STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

July 28, 2009

Jennifer Young Gaudet
HPC Development LLC
53 Lake Avenue Ext.
Danbury, CT 06811

RE: **EM-T-MOBILE-035-090710** - Omnipoint Communications Inc. (T-Mobile) notice of intent to modify an existing telecommunications facility located at 3 Mechanic Street, Darien, Connecticut.

Dear Mrs. Gaudet:

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

The proposed modifications are to be implemented as specified here and in your notice received July 10, 2009, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP

c: The Honorable Evonne M. Klein, First Selectman, Town of Darien
David J. Keating, Zoning Enforcement Officer, Town of Darien
Daniel J. Garstka, Senior Engineer – Transmission Projects, CL&P
Hans Fiedler, T-Mobile

T-Mobile

T-Mobile USA Inc.
35 Griffin Rd South, Bloomfield, CT 06002-1853
Phone: (860) 692-7100
Fax: (860) 692-7159

Technical Memo

To: Maxton
From: Farid Marbouh - Radio Frequency Engineer
cc: Jason Overbey
Subject: Power Density Report for CT11290C
Date: June 22, 2009

1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the T-Mobile antenna installation on a Utility Lattice Towe at 3 Mechanic Street, Darien, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location.

2. Discussion:

The following assumptions were used in the calculations:

1) The emissions from T-Mobile transmitters are in the (1940-1949.8), (2140-2145), (2110-2120)MHz frequency Band.
2) The antenna array consists of three sectors, with 1 antenna per sector.
3) The model number for GSM antenna is APX16DWV-16DWV.
3) The model number for UMTS antenna is APX16DWV-16DWV.
4) GSM antenna center line height is 120 ft.
4) UMTS antenna center line height is 120 ft.
5) The maximum transmit power from any GSM sector is 2565.19 Watts Effective Radiated Power (EiRP) assuming 8 channels per sector.
5) The maximum transmit power from any UMTS sector is 2559.12 Watts Effective Radiated Power (EiRP) assuming 2 channels per sector.
6) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
7) Power levels emitting from the antennas 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.
8) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

3. Conclusion:

Based on the above worst case assumptions, the power density calculation from the T-Mobile antenna installation on a Utility Lattice Towe at 3 Mechanic Street, Darien, CT, is 0.08651 mW/cm^2. This value represents 8.651% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm^2) set forth in the FCC/ANSI/IEEE C95.1-1991. Furthermore, the proposed antenna location for T-Mobile will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area.

Connecticut Market

Worst Case Power Density

Site:	**CT11290C**
Site Address:	**3 Mechanic Street**
Town:	**Darien**
Tower Height:	**115 ft.**
Tower Style:	**Utility Lattice Towe**

GSM Data		**UMTS Data**	
Base Station TX output	20 W	**Base Station TX output**	40 W
Number of channels	8	**Number of channels**	2
Antenna Model	APX16DWV-16DWV	**Antenna Model**	APX16DWV-16DWV
Cable Size	1 5/8 in.	**Cable Size**	1 5/8 in.
Cable Length	125 ft.	**Cable Length**	125 ft.
Antenna Height	120.0 ft.	**Antenna Height**	120.0 ft.
Ground Reflection	1.6	**Ground Reflection**	1.6
Frequency	1945.0 MHz	**Frequency**	2.1 GHz
Jumper & Connector loss	4.50 dB	**Jumper & Connector loss**	1.50 dB
Antenna Gain	18.0 dBi	**Antenna Gain**	18.0 dBi
Cable Loss per foot	0.0116 dB	**Cable Loss per foot**	0.0116 dB
Total Cable Loss	1.4500 dB	**Total Cable Loss**	1.4500 dB
Total Attenuation	5.9500 dB	**Total Attenuation**	2.9500 dB
Total EIRP per Channel	55.06 dBm	**Total EIRP per Channel**	61.07 dBm
(In Watts)	320.65 W	**(In Watts)**	1279.56 W
Total EIRP per Sector	64.09 dBm	**Total EIRP per Sector**	64.08 dBm
(In Watts)	2565.19 W	**(In Watts)**	2559.12 W
nsg	12.0500	**nsg**	15.0500
Power Density (S) =	**0.043304 mW/cm^2**	**Power Density (S) =**	**0.043202 mW/cm^2**

T-Mobile Worst Case % MPE = 8.6506%

Equation Used :

$$S = \frac{(1000)(grf)^2 (Power) * 10^{(nsg/10)}}{4\pi (R)^2}$$

Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997

Co-Location Total

Carrier	**% of Standard**
Verizon	
Cingular	
Sprint	
AT&T Wireless	
Nextel	
MetroPCS	
Other Antenna Systems	
Total Excluding T-Mobile	**0.0000 %**
T-Mobile	8.6506
Total % MPE for Site	**8.6506%**

HPC DEVELOPMENT LLC

EM-T-MOBILE-035-090710

ORIGINAL July 9, 2009

RECEIVED
JUL 10 2009
CONNECTICUT
SITING COUNCIL

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Mr. S. Derek Phelps, Executive Director

Re: Omnipoint Communications, Inc. – exempt modification
3 Mechanic Street, Darien, Connecticut

Dear Mr. Phelps:

This letter and attachments are submitted on behalf of Omnipoint Communications, Inc. (also referred to herein as "T-Mobile"). T-Mobile is enhancing the capabilities of its wireless system in Connecticut by implementing UMTS technology. In order to do so, T-Mobile will modify antenna and equipment configurations at a number of its existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of Darien.

T-Mobile plans to modify the existing wireless communications facility on CL&P structure No. 1068 located at 3 Mechanic Street, Darien (coordinates 41°47'04" N, -72°30'42" W). The pole is owned by CL&P, and the underlying ground is owned by the State of Connecticut Department of Transportation. Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to T-Mobile's operations at the site.

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

1. The height of the structure will not be increased. Both T-Mobile's existing and proposed antennas will be located at an approximate center line of 120' AGL. The tower, which is 115' in height, currently supports an 18'8" pipe mast on which T-Mobile's three panel antennas and six TMAs are mounted. The pipe mast will be replaced with a 17'6" pipe mast, on which three different panel antennas and three TMAs will be mounted. Six additional coaxial cables will be added. The proposed modifications will not extend the

height of the structure; there will be a slight decrease in the overall height due to the change in size of the pipe mast.

2. The proposed changes will not extend the site boundaries. T-Mobile will remove its three existing equipment cabinets and install two cabinets on the existing concrete pad. Thus, there will be no effect on the site compound.

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

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached power density calculation, T-Mobile's operations at the site will result in a power density of 8.6505%.

Please feel free to call me at (860) 798-7454 with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet

Jennifer Young Gaudet

cc: Honorable Evonne Klein, First Selectman, Town of Darien
State of Connecticut Department of Transportation (underlying property owner)

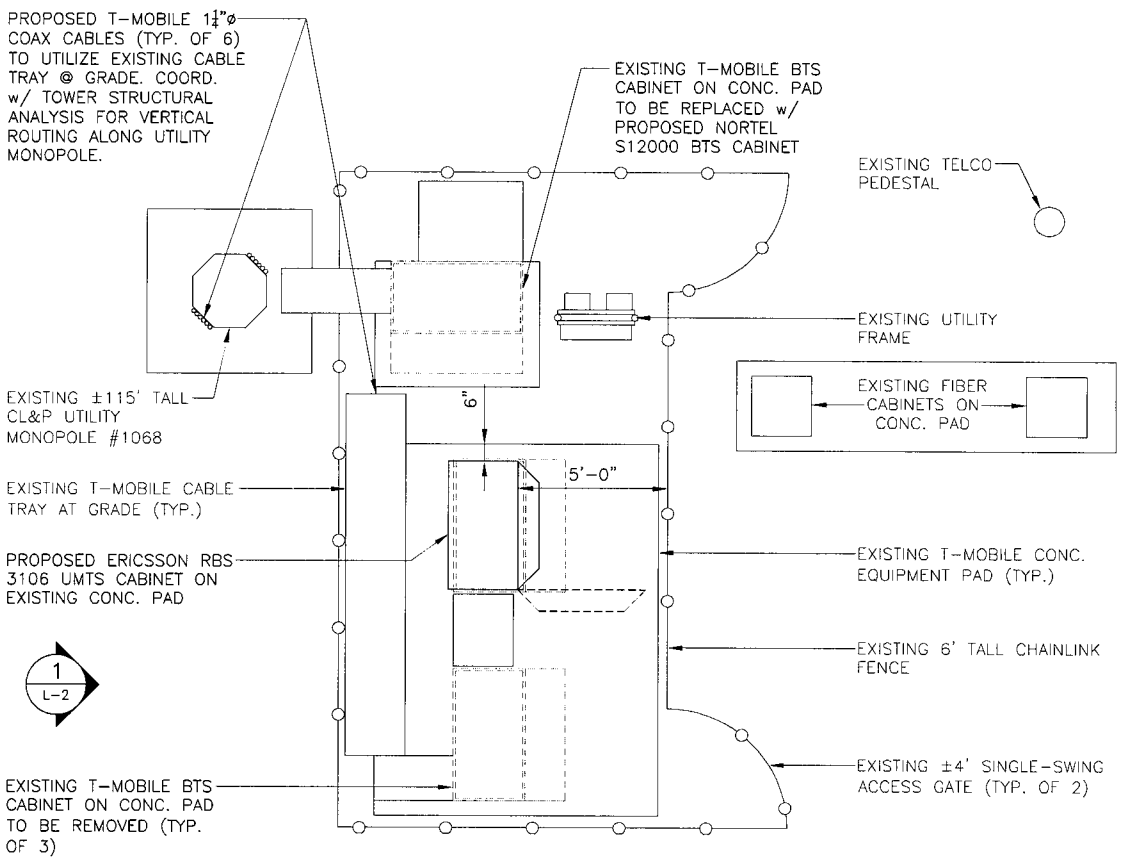
Attachments

LEASE EXHIBIT

THIS LEASE PLAN IS DIAGRAMMATIC IN NATURE AND IS INTENDED TO PROVIDE GENERAL INFORMATION REGARDING THE LOCATION AND SIZE OF THE PROPOSED WIRELESS COMMUNICATION FACILITY. THE SITE LAYOUT WILL BE FINALIZED UPON COMPLETION OF SITE SURVEY AND FACILITY DESIGN.

UMTS UPGRADE PROJECT SCOPE

EQUIPMENT TYPE	PROPOSED CHANGES
RADIO CABINET	REMOVE THE (3) EXISTING BTS CABINETS ON EXISTING CONC. EQUIPMENT PAD. INSTALL (1) ERICSSON RBS 3106 UMTS CABINET & (1) NORTEL S12000 BTS CABINET ON EXISTING CONC. EQUIPMENT PADS AS SHOWN.
ANTENNAS/ TMAs	THE THREE (3) EXISTING PANEL ANTENNAS ARE PROPOSED TO BE REPLACED WITH THREE (3) RFS APX16 SERIES ANTENNAS. THE PROPOSED REPLACEMENT ANTENNAS WILL UTILIZE THE EXISTING ANTENNA ℄ HEIGHT. THE (6) EXISTING TMAs ARE PROPOSED TO BE REPLACED w/ (3) TMAs.
COAX CABLES	NO CHANGE IS PROPOSED FOR THE (6) EXISTING 1¼"ø COAX CABLES ROUTED VERTICALLY ALONG THE EXISTING CL&P UTILITY MONOPOLE. ADDITIONALLY, (6) 1¼"ø COAX CABLES ARE PROPOSED TO BE ROUTED VERTICALLY ALONG THE EXISTING CL&P UTILITY MONOPOLE (SIMILAR TO THE EXISTING). THE PROPOSED COAX ROUTING CONFIGURATION TO BE COORDINATED WITH TOWER STRUCTURAL ANALYSIS.
COMPOUND LIMITS	NO CHANGE TO THE LIMITS OF THE EXISTING FENCED COMPOUND IS PROPOSED.



1 / L-1 **COMPOUND PLAN**

SCALE: 1/4" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)

1 inch = 4 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
00	8/23/08	DEB	CFC	LEASE EXHIBIT
A	12/5/08	FV	CFC	LEASE EXHIBIT - REVIEW

DESIGNED BY: CFC
DRAWN BY: FV
CHK'D BY: CFC

PROFESSIONAL ENGINEER SEAL

T-Mobile

NATCOMM

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY: UMTS UPGRADE
CT11290C
DARIEN/ DTWN & RT-1
CL+P STRUCTURE #1068
0 MECHANIC STREET
DARIEN, CT 06820

DATE: 12/4/08
SCALE: AS SHOWN
JOB NO. 08174.C03

LEASE EXHIBIT

SHEET NO. L-1

Sheet No. 1 of 2

LEASE EXHIBIT

THIS LEASE PLAN IS DIAGRAMMATIC IN NATURE AND IS INTENDED TO PROVIDE GENERAL INFORMATION REGARDING THE LOCATION AND SIZE OF THE PROPOSED WIRELESS COMMUNICATION FACILITY. THE SITE LAYOUT WILL BE FINALIZED UPON COMPLETION OF SITE SURVEY AND FACILITY DESIGN.

UMTS UPGRADE PROJECT SCOPE

EQUIPMENT TYPE	PROPOSED CHANGES
RADIO CABINET	REMOVE THE (3) EXISTING BTS CABINETS ON EXISTING CONC. EQUIPMENT PAD. INSTALL (1) ERICSSON RBS 3106 UMTS CABINET & (1) NORTEL S12000 BTS CABINET ON EXISTING CONC. EQUIPMENT PADS AS SHOWN.
ANTENNAS/ TMAs	THE THREE (3) EXISTING PANEL ANTENNAS ARE PROPOSED TO BE REPLACED WITH THREE (3) RFS APX16 SERIES ANTENNAS. THE PROPOSED REPLACEMENT ANTENNAS WILL UTILIZE THE EXISTING ANTENNA ℄ HEIGHT. THE (6) EXISTING TMAs ARE PROPOSED TO BE REPLACED w/ (3) TMAs.
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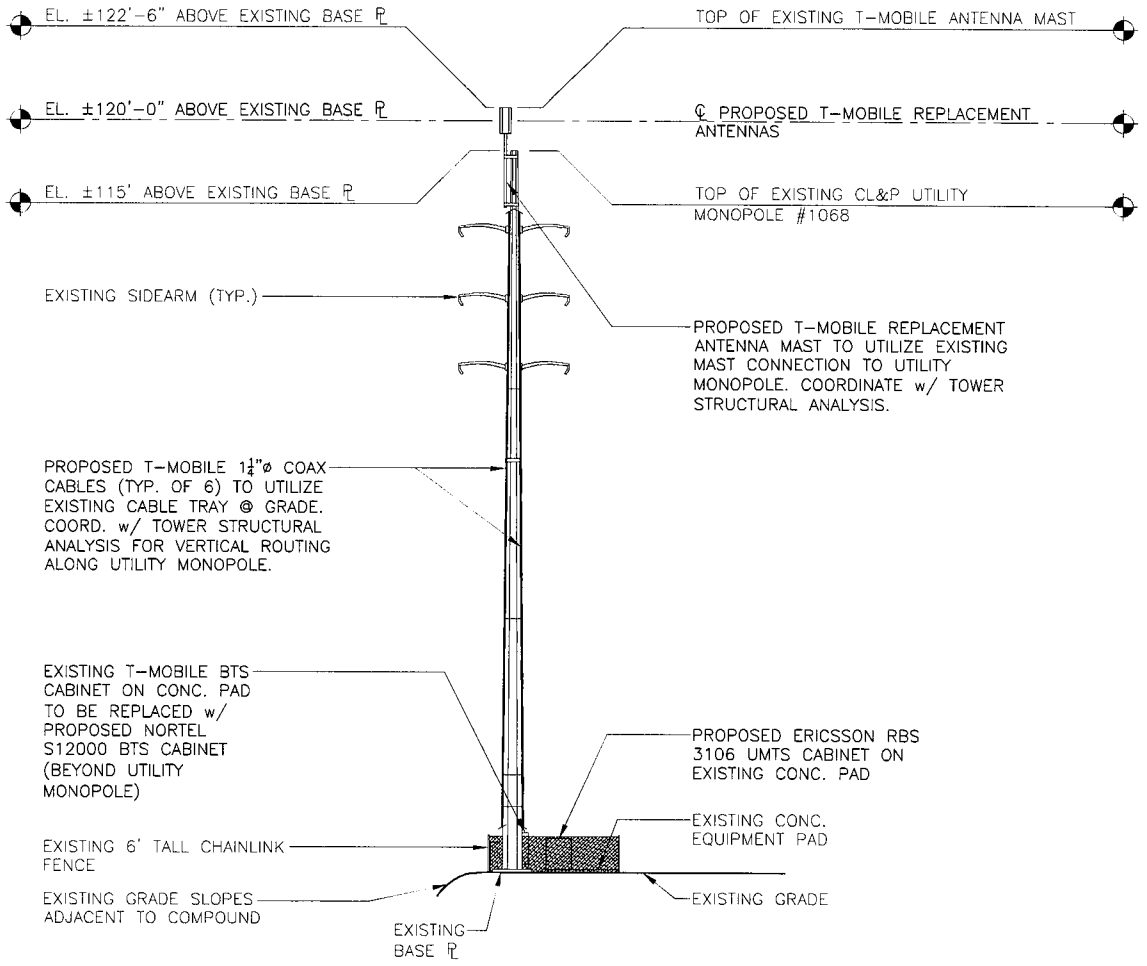


1 / L-2 **NORTHWEST ELEVATION**

SCALE: 1" = 20'

GRAPHIC SCALE

-20 0 10 20 40 80

(IN FEET)

1 inch = 20 ft.

DESIGNED BY:	CFC		
DRAWN BY:	FV		
CHK'D BY:	CFC		
00	6/23/09	DEB	CFC	LEASE EXHIBIT
A	12/5/08	FV	CFC	LEASE EXHIBIT - REVIEW
REV'S	DATE	DRAWN BY	CHK'D BY	DESCRIPTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NATCOMM, INC.

T-MOBILE

PROPOSED WIRELESS COMMUNICATIONS FACILITY (LATTICE TOWER)

CT11290C

DARIEN/ DTWN & RT-1

CL+P STRUCTURE #1068

10 MECHANIC STREET

DARIEN, CT 06820

DATE: 12/4/08

SCALE: AS SHOWN

JOB NO. 08174.C03

LEASE EXHIBIT

SHEET NO.

L-2

Sheet No. 2 of 2

NATCOMM INC.
CONSULTING ENGINEERS

Structural Analysis of PCS Mast and CL&P Pole

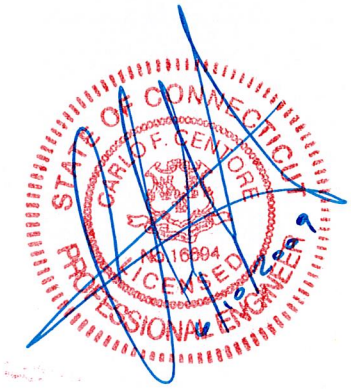
T-Mobile: CT11290-Darien Downtown & Rt-1

CL&P Structure No. 1068
115' Electric Transmission Pole
and proposed 17'-6" PCS Mast

3 Mechanic Street,
Darien, CT

Natcomm Project No. 08174.CO.03

~~Date: May 27, 2009~~
Rev 1: June 10, 2009



Prepared for:
HPC Development, LLC
53 Lake Ave Ext
Danbury, CT 06811

p: 203.488.0580
f: 203.488.8587
w: nat-eng.com
63-2 N. Branford Rd.
Branford, CT 06405

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Natcomm, Inc.
Structural Analysis – T-Mobile: CT-11290-Darien Downtown & Rt-1
CL&P Structure # 1068
Darien, CT
Rev 1 ~ June 10, 2009

Introduction

The purpose of this report is to analyze the existing 18'-8"' pipe mast and 115' CL&P structure located at 3 Mechanic Street in Darien, CT for the proposed antenna and equipment upgrade by T-Mobile.

The proposed loads consist of the following:

- T-MOBILE (Existing to be removed):

  Antennas: Three (3) panel antennas and six (6) TMA's with a RAD center elevation of 120-ft above the tower base plate.

- T-MOBILE (Existing to remain):

  Coax Cables: Six (6) 1-1/4" ∅ coax cables.

- **T-MOBILE (Proposed):**

  Antennas: Three (3) RFS APX16DWV-DWVS-E-A20 quad pole panel antennas and three (3) RFS ATMAA1412D-1A20 Twin TMA's mounted on a PCS mast with a RAD center elevation of 120-ft above the tower base plate.

  Coax Cables: Six (6) 1-1/4" ∅ coax cables running outside the pipe mast. Coax arrangement and orientation on the antenna mast and CL&P utility pole per the coax layout on Drawing EL-1 found in Section 4 of this report.

Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9th edition for design of the PCS Mast and antenna supporting elements.
- ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", defines allowable steel stresses for evaluation of the CL&P utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed within the pipe mast unless specified otherwise.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- All proposed pipe mast members will be as specified in the construction documents to be prepared by Natcomm, Inc.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Structural design of the proposed *PCS Mast Structure* was independently completed using the current version of RISA-3D computer program licensed to Natcomm, Inc.

The existing mast consisting of a 4.5" dia. x 18'-8" long SCH. 40 pipe connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast structure in order to obtain reactions needed for analyzing the CL&P pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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

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

Design Basis

Our analysis was performed in accordance with EIA-222-F-1996, ASCE Manual No. 72 – "Design of Steel Transmission Pole Structures Second Edition", NESC C2-2007 and Northeast Utilities Design Criteria.

The CL&P structure, considering existing and future conductor and shield wire loading, with the proposed antenna mast was analyzed under two conditions:

- UTILITY STRUCTURE 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 C2-2007 ~ Construction Grade B, and ASCE Manual No. 72.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure..... 4.0 psf
  Vertical Overload Capacity Factor..... 1.50
  Wind Overload Capacity Factor..... 2.50
  Wire Tension Overload Capacity Factor..... 1.65

  Load Case 2: NESC Extreme
  Wind Speed..... 110 mph [1]
  Radial Ice Thickness..... 0"

  Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-secong gust)

- ANTENNA MAST ANALYSIS

  The antenna mast pipe, appurtenances and connections to the utility pole were analyzed and designed in accordance with the NU Design Criteria Table, TIA/EIA-222-F, and AISC-ASD standards.

  Load cases considered:

  Load Case 1:
  Wind Speed..... 85 mph [(2)]
  Radial Ice Thickness..... 0"

  Load Case 2:
  Wind Pressure..... 75% of 85 mph wind pressure
  Radial Ice Thickness..... 0.5"

  Note 2: Per NU Mast Design Criteria Exception 1.

Results

- PIPE MAST

  The existing pipe mast was determined to be structurally inadequate. Replacement of the existing antenna mast with a **4.5" dia. x 17'-6" long SCH. 80 Pipe**, conforming to ASTM A53, Grade B, F_y = 35 ksi specifications will be required.

- UTILITY STRUCTURE

  This analysis finds that the subject utility structure is adequate to support the proposed antenna mast and related appurtenances. The structure stresses meet the requirements set forth by the ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

  A maximum usage of **91.20%** occurs in the utility pole base plate under the NESC Extreme loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Tube Number 4	0' -15.08'	90.58%	**PASS**

  BASE PLATE:

  The base plate was found to be within allowable limits from the PLS output based on 10 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	91.20%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of an 6-ft ∅ x 18-ft long reinforced concrete cassion. The base of the tower is connected to the foundation by means of (12) 2.25"∅, ASTM A432 Grade 60 anchor bolts embedded approximately 5.5-ft into the concrete foundation structure.

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

BASE REACTIONS:

From PLS-Pole analysis of CL&P pole based on NESC/NU prescribed loads.

Load Case	Transverse	Axial	Overturning Moment
NESC Heavy Wind	16.44 kips	43.3 kips	1479.27 ft-kips
NESC Extreme Wind	26.32 kips	22.18 kips	2026.91 ft-kips
NESC Heavy Wind w/ Broken Wire	15.6 kips	42.15 kips	1385.63 ft-kips

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	89.89%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits based on original tower design reaction.

Reaction Type	Original Design Reaction (1)	Proposed Design Reaction (2)	Result
Compression	25.2 kips	22.18 kips	**PASS**
Shear	29.5 kips	26.32 kips	**PASS**
Moment	28973 in-kips	24322.92 in-kips	**PASS**

Note 1: Original design reactions taken from drawing no. 01153-5004-3.
Note 2: Proposed design reactions taken from NESC Extreme Wind load case.

Conclusions

This analysis shows that the subject utility structure **is adequate** to support the replacement antenna mast and related appurtenances.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

6/10/2009

STATE OF CONNECTICUT
CARLO F. CENTORE
No.16694
LICENSED
PROFESSIONAL ENGINEER

Carlo F. Centore, PE
Principal ~ Structural Engineer

Natcomm, Inc.
Structural Analysis – T-Mobile: CT-11290-Darien Downtown & Rt-1
CL&P Structure # 1068
Darien, CT
Rev 1 ~ June 10, 2009

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 Natcomm, 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 Natcomm, 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. Natcomm, 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.

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GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE

PLS-POLE provides all of the capabilities a structural engineer requires to design transmission, substation or communications structures. It does so using a simple easy to use graphical interface that rests upon our time tested finite element engine. Regardless of whether you want to model a simple wood pole or a guyed steel X-Frame; PLS-POLE can handle the job simply, reliably and efficiently.

Modeling Features:

- Structures are made of standard reusable components that are available in libraries. You can easily create your own libraries or get them from a manufacturer
- Structure models are built interactively using interactive menus and graphical commands
- Automatic generation of underlying finite element model of structure
- Steel poles can have circular, 4, 6, 8, 12, 16, or 18-sided, regular, elliptical or user input cross sections (flat-to-flat or tip-to-tip orientations)
- Steel and concrete poles can be selected from standard sizes available from manufacturers
- Automatic pole class selection
- Cross brace position optimizer
- Capability to specify pole ground line rotations
- Capability to model foundation displacements
- Can optionally model foundation stiffness
- Guys are easily handled (modeled as exact cable elements in nonlinear analysis)
- Powerful graphics module (members color-coded by stress usage)
- Graphical selection of joints and components allows graphical editing and checking
- Poles can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and 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
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- 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
- Automatic tracking of part numbers and costs

Natcomm, Inc.
Structural Analysis – T-Mobile: CT-11290-Darien Downtown & Rt-1
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Darien, CT
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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.

PCS Mast

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

ELECTRIC TRANSMISSION TOWER

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

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

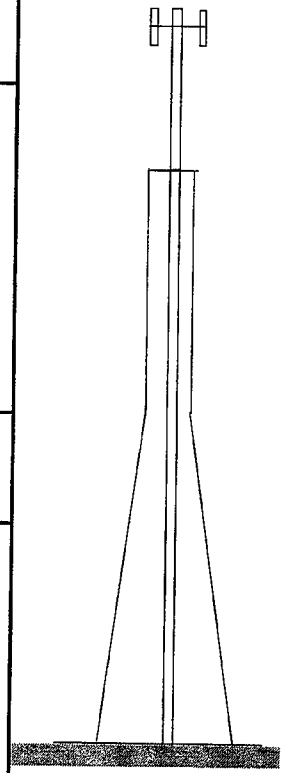
The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with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

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

J:\PCS Wireless\Vendor Design Package\Design Criteria Table(Rev04).xls

NU DESIGN CRITERIA TABLE

	Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef - Shape Factor	
	V (mph)	q (psf)	Kz	Gh			
EXTREME WIND (50-YR) PCS Mast, etc. Design (Allowable stress)	85	TIA	TIA	TIA	TIA except no Sect 3.1.1.1	TIA	
Tower/Pole Analysis (yield stress) PCS above tower/pole-top	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading 1.25 x Gust Response Factor Height above groundline based on top of mast/antenna					1.60 flat surfaces 1.30 round surfaces	
Tower/Pole & PCS below tower/pole-top	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading Height above groundline based on top of tower/pole					1.60 flat surfaces 1.30 round surfaces	
Conductors Only for structures installed 2007 and after>>	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading, and Use NESC C2-2007, Section 25, Rule 250D; Combined Extreme Ice and Wind					1.00 1.00	
NESC HEAVY PCS Design (Allowable stress)	TIA	TIA (.75Wi)	TIA	TIA	TIA except no Sect 3.1.1.1	TIA	
Tower/Pole Analysis (yield stress) PCS above tower/pole-top		4	1.00	1.00	2.50	1.60 flat surfaces 1.30 round surfaces	
Tower (on each of 2 faces)/pole and PCS below tower-top		4	1.00	1.00	2.50	1.60 flat surfaces 1.30 round surfaces	
Conductors Wind Horizontal comp. of tension Vertical weight w/ 1/2" ice		4	1.00	1.00	2.50 1.65 1.50	1.00	



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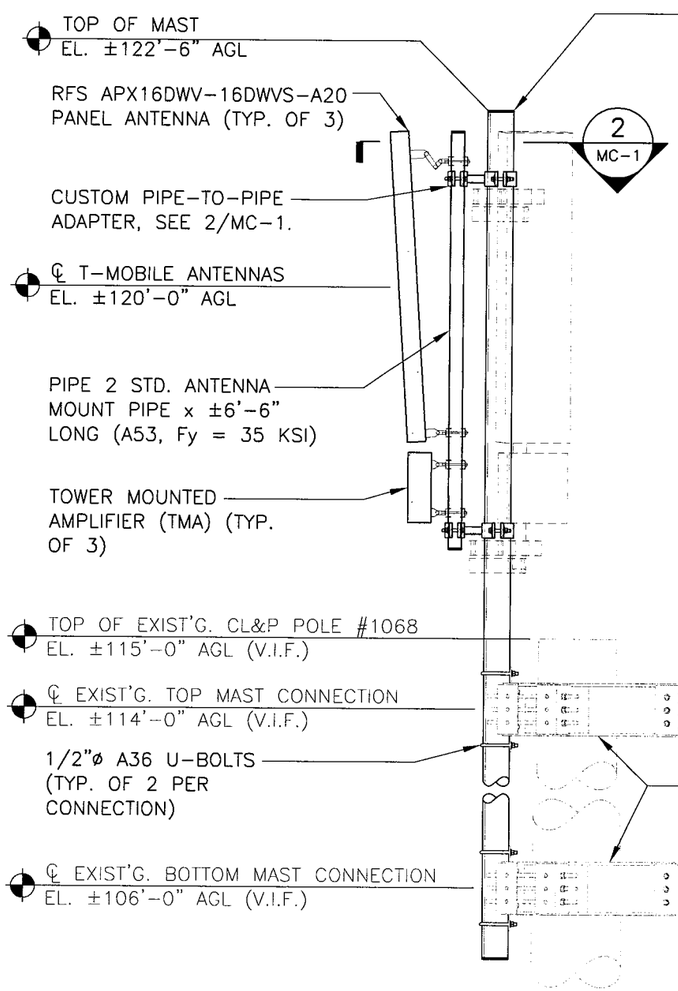
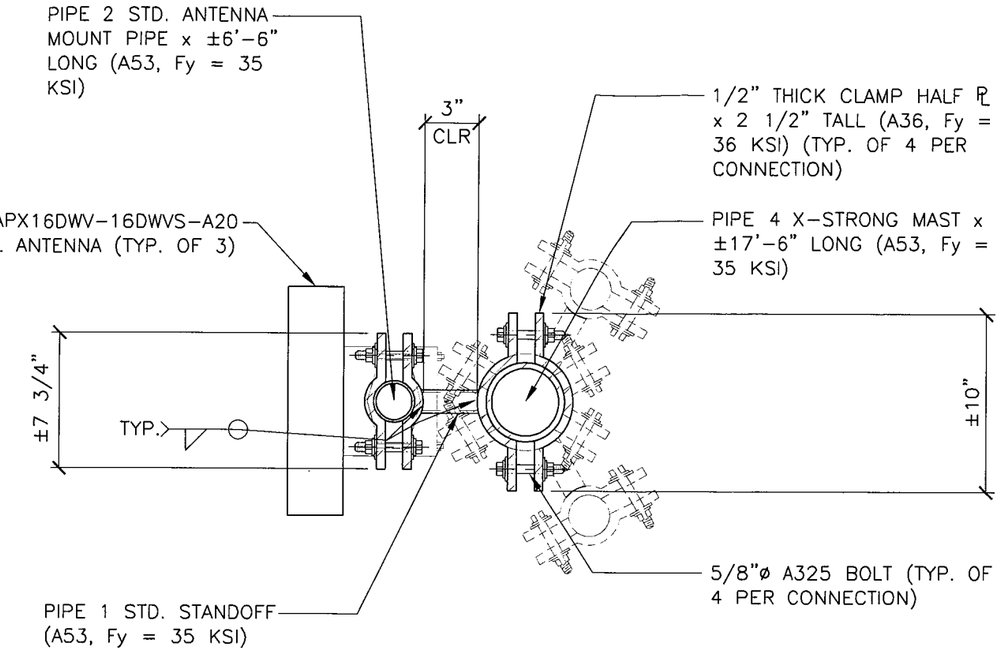


1 / MC-1 **MAST CONNECTION ELEVATION**

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



2 / MC-1 **PLAN DETAIL**

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

NOTES:

1. ALL PIPES TO RECEIVE 1/4" THICK TOP AND BOTTOM PLATES w/ WEEP HOLE IN BOTTOM PLATE.
2. USE OF LOCK WASHERS IS NOT PERMITTED PER AISC.
3. REFER TO NOTES ON DRAWING N-1 FOR ADDITIONAL REQUIREMENTS.

DESIGNED BY:	CFC
DRAWN BY:	DEB
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
00	3/31/09	DEB	CFC	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

NATCOMM

T-Mobile

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY UNITS UPGRADE

CT11290C
DARIEN/ DTWN & RT-1

CL+P STRUCTURE #1068
3 MECHANIC STREET
DARIEN, CT 06820

DATE:	3/31/09
SCALE:	AS SHOWN
JOB NO.	08174.C03

MAST CONNECTION DETAILS

SHEET NO.
MC-1
Sheet No. 1 of 2

GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES", ASCE MANUAL NO. 72 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2002 AND NORTHEAST UTILITIES DESIGN CRITERIA.

2. 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.

3. 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.

4. 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.

5. 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.

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. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

11. 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.

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

13. 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.

14. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.

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

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

17. FABRICATE BEAMS WITH MILL CAMBER UP.

18. 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.

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

20. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.

21. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

DESIGNED BY:	CFC
DRAWN BY:	DEB
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
00	3/31/09	DEB	CFC	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

NATCOMM
CONSULTING ENGINEERS

T Mobile

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PROPOSED WIRELESS COMMUNICATIONS FACILITY UMTS UPGRADE

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3 MECHANIC STREET
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JOB NO.	08174.C03

STRUCTURAL SPECIFICATIONS

SHEET NO.
N-1
Sheet No. 2 of 2

Northeast Utilities/ Western Massachusetts Electric Co.
Transmission Structure Shape factor Criteria Supporting PCS Antennas (Issued April 12, 2007)

The shape factor Multiplier.

- Flat member Cd = 1.6:
- Round Member Cd=1.3

Where the coax cables are mounted along side of the pole structure the shape factor multiplier shall be as follows:

- Coax cables attached on outside periphery of the pole in one layer Cd=1.45 to the pole and the coax.
- Coax cables mounted on stand off, use Cd=1.6 for coax cables and Cd=1.3 for pole

Mohsen Sahirad, P.E.
Transmission Civil Engineer

Northeast Utilities System

Job :
Description:

Spec. Number
Computed by
Checked by

Page of
Sheet of
Date 5/26/09
Date

INPUT DATA

TOWER ID: 1068

Structure Height (ft) : 115

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*OPGW-012*	*OPGW-012*
DESCRIPTION =	2-Groove	2-Groove
STRANDING =	12 #8 FOCAS	12 #8 FOCAS
DIAMETER =	0.635 in	0.635 in
WEIGHT =	0.563 lb/ft	0.563 lb/ft

Conductor Properties:

	BACK	AHEAD	
NAME =	*BITTERN*	*BITTERN*	
Number of Conductors per phase: 1	1272.000 45/7 ACSR	1272.000 45/7 ACSR	1 Number of Conductors per phase
DIAMETER =	1.345 in	1.345 in	
WEIGHT =	1.432 lb/ft	1.432 lb/ft	

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	10,000	3,800	10,000
EXTREME WIND =	2,500	6,751	2,500	6,751
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,319	4,289	1,319	4,289

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	2	AHEAD:	2	**3**
WIND SPAN (ft) =	BACK:	210	AHEAD:	210	**420**
WEIGHT SPAN (ft) =	BACK:	217	AHEAD:	217	**434**

Northeast Utilities System

Job :
Description:

Spec. Number
Computed by
Checked by

Page of
Sheet of
Date 5/26/09
Date

WIRE LOADING AT ATTACHMENTS

TOWER ID: 1068

Wind Span =	420 ft
Weight Span =	434 ft
Total Angle =	3 degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	901 lb	0 lb	826 lb	450 lb	4,369 lb	413 lb
Conductor =	1,685 lb	0 lb	2,279 lb	842 lb	11,496 lb	1,140 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	828 lb	0 lb	244 lb
Conductor =	1,830 lb	0 lb	1,021 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	244 lb
Conductor =	#VALUE!	#VALUE!	1,021 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,127 lb
Conductor =	#VALUE!	#VALUE!	2,287 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	551 lb
Conductor =	#VALUE!	#VALUE!	1,519 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	69 lb	0 lb	244 lb
Conductor =	225 lb	0 lb	1,021 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	337 lb	0 lb	1,532 lb

NOTE: All loads include required overload factors (OLF's).

Northeast Utilities System

Job :
Description:

Spec. Number
Computed by
Checked by

Page of
Sheet of
Date 5/26/09
Date

INPUT DATA

TOWER ID: 1068

Structure Height (ft) : 115

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*OPGW-012*	*OPGW-012*
DESCRIPTION =	2-Groove	2-Groove
STRANDING =	12 #8 FOCAS	12 #8 FOCAS
DIAMETER =	0.635 in	0.635 in
WEIGHT =	0.563 lb/ft	0.563 lb/ft

Conductor Properties:

	BACK	AHEAD	
NAME =	*LINNET*	*LINNET*	
Number of Conductors per phase: 1	336	336	1 Number of Conductors per phase
	26/7 ACSR	26/7 ACSR	
DIAMETER =	0.720 in	0.720 in	
WEIGHT =	0.462 lb/ft	0.462 lb/ft	

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	5,000	3,800	5,000
EXTREME WIND =	2,500	3,464	2,500	3,464
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,319	1,943	1,319	1,943

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	2	AHEAD:	2	**3**
WIND SPAN (ft) =	BACK:	210	AHEAD:	210	**420**
WEIGHT SPAN (ft) =	BACK:	217	AHEAD:	217	**434**

Northeast Utilities System

Job :
Description:

Spec. Number
Computed by
Checked by

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Sheet of
Date 5/26/09
Date

WIRE LOADING AT ATTACHMENTS

TOWER ID: 1068

Wind Span =	420	ft	
Weight Span =	434	ft	
Total Angle =	3	degrees	

Broken Wire Span = AHEAD SPAN
Type of Insulator Attachment = SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	901 lb	0 lb	826 lb	450 lb	4,369 lb	413 lb
Conductor =	1,034 lb	0 lb	1,395 lb	517 lb	5,748 lb	697 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	828 lb	0 lb	244 lb
Conductor =	972 lb	0 lb	601 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	244 lb
Conductor =	#VALUE!	#VALUE!	601 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,127 lb
Conductor =	#VALUE!	#VALUE!	1,529 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	551 lb
Conductor =	#VALUE!	#VALUE!	930 lb

6. 60 Deg. F. No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	69 lb	0 lb	244 lb
Conductor =	102 lb	0 lb	601 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	104 lb	0 lb	367 lb
Conductor =	153 lb	0 lb	901 lb

NOTE: All loads include required overload factors (OLF's).

℄ T-MOBILE ANTENNAS
EL. ±120'-0" AGL

℄ TOP CONNECTION
EL. ±114'-0" AGL

℄ BOTTOM CONNECTION
EL. ±106'-0" AGL

TOP PIPE MAST
±122'-6" AGL

TOP CL&P POLE
±115'-0" AGL

REPLACE EXISTING 4-1/2" DIA. X 18'-8" SCH. 40 PIPE MAST W/ 4-1/2" DIA. 17'-6" SCH 80 PIPE MAST

PROPOSED (6) 1-1/4" DIA. COAX CABLES

EXISTING TRI-BRACKET PIPE MOUNT (TYP. of 2)

(6) PROPOSED 1-1/4" DIA. COAX CABLES MOUNTED TO EXISTING CL&P POLE SHAFT @ 10'-0" o.c. VERTICAL MAX. w/ VALMONT SNAP-IN HANGER (P/N B1562), MONOPOLE TRANSMISSION LINE BRACKET (P/N B3254), STAINLESS STEEL BANDING (P/N B1769) AND BUCKLES (P/N B1770)

REPLACE EXISTING 1/2" DIA. U-BOLT W/ NEW 1/2" DIA. A36 U-BOLT (TYP. OF 4)

3 / EL-1 **MAST CONNECTION PLAN**
NOT TO SCALE

EXISTING 115' TALL CL&P STEEL POLE STRUCTURE NO. 1068

EXISTING (6) 1-1/4" DIA. COAX CABLES

EXISTING (6) 1-1/4" DIA. COAX CABLES

2 / EL-1 **COAX MOUNTING PLAN**
NOT TO SCALE

1 / EL-1 **TOWER + MAST ELEVATION**
SCALE: NOT TO SCALE

REVISIONS		
00	3/31/09	REPORT

NATCOMM INC CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587
w: nat-eng.com e: info@nat-eng.com
63-2 N. Branford Rd. Branford, CT 06405

DARIEN DOWNTOWN
NU STRUCTURE #1068

3 MECHANIC STREET
DARIEN, CT 06820

PROJECT NO:	08174.CO3
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	3/31/09

T-Mobile

TOWER & MAST ELEVATION

EL-1

DWG. 1 OF 1

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CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Load Analysis of PCS Mast on CL&P Pole # 1068 T-Mobile equipment
Location:	Darien, CT
Rev. 0: 03/30/09	Prepared by: J.R.M. Checked by: C.F.C. Job No. 08174-CO.3

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA/EIA

Wind Speeds

Basic Wind Speed, V	$V := 85$	mph	(per NU Mast Design Criteria Exception 1)
Basic Wind Speed with Ice, V_i	$V_i := 74$	mph	(per TIA/EIA-222-F Section 2.3.16)

Heights above ground level, z

Mast, z_{mast}	$z_{mast} := 119.33$	ft
Antenna, z_{ant}	$z_{ant} := 120$	ft
TMA, z_{TMA}	$z_{TMA} := 120$	ft
Mount, z_{mnt}	$z_{mnt} := 120$	ft
Coax Cable, z_{coax}	$z_{coax} := 119.33$	ft

Exposure Coefficients, kz

(per TIA/EIA-222-F Section 2.3.3)

Mast, kz_{mast}: $Kz_{mast} := \left(\frac{z_{mast}}{33}\right)^{\frac{2}{7}} = 1.444$

Antenna, kz_{ant}: $Kz_{ant} := \left(\frac{z_{ant}}{33}\right)^{\frac{2}{7}} = 1.446$

TMA, kz_{TMA}: $Kz_{TMA} := \left(\frac{z_{TMA}}{33}\right)^{\frac{2}{7}} = 1.446$

Mount, kz_{mnt}: $Kz_{mnt} := \left(\frac{z_{mnt}}{33}\right)^{\frac{2}{7}} = 1.446$

Coax Cable, kz_{coax}: $Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.444$

Velocity Pressure without ice, qz (per TIA/EIA-222-F Section 2.3.3)

Mast, qz_{mast}: $qz_{mast} := 0.00256 \cdot Kz_{mast} \cdot V^2 = 26.704$

Antenna, qz_{ant}: $qz_{ant} := 0.00256 \cdot Kz_{ant} \cdot V^2 = 26.747$

TMA, qz_{TMA}: $qz_{TMA} := 0.00256 \cdot Kz_{TMA} \cdot V^2 = 26.747$

Mount, qz_{mnt}: $qz_{mnt} := 0.00256 \cdot Kz_{mnt} \cdot V^2 = 26.747$

Coax Cable, qz_{coax}: $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 26.704$

Velocity Pressure with ice, qzICE (per TIA/EIA-222-F Section 2.3.3)

Mast, $qzICE_{mast}$: $qzICE_{mast} := 0.00256 \cdot Kz_{mast} \cdot V_i^2 = 20.239$

Antenna, $qzICE_{ant}$: $qzICE_{ant} := 0.00256 \cdot Kz_{ant} \cdot V_i^2 = 20.272$

TMA, $qzICE_{TMA}$: $qzICE_{TMA} := 0.00256 \cdot Kz_{TMA} \cdot V_i^2 = 20.272$

Mount, $qzICE_{mnt}$: $qzICE_{mnt} := 0.00256 \cdot Kz_{mnt} \cdot V_i^2 = 20.272$

Coax Cable, $qzICE_{coax}$: $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 20.239$

TIA/EIA Common Factors:

Gust Response Factor =	$G_H := 1.69$		(per TIA/EIA-222-F Section 2.3.4)
Gust Response Factor Multiplier =	$m := 1.25$		(per TIA/EIA-222-F Section 2.3.4.4)
Radial Ice Thickness =	$Ir := 0.50$	in	(per TIA/EIA-222-F Section 2.3.1)
Radial Ice Density =	$Id := 56.00$	pcf	

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p: 203.488.0580 f: 203.488.8587 www.natcomm-eng.com
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Subject:	Load Analysis of PCS Mast on CL&P Pole # 1068 T-Mobile equipment
Location:	Darien, CT
Rev. 0: 03/30/09	Prepared by: J.R.M. Checked by: C.F.C. Job No. 08174-CO.3

Development of Wind & Ice Load on PCS Mast (per TIA/EIA-222-F-1996 Criteria)

PCS Mast Data:

Mast Shape = Round

Mast Diameter = $D_{mast} := 4.5$ in (Pipe 4.0" SCH. 80)

Mast Length = $L_{mast} := 17.5$ ft

Mast Thickness = $t_{mast} := .337$ in

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 46.7$

Mast Force Coefficient = $Ca_{mast} = 1.2$ (per TIA/EIA-222-F Table 3)

Velocity Coefficient = $C := \left(\sqrt{Kz_{mast}}\right) \cdot V \cdot \frac{D_{mast}}{12} = 38.3$

Structure Force Coefficient = $C_{Fmast} = 1.137$ (per TIA/EIA-222-F Table 1 for round pole)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Mast is Shielded by Coax Cable, Antennas and TMA's

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.375$

Total Mast Wind Force = $qz_{mast} \cdot G_H \cdot C_{Fmast} \cdot Ca_{mast} \cdot A_{mast} = 23$ plf **BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Mast is Shielded by Coax Cable, Antennas and TMA's

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 0.458$

Total Mast Wind Force w/ Ice = $qzICE_{mast} \cdot G_H \cdot C_{Fmast} \cdot Ca_{mast} \cdot AICE_{mast} = 21$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (without ice)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 7.9$ sq in

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

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p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject: Load Analysis of PCS Mast on CL&P Pole # 1068 T-Mobile equipment

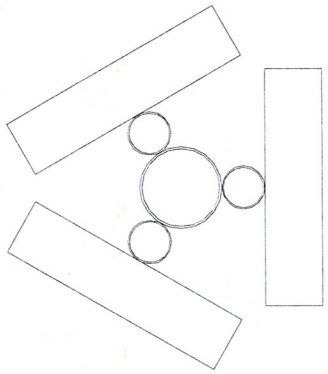
Location: Darien, CT

Rev. 0: 03/30/09

Prepared by: J.R.M. Checked by: C.F.C.
Job No. 08174-CO.3

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:



Antenna Model =	RFS APX16DWV-DWVS-E-A20		
Antenna Shape =	Flat		
Antenna Height =	$L_{ant} := 55.9$	in	
Antenna Width =	$W_{ant} := 13.0$	in	
Antenna Thickness =	$T_{ant} := 3.15$	in	
Antenna Weight =	$WT_{ant} := 40.7$	lbs	
Number of Antennas =	$N_{ant} := 3$		
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 958$	lbs	**BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 796$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 122$	lbs	**BLC 2**

Gravity Load (with ice)

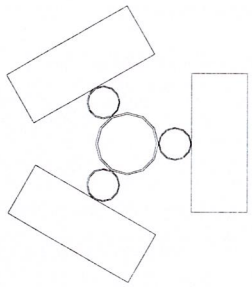
Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1017$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 99$	lbs	**BLC 3**

Development of Wind & Ice Load on TMA's (per TIA/EIA-222-F-1996 Criteria)

TMA Data:

TMA Model = RFS ATMAA1412D-1A20

TMA Shape = Flat



TMA Height = $L_{TMA} := 12.0$ in

TMA Width = $W_{TMA} := 10.0$ in

TMA Thickness = $T_{TMA} := 4.0$ in

TMA Weight = $WT_{TMA} := 13.0$ lbs

Number of TMA's = $N_{TMA} := 3$

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.2$

TMA Force Coefficient = $Ca_{TMA} = 1.4$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on TMA's

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.8$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 2.5$ sf

Total TMA Wind Force = $F_{TMA} := qz_{TMA} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 158$ lbs **BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on TMA's

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

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 3$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qzICE_{TMA} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 143$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 39$ lbs **BLC 2**

Gravity Load (with ice)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 480$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 235$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 8$ lbs

Weight of Ice on All TMA's = $W_{ICETMA} \cdot N_{TMA} = 23$ lbs **BLC 3**

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p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject: Load Analysis of PCS Mast on CL&P Pole # 1068 T-Mobile equipment

Location: Darien, CT

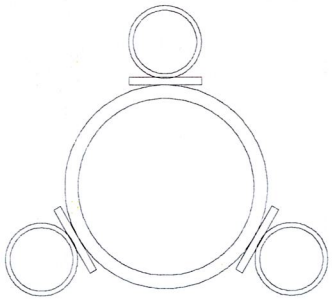
Rev. 0: 03/30/09

Prepared by: J.R.M. Checked by: C.F.C.
Job No. 08174-CO.3

Development of Wind & Ice Load on Antenna Mounts (per TIA/EIA-222-F-1996 Criteria)

Mount Data:

Mount Type: Site-Pro Pipe to Pipe Adapter Clamp Set w/ Mounting Pipes



Mount Shape = Round

Pipe Mount Length = $L_{mnt} := 72$ in

2 inch Pipe Mount Linear Weight = $W_{mnt} := 3.66$ plf

Pipe Mount Outside Diameter = $D_{mnt} := 2.375$ in

Number of Mounting Pipes = $N_{mnt} := 3$

Pipe to Pipe Adapter Clamp Set Weight = $W_{ppac.mnt} := 5$ lbs

Number of Pipe to Pipe Adapter Clamp Sets = $N_{ppac.mnt} := 6$ lbs

Mount Aspect Ratio = $Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 30$

Appurtenance Force Factor = $Ca_{mnt} = 1.2$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Mount is Shielded by Antenna and TMA

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

Total Mount Wind Force = $F_{mnt} := qz_{mnt} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 0$ lbs **BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Mount is Shielded by Antenna and TMA

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

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

Gravity Loads (without ice) (per TIA/EIA-222-F-1996)

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 22$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + N_{ppac.mnt} \cdot W_{ppac.mnt} = 96$ lbs **BLC 2**

Gravity Loads (with ice) (per TIA/EIA-222-F-1996)

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 319$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[(D_{mnt} + 1)^2\right] \cdot (L_{mnt} + 1)\right] - V_{mnt} = 334$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 11$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 10 = 42$ lbs **BLC 3**

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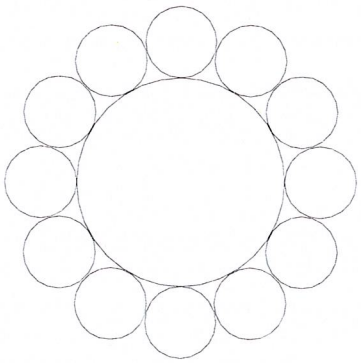
Subject:	Load Analysis of PCS Mast on CL&P Pole # 1068 T-Mobile equipment
Location:	Darien, CT
Rev. 0: 03/30/09	Prepared by: J.R.M. Checked by: C.F.C. Job No. 08174-CO.3

Development of Wind & Ice Load on Coax Cables per TIA/EIA-222-F-96 Criteria

Coax Cable Data:

Coax Type: Use HELIAX 1-1/4"

Shape: Round



Coax Outside Diameter = $D_{coax} := 1.55$ in

Coax Cable Length = $L_{coax} := 19.0$ ft

Weight of Coax per foot = $WT_{coax} := 1.04$ plf

Total Number of Coax = $N_{coax} := 12$

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

Coax aspect ratio = $Ar_{coax} := L_{coax} \cdot \frac{12}{D_{coax}} = 147$

Appurtenance Force Factor = $Ca_{coax} := 1.2$ (TIA/EIA-222-F Table 3)

Wind Load per TIA/EIA-222-F-1996 (without ice) per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax} + D_{mast})}{12} = 0.63$ sf/ft

Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{coax} \cdot G_H \cdot A_{coax} = 34$ plf **BLC 5**

Wind Load per TIA/EIA-222-F-1996 (with ice) per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + D_{mast} + 2 \cdot Ir)}{12} = 0.72$ sf/ft

Coax Wind Force = $Fi_{coax} := Ca_{coax} \cdot qzICE_{coax} \cdot G_H \cdot AICE_{coax} = 29$ plf **BLC 4**

Gravity Loads per TIA/EIA-222-F-1996

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

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2\right] = 3.22$ in^2

Ice Weight All Coax per foot = $WTi_{coax} := Id \cdot \frac{Ai_{coax}}{144} \cdot N_{coax} = 15$ plf **BLC 3**

NATCOMM, INC.	Subject:	**Analysis of TIA/EIA Wind and Ice Loads for Design of PCS Mast Only**
Consulting Engineers		**Tabulated Load Cases**
63-2 North Branford Road	Location:	**Darien, CT**
Branford, CT 06405		
Ph. 203-488-0580 / Fax. 203-488-8587	Date: 3/30/09	Prepared by: T.J.L. Checked by: C.F.C. Job No. 08174.CO3

Load Case	Description
1	Self Weight (PCS Mast)
2	Weight of PCS Structure [1] (no Ice)
3	Weight of Ice Only on PCS Mast + PCS Structure
4	TIA/EIA Wind with Ice on PCS Mast + PCS Structure
5	TIA/EIA Wind on PCS Mast + PCS Structure

Footnotes:

(1) PCS Structure includes: Antennas, TMA's, Mounts, Coax Cable

NATCOMM, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of TIA/EIA Wind and Ice Loads for Design of PCS Mast Only**
Load Combinations Table

Location: **Darien, CT**

Date: 3/30/09 Prepared by: T.J.L. Checked by: C.F.C. Job No. 08174.CO3

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	TIA/EIA Wind + Ice on PCS Mast + PCS Structure		1		1	1	2	1	3	1	4	1		
2	TIA/EIA Wind on PCS Mast + PCS Structure		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: antennas, tma's, mounts, coax cable, and miscellaneous hardware

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Include Warping	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y

Hot Rolled Steel Code	AISC: ASD 9th
Cold Formed Steel Code	AISI 99: ASD
Wood Code	NDS 91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 2002

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections	Yes
Bad Framing Warnings	No
Unused Force Warnings	Yes

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]
1	A36 Gr.36	29000	11154	.3	.65	.49	36
2	A572 Gr.50	29000	11154	.3	.65	.49	50
3	A992	29000	11154	.3	.65	.49	50
4	A500 Gr.42	29000	11154	.3	.65	.49	42
5	A500 Gr.46	29000	11154	.3	.65	.49	46
6	A53 Gr. B	29000	11154	.3	.65	.49	35

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-yy	Cm-...	Cb	y sw...	z sw...	Function
1	M1	Mast-new	17.5												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast-old	PIPE_4.0	Column	Pipe	A53 Gr. B	Typical	2.97	6.82	6.82	13.6
2	Mast-new	PIPE_4.0X	Column	Pipe	A53 Gr. B	Typical	4.14	9.12	9.12	18.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design List	Material	Design Rules
1	M1	BOTTOM-MAST	TOP-MAST			Mast-new	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-MAST	0	0	0	0	
2	BOTTOM-BRACE	0	1	0	0	
3	TOP-BRACE	0	9	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
4	ANTENNA-CENTERLINE	0	15	0	0	
5	TOP-MAST	0	17.5	0	0	

Joint Boundary Conditions

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

Joint Loads and Enforced Displacements (BLC 2 : Weight of PCS Structure)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	Y	-.122
2	ANTENNA-CENTERLINE	L	Y	-.039
3	ANTENNA-CENTERLINE	L	Y	-.096

Joint Loads and Enforced Displacements (BLC 3 : Weight of Ice Only on PCS Mast +)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	Y	-.099
2	ANTENNA-CENTERLINE	L	Y	-.023
3	ANTENNA-CENTERLINE	L	Y	-.042

Joint Loads and Enforced Displacements (BLC 4 : TIA/EIA Wind with Ice on PCS Mas)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	X	.769
2	ANTENNA-CENTERLINE	L	X	.143

Joint Loads and Enforced Displacements (BLC 5 : TIA/EIA Extreme Wind on PCS Mast)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	X	.958
2	ANTENNA-CENTERLINE	L	X	.158

Member Distributed Loads (BLC 2 : Weight of PCS Structure)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	12.67

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.003	-.003	0	0
2	M1	Y	-.015	-.015	0	12.67

Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice on PCS Mas)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.029	.029	0	12.67

Member Distributed Loads (BLC 5 : TIA/EIA Extreme Wind on PCS Mast)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.034	.034	0	12.67

Basic Load Cases

	BLC Description	Category	X Gra...	Y Grav...	Z Gra...	Joint	Point	Distributed	Area (Mem...	Surfa...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of PCS Structure	None				3		1		
3	Weight of Ice Only on PCS Mast +	None				3		2		
4	TIA/EIA Wind with Ice on PCS Mas	None				2		1		
5	TIA/EIA Extreme Wind on PCS Mast	None				2		1		

Load Combinations

	Description	Solve	PD...	SR...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...
1	TIA/EIA Wind + Ice on PCS Mast and...	Yes			1	1	2	1	3	1	4	1								
2	TIA/EIA Extreme Wind on PCS Mast ...	Yes			1	1	2	1	5	1										
3	Self Weight																			

Envelope Member Section Forces

	Member	Sec		Axial[k]	lc	y Shear[k]	lc	z Shear[k]	lc	Torque[k-ft]	lc	y-y Mome...	lc	z-z Momen...	lc
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.028	1	-.688	1	0	1	0	1	0	1	2.666	2
4			min	.016	2	-.842	2	0	1	0	1	0	1	2.173	1
5		3	max	-.098	2	-.815	1	0	1	0	1	0	1	6.676	2
6			min	-.165	1	-.991	2	0	1	0	1	0	1	5.463	1
7		4	max	.496	1	1.116	2	0	1	0	1	0	1	2.093	2
8			min	.319	2	.912	1	0	1	0	1	0	1	1.71	1
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	lc	y Shear...	lc	z Shear...	lc	y-Top[ksi]	lc	y-Bot[ksi]	lc	z-Top[ksi]	lc	z-Bot[ksi]	lc
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.007	1	-.333	1	0	1	-6.433	1	7.893	2	0	1	0	1
4			min	.004	2	-.407	2	0	1	-7.893	2	6.433	1	0	1	0	1
5		3	max	-.024	2	-.394	1	0	1	-16.172	1	19.765	2	0	1	0	1
6			min	-.04	1	-.479	2	0	1	-19.765	2	16.172	1	0	1	0	1
7		4	max	.12	1	.539	2	0	1	-5.063	1	6.195	2	0	1	0	1
8			min	.077	2	.441	1	0	1	-6.195	2	5.063	1	0	1	0	1
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Joint Reactions

	Joint		X [k]	lc	Y [k]	lc	Z [k]	lc	MX [k-ft]	lc	MY [k-ft]	lc	MZ [k-ft]	lc
1	BOTTOM-BRA...	max	.693	2	.22	1	0	1	0	1	0	1	0	1
2		min	.562	1	.13	2	0	1	0	1	0	1	0	1
3	TOP-BRACE	max	-1.841	1	.842	1	0	1	0	1	LOCKED		0	1
4		min	-2.24	2	.525	2	0	1	0	1	LOCKED		0	1
5	Totals:	max	-1.279	1	1.062	1	0	1						
6		min	-1.547	2	.656	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	lc	Y [in]	lc	Z [in]	lc	X Rotation...	lc	Y Rotation...	lc	Z Rotation ...	lc
1	BOTTOM-MA...	max	.055	2	0	2	0	1	0	1	0	1	0	1
2		min	.045	1	0	1	0	1	0	1	0	1	0	1
3	BOTTOM-BR...	max	0	1	0	2	0	1	0	1	0	1	4.622e-3	2
4		min	0	2	0	1	0	1	0	1	0	1	3.77e-3	1
5	TOP-BRACE	max	0	2	0	2	0	1	0	1	0	1	-7.931e-3	1
6		min	0	1	0	1	0	1	0	1	0	1	-9.707e-3	2
7	ANTENNA-CE...	max	1.237	2	0	2	0	1	0	1	0	1	-1.7e-2	1
8		min	1.011	1	0	1	0	1	0	1	0	1	-2.08e-2	2
9	TOP-MAST	max	1.86	2	0	2	0	1	0	1	0	1	0	1
10		min	1.521	1	0	1	0	1	0	1	0	1	0	1

Envelope AISC ASD Steel Code Checks

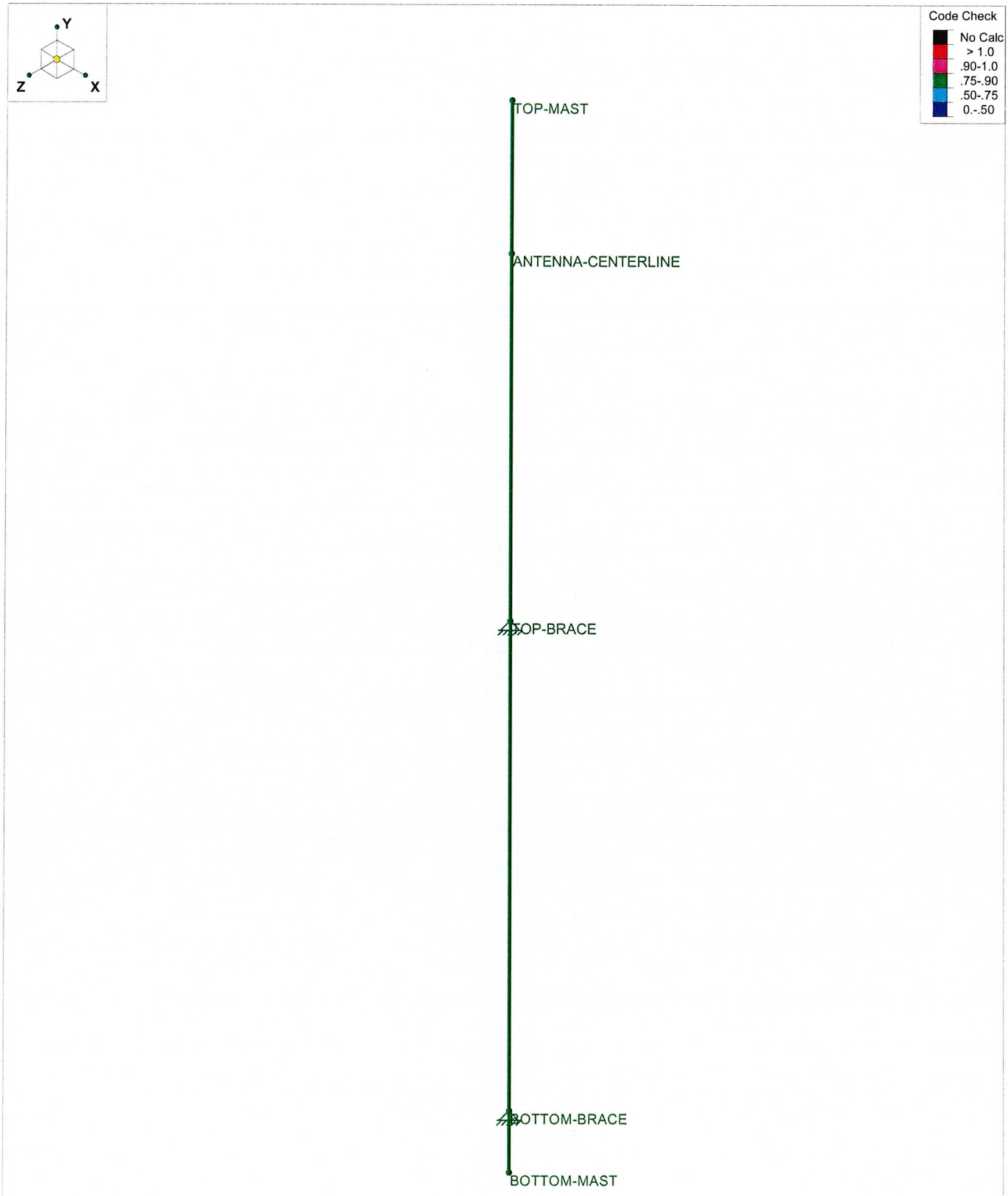
	Member	Shape	Code Check	Loc[ft]	lc	She...	Loc[ft]	...	lc	Fa [...	Ft [...	...	Fb ...	...	C...	C...	AS...
1	M1	PIPE_4.0X	.883	9.115	2	.043	9.115		2	7.459	21	...	23.1	1	.6	1	H1-3

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-BRACE	.562	.22	0	0	0	0
2	1	TOP-BRACE	-1.841	.842	0	0	LOCKED	0
3	1	Totals:	-1.279	1.062	0			
4	1	COG (ft):	X: 0	Y: 10.45	Z: 0			

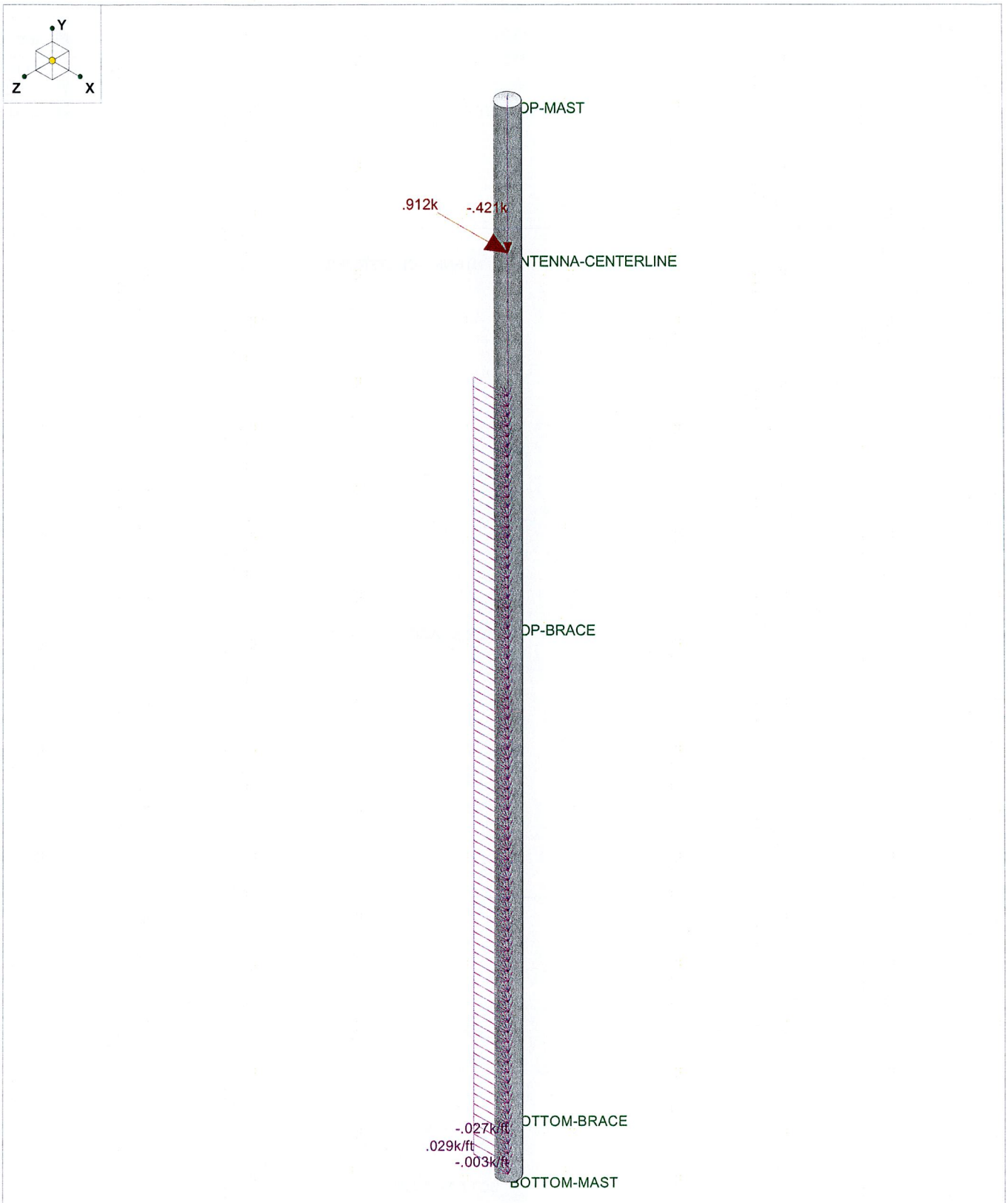
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-BRACE	.693	.13	0	0	0	0
2	2	TOP-BRACE	-2.24	.525	0	0	LOCKED	0
3	2	Totals:	-1.547	.656	0			
4	2	COG (ft):	X: 0	Y: 10.64	Z: 0			



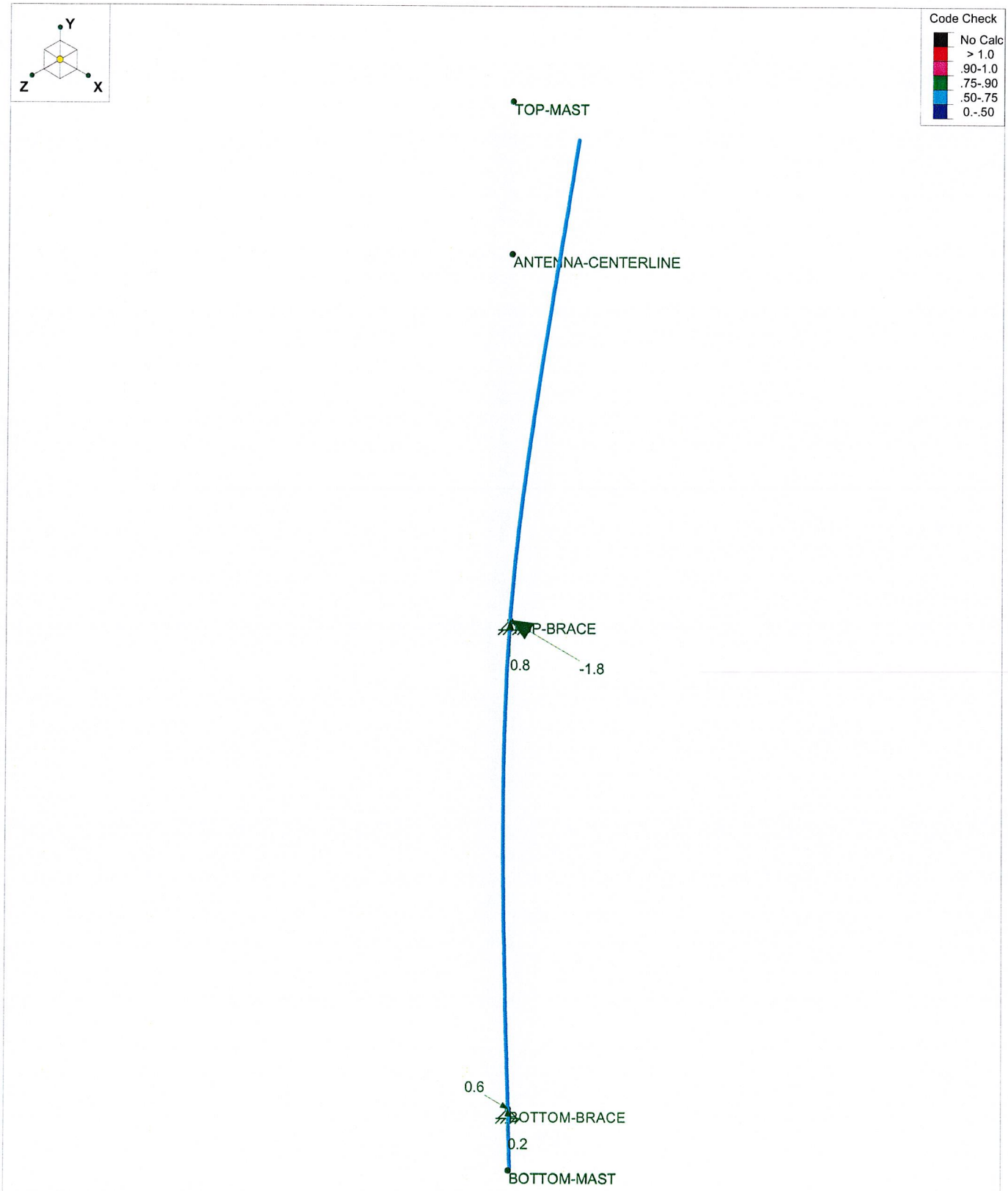
Solution: Envelope

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:28 AM
08174.CO.03	Unity Check	EIA-TIA.r3d



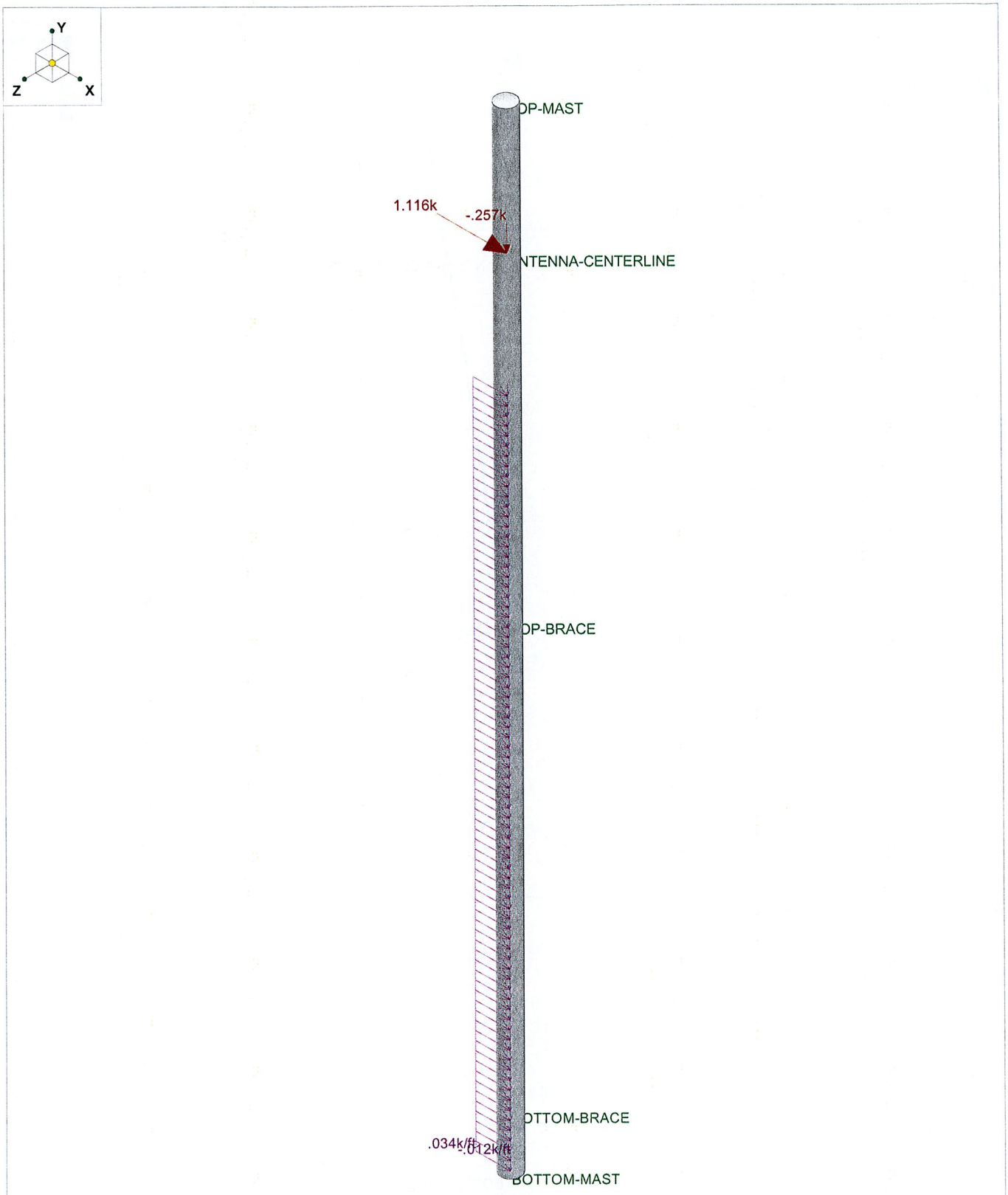
Loads: LC 1, TIA/EIA Wind + Ice on PCS Mast and PCS Structure

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:27 AM
08174.CO.03	LC # 1 Loads	EIA-TIA.r3d



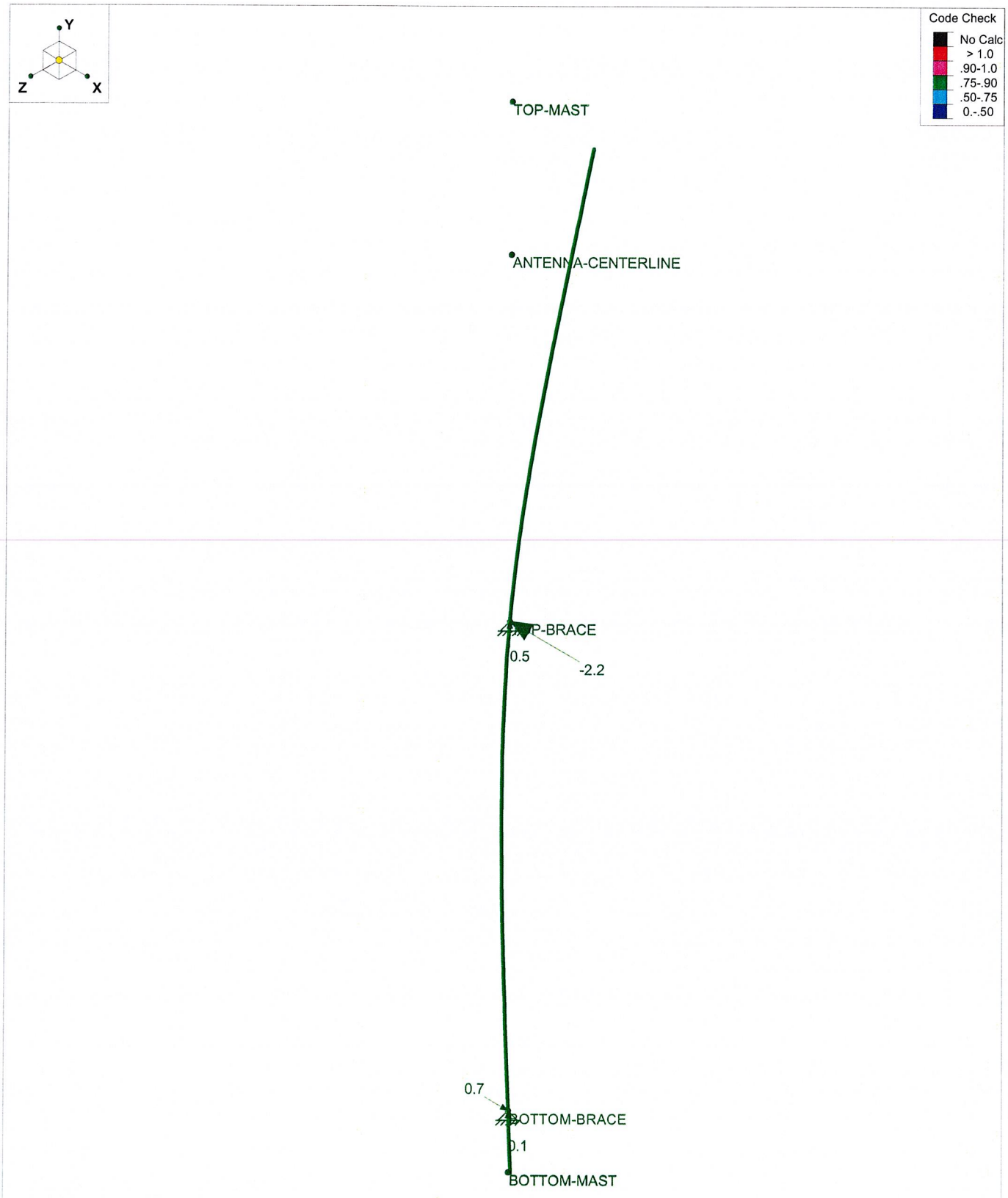
Results for LC 1, TIA/EIA Wind + Ice on PCS Mast and PCS Structure
Reaction units are k and k-ft

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:29 AM
08174.CO.03	LC # 1 Reactions and Deflected Shape	EIA-TIA.r3d



Loads: LC 2, TIA/EIA Extreme Wind on PCS Mast and PCS Structure

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:27 AM
08174.CO.03	LC # 2 Loads	EIA-TIA.r3d



Results for LC 2, TIA/EIA Extreme Wind on PCS Mast and PCS Structure
Reaction units are k and k-ft

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:30 AM
08174.CO.03	LC # 2 Reactions and Deflected Shape	EIA-TIA.r3d

NATCOMM ENG
CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Mast Connection to CL&P Pole #1068
Location:	Darien, CT
Rev. 0: 3/31/09	Prepared by: T.J.L. Checked by: C.F.C. Job No. 08174-CO.3

Design Basis:

New 1/2 Φ A36 U-bolts will be used to attach the antenna mast to the two (2) existing collars on the existing NU Pole. The connections are assumed to be pinned therefore the bolts have only horizontal and vertical reactions to withstand. The bolts will be checked for tension and shear from the horizontal force resulting from the direction of the wind and for their capacity of friction resistance agaist the vertical force. The existing collar rods will also be checked for tension.

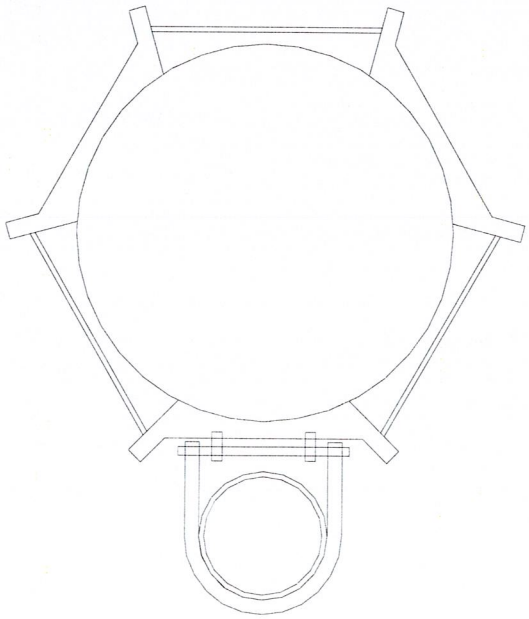
Check U-Bolts to Collar:

Design Reactions at Connection:

Horizontal =	Horizontal := 2.5·kips
Vertical =	Vertical := 1.0·kips
Moment =	Moment := 0·kips·ft

Bolt Data:

Bolt Grade =	A36
Number of Bolts, nb =	$n_b := 4$ (2 U-Bolts)
Bolt Diameter, db =	$d_b := 0.5in$
Bolt Area, ab =	$a_b := \frac{1}{4}\cdot\pi\cdot d_b^{\,2} = 0.196\cdot in^2$
Coefficient of Friction =	$\mu_f := 0.6$
Allowable Tensile Stress, Ftall =	$F_{t.all} := 19.1\cdot ksi$
Allowable Shear Stress, Fvall =	$F_{v.all} := 9.9\cdot ksi$
Allowable Friction Resistance =	$F_{f.all} := 0.25\cdot\mu_f\cdot F_{t.all} = 2.865\cdot ksi$



Check Bolt Stresses:

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horizontal}{n_b} = 0.625 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 3.2 \cdot ksi$

$Condition1 := if(F_{t.act} < F_{t.all}, "OK", "Overstressed")$

Condition1 = "OK"

Shear Force Each Bolt = $F_{shear.bolt} := \frac{Horizontal}{n_b} = 0.625 \cdot kips$

Shear Stress Each Bolt = $F_{v.act} := \frac{F_{shear.bolt}}{a_b} = 3.2 \cdot ksi$

$Condition2 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

Condition2 = "OK"

Friction Force Each Bolt = $F_{friction.bolt} := \frac{Vertical}{n_b} = 0.25 \cdot kips$

$F_{f.act} := \frac{F_{friction.bolt}}{a_b} = 1.273 \cdot ksi$

$Condition3 := if(F_{f.act} < F_{f.all}, "OK", "NG")$

Condition3 = "OK"

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p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Mast Connection to CL&P Pole #1068
Location:	Darien, CT
Rev. 0: 3/31/09	Prepared by: T.J.L. Checked by: C.F.C. Job No. 08174-CO.3

Check Existing Collar:

Design Reactions at Connection:

Horizontal = $Horizontal := 2.5 \cdot kips$

Vertical = $Vertical := 1.0 \cdot kips$

Moment = $Moment := 0 \cdot kips \cdot ft$

Bolt Data:

Bolt Grade = A36

Number of Bolts, nb = $n_b := 6$ (3 Rods per Side)

Bolt Diameter, db = $d_b := 0.625in$

Bolt Area, ab = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.307 \cdot in^2$

Allowable Tensile Stress, Ftall = $F_{t.all} := 19.1 \cdot ksi$

Allowable Shear Stress, Fvall = $F_{v.all} := 9.9 \cdot ksi$

Allowable Friction Resistance = $F_{f.all} := 0.25 \cdot \mu_f \cdot F_{t.all} = 2.865 \cdot ksi$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horizontal}{n_b} = 0.417 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 1.4 \cdot ksi$

$Condition1 := if\left(F_{t.act} < F_{t.all}, "OK", "Overstressed"\right)$

Condition1 = "OK"

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p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Load Analysis of PCS Mast and T-Mobile Equipment on CL&P Structure #1068
Location:	Darien, CT
Rev. 0: 3/31/08	Prepared by: T.J.L Checked by: C.F.C. Job No. 08174.CO.3

Basic Components

Heavy Wind Pressure =	p := 4.00	psf	
Basic Windspeed =	V := 110	mph	(NESC 2007 Figure 250-1 & Table 250-1)
Radial Ice Thickness =	Ir := 0.50	in	(NESC 2007 Figure 250-2(e))
Radial Ice Density =	Id := 56.0	pcf	

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade =	TME := 129	ft	
Multiplier Gust Response Factor =	m := 1.25		(Only for NESC Extreme case NU criteria)
NESC Factor =	kv := 1.43		(NESC 2007 Table 250-3 equation)
Importance Factor =	I := 1.0		(NESC Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(0.67 \cdot \frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.227$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.302$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.82$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.849$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 32.3$ psf (NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members =	$Cd_R := 1.3$
Shape Factor for Round Members =	$Cd_F := 1.6$
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.45$

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	Apply in Risa-3D Analysis

NATCOMM INC. CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
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Subject:	Load Analysis of PCS Mast and T-Mobile Equipment on CL&P Structure #1068
Location:	Darien, CT
Rev. 0: 3/31/08	Prepared by: T.J.L Checked by: C.F.C. Job No. 08174.CO.3

Development of Wind & Ice Load on PCS Mast

PCS Mast Data:

Mast Shape = Round

Mast Diameter = $D_{mast} := 4.5$ in (Pipe 4.0" SCH. 80)

Mast Length = $L_{mast} := 17.5$ ft

Mast Thickness = $t_{mast} := 0.337$ in

Wind Load (NESC Extreme)

Assumes Mast is Shielded by Coax Cable and Antennas Untill 122'-4" AGL

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.375$

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} \cdot m = 20$ plf **BLC 5**

Wind Load (NESE Heavy)

Assumes Mast is Shielded by Coax Cable and Antennas Untill 122'-4" AGL

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.458$

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

Gravity Loads (without ice)

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

Gravity Loads (without ice)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 7.9$ sq in

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

NATCOMM INC. CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Load Analysis of PCS Mast and T-Mobile Equipment on CL&P Structure #1068
Location:	Darien, CT
Rev. 0: 3/31/08	Prepared by: T.J.L Checked by: C.F.C. Job No. 08174.CO.3

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFS APX16DWV-DWVS-E-A20

Antenna Shape = Flat

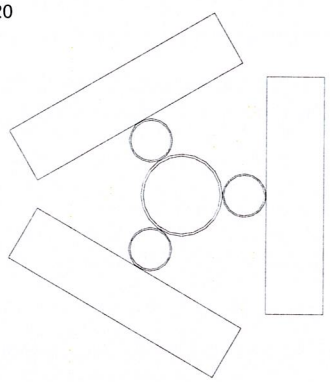
Antenna Height = $L_{ant} := 55.9$ in

Antenna Width = $W_{ant} := 13.0$ in

Antenna Thickness = $T_{ant} := 3.15$ in

Antenna Weight = $WT_{ant} := 40.7$ lbs

Number of Antennas = $N_{ant} := 3$



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 978$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 106$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 122$ lbs **BLC 2**

Gravity Load (with ice)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1017$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 99$ lbs **BLC 3**

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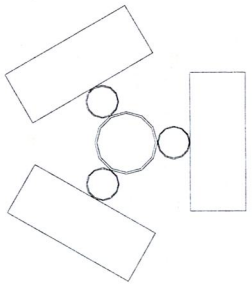
Location:		Darien, CT
Rev. 0: 3/31/08		Prepared by: T.J.L Checked by: C.F.C. Job No. 08174.CO.3

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model = RFS ATMAA1412D-1A20

TMA Shape = Flat



TMA Height = $L_{TMA} := 12$ in

TMA Width = $W_{TMA} := 10$ in

TMA Thickness = $T_{TMA} := 4$ in

TMA Weight = $WT_{TMA} := 13$ lbs

Number of TMA's = $N_{TMA} := 3$

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure on TMA's

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.8$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 2.5$ sf

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 161$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure on TMA's

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

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 3$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 19$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 39$ lbs **BLC 2**

Gravity Load (with ice)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 480$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 235$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 8$ lbs

Weight of Ice on All TMA's = $W_{ICETMA} \cdot N_{TMA} = 23$ lbs **BLC 3**

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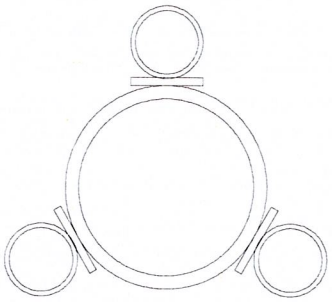
Subject:	Load Analysis of PCS Mast and T-Mobile Equipment on CL&P Structure #1068
Location:	Darien, CT
Rev. 0: 3/31/08	Prepared by: T.J.L Checked by: C.F.C. Job No. 08174.CO.3

Development of Wind & Ice Load on Antenna Mounts

Mount Data:



Mount Type:	Site-Pro Pipe to Pipe Adapter Clamp Set w/ Mounting Pipes		
Mount Shape =	Round		
Pipe Mount Length =	$L_{mnt} := 72$	in	
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	
Number of Mounting Pipes =	$N_{mnt} := 3$		
Pipe to Pipe Adapter Clamp Set Weight =	$W_{ppac.mnt} := 5$	lbs	
Number of Pipe to Pipe Adapter Clamp Sets =	$N_{ppac.mnt} := 6$	lbs	

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area =	$A_{mnt} := 0.0$	sf	
Total Mount Wind Force =	$F_{mnt} := qz \cdot Cd_F \cdot A_{mnt} \cdot m = 0$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice =	$A_{ICEmnt} := 0.0$	sf	
Total Mount Wind Force =	$Fi_{mnt} := p \cdot Cd_F \cdot A_{ICEmnt} = 0$	lbs	**BLC 4**

Gravity Loads (without ice)

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

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 22$	lbs	
Weight of All Mounts =	$WT_{mnt} \cdot N_{mnt} + N_{ppac.mnt} \cdot W_{ppac.mnt} = 96$	lbs	**BLC 2**

Gravity Loads (with ice)

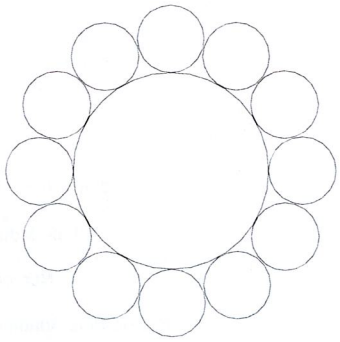
(per TIA/EIA-222-F-1996)

Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^2 \cdot L_{mnt} = 319$	cu in	
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4} \cdot \left[(D_{mnt} + 1)^2\right] \cdot (L_{mnt} + 1)\right] - V_{mnt} = 334$	cu in	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot ld = 11$	lbs	
Weight of Ice on All Mounts =	$W_{ICEmnt} \cdot N_{mnt} + 10 = 42$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-1/4"	
Shape =	Round	
Coax Outside Diameter =	$D_{coax} := 1.55$	in
Coax Cable Length =	$L_{coax} := 9.5$	ft
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf
Total Number of Coax =	$N_{coax} := 12$	
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 2$	



Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax} + D_{mast}\right)}{12} = 0.63$ ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 37$ plf **BLC 5**

Wind Load (NESC Heavy)

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

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

Gravity Loads (without ice)

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

Gravity Loads (with ice)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 15$ plf **BLC 3**

NATCOMM, INC.	Subject:	**Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Mast Reactions Applied to CL&P Tower Tabulated Load Cases**		
Consulting Engineers				
63-2 North Branford Road				
Branford, CT 06405	Location:	**Darien, CT**		
Ph. 203-488-0580 / Fax. 203-488-8587	Date:3/30/09	Prepared by: T.J.L.	Checked by: C.F.C.	Job No. 08174.CO.3

Load Case	Description
1	Self Weight (PCS Mast)
2	Weight of Antennas, TMA's, Mounts, Coax Cables
3	Weight of Ice Only on PCS Structure (1)
4	NESC Heavy Wind on PCS Structure
5	NESC Extreme Wind on PCS Structure

Footnotes:
(1) PCS Structure includes: PCS Mast, Antennas, TMA's, Mounts, Coax Cable

NATCOMM, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Mast Reactions Applied to CL&P Tower Load Combinations Table**

Location: **Darien, CT**

Date: 3/30/09 Prepared by: T.J.L. Checked by: C.F.C. Job No. 08174.CO.3

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	NESC Heavy Wind on PCS Structure		1		1	1.5	2	1.5	3	1.5	4	2.5		
2	NESC Extreme Wind on PCS Structure		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: mast, antennas, tma's, mounts, coax cable, and miscellaneous hardware

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Include Warping	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y

Hot Rolled Steel Code	AISC: ASD 9th
Cold Formed Steel Code	AISI 99: ASD
Wood Code	NDS 91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 2002

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections	Yes
Bad Framing Warnings	No
Unused Force Warnings	Yes

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]
1	A36 Gr.36	29000	11154	.3	.65	.49	36
2	A572 Gr.50	29000	11154	.3	.65	.49	50
3	A992	29000	11154	.3	.65	.49	50
4	A500 Gr.42	29000	11154	.3	.65	.49	42
5	A500 Gr.46	29000	11154	.3	.65	.49	46
6	A53 Gr. B	29000	11154	.3	.65	.49	35

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-yy	Cm-...	Cb	y sw...	z sw...	Function
1	M1	Mast-new	17.5												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast-old	PIPE_4.0	Column	Pipe	A53 Gr. B	Typical	2.97	6.82	6.82	13.6
2	Mast-new	PIPE_4.0X	Column	Pipe	A53 Gr. B	Typical	4.14	9.12	9.12	18.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design List	Material	Design Rules
1	M1	BOTTOM-MAST	TOP-MAST			Mast-new	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-MAST	0	0	0	0	
2	BOTTOM-BRACE	0	1	0	0	
3	TOP-BRACE	0	9	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
4	ANTENNA-CENTERLINE	0	15	0	0	
5	TOP-MAST	0	17.5	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	BOTTOM-MAST							
2	BOTTOM-BRACE	Reaction	Reaction	Reaction				
3	ANTENNA-CENT...							
4	TOP-BRACE	Reaction	Reaction	Reaction				

Joint Loads and Enforced Displacements (BLC 2 : Weight of Antennas, TMA's, Mount)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	Y	-.122
2	ANTENNA-CENTERLINE	L	Y	-.039
3	ANTENNA-CENTERLINE	L	Y	-.096

Joint Loads and Enforced Displacements (BLC 3 : Weight of Ice Only on PCS Struct)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	Y	-.099
2	ANTENNA-CENTERLINE	L	Y	-.023
3	ANTENNA-CENTERLINE	L	Y	-.042

Joint Loads and Enforced Displacements (BLC 4 : NESC Heavy Wind on PCS Structure)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	X	.106
2	ANTENNA-CENTERLINE	L	X	.019

Joint Loads and Enforced Displacements (BLC 5 : NESC Extreme Wind on PCS Structu)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*ft...
1	ANTENNA-CENTERLINE	L	X	.978
2	ANTENNA-CENTERLINE	L	X	.161

Member Distributed Loads (BLC 2 : Weight of Antennas, TMA's, Mount)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	12.67

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.015	-.015	0	12.67
2	M1	Y	-.003	-.003	0	0

Member Distributed Loads (BLC 4 : NESC Heavy Wind on PCS Structure)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	12.67

Member Distributed Loads (BLC 5 : NESC Extreme Wind on PCS Structu)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.037	.037	0	12.67

Basic Load Cases

	BLC Description	Category	X Gra...	Y Grav...	Z Gra...	Joint	Point	Distributed	Area (Mem...	Surfa...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Antennas, TMA's, Mount	None				3		1		
3	Weight of Ice Only on PCS Struct	None				3		2		
4	NESC Heavy Wind on PCS Structure	None				2		1		
5	NESC Extreme Wind on PCS Structu	None				2		1		

Load Combinations

	Description	Solve	PD...	SR...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...	BLC	Fa...
1	NESC Heavy Wind on PCS Structure	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind on PCS Structu...	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Member Section Forces

	Member	Sec		Axial[k]	lc	y Shear[k]	lc	z Shear[k]	lc	Torque[k-ft]	lc	y-y Mome...	lc	z-z Momen...	lc
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.041	1	-.236	1	0	1	0	1	0	1	2.71	2
4			min	.016	2	-.86	2	0	1	0	1	0	1	.744	1
5		3	max	-.098	2	-.28	1	0	1	0	1	0	1	6.827	2
6			min	-.248	1	-1.022	2	0	1	0	1	0	1	1.872	1
7		4	max	.744	1	1.139	2	0	1	0	1	0	1	2.136	2
8			min	.319	2	.313	1	0	1	0	1	0	1	.586	1
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	lc	y Shear...	lc	z Shear...	lc	y-Top[ksi]	lc	y-Bot[ksi]	lc	z-Top[ksi]	lc	z-Bot[ksi]	lc
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.01	1	-.114	1	0	1	-2.203	1	8.024	2	0	1	0	1
4			min	.004	2	-.415	2	0	1	-8.024	2	2.203	1	0	1	0	1
5		3	max	-.024	2	-.135	1	0	1	-5.542	1	20.21	2	0	1	0	1
6			min	-.06	1	-.494	2	0	1	-20.21	2	5.542	1	0	1	0	1
7		4	max	.18	1	.55	2	0	1	-1.735	1	6.323	2	0	1	0	1
8			min	.077	2	.151	1	0	1	-6.323	2	1.735	1	0	1	0	1
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Joint Reactions

	Joint		X [k]	lc	Y [k]	lc	Z [k]	lc	MX [k-ft]	lc	MY [k-ft]	lc	MZ [k-ft]	lc
1	BOTTOM-BRA...	max	.698	2	.331	1	0	1	0	1	0	1	0	1
2		min	.192	1	.13	2	0	1	0	1	0	1	0	1
3	TOP-BRACE	max	-.631	1	1.263	1	0	1	0	1	LOCKED		0	1
4		min	-2.306	2	.525	2	0	1	0	1	LOCKED		0	1
5	Totals:	max	-.439	1	1.593	1	0	1						
6		min	-1.608	2	.656	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	lc	Y [in]	lc	Z [in]	lc	X Rotation...	lc	Y Rotation...	lc	Z Rotation ...	lc
1	BOTTOM-MA...	max	.056	2	0	2	0	1	0	1	0	1	4.707e-3	2
2		min	.016	1	0	1	0	1	0	1	0	1	1.292e-3	1
3	BOTTOM-BR...	max	0	1	0	2	0	1	0	1	0	1	4.703e-3	2
4		min	0	2	0	1	0	1	0	1	0	1	1.291e-3	1
5	TOP-BRACE	max	0	2	0	2	0	1	0	1	0	1	-2.717e-3	1
6		min	0	1	0	1	0	1	0	1	0	1	-9.903e-3	2
7	ANTENNA-CE...	max	1.262	2	0	2	0	1	0	1	0	1	-5.825e-3	1
8		min	.346	1	0	1	0	1	0	1	0	1	-2.123e-2	2
9	TOP-MAST	max	1.899	2	0	2	0	1	0	1	0	1	-5.825e-3	1
10		min	.521	1	0	1	0	1	0	1	0	1	-2.123e-2	2

Envelope AISC ASD Steel Code Checks

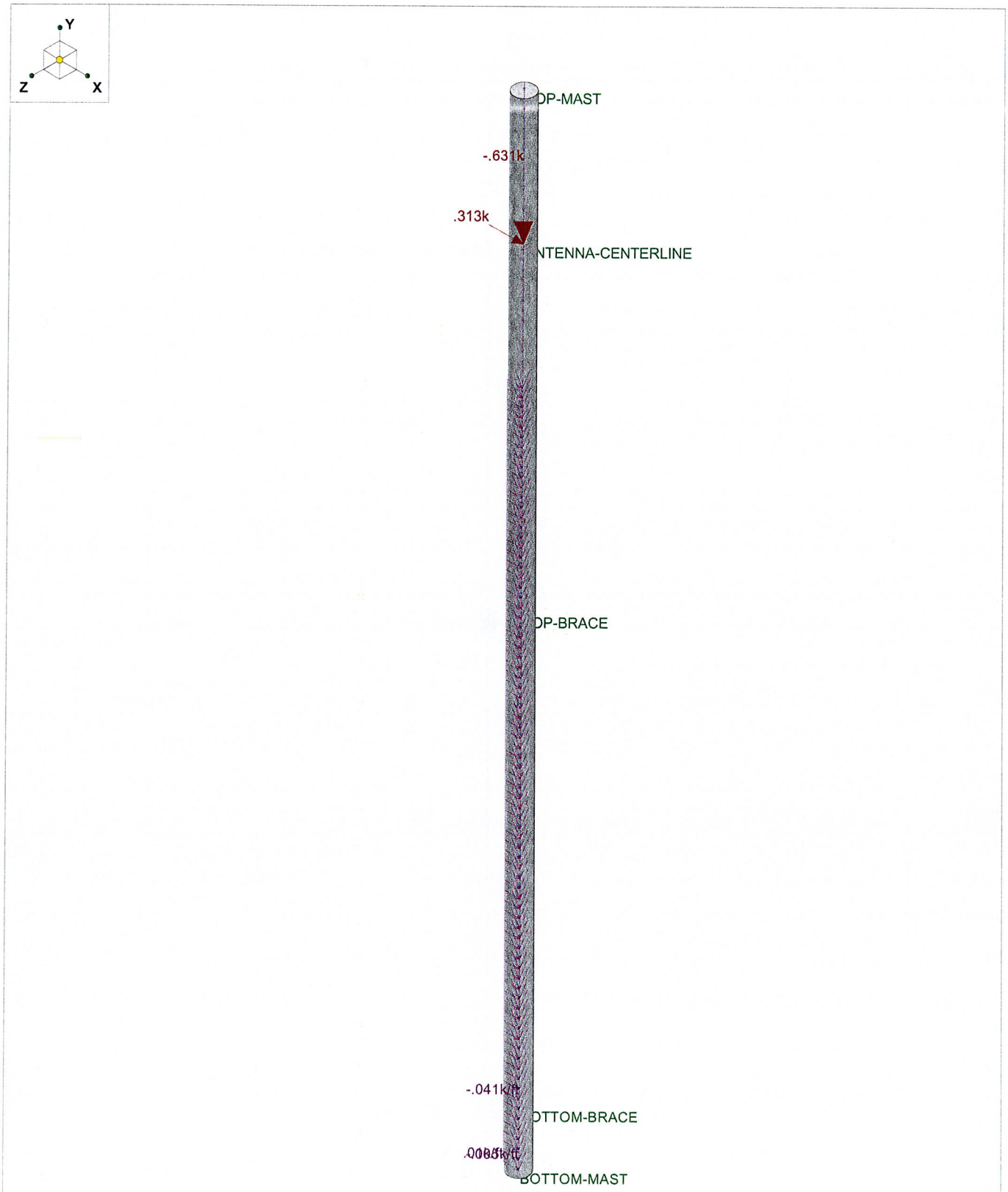
	Member	Shape	Code Check	Loc[ft]	lc	She...	Loc[ft]	...	lc	Fa [...	Ft [...	...	Fb ...	...	C...	C...	AS...
1	M1	PIPE_4.0X	.900	8.932	2	.044	9.115		2	7.459	21	...	23.1	1	.6	.85	H2-1

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-BRACE	.192	.331	0	0	0	0
2	1	TOP-BRACE	-.631	1.263	0	0	LOCKED	0
3	1	Totals:	-.439	1.593	0			
4	1	COG (ft):	X: 0	Y: 10.45	Z: 0			

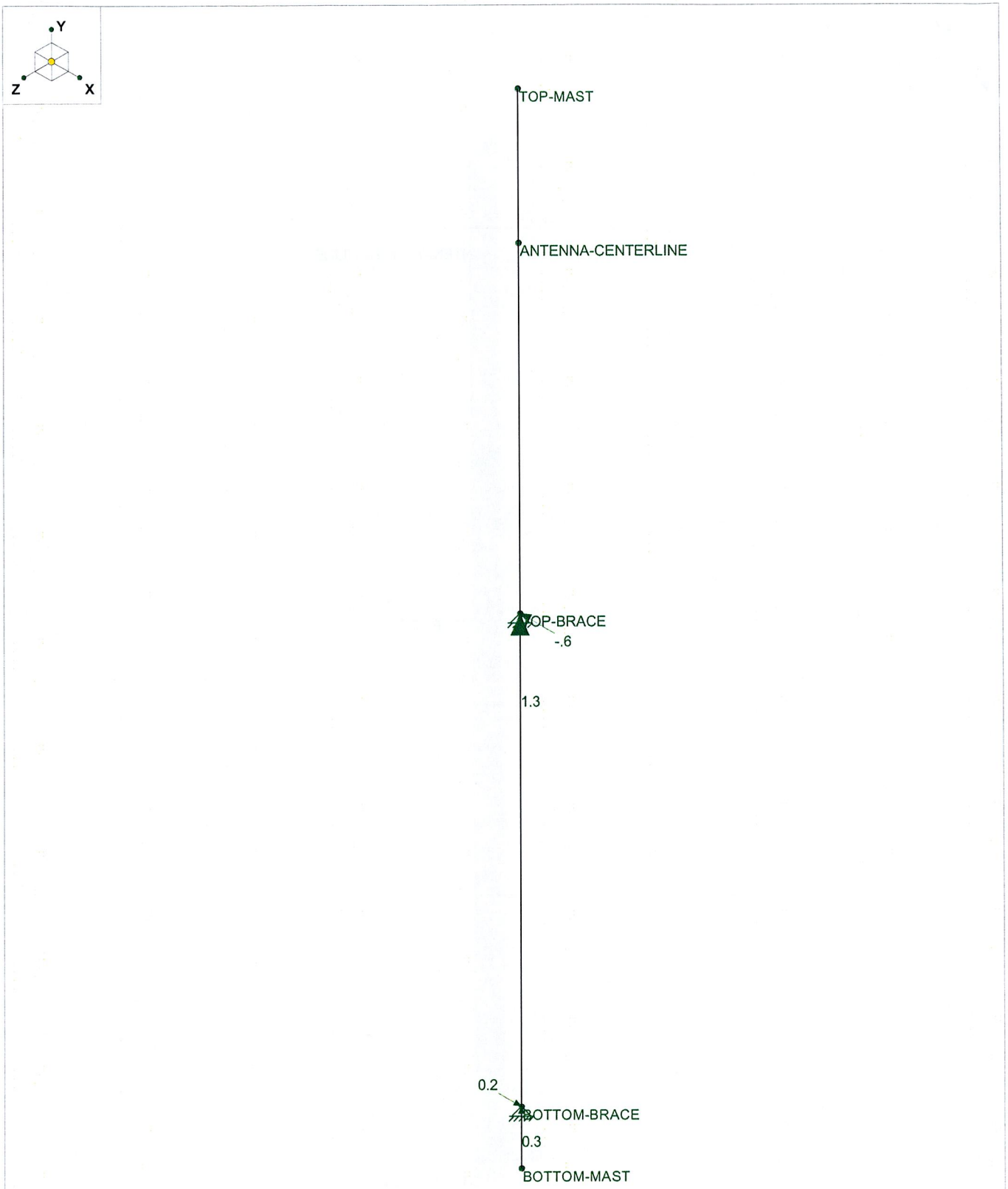
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-BRACE	.698	.13	0	0	0	0
2	2	TOP-BRACE	-2.306	.525	0	0	LOCKED	0
3	2	Totals:	-1.608	.656	0			
4	2	COG (ft):	X: 0	Y: 10.64	Z: 0			



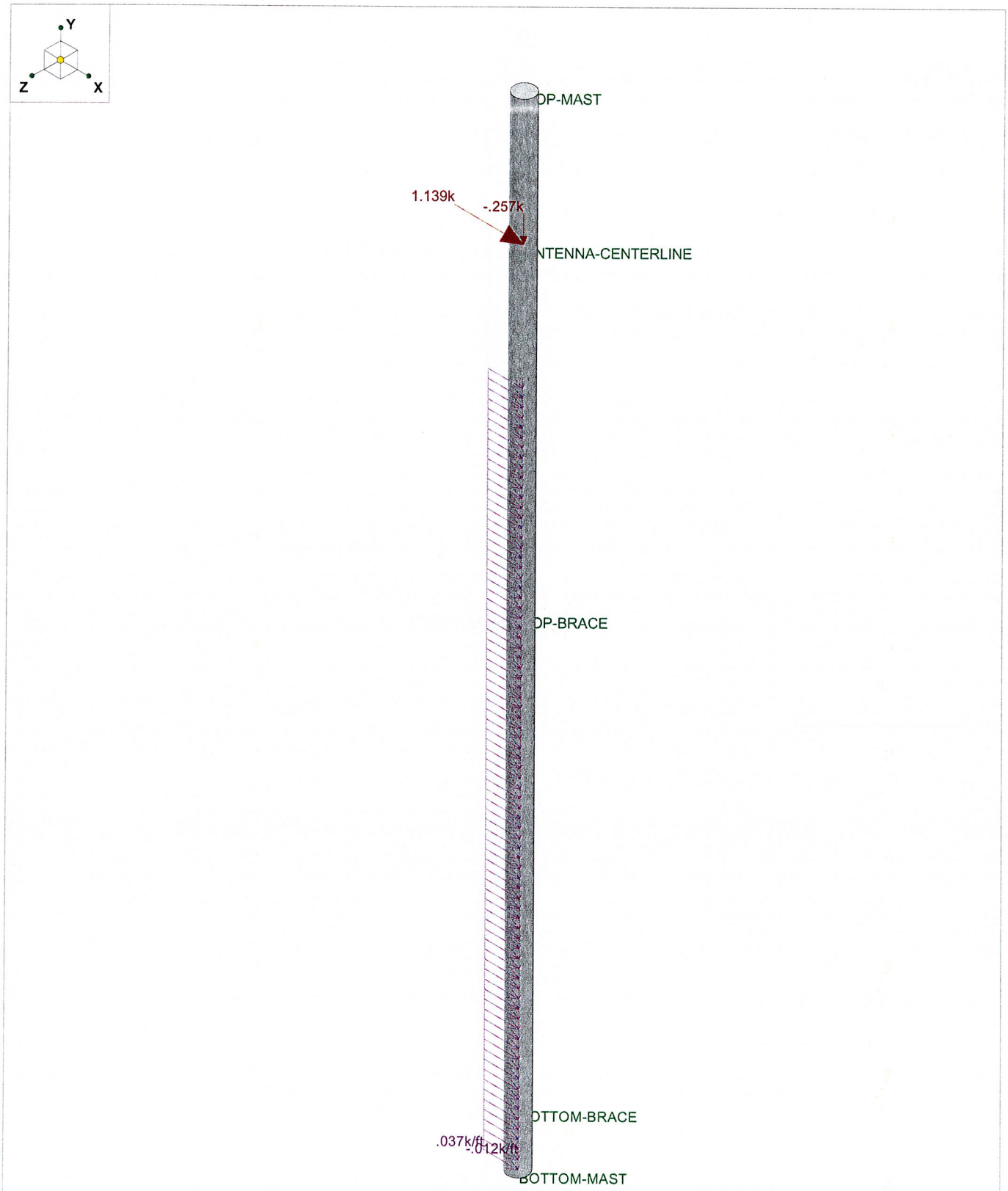
Loads: LC 1, NESC Heavy Wind on PCS Structure

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:39 AM
08174.CO.03	LC # 1 Loads	NESC.r3d



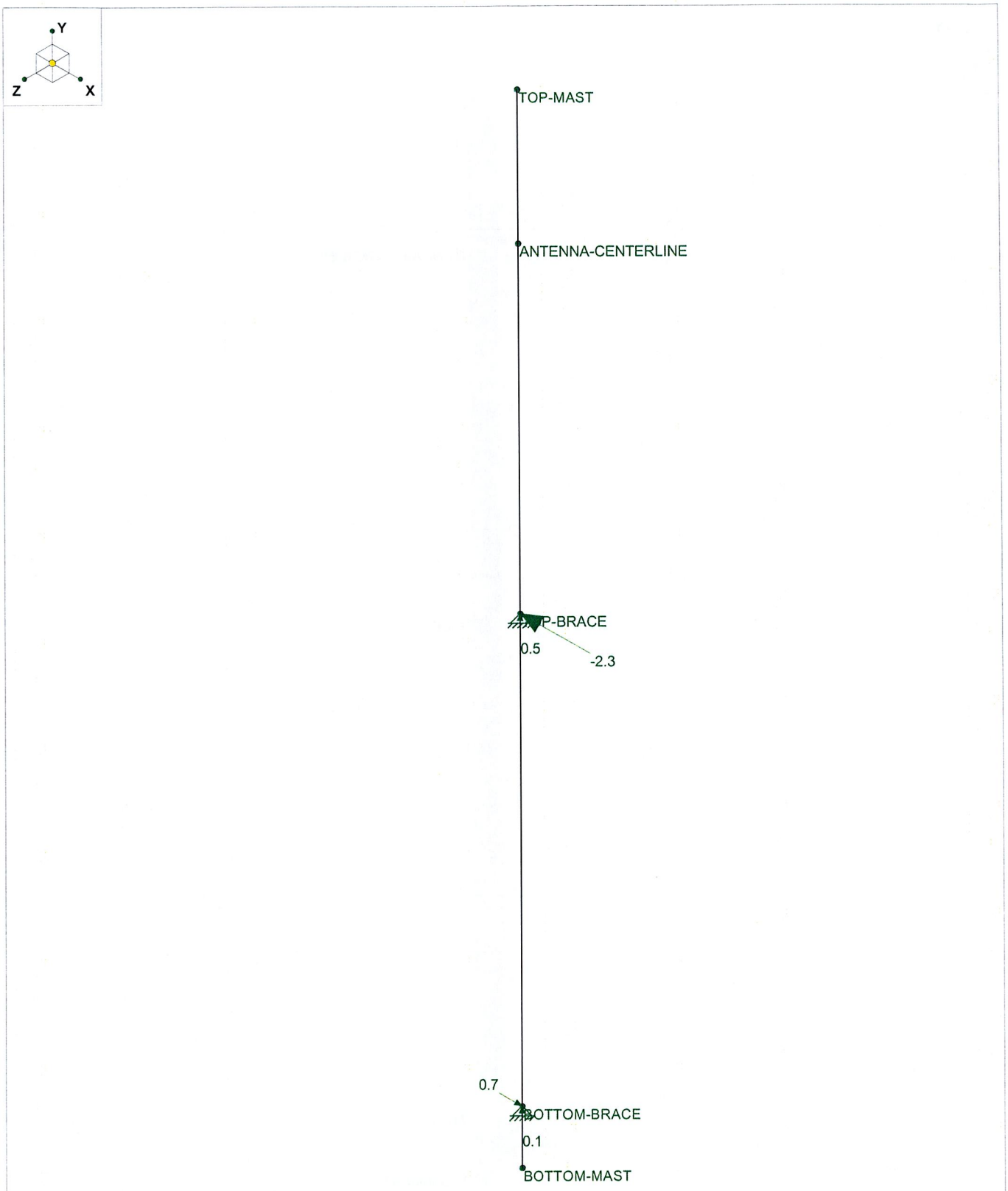
Results for LC 1, NESC Heavy Wind on PCS Structure
Reaction units are k and k-ft

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:40 AM
08174.CO.03	LC # 1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:39 AM
08174.CO.03	LC # 2 Loads	NESC.r3d



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

Natcomm, INC.	CL&P Pole # 1068	
tjl, cfc		Mar 31, 2009 at 10:40 AM
08174.CO.03	LC # 2 Reactions	NESC.r3d

NATCOMM INC
CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Coax Cable on CL&P Pole #1068
Location:	Darien, CT
Rev. 0: 03/31/09	Prepared by: T.J.L Checked by: C.F.C. Job No. 08174.CO.03

Coax Cable on CL&P Pole

Distance Between Coax Cable Attach Points =

Coaxial Cable Span (from Top of Pole Down w/ Top 10' on Mast) =

$$Coax_{Span} := \begin{pmatrix} 5 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix}$$ *(User Input)*

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

Number of Coax Cables = $N_{coax} := 12$ *(User Input)*

Extreme Wind Pressure = $qz := 32.30 \cdot psf$ *(User Input)*

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

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

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

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

Shape Factor = $Cd_{coax} := 1.45$ *(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 = $A_{ice} := \left(2 \cdot D_{coax} + 2 \cdot Ir\right) = 4.96 \cdot in$

Wind Area without Ice = $A := \left(2 \cdot D_{coax}\right) = 3.96 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 18.179 \cdot plf$

NATCOMM INC. CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-engr.com
63-2 N. Branford Rd., Branford, CT 06405

Subject: Coax Cable on CL&P Pole #1068

Location: Darien, CT

Rev. 0: 03/31/09

Prepared by: T.J.L Checked by: C.F.C.
Job No. 08174.CO.03

Heavy Vertical Load =

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

Heavy Transverse Load =

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

$Heavy_{Vert} =$

	0
0	230
1	460
2	460
3	460
4	460
5	460
6	460
7	460
8	460
9	460
10	460

$\frac{lb}{ft}$

$Heavy_{Trans} =$

	0
0	30
1	60
2	60
3	60
4	60
5	60
6	60
7	60
8	60
9	60
10	60

$\frac{lb}{ft}$

Extreme Vertical Load =

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

Extreme Transverse Load =

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

$Extreme_{Vert} =$

	0
0	62
1	125
2	125
3	125
4	125
5	125
6	125
7	125
8	125
9	125
10	125

$\frac{lb}{ft}$

$Extreme_{Trans} =$

	0
0	77
1	155
2	155
3	155
4	155
5	155
6	155
7	155
8	155
9	155
10	155

$\frac{lb}{ft}$

Project Name : 115' UTILITY POLE - CL&P #1068
Project Notes: T-Mobile Site Ref. CT-11-290
Project File : J:\Jobs\0817400.WI - HPC-T-Mobile\CO03 - CT11290-Darien Downtown & Rte 1\Engineering\Structural\Calcs\PLS-Pole\CLP Pole 1068.pol
Date run : 9:14:10 AM Wednesday, June 10, 2009
by : PLS-POLE Version 9.04
Licensed to : Natcomm

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\0817400.wi - hpc-t-mobile\co03 - ct11290-darien downtown & rte 1\engineering\structural\calcs\pls-pole\cl&p pole # 1068.lca

*** Analysis Results:

Maximum element usage is 91.20% for Base Plate "CLP " in load case "EXTREME"
Maximum insulator usage is 11.55% for Clamp "C20" in load case "EXTREME"

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)	Vert. Moment (ft-k)	Bending Moment (ft-k)	Found. Usage %
NESC HEAVY	CLP :g	0.00	-16.44	43.30	16.44	1479.27	-0.14	-0.04	1479.27	0.00
EXTREME	CLP :g	0.00	-26.32	22.18	26.32	2026.91	-0.09	-0.11	2026.91	0.00
HEAVY/BROKEN	CLP :g	0.00	-15.60	42.15	15.60	1385.63	-0.14	-0.04	1385.63	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive rotation

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	CLP :t	0.01	80.23	-3.16	80.29	0.00	-5.95	0.00
EXTREME	CLP :t	0.00	104.75	-5.32	104.89	0.00	-7.82	0.00
HEAVY/BROKEN	CLP :t	0.01	74.83	-2.75	74.88	0.00	-5.57	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
CLP	1	1854	EXTREME	74.31	290.52
CLP	2	3496	EXTREME	85.01	979.86
CLP	3	4553	EXTREME	81.92	1642.97
CLP	4	2253	EXTREME	90.58	2026.91

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
CLP	90.58	EXTREME	23	14259.4

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	43.57	HEAVY/BROKEN	1	65.6
ARM1.1L	30.93	NESC HEAVY	1	65.6
ARM2.1R	43.72	HEAVY/BROKEN	1	65.6
ARM2.1L	31.43	HEAVY/BROKEN	1	65.6
ARM3.1R	43.94	HEAVY/BROKEN	1	65.6
ARM3.1L	31.80	HEAVY/BROKEN	1	65.6
WVGD1	0.02	EXTREME	1	7.5
WVGD2	0.02	EXTREME	1	7.5

WVGD3	0.02	EXTREME	1	7.5
WVGD4	0.02	EXTREME	1	7.5
WVGD5	0.02	EXTREME	1	7.5
WVGD6	0.02	EXTREME	1	7.5
WVGD7	0.02	EXTREME	1	7.5
WVGD8	0.02	EXTREME	1	7.5
WVGD9	0.02	EXTREME	1	7.5

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	70.45	CLP	Steel Pole
EXTREME	91.20	CLP	Base Plate
HEAVY/BROKEN	64.31	CLP	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Segment Label	Segment Number
NESC HEAVY	70.45	CLP	16
EXTREME	90.58	CLP	23
HEAVY/BROKEN	62.95	CLP	16

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC HEAVY	CLP	5	10.196	43.298	1479.272	-0.141	37.690	40.365	2	78.920	2.276	68.53
EXTREME	CLP	5	10.196	22.180	2026.910	-0.087	50.158	53.717	2	105.025	2.626	91.20
HEAVY/BROKEN	CLP	5	10.196	42.148	1385.626	-0.140	35.368	37.878	2	74.058	2.205	64.31

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Segment Label	Segment Number
NESC HEAVY	43.80	ARM3.1R	1
EXTREME	21.61	ARM3.1R	1
HEAVY/BROKEN	43.94	ARM3.1R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	9.45	NESC HEAVY	0.0
C2	Clamp	9.45	NESC HEAVY	0.0
C3	Clamp	9.45	NESC HEAVY	0.0
C4	Clamp	9.45	NESC HEAVY	0.0
C5	Clamp	9.45	NESC HEAVY	0.0
C6	Clamp	9.45	NESC HEAVY	0.0
C9	Clamp	0.77	NESC HEAVY	0.0
C10	Clamp	1.55	NESC HEAVY	0.0
C11	Clamp	1.55	NESC HEAVY	0.0
C12	Clamp	1.55	NESC HEAVY	0.0
C13	Clamp	5.35	NESC HEAVY	0.0
C14	Clamp	1.55	NESC HEAVY	0.0
C15	Clamp	1.55	NESC HEAVY	0.0
C16	Clamp	1.55	NESC HEAVY	0.0
C17	Clamp	1.55	NESC HEAVY	0.0
C18	Clamp	1.55	NESC HEAVY	0.0
C19	Clamp	1.55	NESC HEAVY	0.0
C20	Clamp	11.55	EXTREME	0.0

C21	Clamp	2.37	EXTREME	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	461.4
Weight of Steel Poles:	14259.4
Total:	14720.8

*** End of Report

```
**************************************************************************
*                                                                        *
*                              PLS-POLE                                  *
*                   POLE AND FRAME ANALYSIS AND DESIGN                   *
*                Copyright Power Line Systems, Inc. 1999-2006            *
*                                                                        *
**************************************************************************
```

Project Name : 115' UTILITY POLE - CL&P #1068
Project Notes: T-Mobile Site Ref. CT-11-290
Project File : J:\Jobs\0817400.WI - HPC-T-Mobile\CO03 - CT11290-Darien Downtown & Rte 1\Engineering\Structural\Calcs\PLS-Pole\CLP Pole 1068.pol
Date run : 9:14:08 AM Wednesday, June 10, 2009
by : PLS-POLE Version 9.04
Licensed to : Natcomm

Successfully performed nonlinear analysis

The model has 0 warnings.

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

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

Steel Pole Properties:

Steel Pole Property Label	Stock Number	Length (ft)	Default Embedded Length (ft)	Base Plate	Shape	Tip Diameter (in)	Base Diameter (in)	Taper (in/ft)	Default Drag Coef.	Tubes	Modulus of Elasticity Override (ksi)	Weight Density Override (lbs/ft^3)	Shape At Base	Strength Check Type	Distance From Tip (ft)	Ultimate Trans. Load (kips)	Ultimate Long. Load (kips)
CLP 1068	1068	115.00	0	Yes	8F	13.26	37.4	0	1.3	4 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)
CLP 1068	1	38	0.25	2.833	0.000	50.000	0.000	1854	0.22619	13.26	21.86	2.67

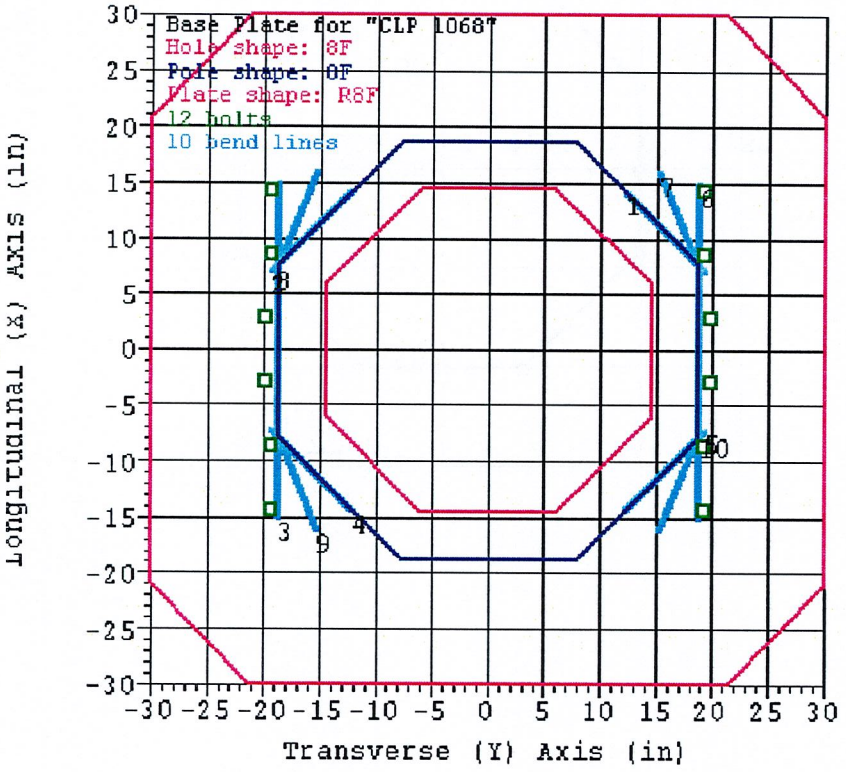
CLP 1068	2	39.833	0.3125	4.000	0.000	65.000	0.000	3496	0.22619	20.72	29.73	3.64
CLP 1068	3	34	0.375	5.083	0.000	65.000	0.000	4553	0.22619	28.20	35.89	4.39
CLP 1068	4	15.083	0.375	0.000	0.000	65.000	0.000	2253	0.22619	33.99	37.40	0.00

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CLP 1068	60.000	R8F	2.750	2103	0.000	29.000	8F	490.00	55.000	2.250	44.000	12	18099.29	4583.85

Base Plate Bolt Coordinates for Property "CLP 1068":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.1304	0.9005	0
0.3913	0.8776	0
0.6522	0.8776	0



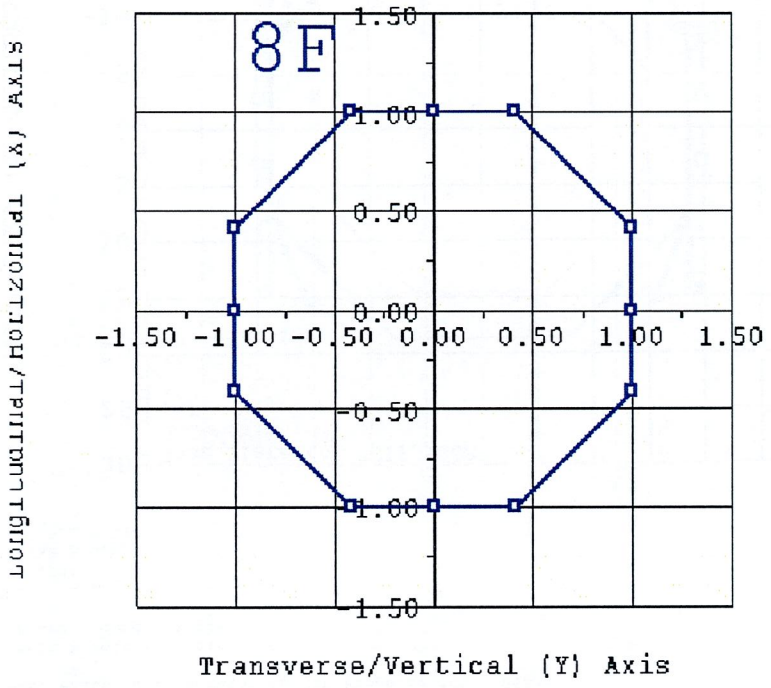
Steel Pole Connectivity:

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

CLP			0	0	0		0	0	CLP 1068 16 labels										0.00		0

Relative Attachment Labels for Steel Pole "CLP ":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
CLP :ARM 1	12.67	0.00
CLP :ARM 2	23.67	0.00
CLP :ARM 3	34.67	0.00
CLP :WVGD1	10.00	0.00
CLP :WVGD2	20.00	0.00
CLP :WVGD3	30.00	0.00
CLP :WVGD4	40.00	0.00
CLP :WVGD5	50.00	0.00
CLP :WVGD6	60.00	0.00
CLP :WVGD7	70.00	0.00
CLP :WVGD8	80.00	0.00
CLP :WVGD9	90.00	0.00
CLP :WVGD10	100.00	0.00
CLP :WVGD11	110.00	0.00
CLP :STUBTop	1.00	0.00
CLP :STUBBot	9.00	0.00



Pole Steel Properties:

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

CLP	CLP :t	CLP :t Ori	0.00	13.26	10.78	241.33	241.33	0.00	17.8	50.00	50.00	151.63	151.63
CLP	CLP :STUBTop	CLP :STUBTop End	1.00	13.49	10.97	254.13	254.13	0.00	18.2	50.00	50.00	157.00	157.00
CLP	CLP :STUBTop	CLP :STUBTop Ori	1.00	13.49	10.97	254.13	254.13	0.00	18.2	50.00	50.00	157.00	157.00
CLP	CLP :STUBBot	CLP :STUBBot End	9.00	15.30	12.47	373.19	373.19	0.00	21.2	50.00	50.00	203.28	203.28
CLP	CLP :STUBBot	CLP :STUBBot Ori	9.00	15.30	12.47	373.19	373.19	0.00	21.2	50.00	50.00	203.28	203.28
CLP	CLP :WVGD1	CLP :WVGD1 End	10.00	15.52	12.65	390.27	390.27	0.00	21.6	50.00	50.00	209.49	209.49
CLP	CLP :WVGD1	CLP :WVGD1 Ori	10.00	15.52	12.65	390.27	390.27	0.00	21.6	50.00	50.00	209.49	209.49
CLP	CLP :ARM 1	CLP :ARM 1 End	12.67	16.13	13.15	438.41	438.41	0.00	22.6	50.00	50.00	226.51	226.51
CLP	CLP :ARM 1	CLP :ARM 1 Ori	12.67	16.13	13.15	438.41	438.41	0.00	22.6	50.00	50.00	226.51	226.51
CLP	CLP :WVGD2	CLP :WVGD2 End	20.00	17.79	14.53	590.55	590.55	0.00	25.3	50.00	50.00	276.68	276.68
CLP	CLP :WVGD2	CLP :WVGD2 Ori	20.00	17.79	14.53	590.55	590.55	0.00	25.3	50.00	50.00	276.68	276.68
CLP	CLP :ARM 2	CLP :ARM 2 End	23.67	18.62	15.22	678.43	678.43	0.00	26.7	50.00	50.00	303.68	303.68
CLP	CLP :ARM 2	CLP :ARM 2 Ori	23.67	18.62	15.22	678.43	678.43	0.00	26.7	50.00	50.00	303.68	303.68
CLP	CLP :WVGD3	CLP :WVGD3 End	30.00	20.05	16.40	849.76	849.76	0.00	29.1	50.00	50.00	353.21	353.21
CLP	CLP :WVGD3	CLP :WVGD3 Ori	30.00	20.05	16.40	849.76	849.76	0.00	29.1	50.00	50.00	353.21	353.21
CLP	CLP :ARM 3	CLP :ARM 3 End	34.67	21.11	17.28	993.14	993.14	0.00	30.8	50.00	50.00	392.14	392.14
CLP	CLP :ARM 3	CLP :ARM 3 Ori	34.67	21.11	17.28	993.14	993.14	0.00	30.8	50.00	50.00	392.14	392.14
CLP	#CLP :0	SpliceT End	35.17	21.22	17.37	1009.29	1009.29	0.00	31.0	50.00	50.00	396.41	396.41
CLP	#CLP :0	SpliceT Ori	35.17	21.22	17.37	1009.29	1009.29	0.00	31.0	50.00	50.00	396.41	396.41
CLP	#CLP :1	SpliceB End	38.00	21.36	21.79	1275.90	1275.90	0.00	24.2	65.00	65.00	647.16	647.16
CLP	#CLP :1	SpliceB Ori	38.00	21.36	21.79	1275.90	1275.90	0.00	24.2	65.00	65.00	647.16	647.16
CLP	CLP :WVGD4	CLP :WVGD4 End	40.00	21.81	22.26	1359.94	1359.94	0.00	24.8	65.00	65.00	675.48	675.48
CLP	CLP :WVGD4	CLP :WVGD4 Ori	40.00	21.81	22.26	1359.94	1359.94	0.00	24.8	65.00	65.00	675.48	675.48
CLP	CLP :WVGD5	CLP :WVGD5 End	50.00	24.07	24.60	1835.88	1835.88	0.00	27.8	65.00	65.00	826.20	826.20
CLP	CLP :WVGD5	CLP :WVGD5 Ori	50.00	24.07	24.60	1835.88	1835.88	0.00	27.8	65.00	65.00	826.20	826.20
CLP	CLP :WVGD6	CLP :WVGD6 End	60.00	26.33	26.95	2411.62	2411.62	0.00	30.8	65.00	65.00	992.08	992.08
CLP	CLP :WVGD6	CLP :WVGD6 Ori	60.00	26.33	26.95	2411.62	2411.62	0.00	30.8	65.00	65.00	992.08	992.08
CLP	CLP :WVGD7	CLP :WVGD7 End	70.00	28.60	29.29	3096.68	3096.68	0.00	33.8	65.00	63.66	1148.92	1148.92
CLP	CLP :WVGD7	CLP :WVGD7 Ori	70.00	28.60	29.29	3096.68	3096.68	0.00	33.8	65.00	63.66	1148.92	1148.92
CLP	#CLP :2	SpliceT End	71.00	28.82	29.52	3171.56	3171.56	0.00	34.1	65.00	63.40	1162.81	1162.81
CLP	#CLP :2	SpliceT Ori	71.00	28.82	29.52	3171.56	3171.56	0.00	34.1	65.00	63.40	1162.81	1162.81
CLP	#CLP :3	SpliceB End	75.00	29.10	35.70	3893.75	3893.75	0.00	28.0	65.00	65.00	1449.44	1449.44
CLP	#CLP :3	SpliceB Ori	75.00	29.10	35.70	3893.75	3893.75	0.00	28.0	65.00	65.00	1449.44	1449.44
CLP	CLP :WVGD8	CLP :WVGD8 End	80.00	30.23	37.10	4371.91	4371.91	0.00	29.3	65.00	65.00	1566.56	1566.56
CLP	CLP :WVGD8	CLP :WVGD8 Ori	80.00	30.23	37.10	4371.91	4371.91	0.00	29.3	65.00	65.00	1566.56	1566.56
CLP	CLP :WVGD9	CLP :WVGD9 End	90.00	32.50	39.91	5442.54	5442.54	0.00	31.8	65.00	65.00	1814.44	1814.44
CLP	CLP :WVGD9	CLP :WVGD9 Ori	90.00	32.50	39.91	5442.54	5442.54	0.00	31.8	65.00	65.00	1814.44	1814.44
CLP	#CLP :4	SpliceT End	99.92	34.74	42.70	6664.16	6664.16	0.00	34.2	65.00	63.26	2022.70	2022.70
CLP	#CLP :4	SpliceT Ori	99.92	34.74	42.70	6664.16	6664.16	0.00	34.2	65.00	63.26	2022.70	2022.70
CLP	CLP :WVGD10	CLP :WVGD10 End	100.00	34.01	41.79	6247.76	6247.76	0.00	33.4	65.00	63.95	1958.07	1958.07
CLP	CLP :WVGD10	CLP :WVGD10 Ori	100.00	34.01	41.79	6247.76	6247.76	0.00	33.4	65.00	63.95	1958.07	1958.07
CLP	#CLP :5	SpliceB End	105.00	35.14	43.20	6899.42	6899.42	0.00	34.7	65.00	62.89	2058.03	2058.03
CLP	#CLP :5	SpliceB Ori	105.00	35.14	43.20	6899.42	6899.42	0.00	34.7	65.00	62.89	2058.03	2058.03
CLP	CLP :WVGD11	CLP :WVGD11 End	110.00	36.27	44.60	7594.89	7594.89	0.00	35.9	65.00	61.83	2157.85	2157.85
CLP	CLP :WVGD11	CLP :WVGD11 Ori	110.00	36.27	44.60	7594.90	7594.90	0.00	35.9	65.00	61.83	2157.85	2157.85
CLP	CLP :g	CLP :g End	115.00	37.40	46.01	8335.60	8335.60	0.00	37.2	65.00	60.77	2257.31	2257.31

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density Override (lbs/ft^3)	Steel Shape At End
ARM 1		8T	0.1875	6.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
ARM 2		8T	0.1875	6.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
ARM 3		8T	0.1875	6.875	3.5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
WVGUIDE		0	0.337	4.5	4.5	0	1.6	29000	1 point	Calculated	0	0	0	0	65	0	

Intermediate Joints for Davit Property "ARM 1":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	6.083	-1.25

Intermediate Joints for Davit Property "ARM 2":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	6.083	-1.25

Intermediate Joints for Davit Property "ARM 3":

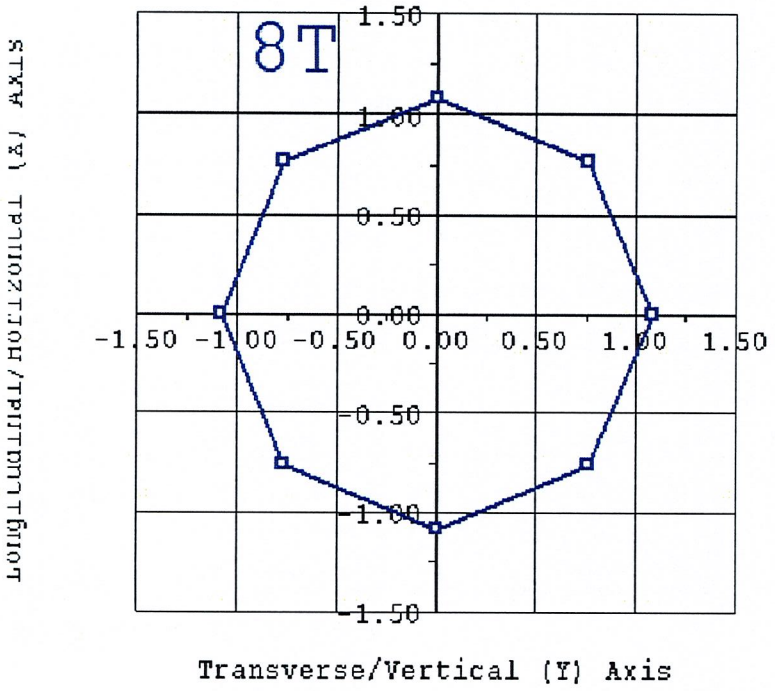
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	6.083	-1.25

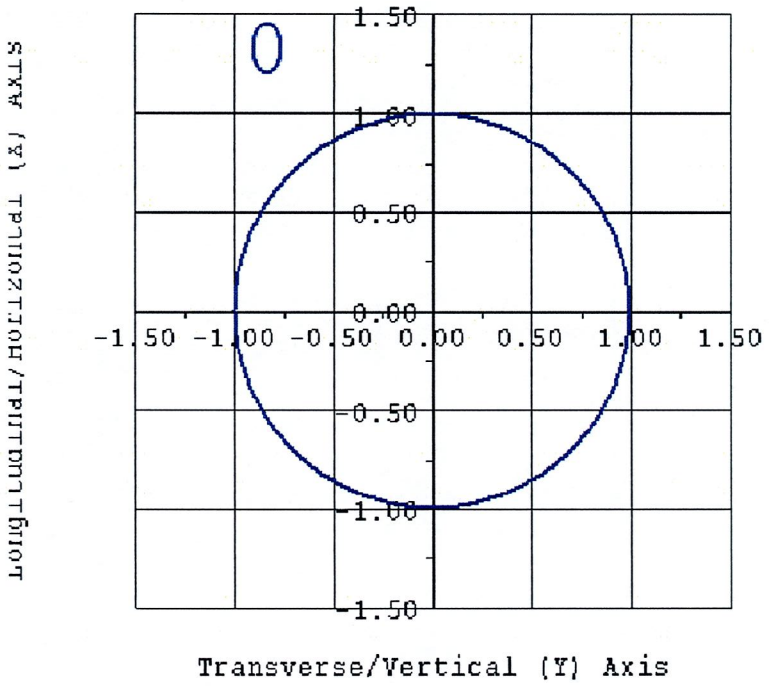
Intermediate Joints for Davit Property "WVGUIDE":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	0.5	0

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
ARM1.1R CLP	:ARM 1	ARM 1	0
ARM1.1L CLP	:ARM 1	ARM 1	180
ARM2.1R CLP	:ARM 2	ARM 2	0
ARM2.1L CLP	:ARM 2	ARM 2	180
ARM3.1R CLP	:ARM 3	ARM 3	0
ARM3.1L CLP	:ARM 3	ARM 3	180
WVGD1 CLP	:WVGD1	WVGUIDE	90
WVGD2 CLP	:WVGD2	WVGUIDE	90
WVGD3 CLP	:WVGD3	WVGUIDE	90
WVGD4 CLP	:WVGD4	WVGUIDE	90
WVGD5 CLP	:WVGD5	WVGUIDE	90
WVGD6 CLP	:WVGD6	WVGUIDE	90
WVGD7 CLP	:WVGD7	WVGUIDE	90
WVGD8 CLP	:WVGD8	WVGUIDE	90
WVGD9 CLP	:WVGD9	WVGUIDE	90


8T
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-1.50 -1.00 -0.50 0.00 0.50 1.00 1.50
Transverse/Vertical (Y) Axis
Longitudinal/Horizontal (X) Axis



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	ASCE Cap V-Mom. (ft-k)	ASCE Cap H-Mom. (ft-k)
ARM1.1R	ARM1.1R:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM1.1R	ARM1.1R:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
ARM1.1L	ARM1.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM1.1L	ARM1.1L:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
ARM2.1R	ARM2.1R:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM2.1R	ARM2.1R:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
ARM2.1L	ARM2.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM2.1L	ARM2.1L:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
ARM3.1R	ARM3.1R:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM3.1R	ARM3.1R:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
ARM3.1L	ARM3.1L:O	Origin	0.00	6.88	4.16	24.58	24.58	0.00	11.0	65.00	65.00	35.78	35.78
ARM3.1L	ARM3.1L:END	End	6.21	3.50	2.06	2.99	2.99	0.00	3.6	65.00	65.00	8.56	8.56
WVGD1	WVGD1:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD1	WVGD1:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD2	WVGD2:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD2	WVGD2:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD3	WVGD3:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD3	WVGD3:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14

WVGD4	WVGD4:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD4	WVGD4:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD5	WVGD5:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD5	WVGD5:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD6	WVGD6:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD6	WVGD6:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD7	WVGD7:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD7	WVGD7:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD8	WVGD8:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD8	WVGD8:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD9	WVGD9:O	Origin	0.00	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14
WVGD9	WVGD9:END	End	0.50	4.50	4.41	9.61	9.61	13.35	0.0	65.00	65.00	23.14	23.14

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
CLAMP		3e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
C1	ARM1.1R:END	CLAMP	No Limit
C2	ARM1.1L:END	CLAMP	No Limit
C3	ARM2.1R:END	CLAMP	No Limit
C4	ARM2.1L:END	CLAMP	No Limit
C5	ARM3.1R:END	CLAMP	No Limit
C6	ARM3.1L:END	CLAMP	No Limit
C9	CLP :WVGD1	CLAMP	No Limit
C10	CLP :WVGD2	CLAMP	No Limit
C11	CLP :WVGD3	CLAMP	No Limit
C12	CLP :WVGD4	CLAMP	No Limit
C13	CLP :WVGD5	CLAMP	No Limit
C14	CLP :WVGD6	CLAMP	No Limit
C15	CLP :WVGD7	CLAMP	No Limit
C16	CLP :WVGD8	CLAMP	No Limit
C17	CLP :WVGD9	CLAMP	No Limit
C18	CLP :WVGD10	CLAMP	No Limit
C19	CLP :WVGD11	CLAMP	No Limit
C20	CLP :STUBTop	CLAMP	No Limit
C21	CLP :STUBBot	CLAMP	No Limit

*** Loads Data

Loads from file: j:\jobs\0817400.wi - hpc-t-mobile\co03 - ct11290-darien downtown & rte 1\engineering\structural\calcs\pls-pole\cl&p pole # 1068.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)	115.00	(ft)
Structure height	115.00	(ft)
Structure height above ground	115.00	(ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF for Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC HEAVY	1.5000	2.5000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	4	0	0.500	56.000	No	Limit 0
EXTREME	1.0000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	32.3	0	0.000	56.000	No	Limit 0
HEAVY/BROKEN	1.5000	2.5000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	4	0	0.500	56.000	No	Limit 0

Point Loads for Load Case "NESC HEAVY":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
CLP :STUBTop	1395	1034	0	Linnet
ARM1.1L:END	2279	1685	0	BITTERN
ARM1.1R:END	2279	1685	0	BITTERN
ARM2.1L:END	2279	1685	0	BITTERN
ARM2.1R:END	2279	1685	0	BITTERN
ARM3.1L:END	2279	1685	0	BITTERN
ARM3.1R:END	2279	1685	0	BITTERN
CLP :WVGD5	826	901	0	OPGW-012
CLP :WVGD1	230	30	0	Coax Cable
CLP :WVGD2	460	60	0	Coax Cable
CLP :WVGD3	460	60	0	Coax Cable
CLP :WVGD4	460	60	0	Coax Cable
CLP :WVGD5	460	60	0	Coax Cable
CLP :WVGD6	460	60	0	Coax Cable
CLP :WVGD7	460	60	0	Coax Cable
CLP :WVGD8	460	60	0	Coax Cable
CLP :WVGD9	460	60	0	Coax Cable
CLP :WVGD10	460	60	0	Coax Cable
CLP :WVGD11	460	60	0	Coax Cable
CLP :STUBTop	1263	631	0	Mast Top Connection
CLP :STUBBot	331	-192	0	Mast Bottom Connection

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

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	Section Bottom	Section Average	Outer Diameter	Reynolds Number	Drag Coef.	Adjusted Wind	Adjusted Ice	Pole Vert.	Pole Wind	Pole Ice Vertical	Pole Ice Wind	Tran. Wind	Long. Wind

			Z (ft)	Z (ft)	Elevation (ft)	(in)		Pressure (psf)	Thickness (in)	Load (lbs)	Load (lbs)	Load (lbs)	Load (lbs)	Load (lbs)	Load (lbs)
CLP	CLP :t	CLP :STUBTop	115.00	114.00	114.50	13.376	6.33e+005 1.300	10.00	0.50	55.50	14.49	8.62	1.08	15.57	0.00
CLP	CLP :STUBTop	CLP :STUBBot	114.00	106.00	110.00	14.394	6.81e+005 1.300	10.00	0.50	478.45	124.75	74.20	8.67	133.41	0.00
CLP	CLP :STUBBot	CLP :WVGD1	106.00	105.00	105.50	15.412	7.3e+005 1.300	10.00	0.50	64.11	16.70	9.93	1.08	17.78	0.00
CLP	CLP :WVGD1	CLP :ARM 1	105.00	102.33	103.66	15.827	7.49e+005 1.300	10.00	0.50	175.86	45.78	27.23	2.89	48.67	0.00
CLP	CLP :ARM 1	CLP :WVGD2	102.33	95.00	98.67	16.958	8.03e+005 1.300	10.00	0.50	517.85	134.66	80.09	7.94	142.60	0.00
CLP	CLP :WVGD2	CLP :ARM 2	95.00	91.33	93.17	18.202	8.62e+005 1.300	10.00	0.50	278.58	72.37	43.04	3.98	76.34	0.00
CLP	CLP :ARM 2	CLP :WVGD3	91.33	85.00	88.17	19.333	9.15e+005 1.300	10.00	0.50	510.77	132.57	78.85	6.86	139.43	0.00
CLP	CLP :WVGD3	CLP :ARM 3	85.00	80.33	82.67	20.577	9.74e+005 1.300	10.00	0.50	401.39	104.10	61.92	5.06	109.16	0.00
CLP	CLP :ARM 3		80.33	79.83	80.08	21.161	1e+006 1.300	10.00	0.50	43.95	11.39	6.78	0.54	11.93	0.00
CLP			79.83	77.00	78.42	21.288	1.01e+006 1.300	10.00	0.50	565.20	65.33	38.86	3.07	68.40	0.00
CLP		CLP :WVGD4	77.00	75.00	76.00	21.584	1.02e+006 1.300	10.00	0.50	224.95	46.77	27.82	2.17	48.93	0.00
CLP	CLP :WVGD4	CLP :WVGD5	75.00	65.00	70.00	22.942	1.09e+006 1.300	10.00	0.50	1196.07	248.53	147.82	10.83	259.37	0.00
CLP	CLP :WVGD5	CLP :WVGD6	65.00	55.00	60.00	25.204	1.19e+006 1.300	10.00	0.50	1315.62	273.04	162.39	10.83	283.87	0.00
CLP	CLP :WVGD6	CLP :WVGD7	55.00	45.00	50.00	27.465	1.3e+006 1.300	10.00	0.50	1435.18	297.54	176.97	10.83	308.38	0.00
CLP	CLP :WVGD7		45.00	44.00	44.50	28.709	1.36e+006 1.300	10.00	0.50	150.09	31.10	18.50	1.08	32.19	0.00
CLP			44.00	40.00	42.00	28.962	1.37e+006 1.300	10.00	0.50	1329.44	125.50	74.65	4.33	129.84	0.00
CLP		CLP :WVGD8	40.00	35.00	37.50	29.668	1.4e+006 1.300	10.00	0.50	929.10	160.70	95.58	5.42	166.12	0.00
CLP	CLP :WVGD8	CLP :WVGD9	35.00	25.00	30.00	31.364	1.48e+006 1.300	10.00	0.50	1965.54	339.78	202.09	10.83	350.61	0.00
CLP	CLP :WVGD9		25.00	15.08	20.04	33.617	1.59e+006 1.300	10.00	0.50	2090.91	361.16	214.81	10.74	371.90	0.00
CLP		CLP :WVGD10	15.08	15.00	15.04	34.373	1.63e+006 1.300	10.00	0.50	35.80	3.09	1.84	0.09	3.18	0.00
CLP	CLP :WVGD10		15.00	10.00	12.50	34.573	1.64e+006 1.300	10.00	0.50	2192.82	187.27	111.38	5.42	192.68	0.00
CLP		CLP :WVGD11	10.00	5.00	7.50	35.704	1.69e+006 1.300	10.00	0.50	1120.54	193.39	115.02	5.42	198.81	0.00
CLP	CLP :WVGD11	CLP :g	5.00	0.00	2.50	36.835	1.74e+006 1.300	10.00	0.50	1156.25	199.52	118.67	5.42	204.94	0.00

Point Loads for Load Case "EXTREME":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
CLP :STUBTop	601	972	0	Linnet
ARM1.1L:END	1021	1830	0	BITTERN
ARM1.1R:END	1021	1830	0	BITTERN
ARM2.1L:END	1021	1830	0	BITTERN
ARM2.1R:END	1021	1830	0	BITTERN
ARM3.1L:END	1021	1830	0	BITTERN
ARM3.1R:END	1021	1830	0	BITTERN
CLP :WVGD5	244	828	0	OPGW-012
CLP :WVGD1	62	77	0	Coax Cable
CLP :WVGD2	125	155	0	Coax Cable
CLP :WVGD3	125	155	0	Coax Cable
CLP :WVGD4	125	155	0	Coax Cable
CLP :WVGD5	125	155	0	Coax Cable
CLP :WVGD6	125	155	0	Coax Cable
CLP :WVGD7	125	155	0	Coax Cable
CLP :WVGD8	125	155	0	Coax Cable
CLP :WVGD9	125	155	0	Coax Cable
CLP :WVGD10	125	155	0	Coax Cable
CLP :WVGD11	125	155	0	Coax Cable
CLP :STUBTop	525	2306	0	Mast Top Connection
CLP :STUBBot	130	-698	0	Mast Bottom Connection

Point Loads for Load Case "HEAVY/BROKEN":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
CLP :STUBTop	1395	1034	0	Linnet
ARM1.1L:END	1140	842	0	BITTERN
ARM1.1R:END	2279	1685	0	BITTERN
ARM2.1L:END	2279	1685	0	BITTERN
ARM2.1R:END	2279	1685	0	BITTERN
ARM3.1L:END	2279	1685	0	BITTERN
ARM3.1R:END	2279	1685	0	BITTERN
CLP :WVGD5	826	901	0	OPGW-012
CLP :WVGD1	230	30	0	Coax Cable
CLP :WVGD2	460	60	0	Coax Cable
CLP :WVGD3	460	60	0	Coax Cable
CLP :WVGD4	460	60	0	Coax Cable
CLP :WVGD5	460	60	0	Coax Cable

CLP :WVGD6	460	60	0	Coax Cable
CLP :WVGD7	460	60	0	Coax Cable
CLP :WVGD8	460	60	0	Coax Cable
CLP :WVGD9	460	60	0	Coax Cable
CLP :WVGD10	460	60	0	Coax Cable
CLP :WVGD11	460	60	0	Coax Cable
CLP :STUBTop	1263	631	0	Mast Top Connection
CLP :STUBBot	331	-192	0	Mast Bottom Connection

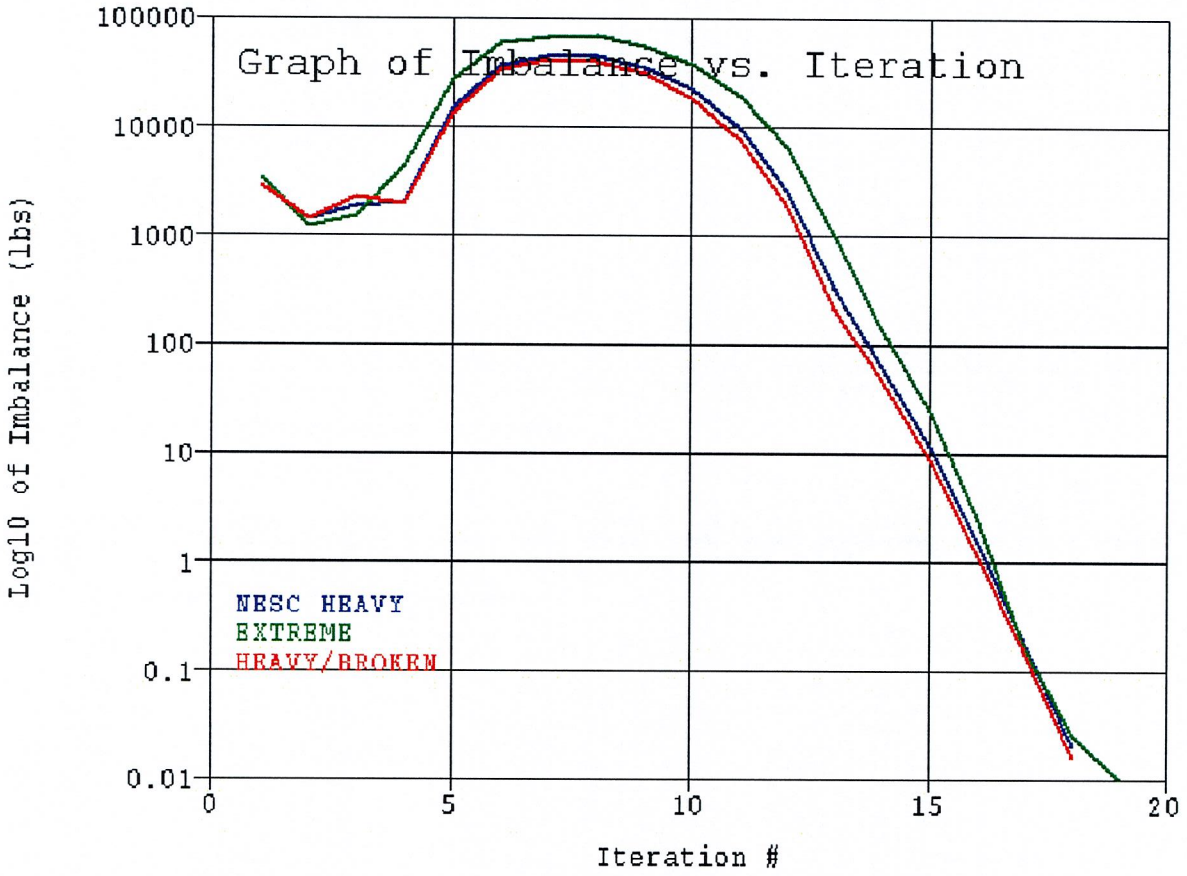
Detailed Pole Loading Data for Load Case "HEAVY/BROKEN":

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)
CLP	CLP :t	CLP :STUBTop	115.00	114.00	114.50	13.376	6.33e+005	1.300	10.00	0.50	55.50	14.49	8.62	1.08	15.57	0.00
CLP	CLP :STUBTop	CLP :STUBBot	114.00	106.00	110.00	14.394	6.81e+005	1.300	10.00	0.50	478.45	124.75	74.20	8.67	133.41	0.00
CLP	CLP :STUBBot	CLP :WVGD1	106.00	105.00	105.50	15.412	7.3e+005	1.300	10.00	0.50	64.11	16.70	9.93	1.08	17.78	0.00
CLP	CLP :WVGD1	CLP :ARM 1	105.00	102.33	103.66	15.827	7.49e+005	1.300	10.00	0.50	175.86	45.78	27.23	2.89	48.67	0.00
CLP	CLP :ARM 1	CLP :WVGD2	102.33	95.00	98.67	16.958	8.03e+005	1.300	10.00	0.50	517.85	134.66	80.09	7.94	142.60	0.00
CLP	CLP :WVGD2	CLP :ARM 2	95.00	91.33	93.17	18.202	8.62e+005	1.300	10.00	0.50	278.58	72.37	43.04	3.98	76.34	0.00
CLP	CLP :ARM 2	CLP :WVGD3	91.33	85.00	88.17	19.333	9.15e+005	1.300	10.00	0.50	510.77	132.57	78.85	6.86	139.43	0.00
CLP	CLP :WVGD3	CLP :ARM 3	85.00	80.33	82.67	20.577	9.74e+005	1.300	10.00	0.50	401.39	104.10	61.92	5.06	109.16	0.00
CLP	CLP :ARM 3		80.33	79.83	80.08	21.161	1e+006	1.300	10.00	0.50	43.95	11.39	6.78	0.54	11.93	0.00
CLP			79.83	77.00	78.42	21.288	1.01e+006	1.300	10.00	0.50	565.20	65.33	38.86	3.07	68.40	0.00
CLP		CLP :WVGD4	77.00	75.00	76.00	21.584	1.02e+006	1.300	10.00	0.50	224.95	46.77	27.82	2.17	48.93	0.00
CLP	CLP :WVGD4	CLP :WVGD5	75.00	65.00	70.00	22.942	1.09e+006	1.300	10.00	0.50	1196.07	248.53	147.82	10.83	259.37	0.00
CLP	CLP :WVGD5	CLP :WVGD6	65.00	55.00	60.00	25.204	1.19e+006	1.300	10.00	0.50	1315.62	273.04	162.39	10.83	283.87	0.00
CLP	CLP :WVGD6	CLP :WVGD7	55.00	45.00	50.00	27.465	1.3e+006	1.300	10.00	0.50	1435.18	297.54	176.97	10.83	308.38	0.00
CLP	CLP :WVGD7		45.00	44.00	44.50	28.709	1.36e+006	1.300	10.00	0.50	150.09	31.10	18.50	1.08	32.19	0.00
CLP			44.00	40.00	42.00	28.962	1.37e+006	1.300	10.00	0.50	1329.44	125.50	74.65	4.33	129.84	0.00
CLP		CLP :WVGD8	40.00	35.00	37.50	29.668	1.4e+006	1.300	10.00	0.50	929.10	160.70	95.58	5.42	166.12	0.00
CLP	CLP :WVGD8	CLP :WVGD9	35.00	25.00	30.00	31.364	1.48e+006	1.300	10.00	0.50	1965.54	339.78	202.09	10.83	350.61	0.00
CLP	CLP :WVGD9		25.00	15.08	20.04	33.617	1.59e+006	1.300	10.00	0.50	2090.91	361.16	214.81	10.74	371.90	0.00
CLP		CLP :WVGD10	15.08	15.00	15.04	34.373	1.63e+006	1.300	10.00	0.50	35.80	3.09	1.84	0.09	3.18	0.00
CLP	CLP :WVGD10		15.00	10.00	12.50	34.573	1.64e+006	1.300	10.00	0.50	2192.82	187.27	111.38	5.42	192.68	0.00
CLP		CLP :WVGD11	10.00	5.00	7.50	35.704	1.69e+006	1.300	10.00	0.50	1120.54	193.39	115.02	5.42	198.81	0.00
CLP	CLP :WVGD11	CLP :g	5.00	0.00	2.50	36.835	1.74e+006	1.300	10.00	0.50	1156.25	199.52	118.67	5.42	204.94	0.00

*** Analysis Results:

Maximum element usage is 91.20% for Base Plate "CLP " in load case "EXTREME"
Maximum insulator usage is 11.55% for Clamp "C20" in load case "EXTREME"



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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.0008019	6.686	-0.2633	-5.9486	0.0008	0.0003	0.0008019	6.686	114.7
CLP :STUBTop	0.0007882	6.582	-0.2579	-5.9486	0.0008	0.0003	0.0007882	6.582	113.7
CLP :STUBBot	0.0006789	5.756	-0.2151	-5.8891	0.0008	0.0003	0.0006789	5.756	105.8
CLP :WVGD1	0.0006652	5.653	-0.2098	-5.8761	0.0008	0.0003	0.0006652	5.653	104.8
CLP :ARM 1	0.0006301	5.381	-0.1958	-5.8373	0.0008	0.0003	0.0006301	5.381	102.1
CLP :WVGD2	0.0005365	4.646	-0.1587	-5.6316	0.0008	0.0003	0.0005365	4.646	94.84
CLP :ARM 2	0.0004926	4.29	-0.1414	-5.4925	0.0007	0.0003	0.0004926	4.29	91.19
CLP :WVGD3	0.0004208	3.7	-0.1136	-5.1794	0.0007	0.0003	0.0004208	3.7	84.89
CLP :ARM 3	0.0003721	3.288	-0.09527	-4.9063	0.0006	0.0002	0.0003721	3.288	80.23
CLP :WVGD4	0.0003204	2.847	-0.07679	-4.5810	0.0006	0.0002	0.0003204	2.847	74.92

CLP :WVGD5	0.0002342	2.101	-0.04858	-3.9286	0.0005	0.0002	0.0002342	2.101	64.95
CLP :WVGD6	0.0001626	1.473	-0.02847	-3.2366	0.0004	0.0001	0.0001626	1.473	54.97
CLP :WVGD7	0.0001053	0.9658	-0.01528	-2.5412	0.0003	0.0001	0.0001053	0.9658	44.98
CLP :WVGD8	6.185e-005	0.5776	-0.0074	-1.9149	0.0002	0.0001	6.185e-005	0.5776	34.99
CLP :WVGD9	3.037e-005	0.2919	-0.003019	-1.3402	0.0001	0.0001	3.037e-005	0.2919	25
CLP :WVGD10	1.037e-005	0.1038	-0.0009478	-0.7988	0.0001	0.0000	1.037e-005	0.1038	15
CLP :WVGD11	1.096e-006	0.01148	-0.0001754	-0.2568	0.0000	0.0000	1.096e-006	0.01148	5
ARM1.1R:O	0.0006254	5.377	-0.2642	-5.8373	0.0008	0.0003	0.0006254	6.049	102.1
ARM1.1R:END	0.0005989	5.48	-0.9604	-6.8201	0.0008	0.0003	0.0005989	12.23	102.6
ARM1.1L:O	0.0006347	5.384	-0.1275	-5.8373	0.0008	0.0003	0.0006347	4.712	102.2
ARM1.1L:END	0.0006937	5.528	0.4368	-5.1477	0.0008	0.0003	0.0006937	-1.227	104
ARM2.1R:O	0.0004878	4.286	-0.2156	-5.4925	0.0007	0.0003	0.0004878	5.062	91.11
ARM2.1R:END	0.0004645	4.385	-0.8749	-6.4788	0.0007	0.0003	0.0004645	11.24	91.71
ARM2.1L:O	0.0004973	4.294	-0.06711	-5.4925	0.0007	0.0003	0.0004973	3.518	91.26
ARM2.1L:END	0.0005499	4.427	0.461	-4.7973	0.0007	0.0003	0.0005499	-2.432	93.04
ARM3.1R:O	0.0003676	3.285	-0.1705	-4.9063	0.0006	0.0002	0.0003676	4.165	80.16
ARM3.1R:END	0.0003486	3.378	-0.767	-5.8984	0.0006	0.0002	0.0003486	10.34	80.81
ARM3.1L:O	0.0003766	3.292	-0.02006	-4.9063	0.0006	0.0002	0.0003766	2.412	80.31
ARM3.1L:END	0.0004206	3.407	0.4464	-4.2017	0.0006	0.0002	0.0004206	-3.556	82.03
WVGD1:O	0.0006652	5.653	-0.2098	-5.8761	0.0008	0.0003	0.6475	5.653	104.8
WVGD1:END	0.0006652	5.653	-0.2098	-5.8761	0.0008	0.0003	1.148	5.653	104.8
WVGD2:O	0.0005365	4.646	-0.1588	-5.6316	0.0008	0.0003	0.7417	4.646	94.84
WVGD2:END	0.0005365	4.646	-0.1588	-5.6316	0.0008	0.0003	1.242	4.646	94.84
WVGD3:O	0.0004208	3.7	-0.1136	-5.1794	0.0007	0.0003	0.8358	3.7	84.89
WVGD3:END	0.0004208	3.7	-0.1136	-5.1794	0.0007	0.0003	1.336	3.7	84.89
WVGD4:O	0.0003204	2.847	-0.07679	-4.5810	0.0006	0.0002	0.9091	2.847	74.92
WVGD4:END	0.0003204	2.847	-0.0768	-4.5810	0.0006	0.0002	1.409	2.847	74.92
WVGD5:O	0.0002342	2.101	-0.04859	-3.9286	0.0005	0.0002	1.003	2.101	64.95
WVGD5:END	0.0002342	2.101	-0.04859	-3.9286	0.0005	0.0002	1.503	2.101	64.95
WVGD6:O	0.0001626	1.473	-0.02848	-3.2366	0.0004	0.0001	1.097	1.473	54.97
WVGD6:END	0.0001626	1.473	-0.02848	-3.2366	0.0004	0.0002	1.597	1.473	54.97
WVGD7:O	0.0001053	0.9658	-0.01529	-2.5412	0.0003	0.0001	1.192	0.9658	44.98
WVGD7:END	0.0001053	0.9658	-0.01529	-2.5412	0.0003	0.0001	1.692	0.9658	44.98
WVGD8:O	6.185e-005	0.5776	-0.007405	-1.9149	0.0002	0.0001	1.26	0.5776	34.99
WVGD8:END	6.185e-005	0.5776	-0.007407	-1.9149	0.0002	0.0001	1.76	0.5776	34.99
WVGD9:O	3.037e-005	0.2919	-0.003022	-1.3402	0.0001	0.0001	1.354	0.2919	25
WVGD9:END	3.037e-005	0.2919	-0.003024	-1.3402	0.0002	0.0001	1.854	0.2919	25

Joint Support Reactions for Load Case "NESC HEAVY":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y 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 %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
CLP :g	0.00	0.0	-16.44	0.0	43.30	0.0	0.0	46.31	0.0	1479.27	0.0	-0.1	0.0	-0.04	0.0	0.0

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
CLP	CLP :t	Origin	0.00	80.23	0.01	-3.16	-0.00	0.00	0.0	-0.03	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
CLP	CLP :STUBTop	End	1.00	78.99	0.01	-3.10	0.01	-0.00	0.0	-0.03	0.01	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	2
CLP	CLP :STUBTop	Origin	1.00	78.99	0.01	-3.10	0.01	-0.00	0.0	-2.81	2.05	-0.00	-0.26	0.00	0.39	0.00	0.72	1.4	4
CLP	CLP :STUBBot	End	9.00	69.07	0.01	-2.58	16.39	-0.00	0.0	-2.81	2.05	-0.00	-0.23	4.03	0.13	0.00	4.26	8.5	2
CLP	CLP :STUBBot	Origin	9.00	69.07	0.01	-2.58	16.39	-0.00	-0.0	-3.47	1.99	-0.00	-0.28	4.03	0.13	0.00	4.32	8.6	2
CLP	CLP :WVGD1	End	10.00	67.84	0.01	-2.52	18.38	-0.00	-0.0	-3.47	1.99	-0.00	-0.27	4.39	0.13	0.00	4.67	9.3	2
CLP	CLP :WVGD1	Origin	10.00	67.84	0.01	-2.52	18.38	-0.01	0.0	-3.85	2.10	-0.00	-0.30	4.39	0.13	0.00	4.70	9.4	2
CLP	CLP :ARM 1	End	12.67	64.57	0.01	-2.35	23.98	-0.01	0.0	-3.85	2.10	-0.00	-0.29	5.30	0.13	0.00	5.59	11.2	2
CLP	CLP :ARM 1	Origin	12.67	64.57	0.01	-2.35	28.56	-0.01	0.0	-8.64	6.06	-0.00	-0.66	6.31	0.37	0.00	6.99	14.0	2
CLP	CLP :WVGD2	End	20.00	55.75	0.01	-1.90	72.95	-0.01	0.0	-8.64	6.06	-0.00	-0.59	13.18	0.33	0.00	13.79	27.6	2
CLP	CLP :WVGD2	Origin	20.00	55.75	0.01	-1.90	72.95	-0.02	0.0	-9.58	6.29	-0.00	-0.66	13.18	0.34	0.00	13.86	27.7	2
CLP	CLP :ARM 2	End	23.67	51.48	0.01	-1.70	96.03	-0.02	0.0	-9.58	6.29	-0.00	-0.63	15.81	0.33	0.00	16.45	32.9	2
CLP	CLP :ARM 2	Origin	23.67	51.48	0.01	-1.70	100.57	-0.02	0.0	-14.48	10.20	-0.00	-0.95	16.56	0.53	0.00	17.54	35.1	2
CLP	CLP :WVGD3	End	30.00	44.40	0.01	-1.36	165.15	-0.02	0.0	-14.48	10.20	-0.00	-0.88	23.38	0.49	0.00	24.28	48.6	2
CLP	CLP :WVGD3	Origin	30.00	44.40	0.01	-1.36	165.15	-0.04	0.0	-15.52	10.40	-0.00	-0.95	23.38	0.50	0.00	24.34	48.7	2
CLP	CLP :ARM 3	End	34.67	39.46	0.00	-1.14	213.72	-0.04	0.0	-15.52	10.40	-0.00	-0.90	27.25	0.48	0.00	28.16	56.3	2
CLP	CLP :ARM 3	Origin	34.67	39.46	0.00	-1.14	218.20	-0.04	0.0	-20.25	14.20	-0.00	-1.17	27.82	0.65	0.00	29.02	58.0	2
CLP	SpliceT	End	35.17	38.95	0.00	-1.12	225.26	-0.04	0.0	-20.25	14.20	-0.00	-1.17	28.42	0.65	0.00	29.60	59.2	2
CLP	SpliceT	Origin	35.17	38.95	0.00	-1.12	225.26	-0.04	0.0	-20.60	14.24	-0.00	-1.19	28.42	0.65	0.00	29.62	59.2	2
CLP	SpliceB	End	38.00	36.11	0.00	-1.00	265.59	-0.04	0.0	-20.60	14.24	-0.00	-0.95	26.68	0.52	0.00	27.64	42.5	2
CLP	SpliceB	Origin	38.00	36.11	0.00	-1.00	265.59	-0.04	0.0	-21.07	14.27	-0.00	-0.97	26.68	0.52	0.00	27.66	42.6	2

CLP	CLP :WVGD4	End	40.00	34.17	0.00	-0.92	294.14	-0.04	0.0	-21.07	14.27	-0.00	-0.95	28.31	0.51	0.00	29.27	45.0	2
CLP	CLP :WVGD4	Origin	40.00	34.17	0.00	-0.92	294.14	-0.05	0.0	-22.42	14.45	-0.00	-1.01	28.31	0.52	0.00	29.33	45.1	2
CLP	CLP :WVGD5	End	50.00	25.21	0.00	-0.58	438.64	-0.05	0.0	-22.42	14.45	-0.00	-0.91	34.51	0.47	0.00	35.43	54.5	2
CLP	CLP :WVGD5	Origin	50.00	25.21	0.00	-0.58	438.64	-0.07	0.0	-25.23	15.59	-0.00	-1.03	34.51	0.50	0.00	35.55	54.7	2
CLP	CLP :WVGD6	End	60.00	17.67	0.00	-0.34	594.51	-0.07	0.0	-25.23	15.59	-0.00	-0.94	38.95	0.46	0.00	39.90	61.4	2
CLP	CLP :WVGD6	Origin	60.00	17.67	0.00	-0.34	594.51	-0.08	0.0	-27.43	15.74	-0.00	-1.02	38.95	0.46	0.00	39.98	62.4	2
CLP	CLP :WVGD7	End	70.00	11.59	0.00	-0.18	751.89	-0.09	0.0	-27.43	15.74	-0.00	-0.94	41.66	0.43	0.00	42.61	66.9	2
CLP	CLP :WVGD7	Origin	70.00	11.59	0.00	-0.18	751.89	-0.10	0.0	-28.90	15.84	-0.00	-0.99	41.66	0.43	0.00	42.66	67.0	2
CLP	SpliceT	End	71.00	11.06	0.00	-0.17	767.74	-0.10	0.0	-28.90	15.84	-0.00	-0.98	41.86	0.43	0.00	42.85	67.6	2
CLP	SpliceT	Origin	71.00	11.06	0.00	-0.17	767.74	-0.10	0.0	-29.73	15.87	-0.00	-1.01	41.86	0.43	0.00	42.88	70.5	2
CLP	SpliceB	End	75.00	9.10	0.00	-0.13	831.23	-0.10	0.0	-29.73	15.87	-0.00	-0.83	37.28	0.35	0.00	38.12	58.6	2
CLP	SpliceB	Origin	75.00	9.10	0.00	-0.13	831.23	-0.10	0.0	-31.02	15.92	-0.00	-0.87	37.28	0.35	0.00	38.15	58.7	2
CLP	CLP :WVGD8	End	80.00	6.93	0.00	-0.09	910.83	-0.10	0.0	-31.02	15.92	-0.00	-0.84	37.79	0.34	0.00	38.63	59.4	2
CLP	CLP :WVGD8	Origin	80.00	6.93	0.00	-0.09	910.83	-0.12	0.0	-33.20	16.07	-0.00	-0.89	37.79	0.34	0.00	38.69	59.5	2
CLP	CLP :WVGD9	End	90.00	3.50	0.00	-0.04	1071.48	-0.12	0.0	-33.20	16.07	-0.00	-0.83	38.39	0.32	0.00	39.22	60.3	2
CLP	CLP :WVGD9	Origin	90.00	3.50	0.00	-0.04	1071.48	-0.14	0.0	-36.07	16.22	-0.00	-0.90	38.39	0.32	0.00	39.29	60.5	2
CLP	SpliceT	End	99.92	1.26	0.00	-0.01	1232.31	-0.14	0.0	-36.07	16.22	-0.00	-0.84	38.54	0.30	0.00	39.39	62.3	2
CLP	SpliceT	Origin	99.92	1.26	0.00	-0.01	1232.31	-0.14	0.0	-37.32	16.25	-0.00	-0.87	38.54	0.30	0.00	39.42	62.3	2
CLP	CLP :WVGD10	End	100.00	1.25	0.00	-0.01	1233.65	-0.14	0.0	-37.32	16.25	-0.00	-0.89	40.29	0.31	0.00	41.19	64.4	2
CLP	CLP :WVGD10	Origin	100.00	1.25	0.00	-0.01	1233.65	-0.14	0.0	-38.99	16.33	-0.00	-0.93	40.29	0.31	0.00	41.23	64.5	2
CLP	SpliceB	End	105.00	0.55	0.00	-0.01	1315.32	-0.14	0.0	-38.99	16.33	-0.00	-0.90	40.19	0.30	0.00	41.10	65.4	2
CLP	SpliceB	Origin	105.00	0.55	0.00	-0.01	1315.32	-0.14	0.0	-40.83	16.36	-0.00	-0.95	40.19	0.30	0.00	41.14	65.4	2
CLP	CLP :WVGD11	End	110.00	0.14	0.00	-0.00	1397.10	-0.14	0.0	-40.83	16.36	-0.00	-0.92	40.03	0.29	0.00	40.95	66.2	2
CLP	CLP :WVGD11	Origin	110.00	0.14	0.00	-0.00	1397.10	-0.14	0.0	-42.62	16.44	-0.00	-0.96	40.03	0.29	0.00	40.99	66.3	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	1479.27	-0.14	0.0	-42.62	16.44	-0.00	-0.93	39.82	0.28	0.00	40.75	67.1	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1.1R	ARM1.1R:O	Origin	0.00	64.53	0.01	-3.17	-15.34	-0.00	0.0	1.47	2.47	0.00	0.35	27.86	0.00	0.00	28.21	43.4	1
ARM1.1R	ARM1.1R:END	End	6.21	65.76	0.01	-11.53	0.00	-0.00	0.0	1.47	2.47	0.00	0.71	0.00	2.51	0.00	4.41	6.8	3
ARM1.1L	ARM1.1L:O	Origin	0.00	64.61	0.01	-1.53	-10.76	0.00	-0.0	-2.29	1.73	-0.00	-0.55	19.55	0.00	0.00	20.10	30.9	1
ARM1.1L	ARM1.1L:END	End	6.21	66.34	0.01	5.24	-0.00	-0.00	-0.0	-2.29	1.73	-0.00	-1.11	0.00	1.76	0.00	3.25	5.0	3
ARM2.1R	ARM2.1R:O	Origin	0.00	51.44	0.01	-2.59	-15.39	-0.00	-0.0	1.46	2.48	0.00	0.35	27.96	0.00	0.00	28.31	43.6	1
ARM2.1R	ARM2.1R:END	End	6.21	52.63	0.01	-10.50	0.00	-0.00	-0.0	1.46	2.48	0.00	0.71	0.00	2.52	0.00	4.42	6.8	3
ARM2.1L	ARM2.1L:O	Origin	0.00	51.52	0.01	-0.81	-10.85	0.00	-0.0	-2.28	1.75	-0.00	-0.55	19.71	0.00	0.00	20.26	31.2	1
ARM2.1L	ARM2.1L:END	End	6.21	53.12	0.01	5.53	-0.00	-0.00	-0.0	-2.28	1.75	-0.00	-1.11	0.00	1.78	0.00	3.27	5.0	3
ARM3.1R	ARM3.1R:O	Origin	0.00	39.42	0.00	-2.05	-15.48	-0.00	-0.0	1.43	2.49	0.00	0.34	28.13	0.00	0.00	28.47	43.8	1
ARM3.1R	ARM3.1R:END	End	6.21	40.53	0.00	-9.20	0.00	-0.00	-0.0	1.43	2.49	0.00	0.70	0.00	2.53	0.00	4.44	6.8	3
ARM3.1L	ARM3.1L:O	Origin	0.00	39.50	0.00	-0.24	-10.99	0.00	-0.0	-2.26	1.77	-0.00	-0.54	19.97	0.00	0.00	20.52	31.6	1
ARM3.1L	ARM3.1L:END	End	6.21	40.88	0.01	5.36	-0.00	-0.00	-0.0	-2.26	1.77	-0.00	-1.10	0.00	1.80	0.00	3.31	5.1	3
WVGD1	WVGD1:O	Origin	0.00	67.84	0.01	-2.52	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD1	WVGD1:END	End	0.50	67.84	0.01	-2.52	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD2	WVGD2:O	Origin	0.00	55.75	0.01	-1.91	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD2	WVGD2:END	End	0.50	55.75	0.01	-1.91	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD3	WVGD3:O	Origin	0.00	44.40	0.01	-1.36	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD3	WVGD3:END	End	0.50	44.40	0.01	-1.36	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD4	WVGD4:O	Origin	0.00	34.17	0.00	-0.92	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD4	WVGD4:END	End	0.50	34.17	0.00	-0.92	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD5	WVGD5:O	Origin	0.00	25.21	0.00	-0.58	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD5	WVGD5:END	End	0.50	25.21	0.00	-0.58	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD6	WVGD6:O	Origin	0.00	17.67	0.00	-0.34	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD6	WVGD6:END	End	0.50	17.67	0.00	-0.34	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD7	WVGD7:O	Origin	0.00	11.59	0.00	-0.18	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD7	WVGD7:END	End	0.50	11.59	0.00	-0.18	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD8	WVGD8:O	Origin	0.00	6.93	0.00	-0.09	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD8	WVGD8:END	End	0.50	6.93	0.00	-0.09	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1

WVGD9	WVGD9:O	Origin	0.00	3.50	0.00	-0.04	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD9	WVGD9:END	End	0.50	3.50	0.00	-0.04	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	2.834	30.00	30.00	9.45
C2	2.834	30.00	30.00	9.45
C3	2.834	30.00	30.00	9.45
C4	2.834	30.00	30.00	9.45
C5	2.834	30.00	30.00	9.45
C6	2.834	30.00	30.00	9.45
C9	0.232	30.00	30.00	0.77
C10	0.464	30.00	30.00	1.55
C11	0.464	30.00	30.00	1.55
C12	0.464	30.00	30.00	1.55
C13	1.605	30.00	30.00	5.35
C14	0.464	30.00	30.00	1.55
C15	0.464	30.00	30.00	1.55
C16	0.464	30.00	30.00	1.55
C17	0.464	30.00	30.00	1.55
C18	0.464	30.00	30.00	1.55
C19	0.464	30.00	30.00	1.55
C20	3.136	30.00	30.00	10.45
C21	0.383	30.00	30.00	1.28

*** Analysis Results for Load Case No. 2 "EXTREME" - Number of iterations in SAPS 19

Equilibrium Joint Positions and Rotations for Load Case "EXTREME":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.000351	8.73	-0.4432	-7.8160	0.0005	0.0009	0.000351	8.73	114.6
CLP :STUBTop	0.0003451	8.594	-0.4339	-7.8160	0.0005	0.0009	0.0003451	8.594	113.6
CLP :STUBBot	0.0002974	7.51	-0.3602	-7.7093	0.0005	0.0009	0.0002974	7.51	105.6
CLP :WVGD1	0.0002915	7.376	-0.3512	-7.6862	0.0005	0.0009	0.0002915	7.376	104.6
CLP :ARM 1	0.0002785	7.021	-0.3274	-7.6179	0.0005	0.0009	0.0002785	7.021	102
CLP :WVGD2	0.000242	6.065	-0.2648	-7.3147	0.0004	0.0008	0.000242	6.065	94.74
CLP :ARM 2	0.000226	5.604	-0.2356	-7.1205	0.0004	0.0008	0.000226	5.604	91.09
CLP :WVGD3	0.000198	4.84	-0.1893	-6.7028	0.0004	0.0007	0.000198	4.84	84.81
CLP :ARM 3	0.0001793	4.309	-0.1589	-6.3467	0.0004	0.0007	0.0001793	4.309	80.17
CLP :WVGD4	0.0001577	3.738	-0.1282	-5.9303	0.0003	0.0006	0.0001577	3.738	74.87
CLP :WVGD5	0.00012	2.771	-0.08119	-5.1046	0.0003	0.0005	0.00012	2.771	64.92
CLP :WVGD6	8.66e-005	1.953	-0.04751	-4.2307	0.0002	0.0004	8.66e-005	1.953	54.95
CLP :WVGD7	5.814e-005	1.288	-0.02525	-3.3476	0.0002	0.0003	5.814e-005	1.288	44.97
CLP :WVGD8	3.523e-005	0.7751	-0.01186	-2.5442	0.0001	0.0002	3.523e-005	0.7751	34.99
CLP :WVGD9	1.778e-005	0.394	-0.004453	-1.7959	0.0001	0.0002	1.778e-005	0.394	25
CLP :WVGD10	6.226e-006	0.141	-0.001102	-1.0796	0.0001	0.0001	6.226e-006	0.141	15
CLP :WVGD11	6.739e-007	0.01571	-0.0001073	-0.3503	0.0000	0.0000	6.739e-007	0.01571	5
ARM1.1R:O	0.0002678	7.015	-0.4164	-7.6179	0.0005	0.0009	0.0002678	7.687	101.9
ARM1.1R:END	0.0001778	7.129	-1.268	-8.0833	0.0004	0.0008	0.0001778	13.88	102.3
ARM1.1L:O	0.0002892	7.027	-0.2383	-7.6179	0.0005	0.0009	0.0002892	6.355	102.1
ARM1.1L:END	0.0003952	7.242	0.5464	-7.4627	0.0005	0.0009	0.0003952	0.4874	104.1
ARM2.1R:O	0.000215	5.598	-0.3318	-7.1205	0.0004	0.0008	0.000215	6.374	91
ARM2.1R:END	0.0001351	5.709	-1.13	-7.5919	0.0004	0.0008	0.0001351	12.57	91.45
ARM2.1L:O	0.0002371	5.61	-0.1395	-7.1205	0.0004	0.0008	0.0002371	4.834	91.19
ARM2.1L:END	0.0003318	5.808	0.5937	-6.9579	0.0004	0.0008	0.0003318	-1.051	93.17
ARM3.1R:O	0.0001687	4.303	-0.2561	-6.3467	0.0004	0.0007	0.0001687	5.183	80.07
ARM3.1R:END	0.0001017	4.407	-0.971	-6.8275	0.0003	0.0006	0.0001017	11.37	80.61
ARM3.1L:O	0.0001898	4.314	-0.06166	-6.3467	0.0004	0.0007	0.0001898	3.435	80.27
ARM3.1L:END	0.00027	4.486	0.591	-6.1728	0.0004	0.0007	0.00027	-2.477	82.17
WVGD1:O	0.0002915	7.376	-0.3512	-7.6862	0.0005	0.0009	0.6472	7.376	104.6
WVGD1:END	0.0002915	7.376	-0.3512	-7.6862	0.0005	0.0009	1.147	7.376	104.6
WVGD2:O	0.000242	6.065	-0.2648	-7.3147	0.0004	0.0008	0.7414	6.065	94.74
WVGD2:END	0.000242	6.066	-0.2648	-7.3147	0.0004	0.0008	1.241	6.066	94.74
WVGD3:O	0.000198	4.84	-0.1893	-6.7028	0.0004	0.0007	0.8356	4.84	84.81
WVGD3:END	0.000198	4.84	-0.1893	-6.7028	0.0004	0.0007	1.336	4.84	84.81
WVGD4:O	0.0001577	3.738	-0.1282	-5.9303	0.0003	0.0006	0.9089	3.738	74.87
WVGD4:END	0.0001577	3.738	-0.1282	-5.9303	0.0003	0.0006	1.409	3.738	74.87
WVGD5:O	0.00012	2.771	-0.0812	-5.1046	0.0003	0.0005	1.003	2.771	64.92
WVGD5:END	0.00012	2.771	-0.0812	-5.1046	0.0003	0.0005	1.503	2.771	64.92
WVGD6:O	8.66e-005	1.953	-0.04752	-4.2307	0.0002	0.0004	1.097	1.953	54.95
WVGD6:END	8.66e-005	1.953	-0.04752	-4.2307	0.0002	0.0004	1.597	1.953	54.95
WVGD7:O	5.814e-005	1.288	-0.02526	-3.3476	0.0002	0.0003	1.192	1.288	44.97
WVGD7:END	5.814e-005	1.288	-0.02526	-3.3476	0.0002	0.0003	1.692	1.288	44.97
WVGD8:O	3.523e-005	0.7751	-0.01186	-2.5442	0.0001	0.0002	1.26	0.7751	34.99
WVGD8:END	3.523e-005	0.7751	-0.01186	-2.5442	0.0001	0.0002	1.76	0.7751	34.99
WVGD9:O	1.778e-005	0.394	-0.004455	-1.7959	0.0001	0.0002	1.354	0.394	25
WVGD9:END	1.778e-005	0.394	-0.004456	-1.7959	0.0001	0.0002	1.854	0.394	25

Joint Support Reactions for Load Case "EXTREME":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y 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 %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
CLP :g	0.00	0.0	-26.32	0.0	22.18	0.0	0.0	34.42	0.0	2026.91	0.0	-0.1	0.0	-0.11	0.0	0.0

Detailed Steel Pole Usages for Load Case "EXTREME":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
CLP	CLP :t	Origin	0.00	104.75	0.00	-5.32	-0.00	0.00	0.0	-0.02	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	4

CLP	CLP :STUBTop	End	1.00	103.12	0.00	-5.21	0.03	-0.00	0.0	-0.02	0.03	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
CLP	CLP :STUBTop	Origin	1.00	103.12	0.00	-5.21	0.03	-0.00	0.0	-0.87	3.67	-0.00	-0.08	0.00	0.69	0.00	1.20	2.4	4
CLP	CLP :STUBBot	End	9.00	90.12	0.00	-4.32	29.39	-0.00	0.0	-0.87	3.67	-0.00	-0.07	7.23	0.23	0.00	7.31	14.6	2
CLP	CLP :STUBBot	Origin	9.00	90.12	0.00	-4.32	29.39	-0.00	-0.0	-1.27	3.24	-0.00	-0.10	7.23	0.21	0.00	7.34	14.7	2
CLP	CLP :WVGD1	End	10.00	88.52	0.00	-4.21	32.63	-0.00	-0.0	-1.27	3.24	-0.00	-0.10	7.79	0.20	0.00	7.90	15.8	2
CLP	CLP :WVGD1	Origin	10.00	88.52	0.00	-4.21	32.63	-0.01	0.0	-1.41	3.45	-0.00	-0.11	7.79	0.22	0.00	7.91	15.8	2
CLP	CLP :ARM 1	End	12.67	84.25	0.00	-3.93	41.84	-0.01	0.0	-1.41	3.45	-0.00	-0.11	9.24	0.21	0.00	9.35	18.7	2
CLP	CLP :ARM 1	Origin	12.67	84.25	0.00	-3.93	46.69	-0.01	0.0	-3.32	7.67	-0.00	-0.25	10.31	0.46	0.00	10.59	21.2	2
CLP	CLP :WVGD2	End	20.00	72.79	0.00	-3.18	102.94	-0.01	0.0	-3.32	7.67	-0.00	-0.23	18.60	0.42	0.00	18.85	37.7	2
CLP	CLP :WVGD2	Origin	20.00	72.79	0.00	-3.18	102.94	-0.01	0.0	-3.73	8.20	-0.00	-0.26	18.60	0.45	0.00	18.88	37.8	2
CLP	CLP :ARM 2	End	23.67	67.25	0.00	-2.83	133.04	-0.01	0.0	-3.73	8.20	-0.00	-0.25	21.91	0.43	0.00	22.16	44.3	2
CLP	CLP :ARM 2	Origin	23.67	67.25	0.00	-2.83	137.87	-0.01	0.0	-5.74	12.44	-0.00	-0.38	22.70	0.65	0.00	23.11	46.2	2
CLP	CLP :WVGD3	End	30.00	58.08	0.00	-2.27	216.60	-0.02	0.0	-5.74	12.44	-0.00	-0.35	30.66	0.60	0.00	31.03	62.1	2
CLP	CLP :WVGD3	Origin	30.00	58.08	0.00	-2.27	216.60	-0.02	0.0	-6.24	12.99	-0.00	-0.38	30.66	0.63	0.00	31.06	62.1	2
CLP	CLP :ARM 3	End	34.67	51.70	0.00	-1.91	277.25	-0.02	0.0	-6.24	12.99	-0.00	-0.36	35.35	0.60	0.00	35.73	71.5	2
CLP	CLP :ARM 3	Origin	34.67	51.70	0.00	-1.91	282.05	-0.02	0.0	-8.18	17.05	-0.00	-0.47	35.96	0.78	0.00	36.46	72.9	2
CLP	SpliceT	End	35.17	51.04	0.00	-1.87	290.52	-0.02	0.0	-8.18	17.05	-0.00	-0.47	36.65	0.78	0.00	37.14	74.3	2
CLP	SpliceT	Origin	35.17	51.04	0.00	-1.87	290.52	-0.02	0.0	-8.42	17.17	-0.00	-0.48	36.65	0.78	0.00	37.16	74.3	2
CLP	SpliceB	End	38.00	47.37	0.00	-1.67	339.17	-0.02	0.0	-8.42	17.17	-0.00	-0.39	34.07	0.63	0.00	34.47	53.0	2
CLP	SpliceB	Origin	38.00	47.37	0.00	-1.67	339.17	-0.02	0.0	-8.74	17.35	-0.00	-0.40	34.07	0.63	0.00	34.49	53.1	2
CLP	CLP :WVGD4	End	40.00	44.86	0.00	-1.54	373.87	-0.02	0.0	-8.74	17.35	-0.00	-0.39	35.98	0.62	0.00	36.39	56.0	2
CLP	CLP :WVGD4	Origin	40.00	44.86	0.00	-1.54	373.87	-0.03	0.0	-9.47	17.97	-0.00	-0.43	35.98	0.64	0.00	36.42	56.0	2
CLP	CLP :WVGD5	End	50.00	33.26	0.00	-0.97	553.61	-0.03	0.0	-9.47	17.97	-0.00	-0.38	43.56	0.58	0.00	43.95	67.6	2
CLP	CLP :WVGD5	Origin	50.00	33.26	0.00	-0.97	553.61	-0.04	0.1	-10.87	19.75	-0.00	-0.44	43.56	0.64	0.00	44.01	67.7	2
CLP	CLP :WVGD6	End	60.00	23.44	0.00	-0.57	751.15	-0.04	0.1	-10.87	19.75	-0.00	-0.40	49.22	0.58	0.00	49.63	76.4	2
CLP	CLP :WVGD6	Origin	60.00	23.44	0.00	-0.57	751.15	-0.05	0.1	-12.22	20.74	-0.00	-0.45	49.22	0.61	0.00	49.68	76.4	2
CLP	CLP :WVGD7	End	70.00	15.46	0.00	-0.30	958.50	-0.05	0.1	-12.22	20.74	-0.00	-0.42	53.11	0.56	0.00	53.54	84.1	2
CLP	CLP :WVGD7	Origin	70.00	15.46	0.00	-0.30	958.50	-0.06	0.1	-13.05	21.36	-0.00	-0.45	53.11	0.58	0.00	53.56	84.1	2
CLP	SpliceT	End	71.00	14.77	0.00	-0.28	979.86	-0.06	0.1	-13.05	21.36	-0.00	-0.44	53.43	0.57	0.00	53.88	85.0	2
CLP	SpliceT	Origin	71.00	14.77	0.00	-0.28	979.86	-0.06	0.1	-13.62	21.59	-0.00	-0.46	53.43	0.58	0.00	53.90	85.0	2
CLP	SpliceB	End	75.00	12.17	0.00	-0.21	1066.22	-0.06	0.1	-13.62	21.59	-0.00	-0.38	47.82	0.48	0.00	48.20	74.2	2
CLP	SpliceB	Origin	75.00	12.17	0.00	-0.21	1066.22	-0.06	0.1	-14.51	22.00	-0.00	-0.41	47.82	0.49	0.00	48.23	74.2	2
CLP	CLP :WVGD8	End	80.00	9.30	0.00	-0.14	1176.23	-0.06	0.1	-14.51	22.00	-0.00	-0.39	48.81	0.47	0.00	49.20	75.7	2
CLP	CLP :WVGD8	Origin	80.00	9.30	0.00	-0.14	1176.23	-0.08	0.1	-15.82	22.87	-0.00	-0.43	48.81	0.49	0.00	49.24	75.8	2
CLP	CLP :WVGD9	End	90.00	4.73	0.00	-0.05	1404.95	-0.08	0.1	-15.82	22.87	-0.00	-0.40	50.33	0.45	0.00	50.73	78.1	2
CLP	CLP :WVGD9	Origin	90.00	4.73	0.00	-0.05	1404.95	-0.09	0.1	-17.59	24.00	-0.00	-0.44	50.33	0.48	0.00	50.78	78.1	2
CLP	SpliceT	End	99.92	1.71	0.00	-0.01	1642.97	-0.09	0.1	-17.59	24.00	-0.00	-0.41	51.39	0.45	0.00	51.80	81.9	2
CLP	SpliceT	Origin	99.92	1.71	0.00	-0.01	1642.97	-0.09	0.1	-18.46	24.49	-0.00	-0.43	51.39	0.45	0.00	51.83	81.9	2
CLP	CLP :WVGD10	End	100.00	1.69	0.00	-0.01	1645.00	-0.09	0.1	-18.46	24.49	-0.00	-0.44	53.72	0.46	0.00	54.17	84.7	2
CLP	CLP :WVGD10	Origin	100.00	1.69	0.00	-0.01	1645.00	-0.09	0.1	-19.40	24.91	-0.00	-0.46	53.72	0.47	0.00	54.20	84.7	2
CLP	SpliceB	End	105.00	0.75	0.00	-0.00	1769.53	-0.09	0.1	-19.40	24.91	-0.00	-0.45	54.07	0.46	0.00	54.53	86.7	2
CLP	SpliceB	Origin	105.00	0.75	0.00	-0.00	1769.53	-0.09	0.1	-20.67	25.41	-0.00	-0.48	54.07	0.47	0.00	54.56	86.8	2
CLP	CLP :WVGD11	End	110.00	0.19	0.00	-0.00	1896.56	-0.09	0.1	-20.67	25.41	-0.00	-0.46	54.34	0.45	0.00	54.81	88.7	2
CLP	CLP :WVGD11	Origin	110.00	0.19	0.00	-0.00	1896.56	-0.09	0.1	-21.71	26.07	-0.00	-0.49	54.34	0.46	0.00	54.84	88.7	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	2026.91	-0.09	0.1	-21.71	26.07	-0.00	-0.47	54.57	0.45	0.00	55.04	90.6	2

Detailed Tubular Davit Arm Usages for Load Case "EXTREME":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1.1R	ARM1.1R:O	Origin	0.00	84.18	0.00	-5.00	-7.26	-0.00	-0.0	1.76	1.17	0.00	0.42	13.19	0.00	0.00	13.62	20.9	1
ARM1.1R	ARM1.1R:END	End	6.21	85.55	0.00	-15.21	0.00	0.00	-0.0	1.76	1.17	0.00	0.85	0.00	1.19	0.00	2.23	3.4	3
ARM1.1L	ARM1.1L:O	Origin	0.00	84.32	0.00	-2.86	-2.42	0.00	-0.0	-2.07	0.39	-0.00	-0.50	4.40	0.00	0.00	4.90	7.5	1
ARM1.1L	ARM1.1L:END	End	6.21	86.91	0.00	6.56	-0.00	-0.00	-0.0	-2.07	0.39	-0.00	-1.01	0.00	0.40	0.00	1.22	1.9	3
ARM2.1R	ARM2.1R:O	Origin	0.00	67.18	0.00	-3.98	-7.36	-0.00	-0.0	1.75	1.18	0.00	0.42	13.37	0.00	0.00	13.79	21.2	1
ARM2.1R	ARM2.1R:END	End	6.21	68.50	0.00	-13.56	0.00	0.00	-0.0	1.75	1.18	0.00	0.85	0.00	1.20	0.00	2.25	3.5	3
ARM2.1L	ARM2.1L:O	Origin	0.00	67.32	0.00	-1.67	-2.54	0.00	-0.0	-2.07	0.41	-0.00	-0.50	4.61	0.00	0.00	5.11	7.9	1
ARM2.1L	ARM2.1L:END	End	6.21	69.70	0.00	7.12	-0.00	-0.00	-0.0	-2.07	0.41	-0.00	-1.01	0.00	0.42	0.00	1.24	1.9	3
ARM3.1R	ARM3.1R:O	Origin	0.00	51.64	0.00	-3.07	-7.50	-0.00	-0.0	1.73	1.21	0.00	0.42	13.63	0.00	0.00	14.05	21.6	1
ARM3.1R	ARM3.1R:END	End	6.21	52.89	0.00	-11.65	0.00	0.00	-0.0	1.73	1.21	0.00	0.84	0.00	1.23	0.00	2.29	3.5	3
ARM3.1L	ARM3.1L:O	Origin	0.00	51.77	0.00	-0.74	-2.71	0.00	-0.0	-2.06	0.44	-0.00	-0.50	4.93	0.00	0.00	5.43	8.4	1
ARM3.1L	ARM3.1L:END	End	6.21	53.83	0.00	7.09	-0.00	-0.00	-0.0	-2.06	0.44	-0.00	-1.00	0.00	0.44	0.00	1.26	1.9	3
WVGD1	WVGD1:O	Origin	0.00	88.52	0.00	-4.21	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD1	WVGD1:END	End	0.50	88.52	0.00	-4.21	-0.00	-0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1

WVGD2	WVGD2:O	Origin	0.00	72.79	0.00	-3.18	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD2	WVGD2:END	End	0.50	72.79	0.00	-3.18	-0.00	-0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD3	WVGD3:O	Origin	0.00	58.08	0.00	-2.27	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD3	WVGD3:END	End	0.50	58.08	0.00	-2.27	-0.00	-0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD4	WVGD4:O	Origin	0.00	44.86	0.00	-1.54	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD4	WVGD4:END	End	0.50	44.86	0.00	-1.54	-0.00	-0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD5	WVGD5:O	Origin	0.00	33.26	0.00	-0.97	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD5	WVGD5:END	End	0.50	33.26	0.00	-0.97	-0.00	-0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD6	WVGD6:O	Origin	0.00	23.44	0.00	-0.57	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD6	WVGD6:END	End	0.50	23.44	0.00	-0.57	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD7	WVGD7:O	Origin	0.00	15.46	0.00	-0.30	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD7	WVGD7:END	End	0.50	15.46	0.00	-0.30	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD8	WVGD8:O	Origin	0.00	9.30	0.00	-0.14	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD8	WVGD8:END	End	0.50	9.30	0.00	-0.14	-0.00	0.00	0.0	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD9	WVGD9:O	Origin	0.00	4.73	0.00	-0.05	-0.00	0.00	0.0	0.00	0.00	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD9	WVGD9:END	End	0.50	4.73	0.00	-0.05	-0.00	0.00	0.0	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1

Summary of Clamp Capacities and Usages for Load Case "EXTREME":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	2.096	30.00	30.00	6.99
C2	2.096	30.00	30.00	6.99
C3	2.096	30.00	30.00	6.99
C4	2.096	30.00	30.00	6.99
C5	2.096	30.00	30.00	6.99
C6	2.096	30.00	30.00	6.99
C9	0.099	30.00	30.00	0.33
C10	0.199	30.00	30.00	0.66
C11	0.199	30.00	30.00	0.66
C12	0.199	30.00	30.00	0.66
C13	1.050	30.00	30.00	3.50
C14	0.199	30.00	30.00	0.66
C15	0.199	30.00	30.00	0.66
C16	0.199	30.00	30.00	0.66
C17	0.199	30.00	30.00	0.66
C18	0.199	30.00	30.00	0.66
C19	0.199	30.00	30.00	0.66
C20	3.466	30.00	30.00	11.55
C21	0.710	30.00	30.00	2.37

*** Analysis Results for Load Case No. 3 "HEAVY/BROKEN" - Number of iterations in SAPS 18

Equilibrium Joint Positions and Rotations for Load Case "HEAVY/BROKEN":

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)
CLP :g	0	0	0	0.0000	0.0000	0.0000	0	0	0
CLP :t	0.0008001	6.236	-0.2292	-5.5664	0.0008	0.0003	0.0008001	6.236	114.8
CLP :STUBTop	0.0007865	6.139	-0.2245	-5.5664	0.0008	0.0003	0.0007865	6.139	113.8
CLP :STUBBot	0.0006775	5.365	-0.187	-5.5075	0.0008	0.0003	0.0006775	5.365	105.8
CLP :WVGD1	0.0006639	5.269	-0.1824	-5.4946	0.0008	0.0003	0.0006639	5.269	104.8
CLP :ARM 1	0.0006287	5.014	-0.1701	-5.4562	0.0008	0.0003	0.0006287	5.014	102.2
CLP :WVGD2	0.0005353	4.329	-0.1379	-5.2421	0.0007	0.0003	0.0005353	4.329	94.86
CLP :ARM 2	0.0004914	3.998	-0.1228	-5.1087	0.0007	0.0003	0.0004914	3.998	91.21
CLP :WVGD3	0.0004197	3.449	-0.0988	-4.8159	0.0007	0.0003	0.0004197	3.449	84.9
CLP :ARM 3	0.000371	3.066	-0.08297	-4.5634	0.0006	0.0002	0.000371	3.066	80.25
CLP :WVGD4	0.0003194	2.656	-0.06695	-4.2629	0.0006	0.0002	0.0003194	2.656	74.93
CLP :WVGD5	0.0002334	1.961	-0.04247	-3.6595	0.0005	0.0002	0.0002334	1.961	64.96
CLP :WVGD6	0.0001619	1.375	-0.02498	-3.0180	0.0004	0.0001	0.0001619	1.375	54.98
CLP :WVGD7	0.0001048	0.9026	-0.01347	-2.3719	0.0003	0.0001	0.0001048	0.9026	44.99
CLP :WVGD8	6.156e-005	0.5401	-0.006571	-1.7889	0.0002	0.0001	6.156e-005	0.5401	34.99
CLP :WVGD9	3.022e-005	0.273	-0.002717	-1.2531	0.0001	0.0001	3.022e-005	0.273	25
CLP :WVGD10	1.031e-005	0.09713	-0.0008765	-0.7474	0.0001	0.0000	1.031e-005	0.09713	15
CLP :WVGD11	1.09e-006	0.01075	-0.0001694	-0.2405	0.0000	0.0000	1.09e-006	0.01075	5
ARM1.1R:O	0.0006242	5.011	-0.234	-5.4562	0.0008	0.0003	0.0006242	5.683	102.1
ARM1.1R:END	0.000599	5.11	-0.8895	-6.4428	0.0008	0.0003	0.000599	11.87	102.7
ARM1.1L:O	0.0006333	5.018	-0.1062	-5.4562	0.0008	0.0003	0.0006333	4.345	102.2
ARM1.1L:END	0.0006908	5.156	0.4418	-5.1008	0.0008	0.0003	0.0006908	-1.599	104
ARM2.1R:O	0.0004867	3.995	-0.1919	-5.1087	0.0007	0.0003	0.0004867	4.771	91.14
ARM2.1R:END	0.0004646	4.09	-0.8101	-6.0988	0.0007	0.0003	0.0004646	10.95	91.77
ARM2.1L:O	0.000496	4.001	-0.05377	-5.1087	0.0007	0.0003	0.000496	3.225	91.28
ARM2.1L:END	0.0005473	4.122	0.434	-4.4074	0.0007	0.0003	0.0005473	-2.736	93.01
ARM3.1R:O	0.0003667	3.064	-0.1529	-4.5634	0.0006	0.0002	0.0003667	3.943	80.18
ARM3.1R:END	0.0003485	3.152	-0.7127	-5.5589	0.0006	0.0002	0.0003485	10.11	80.87
ARM3.1L:O	0.0003754	3.069	-0.01301	-4.5634	0.0006	0.0002	0.0003754	2.19	80.32
ARM3.1L:END	0.0004184	3.174	0.4173	-3.8533	0.0006	0.0002	0.0004184	-3.788	82
WVGD1:O	0.0006639	5.269	-0.1824	-5.4946	0.0008	0.0003	0.6475	5.269	104.8
WVGD1:END	0.0006639	5.269	-0.1824	-5.4946	0.0008	0.0003	1.148	5.269	104.8
WVGD2:O	0.0005353	4.329	-0.1379	-5.2421	0.0007	0.0003	0.7417	4.329	94.86
WVGD2:END	0.0005353	4.329	-0.1379	-5.2421	0.0008	0.0003	1.242	4.329	94.86
WVGD3:O	0.0004197	3.449	-0.09881	-4.8159	0.0007	0.0003	0.8358	3.449	84.9
WVGD3:END	0.0004197	3.449	-0.09881	-4.8159	0.0007	0.0003	1.336	3.449	84.9
WVGD4:O	0.0003194	2.656	-0.06696	-4.2629	0.0006	0.0002	0.9091	2.656	74.93
WVGD4:END	0.0003194	2.656	-0.06697	-4.2629	0.0006	0.0002	1.409	2.656	74.93
WVGD5:O	0.0002334	1.961	-0.04248	-3.6595	0.0005	0.0002	1.003	1.961	64.96
WVGD5:END	0.0002334	1.961	-0.04249	-3.6595	0.0005	0.0002	1.503	1.961	64.96
WVGD6:O	0.0001619	1.375	-0.02499	-3.0180	0.0004	0.0001	1.097	1.375	54.98
WVGD6:END	0.0001619	1.375	-0.02499	-3.0180	0.0004	0.0002	1.597	1.375	54.98
WVGD7:O	0.0001048	0.9026	-0.01348	-2.3719	0.0003	0.0001	1.192	0.9026	44.99
WVGD7:END	0.0001048	0.9026	-0.01348	-2.3719	0.0003	0.0001	1.692	0.9026	44.99
WVGD8:O	6.156e-005	0.5401	-0.006576	-1.7889	0.0002	0.0001	1.26	0.5401	34.99
WVGD8:END	6.156e-005	0.5401	-0.006578	-1.7889	0.0002	0.0001	1.76	0.5401	34.99
WVGD9:O	3.022e-005	0.2731	-0.00272	-1.2531	0.0001	0.0001	1.354	0.2731	25
WVGD9:END	3.022e-005	0.2731	-0.002722	-1.2531	0.0002	0.0001	1.854	0.2731	25

Joint Support Reactions for Load Case "HEAVY/BROKEN":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y 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 %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
CLP :g	0.00	0.0	-15.60	0.0	42.15	0.0	0.0	44.94	0.0	1385.63	0.0	-0.1	0.0	-0.04	0.0	0.0

Detailed Steel Pole Usages for Load Case "HEAVY/BROKEN":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
CLP	CLP :t	Origin	0.00	74.83	0.01	-2.75	-0.00	0.00	0.0	-0.03	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4

CLP	CLP :STUBTop	End	1.00	73.66	0.01	-2.69	0.01	-0.00	0.0	-0.03	0.01	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	2
CLP	CLP :STUBTop	Origin	1.00	73.66	0.01	-2.69	0.01	-0.00	0.0	-2.82	2.03	-0.00	-0.26	0.00	0.38	0.00	0.71	1.4	4
CLP	CLP :STUBBot	End	9.00	64.38	0.01	-2.24	16.24	-0.00	0.0	-2.82	2.03	-0.00	-0.23	3.99	0.13	0.00	4.23	8.5	2
CLP	CLP :STUBBot	Origin	9.00	64.38	0.01	-2.24	16.24	-0.00	-0.0	-3.48	1.97	-0.00	-0.28	3.99	0.13	0.00	4.28	8.6	2
CLP	CLP :WVGD1	End	10.00	63.23	0.01	-2.19	18.21	-0.00	-0.0	-3.48	1.97	-0.00	-0.28	4.35	0.12	0.00	4.63	9.3	2
CLP	CLP :WVGD1	Origin	10.00	63.23	0.01	-2.19	18.21	-0.01	0.0	-3.86	2.07	-0.00	-0.31	4.35	0.13	0.00	4.66	9.3	2
CLP	CLP :ARM 1	End	12.67	60.17	0.01	-2.04	23.74	-0.01	0.0	-3.86	2.07	-0.00	-0.29	5.24	0.13	0.00	5.54	11.1	2
CLP	CLP :ARM 1	Origin	12.67	60.17	0.01	-2.04	34.30	-0.01	0.0	-7.62	5.05	-0.00	-0.58	7.57	0.31	0.00	8.17	16.3	2
CLP	CLP :WVGD2	End	20.00	51.95	0.01	-1.65	71.33	-0.01	0.0	-7.62	5.05	-0.00	-0.52	12.89	0.28	0.00	13.42	26.8	2
CLP	CLP :WVGD2	Origin	20.00	51.95	0.01	-1.65	71.33	-0.02	0.0	-8.56	5.28	-0.00	-0.59	12.89	0.29	0.00	13.49	27.0	2
CLP	CLP :ARM 2	End	23.67	47.98	0.01	-1.47	90.72	-0.02	0.0	-8.56	5.28	-0.00	-0.56	14.94	0.28	0.00	15.51	31.0	2
CLP	CLP :ARM 2	Origin	23.67	47.98	0.01	-1.47	95.23	-0.02	0.0	-13.48	9.17	-0.00	-0.89	15.68	0.48	0.00	16.59	33.2	2
CLP	CLP :WVGD3	End	30.00	41.39	0.01	-1.19	153.26	-0.02	0.0	-13.48	9.17	-0.00	-0.82	21.70	0.44	0.00	22.53	45.1	2
CLP	CLP :WVGD3	Origin	30.00	41.39	0.01	-1.19	153.26	-0.04	0.0	-14.51	9.37	-0.00	-0.88	21.70	0.45	0.00	22.60	45.2	2
CLP	CLP :ARM 3	End	34.67	36.80	0.00	-1.00	197.03	-0.04	0.0	-14.51	9.37	-0.00	-0.84	25.12	0.43	0.00	25.97	51.9	2
CLP	CLP :ARM 3	Origin	34.67	36.80	0.00	-1.00	201.48	-0.04	0.0	-19.26	13.15	-0.00	-1.11	25.69	0.60	0.00	26.83	53.7	2
CLP	SpliceT	End	35.17	36.32	0.00	-0.98	208.02	-0.04	0.0	-19.26	13.15	-0.00	-1.11	26.24	0.60	0.00	27.37	54.7	2
CLP	SpliceT	Origin	35.17	36.32	0.00	-0.98	208.02	-0.04	0.0	-19.61	13.19	-0.00	-1.13	26.24	0.60	0.00	27.39	54.8	2
CLP	SpliceB	End	38.00	33.68	0.00	-0.87	245.37	-0.04	0.0	-19.61	13.19	-0.00	-0.90	24.65	0.48	0.00	25.56	39.3	2
CLP	SpliceB	Origin	38.00	33.68	0.00	-0.87	245.37	-0.04	0.0	-20.07	13.23	-0.00	-0.92	24.65	0.48	0.00	25.58	39.4	2
CLP	CLP :WVGD4	End	40.00	31.87	0.00	-0.80	271.83	-0.04	0.0	-20.07	13.23	-0.00	-0.90	26.16	0.47	0.00	27.07	41.7	2
CLP	CLP :WVGD4	Origin	40.00	31.87	0.00	-0.80	271.83	-0.05	0.0	-21.41	13.42	-0.00	-0.96	26.16	0.48	0.00	27.13	41.7	2
CLP	CLP :WVGD5	End	50.00	23.53	0.00	-0.51	405.99	-0.05	0.0	-21.41	13.42	-0.00	-0.87	31.94	0.43	0.00	32.82	50.5	2
CLP	CLP :WVGD5	Origin	50.00	23.53	0.00	-0.51	405.99	-0.07	0.0	-24.20	14.57	-0.00	-0.98	31.94	0.47	0.00	32.94	50.7	2
CLP	CLP :WVGD6	End	60.00	16.51	0.00	-0.30	551.71	-0.07	0.0	-24.20	14.57	-0.00	-0.90	36.15	0.43	0.00	37.05	57.0	2
CLP	CLP :WVGD6	Origin	60.00	16.51	0.00	-0.30	551.71	-0.08	0.0	-26.38	14.75	-0.00	-0.98	36.15	0.43	0.00	37.14	57.1	2
CLP	CLP :WVGD7	End	70.00	10.83	0.00	-0.16	699.22	-0.09	0.0	-26.38	14.75	-0.00	-0.90	38.74	0.40	0.00	39.65	62.3	2
CLP	CLP :WVGD7	Origin	70.00	10.83	0.00	-0.16	699.22	-0.10	0.0	-27.83	14.87	-0.00	-0.95	38.74	0.40	0.00	39.70	62.4	2
CLP	SpliceT	End	71.00	10.34	0.00	-0.15	714.09	-0.10	0.0	-27.83	14.87	-0.00	-0.94	38.94	0.40	0.00	39.89	62.9	2
CLP	SpliceT	Origin	71.00	10.34	0.00	-0.15	714.09	-0.10	0.0	-28.66	14.91	-0.00	-0.97	38.94	0.40	0.00	39.92	63.0	2
CLP	SpliceB	End	75.00	8.50	0.00	-0.11	773.72	-0.10	0.0	-28.66	14.91	-0.00	-0.80	34.70	0.33	0.00	35.51	54.6	2
CLP	SpliceB	Origin	75.00	8.50	0.00	-0.11	773.72	-0.10	0.0	-29.94	14.97	-0.00	-0.84	34.70	0.33	0.00	35.54	54.7	2
CLP	CLP :WVGD8	End	80.00	6.48	0.00	-0.08	848.55	-0.10	0.0	-29.94	14.97	-0.00	-0.81	35.21	0.32	0.00	36.02	55.4	2
CLP	CLP :WVGD8	Origin	80.00	6.48	0.00	-0.08	848.55	-0.12	0.0	-32.11	15.13	-0.00	-0.87	35.21	0.32	0.00	36.08	55.5	2
CLP	CLP :WVGD9	End	90.00	3.28	0.00	-0.03	999.87	-0.12	0.0	-32.11	15.13	-0.00	-0.80	35.82	0.30	0.00	36.63	56.4	2
CLP	CLP :WVGD9	Origin	90.00	3.28	0.00	-0.03	999.87	-0.14	0.0	-34.95	15.31	-0.00	-0.88	35.82	0.30	0.00	36.70	56.5	2
CLP	SpliceT	End	99.92	1.18	0.00	-0.01	1151.72	-0.14	0.0	-34.95	15.31	-0.00	-0.82	36.02	0.28	0.00	36.85	58.2	2
CLP	SpliceT	Origin	99.92	1.18	0.00	-0.01	1151.72	-0.14	0.0	-36.19	15.36	-0.00	-0.85	36.02	0.28	0.00	36.87	58.3	2
CLP	CLP :WVGD10	End	100.00	1.17	0.00	-0.01	1153.00	-0.14	0.0	-36.19	15.36	-0.00	-0.87	37.66	0.29	0.00	38.53	60.2	2
CLP	CLP :WVGD10	Origin	100.00	1.17	0.00	-0.01	1153.00	-0.14	0.0	-37.86	15.45	-0.00	-0.91	37.66	0.29	0.00	38.57	60.3	2
CLP	SpliceB	End	105.00	0.51	0.00	-0.01	1230.25	-0.14	0.0	-37.86	15.45	-0.00	-0.88	37.60	0.28	0.00	38.47	61.2	2
CLP	SpliceB	Origin	105.00	0.51	0.00	-0.01	1230.25	-0.14	0.0	-39.70	15.49	-0.00	-0.92	37.60	0.28	0.00	38.52	61.2	2
CLP	CLP :WVGD11	End	110.00	0.13	0.00	-0.00	1307.70	-0.14	0.0	-39.70	15.49	-0.00	-0.89	37.47	0.27	0.00	38.36	62.0	2
CLP	CLP :WVGD11	Origin	110.00	0.13	0.00	-0.00	1307.70	-0.14	0.0	-41.48	15.59	-0.00	-0.93	37.47	0.28	0.00	38.40	62.1	2
CLP	CLP :g	End	115.00	0.00	0.00	0.00	1385.63	-0.14	0.0	-41.48	15.59	-0.00	-0.90	37.30	0.27	0.00	38.21	62.9	2

Detailed Tubular Davit Arm Usages for Load Case "HEAVY/BROKEN":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1.1R	ARM1.1R:O	Origin	0.00	60.14	0.01	-2.81	-15.40	-0.00	0.0	1.45	2.48	0.00	0.35	27.97	0.00	0.00	28.32	43.6	1
ARM1.1R	ARM1.1R:END	End	6.21	61.32	0.01	-10.67	0.00	-0.00	0.0	1.45	2.48	0.00	0.71	0.00	2.52	0.00	4.42	6.8	3
ARM1.1L	ARM1.1L:O	Origin	0.00	60.21	0.01	-1.27	-5.55	0.00	-0.0	-1.15	0.89	-0.00	-0.28	10.08	0.00	0.00	10.35	15.9	1
ARM1.1L	ARM1.1L:END	End	6.21	61.88	0.01	5.30	-0.00	-0.00	-0.0	-1.15	0.89	-0.00	-0.56	0.00	0.91	0.00	1.67	2.6	3
ARM2.1R	ARM2.1R:O	Origin	0.00	47.94	0.01	-2.30	-15.45	-0.00	0.0	1.44	2.49	0.00	0.35	28.07	0.00	0.00	28.41	43.7	1
ARM2.1R	ARM2.1R:END	End	6.21	49.08	0.01	-9.72	0.00	-0.00	0.0	1.44	2.49	0.00	0.70	0.00	2.53	0.00	4.44	6.8	3
ARM2.1L	ARM2.1L:O	Origin	0.00	48.01	0.01	-0.65	-10.94	0.00	-0.0	-2.27	1.76	-0.00	-0.55	19.88	0.00	0.00	20.43	31.4	1
ARM2.1L	ARM2.1L:END	End	6.21	49.47	0.01	5.21	-0.00	-0.00	-0.0	-2.27	1.76	-0.00	-1.10	0.00	1.79	0.00	3.29	5.1	3
ARM3.1R	ARM3.1R:O	Origin	0.00	36.76	0.00	-1.84	-15.53	-0.00	0.0	1.42	2.50	0.00	0.34	28.22	0.00	0.00	28.56	43.9	1
ARM3.1R	ARM3.1R:END	End	6.21	37.83	0.00	-8.55	0.00	-0.00	0.0	1.42	2.50	0.00	0.69	0.00	2.54	0.00	4.46	6.9	3
ARM3.1L	ARM3.1L:O	Origin	0.00	36.83	0.00	-0.16	-11.08	0.00	-0.0	-2.25	1.78	-0.00	-0.54	20.13	0.00	0.00	20.67	31.8	1
ARM3.1L	ARM3.1L:END	End	6.21	38.09	0.01	5.01	-0.00	-0.00	-0.0	-2.25	1.78	-0.00	-1.09	0.00	1.81	0.00	3.33	5.1	3
WVGD1	WVGD1:O	Origin	0.00	63.23	0.01	-2.19	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD1	WVGD1:END	End	0.50	63.23	0.01	-2.19	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1

WVGD2	WVGD2:O	Origin	0.00	51.95	0.01	-1.65	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD2	WVGD2:END	End	0.50	51.95	0.01	-1.66	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD3	WVGD3:O	Origin	0.00	41.39	0.01	-1.19	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD3	WVGD3:END	End	0.50	41.39	0.01	-1.19	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD4	WVGD4:O	Origin	0.00	31.87	0.00	-0.80	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD4	WVGD4:END	End	0.50	31.87	0.00	-0.80	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD5	WVGD5:O	Origin	0.00	23.53	0.00	-0.51	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD5	WVGD5:END	End	0.50	23.53	0.00	-0.51	-0.00	-0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD6	WVGD6:O	Origin	0.00	16.51	0.00	-0.30	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD6	WVGD6:END	End	0.50	16.51	0.00	-0.30	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD7	WVGD7:O	Origin	0.00	10.83	0.00	-0.16	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD7	WVGD7:END	End	0.50	10.83	0.00	-0.16	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD8	WVGD8:O	Origin	0.00	6.48	0.00	-0.08	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD8	WVGD8:END	End	0.50	6.48	0.00	-0.08	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1
WVGD9	WVGD9:O	Origin	0.00	3.28	0.00	-0.03	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.01	0.00	0.00	0.01	0.0	1
WVGD9	WVGD9:END	End	0.50	3.28	0.00	-0.03	-0.00	0.00	0.0	0.00	0.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.0	1

Summary of Clamp Capacities and Usages for Load Case "HEAVY/BROKEN":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
C1	2.834	30.00	30.00	9.45
C2	1.417	30.00	30.00	4.72
C3	2.834	30.00	30.00	9.45
C4	2.834	30.00	30.00	9.45
C5	2.834	30.00	30.00	9.45
C6	2.834	30.00	30.00	9.45
C9	0.232	30.00	30.00	0.77
C10	0.464	30.00	30.00	1.55
C11	0.464	30.00	30.00	1.55
C12	0.464	30.00	30.00	1.55
C13	1.605	30.00	30.00	5.35
C14	0.464	30.00	30.00	1.55
C15	0.464	30.00	30.00	1.55
C16	0.464	30.00	30.00	1.55
C17	0.464	30.00	30.00	1.55
C18	0.464	30.00	30.00	1.55
C19	0.464	30.00	30.00	1.55
C20	3.136	30.00	30.00	10.45
C21	0.383	30.00	30.00	1.28

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
CLP	90.58	EXTREME	23	14259.4

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
CLP	NESC HEAVY	1	1.196	1.008	0.595	1.609	10.196	37.671	40.344	2	78.886	2.276	2.750	68.49
CLP	NESC HEAVY	2	0.595	-1.609	1.196	-1.008	10.196	34.244	36.674	2	-71.704	2.170	2.750	62.26
CLP	NESC HEAVY	3	-1.246	-1.558	1.246	-1.558	29.911	8.959	28.146	6	-73.651	1.110	2.750	16.29
CLP	NESC HEAVY	4	-1.196	-1.008	-0.595	-1.609	10.196	34.225	36.654	2	-71.670	2.169	2.750	62.23
CLP	NESC HEAVY	5	-0.595	1.609	-1.196	1.008	10.196	37.690	40.365	2	78.920	2.276	2.750	68.53
CLP	NESC HEAVY	6	1.246	1.558	-1.246	1.558	29.911	9.849	30.942	6	80.868	1.164	2.750	17.91
CLP	NESC HEAVY	7	1.335	1.273	0.620	1.569	9.282	26.828	26.155	2	78.886	1.921	2.750	48.78
CLP	NESC HEAVY	8	0.620	-1.569	1.335	-1.273	9.282	24.386	23.775	2	-71.704	1.831	2.750	44.34
CLP	NESC HEAVY	9	-1.335	-1.273	-0.620	-1.569	9.282	24.373	23.762	2	-71.670	1.831	2.750	44.32
CLP	NESC HEAVY	10	-0.620	1.569	-1.335	1.273	9.282	26.841	26.167	2	78.920	1.921	2.750	48.80
CLP	EXTREME	1	1.196	1.008	0.595	1.609	10.196	50.146	53.705	2	105.005	2.626	2.750	91.17
CLP	EXTREME	2	0.595	-1.609	1.196	-1.008	10.196	48.392	51.826	2	-101.329	2.580	2.750	87.99
CLP	EXTREME	3	-1.246	-1.558	1.246	-1.558	29.911	12.657	39.765	6	-104.010	1.319	2.750	23.01
CLP	EXTREME	4	-1.196	-1.008	-0.595	-1.609	10.196	48.381	51.814	2	-101.308	2.579	2.750	87.96
CLP	EXTREME	5	-0.595	1.609	-1.196	1.008	10.196	50.158	53.717	2	105.025	2.626	2.750	91.20
CLP	EXTREME	6	1.246	1.558	-1.246	1.558	29.911	13.113	41.198	6	107.707	1.343	2.750	23.84
CLP	EXTREME	7	1.335	1.273	0.620	1.569	9.282	35.712	34.816	2	105.005	2.216	2.750	64.93
CLP	EXTREME	8	0.620	-1.569	1.335	-1.273	9.282	34.462	33.598	2	-101.329	2.177	2.750	62.66
CLP	EXTREME	9	-1.335	-1.273	-0.620	-1.569	9.282	34.454	33.590	2	-101.308	2.177	2.750	62.64
CLP	EXTREME	10	-0.620	1.569	-1.335	1.273	9.282	35.720	34.823	2	105.025	2.216	2.750	64.94
CLP	HEAVY/BROKEN	1	1.196	1.008	0.595	1.609	10.196	35.349	37.858	2	74.024	2.205	2.750	64.27
CLP	HEAVY/BROKEN	2	0.595	-1.609	1.196	-1.008	10.196	32.013	34.285	2	-67.033	2.098	2.750	58.21
CLP	HEAVY/BROKEN	3	-1.246	-1.558	1.246	-1.558	29.911	8.375	26.312	6	-68.857	1.073	2.750	15.23
CLP	HEAVY/BROKEN	4	-1.196	-1.008	-0.595	-1.609	10.196	31.994	34.265	2	-67.000	2.097	2.750	58.17
CLP	HEAVY/BROKEN	5	-0.595	1.609	-1.196	1.008	10.196	35.368	37.878	2	74.058	2.205	2.750	64.31
CLP	HEAVY/BROKEN	6	1.246	1.558	-1.246	1.558	29.911	9.242	29.035	6	75.881	1.127	2.750	16.80
CLP	HEAVY/BROKEN	7	1.335	1.273	0.620	1.569	9.282	25.174	24.542	2	74.024	1.860	2.750	45.77
CLP	HEAVY/BROKEN	8	0.620	-1.569	1.335	-1.273	9.282	22.798	22.226	2	-67.033	1.771	2.750	41.45
CLP	HEAVY/BROKEN	9	-1.335	-1.273	-0.620	-1.569	9.282	22.785	22.213	2	-67.000	1.770	2.750	41.43
CLP	HEAVY/BROKEN	10	-0.620	1.569	-1.335	1.273	9.282	25.187	24.555	2	74.058	1.861	2.750	45.79

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1.1R	43.57	HEAVY/BROKEN	1	65.6
ARM1.1L	30.93	NESC HEAVY	1	65.6
ARM2.1R	43.72	HEAVY/BROKEN	1	65.6
ARM2.1L	31.43	HEAVY/BROKEN	1	65.6
ARM3.1R	43.94	HEAVY/BROKEN	1	65.6
ARM3.1L	31.80	HEAVY/BROKEN	1	65.6
WVGD1	0.02	EXTREME	1	7.5
WVGD2	0.02	EXTREME	1	7.5
WVGD3	0.02	EXTREME	1	7.5
WVGD4	0.02	EXTREME	1	7.5
WVGD5	0.02	EXTREME	1	7.5
WVGD6	0.02	EXTREME	1	7.5
WVGD7	0.02	EXTREME	1	7.5
WVGD8	0.02	EXTREME	1	7.5
WVGD9	0.02	EXTREME	1	7.5

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY	70.45	CLP	Steel Pole
EXTREME	91.20	CLP	Base Plate
HEAVY/BROKEN	64.31	CLP	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC HEAVY	70.45	CLP	16
EXTREME	90.58	CLP	23
HEAVY/BROKEN	62.95	CLP	16

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC HEAVY	CLP	5	10.196	43.298	1479.272	-0.141	37.690	40.365	2	78.920	2.276	68.53
EXTREME	CLP	5	10.196	22.180	2026.910	-0.087	50.158	53.717	2	105.025	2.626	91.20
HEAVY/BROKEN	CLP	5	10.196	42.148	1385.626	-0.140	35.368	37.878	2	74.058	2.205	64.31

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC HEAVY	43.80	ARM3.1R	1
EXTREME	21.61	ARM3.1R	1
HEAVY/BROKEN	43.94	ARM3.1R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
C1	Clamp	9.45	NESC HEAVY	0.0
C2	Clamp	9.45	NESC HEAVY	0.0
C3	Clamp	9.45	NESC HEAVY	0.0
C4	Clamp	9.45	NESC HEAVY	0.0
C5	Clamp	9.45	NESC HEAVY	0.0
C6	Clamp	9.45	NESC HEAVY	0.0
C9	Clamp	0.77	NESC HEAVY	0.0
C10	Clamp	1.55	NESC HEAVY	0.0
C11	Clamp	1.55	NESC HEAVY	0.0
C12	Clamp	1.55	NESC HEAVY	0.0
C13	Clamp	5.35	NESC HEAVY	0.0
C14	Clamp	1.55	NESC HEAVY	0.0
C15	Clamp	1.55	NESC HEAVY	0.0
C16	Clamp	1.55	NESC HEAVY	0.0
C17	Clamp	1.55	NESC HEAVY	0.0
C18	Clamp	1.55	NESC HEAVY	0.0
C19	Clamp	1.55	NESC HEAVY	0.0
C20	Clamp	11.55	EXTREME	0.0
C21	Clamp	2.37	EXTREME	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC HEAVY	C1	Clamp	ARM1.1R:END	0.000	1.685	2.279	2.834

NESC HEAVY	C2	Clamp	ARM1.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C3	Clamp	ARM2.1R:END	0.000	1.685	2.279	2.834
NESC HEAVY	C4	Clamp	ARM2.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C5	Clamp	ARM3.1R:END	0.000	1.685	2.279	2.834
NESC HEAVY	C6	Clamp	ARM3.1L:END	0.000	1.685	2.279	2.834
NESC HEAVY	C9	Clamp	CLP :WVGD1	0.000	0.030	0.230	0.232
NESC HEAVY	C10	Clamp	CLP :WVGD2	0.000	0.060	0.460	0.464
NESC HEAVY	C11	Clamp	CLP :WVGD3	0.000	0.060	0.460	0.464
NESC HEAVY	C12	Clamp	CLP :WVGD4	0.000	0.060	0.460	0.464
NESC HEAVY	C13	Clamp	CLP :WVGD5	0.000	0.961	1.286	1.605
NESC HEAVY	C14	Clamp	CLP :WVGD6	0.000	0.060	0.460	0.464
NESC HEAVY	C15	Clamp	CLP :WVGD7	0.000	0.060	0.460	0.464
NESC HEAVY	C16	Clamp	CLP :WVGD8	0.000	0.060	0.460	0.464
NESC HEAVY	C17	Clamp	CLP :WVGD9	0.000	0.060	0.460	0.464
NESC HEAVY	C18	Clamp	CLP :WVGD10	0.000	0.060	0.460	0.464
NESC HEAVY	C19	Clamp	CLP :WVGD11	0.000	0.060	0.460	0.464
NESC HEAVY	C20	Clamp	CLP :STUBTop	0.000	1.665	2.658	3.136
NESC HEAVY	C21	Clamp	CLP :STUBBot	0.000	-0.192	0.331	0.383
EXTREME	C1	Clamp	ARM1.1R:END	0.000	1.830	1.021	2.096
EXTREME	C2	Clamp	ARM1.1L:END	0.000	1.830	1.021	2.096
EXTREME	C3	Clamp	ARM2.1R:END	0.000	1.830	1.021	2.096
EXTREME	C4	Clamp	ARM2.1L:END	0.000	1.830	1.021	2.096
EXTREME	C5	Clamp	ARM3.1R:END	0.000	1.830	1.021	2.096
EXTREME	C6	Clamp	ARM3.1L:END	0.000	1.830	1.021	2.096
EXTREME	C9	Clamp	CLP :WVGD1	0.000	0.077	0.062	0.099
EXTREME	C10	Clamp	CLP :WVGD2	0.000	0.155	0.125	0.199
EXTREME	C11	Clamp	CLP :WVGD3	0.000	0.155	0.125	0.199
EXTREME	C12	Clamp	CLP :WVGD4	0.000	0.155	0.125	0.199
EXTREME	C13	Clamp	CLP :WVGD5	0.000	0.983	0.369	1.050
EXTREME	C14	Clamp	CLP :WVGD6	0.000	0.155	0.125	0.199
EXTREME	C15	Clamp	CLP :WVGD7	0.000	0.155	0.125	0.199
EXTREME	C16	Clamp	CLP :WVGD8	0.000	0.155	0.125	0.199
EXTREME	C17	Clamp	CLP :WVGD9	0.000	0.155	0.125	0.199
EXTREME	C18	Clamp	CLP :WVGD10	0.000	0.155	0.125	0.199
EXTREME	C19	Clamp	CLP :WVGD11	0.000	0.155	0.125	0.199
EXTREME	C20	Clamp	CLP :STUBTop	0.000	3.278	1.126	3.466
EXTREME	C21	Clamp	CLP :STUBBot	0.000	-0.698	0.130	0.710
HEAVY/BROKEN	C1	Clamp	ARM1.1R:END	0.000	1.685	2.279	2.834
HEAVY/BROKEN	C2	Clamp	ARM1.1L:END	0.000	0.842	1.140	1.417
HEAVY/BROKEN	C3	Clamp	ARM2.1R:END	0.000	1.685	2.279	2.834
HEAVY/BROKEN	C4	Clamp	ARM2.1L:END	0.000	1.685	2.279	2.834
HEAVY/BROKEN	C5	Clamp	ARM3.1R:END	0.000	1.685	2.279	2.834
HEAVY/BROKEN	C6	Clamp	ARM3.1L:END	0.000	1.685	2.279	2.834
HEAVY/BROKEN	C9	Clamp	CLP :WVGD1	0.000	0.030	0.230	0.232
HEAVY/BROKEN	C10	Clamp	CLP :WVGD2	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C11	Clamp	CLP :WVGD3	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C12	Clamp	CLP :WVGD4	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C13	Clamp	CLP :WVGD5	0.000	0.961	1.286	1.605
HEAVY/BROKEN	C14	Clamp	CLP :WVGD6	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C15	Clamp	CLP :WVGD7	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C16	Clamp	CLP :WVGD8	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C17	Clamp	CLP :WVGD9	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C18	Clamp	CLP :WVGD10	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C19	Clamp	CLP :WVGD11	0.000	0.060	0.460	0.464
HEAVY/BROKEN	C20	Clamp	CLP :STUBTop	0.000	1.665	2.658	3.136
HEAVY/BROKEN	C21	Clamp	CLP :STUBBot	0.000	-0.192	0.331	0.383

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0.

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)
NESC HEAVY	13.114	0.000	22.319	1197.157	-0.000
EXTREME	16.015	0.000	8.938	1455.637	-0.000
HEAVY/BROKEN	12.271	0.000	21.180	1117.533	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 461.4
Weight of Steel Poles: 14259.4
Total: 14720.8

*** End of Report

NATCOMM ENG
CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: natcomm.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	ANCHOR BOLT ANALYSIS CL&P Pole #1068
Location:	Darien, CT
Rev. 1: 06/10/09	Prepared by: T.J.L. Checked by: C.F.C. Job No. 08174. CO3

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 105.1 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A432 Grade 60

Number of Anchor Bolts = $N := 12$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 90 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 60 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

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

Bolt Tension Check:

Allowable Tensile Force (Gross Area) = $T_{ALL.Gross} := 1.0 \cdot (0.33 \cdot A_g \cdot F_u) = 118.1 \cdot kips$

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot (0.60 \cdot A_n \cdot F_y) = 116.917 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 89.89 \cdot \%$

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

Condition1 = "OK"

UMTS RFDS v2.0

T-Mobile

Site ID	**CT11290A**	**Site Type**	0
Address	3 Mechanic Street, Darien, CT, 6820	**Latitude**	41.07757
		Longitude	-73.46766

TMO UMTS Engineer	M Lucey

GSM Impacted?	
Alpha	X
Beta	X
Gamma	X
Delta	

History (approvals)	**Date**
RFDS	11/06/08
GSM RF Acceptance	

RFDS Revision	3

Site Leasing/Zoning	**Preliminary Leasing**	**Preliminary Zoning**
* # of Sectors	3	---
* # of Antennas	6	not specified
Antenna Model	RACAL #8265T56-RO	---
Antenna Size	---	not specified
* # of TMA	not specified	---
* # of Feeders	24	not specified
Feeder Diameter	7/8	NA
Leased area (sq ft)	240	not specified
* # of Cabinets	3	
Cabinet Model	Nortel S8000	---
Site Comments	Swap out all 3 S8000's for 1 S12000 and 1 3106. Antenna swap and share.	

* Legend: Config under threshold | Config meets threshold | Config above threshold | Text / Not checked

GSM Information

Existing Configuration

Alpha	Beta	Gamma	Delta
120	120	120	
NO	NO	NO	
1 1/4"	1 1/4"	1 1/4"	
125	125	125	
3	4	3	
3	4	3	

S8000 outdoor	
3	

Proposed Configuration

	Alpha	Beta	Gamma	Delta
Ant. Height (ft)	120	120	120	
RET deployed	YES	YES	YES	
Feeder Type	1 1/4"	1 1/4"	1 1/4"	
Feeder Length (ft)	125	125	125	
# Current TRX	3	4	3	
# Forec. TRX	3	4	3	
# of Nortel HePA	3	3	3	

Cabinet Type	S12000 Outdoor
Cabinet #	1

UMTS Information

Existing Configuration

Alpha	Beta	Gamma	Delta
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---

Proposed Configuration

	Alpha	Beta	Gamma	Delta
Ant. Height (ft)	120	120	120	
RET deployed	YES	YES	YES	
Feeder Type	1 1/4"	1 1/4"	1 1/4"	
Feeder Length (ft)	125	125	125	

Cabinet Type	RBS 3106
Cabinet #	1

UMTS RFDS v2.0

T-Mobile

Site ID	**CT11290A**	**Site Type**	0
Address	3 Mechanic Street, Darien, CT, 6820	**Latitude**	41.07757
		Longitude	-73.46766

TMO UMTS Engineer	M Lucey

GSM Impacted?	
Alpha	X
Beta	X
Gamma	X
Delta	

History (approvals)	**Date**
RFDS	11/06/08
GSM RF Acceptance	

RFDS Revision	3

ALPHA

Existing Configuration					Proposed Configuration			
X				**Mount**	X			
GSM Dual pole RR90-17-02DP EMS 110 - / - / - 0				**Antenna Deployed** **Ant. Type** **Ant. Model** **Ant. Vendor** **Azimuth** **E-Tilt (sw)** **M-Tilt**	GSM/UMTS Quad pole X16DWV-16DWVS-A RFS 110 2 2 0			
2 GMA/SMA 2				**TMA #** **TMA Type** **Used Feeders**	1 RFS - Twin PCS 4			

☐ GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
X		Swap GSM antenna
X		Consolidate GSM feeders
		Add Twin TMA
X		Swap single TMA with twin TMA
		Add Booster
X		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

Comments

Swap out antenna for RFS quad to be shared. We will add 2 new coax for UMTS run to 3106. We will swap out existing GSM TMA to 1 twin PCS mounted at cabinet and not current ground location. UMTS will not have TMA.

BETA

Existing Configuration					Proposed Configuration			
X				**Mount**	X			
GSM Dual pole RR90-17-02DP EMS 240 - / - / - 0				**Antenna Deployed** **Ant. Type** **Ant. Model** **Ant. Vendor** **Azimuth** **E-Tilt (sw)** **M-Tilt**	GSM/UMTS Quad pole X16DWV-16DWVS-A RFS 230 2 5 0			
2 GMA/SMA 2				**TMA #** **TMA Type** **Used Feeders**	1 RFS - Twin PCS 4			

☐ GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
X		Swap GSM antenna
X		Consolidate GSM feeders
		Add Twin TMA
X		Swap single TMA with twin TMA
		Add Booster
X		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

Comments

Swap out antenna for RFS quad to be shared. We will add 2 new coax for UMTS run to 3106. We will swap out existing GSM TMA to 1 twin PCS mounted at cabinet and not current ground location. UMTS will not have TMA.

UMTS RFDS v2.0

T-Mobile

Site ID	**CT11290A**	**Site Type**	0
Address	3 Mechanic Street, Darien, CT, 6820	**Latitude**	41.07757
		Longitude	-73.46766

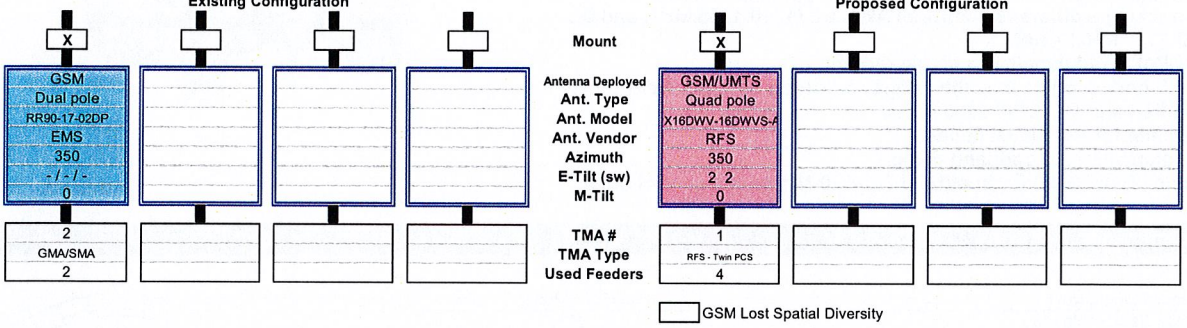
TMO UMTS Engineer	M Lucey

GSM Impacted?	
Alpha	X
Beta	X
Gamma	X
Delta	

History (approvals)	**Date**
RFDS	11/06/08
GSM RF Acceptance	

RFDS Revision	3

GAMMA



GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
X		Swap GSM antenna
X		Consolidate GSM feeders
		Add Twin TMA
X		Swap single TMA with twin TMA
		Add Booster
X		Add two new feeders for UMTS
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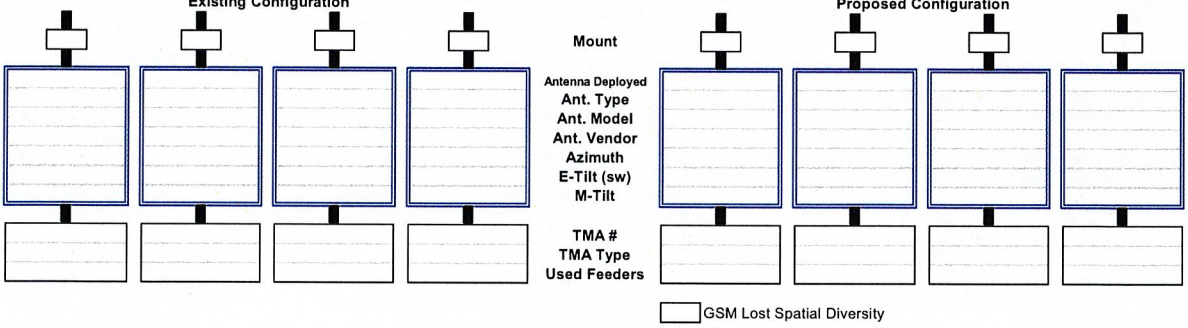
DELTA



GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
		Swap GSM antenna
		Consolidate GSM feeders
		Add Twin TMA
		Swap single TMA with twin TMA
		Add Booster
		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

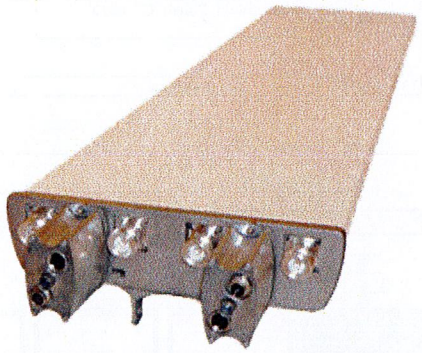
Comments

Product Data Sheet **APX16DWV-16DWVS-E-A20**

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).



Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

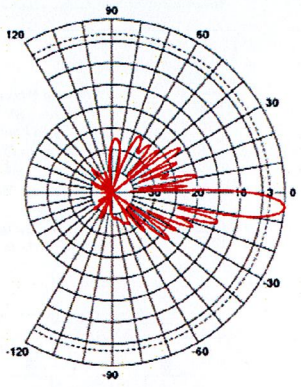
Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female

Mechanical Specifications

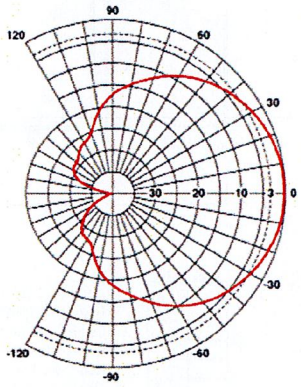
Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Vertical Pattern



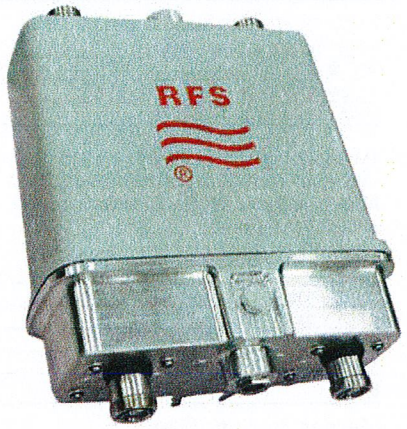
Horizontal Pattern

Product Data Sheet ATMAA1412D-1A20

Twin Tower Mounted Amplifier, Dual Duplexed, AWS

Product Description

Designed for use in AWS projects, these units improve base station receiver sensitivity and enhance coverage. Use of these TMAs can increase data rates without a reduction in capacity. These TMAs are wideband and cover the entire 45 MHz in the AWS frequency band. The unit is extremely lightweight, weighing just 13 lbs (5.9 kg) for a twin unit. It is easy to install and meets IP66 requirements for ingress protection. The TMA has a metallic base and the radome cap is light grey allowing them to blend with antenna radomes. Its dual-duplex configuration enables the use of a single feeder for both Tx and Rx.



Features/Benefits

- **AISG 2.0 compliant**
- **Two TMAs in a single enclosure – reduces tower load and installation time.**
- **Low noise figure overcomes feeder losses and enhances site coverage.**
- **Filtering improves Tx-Rx isolation by reducing noise and interference.**
- **Dual-duplex configuration enables use of a single feeder for both Tx and Rx.**
- **Low insertion loss of Tx filter provides increased downlink coverage.**
- **Extremely light weight – reduces tower loading and facilitates installation.**
- **Equipped with breather valves – guards against internal condensation.**
- **Option: AISG connector location at bottom or top**

Technical Specifications

Electrical Specifications – Rx

AWS Frequency range, MHz	1710 - 1755
Tx Band rejection, dB	> 80
Gain, dB	12 +/- 1
Gain ripple, dB	+/- 0.8
Group delay, ns	160 Max, band edge
Group delay variation, ns	< 100
Group delay distortion, ns	< 10 (any 240 kHz)
Noise Figure, dB	< 1.3 midband, < 1.5 @band edge, Typical
Output IP3, dBm	> 25
Return Loss, dB	> 18

Electrical Specifications – Tx

AWS Frequency range, MHz	2110 - 2155
Rx Band rejection, dB	> 60
Ripple, dB	< +/- 0.1
Group delay, ns	< 10
Group delay variation, ns	< 5
Return loss, dB	>18
Insertion Loss, dB	< 0.4
Power handling, W	250 cw / 5k peak

* This data is provisional and subject to change.

Product Data Sheet ATMAA1412D-1A20

Twin Tower Mounted Amplifier, Dual Duplexed, AWS

Technical Specifications

System Specifications

Power Supply voltage, Volt	10-30
IMD @ antenna port with two 43 dBm tones, dBc	< -160 dBc (-117dBm)
Antenna Port Power Handling Rx, dBm	17
Voltage ripple handling	150 mVp-p amplitude
TMA operating current drawn from each bias source, mA (AISG products connected to TMA AISG RS-485 port will draw additional current through AWS 1 port)	**AISG Mode:** 120-200 normal operation, AWS 1 port 100 ±20 normal operation, AWS 2 port 190 ±10 alarm condition, AWS 2 port **Non-AISG Mode:** 100 ±20 normal operation, both ports 190 ±10 alarm condition, both ports
Impedance, ohms	50 nominal
Polarity protection	No damage if -48 V applied at Node-B port
Alarm functionality	AISG 2.0 and 3GPP TS25.461 Compatible
Antenna support	AISG / Dual-Band
Bias-T	Yes - Internal

Mechanical Specifications

Dimensions, H x D x W, mm (in)	305 x 254 x 101 (12 x 10 x 4); Includes connector length
Weight, kg (lb) (not to exceed)	5.9 (13)
RF Connectors, BTS/Node-B and ANT ports	Long neck DIN 7/16 Female
AISG Connector	8-pin Circular multi-pole, IEC 60130-9;IP67, Hex Nut
Mounting	Wall, Pole
Orientation	Pole Mount Upright, Wall mount upright or side way

Environmental Specifications

Operating temperature range, °C	-40 to + 65
Thermal Shock	IEC 68 2-14, Test Na
Humidity, %	20 to 100
Altitude, ft	11,000
Air Pressure, kPa	86 to 106
Solar radiation, W/m2	1120
Lightning	8/20 us, 20 kA Multiple pulses
EMC	EN 301 489-8 (2002-08)
Ingress protection	IP66
Sand and dust	IEC 68-2-18
Salt fog	IEC 68-2-11
Wind load @ 115 km/h (70 mph), N (lb-f)	50
Wind speed, km/h	> 200

* This data is provisional and subject to change.