e+005	1.600	10.00	0.00	357.60	81.67	0.00	0.00	81.67	0.85
Left			26.75	21.75	24.25	12.250	5.8e+005	1.600	10.00	0.00	379.25	81.67	0.00	0.00	81.67	0.90
Left			21.75	16.75	19.25	12.250	5.8e+005	1.600	10.00	0.00	400.90	81.67	0.00	0.00	81.67	0.95
Left			16.75	11.75	14.25	12.250	5.8e+005	1.600	10.00	0.00	422.55	81.67	0.00	0.00	81.67	1.00
Left			11.75	6.75	9.25	12.250	5.8e+005	1.600	10.00	0.00	444.20	81.67	0.00	0.00	81.67	1.05
Left			6.75	3.37	5.06	12.250	5.8e+005	1.600	10.00	0.00	312.08	55.13	0.00	0.00	55.12	0.74
Left		Left:g	3.37	0.00	1.69	12.250	5.8e+005	1.600	10.00	0.00	321.94	55.13	0.00	0.00	55.12	0.76
Right	Right:t	Right:Sprint	87.00	85.00	86.00	12.131	5.74e+005	1.600	10.00	0.00	258.66	59.33	0.00	0.00	59.33	0.34
Right	Right:Sprint	Right:Coax1	85.00	80.00	82.50	12.589	5.96e+005	1.600	10.00	0.00	671.07	148.34	0.00	0.00	148.33	0.88
Right	Right:Coax1		80.00	75.00	77.50	13.243	6.27e+005	1.600	10.00	0.00	705.93	148.34	0.00	0.00	148.33	0.92
Right		Right:Coax2	75.00	70.00	72.50	13.897	6.58e+005	1.600	10.00	0.00	740.79	148.34	0.00	0.00	148.33	0.97
Right	Right:Coax2		70.00	65.25	67.63	14.534	6.88e+005	1.600	10.00	0.00	736.05	140.92	0.00	0.00	140.92	0.96
Right		Right:SW	65.25	60.50	62.88	15.156	7.18e+005	1.600	10.00	0.00	767.51	140.92	0.00	0.00	140.92	1.00
Right	Right:SW	Right:Coax3	60.50	60.00	60.25	15.499	7.34e+005	1.600	10.00	0.00	82.62	14.83	0.00	0.00	14.83	0.11
Right	Right:Coax3	Right:Brace	60.00	59.00	59.50	15.597	7.38e+005	1.600	10.00	0.00	166.29	29.67	0.00	0.00	29.67	0.22
Right	Right:Brace		59.00	56.13	57.56	15.851	7.5e+005	1.600	10.00	0.00	485.85	85.29	0.00	0.00	85.29	0.63
Right		Right:ARM	56.13	53.25	54.69	16.227	7.68e+005	1.600	10.00	0.00	497.37	85.29	0.00	0.00	85.29	0.65
Right	Right:ARM	Right:Coax4	53.25	50.00	51.63	16.627	7.87e+005	1.600	10.00	0.00	576.13	96.42	0.00	0.00	96.42	0.75
Right	Right:Coax4	Right:XT	50.00	47.25	48.63	17.020	8.06e+005	1.600	10.00	0.00	499.00	81.59	0.00	0.00	81.58	0.65
Right	Right:XT		47.25	43.63	45.44	17.437	8.26e+005	1.600	10.00	0.00	673.88	107.55	0.00	0.00	107.54	0.88
Right		Right:Coax5	43.63	40.00	41.81	17.911	8.48e+005	1.600	10.00	0.00	692.21	107.55	0.00	0.00	107.54	0.90
Right	Right:Coax5		40.00	35.88	37.94	18.418	8.72e+005	1.600	10.00	0.00	809.98	122.38	0.00	0.00	122.37	1.06
Right		Right:XB	35.88	31.75	33.81	18.957	8.98e+005	1.600	10.00	0.00	833.71	122.38	0.00	0.00	122.37	1.09
Right	Right:XB	Right:Coax6	31.75	30.00	30.88	19.341	9.16e+005	1.600	10.00	0.00	360.86	51.92	0.00	0.00	51.92	0.47
Right	Right:Coax6		30.00	25.00	27.50	19.783	9.37e+005	1.600	10.00	0.00	1054.57	148.34	0.00	0.00	148.33	1.38
Right		Right:Coax7	25.00	20.00	22.50	20.437	9.68e+005	1.600	10.00	0.00	1089.44	148.34	0.00	0.00	148.33	1.42
Right	Right:Coax7		20.00	15.00	17.50	21.091	9.99e+005	1.600	10.00	0.00	1124.30	148.34	0.00	0.00	148.33	1.47
Right		Right:Coax8	15.00	10.00	12.50	21.745	1.03e+006	1.600	10.00	0.00	1159.16	148.34	0.00	0.00	148.33	1.51
Right	Right:Coax8		10.00	5.00	7.50	22.250	1.05e+006	1.600	10.00	0.00	1194.03	148.34	0.00	0.00	148.33	1.56
Right		Right:g	5.00	0.00	2.50	22.250	1.05e+006	1.600	10.00	0.00	1228.89	148.34	0.00	0.00	148.33	1.60

Point Loads for Load Case "NESC Heavy L":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment

SWL	747	0	0	Shield Wire
SWR	747	0	0	Shield Wire
L1	2385	0	0	Conductor
L2	2385	0	0	Conductor
L3	2385	0	0	Conductor
Right:Sprint	1851	0	521	Sprint
Right:Coax1	421	0	73	Coax
Right:Coax2	421	0	73	Coax
Right:Coax3	421	0	73	Coax
Right:Coax4	421	0	73	Coax
Right:Coax5	421	0	73	Coax
Right:Coax6	421	0	73	Coax
Right:Coax7	421	0	73	Coax
Right:Coax8	421	0	73	Coax

Detailed Pole Loading Data for Load Case "NESC Heavy L":

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)
Left	Left:t	Left:SW	61.00	60.50	60.75	7.537	3.57e+005	1.600	10.00	0.00	22.12	5.03	0.00	0.00	0.09	5.02
Left	Left:SW	Left:Brace	60.50	59.00	59.75	7.684	3.64e+005	1.600	10.00	0.00	67.66	15.37	0.00	0.00	0.26	15.37
Left	Left:Brace		59.00	56.12	57.56	8.007	3.79e+005	1.600	10.00	0.00	135.13	30.70	0.00	0.00	0.49	30.69
Left		Left:ARM	56.12	53.25	54.69	8.431	3.99e+005	1.600	10.00	0.00	142.28	32.32	0.00	0.00	0.49	32.32
Left	Left:ARM		53.25	50.25	51.75	8.865	4.2e+005	1.600	10.00	0.00	156.10	35.46	0.00	0.00	0.51	35.46
Left		Left:XT	50.25	47.25	48.75	9.307	4.41e+005	1.600	10.00	0.00	163.90	37.23	0.00	0.00	0.51	37.23
Left	Left:XT		47.25	42.25	44.75	9.898	4.69e+005	1.600	10.00	0.00	290.48	65.99	0.00	0.00	0.85	65.98
Left			42.25	37.25	39.75	10.635	5.04e+005	1.600	10.00	0.00	312.13	70.91	0.00	0.00	0.85	70.90
Left			37.25	34.50	35.87	11.207	5.31e+005	1.600	10.00	0.00	180.90	41.09	0.00	0.00	0.47	41.09
Left		Left:XB	34.50	31.75	33.12	11.613	5.5e+005	1.600	10.00	0.00	187.45	42.58	0.00	0.00	0.47	42.58
Left	Left:XB		31.75	26.75	29.25	12.184	5.77e+005	1.600	10.00	0.00	357.60	81.23	0.00	0.00	0.85	81.23
Left			26.75	21.75	24.25	12.250	5.8e+005	1.600	10.00	0.00	379.25	86.15	0.00	0.00	0.85	86.15
Left			21.75	16.75	19.25	12.250	5.8e+005	1.600	10.00	0.00	400.90	91.07	0.00	0.00	0.85	91.07
Left			16.75	11.75	14.25	12.250	5.8e+005	1.600	10.00	0.00	422.55	95.99	0.00	0.00	0.85	95.98
Left			11.75	6.75	9.25	12.250	5.8e+005	1.600	10.00	0.00	444.20	100.91	0.00	0.00	0.85	100.90
Left			6.75	3.37	5.06	12.250	5.8e+005	1.600	10.00	0.00	312.08	70.89	0.00	0.00	0.58	70.89
Left		Left:g	3.37	0.00	1.69	12.250	5.8e+005	1.600	10.00	0.00	321.94	73.13	0.00	0.00	0.58	73.13
Right	Right:t	Right:Sprint	87.00	85.00	86.00	12.131	5.74e+005	1.600	10.00	0.00	258.66	32.35	0.00	0.00	0.62	32.35
Right	Right:Sprint	Right:Coax1	85.00	80.00	82.50	12.589	5.96e+005	1.600	10.00	0.00	671.07	83.94	0.00	0.00	1.55	83.92
Right	Right:Coax1		80.00	75.00	77.50	13.243	6.27e+005	1.600	10.00	0.00	705.93	88.30	0.00	0.00	1.55	88.28
Right		Right:Coax2	75.00	70.00	72.50	13.897	6.58e+005	1.600	10.00	0.00	740.79	92.66	0.00	0.00	1.55	92.64
Right	Right:Coax2		70.00	65.25	67.63	14.534	6.88e+005	1.600	10.00	0.00	736.05	92.06	0.00	0.00	1.47	92.05
Right		Right:SW	65.25	60.50	62.88	15.156	7.18e+005	1.600	10.00	0.00	767.51	96.00	0.00	0.00	1.47	95.99
Right	Right:SW	Right:Coax3	60.50	60.00	60.25	15.499	7.34e+005	1.600	10.00	0.00	82.62	10.33	0.00	0.00	0.15	10.33
Right	Right:Coax3	Right:Brace	60.00	59.00	59.50	15.597	7.38e+005	1.600	10.00	0.00	166.29	20.80	0.00	0.00	0.31	20.80
Right	Right:Brace		59.00	56.13	57.56	15.851	7.5e+005	1.600	10.00	0.00	485.85	60.77	0.00	0.00	0.89	60.76
Right		Right:ARM	56.13	53.25	54.69	16.227	7.68e+005	1.600	10.00	0.00	497.37	62.21	0.00	0.00	0.89	62.20
Right	Right:ARM	Right:Coax4	53.25	50.00	51.63	16.627	7.87e+005	1.600	10.00	0.00	576.13	72.06	0.00	0.00	1.01	72.05
Right	Right:Coax4	Right:XT	50.00	47.25	48.63	17.020	8.06e+005	1.600	10.00	0.00	499.00	62.41	0.00	0.00	0.85	62.41
Right	Right:XT		47.25	43.63	45.44	17.437	8.26e+005	1.600	10.00	0.00	673.88	84.28	0.00	0.00	1.12	84.28
Right		Right:Coax5	43.63	40.00	41.81	17.911	8.48e+005	1.600	10.00	0.00	692.21	86.58	0.00	0.00	1.12	86.57
Right	Right:Coax5		40.00	35.88	37.94	18.418	8.72e+005	1.600	10.00	0.00	809.98	101.30	0.00	0.00	1.28	101.30
Right		Right:XB	35.88	31.75	33.81	18.957	8.98e+005	1.600	10.00	0.00	833.71	104.27	0.00	0.00	1.28	104.26

Right	Right:XB	Right:Coax6	31.75	30.00	30.88	19.341	9.16e+005	1.600	10.00	0.00	360.86	45.13	0.00	0.00	0.54	45.13
Right	Right:Coax6		30.00	25.00	27.50	19.783	9.37e+005	1.600	10.00	0.00	1054.57	131.89	0.00	0.00	1.55	131.89
Right		Right:Coax7	25.00	20.00	22.50	20.437	9.68e+005	1.600	10.00	0.00	1089.44	136.25	0.00	0.00	1.55	136.25
Right	Right:Coax7		20.00	15.00	17.50	21.091	9.99e+005	1.600	10.00	0.00	1124.30	140.61	0.00	0.00	1.55	140.61
Right		Right:Coax8	15.00	10.00	12.50	21.745	1.03e+006	1.600	10.00	0.00	1159.16	144.97	0.00	0.00	1.55	144.97
Right	Right:Coax8		10.00	5.00	7.50	22.250	1.05e+006	1.600	10.00	0.00	1194.03	149.33	0.00	0.00	1.55	149.33
Right		Right:g	5.00	0.00	2.50	22.250	1.05e+006	1.600	10.00	0.00	1228.89	153.69	0.00	0.00	1.55	153.69

Point Loads for Load Case "Ext. Wind T":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
SWL	248	546	0	Shield Wire
SWR	248	546	0	Shield Wire
L1	1085	1590	0	Conductor
L2	1085	1590	0	Conductor
L3	1085	1590	0	Conductor
Right:Sprint	833	1935	0	Sprint
Right:Coax1	101	163	0	Coax
Right:Coax2	101	163	0	Coax
Right:Coax3	101	163	0	Coax
Right:Coax4	101	163	0	Coax
Right:Coax5	101	163	0	Coax
Right:Coax6	101	163	0	Coax
Right:Coax7	101	163	0	Coax
Right:Coax8	101	163	0	Coax

Detailed Pole Loading Data for Load Case "Ext. Wind T":

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)
Left	Left:t	Left:SW	61.00	60.50	60.75	7.537	6.84e+005	1.600	36.74	0.00	14.75	30.00	0.00	0.00	30.00	0.06
Left	Left:SW	Left:Brace	60.50	59.00	59.75	7.684	6.97e+005	1.600	36.74	0.00	45.11	90.00	0.00	0.00	90.00	0.18
Left	Left:Brace		59.00	56.12	57.56	8.007	7.27e+005	1.600	36.74	0.00	90.08	172.50	0.00	0.00	172.50	0.36
Left		Left:ARM	56.12	53.25	54.69	8.431	7.65e+005	1.600	36.74	0.00	94.86	172.50	0.00	0.00	172.50	0.38
Left	Left:ARM		53.25	50.25	51.75	8.865	8.04e+005	1.600	36.74	0.00	104.07	180.00	0.00	0.00	180.00	0.42
Left		Left:XT	50.25	47.25	48.75	9.307	8.45e+005	1.600	36.74	0.00	109.26	180.00	0.00	0.00	180.00	0.44
Left	Left:XT		47.25	42.25	44.75	9.898	8.98e+005	1.600	36.74	0.00	193.66	300.01	0.00	0.00	300.01	0.78
Left			42.25	37.25	39.75	10.635	9.65e+005	1.600	36.74	0.00	208.09	300.01	0.00	0.00	300.01	0.84
Left			37.25	34.50	35.87	11.207	1.02e+006	1.600	36.74	0.00	120.60	165.00	0.00	0.00	165.00	0.48
Left		Left:XB	34.50	31.75	33.12	11.613	1.05e+006	1.600	36.74	0.00	124.97	165.00	0.00	0.00	165.00	0.50
Left	Left:XB		31.75	26.75	29.25	12.184	1.11e+006	1.600	36.74	0.00	238.40	300.01	0.00	0.00	300.01	0.96
Left			26.75	21.75	24.25	12.250	1.11e+006	1.600	36.74	0.00	252.83	300.01	0.00	0.00	300.01	1.02
Left			21.75	16.75	19.25	12.250	1.11e+006	1.600	36.74	0.00	267.27	300.01	0.00	0.00	300.01	1.07
Left			16.75	11.75	14.25	12.250	1.11e+006	1.600	36.74	0.00	281.70	300.01	0.00	0.00	300.01	1.13
Left			11.75	6.75	9.25	12.250	1.11e+006	1.600	36.74	0.00	296.14	300.01	0.00	0.00	300.01	1.19
Left			6.75	3.37	5.06	12.250	1.11e+006	1.600	36.74	0.00	208.05	202.51	0.00	0.00	202.50	0.84
Left		Left:g	3.37	0.00	1.69	12.250	1.11e+006	1.600	36.74	0.00	214.63	202.51	0.00	0.00	202.50	0.86
Right	Right:t	Right:Sprint	87.00	85.00	86.00	12.131	1.1e+006	1.600	36.74	0.00	172.44	217.96	0.00	0.00	217.96	0.38
Right	Right:Sprint	Right:Coax1	85.00	80.00	82.50	12.589	1.14e+006	1.600	36.74	0.00	447.38	544.91	0.00	0.00	544.91	0.99
Right	Right:Coax1		80.00	75.00	77.50	13.243	1.2e+006	1.600	36.74	0.00	470.62	544.91	0.00	0.00	544.91	1.04

Right		Right:Coax2	75.00	70.00	72.50	13.897	1.26e+006	1.600	36.74	0.00	493.86	544.91	0.00	0.00	544.91	1.09
Right	Right:Coax2		70.00	65.25	67.63	14.534	1.32e+006	1.600	36.74	0.00	490.70	517.66	0.00	0.00	517.66	1.09
Right		Right:SW	65.25	60.50	62.88	15.156	1.38e+006	1.600	36.74	0.00	511.67	517.66	0.00	0.00	517.66	1.13
Right	Right:SW	Right:Coax3	60.50	60.00	60.25	15.499	1.41e+006	1.600	36.74	0.00	55.08	54.49	0.00	0.00	54.49	0.12
Right	Right:Coax3	Right:Brace	60.00	59.00	59.50	15.597	1.42e+006	1.600	36.74	0.00	110.86	108.98	0.00	0.00	108.98	0.25
Right	Right:Brace		59.00	56.13	57.56	15.851	1.44e+006	1.600	36.74	0.00	323.90	313.32	0.00	0.00	313.32	0.72
Right		Right:ARM	56.13	53.25	54.69	16.227	1.47e+006	1.600	36.74	0.00	331.58	313.32	0.00	0.00	313.32	0.73
Right	Right:ARM	Right:Coax4	53.25	50.00	51.63	16.627	1.51e+006	1.600	36.74	0.00	384.09	354.19	0.00	0.00	354.19	0.85
Right	Right:Coax4	Right:XT	50.00	47.25	48.63	17.020	1.54e+006	1.600	36.74	0.00	332.67	299.70	0.00	0.00	299.70	0.74
Right	Right:XT		47.25	43.63	45.44	17.437	1.58e+006	1.600	36.74	0.00	449.26	395.06	0.00	0.00	395.06	0.99
Right		Right:Coax5	43.63	40.00	41.81	17.911	1.63e+006	1.600	36.74	0.00	461.47	395.06	0.00	0.00	395.06	1.02
Right	Right:Coax5		40.00	35.88	37.94	18.418	1.67e+006	1.600	36.74	0.00	539.99	449.55	0.00	0.00	449.55	1.19
Right		Right:XB	35.88	31.75	33.81	18.957	1.72e+006	1.600	36.74	0.00	555.81	449.55	0.00	0.00	449.55	1.23
Right	Right:XB	Right:Coax6	31.75	30.00	30.88	19.341	1.76e+006	1.600	36.74	0.00	240.58	190.72	0.00	0.00	190.72	0.53
Right	Right:Coax6		30.00	25.00	27.50	19.783	1.8e+006	1.600	36.74	0.00	703.05	544.91	0.00	0.00	544.91	1.56
Right		Right:Coax7	25.00	20.00	22.50	20.437	1.85e+006	1.600	36.74	0.00	726.29	544.91	0.00	0.00	544.91	1.61
Right	Right:Coax7		20.00	15.00	17.50	21.091	1.91e+006	1.600	36.74	0.00	749.53	544.91	0.00	0.00	544.91	1.66
Right		Right:Coax8	15.00	10.00	12.50	21.745	1.97e+006	1.600	36.74	0.00	772.78	544.91	0.00	0.00	544.91	1.71
Right	Right:Coax8		10.00	5.00	7.50	22.250	2.02e+006	1.600	36.74	0.00	796.02	544.91	0.00	0.00	544.91	1.76
Right		Right:g	5.00	0.00	2.50	22.250	2.02e+006	1.600	36.74	0.00	819.26	544.91	0.00	0.00	544.91	1.81

Point Loads for Load Case "Ext. Wind L":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
SWL	248	0	0	Shield Wire
SWR	248	0	0	Shield Wire
L1	1085	0	0	Conductor
L2	1085	0	0	Conductor
L3	1085	0	0	Conductor
Right:Sprint	833	0	1935	Sprint
Right:Coax1	101	0	217	Coax
Right:Coax2	101	0	217	Coax
Right:Coax3	101	0	217	Coax
Right:Coax4	101	0	217	Coax
Right:Coax5	101	0	217	Coax
Right:Coax6	101	0	217	Coax
Right:Coax7	101	0	217	Coax
Right:Coax8	101	0	217	Coax

Detailed Pole Loading Data for Load Case "Ext. Wind L":

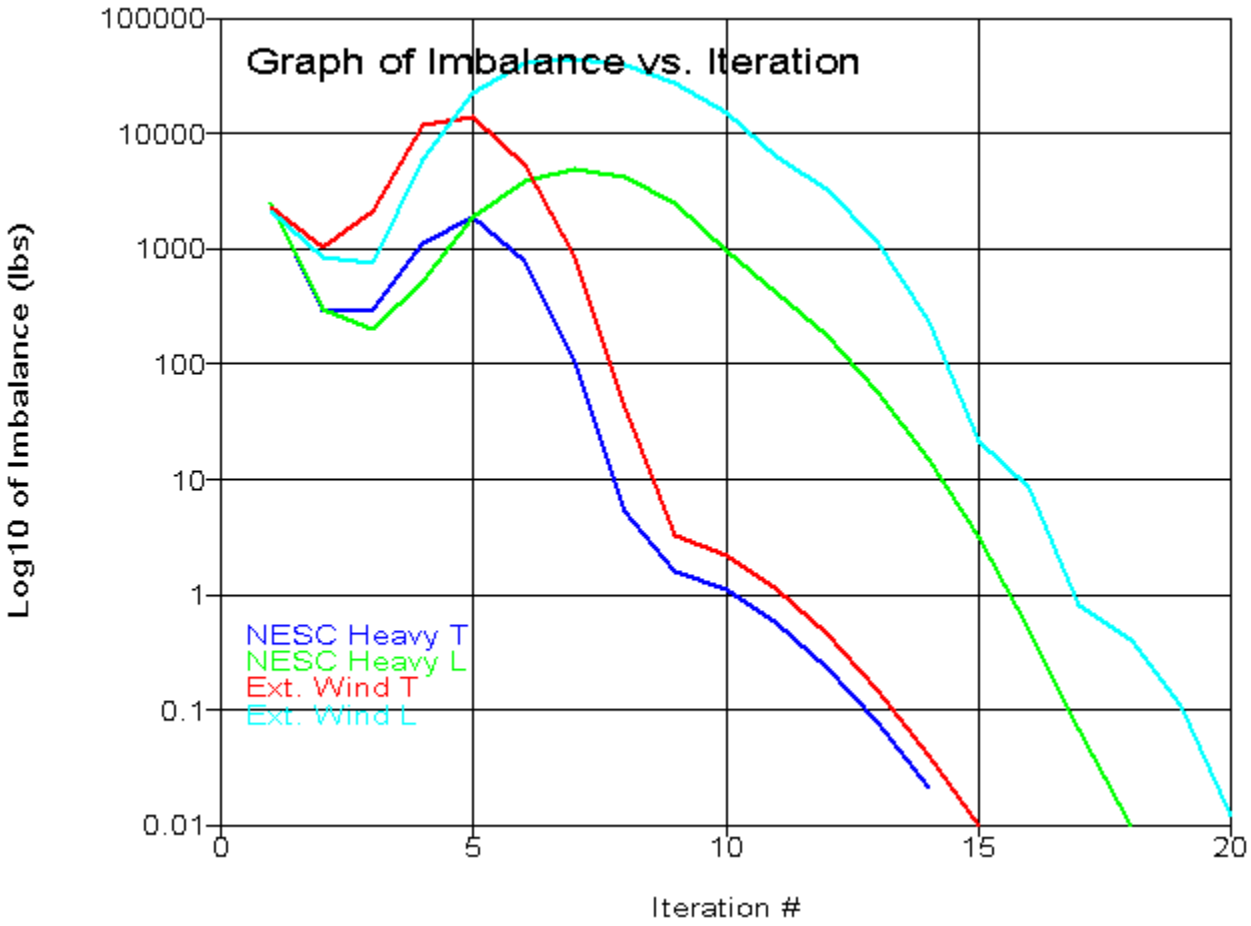
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

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)
Left	Left:t	Left:SW	61.00	60.50	60.75	7.537	6.84e+005	1.600	36.74	0.00	14.75	18.46	0.00	0.00	0.10	18.46
Left	Left:SW	Left:Brace	60.50	59.00	59.75	7.684	6.97e+005	1.600	36.74	0.00	45.11	56.46	0.00	0.00	0.29	56.46
Left	Left:Brace		59.00	56.12	57.56	8.007	7.27e+005	1.600	36.74	0.00	90.08	112.76	0.00	0.00	0.55	112.76
Left		Left:ARM	56.12	53.25	54.69	8.431	7.65e+005	1.600	36.74	0.00	94.86	118.73	0.00	0.00	0.55	118.73
Left	Left:ARM		53.25	50.25	51.75	8.865	8.04e+005	1.600	36.74	0.00	104.07	130.26	0.00	0.00	0.58	130.26
Left		Left:XT	50.25	47.25	48.75	9.307	8.45e+005	1.600	36.74	0.00	109.26	136.77	0.00	0.00	0.58	136.76
Left	Left:XT		47.25	42.25	44.75	9.898	8.98e+005	1.600	36.74	0.00	193.66	242.40	0.00	0.00	0.96	242.39

Left			42.25	37.25	39.75	10.635	9.65e+005	1.600	36.74	0.00	208.09	260.46	0.00	0.00	0.96	260.46
Left			37.25	34.50	35.87	11.207	1.02e+006	1.600	36.74	0.00	120.60	150.95	0.00	0.00	0.53	150.95
Left		Left:XB	34.50	31.75	33.12	11.613	1.05e+006	1.600	36.74	0.00	124.97	156.42	0.00	0.00	0.53	156.42
Left	Left:XB		31.75	26.75	29.25	12.184	1.11e+006	1.600	36.74	0.00	238.40	298.40	0.00	0.00	0.96	298.40
Left			26.75	21.75	24.25	12.250	1.11e+006	1.600	36.74	0.00	252.83	316.47	0.00	0.00	0.96	316.47
Left			21.75	16.75	19.25	12.250	1.11e+006	1.600	36.74	0.00	267.27	334.53	0.00	0.00	0.96	334.53
Left			16.75	11.75	14.25	12.250	1.11e+006	1.600	36.74	0.00	281.70	352.60	0.00	0.00	0.96	352.60
Left			11.75	6.75	9.25	12.250	1.11e+006	1.600	36.74	0.00	296.14	370.67	0.00	0.00	0.96	370.67
Left			6.75	3.37	5.06	12.250	1.11e+006	1.600	36.74	0.00	208.05	260.41	0.00	0.00	0.65	260.41
Left		Left:g	3.37	0.00	1.69	12.250	1.11e+006	1.600	36.74	0.00	214.63	268.64	0.00	0.00	0.65	268.64
Right	Right:t	Right:Sprint	87.00	85.00	86.00	12.131	1.1e+006	1.600	36.74	0.00	172.44	118.84	0.00	0.00	0.70	118.83
Right	Right:Sprint	Right:Coax1	85.00	80.00	82.50	12.589	1.14e+006	1.600	36.74	0.00	447.38	308.30	0.00	0.00	1.75	308.30
Right	Right:Coax1		80.00	75.00	77.50	13.243	1.2e+006	1.600	36.74	0.00	470.62	324.32	0.00	0.00	1.75	324.32
Right		Right:Coax2	75.00	70.00	72.50	13.897	1.26e+006	1.600	36.74	0.00	493.86	340.34	0.00	0.00	1.75	340.33
Right	Right:Coax2		70.00	65.25	67.63	14.534	1.32e+006	1.600	36.74	0.00	490.70	338.16	0.00	0.00	1.66	338.15
Right		Right:SW	65.25	60.50	62.88	15.156	1.38e+006	1.600	36.74	0.00	511.67	352.61	0.00	0.00	1.66	352.61
Right	Right:SW	Right:Coax3	60.50	60.00	60.25	15.499	1.41e+006	1.600	36.74	0.00	55.08	37.96	0.00	0.00	0.17	37.96
Right	Right:Coax3	Right:Brace	60.00	59.00	59.50	15.597	1.42e+006	1.600	36.74	0.00	110.86	76.40	0.00	0.00	0.35	76.40
Right	Right:Brace		59.00	56.13	57.56	15.851	1.44e+006	1.600	36.74	0.00	323.90	223.21	0.00	0.00	1.01	223.21
Right		Right:ARM	56.13	53.25	54.69	16.227	1.47e+006	1.600	36.74	0.00	331.58	228.50	0.00	0.00	1.01	228.50
Right	Right:ARM	Right:Coax4	53.25	50.00	51.63	16.627	1.51e+006	1.600	36.74	0.00	384.09	264.69	0.00	0.00	1.14	264.68
Right	Right:Coax4	Right:XT	50.00	47.25	48.63	17.020	1.54e+006	1.600	36.74	0.00	332.67	229.25	0.00	0.00	0.96	229.25
Right	Right:XT		47.25	43.63	45.44	17.437	1.58e+006	1.600	36.74	0.00	449.26	309.60	0.00	0.00	1.27	309.59
Right		Right:Coax5	43.63	40.00	41.81	17.911	1.63e+006	1.600	36.74	0.00	461.47	318.02	0.00	0.00	1.27	318.01
Right	Right:Coax5		40.00	35.88	37.94	18.418	1.67e+006	1.600	36.74	0.00	539.99	372.12	0.00	0.00	1.44	372.12
Right		Right:XB	35.88	31.75	33.81	18.957	1.72e+006	1.600	36.74	0.00	555.81	383.02	0.00	0.00	1.44	383.02
Right	Right:XB	Right:Coax6	31.75	30.00	30.88	19.341	1.76e+006	1.600	36.74	0.00	240.58	165.79	0.00	0.00	0.61	165.79
Right	Right:Coax6		30.00	25.00	27.50	19.783	1.8e+006	1.600	36.74	0.00	703.05	484.49	0.00	0.00	1.75	484.49
Right		Right:Coax7	25.00	20.00	22.50	20.437	1.85e+006	1.600	36.74	0.00	726.29	500.51	0.00	0.00	1.75	500.50
Right	Right:Coax7		20.00	15.00	17.50	21.091	1.91e+006	1.600	36.74	0.00	749.53	516.52	0.00	0.00	1.75	516.52
Right		Right:Coax8	15.00	10.00	12.50	21.745	1.97e+006	1.600	36.74	0.00	772.78	532.54	0.00	0.00	1.75	532.54
Right	Right:Coax8		10.00	5.00	7.50	22.250	2.02e+006	1.600	36.74	0.00	796.02	548.56	0.00	0.00	1.75	548.56
Right		Right:g	5.00	0.00	2.50	22.250	2.02e+006	1.600	36.74	0.00	819.26	564.58	0.00	0.00	1.75	564.57

*** Analysis Results:

Maximum element usage is 90.60% for Brace "VEER" in load case "Ext. Wind T"
Maximum insulator usage is 24.62% for Clamp "C1" in load case "Ext. Wind T"



*** Analysis Results for Load Case No. 1 "NESC Heavy T" - Number of iterations in SAPS 14

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

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)
Left:g	0	0	0	0.0000	0.0000	0.0000	0	-7.75	0
Left:t	0.006363	0.1131	0.0007015	0.2370	0.0078	0.0042	0.006363	-7.637	61
Left:SW	0.006295	0.1152	0.0007058	0.2370	0.0078	0.0042	0.006295	-7.635	60.5

Left:Brace	0.006089	0.1215	0.0007242	0.2431	0.0078	0.0041	0.006089	-7.629	59
Left:ARM	0.005306	0.1329	0.0008033	-0.1346	0.0077	0.0042	0.005306	-7.617	53.25
Left:XT	0.004507	0.1074	0.0009177	-0.1372	0.0076	0.0034	0.004507	-7.643	47.25
Left:XB	0.002485	0.1182	0.0005388	-0.0686	0.0072	0.0018	0.002485	-7.632	31.75
Right:g	0	0	0	0.0000	0.0000	0.0000	0	7.75	0
Right:t	0.008251	0.3168	-0.002609	-0.3993	0.0073	0.0007	0.008251	8.067	87
Right:Sprint	0.007998	0.3028	-0.00256	-0.3992	0.0073	0.0007	0.007998	8.053	85
Right:Coax1	0.007365	0.2682	-0.002422	-0.3912	0.0073	0.0007	0.007365	8.018	80
Right:Coax2	0.006103	0.2042	-0.002163	-0.3328	0.0072	0.0007	0.006103	7.954	70
Right:SW	0.004917	0.1567	-0.001974	-0.2310	0.0071	0.0007	0.004917	7.907	60.5
Right:Coax3	0.004856	0.1547	-0.001965	-0.2245	0.0071	0.0007	0.004856	7.905	60
Right:Brace	0.004732	0.1509	-0.001948	-0.2110	0.0070	0.0007	0.004732	7.901	59
Right:ARM	0.004032	0.1335	-0.00182	-0.1365	0.0069	0.0007	0.004032	7.883	53.25
Right:Coax4	0.003644	0.1268	-0.001755	-0.1002	0.0068	0.0006	0.003644	7.877	50
Right:XT	0.003321	0.1226	-0.001701	-0.0755	0.0067	0.0006	0.003321	7.873	47.25
Right:Coax5	0.002507	0.1143	-0.001525	-0.0729	0.0062	0.0005	0.002507	7.864	40
Right:XB	0.00167	0.09867	-0.001309	-0.1586	0.0054	0.0004	0.00167	7.849	31.75
Right:Coax6	0.001508	0.09337	-0.001239	-0.1856	0.0052	0.0003	0.001508	7.843	30
Right:Coax7	0.0007138	0.0537	-0.0008043	-0.2423	0.0038	0.0002	0.0007138	7.804	20
Right:Coax8	0.0001895	0.01608	-0.0003755	-0.1682	0.0021	0.0001	0.0001895	7.766	10
NESC32:O	0.005966	0.1333	-0.01966	0.1205	0.0077	0.0048	0.005966	-15.87	53.23
NESC32:L1	0.005925	0.1333	-0.01861	0.1205	0.0077	0.0048	0.005925	-15.37	53.23
NESC32:PL	0.005306	0.1329	0.0008033	0.1772	0.0077	0.0042	0.005306	-7.617	53.25
NESC32:BRL	0.004669	0.1335	0.01825	0.0524	0.0074	0.0059	0.004669	-0.8665	53.27
NESC32:L2V	0.004566	0.1335	0.0187	-0.0045	0.0073	0.0058	0.004566	0.1335	53.27
NESC32:BRR	0.004466	0.1335	0.01809	-0.0621	0.0073	0.0056	0.004466	1.134	53.27
NESC32:PR	0.004032	0.1335	-0.00182	-0.2147	0.0069	0.0007	0.004032	7.883	53.25
NESC32:L3	0.003979	0.1332	-0.02852	-0.1826	0.0069	0.0002	0.003979	15.63	53.22
NESC32:E	0.003977	0.1332	-0.03011	-0.1826	0.0069	0.0002	0.003977	16.13	53.22
TENL:E	0.006113	0.1215	-0.0006539	0.2431	0.0078	0.0041	0.006113	-7.953	59
TENR:E	0.004724	0.1509	-0.004351	-0.2110	0.0070	0.0007	0.004724	8.554	59
VEEL:O	0.006066	0.1215	0.002102	0.2431	0.0078	0.0041	0.006066	-7.304	59
VEER:O	0.004741	0.1509	0.0004543	-0.2110	0.0070	0.0007	0.004741	7.248	59
X1:O	0.004483	0.1074	-3.319e-005	-0.1372	0.0076	0.0034	0.004483	-7.246	47.25
X1:E	0.001676	0.09867	0.0009086	-0.1586	0.0054	0.0004	0.001676	7.048	31.75
X2:O	0.003329	0.1226	-0.0007568	-0.0755	0.0067	0.0006	0.003329	7.156	47.25
X2:E	0.002469	0.1182	-5.047e-005	-0.0686	0.0072	0.0018	0.002469	-7.14	31.75

Joint Support Reactions for Load Case "NESC Heavy T":

Joint Label	X Force (kips)	X Usage %(kips)	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 %
Left:g	-0.01	0.0	-2.15	0.0	0.0	8.83	0.0	0.0	9.08	0.0	37.15	0.0	-0.3	0.0	0.0	-0.03	0.0	0.0
Right:g	-0.03	0.0	-6.93	0.0	0.0	-44.90	0.0	0.0	45.43	0.0	141.50	0.0	-1.4	0.0	0.0	-0.05	0.0	0.0

Detailed Laminated Wood Pole Usages for Load Case "NESC Heavy T":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (ft-k)	Long. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	Usage %
Left	Left:t	Origin	0.00	1.36	0.08	0.01	0.00	0.00	-0.0	-0.01	0.00	-0.00	0.0
Left	Left:SW	End	0.50	1.38	0.08	0.01	0.00	-0.00	-0.0	-0.01	0.00	-0.00	0.0
Left	Left:SW	Origin	0.50	1.38	0.08	0.01	0.00	-0.00	-0.0	-0.81	0.73	-0.00	0.2
Left	Left:Brace	End	2.00	1.46	0.07	0.01	1.10	-0.00	-0.0	-0.81	0.73	-0.00	2.3
Left	Left:Brace	Origin	2.00	1.46	0.07	0.01	-0.08	-0.00	-0.0	-2.43	-3.89	-0.00	0.7

Left	#Left:0	End	4.88	1.58	0.07	0.01	-11.28	-0.01	-0.0	-2.43	-3.89	-0.00	20.3
Left	#Left:0	Origin	4.88	1.58	0.07	0.01	-11.28	-0.01	-0.0	-2.58	-3.84	-0.00	20.4
Left	Left:ARM	End	7.75	1.59	0.06	0.01	-22.31	-0.01	-0.0	-2.58	-3.84	-0.00	36.0
Left	Left:ARM	Origin	7.75	1.59	0.06	0.01	-22.31	-0.01	0.0	-2.60	7.67	0.00	36.0
Left	#Left:1	End	10.75	1.44	0.06	0.01	0.70	-0.01	0.0	-2.60	7.67	0.00	1.5
Left	#Left:1	Origin	10.75	1.44	0.06	0.01	0.70	-0.01	0.0	-2.76	7.72	0.00	1.5
Left	Left:XT	End	13.75	1.29	0.05	0.01	23.87	-0.00	0.0	-2.76	7.72	0.00	31.8
Left	Left:XT	Origin	13.75	1.29	0.05	0.01	19.45	-0.00	0.0	8.15	-2.60	-0.00	26.9
Left	#Left:2	End	18.75	1.28	0.05	0.01	6.44	-0.01	0.0	8.15	-2.60	-0.00	8.6
Left	#Left:2	Origin	18.75	1.28	0.05	0.01	6.44	-0.01	0.0	7.86	-2.51	-0.00	8.5
Left	#Left:3	End	23.75	1.39	0.04	0.01	-6.09	-0.02	0.0	7.86	-2.51	-0.00	7.2
Left	#Left:3	Origin	23.75	1.39	0.04	0.01	-6.09	-0.02	0.0	7.61	-2.45	-0.00	7.1
Left	#Left:4	End	26.50	1.43	0.03	0.01	-12.83	-0.03	0.0	7.61	-2.45	-0.00	12.8
Left	#Left:4	Origin	26.50	1.43	0.03	0.01	-12.83	-0.03	0.0	7.42	-2.41	-0.00	12.8
Left	Left:XB	End	29.25	1.42	0.03	0.01	-19.46	-0.03	0.0	7.42	-2.41	-0.00	17.6
Left	Left:XB	Origin	29.25	1.42	0.03	0.01	-21.50	-0.03	0.0	11.29	1.64	-0.01	19.9
Left	#Left:5	End	34.25	1.25	0.02	0.00	-13.32	-0.06	0.0	11.29	1.64	-0.01	11.5
Left	#Left:5	Origin	34.25	1.25	0.02	0.00	-13.32	-0.06	0.0	10.92	1.70	-0.01	11.5
Left	#Left:6	End	39.25	0.97	0.02	0.00	-4.83	-0.09	0.0	10.92	1.70	-0.01	4.6
Left	#Left:6	Origin	39.25	0.97	0.02	0.00	-4.83	-0.09	0.0	10.54	1.77	-0.01	4.6
Left	#Left:7	End	44.25	0.65	0.01	0.00	4.04	-0.13	0.0	10.54	1.77	-0.01	3.7
Left	#Left:7	Origin	44.25	0.65	0.01	0.00	4.04	-0.13	0.0	10.12	1.86	-0.01	3.7
Left	#Left:8	End	49.25	0.35	0.01	0.00	13.35	-0.17	0.0	10.12	1.86	-0.01	8.5
Left	#Left:8	Origin	49.25	0.35	0.01	0.00	13.35	-0.17	0.0	9.69	1.96	-0.01	8.4
Left	#Left:9	End	54.25	0.12	0.00	0.00	23.14	-0.22	0.0	9.69	1.96	-0.01	12.6
Left	#Left:9	Origin	54.25	0.12	0.00	0.00	23.14	-0.22	0.0	9.31	2.04	-0.01	12.6
Left	#Left:10	End	57.63	0.03	0.00	0.00	30.03	-0.26	0.0	9.31	2.04	-0.01	15.0
Left	#Left:10	Origin	57.63	0.03	0.00	0.00	30.03	-0.26	0.0	8.99	2.11	-0.01	15.0
Left	Left:g	End	61.00	0.00	0.00	0.00	37.15	-0.30	0.0	8.99	2.11	-0.01	17.3
Right	Right:t	Origin	0.00	3.80	0.10	-0.03	0.00	-0.00	-0.0	-0.13	0.03	-0.00	0.0
Right	Right:Sprint	End	2.00	3.63	0.10	-0.03	0.06	-0.00	-0.0	-0.13	0.03	-0.00	0.0
Right	Right:Sprint	Origin	2.00	3.63	0.10	-0.03	0.06	-0.00	-0.0	-2.44	0.67	-0.00	0.2
Right	Right:Coax1	End	7.00	3.22	0.09	-0.03	3.42	-0.01	-0.0	-2.44	0.67	-0.00	1.5
Right	Right:Coax1	Origin	7.00	3.22	0.09	-0.03	3.42	-0.01	-0.0	-3.55	0.88	-0.00	1.6
Right	#Right:11	End	12.00	2.82	0.08	-0.03	7.84	-0.02	-0.0	-3.55	0.88	-0.00	3.0
Right	#Right:11	Origin	12.00	2.82	0.08	-0.03	7.84	-0.02	-0.0	-4.27	1.04	-0.00	3.1
Right	Right:Coax2	End	17.00	2.45	0.07	-0.03	13.02	-0.03	-0.0	-4.27	1.04	-0.00	4.5
Right	Right:Coax2	Origin	17.00	2.45	0.07	-0.03	13.02	-0.03	-0.0	-5.43	1.24	-0.00	4.6
Right	#Right:12	End	21.75	2.14	0.07	-0.02	18.91	-0.05	-0.0	-5.43	1.24	-0.00	6.0
Right	#Right:12	Origin	21.75	2.14	0.07	-0.02	18.91	-0.05	-0.0	-6.18	1.38	-0.01	6.0
Right	Right:SW	End	26.50	1.88	0.06	-0.02	25.47	-0.08	-0.0	-6.18	1.38	-0.01	7.3
Right	Right:SW	Origin	26.50	1.88	0.06	-0.02	25.47	-0.08	-0.0	-7.35	2.17	-0.01	7.4
Right	Right:Coax3	End	27.00	1.86	0.06	-0.02	26.56	-0.08	-0.0	-7.35	2.17	-0.01	7.6
Right	Right:Coax3	Origin	27.00	1.86	0.06	-0.02	26.56	-0.08	-0.0	-7.90	2.25	-0.01	7.7
Right	Right:Brace	End	28.00	1.81	0.06	-0.02	28.81	-0.09	-0.0	-7.90	2.25	-0.01	8.2
Right	Right:Brace	Origin	28.00	1.81	0.06	-0.02	27.75	-0.09	0.0	-14.90	0.35	-0.01	8.3
Right	#Right:13	End	30.87	1.70	0.05	-0.02	28.75	-0.11	0.0	-14.90	0.35	-0.01	8.2
Right	#Right:13	Origin	30.87	1.70	0.05	-0.02	28.75	-0.11	0.0	-15.39	0.42	-0.01	8.2
Right	Right:ARM	End	33.75	1.60	0.05	-0.02	29.97	-0.14	0.0	-15.39	0.42	-0.01	8.2
Right	Right:ARM	Origin	33.75	1.60	0.05	-0.02	29.97	-0.14	0.0	-15.88	-1.36	-0.02	8.2
Right	Right:Coax4	End	37.00	1.52	0.04	-0.02	25.56	-0.19	0.0	-15.88	-1.36	-0.02	6.8
Right	Right:Coax4	Origin	37.00	1.52	0.04	-0.02	25.56	-0.19	0.0	-16.84	-1.22	-0.02	6.9
Right	Right:XT	End	39.75	1.47	0.04	-0.02	22.21	-0.24	0.0	-16.84	-1.22	-0.02	5.9
Right	Right:XT	Origin	39.75	1.47	0.04	-0.02	18.98	-0.24	0.0	-21.93	-5.07	-0.02	5.4
Right	#Right:14	End	43.38	1.42	0.03	-0.02	0.59	-0.31	0.0	-21.93	-5.07	-0.02	1.3
Right	#Right:14	Origin	43.38	1.42	0.03	-0.02	0.59	-0.31	0.0	-22.61	-4.96	-0.02	1.3
Right	Right:Coax5	End	47.00	1.37	0.03	-0.02	-17.40	-0.38	0.0	-22.61	-4.96	-0.02	4.7
Right	Right:Coax5	Origin	47.00	1.37	0.03	-0.02	-17.40	-0.38	0.0	-23.79	-4.78	-0.02	4.7

Right	#Right:15	End	51.13	1.30	0.02	-0.02	-37.12	-0.47	0.0	-23.79	-4.78	-0.02	8.3
Right	#Right:15	Origin	51.13	1.30	0.02	-0.02	-37.12	-0.47	0.0	-24.61	-4.64	-0.02	8.3
Right	Right:XB	End	55.25	1.18	0.02	-0.02	-56.26	-0.57	0.0	-24.61	-4.64	-0.02	11.4
Right	Right:XB	Origin	55.25	1.18	0.02	-0.02	-65.37	-0.56	0.0	-36.59	5.95	-0.02	13.6
Right	Right:Coax6	End	57.00	1.12	0.02	-0.01	-54.96	-0.61	0.0	-36.59	5.95	-0.02	11.5
Right	Right:Coax6	Origin	57.00	1.12	0.02	-0.01	-54.96	-0.61	0.0	-37.71	6.14	-0.02	11.5
Right	#Right:16	End	62.00	0.90	0.01	-0.01	-24.29	-0.73	0.0	-37.71	6.14	-0.02	5.8
Right	#Right:16	Origin	62.00	0.90	0.01	-0.01	-24.29	-0.73	0.0	-38.78	6.31	-0.03	5.9
Right	Right:Coax7	End	67.00	0.64	0.01	-0.01	7.25	-0.86	0.0	-38.78	6.31	-0.03	2.9
Right	Right:Coax7	Origin	67.00	0.64	0.01	-0.01	7.25	-0.86	0.0	-40.31	6.51	-0.03	3.0
Right	#Right:17	End	72.00	0.40	0.00	-0.01	39.82	-0.99	0.0	-40.31	6.51	-0.03	7.7
Right	#Right:17	Origin	72.00	0.40	0.00	-0.01	39.82	-0.99	0.0	-41.45	6.64	-0.03	7.7
Right	Right:Coax8	End	77.00	0.19	0.00	-0.00	73.02	-1.13	0.0	-41.45	6.64	-0.03	12.0
Right	Right:Coax8	Origin	77.00	0.19	0.00	-0.00	73.02	-1.13	0.0	-43.06	6.81	-0.03	12.0
Right	#Right:18	End	82.00	0.05	0.00	-0.00	107.05	-1.27	0.0	-43.06	6.81	-0.03	15.9
Right	#Right:18	Origin	82.00	0.05	0.00	-0.00	107.05	-1.27	0.0	-44.28	6.89	-0.03	16.0
Right	Right:g	End	87.00	0.00	0.00	0.00	141.50	-1.42	0.0	-44.28	6.89	-0.03	19.5

Summary of Brace Forces and Usages for Load Case "NESC Heavy T":

Brace Label	Forces (kips)	Allowable Compression (kips)	Allowable Tension (kips)	Usage %
TENL	4.14	16.50	30.00	21.24
TENR	3.96	16.50	30.00	20.33
VEEL	-1.77	20.28	20.00	13.41
VEER	6.51	20.28	20.00	50.08
X1	-15.36	66.95	35.00	35.29
X2	5.87	66.95	35.00	25.82

Detailed X-Arm Usages for Load Case "NESC Heavy T":

X-Arm Label	Joint Label	Joint Position	Rel. Dist. (ft)	Area (in^2)	X Sect. Modulus (in^3)	Z Sect. Modulus (in^3)	Tran. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	X Mom. (ft-k)	Z Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	X Shear (kips)	Z Shear (kips)	P/A (psi)	Mx/Sx (psi)	Mz/Sz (psi)	Max. Usage %
NESC32	NESC32:O	Origin	0.00	38.40	32.83	48.04	1.60	0.07	-0.24	0.00	0.00	0.0	0.00	-0.00	-0.00	0.00025	6.09e-005	2.55e-005	0.0
NESC32	NESC32:L1	End	0.50	38.40	32.83	48.04	1.60	0.07	-0.22	-0.00	0.00	0.0	0.00	-0.00	-0.00	0.00025	0.842	0.000238	0.0
NESC32	NESC32:L1	Origin	0.50	38.40	32.83	48.04	1.60	0.07	-0.22	0.00	-0.00	0.0	-4.24	0.06	-0.00	1.1e+002	0.842	0.000195	2.1
NESC32	#gNESC32:0	End	4.38	38.40	32.83	48.04	1.60	0.07	-0.12	0.23	0.00	0.0	-4.24	0.06	-0.00	1.1e+002	83.4	0.852	3.7
NESC32	#gNESC32:0	Origin	4.38	38.40	32.83	48.04	1.60	0.07	-0.12	-0.23	-0.00	-0.0	-4.24	-0.01	-0.00	1.1e+002	83.4	0.852	3.7
NESC32	NESC32:PL	End	8.25	38.40	32.83	48.04	1.59	0.06	0.01	0.17	0.01	-0.0	-4.24	-0.01	-0.00	1.1e+002	63	1.72	3.4
NESC32	NESC32:PL	Origin	8.25	38.40	32.83	48.04	1.59	0.06	0.01	-0.17	0.03	-0.0	7.21	-0.15	-0.00	1.9e+002	63	6.57	5.0
NESC32	#gNESC32:1	End	11.63	38.40	32.83	48.04	1.60	0.06	0.14	-0.34	-0.01	-0.0	7.21	-0.15	-0.00	1.9e+002	123	2.88	6.0
NESC32	#gNESC32:1	Origin	11.63	38.40	32.83	48.04	1.60	0.06	0.14	0.34	0.01	-0.0	7.21	-0.22	-0.00	1.9e+002	123	2.88	6.0
NESC32	NESC32:BRL	End	15.00	38.40	32.83	48.04	1.60	0.06	0.22	-1.08	0.00	-0.0	7.21	-0.22	-0.00	1.9e+002	395	0.748	11.2
NESC32	NESC32:BRL	Origin	15.00	38.40	32.83	48.04	1.60	0.06	0.22	1.08	-0.00	-0.0	7.21	-0.27	-0.00	1.9e+002	395	0.749	11.2
NESC32	NESC32:L2V	End	16.00	38.40	32.83	48.04	1.60	0.05	0.22	-1.35	0.01	-0.0	7.21	-0.27	-0.00	1.9e+002	495	1.83	13.2
NESC32	NESC32:L2V	Origin	16.00	38.40	32.83	48.04	1.60	0.05	0.22	1.35	-0.01	-0.0	-0.24	0.24	-0.01	6.2	495	1.83	9.7
NESC32	NESC32:BRR	End	17.00	38.40	32.83	48.04	1.60	0.05	0.22	-1.11	0.01	-0.0	-0.24	0.24	-0.01	6.2	407	3.31	8.0
NESC32	NESC32:BRR	Origin	17.00	38.40	32.83	48.04	1.60	0.05	0.22	1.11	-0.01	-0.0	-0.24	0.20	-0.01	6.1	407	3.31	8.0
NESC32	#gNESC32:2	End	20.38	38.40	32.83	48.04	1.60	0.05	0.12	-0.43	0.03	-0.0	-0.24	0.20	-0.01	6.1	158	8.33	3.3
NESC32	#gNESC32:2	Origin	20.38	38.40	32.83	48.04	1.60	0.05	0.12	0.43	-0.03	-0.0	-0.24	0.14	-0.01	6.1	158	8.33	3.3
NESC32	NESC32:PR	End	23.75	38.40	32.83	48.04	1.60	0.05	-0.02	0.04	0.05	-0.0	-0.24	0.14	-0.01	6.1	14.6	13.4	0.7
NESC32	NESC32:PR	Origin	23.75	38.40	32.83	48.04	1.60	0.05	-0.02	-0.04	-0.01	0.0	-2.10	0.03	0.00	55	14.6	1.51	1.4
NESC32	#gNESC32:3	End	27.63	38.40	32.83	48.04	1.60	0.05	-0.19	0.16	0.00	0.0	-2.10	0.03	0.00	55	58	0.742	2.2
NESC32	#gNESC32:3	Origin	27.63	38.40	32.83	48.04	1.60	0.05	-0.19	-0.16	-0.00	-0.0	-2.10	-0.04	0.00	55	58	0.742	2.2

NESC32	NESC32:L3	End	31.50	38.40	32.83	48.04	1.60	0.05	-0.34	-0.00	0.00	-0.0	-2.10	-0.04	0.00	55	0.842	0.000255	1.1
NESC32	NESC32:L3	Origin	31.50	38.40	32.83	48.04	1.60	0.05	-0.34	0.00	-0.00	-0.0	0.00	0.00	0.00	0.00038	0.842	0.000269	0.0
NESC32	NESC32:E	End	32.00	38.40	32.83	48.04	1.60	0.05	-0.36	-0.00	-0.00	-0.0	0.00	0.00	0.00	0.00038	6.59e-007	6.71e-006	0.0

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	1.954	10.00	10.00	19.54
C2	0.469	10.00	10.00	4.69
C3	0.467	10.00	10.00	4.67
C4	0.429	10.00	10.00	4.29
C5	0.446	10.00	10.00	4.46
C6	0.455	10.00	10.00	4.55
C7	0.450	10.00	10.00	4.50
C8	0.469	10.00	10.00	4.69
C9	0.469	10.00	10.00	4.69

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

Suspension Label	Tension (kips)	Input Tension Capacity (kips)	Factored Tension Capacity (kips)	Usage %
SUSSWL	1.033	60.00	60.00	1.72
SUSSWR	1.033	60.00	60.00	1.72
L1	2.572	60.00	60.00	4.29
L2	2.572	60.00	60.00	4.29
L3	2.572	60.00	60.00	4.29

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

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

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)
Left:g	0	0	0	0.0000	0.0000	0.0000	0	-7.75	0
Left:t	0.8509	-0.007719	-0.008056	0.0906	1.1073	0.3152	0.8509	-7.758	60.99
Left:SW	0.8413	-0.006981	-0.007962	0.0906	1.1073	0.3152	0.8413	-7.757	60.49
Left:Brace	0.8123	-0.00477	-0.007675	0.0906	1.1072	0.3152	0.8123	-7.755	58.99
Left:ARM	0.7014	0.00141	-0.00647	0.0262	1.1006	0.3164	0.7014	-7.749	53.24
Left:XT	0.5869	-0.0003228	-0.005244	-0.0126	1.0830	0.2558	0.5869	-7.75	47.24
Left:XB	0.3089	-0.002385	-0.002455	0.0061	0.9456	0.1373	0.3089	-7.752	31.75
Right:g	0	0	0	0.0000	0.0000	0.0000	0	7.75	0
Right:t	1.296	0.03749	-0.01251	-0.0629	1.1995	0.0478	1.296	7.787	86.99
Right:Sprint	1.254	0.03526	-0.01207	-0.0629	1.1995	0.0478	1.254	7.785	84.99
Right:Coax1	1.15	0.02969	-0.01096	-0.0628	1.1971	0.0478	1.15	7.78	79.99
Right:Coax2	0.9423	0.01857	-0.008744	-0.0625	1.1764	0.0478	0.9423	7.769	69.99
Right:SW	0.7504	0.00812	-0.00673	-0.0616	1.1345	0.0478	0.7504	7.758	60.49
Right:Coax3	0.7405	0.007574	-0.006627	-0.0616	1.1317	0.0478	0.7405	7.758	59.99
Right:Brace	0.7208	0.006484	-0.006423	-0.0615	1.1258	0.0478	0.7208	7.756	58.99
Right:ARM	0.6097	0.0009262	-0.005269	-0.0415	1.0859	0.0475	0.6097	7.751	53.24
Right:Coax4	0.5489	-0.001004	-0.004652	-0.0243	1.0582	0.0434	0.5489	7.749	50
Right:XT	0.4987	-0.001949	-0.004154	-0.0130	1.0309	0.0402	0.4987	7.748	47.25
Right:Coax5	0.3736	-0.002438	-0.002961	0.0047	0.9418	0.0322	0.3736	7.748	40
Right:XB	0.247	-0.001409	-0.001851	0.0084	0.8101	0.0243	0.247	7.749	31.75
Right:Coax6	0.2227	-0.001183	-0.001652	0.0074	0.7781	0.0227	0.2227	7.749	30
Right:Coax7	0.1046	-0.0003541	-0.0007611	0.0032	0.5662	0.0142	0.1046	7.75	20
Right:Coax8	0.02757	-5.18e-005	-0.0002584	0.0008	0.3065	0.0067	0.02757	7.75	10
NESC32:O	0.7539	0.001897	-0.01983	0.0824	1.1005	0.3885	0.7539	-16	53.23
NESC32:L1	0.7506	0.001885	-0.01905	0.0823	1.1005	0.3885	0.7506	-15.5	53.23
NESC32:PL	0.7014	0.00141	-0.00647	0.0811	1.1006	0.3164	0.7014	-7.749	53.24
NESC32:BRL	0.6554	0.001094	0.0006816	0.0139	1.0942	0.4231	0.6554	-0.9989	53.25
NESC32:L2V	0.6481	0.001044	0.0009167	-0.0053	1.0932	0.4164	0.6481	0.001044	53.25
NESC32:BRR	0.6409	0.001018	0.0007954	-0.0242	1.0922	0.4020	0.6409	1.001	53.25
NESC32:PR	0.6097	0.0009262	-0.005269	-0.0758	1.0859	0.0475	0.6097	7.751	53.24
NESC32:L3	0.6097	0.0006242	-0.01571	-0.0718	1.0858	-0.0241	0.6097	15.5	53.23
NESC32:E	0.6099	0.0006238	-0.01634	-0.0718	1.0858	-0.0241	0.6099	16	53.23
TENL:E	0.8141	-0.004765	-0.008188	0.0906	1.1072	0.3152	0.8141	-8.08	58.99
TENR:E	0.7202	0.006483	-0.007123	-0.0615	1.1258	0.0478	0.7202	8.409	58.99
VEEL:O	0.8105	-0.004775	-0.007162	0.0906	1.1072	0.3152	0.8105	-7.43	58.99
VEER:O	0.7214	0.006485	-0.005723	-0.0615	1.1258	0.0478	0.7214	7.104	58.99
X1:O	0.5852	-0.0003268	-0.005331	-0.0126	1.0830	0.2558	0.5852	-7.353	47.24
X1:E	0.2473	-0.001409	-0.001969	0.0084	0.8101	0.0243	0.2473	6.947	31.75
X2:O	0.4992	-0.001948	-0.003992	-0.0130	1.0309	0.0402	0.4992	7.031	47.25
X2:E	0.3077	-0.002386	-0.002402	0.0061	0.9456	0.1373	0.3077	-7.26	31.75

Joint Support Reactions for Load Case "NESC Heavy L":

Joint Label	X Force (kips)	X Usage %(kips)	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift 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 %
Left:g	-1.07	0.0	0.03	0.0	0.0	-9.19	0.0	0.0	9.25	0.0	-0.70	0.0	-33.7	0.0	0.0	-2.39	0.0	0.0
Right:g	-3.96	0.0	-0.07	0.0	0.0	-26.89	0.0	0.0	27.18	0.0	-0.18	0.0	-205.6	0.0	0.0	-3.19	0.0	0.0

Detailed Laminated Wood Pole Usages for Load Case "NESC Heavy L":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (ft-k)	Long. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	Usage %
Left	Left:t	Origin	0.00	-0.09	10.21	-0.10	0.00	-0.00	-0.0	-0.01	0.00	-0.00	0.0
Left	Left:SW	End	0.50	-0.08	10.10	-0.10	0.00	-0.00	-0.0	-0.01	0.00	-0.00	0.0
Left	Left:SW	Origin	0.50	-0.08	10.10	-0.10	0.00	-0.00	-0.0	-0.80	-0.00	-0.03	0.2
Left	Left:Brace	End	2.00	-0.06	9.75	-0.09	-0.00	-0.04	-0.0	-0.80	-0.00	-0.03	0.2
Left	Left:Brace	Origin	2.00	-0.06	9.75	-0.09	-0.15	-0.04	0.0	-5.48	-0.61	-0.12	1.5
Left	#Left:0	End	4.88	-0.01	9.08	-0.08	-1.91	-0.37	0.0	-5.48	-0.61	-0.12	4.9
Left	#Left:0	Origin	4.88	-0.01	9.08	-0.08	-1.91	-0.37	0.0	-5.62	-0.61	-0.15	4.9
Left	Left:ARM	End	7.75	0.02	8.42	-0.08	-3.67	-0.80	0.0	-5.62	-0.61	-0.15	7.7
Left	Left:ARM	Origin	7.75	0.02	8.42	-0.08	-3.62	-0.78	2.5	-5.88	0.75	-0.12	7.7
Left	#Left:1	End	10.75	0.01	7.73	-0.07	-1.36	-1.15	2.5	-5.88	0.75	-0.12	4.2
Left	#Left:1	Origin	10.75	0.01	7.73	-0.07	-1.36	-1.15	2.5	-6.04	0.76	-0.16	4.2
Left	Left:XT	End	13.75	-0.00	7.04	-0.06	0.91	-1.64	2.5	-6.04	0.76	-0.16	3.8
Left	Left:XT	Origin	13.75	-0.00	7.04	-0.06	0.63	-1.64	2.4	-5.56	-0.03	-0.30	3.4
Left	#Left:2	End	18.75	-0.02	5.92	-0.05	0.48	-3.15	2.4	-5.56	-0.03	-0.30	4.2
Left	#Left:2	Origin	18.75	-0.02	5.92	-0.05	0.48	-3.15	2.4	-5.87	-0.03	-0.37	4.3
Left	#Left:3	End	23.75	-0.03	4.84	-0.04	0.33	-5.02	2.4	-5.87	-0.03	-0.37	5.4
Left	#Left:3	Origin	23.75	-0.03	4.84	-0.04	0.33	-5.02	2.4	-6.11	-0.03	-0.43	5.4
Left	#Left:4	End	26.50	-0.03	4.26	-0.03	0.24	-6.20	2.4	-6.11	-0.03	-0.43	6.1
Left	#Left:4	Origin	26.50	-0.03	4.26	-0.03	0.24	-6.20	2.4	-6.29	-0.03	-0.47	6.1
Left	Left:XB	End	29.25	-0.03	3.71	-0.03	0.16	-7.49	2.4	-6.29	-0.03	-0.47	6.8
Left	Left:XB	Origin	29.25	-0.03	3.71	-0.03	0.24	-7.49	2.4	-6.72	-0.03	-0.62	7.0
Left	#Left:5	End	34.25	-0.02	2.76	-0.02	0.08	-10.58	2.4	-6.72	-0.03	-0.62	8.7
Left	#Left:5	Origin	34.25	-0.02	2.76	-0.02	0.07	-10.58	2.4	-7.09	-0.03	-0.70	8.7
Left	#Left:6	End	39.25	-0.02	1.91	-0.01	-0.08	-14.06	2.4	-7.09	-0.03	-0.70	10.7
Left	#Left:6	Origin	39.25	-0.02	1.91	-0.01	-0.08	-14.06	2.4	-7.48	-0.03	-0.77	10.7
Left	#Left:7	End	44.25	-0.01	1.18	-0.01	-0.23	-17.92	2.4	-7.48	-0.03	-0.77	12.8
Left	#Left:7	Origin	44.25	-0.01	1.18	-0.01	-0.24	-17.92	2.4	-7.89	-0.03	-0.85	12.8
Left	#Left:8	End	49.25	-0.01	0.61	-0.00	-0.38	-22.19	2.4	-7.89	-0.03	-0.85	14.9
Left	#Left:8	Origin	49.25	-0.01	0.61	-0.00	-0.39	-22.19	2.4	-8.33	-0.03	-0.93	15.0
Left	#Left:9	End	54.25	-0.00	0.21	-0.00	-0.52	-26.84	2.4	-8.33	-0.03	-0.93	17.1
Left	#Left:9	Origin	54.25	-0.00	0.21	-0.00	-0.53	-26.84	2.4	-8.71	-0.03	-0.99	17.1
Left	#Left:10	End	57.63	-0.00	0.05	-0.00	-0.61	-30.20	2.4	-8.71	-0.03	-0.99	18.6
Left	#Left:10	Origin	57.63	-0.00	0.05	-0.00	-0.62	-30.20	2.4	-9.03	-0.03	-1.05	18.6
Left	Left:g	End	61.00	0.00	0.00	0.00	-0.70	-33.72	2.4	-9.03	-0.03	-1.05	20.0
Right	Right:t	Origin	0.00	0.45	15.55	-0.15	0.00	0.00	-0.0	-0.13	0.00	-0.02	0.0
Right	Right:Sprint	End	2.00	0.42	15.05	-0.14	0.00	-0.04	-0.0	-0.13	0.00	-0.02	0.0
Right	Right:Sprint	Origin	2.00	0.42	15.05	-0.14	0.00	-0.04	-0.0	-2.43	0.00	-0.65	0.2
Right	Right:Coax1	End	7.00	0.36	13.80	-0.13	0.02	-3.27	-0.0	-2.43	0.00	-0.65	0.9
Right	Right:Coax1	Origin	7.00	0.36	13.80	-0.13	0.02	-3.27	-0.0	-3.54	0.01	-0.83	1.0
Right	#Right:11	End	12.00	0.29	12.55	-0.12	0.05	-7.41	-0.0	-3.54	0.01	-0.83	1.8
Right	#Right:11	Origin	12.00	0.29	12.55	-0.12	0.05	-7.41	-0.0	-4.26	0.01	-0.93	1.8
Right	Right:Coax2	End	17.00	0.22	11.31	-0.10	0.09	-12.08	-0.0	-4.26	0.01	-0.93	2.7
Right	Right:Coax2	Origin	17.00	0.22	11.31	-0.10	0.09	-12.08	-0.0	-5.42	0.01	-1.12	2.7
Right	#Right:12	End	21.75	0.16	10.15	-0.09	0.14	-17.40	-0.0	-5.42	0.01	-1.12	3.6
Right	#Right:12	Origin	21.75	0.16	10.15	-0.09	0.14	-17.40	-0.0	-6.17	0.01	-1.23	3.7
Right	Right:SW	End	26.50	0.10	9.00	-0.08	0.21	-23.23	-0.0	-6.17	0.01	-1.23	4.6
Right	Right:SW	Origin	26.50	0.10	9.00	-0.08	0.21	-23.23	-0.0	-7.34	0.02	-1.30	4.7
Right	Right:Coax3	End	27.00	0.09	8.89	-0.08	0.21	-23.88	-0.0	-7.34	0.02	-1.30	4.8
Right	Right:Coax3	Origin	27.00	0.09	8.89	-0.08	0.21	-23.88	-0.0	-7.88	0.02	-1.40	4.8
Right	Right:Brace	End	28.00	0.08	8.65	-0.08	0.23	-25.29	-0.0	-7.88	0.02	-1.40	5.0
Right	Right:Brace	Origin	28.00	0.08	8.65	-0.08	1.40	-25.29	0.0	-11.46	2.24	-1.52	5.5

Right	#Right:13	End	30.87	0.04	7.98	-0.07	7.83	-29.64	0.0	-11.46	2.24	-1.52	7.8
Right	#Right:13	Origin	30.87	0.04	7.98	-0.07	7.83	-29.64	0.0	-11.95	2.23	-1.58	7.8
Right	Right:ARM	End	33.75	0.01	7.32	-0.06	14.25	-34.19	0.0	-11.95	2.23	-1.58	9.9
Right	Right:ARM	Origin	33.75	0.01	7.32	-0.06	14.31	-34.21	3.1	-12.59	-0.73	-2.30	10.0
Right	Right:Coax4	End	37.00	-0.01	6.59	-0.06	11.94	-41.70	3.1	-12.59	-0.73	-2.30	10.4
Right	Right:Coax4	Origin	37.00	-0.01	6.59	-0.06	11.93	-41.70	3.1	-13.54	-0.73	-2.46	10.4
Right	Right:XT	End	39.75	-0.02	5.98	-0.05	9.92	-48.46	3.1	-13.54	-0.73	-2.46	10.8
Right	Right:XT	Origin	39.75	-0.02	5.98	-0.05	9.81	-48.46	3.1	-14.28	-0.73	-2.62	10.8
Right	#Right:14	End	43.38	-0.03	5.22	-0.04	7.17	-57.95	3.1	-14.28	-0.73	-2.62	11.4
Right	#Right:14	Origin	43.38	-0.03	5.22	-0.04	7.17	-57.95	3.1	-14.96	-0.73	-2.71	11.4
Right	Right:Coax5	End	47.00	-0.03	4.48	-0.04	4.52	-67.76	3.1	-14.96	-0.73	-2.71	12.1
Right	Right:Coax5	Origin	47.00	-0.03	4.48	-0.04	4.52	-67.76	3.1	-16.13	-0.73	-2.88	12.1
Right	#Right:15	End	51.13	-0.02	3.69	-0.03	1.51	-79.63	3.1	-16.13	-0.73	-2.88	13.0
Right	#Right:15	Origin	51.13	-0.02	3.69	-0.03	1.50	-79.63	3.1	-16.95	-0.73	-2.97	13.0
Right	Right:XB	End	55.25	-0.02	2.96	-0.02	-1.51	-91.89	3.1	-16.95	-0.73	-2.97	14.4
Right	Right:XB	Origin	55.25	-0.02	2.96	-0.02	-2.31	-91.89	3.2	-18.56	0.06	-3.12	14.6
Right	Right:Coax6	End	57.00	-0.01	2.67	-0.02	-2.21	-97.35	3.2	-18.56	0.06	-3.12	15.2
Right	Right:Coax6	Origin	57.00	-0.01	2.67	-0.02	-2.21	-97.35	3.2	-19.69	0.06	-3.28	15.3
Right	#Right:16	End	62.00	-0.01	1.91	-0.01	-1.89	-113.73	3.2	-19.69	0.06	-3.28	17.0
Right	#Right:16	Origin	62.00	-0.01	1.91	-0.01	-1.90	-113.73	3.2	-20.76	0.06	-3.38	17.1
Right	Right:Coax7	End	67.00	-0.00	1.25	-0.01	-1.57	-130.65	3.2	-20.76	0.06	-3.38	18.7
Right	Right:Coax7	Origin	67.00	-0.00	1.25	-0.01	-1.58	-130.65	3.2	-22.30	0.07	-3.57	18.8
Right	#Right:17	End	72.00	-0.00	0.72	-0.01	-1.24	-148.49	3.2	-22.30	0.07	-3.57	20.5
Right	#Right:17	Origin	72.00	-0.00	0.72	-0.01	-1.24	-148.49	3.2	-23.44	0.07	-3.67	20.6
Right	Right:Coax8	End	77.00	-0.00	0.33	-0.00	-0.89	-166.82	3.2	-23.44	0.07	-3.67	22.2
Right	Right:Coax8	Origin	77.00	-0.00	0.33	-0.00	-0.90	-166.82	3.2	-25.05	0.07	-3.84	22.3
Right	#Right:18	End	82.00	-0.00	0.09	-0.00	-0.54	-186.00	3.2	-25.05	0.07	-3.84	24.0
Right	#Right:18	Origin	82.00	-0.00	0.09	-0.00	-0.55	-186.00	3.2	-26.27	0.07	-3.92	24.0
Right	Right:g	End	87.00	0.00	0.00	0.00	-0.17	-205.61	3.2	-26.27	0.07	-3.92	25.6

Summary of Brace Forces and Usages for Load Case "NESC Heavy L":

Brace Label	Forces (kips)	Allowable Compression (kips)	Allowable Tension (kips)	Usage %
TENL	4.06	16.50	30.00	20.81
TENR	3.95	16.50	30.00	20.25
VEEL	3.28	20.28	20.00	25.26
VEER	1.09	20.28	20.00	8.42
X1	-1.16	66.95	35.00	2.67
X2	-0.00	66.95	35.00	0.01

Detailed X-Arm Usages for Load Case "NESC Heavy L":

X-Arm Label	Joint Label	Joint Position	Rel. Dist. (ft)	Area (in^2)	X Sect. Modulus (in^3)	Z Sect. Modulus (in^3)	Tran. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	X Mom. (ft-k)	Z Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	X Shear (kips)	Z Shear (kips)	P/A (psi)	Mx/Sx (psi)	Mz/Sz (psi)	Max. Usage %
NESC32	NESC32:O	Origin	0.00	38.40	32.83	48.04	0.02	9.05	-0.24	0.00	0.00	0.0	0.00	-0.00	-0.00	0.00019	0.000452	2.05e-005	0.0
NESC32	NESC32:L1	End	0.50	38.40	32.83	48.04	0.02	9.01	-0.23	-0.00	0.00	0.0	0.00	-0.00	-0.00	0.00019	0.832	0.323	0.0
NESC32	NESC32:L1	Origin	0.50	38.40	32.83	48.04	0.02	9.01	-0.23	0.00	-0.00	-0.0	-3.20	0.02	-0.10	83	0.833	0.323	1.6
NESC32	#gNESC32:0	End	4.38	38.40	32.83	48.04	0.02	8.70	-0.15	0.07	0.39	-0.0	-3.20	0.02	-0.10	83	25.2	97.3	4.0
NESC32	#gNESC32:0	Origin	4.38	38.40	32.83	48.04	0.02	8.70	-0.15	-0.07	-0.39	0.0	-3.20	-0.05	-0.14	83	25.2	97.3	4.0
NESC32	NESC32:PL	End	8.25	38.40	32.83	48.04	0.02	8.42	-0.08	-0.13	0.93	0.0	-3.20	-0.05	-0.14	83	49	231	7.0
NESC32	NESC32:PL	Origin	8.25	38.40	32.83	48.04	0.02	8.42	-0.08	0.18	1.54	-0.0	-1.85	0.00	-0.24	48	66.4	386	9.6
NESC32	#gNESC32:1	End	11.63	38.40	32.83	48.04	0.02	8.16	-0.02	-0.17	-0.75	-0.0	-1.85	0.00	-0.24	48	61.6	187	5.7
NESC32	#gNESC32:1	Origin	11.63	38.40	32.83	48.04	0.02	8.16	-0.02	0.17	0.75	-0.0	-1.85	-0.06	-0.27	48	61.6	186	5.7

NESC32	NESC32:BRL	End	15.00	38.40	32.83	48.04	0.01	7.87	0.01	-0.36	0.17	-0.0	-1.85	-0.06	-0.27	48	132	43.4	4.3
NESC32	NESC32:BRL	Origin	15.00	38.40	32.83	48.04	0.01	7.87	0.01	0.36	-0.17	-0.0	-1.85	-0.10	-0.30	48	132	43.4	4.3
NESC32	NESC32:L2V	End	16.00	38.40	32.83	48.04	0.01	7.78	0.01	-0.46	0.47	-0.0	-1.85	-0.10	-0.30	48	166	117	6.4
NESC32	NESC32:L2V	Origin	16.00	38.40	32.83	48.04	0.01	7.78	0.01	0.46	-0.47	-0.0	-0.10	0.11	-0.42	2.6	166	117	5.5
NESC32	NESC32:BRR	End	17.00	38.40	32.83	48.04	0.01	7.69	0.01	-0.34	0.89	-0.0	-0.10	0.11	-0.42	2.6	125	222	6.7
NESC32	NESC32:BRR	Origin	17.00	38.40	32.83	48.04	0.01	7.69	0.01	0.34	-0.89	-0.0	-0.10	0.07	-0.44	2.6	125	222	6.7
NESC32	#gNESC32:2	End	20.38	38.40	32.83	48.04	0.01	7.44	-0.02	-0.09	2.39	-0.0	-0.10	0.07	-0.44	2.6	33.1	596	12.1
NESC32	#gNESC32:2	Origin	20.38	38.40	32.83	48.04	0.01	7.44	-0.02	0.09	-2.39	-0.0	-0.10	0.01	-0.48	2.6	33.1	596	12.1
NESC32	NESC32:PR	End	23.75	38.40	32.83	48.04	0.01	7.32	-0.06	-0.05	4.00	-0.0	-0.10	0.01	-0.48	2.6	17.3	999	19.6
NESC32	NESC32:PR	Origin	23.75	38.40	32.83	48.04	0.01	7.32	-0.06	0.11	-0.92	-0.0	-3.07	0.05	0.14	80	38.7	230	6.7
NESC32	#gNESC32:3	End	27.63	38.40	32.83	48.04	0.01	7.30	-0.13	0.08	0.39	-0.0	-3.07	0.05	0.14	80	30.5	96.5	4.0
NESC32	#gNESC32:3	Origin	27.63	38.40	32.83	48.04	0.01	7.30	-0.13	-0.08	-0.39	0.0	-3.07	-0.02	0.10	80	30.5	96.5	4.0
NESC32	NESC32:L3	End	31.50	38.40	32.83	48.04	0.01	7.32	-0.19	-0.00	0.00	0.0	-3.07	-0.02	0.10	80	0.833	0.323	1.6
NESC32	NESC32:L3	Origin	31.50	38.40	32.83	48.04	0.01	7.32	-0.19	0.00	-0.00	-0.0	0.00	0.00	0.00	0.00015	0.833	0.323	0.0
NESC32	NESC32:E	End	32.00	38.40	32.83	48.04	0.01	7.32	-0.20	-0.00	0.00	-0.0	0.00	0.00	0.00	0.00015	4.86e-005	1.08e-005	0.0

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

Clamp Force Label	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1 1.939	10.00	10.00	19.39
C2 0.450	10.00	10.00	4.50
C3 0.452	10.00	10.00	4.52
C4 0.430	10.00	10.00	4.30
C5 0.444	10.00	10.00	4.44
C6 0.453	10.00	10.00	4.53
C7 0.451	10.00	10.00	4.51
C8 0.471	10.00	10.00	4.71
C9 0.475	10.00	10.00	4.75

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

Suspension Label	Tension (kips)	Input Tension Capacity (kips)	Factored Tension Capacity (kips)	Usage %
SUSSWL	0.747	60.00	60.00	1.25
SUSSWR	0.747	60.00	60.00	1.25
L1	2.385	60.00	60.00	3.98
L2	2.385	60.00	60.00	3.98
L3	2.385	60.00	60.00	3.98

*** Analysis Results for Load Case No. 3 "Ext. Wind T" - Number of iterations in SAPS 15

Equilibrium Joint Positions and Rotations for Load Case "Ext. Wind T":

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)
Left:g	0	0	0	0.0000	0.0000	0.0000	0	-7.75	0
Left:t	0.005198	0.2646	0.002772	0.5828	0.0062	0.0027	0.005198	-7.485	61
Left:SW	0.005143	0.2697	0.002797	0.5828	0.0062	0.0027	0.005143	-7.48	60.5
Left:Brace	0.00498	0.285	0.002877	0.5880	0.0062	0.0027	0.00498	-7.465	59
Left:ARM	0.004357	0.3128	0.002888	-0.2952	0.0061	0.0028	0.004357	-7.437	53.25
Left:XT	0.003726	0.2559	0.003048	-0.2999	0.0061	0.0022	0.003726	-7.494	47.25
Left:XB	0.002101	0.2801	0.001583	-0.1696	0.0058	0.0012	0.002101	-7.47	31.75
Right:g	0	0	0	0.0000	0.0000	0.0000	0	7.75	0
Right:t	0.007203	0.8538	-0.008104	-1.2301	0.0064	0.0006	0.007203	8.604	86.99
Right:Sprint	0.006981	0.8109	-0.007642	-1.2299	0.0064	0.0006	0.006981	8.561	84.99
Right:Coax1	0.006423	0.7044	-0.006499	-1.2005	0.0064	0.0006	0.006423	8.454	79.99
Right:Coax2	0.005312	0.5101	-0.004581	-0.9894	0.0063	0.0005	0.005312	8.26	70
Right:SW	0.00427	0.3739	-0.003556	-0.6238	0.0062	0.0005	0.00427	8.124	60.5
Right:Coax3	0.004216	0.3685	-0.003525	-0.6007	0.0062	0.0005	0.004216	8.119	60
Right:Brace	0.004108	0.3584	-0.003469	-0.5532	0.0062	0.0005	0.004108	8.108	59
Right:ARM	0.003494	0.3149	-0.003205	-0.3267	0.0060	0.0005	0.003494	8.065	53.25
Right:Coax4	0.003155	0.2992	-0.003116	-0.2314	0.0059	0.0004	0.003155	8.049	50
Right:XT	0.002873	0.2896	-0.003055	-0.1696	0.0058	0.0004	0.002873	8.04	47.25
Right:Coax5	0.002164	0.2711	-0.002837	-0.1630	0.0054	0.0003	0.002164	8.021	40
Right:XB	0.001439	0.2352	-0.002537	-0.3713	0.0047	0.0002	0.001439	7.985	31.75
Right:Coax6	0.001299	0.2228	-0.002403	-0.4362	0.0045	0.0002	0.001299	7.973	30
Right:Coax7	0.0006136	0.1288	-0.001457	-0.5773	0.0033	0.0001	0.0006136	7.879	20
Right:Coax8	0.0001628	0.03878	-0.000563	-0.4045	0.0018	0.0001	0.0001628	7.789	9.999
NESC32:O	0.004781	0.3133	-0.04026	0.2372	0.0061	0.0031	0.004781	-15.69	53.21
NESC32:L1	0.004755	0.3133	-0.03819	0.2372	0.0061	0.0031	0.004755	-15.19	53.21
NESC32:PL	0.004357	0.3128	0.002888	0.4282	0.0061	0.0028	0.004357	-7.437	53.25
NESC32:BRL	0.003931	0.3145	0.04889	0.1487	0.0061	0.0040	0.003931	-0.6855	53.3
NESC32:L2V	0.003861	0.3148	0.05024	-0.0034	0.0061	0.0040	0.003861	0.3148	53.3
NESC32:BRR	0.003793	0.3149	0.04876	-0.1588	0.0061	0.0038	0.003793	1.315	53.3
NESC32:PR	0.003494	0.3149	-0.003205	-0.5318	0.0060	0.0005	0.003494	8.065	53.25
NESC32:L3	0.003443	0.3146	-0.06454	-0.4104	0.0060	0.0003	0.003443	15.81	53.19
NESC32:E	0.003441	0.3146	-0.06812	-0.4105	0.0060	0.0003	0.003441	16.31	53.18
TENL:E	0.004995	0.285	-0.0004561	0.5880	0.0062	0.0027	0.004995	-7.79	59
TENR:E	0.004102	0.3584	-0.00977	-0.5532	0.0062	0.0005	0.004102	8.761	58.99
VEEL:O	0.004965	0.2849	0.006211	0.5880	0.0062	0.0027	0.004965	-7.14	59.01
VEER:O	0.004114	0.3585	0.002832	-0.5532	0.0062	0.0005	0.004114	7.456	59
X1:O	0.00371	0.2559	0.0009698	-0.2999	0.0061	0.0022	0.00371	-7.097	47.25
X1:E	0.001442	0.2352	0.002654	-0.3713	0.0047	0.0002	0.001442	7.184	31.75
X2:O	0.002878	0.2896	-0.0009331	-0.1696	0.0058	0.0004	0.002878	7.323	47.25
X2:E	0.002091	0.2801	0.0001255	-0.1696	0.0058	0.0012	0.002091	-6.978	31.75

Joint Support Reactions for Load Case "Ext. Wind T":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	Result. 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 %
Left:g	-0.01	0.0	-5.71	0.0	0.0	37.98	0.0	0.0	38.40	0.0	90.84	0.0	-0.3	0.0	0.0	-0.02	0.0	0.0
Right:g	-0.03	0.0	-17.24	0.0	0.0	-58.17	0.0	0.0	60.67	0.0	342.73	0.0	-1.2	0.0	0.0	-0.03	0.0	0.0

Detailed Laminated Wood Pole Usages for Load Case "Ext. Wind T":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (ft-k)	Long. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	Usage %
Left	Left:t	Origin	0.00	3.17	0.06	0.03	0.00	-0.00	-0.0	-0.01	0.01	-0.00	0.0
Left	Left:SW	End	0.50	3.24	0.06	0.03	0.01	-0.00	-0.0	-0.01	0.01	-0.00	0.0
Left	Left:SW	Origin	0.50	3.24	0.06	0.03	0.01	-0.00	-0.0	-0.29	0.62	-0.00	0.1
Left	Left:Brace	End	2.00	3.42	0.06	0.03	0.93	-0.00	-0.0	-0.29	0.62	-0.00	1.6
Left	Left:Brace	Origin	2.00	3.42	0.06	0.03	-1.47	-0.00	-0.0	4.30	-8.64	-0.00	3.3
Left	#Left:0	End	4.88	3.72	0.06	0.04	-26.33	-0.00	-0.0	4.30	-8.64	-0.00	40.9
Left	#Left:0	Origin	4.88	3.72	0.06	0.04	-26.33	-0.00	-0.0	4.14	-8.51	-0.00	40.9
Left	Left:ARM	End	7.75	3.75	0.05	0.03	-50.78	-0.01	-0.0	4.14	-8.51	-0.00	70.8
Left	Left:ARM	Origin	7.75	3.75	0.05	0.03	-50.78	-0.01	0.0	4.97	17.46	0.00	70.9
Left	#Left:1	End	10.75	3.41	0.05	0.04	1.61	-0.00	0.0	4.97	17.46	0.00	2.8
Left	#Left:1	Origin	10.75	3.41	0.05	0.04	1.61	-0.00	0.0	4.86	17.64	0.00	2.8
Left	Left:XT	End	13.75	3.07	0.04	0.04	54.54	-0.00	0.0	4.86	17.64	0.00	62.7
Left	Left:XT	Origin	13.75	3.07	0.04	0.04	44.19	-0.00	0.0	30.76	-6.09	-0.00	54.7
Left	#Left:2	End	18.75	3.07	0.04	0.03	13.74	-0.00	0.0	30.76	-6.09	-0.00	17.6
Left	#Left:2	Origin	18.75	3.07	0.04	0.03	13.74	-0.00	0.0	30.58	-5.66	-0.00	17.6
Left	#Left:3	End	23.75	3.31	0.03	0.02	-14.58	-0.01	0.0	30.58	-5.66	-0.00	16.3
Left	#Left:3	Origin	23.75	3.31	0.03	0.02	-14.58	-0.01	0.0	30.40	-5.48	-0.00	16.3
Left	#Left:4	End	26.50	3.39	0.03	0.02	-29.67	-0.01	0.0	30.40	-5.48	-0.00	27.2
Left	#Left:4	Origin	26.50	3.39	0.03	0.02	-29.67	-0.01	0.0	30.26	-5.42	-0.00	27.2
Left	Left:XB	End	29.25	3.36	0.03	0.02	-44.56	-0.02	0.0	30.26	-5.42	-0.00	36.5
Left	Left:XB	Origin	29.25	3.36	0.03	0.02	-49.27	-0.02	0.0	39.64	3.70	-0.00	41.1
Left	#Left:5	End	34.25	2.97	0.02	0.01	-30.78	-0.04	0.0	39.64	3.70	-0.00	24.6
Left	#Left:5	Origin	34.25	2.97	0.02	0.01	-30.78	-0.04	0.0	39.42	3.82	-0.01	24.5
Left	#Left:6	End	39.25	2.30	0.01	0.01	-11.70	-0.07	0.0	39.42	3.82	-0.01	11.0
Left	#Left:6	Origin	39.25	2.30	0.01	0.01	-11.70	-0.07	0.0	39.17	4.06	-0.01	11.0
Left	#Left:7	End	44.25	1.55	0.01	0.01	8.60	-0.10	0.0	39.17	4.06	-0.01	8.5
Left	#Left:7	Origin	44.25	1.55	0.01	0.01	8.60	-0.10	0.0	38.89	4.40	-0.01	8.4
Left	#Left:8	End	49.25	0.84	0.00	0.01	30.59	-0.14	0.0	38.89	4.40	-0.01	18.2
Left	#Left:8	Origin	49.25	0.84	0.00	0.01	30.59	-0.14	0.0	38.59	4.81	-0.01	18.2
Left	#Left:9	End	54.25	0.30	0.00	0.01	54.63	-0.19	0.0	38.59	4.81	-0.01	27.0
Left	#Left:9	Origin	54.25	0.30	0.00	0.01	54.63	-0.19	0.0	38.32	5.20	-0.01	27.0
Left	#Left:10	End	57.63	0.08	0.00	0.00	72.16	-0.23	0.0	38.32	5.20	-0.01	32.5
Left	#Left:10	Origin	57.63	0.08	0.00	0.00	72.16	-0.23	0.0	38.09	5.53	-0.01	32.5
Left	Left:g	End	61.00	0.00	0.00	0.00	90.84	-0.28	0.0	38.09	5.53	-0.01	37.9
Right	Right:t	Origin	0.00	10.25	0.09	-0.10	0.00	-0.00	-0.0	-0.08	0.11	-0.00	0.0
Right	Right:Sprint	End	2.00	9.73	0.08	-0.09	0.22	-0.00	-0.0	-0.08	0.11	-0.00	0.1
Right	Right:Sprint	Origin	2.00	9.73	0.08	-0.09	0.22	-0.00	-0.0	-1.18	2.45	-0.00	0.2
Right	Right:Coax1	End	7.00	8.45	0.08	-0.08	12.48	-0.01	-0.0	-1.18	2.45	-0.00	4.3
Right	Right:Coax1	Origin	7.00	8.45	0.08	-0.08	12.48	-0.01	-0.0	-1.73	3.17	-0.00	4.3
Right	#Right:11	End	12.00	7.23	0.07	-0.07	28.32	-0.02	-0.0	-1.73	3.17	-0.00	8.8
Right	#Right:11	Origin	12.00	7.23	0.07	-0.07	28.32	-0.02	-0.0	-2.20	3.72	-0.00	8.9
Right	Right:Coax2	End	17.00	6.12	0.06	-0.05	46.92	-0.03	-0.0	-2.20	3.72	-0.00	13.3
Right	Right:Coax2	Origin	17.00	6.12	0.06	-0.05	46.92	-0.03	-0.0	-2.79	4.42	-0.00	13.3
Right	#Right:12	End	21.75	5.21	0.06	-0.05	67.90	-0.05	-0.0	-2.79	4.42	-0.00	17.6
Right	#Right:12	Origin	21.75	5.21	0.06	-0.05	67.90	-0.05	-0.0	-3.30	4.93	-0.01	17.7
Right	Right:SW	End	26.50	4.49	0.05	-0.04	91.33	-0.08	-0.0	-3.30	4.93	-0.01	21.9
Right	Right:SW	Origin	26.50	4.49	0.05	-0.04	91.33	-0.08	-0.0	-3.84	5.76	-0.01	21.9
Right	Right:Coax3	End	27.00	4.42	0.05	-0.04	94.22	-0.08	-0.0	-3.84	5.76	-0.01	22.4
Right	Right:Coax3	Origin	27.00	4.42	0.05	-0.04	94.22	-0.08	-0.0	-4.02	6.01	-0.01	22.4
Right	Right:Brace	End	28.00	4.30	0.05	-0.04	100.22	-0.09	-0.0	-4.02	6.01	-0.01	23.4
Right	Right:Brace	Origin	28.00	4.30	0.05	-0.04	95.35	-0.09	-0.0	-14.07	-2.80	-0.01	22.8

Right	#Right:13	End	30.87	4.01	0.05	-0.04	87.30	-0.11	-0.0	-14.07	-2.80	-0.01	20.0
Right	#Right:13	Origin	30.87	4.01	0.05	-0.04	87.30	-0.11	-0.0	-14.39	-2.51	-0.01	20.0
Right	Right:ARM	End	33.75	3.78	0.04	-0.04	80.07	-0.14	-0.0	-14.39	-2.51	-0.01	17.6
Right	Right:ARM	Origin	33.75	3.78	0.04	-0.04	80.07	-0.14	0.0	-14.21	-4.53	-0.01	17.6
Right	Right:Coax4	End	37.00	3.59	0.04	-0.04	65.34	-0.18	0.0	-14.21	-4.53	-0.01	13.8
Right	Right:Coax4	Origin	37.00	3.59	0.04	-0.04	65.34	-0.18	0.0	-14.66	-4.06	-0.01	13.8
Right	Right:XT	End	39.75	3.48	0.03	-0.04	54.17	-0.22	0.0	-14.66	-4.06	-0.01	11.2
Right	Right:XT	Origin	39.75	3.48	0.03	-0.04	47.02	-0.22	0.0	-25.03	-12.57	-0.02	10.2
Right	#Right:14	End	43.38	3.36	0.03	-0.04	1.46	-0.28	0.0	-25.03	-12.57	-0.02	1.4
Right	#Right:14	Origin	43.38	3.36	0.03	-0.04	1.46	-0.28	0.0	-25.48	-12.17	-0.02	1.4
Right	Right:Coax5	End	47.00	3.25	0.03	-0.03	-42.65	-0.35	0.0	-25.48	-12.17	-0.02	8.6
Right	Right:Coax5	Origin	47.00	3.25	0.03	-0.03	-42.65	-0.35	0.0	-26.09	-11.56	-0.02	8.6
Right	#Right:15	End	51.13	3.08	0.02	-0.03	-90.34	-0.42	0.0	-26.09	-11.56	-0.02	16.1
Right	#Right:15	Origin	51.13	3.08	0.02	-0.03	-90.34	-0.42	0.0	-26.66	-11.06	-0.02	16.1
Right	Right:XB	End	55.25	2.82	0.02	-0.03	-135.96	-0.50	0.0	-26.66	-11.06	-0.02	22.4
Right	Right:XB	Origin	55.25	2.82	0.02	-0.03	-156.81	-0.50	0.0	-53.09	13.76	-0.02	26.7
Right	Right:Coax6	End	57.00	2.67	0.02	-0.03	-132.73	-0.54	0.0	-53.09	13.76	-0.02	22.5
Right	Right:Coax6	Origin	57.00	2.67	0.02	-0.03	-132.73	-0.54	0.0	-53.63	14.39	-0.02	22.5
Right	#Right:16	End	62.00	2.15	0.01	-0.02	-60.81	-0.64	0.0	-53.63	14.39	-0.02	10.9
Right	#Right:16	Origin	62.00	2.15	0.01	-0.02	-60.81	-0.64	0.0	-54.32	15.00	-0.02	10.9
Right	Right:Coax7	End	67.00	1.55	0.01	-0.02	14.20	-0.75	0.0	-54.32	15.00	-0.02	4.0
Right	Right:Coax7	Origin	67.00	1.55	0.01	-0.02	14.20	-0.75	0.0	-55.16	15.71	-0.02	4.1
Right	#Right:17	End	72.00	0.96	0.00	-0.01	92.73	-0.86	0.0	-55.16	15.71	-0.02	13.9
Right	#Right:17	Origin	72.00	0.96	0.00	-0.01	92.73	-0.86	0.0	-55.94	16.17	-0.02	13.9
Right	Right:Coax8	End	77.00	0.47	0.00	-0.01	173.60	-0.97	0.0	-55.94	16.17	-0.02	23.0
Right	Right:Coax8	Origin	77.00	0.47	0.00	-0.01	173.60	-0.97	0.0	-56.86	16.74	-0.02	23.0
Right	#Right:18	End	82.00	0.13	0.00	-0.00	257.30	-1.09	0.0	-56.86	16.74	-0.02	31.4
Right	#Right:18	Origin	82.00	0.13	0.00	-0.00	257.30	-1.09	0.0	-57.73	17.09	-0.03	31.4
Right	Right:g	End	87.00	0.00	0.00	0.00	342.73	-1.22	0.0	-57.73	17.09	-0.03	39.0

Summary of Brace Forces and Usages for Load Case "Ext. Wind T":

Brace Label	Forces (kips)	Allowable Compression (kips)	Allowable Tension (kips)	Usage %
TENL	2.16	16.50	30.00	9.62
TENR	1.90	16.50	30.00	8.43
VEEL	-9.80	20.28	20.00	64.43
VEER	13.59	20.28	20.00	90.60
X1	-35.62	66.95	35.00	70.95
X2	13.26	66.95	35.00	50.50

Detailed X-Arm Usages for Load Case "Ext. Wind T":

X-Arm Label	Joint Label	Joint Position	Rel. Dist. (ft)	Area (in^2)	X Sect. Modulus (in^3)	Z Sect. Modulus (in^3)	Tran. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	X Mom. (ft-k)	Z Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	X Shear (kips)	Z Shear (kips)	P/A (psi)	Mx/Sx (psi)	Mz/Sz (psi)	Max. Usage %
NESC32	NESC32:O	Origin	0.00	38.40	32.83	48.04	3.76	0.06	-0.48	0.00	0.00	0.0	0.00	-0.00	-0.00	0.00033	6.97e-006	3.97e-006	0.0
NESC32	NESC32:L1	End	0.50	38.40	32.83	48.04	3.76	0.06	-0.46	-0.00	0.00	0.0	0.00	-0.00	-0.00	0.00033	0.561	5.23e-005	0.0
NESC32	NESC32:L1	Origin	0.50	38.40	32.83	48.04	3.76	0.06	-0.46	0.00	-0.00	0.0	-3.32	0.15	-0.00	86	0.561	4.58e-005	1.4
NESC32	#gNESC32:0	End	4.38	38.40	32.83	48.04	3.76	0.05	-0.25	0.58	0.00	0.0	-3.32	0.15	-0.00	86	212	0.377	5.0
NESC32	#gNESC32:0	Origin	4.38	38.40	32.83	48.04	3.76	0.05	-0.25	-0.58	-0.00	-0.0	-3.32	0.10	-0.00	86	212	0.377	5.0
NESC32	NESC32:PL	End	8.25	38.40	32.83	48.04	3.75	0.05	0.03	0.95	0.00	-0.0	-3.32	0.10	-0.00	86	349	0.753	7.3
NESC32	NESC32:PL	Origin	8.25	38.40	32.83	48.04	3.75	0.05	0.03	-0.95	0.02	0.0	22.53	-0.52	-0.00	5.9e+002	348	4.77	15.7
NESC32	#gNESC32:1	End	11.63	38.40	32.83	48.04	3.76	0.05	0.36	-0.81	-0.01	0.0	22.53	-0.52	-0.00	5.9e+002	295	1.99	14.7
NESC32	#gNESC32:1	Origin	11.63	38.40	32.83	48.04	3.76	0.05	0.36	0.81	0.01	-0.0	22.53	-0.62	-0.00	5.9e+002	295	1.99	14.7

NESC32	NESC32:BRL	End	15.00	38.40	32.83	48.04	3.77	0.05	0.59	-2.89	0.00	-0.0	22.53	-0.62	-0.00	5.9e+002	1.05e+003	0.59	27.4
NESC32	NESC32:BRL	Origin	15.00	38.40	32.83	48.04	3.77	0.05	0.59	2.89	-0.00	0.0	22.53	-0.74	-0.00	5.9e+002	1.05e+003	0.59	27.4
NESC32	NESC32:L2V	End	16.00	38.40	32.83	48.04	3.78	0.05	0.60	-3.63	0.01	0.0	22.53	-0.74	-0.00	5.9e+002	1.33e+003	1.35	31.9
NESC32	NESC32:L2V	Origin	16.00	38.40	32.83	48.04	3.78	0.05	0.60	3.63	-0.01	0.0	2.48	0.60	-0.00	65	1.33e+003	1.35	23.2
NESC32	NESC32:BRR	End	17.00	38.40	32.83	48.04	3.78	0.05	0.59	-3.03	0.01	0.0	2.48	0.60	-0.00	65	1.11e+003	2.34	19.6
NESC32	NESC32:BRR	Origin	17.00	38.40	32.83	48.04	3.78	0.05	0.59	3.03	-0.01	0.0	2.48	0.56	-0.00	65	1.11e+003	2.34	19.6
NESC32	#gNESC32:2	End	20.38	38.40	32.83	48.04	3.78	0.04	0.34	-1.14	0.02	0.0	2.48	0.56	-0.00	65	417	5.71	8.1
NESC32	#gNESC32:2	Origin	20.38	38.40	32.83	48.04	3.78	0.04	0.34	1.14	-0.02	0.0	2.48	0.51	-0.00	65	417	5.71	8.1
NESC32	NESC32:PR	End	23.75	38.40	32.83	48.04	3.78	0.04	-0.04	0.58	0.04	0.0	2.48	0.51	-0.00	65	212	9.15	4.8
NESC32	NESC32:PR	Origin	23.75	38.40	32.83	48.04	3.78	0.04	-0.04	-0.58	-0.00	0.0	0.15	-0.05	0.00	3.9	212	0.606	3.6
NESC32	#gNESC32:3	End	27.63	38.40	32.83	48.04	3.78	0.04	-0.43	0.38	0.00	0.0	0.15	-0.05	0.00	3.9	139	0.299	2.4
NESC32	#gNESC32:3	Origin	27.63	38.40	32.83	48.04	3.78	0.04	-0.43	-0.38	-0.00	-0.0	0.15	-0.10	0.00	3.9	139	0.299	2.4
NESC32	NESC32:L3	End	31.50	38.40	32.83	48.04	3.78	0.04	-0.77	-0.00	0.00	-0.0	0.15	-0.10	0.00	3.9	0.561	6.06e-005	0.1
NESC32	NESC32:L3	Origin	31.50	38.40	32.83	48.04	3.78	0.04	-0.77	0.00	-0.00	-0.0	0.00	0.00	0.00	0.00057	0.561	6.55e-005	0.0
NESC32	NESC32:E	End	32.00	38.40	32.83	48.04	3.78	0.04	-0.82	-0.00	-0.00	-0.0	0.00	0.00	0.00	0.00057	4.33e-008	2.4e-006	0.0

Summary of Clamp Capacities and Usages for Load Case "Ext. Wind T":

Clamp Force Label	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1 2.462	10.00	10.00	24.62
C2 0.715	10.00	10.00	7.15
C3 0.702	10.00	10.00	7.02
C4 0.265	10.00	10.00	2.65
C5 0.500	10.00	10.00	5.00
C6 0.594	10.00	10.00	5.94
C7 0.540	10.00	10.00	5.40
C8 0.715	10.00	10.00	7.15
C9 0.715	10.00	10.00	7.15

Summary of Suspension Capacities and Usages for Load Case "Ext. Wind T":

Suspension Label	Tension (kips)	Input Tension Capacity (kips)	Factored Tension Capacity (kips)	Usage %
SUSSWL	0.600	60.00	60.00	1.00
SUSSWR	0.600	60.00	60.00	1.00
L1	1.925	60.00	60.00	3.21
L2	1.925	60.00	60.00	3.21
L3	1.925	60.00	60.00	3.21

*** Analysis Results for Load Case No. 4 "Ext. Wind L" - Number of iterations in SAPS 20

Equilibrium Joint Positions and Rotations for Load Case "Ext. Wind L":

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)
Left:g	0	0	0	0.0000	0.0000	0.0000	0	-7.75	0
Left:t	2.9	0.01529	-0.08036	0.0858	3.7395	1.0525	2.9	-7.735	60.92
Left:SW	2.868	0.01544	-0.0793	0.0858	3.7395	1.0525	2.868	-7.735	60.42
Left:Brace	2.77	0.01589	-0.0761	0.0858	3.7393	1.0525	2.77	-7.734	58.92
Left:ARM	2.395	0.01705	-0.06384	0.0699	3.7192	1.0536	2.395	-7.733	53.19
Left:XT	2.009	0.009847	-0.05131	0.0700	3.6650	0.8477	2.009	-7.74	47.2
Left:XB	1.065	0.00483	-0.02234	0.0368	3.2297	0.4545	1.065	-7.745	31.73
Right:g	0	0	0	0.0000	0.0000	0.0000	0	7.75	0
Right:t	4.426	0.05081	-0.1323	-0.0521	4.0987	0.1690	4.426	7.801	86.87
Right:Sprint	4.283	0.04857	-0.1272	-0.0521	4.0986	0.1690	4.283	7.799	84.87
Right:Coax1	3.926	0.04296	-0.1144	-0.0521	4.0899	0.1690	3.926	7.793	79.89
Right:Coax2	3.218	0.03177	-0.08927	-0.0522	4.0177	0.1691	3.218	7.782	69.91
Right:SW	2.563	0.02119	-0.06663	-0.0520	3.8728	0.1692	2.563	7.771	60.43
Right:Coax3	2.529	0.02064	-0.06549	-0.0520	3.8630	0.1692	2.529	7.771	59.93
Right:Brace	2.462	0.01954	-0.06323	-0.0520	3.8427	0.1692	2.462	7.77	58.94
Right:ARM	2.083	0.01354	-0.05069	-0.0423	3.7061	0.1687	2.083	7.764	53.2
Right:Coax4	1.875	0.01037	-0.04403	-0.0325	3.6112	0.1547	1.875	7.76	49.96
Right:XT	1.704	0.008202	-0.03868	-0.0250	3.5182	0.1434	1.704	7.758	47.21
Right:Coax5	1.277	0.004315	-0.02604	-0.0113	3.2154	0.1152	1.277	7.754	39.97
Right:XB	0.8453	0.002008	-0.01463	-0.0043	2.7680	0.0868	0.8453	7.752	31.74
Right:Coax6	0.7624	0.001684	-0.01264	-0.0037	2.6591	0.0810	0.7624	7.752	29.99
Right:Coax7	0.3585	0.0004824	-0.004334	-0.0015	1.9383	0.0506	0.3585	7.75	20
Right:Coax8	0.09468	5.742e-005	-0.0006709	-0.0003	1.0517	0.0238	0.09468	7.75	9.999
NESC32:O	2.567	0.01898	-0.07819	0.0118	3.7183	1.2534	2.567	-15.98	53.17
NESC32:L1	2.556	0.01887	-0.07738	0.0118	3.7183	1.2534	2.556	-15.48	53.17
NESC32:PL	2.395	0.01705	-0.06384	0.0389	3.7192	1.0536	2.395	-7.733	53.19
NESC32:BRL	2.239	0.01513	-0.05265	-0.0260	3.7124	1.4514	2.239	-0.9849	53.2
NESC32:L2V	2.214	0.0148	-0.05155	-0.0390	3.7114	1.4287	2.214	0.0148	53.2
NESC32:BRR	2.19	0.01449	-0.05073	-0.0509	3.7104	1.3788	2.19	1.014	53.2
NESC32:PR	2.083	0.01354	-0.05069	-0.0496	3.7061	0.1687	2.083	7.764	53.2
NESC32:L3	2.078	0.0134	-0.05979	-0.0762	3.7058	-0.0262	2.078	15.51	53.19
NESC32:E	2.078	0.01339	-0.06046	-0.0762	3.7058	-0.0262	2.078	16.01	53.19
TENL:E	2.776	0.01594	-0.07659	0.0858	3.7393	1.0525	2.776	-8.059	58.92
TENR:E	2.46	0.01953	-0.06382	-0.0520	3.8427	0.1692	2.46	8.422	58.94
VEEL:O	2.764	0.01583	-0.07562	0.0858	3.7393	1.0525	2.764	-7.409	58.92
VEER:O	2.464	0.01954	-0.06263	-0.0520	3.8427	0.1692	2.464	7.117	58.94
X1:O	2.003	0.009803	-0.05083	0.0700	3.6650	0.8477	2.003	-7.343	47.2
X1:E	0.8465	0.002009	-0.01457	-0.0043	2.7680	0.0868	0.8465	6.951	31.74
X2:O	1.706	0.008204	-0.03837	-0.0250	3.5182	0.1434	1.706	7.042	47.21
X2:E	1.061	0.004814	-0.02202	0.0368	3.2297	0.4545	1.061	-7.253	31.73

Joint Support Reactions for Load Case "Ext. Wind L":

Joint Label	X Force (kips)	X Usage %(kips)	Y Force	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift 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 %
Left:g	-4.00	0.0	-0.10	0.0	0.0	-5.06	0.0	0.0	6.45	0.0	0.58	0.0	-118.5	0.0	0.0	-7.93	0.0	0.0
Right:g	-14.09	0.0	0.02	0.0	0.0	-15.20	0.0	0.0	20.72	0.0	-0.00	0.0	-707.4	0.0	0.0	-11.35	0.0	0.0

Detailed Laminated Wood Pole Usages for Load Case "Ext. Wind L":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (ft-k)	Long. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	Usage %
Left	Left:t	Origin	0.00	0.18	34.80	-0.96	-0.00	-0.00	0.0	-0.01	-0.00	-0.01	0.0
Left	Left:SW	End	0.50	0.19	34.41	-0.95	-0.00	-0.00	0.0	-0.01	-0.00	-0.01	0.0
Left	Left:SW	Origin	0.50	0.19	34.41	-0.95	-0.00	-0.00	0.0	-0.28	-0.00	-0.07	0.1
Left	Left:Brace	End	2.00	0.19	33.24	-0.91	-0.00	-0.10	0.0	-0.28	-0.00	-0.07	0.2
Left	Left:Brace	Origin	2.00	0.19	33.24	-0.91	-0.04	-0.10	-0.0	-2.60	-0.16	-0.38	0.6
Left	#Left:0	End	4.88	0.20	30.99	-0.84	-0.48	-1.19	-0.0	-2.60	-0.16	-0.38	2.3
Left	#Left:0	Origin	4.88	0.20	30.99	-0.84	-0.48	-1.19	-0.0	-2.68	-0.16	-0.50	2.4
Left	Left:ARM	End	7.75	0.20	28.75	-0.77	-0.93	-2.62	-0.0	-2.68	-0.16	-0.50	4.1
Left	Left:ARM	Origin	7.75	0.20	28.75	-0.77	-0.40	-2.59	8.3	-2.85	0.13	-0.32	3.4
Left	#Left:1	End	10.75	0.16	26.42	-0.69	-0.01	-3.55	8.3	-2.85	0.13	-0.32	3.6
Left	#Left:1	Origin	10.75	0.16	26.42	-0.69	-0.02	-3.55	8.3	-2.95	0.12	-0.46	3.6
Left	Left:XT	End	13.75	0.12	24.11	-0.62	0.37	-4.93	8.3	-2.95	0.12	-0.46	5.0
Left	Left:XT	Origin	13.75	0.12	24.11	-0.62	0.27	-4.93	8.1	-2.86	-0.17	-0.97	4.9
Left	#Left:2	End	18.75	0.08	20.31	-0.49	-0.53	-9.77	8.1	-2.86	-0.17	-0.97	8.5
Left	#Left:2	Origin	18.75	0.08	20.31	-0.49	-0.55	-9.78	8.1	-3.05	-0.17	-1.23	8.6
Left	#Left:3	End	23.75	0.07	16.63	-0.38	-1.34	-15.91	8.1	-3.05	-0.17	-1.23	13.1
Left	#Left:3	Origin	23.75	0.07	16.63	-0.38	-1.36	-15.92	8.1	-3.20	-0.16	-1.44	13.1
Left	#Left:4	End	26.50	0.06	14.67	-0.32	-1.79	-19.87	8.1	-3.20	-0.16	-1.44	15.7
Left	#Left:4	Origin	26.50	0.06	14.67	-0.32	-1.81	-19.87	8.1	-3.32	-0.16	-1.59	15.8
Left	Left:XB	End	29.25	0.06	12.78	-0.27	-2.23	-24.24	8.1	-3.32	-0.16	-1.59	18.4
Left	Left:XB	Origin	29.25	0.06	12.78	-0.27	-2.35	-24.24	8.0	-3.31	0.08	-2.13	18.5
Left	#Left:5	End	34.25	0.05	9.53	-0.18	-1.89	-34.89	8.0	-3.31	0.08	-2.13	23.8
Left	#Left:5	Origin	34.25	0.05	9.53	-0.18	-1.93	-34.89	8.0	-3.55	0.08	-2.43	23.9
Left	#Left:6	End	39.25	0.03	6.61	-0.11	-1.45	-47.05	8.0	-3.55	0.08	-2.43	29.5
Left	#Left:6	Origin	39.25	0.03	6.61	-0.11	-1.50	-47.05	8.0	-3.81	0.09	-2.74	29.6
Left	#Left:7	End	44.25	0.02	4.11	-0.06	-0.99	-60.76	8.0	-3.81	0.09	-2.74	35.5
Left	#Left:7	Origin	44.25	0.02	4.11	-0.06	-1.06	-60.76	7.9	-4.10	0.09	-3.06	35.6
Left	#Left:8	End	49.25	0.01	2.12	-0.02	-0.53	-76.07	7.9	-4.10	0.09	-3.06	41.8
Left	#Left:8	Origin	49.25	0.01	2.12	-0.02	-0.61	-76.07	7.9	-4.41	0.09	-3.39	41.9
Left	#Left:9	End	54.25	0.00	0.73	-0.00	-0.04	-93.01	7.9	-4.41	0.09	-3.39	48.4
Left	#Left:9	Origin	54.25	0.00	0.73	-0.00	-0.12	-93.01	7.9	-4.69	0.10	-3.66	48.4
Left	#Left:10	End	57.63	0.00	0.19	-0.00	0.27	-105.38	7.9	-4.69	0.10	-3.66	53.2
Left	#Left:10	Origin	57.63	0.00	0.19	-0.00	0.21	-105.38	7.9	-4.93	0.10	-3.89	53.2
Left	Left:g	End	61.00	0.00	0.00	0.00	0.61	-118.50	7.9	-4.93	0.10	-3.89	58.1
Right	Right:t	Origin	0.00	0.61	53.11	-1.59	-0.00	0.00	0.0	-0.08	0.00	-0.07	0.0
Right	Right:Sprint	End	2.00	0.58	51.40	-1.53	0.00	-0.13	0.0	-0.08	0.00	-0.07	0.0
Right	Right:Sprint	Origin	2.00	0.58	51.40	-1.53	0.00	-0.13	0.0	-1.07	-0.00	-2.29	0.1
Right	Right:Coax1	End	7.00	0.52	47.11	-1.37	-0.02	-11.58	0.0	-1.07	-0.00	-2.29	2.2
Right	Right:Coax1	Origin	7.00	0.52	47.11	-1.37	-0.02	-11.58	0.0	-1.59	-0.00	-2.86	2.3
Right	#Right:11	End	12.00	0.45	42.84	-1.22	-0.04	-25.89	0.0	-1.59	-0.00	-2.86	4.7
Right	#Right:11	Origin	12.00	0.45	42.84	-1.22	-0.04	-25.89	-0.0	-2.05	-0.00	-3.23	4.8
Right	Right:Coax2	End	17.00	0.38	38.61	-1.07	-0.05	-42.02	-0.0	-2.05	-0.00	-3.23	7.3
Right	Right:Coax2	Origin	17.00	0.38	38.61	-1.07	-0.05	-42.02	-0.0	-2.61	-0.00	-3.82	7.3
Right	#Right:12	End	21.75	0.32	34.65	-0.93	-0.05	-60.17	-0.0	-2.61	-0.00	-3.82	10.0
Right	#Right:12	Origin	21.75	0.32	34.65	-0.93	-0.05	-60.17	-0.0	-3.09	-0.00	-4.20	10.0
Right	Right:SW	End	26.50	0.25	30.75	-0.80	-0.06	-80.10	-0.0	-3.09	-0.00	-4.20	12.7
Right	Right:SW	Origin	26.50	0.25	30.75	-0.80	-0.06	-80.10	-0.0	-3.61	0.00	-4.42	12.7
Right	Right:Coax3	End	27.00	0.25	30.35	-0.79	-0.06	-82.31	-0.0	-3.61	0.00	-4.42	13.0
Right	Right:Coax3	Origin	27.00	0.25	30.35	-0.79	-0.06	-82.31	-0.0	-3.77	-0.00	-4.71	13.0
Right	Right:Brace	End	28.00	0.23	29.54	-0.76	-0.06	-87.02	-0.0	-3.77	-0.00	-4.71	13.7
Right	Right:Brace	Origin	28.00	0.23	29.54	-0.76	0.51	-87.02	0.0	-5.40	1.08	-5.10	13.9

Right	#Right:13	End	30.87	0.20	27.25	-0.68	3.63	-101.68	0.0	-5.40	1.08	-5.10	16.4
Right	#Right:13	Origin	30.87	0.20	27.25	-0.68	3.63	-101.68	0.0	-5.72	1.08	-5.34	16.4
Right	Right:ARM	End	33.75	0.16	25.00	-0.61	6.75	-117.03	0.0	-5.72	1.08	-5.34	19.0
Right	Right:ARM	Origin	33.75	0.16	25.00	-0.61	7.45	-117.04	11.0	-6.06	-0.10	-7.77	19.1
Right	Right:Coax4	End	37.00	0.12	22.51	-0.53	7.15	-142.28	11.0	-6.06	-0.10	-7.77	22.2
Right	Right:Coax4	Origin	37.00	0.12	22.51	-0.53	7.13	-142.28	11.0	-6.50	-0.10	-8.25	22.2
Right	Right:XT	End	39.75	0.10	20.45	-0.46	6.88	-164.96	11.0	-6.50	-0.10	-8.25	24.9
Right	Right:XT	Origin	39.75	0.10	20.45	-0.46	6.60	-164.97	11.2	-7.25	-0.36	-8.85	24.9
Right	#Right:14	End	43.38	0.07	17.83	-0.38	5.35	-197.03	11.2	-7.25	-0.36	-8.85	28.3
Right	#Right:14	Origin	43.38	0.07	17.83	-0.38	5.32	-197.03	11.2	-7.71	-0.36	-9.17	28.3
Right	Right:Coax5	End	47.00	0.05	15.33	-0.31	4.08	-230.26	11.2	-7.71	-0.36	-9.17	31.8
Right	Right:Coax5	Origin	47.00	0.05	15.33	-0.31	4.04	-230.27	11.2	-8.31	-0.36	-9.74	31.8
Right	#Right:15	End	51.13	0.04	12.64	-0.24	2.64	-270.43	11.2	-8.31	-0.36	-9.74	35.9
Right	#Right:15	Origin	51.13	0.04	12.64	-0.24	2.60	-270.43	11.2	-8.88	-0.35	-10.11	35.9
Right	Right:XB	End	55.25	0.02	10.14	-0.18	1.22	-312.12	11.2	-8.88	-0.35	-10.11	39.9
Right	Right:XB	Origin	55.25	0.02	10.14	-0.18	0.85	-312.12	11.4	-9.71	-0.05	-10.68	39.9
Right	Right:Coax6	End	57.00	0.02	9.15	-0.15	0.80	-330.81	11.4	-9.71	-0.05	-10.68	41.7
Right	Right:Coax6	Origin	57.00	0.02	9.15	-0.15	0.76	-330.81	11.4	-10.30	-0.04	-11.21	41.7
Right	#Right:16	End	62.00	0.01	6.54	-0.09	0.64	-386.85	11.4	-10.30	-0.04	-11.21	47.1
Right	#Right:16	Origin	62.00	0.01	6.54	-0.09	0.57	-386.85	11.4	-11.07	-0.04	-11.66	47.1
Right	Right:Coax7	End	67.00	0.01	4.30	-0.05	0.49	-445.17	11.4	-11.07	-0.04	-11.66	52.4
Right	Right:Coax7	Origin	67.00	0.01	4.30	-0.05	0.41	-445.17	11.4	-11.97	-0.04	-12.34	52.5
Right	#Right:17	End	72.00	0.00	2.49	-0.02	0.35	-506.84	11.4	-11.97	-0.04	-12.34	57.8
Right	#Right:17	Origin	72.00	0.00	2.49	-0.02	0.26	-506.84	11.4	-12.81	-0.03	-12.78	57.9
Right	Right:Coax8	End	77.00	0.00	1.14	-0.01	0.23	-570.76	11.4	-12.81	-0.03	-12.78	63.2
Right	Right:Coax8	Origin	77.00	0.00	1.14	-0.01	0.13	-570.76	11.4	-13.79	-0.03	-13.44	63.2
Right	#Right:18	End	82.00	0.00	0.29	-0.00	0.13	-637.98	11.4	-13.79	-0.03	-13.44	68.5
Right	#Right:18	Origin	82.00	0.00	0.29	-0.00	0.03	-637.98	11.4	-14.72	-0.02	-13.88	68.6
Right	Right:g	End	87.00	0.00	0.00	0.00	0.05	-707.37	11.4	-14.72	-0.02	-13.88	73.8

Summary of Brace Forces and Usages for Load Case "Ext. Wind L":

Brace Label	Forces (kips)	Allowable Compression (kips)	Allowable Tension (kips)	Usage %
TENL	1.90	16.50	30.00	8.45
TENR	1.79	16.50	30.00	7.95
VEEL	1.71	20.28	20.00	11.39
VEER	0.39	20.28	20.00	2.63
X1	-0.43	66.95	35.00	0.86
X2	0.37	66.95	35.00	1.41

Detailed X-Arm Usages for Load Case "Ext. Wind L":

X-Arm Label	Joint Label	Joint Position	Rel. Dist. (ft)	Area (in^2)	X Sect. Modulus (in^3)	Z Sect. Modulus (in^3)	Tran. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	X Mom. (ft-k)	Z Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	X Shear (kips)	Z Shear (kips)	P/A (psi)	Mx/Sx (psi)	Mz/Sz (psi)	Max. Usage %
NESC32	NESC32:O	Origin	0.00	38.40	32.83	48.04	0.23	30.80	-0.94	-0.00	0.00	-0.0	0.00	-0.00	-0.01	0.00013	0.00108	0.000257	0.0
NESC32	NESC32:L1	End	0.50	38.40	32.83	48.04	0.23	30.67	-0.93	-0.00	0.00	-0.0	0.00	-0.00	-0.01	0.00013	0.452	1.17	0.0
NESC32	NESC32:L1	Origin	0.50	38.40	32.83	48.04	0.23	30.67	-0.93	0.00	-0.00	-0.0	-1.50	0.04	-0.26	39	0.451	1.17	0.7
NESC32	#gNESC32:0	End	4.38	38.40	32.83	48.04	0.21	29.67	-0.85	0.15	1.03	-0.0	-1.50	0.04	-0.26	39	54.2	258	5.8
NESC32	#gNESC32:0	Origin	4.38	38.40	32.83	48.04	0.21	29.67	-0.85	-0.15	-1.03	-0.0	-1.50	-0.00	-0.41	39	54.2	258	5.8
NESC32	NESC32:PL	End	8.25	38.40	32.83	48.04	0.20	28.75	-0.77	0.15	2.61	-0.0	-1.50	-0.00	-0.41	39	54	652	12.4
NESC32	NESC32:PL	Origin	8.25	38.40	32.83	48.04	0.20	28.75	-0.77	0.39	5.66	-0.0	-1.22	0.04	-0.85	32	143	1.41e+003	26.5
NESC32	#gNESC32:1	End	11.63	38.40	32.83	48.04	0.19	27.88	-0.69	-0.26	-2.78	-0.0	-1.22	0.04	-0.85	32	94.9	694	13.7
NESC32	#gNESC32:1	Origin	11.63	38.40	32.83	48.04	0.19	27.88	-0.69	0.26	2.78	-0.0	-1.21	0.01	-0.98	32	94.9	694	13.7

NESC32	NESC32:BRL	End	15.00	38.40	32.83	48.04	0.18	26.87	-0.63	-0.24	0.54	-0.0	-1.21	0.01	-0.98	32	87.4	135	4.2
NESC32	NESC32:BRL	Origin	15.00	38.40	32.83	48.04	0.18	26.87	-0.63	0.24	-0.54	-0.0	-1.21	-0.02	-1.07	32	87.4	135	4.2
NESC32	NESC32:L2V	End	16.00	38.40	32.83	48.04	0.18	26.57	-0.62	-0.25	1.61	-0.0	-1.21	-0.02	-1.07	32	92.9	402	8.8
NESC32	NESC32:L2V	Origin	16.00	38.40	32.83	48.04	0.18	26.57	-0.62	0.25	-1.61	-0.0	-0.16	0.14	-1.42	4.3	92.9	402	8.3
NESC32	NESC32:BRR	End	17.00	38.40	32.83	48.04	0.17	26.28	-0.61	-0.12	3.03	-0.0	-0.16	0.14	-1.42	4.3	42.2	757	13.4
NESC32	NESC32:BRR	Origin	17.00	38.40	32.83	48.04	0.17	26.28	-0.61	0.12	-3.03	-0.0	-0.17	0.12	-1.50	4.4	42.2	757	13.4
NESC32	#gNESC32:2	End	20.38	38.40	32.83	48.04	0.16	25.42	-0.60	0.28	8.10	-0.0	-0.17	0.12	-1.50	4.4	102	2.02e+003	35.5
NESC32	#gNESC32:2	Origin	20.38	38.40	32.83	48.04	0.16	25.42	-0.60	-0.28	-8.10	-0.0	-0.19	0.08	-1.63	4.8	102	2.02e+003	35.5
NESC32	NESC32:PR	End	23.75	38.40	32.83	48.04	0.16	25.00	-0.61	0.56	13.59	-0.0	-0.19	0.08	-1.63	4.8	206	3.39e+003	60.1
NESC32	NESC32:PR	Origin	23.75	38.40	32.83	48.04	0.16	25.00	-0.61	0.15	-2.59	-0.0	-1.39	0.04	0.41	36	54.5	648	12.3
NESC32	#gNESC32:3	End	27.63	38.40	32.83	48.04	0.16	24.93	-0.66	-0.00	1.02	-0.0	-1.39	0.04	0.41	36	0.55	256	4.9
NESC32	#gNESC32:3	Origin	27.63	38.40	32.83	48.04	0.16	24.93	-0.66	0.00	-1.02	0.0	-1.39	0.00	0.26	36	0.549	256	4.9
NESC32	NESC32:L3	End	31.50	38.40	32.83	48.04	0.16	24.93	-0.72	-0.00	0.00	0.0	-1.39	0.00	0.26	36	0.452	1.17	0.6
NESC32	NESC32:L3	Origin	31.50	38.40	32.83	48.04	0.16	24.93	-0.72	0.00	-0.00	0.0	0.00	0.00	0.01	0.00011	0.451	1.17	0.0
NESC32	NESC32:E	End	32.00	38.40	32.83	48.04	0.16	24.93	-0.73	-0.00	0.00	0.0	0.00	0.00	0.01	0.00011	0.000339	0.000109	0.0

Summary of Clamp Capacities and Usages for Load Case "Ext. Wind L":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	2.304	10.00	10.00	23.04
C2	0.543	10.00	10.00	5.43
C3	0.565	10.00	10.00	5.65
C4	0.292	10.00	10.00	2.92
C5	0.475	10.00	10.00	4.75
C6	0.571	10.00	10.00	5.71
C7	0.551	10.00	10.00	5.51
C8	0.733	10.00	10.00	7.33
C9	0.764	10.00	10.00	7.64

Summary of Suspension Capacities and Usages for Load Case "Ext. Wind L":

Suspension Label	Tension (kips)	Input Tension Capacity (kips)	Factored Tension Capacity (kips)	Usage %
SUSSWL	0.248	60.00	60.00	0.41
SUSSWR	0.248	60.00	60.00	0.41
L1	1.085	60.00	60.00	1.81
L2	1.085	60.00	60.00	1.81
L3	1.085	60.00	60.00	1.81

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

Summary of Laminated Wood Pole Usages:

Laminated Wood Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Left	70.90	Ext. Wind T	5	3445.6
Right	73.84	Ext. Wind L	23	13597.7

Summary of X-Arm Usages:

X-Arm Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
NESC32	60.09	Ext. Wind L	9	393.0

Summary of Brace Usages:

Brace Label	Maximum Usage %	Load Case	Weight (lbs)
TENL	21.24	NESC Heavy T	47.0
TENR	20.33	NESC Heavy T	47.0
VEEL	64.43	Ext. Wind T	58.0
VEER	90.60	Ext. Wind T	58.0
X1	70.95	Ext. Wind T	200.0
X2	50.50	Ext. Wind T	200.0

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy T	50.08	VEER	Brace
NESC Heavy L	25.63	Right Laminated Wood	
Ext. Wind T	90.60	VEER	Brace
Ext. Wind L	73.84	Right Laminated Wood	

Summary of Laminated Wood Pole Usages by Load Case:

Load Case	Maximum Usage %	Laminated Wood Pole Segment Label	Number
NESC Heavy T	36.03	Left	5
NESC Heavy L	25.63	Right	23
Ext. Wind T	70.90	Left	5
Ext. Wind L	73.84	Right	23

Summary of X-Arm Usages by Load Case:

Load Case	Maximum	X-Arm Segment

	Usage %	Label	Number
NESC Heavy T	13.16	NESC32	6
NESC Heavy L	19.59	NESC32	9
Ext. Wind T	31.89	NESC32	6
Ext. Wind L	60.09	NESC32	9

Summary of Brace Usages by Load Case:

Load Case	Maximum Usage %	Brace Label
NESC Heavy T	50.08	VEER
NESC Heavy L	25.26	VEEL
Ext. Wind T	90.60	VEER
Ext. Wind L	11.39	VEEL

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	24.62	Ext. Wind T	0.0
C2	Clamp	7.15	Ext. Wind T	0.0
C3	Clamp	7.02	Ext. Wind T	0.0
C4	Clamp	4.30	NESC Heavy L	0.0
C5	Clamp	5.00	Ext. Wind T	0.0
C6	Clamp	5.94	Ext. Wind T	0.0
C7	Clamp	5.51	Ext. Wind L	0.0
C8	Clamp	7.33	Ext. Wind L	0.0
C9	Clamp	7.64	Ext. Wind L	0.0
SUSSWL	Suspension	1.72	NESC Heavy T	3.0
SUSSWR	Suspension	1.72	NESC Heavy T	3.0
L1	Suspension	4.29	NESC Heavy T	50.0
L2	Suspension	4.29	NESC Heavy T	50.0
L3	Suspension	4.29	NESC Heavy T	50.0

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 T	C1	Clamp	Right:Sprint	0.001	0.625	1.851	1.954
NESC Heavy T	C2	Clamp	Right:Coax1	0.001	0.206	0.421	0.469
NESC Heavy T	C3	Clamp	Right:Coax2	0.001	0.203	0.421	0.467
NESC Heavy T	C4	Clamp	Right:Coax3	0.000	0.080	0.421	0.429
NESC Heavy T	C5	Clamp	Right:Coax4	0.001	0.147	0.421	0.446
NESC Heavy T	C6	Clamp	Right:Coax5	0.001	0.173	0.421	0.455
NESC Heavy T	C7	Clamp	Right:Coax6	0.001	0.158	0.421	0.450
NESC Heavy T	C8	Clamp	Right:Coax7	0.001	0.206	0.421	0.469
NESC Heavy T	C9	Clamp	Right:Coax8	0.002	0.206	0.421	0.469
NESC Heavy T	SUSSWL	Suspension	Left:SW	0.000	0.713	0.747	1.033
NESC Heavy T	SUSSWR	Suspension	Right:SW	0.000	0.713	0.747	1.033
NESC Heavy T	L1	Suspension	NESC32:L1	0.000	0.964	2.385	2.572
NESC Heavy T	L2	Suspension	NESC32:L2V	0.000	0.964	2.385	2.572
NESC Heavy T	L3	Suspension	NESC32:L3	0.000	0.964	2.385	2.572

NESC Heavy L	C1	Clamp	Right:Sprint	0.579	0.001	1.851	1.939
NESC Heavy L	C2	Clamp	Right:Coax1	0.159	0.002	0.421	0.450
NESC Heavy L	C3	Clamp	Right:Coax2	0.165	0.002	0.421	0.452
NESC Heavy L	C4	Clamp	Right:Coax3	0.089	0.000	0.421	0.430
NESC Heavy L	C5	Clamp	Right:Coax4	0.140	0.001	0.421	0.444
NESC Heavy L	C6	Clamp	Right:Coax5	0.167	0.001	0.421	0.453
NESC Heavy L	C7	Clamp	Right:Coax6	0.162	0.001	0.421	0.451
NESC Heavy L	C8	Clamp	Right:Coax7	0.211	0.002	0.421	0.471
NESC Heavy L	C9	Clamp	Right:Coax8	0.220	0.002	0.421	0.475
NESC Heavy L	SUSSWL	Suspension	Left:SW	0.000	0.000	0.747	0.747
NESC Heavy L	SUSSWR	Suspension	Right:SW	0.000	0.000	0.747	0.747
NESC Heavy L	L1	Suspension	NESC32:L1	0.000	0.000	2.385	2.385
NESC Heavy L	L2	Suspension	NESC32:L2V	0.000	0.000	2.385	2.385
NESC Heavy L	L3	Suspension	NESC32:L3	0.000	0.000	2.385	2.385
Ext. Wind T	C1	Clamp	Right:Sprint	0.001	2.316	0.833	2.462
Ext. Wind T	C2	Clamp	Right:Coax1	0.001	0.708	0.101	0.715
Ext. Wind T	C3	Clamp	Right:Coax2	0.001	0.694	0.101	0.702
Ext. Wind T	C4	Clamp	Right:Coax3	0.000	0.245	0.101	0.265
Ext. Wind T	C5	Clamp	Right:Coax4	0.001	0.490	0.101	0.500
Ext. Wind T	C6	Clamp	Right:Coax5	0.001	0.585	0.101	0.594
Ext. Wind T	C7	Clamp	Right:Coax6	0.001	0.531	0.101	0.540
Ext. Wind T	C8	Clamp	Right:Coax7	0.002	0.708	0.101	0.715
Ext. Wind T	C9	Clamp	Right:Coax8	0.002	0.708	0.101	0.715
Ext. Wind T	SUSSWL	Suspension	Left:SW	0.000	0.546	0.248	0.600
Ext. Wind T	SUSSWR	Suspension	Right:SW	0.000	0.546	0.248	0.600
Ext. Wind T	L1	Suspension	NESC32:L1	0.000	1.590	1.085	1.925
Ext. Wind T	L2	Suspension	NESC32:L2V	0.000	1.590	1.085	1.925
Ext. Wind T	L3	Suspension	NESC32:L3	0.000	1.590	1.085	1.925
Ext. Wind L	C1	Clamp	Right:Sprint	2.149	0.001	0.833	2.304
Ext. Wind L	C2	Clamp	Right:Coax1	0.533	0.002	0.101	0.543
Ext. Wind L	C3	Clamp	Right:Coax2	0.556	0.002	0.101	0.565
Ext. Wind L	C4	Clamp	Right:Coax3	0.274	0.000	0.101	0.292
Ext. Wind L	C5	Clamp	Right:Coax4	0.464	0.001	0.101	0.475
Ext. Wind L	C6	Clamp	Right:Coax5	0.562	0.001	0.101	0.571
Ext. Wind L	C7	Clamp	Right:Coax6	0.542	0.001	0.101	0.551
Ext. Wind L	C8	Clamp	Right:Coax7	0.726	0.002	0.101	0.733
Ext. Wind L	C9	Clamp	Right:Coax8	0.758	0.002	0.101	0.764
Ext. Wind L	SUSSWL	Suspension	Left:SW	0.000	0.000	0.248	0.248
Ext. Wind L	SUSSWR	Suspension	Right:SW	0.000	0.000	0.248	0.248
Ext. Wind L	L1	Suspension	NESC32:L1	0.000	0.000	1.085	1.085
Ext. Wind L	L2	Suspension	NESC32:L2V	0.000	0.000	1.085	1.085
Ext. Wind L	L3	Suspension	NESC32:L3	0.000	0.000	1.085	1.085

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 T	5.303	0.000	13.868	345.884	0.000	0.000
NESC Heavy L	0.000	1.105	13.868	40.447	70.565	-8.564
Ext. Wind T	9.101	0.000	5.392	555.941	0.000	0.000
Ext. Wind L	0.000	3.671	5.392	12.718	242.595	-28.450

*** Weight of structure (lbs):
Weight of Braces: 610.0

Weight of X-Arms:	393.0
Weight of Laminated Wood Poles:	17043.3
Weight of Suspensions:	156.0
Total:	18202.3

*** End of Report

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: FOUNDATION ANALYSIS

Location: Norwich, CT

Rev. 0: 3/8/19 Prepared by: T.J.L Checked by: C.A.G.

Direct Embed Foundation:

Left Pole

Input Data:

Tower Data

Uplift = $Uplift := 38 \cdot kips \cdot 1.1 = 42 \cdot kips$ (User Input)

Pole Length = $L := 70 \cdot ft$

Pole Base Width 1 = $W_{pole1} := 12.25 \cdot in$

Pole Base Width 2 = $W_{pole2} := 16.5 \cdot in$

Embedment Depth = $D_e := 9 \cdot ft$ (User Input)

Material Properties:

Unit Weight of Gravel = $\gamma_g := 115 \cdot pcf$ (User Input)

Unit Weight of Wood Pole = $\gamma_{wood} := 46 \cdot pcf$ (User Input)

Depth to Neglect = $n := 0 \cdot ft$ (User Input)

Angle of Internal Friction = $\theta := 30 \cdot deg$ (User Input)

PA-1 Pole Anchor Angle = $d := 4 \cdot in$ (User Input)

Resisting Width 1 Top = $R1 := 2 \cdot \tan(\theta) \cdot (D_e - n) + (W_{pole1} + 2 \cdot d) = 12.08 \cdot ft$ (User Input)

Resisting Width 2 Top = $R2 := 2 \cdot \tan(\theta) \cdot (D_e - n) + W_{pole2} = 11.77 \cdot ft$ (User Input)

Resisting Width 1 Bot = $R3 := W_{pole1} + 2 \cdot d = 1.69 \cdot ft$ (User Input)

Resisting Width 2 Bot = $R4 := W_{pole2} = 1.38 \cdot ft$ (User Input)

Check Uplift:

Weight of Embedded Pole = $Weight_{pole} := \left[(W_{pole1} \cdot W_{pole2}) \cdot (D_e) \cdot \gamma_{wood} \right] = 0.6 \cdot kips$

Volume of Resisting Tot = $V_{tot} := \frac{(D_e - n)}{3} \cdot \left[R1 \cdot R2 + R3 \cdot R4 + \sqrt{(R1 \cdot R2) \cdot (R3 \cdot R4)} \right] = 488 \cdot ft^3$

Volume of Resisting Material = $V_{res} := V_{tot} - W_{pole1} \cdot W_{pole2} \cdot D_e = 475 \cdot ft^3$

Weight of Resisting Material = $WT_{res} := V_{res} \cdot \gamma_g = 54.654 \cdot kip$

Total Uplift Resistance = $Uplift_R := Weight_{pole} + WT_{res} = 55.2 \cdot kips$

Uplift Check = $Uplift\_Check := if\left(\frac{Uplift_R}{Uplift} \geq 1.0, "Okay", "No Good" \right)$ $\frac{Uplift}{Uplift_R} = 75.68 \cdot \%$

Uplift_Check = "Okay"

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Subject: FOUNDATION ANALYSIS

Location: Norwich, CT

Rev. 0: 3/8/19 Prepared by: T.J.L Checked by: C.A.G.

Direct Embed Foundation:

Right Pole

Input Data:

Tower Data

Uplift = $Uplift := 38 \cdot kips \cdot 1.1 = 42 \cdot kips$ (User Input)

Pole Length = $L := 103 \cdot ft$

Pole Base Width 1 = $W_{pole1} := 22.25 \cdot in$

Pole Base Width 2 = $W_{pole2} := 23.375 \cdot in$

Embedment Depth = $D_e := 16 \cdot ft$ (User Input)

Material Properties:

Unit Weight of Gravel = $\gamma_g := 115 \cdot pcf$ (User Input)

Unit Weight of Wood Pole = $\gamma_{wood} := 46 \cdot pcf$ (User Input)

Depth to Neglect = $n := 0 \cdot ft$ (User Input)

Angle of Internal Friction = $\theta := 30 \cdot deg$ (User Input)

PA-1 Pole Anchor Angle = $d := 4 \cdot in$ (User Input)

Resisting Width 1 Top = $R1 := 2 \cdot \tan(\theta) \cdot (D_e - n) + (W_{pole1} + 2 \cdot d) = 21 \cdot ft$ (User Input)

Resisting Width 2 Top = $R2 := 2 \cdot \tan(\theta) \cdot (D_e - n) + W_{pole2} = 20.42 \cdot ft$ (User Input)

Resisting Width 1 Bot = $R3 := W_{pole1} + 2 \cdot d = 2.52 \cdot ft$ (User Input)

Resisting Width 2 Bot = $R4 := W_{pole2} = 1.95 \cdot ft$ (User Input)

Check Uplift:

Weight of Embedded Pole = $Weight_{pole} := \left[(W_{pole1} \cdot W_{pole2}) \cdot (D_e) \cdot \gamma_{wood} \right] = 2.7 \cdot kips$

Volume of Resisting Tot = $V_{tot} := \frac{(D_e - n)}{3} \cdot \left[R1 \cdot R2 + R3 \cdot R4 + \sqrt{(R1 \cdot R2) \cdot (R3 \cdot R4)} \right] = 2558 \cdot ft^3$

Volume of Resisting Material = $V_{res} := V_{tot} - W_{pole1} \cdot W_{pole2} \cdot D_e = 2500 \cdot ft^3$

Weight of Resisting Material = $WT_{res} := V_{res} \cdot \gamma_g = 287.51 \cdot kip$

Total Uplift Resistance = $Uplift_R := Weight_{pole} + WT_{res} = 290.2 \cdot kips$

Uplift Check = $Uplift\_Check := if\left(\frac{Uplift_R}{Uplift} \geq 1.0, "Okay", "No Good" \right)$ $\frac{Uplift}{Uplift_R} = 14.41 \cdot \%$

Uplift_Check = "Okay"

Augment ID: CT54XC775Q17.1

RFDS ID: 45893

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RF Design Sheet

Site Identification	
Cascade	CT54XC775
SMS Schedule ID	12323518
SMS Schedule Name	DO Macro Upgrade
PID	DOKU_CT54XC775
RRU OEM	ALU
Switch OEM	Alcatel Lucent
RFDS Issue Date	
RFDS Revision Date	2017-11-17 00:00:00.0
RFDS Revision	12

Filter Analysis Complete	YES
RFDS - Issue Date	
Design Status	Complete
Project Description	DO Macro Upgrade - Add 2500 MHz

Battery Backup Cabinet Model	
Model Number	60ECv2
Weight (Lbs.)	2830
Dimensions (In.)	60 x 31 x 30
Manufacturer	ALU

Junction Box Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Junction Boxes needed at site	

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Needed at site	1

Contact Information	
Engineer Email	Bill.M.Hastings@sprint.com
Sprint Badged RF Engineer	Bill Hastings
RF Engineer Email	Bill.M.Hastings@sprint.com
RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	3
1900 LTE	1
1900 EVDO	
1900 Voice	1
800 LTE	1
800 Voice	1

UE Relay Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
UE Relay Azimuth	
Manufacturer	
UE Relay CL Height (meters)	

ALU Top Hat Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Top Hat Quantity	

Power Protection Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Power Protection Cabinet	

Location Details	
Latitude	41.509925
Longitude	-72.12493055
Market	Northern Connecticut
Region	Northeast
City	Norwich
State	CT
Zip Code	CT/06360
County	New London

2500MHz	3
1900MHz	3
800MHz	3

GPS Antenna Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
GPS Antenna needed at site	

Repeater Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

Growth Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

BTS #1 Model	
Model Number	9927 Cabinet
Weight (Lbs.)	864
Dimensions (In.)	67.5 x 31.5 x 38.1
Manufacturer	ALU
Number of BTS #1	1

A&E Drawing Requirements

10/18/2017 (WR): RFDS revised to replace existing NV dual band antenna with Commscope 10 port tri-band antenna and add 6 twin diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes Special Construction Requirements

10/18/2017 (WR): RFDS revised to replace existing NV dual band antenna with Commscope 10 port tri-band antenna and add 6 twin diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes

Keep Existing NV Antenna for 800/1900 and add 1 800/2500 antenna for LTE2.5 8T8R and enhance 2R for 800 MHz

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	76.2	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	Hybriflex	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	1	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	1.54	N/A	N/A	N/A	N/A	N/A
Manufacturer	ALU	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Number of RRUs needed	0	0	0	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band			
Weight (lbs)	0	0	0	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A
Manufacturer	-	-	-	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	2.5 Jumper | 8	2.5 Jumper | 8	2.5 Jumper | 8	N/A | 0	N/A | 0	N/A | 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	30	140	250	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	84.973756	84.973756	84.973756	N/A	N/A	N/A
Antenna 1 Electrical DT	2	2	2	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Top Jumper Make/Mode/Qtyl	N/A | 0	N/A | 0	N/A | 0	N/A | 0	N/A | 0	N/A | 0
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

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RF Design Sheet

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	DHHTT65B-3XR	DHHTT65B-3XR	DHHTT65B-3XR			
Weight (lbs)	48.5	48.5	48.5	N/A	N/A	N/A
Dimensions	72 x 12 x 7.1	72 x 12 x 7.1	72 x 12 x 7.1	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper 8	800/1900 Jumper 8	800/1900 Jumper 8	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	30	140	250	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	0	N/A	N/A	N/A
Antenna 1 Center Line (ft)	84.973756	84.973756	84.973756	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	3	N/A	N/A	N/A
Antenna 1 Electrical DT 2	0	0	0	N/A	N/A	N/A
Antenna 1 Electrical DT 3	0	0	0	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	
Ant2 Top Jumper Make/Mode/Qtyl	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0	N/A
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

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RF Design Sheet

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band			
Weight (lbs)	0	0	0	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A
Manufacturer	-	-	-	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper | 4	800/1900 Jumper | 4	800/1900 Jumper | 4	N/A | 0	N/A | 0	N/A | 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	30	140	250	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	84.973756	84.973756	84.973756	N/A	N/A	N/A
Antenna 1 Electrical DT	5	5	5	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	
Ant2 Top Jumper Make/Mode/Qtyl	N/A | 0	N/A | 0	N/A | 0	N/A | 0	N/A | 0	N/A |
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

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RF Design Sheet

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	1900MHz	1900MHz	1900MHz			
Antenna 1 Lower Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	1900MHz	1900MHz	1900MHz			
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

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RF Design Sheet

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL			
Weight (lbs)	6.4	6.4	6.4	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	800MHz	800MHz	800MHz			
Antenna 1 Lower Passive Component Model						
Model Number	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL			
Weight (lbs)	6.4	6.4	6.4	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	800MHz	800MHz	800MHz			
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

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RF Design Sheet

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Upper Pass Comp band combi with						
Antenna 1 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Low Pass Comp band comb with						
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

Product Specifications

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	0 ° | 15.0	0 ° | 16.8	0 ° | 17.0	0 ° | 17.0	0 ° | 17.1
	5 ° | 15.1	5 ° | 15.1	4 ° | 17.0	4 ° | 17.1	4 ° | 17.1	4 ° | 17.2
	10 ° | 15.0	10 ° | 15.0	8 ° | 17.0	8 ° | 17.1	8 ° | 17.1	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®

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Product Specifications

DHHTT65B-3XR

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	

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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.

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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 × +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		

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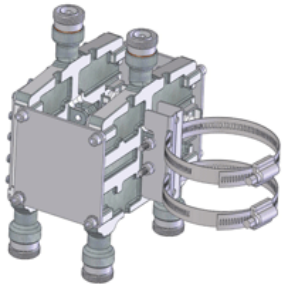
RADIO FREQUENCY SYSTEMS
The Clear Choice®

ShareLite™ 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

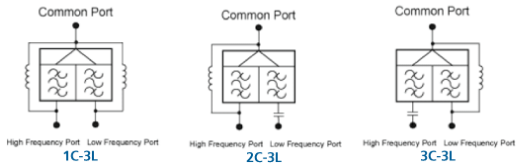
Notes

All information contained in the present datasheet is subject to confirmation at time of ordering

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



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)	

All information contained in the present datasheet is subject to confirmation at time of ordering

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

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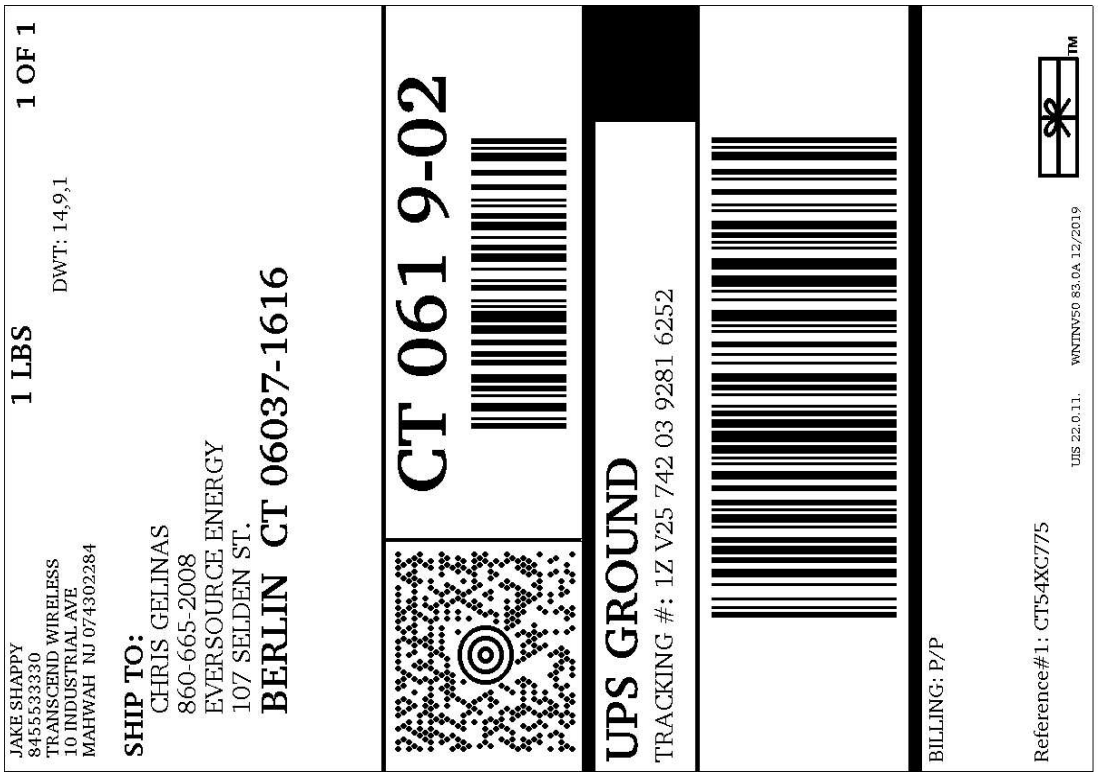

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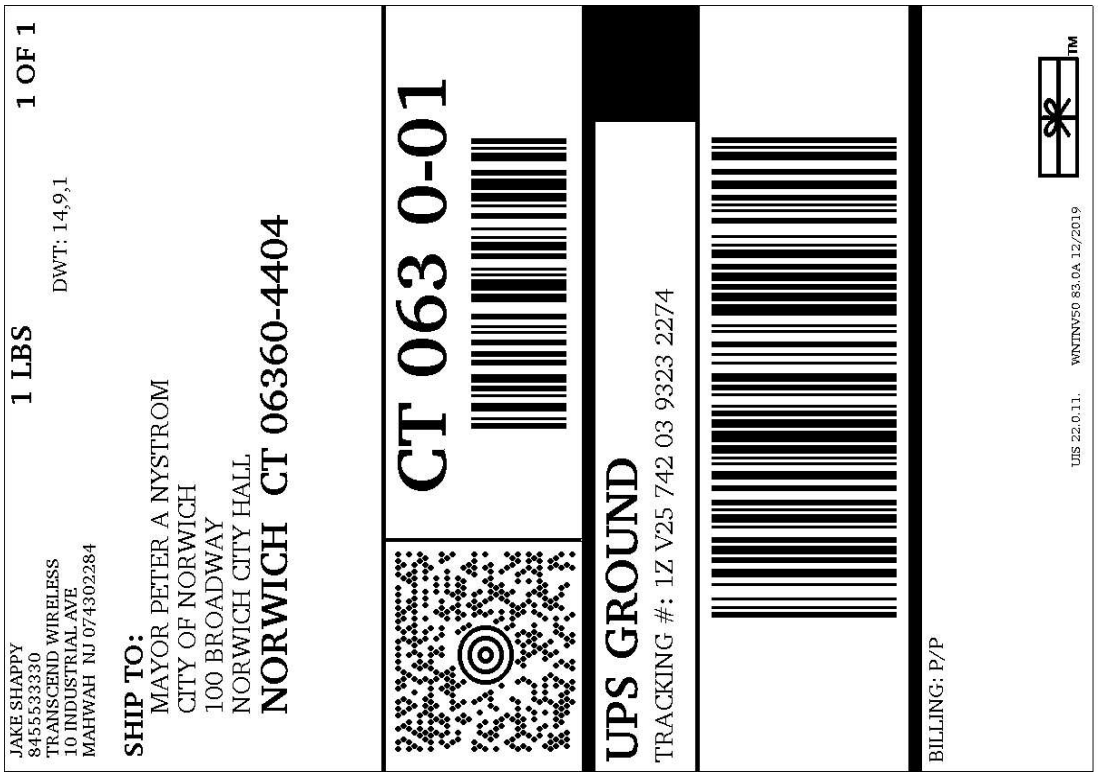

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