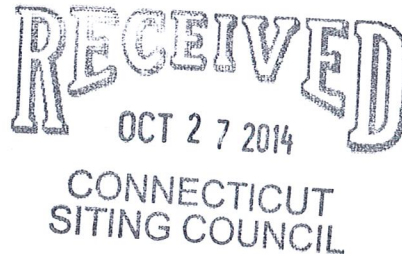




Melanie Bachman  
Acting Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051



RE: EM-CING-096-130220 Notice of Completion of Construction & Commencement of  
Site Operations  
New Cingular Wireless PCS, LLC / AT&T facility (AT&T No.CT2260) at  
5 Town Park Road, New Milford, Connecticut

Dear Ms. Bachman:

On behalf of New Cingular Wireless PCS, LLC (AT&T), please accept this letter as our  
notification of the completion of site construction and the commencement of site operations.

If you have any questions or need any additional information regarding this facility,  
please do not hesitate to contact me.

Sincerely,

Eric Campbell  
SAI Communications  
Agent for New Cingular Wireless/AT&T Mobility, Inc.  
27 Northwestern Drive  
Salem, New Hampshire 03079

Cc: Melanie Bachman (via email and USPS)  
Christine Vergati, Cuddy Feder (via email only)  
Tim Burks, SAI (via email only)



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](mailto:siting.council@ct.gov)  
[www.ct.gov/csc](http://www.ct.gov/csc)

March 8, 2013

Melanie Howlett  
HPC Wireless Services  
46 Mill Plain Road, Floor 2  
Danbury, CT 06811

RE: **EM-CING-096-130220** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 5 Old Town Park Road, New Milford, Connecticut.

Dear Ms. Howlett:

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 with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 15, 2013. 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.

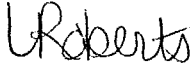
This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies 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. Thank you for your attention and cooperation.

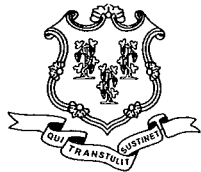
Very truly yours,

A handwritten signature in cursive script that reads "LRoberts".

Linda Roberts  
Executive Director

LR/CDM/cm

c: The Honorable Patricia A. Murphy, Mayor, Town of New Milford  
Laura Regan, Zoning Enforcement Officer, Town of New Milford  
CL&P



# 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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

February 25, 2013

The Honorable Patricia A. Murphy  
Mayor  
Town of New Milford  
Town Hall  
10 Main Street  
New Milford, CT 06776

RE: **EM-CING-096-130220** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 5 Old Town Park Road, New Milford, Connecticut.

Dear Mayor Murphy:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by March 11, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts  
Executive Director

LR/cm

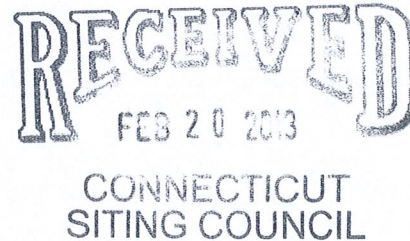
c: Laura Regan, Zoning Enforcement Officer, Town of New Milford



February 15, 2013

**VIA OVERNIGHT COURIER**

Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051  
Attn: Ms. Linda Roberts, Executive Director



Re: New Cingular Wireless PCS, LLC – Exempt Modification  
5 Old Town Park Road (aka 100 Old Town Park Road), New Milford

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC ("AT&T"). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of New Milford.

AT&T plans to modify the existing wireless communications facility owned by CL&P and located at 5 Old Town Park Road (aka 100 Old Town Park Road), New Milford (coordinates 41°-32'-6.46" N, 73°-25'-29.46" W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to AT&T'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. AT&T will remove six (6) existing Cingular Wireless antennas, TMAs and Diplexers, and add six (6) LTE panel antennas on new mounts to the Existing T-arms at a centerline height of approximately 175.5'. AT&T will also place DC power and fiber runs from the equipment to the antennas along the existing coaxial cable run. These



changes will not extend the height of the approximately 160' structure, with an existing pipe mount extension of 15', for a total height of approximately 175'.

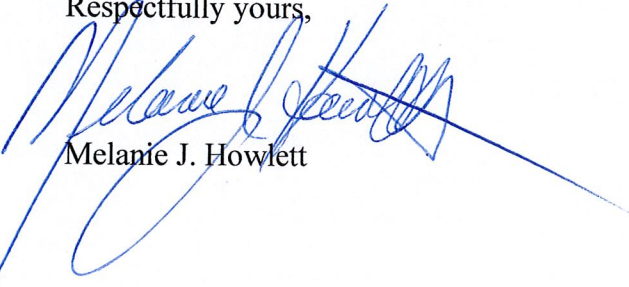
2. One (1) Surge Arrestor will be added to a new support frame, and six (6) RRUS (remote radio units) will be added to another new support frame, all adjacent to the Existing Equipment Shelter. AT&T will also place related equipment in an existing Equipment Shelter and mount a new GPS antenna on the Existing Ice Bridge Post. These changes will be within the existing compound and will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six (6) decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.7%; the combined site operations will result in a total power density of approximately 1.7%.

Please contact me by phone at (203) 610-1071, or by e-mail at [mhowlett@optonline.net](mailto:mhowlett@optonline.net), if there are any questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Melanie J. Howlett

Attachments

cc: Honorable Pat Murphy, Mayor, Town of New Milford  
CL&P (underlying property owner)



**Northeast  
Utilities System**

107 Selden Street, Berlin, CT 06037

Northeast Utilities Service Company  
P.O. Box 270  
Hartford, CT 06141-0270  
(203) 665-5000

January 23, 2013

Mr. Mark Roberts  
AT&T Wireless.  
500 Enterprise Drive  
Rocky Hill, CT 06067

RE: AT&T Antenna Site, CT-2260, 100 Old Town Park Rd., New Milford CT, structure 10185.

Dear Mr. Roberts

Based on our reviews of the site drawings, the structural analysis provided by Centek Engineering and, and the foundation analyses performed by Centek Engineering, we have reviewed for acceptance this modification

Since there are no outstanding structural issues to resolve at this time please contact Mr. Green (860-665-6926) to resolve any lease issues; once the lease amendment is secured you may contact Mr. John Landry directly (860-665-5425) to begin these arrangements.

Sincerely,

  
Robert Gray  
Transmission Line Engineering

ref: 10050959.CT2260.CDREV2.01.22.13.pdf  
10050959.CT2260.StructuralAnalysisRev1.12.26.12.pdf



**Structural Analysis of PCS**  
**Mast and CL&P Pole**

AT&T Site Ref: CT2260

CL&P Structure No. 10185  
160' Electric Transmission Pole

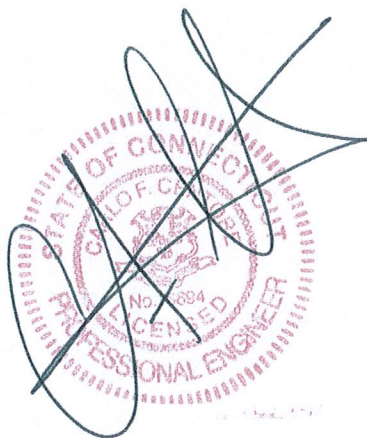
100 Old Town Park Road  
New Milford, CT

CEN TEK Project No. 12101.CO1

~~Date: October 16, 2012~~

~~Rev 1: December 26, 2012~~

Rev 2: January 8, 2013



**Prepared for:**  
AT&T Mobility  
500 Enterprise Drive, Suite 3A  
Rocky Hill, CT 06067

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## Introduction

The purpose of this report is to analysis the existing PCS mast and 160' CL&P pole located at 100 Old Town Park Road in New Milford, CT for the proposed AT&T Mobility antenna upgrade.

The existing/proposed loads consist of the following:

- **AT&T MOBILITY (Existing to Remain):**  
**Coax Cables:** Twelve (12) 1-5/8"  $\varnothing$  coax cables running on the exterior of the CL&P pole.  
**PCS Mast:** 12" Sch. 40 pipe (O.D. = 12.75") x 39-ft long conforming to ASTM A500 Gr. C (Fy = 46 ksi).
- **AT&T MOBILITY (Existing to Remove):**  
**Antennas:** Six (6) Powerwave 7770 panel antennas, six (6) Powerwave LGP-21401 TMA's and six (6) Powerwave LGP-21901 diplexers mounted on a T-Arm Co-Location Kit with a RAD center elevation of 175-ft above grade.
- **AT&T MOBILITY (Proposed):**  
**Antennas:** Two (2) Powerwave P65-17-XLH-RR panel antenna, two (2) KMW-AM-X-CD-16-65-00T panel antennas, two (2) Kathrein Scala 800-10764 panel antenna and six (6) CCI DTMAPB7819VG12A TMA's mounted on the existing T-Arm Co-Location Kit with a RAD center elevation of 175-ft above grade.

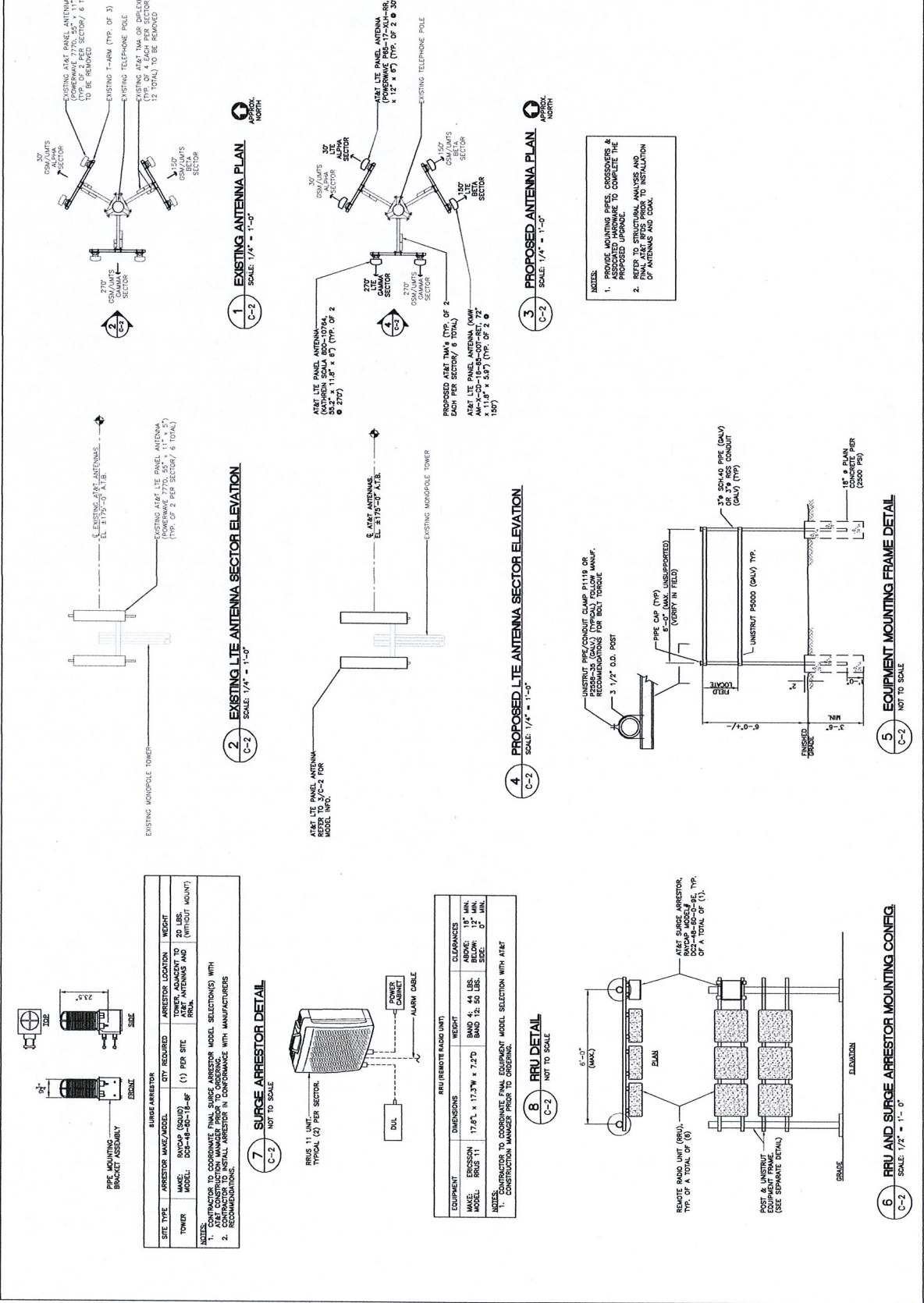
## Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9<sup>th</sup> 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.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.





$\frac{1}{2} \times 57$   
 TOTAL



## A n a l y s i s

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

The PCS mast consisting of a 12" Sch. 40 pipe conforming to ASTM A500 Gr. C ( $F_y = 46$  ksi) 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 PCS Mast 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.

## D e s i g n   B a s i s

Our analysis was performed in accordance with TIA/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 pole structure, considering existing and future conductor and shield wire loading, with the pcs antenna mast was analyzed under two conditions:

### ▪ UTILITY POLE ANALYSIS

The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ 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    |
| Radial Ice Thickness.....                  | 0.5"    |

#### Load Case 2: NESC Extreme

|                           |                        |
|---------------------------|------------------------|
| Wind Speed.....           | 100 mph <sup>(1)</sup> |
| Radial Ice Thickness..... | 0"                     |

Note 1: NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading,  
1.25 x Gust Response Factor (wind speed: 3-second gust)

#### MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility 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 <sup>(2)</sup>  
 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

#### MAST ASSEMBLY

The proposed mast was determined to be structurally **adequate**.

| Member                        | Stress Ratio<br>(% of capacity) | Result      |
|-------------------------------|---------------------------------|-------------|
| 12" Sch. 40 pipe x 39-ft long | 59.7% <sup>(1)</sup>            | <b>PASS</b> |
| Bottom Bracket Bolts          | 77.5% <sup>(2)</sup>            | <b>PASS</b> |

Note 1 – 1/3 Increase in allowable stress used for mast.

Note 2 – 1/3 increase in allowable stress not used for mast connection.

#### UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE 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 **91.56%** occurs in the utility pole under the **NESC Extreme Wind** loading condition.

##### POLE SECTION:

The utility pole was found to be within allowable limits.

| Tower Section | Elevation         | Stress Ratio<br>(% of capacity) | Result      |
|---------------|-------------------|---------------------------------|-------------|
| Tube Number 3 | 0' - 61.25' (AGL) | 91.56%                          | <b>PASS</b> |

##### BASE PLATE:

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

| Tower Component | Design Limit | Stress Ratio<br>(percentage of capacity) | Result      |
|-----------------|--------------|------------------------------------------|-------------|
| Base Plate      | Bending      | 89.90%                                   | <b>PASS</b> |



■ **FOUNDATION AND ANCHORS**

The existing foundation consists of a 8-ft Ø x 16.5-ft long reinforced concrete caisson. The caisson was reinforced with a 20-ft square x 4-ft thick concrete mat by Northeast Utilities. The base of the tower is connected to the foundation by means of (26) 2.25"Ø, ASTM A615-75 anchor bolts embedded into the concrete foundation structure. Foundation information was obtained from NUSCO drawings # 01143-60001 and Foundation-10185.

Review of the foundation and anchor bolts 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         | Shear      | Axial       | Moment          |
|-------------------|------------|-------------|-----------------|
| NESC Heavy Wind   | 33.98 kips | 109.82 kips | 4423.78 ft-kips |
| NESC Extreme Wind | 52.84 kips | 56.69 kips  | 6305.07 ft-kips |

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

**ANCHOR BOLTS:**

The anchor bolts were found to be within allowable limits.

| Tower Component | Design Limit | Stress Ratio<br>(% of capacity) | Result      |
|-----------------|--------------|---------------------------------|-------------|
| Anchor Bolts    | Tension      | 55.4%                           | <b>PASS</b> |

**FOUNDATION:**

The foundation was found to be within allowable limits.

| Foundation                  | Design Limit       | Allowable Limit       | Proposed Loading       | Result      |
|-----------------------------|--------------------|-----------------------|------------------------|-------------|
| Reinf. Conc. Caisson w/ Mat | OTM <sup>(1)</sup> | 1.0 FS <sup>(2)</sup> | 1.06 FS <sup>(2)</sup> | <b>PASS</b> |

Note 1: OTM denote overturning moment.

Note 2: FS denotes Factor of Safety

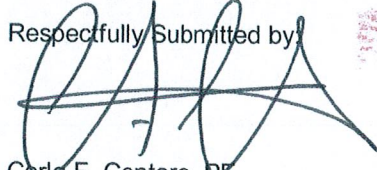
**Conclusions and Recommendations**

This analysis shows that the subject utility pole **is adequate** to support the proposed AT&T equipment installation.

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

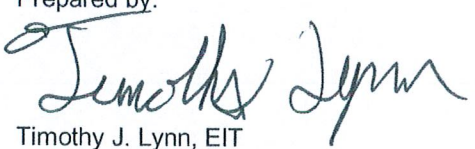
Please feel free to call with any questions or comments.

Respectfully Submitted by:

  
 Carlo F. Centore, PE  
 Principal ~ Structural Engineer



Prepared by:

  
 Timothy J. Lynn, EIT  
 Structural Engineer



STANDARD CONDITIONS FOR FURNISHING OF  
PROFESSIONAL ENGINEERING SERVICES ON  
EXISTING STRUCTURES

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

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

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA - 3 D

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, MarinoWARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

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



## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-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

*CENTEK Engineering, Inc.*  
*Structural Analysis – 160-ft CL&P Pole # 10185*  
*AT&T Antenna Upgrade – CT2260*  
*New Milford, CT*  
*Rev 2 ~ January 8, 2013*

**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

Criteria for Design of PCS Facilities On or  
Extending Above Metal Electric Transmission  
Towers & Analysis of Transmission Towers  
Supporting PCS Masts <sup>(1)</sup>

Introduction

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

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

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

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

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

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

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

### P C S M a s t

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

1. An 85 mph extreme wind speed shall be used for locations in all counties throughout the NU system.
2. The allowable stress increase of TIA Section 3.1.1.1 is allowed for mast section, but is disallowed for the mast to CL&P structure connection.
3. The combined wind and ice condition shall consider  $\frac{1}{2}$ " radial ice in combination with the wind load (0.75 Wi) as specified in TIA section 2.3.16.

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

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

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

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

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





Attachment A

NU Design Criteria

|                                       |                   |                                                                                    | Basic Wind Speed<br>V (MPH)                                                                                                                                                    | Pressure<br>Q (PSF) | Height Factor<br>Kz | Gust Factor<br>Gh | Load or Stress Factor                                 | Force Coef - Shape Factor               |
|---------------------------------------|-------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-------------------|-------------------------------------------------------|-----------------------------------------|
| Ice Condition                         | TIA/EIA           | Antenna Mount                                                                      | TIA                                                                                                                                                                            | TIA<br>(.75Wi)      | TIA                 | TIA               | TIA, Section 3.1.1.1 disallowed for connection design | TIA                                     |
|                                       | NESC Heavy        | Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress) | ----                                                                                                                                                                           | 4                   | 1.00                | 1.00              | 2.50                                                  | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
|                                       |                   | Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)           | ----                                                                                                                                                                           | 4                   | 1.00                | 1.00              | 2.50                                                  | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
|                                       | Conductors:       |                                                                                    | Conductor loads provided by NU                                                                                                                                                 |                     |                     |                   |                                                       |                                         |
| High Wind Condition                   | TIA/EIA           | Antenna Mount                                                                      | 85                                                                                                                                                                             | TIA                 | TIA                 | TIA               | TIA, Section 3.1.1.1 disallowed for connection design | TIA                                     |
|                                       | NESC Extreme Wind | Tower/Pole Analysis with antennas extending above top of Tower/Pole                | Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading<br>1.25 x Gust Response Factor<br>Height above ground level based on top of Mast/Antenna                         |                     |                     |                   |                                                       | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
|                                       |                   | Tower/Pole Analysis with Antennas below top of Tower/Pole                          | Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading<br>Height above ground level based on top of Tower/Pole                                                          |                     |                     |                   |                                                       | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
|                                       | Conductors:       |                                                                                    | Conductor loads provided by NU                                                                                                                                                 |                     |                     |                   |                                                       |                                         |
| NESC Extreme Ice with Wind Condition* |                   | Tower/Pole Analysis with antennas extending above top of Tower/Pole                | Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading<br>4PSF Wind Load 1.25 x Gust Response Factor<br>Height above ground level based on top of Mast/Antenna |                     |                     |                   |                                                       | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
|                                       |                   | Tower/Pole Analysis with Antennas below top of Tower/Pole                          | Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading<br>4PSF Wind Load<br>Height above ground level based on top of Tower/Pole                               |                     |                     |                   |                                                       | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
|                                       | Conductors:       |                                                                                    | Conductor loads provided by NU                                                                                                                                                 |                     |                     |                   |                                                       |                                         |

\* Only for Structures Installed after 2007

Communication Antennas on Transmission Structures (CL&P & WMECo Only)

Northeast Utilities  
Approved by: KMS (NU)

Design  
NU Confidential Information

OTRM 059  
Page 7 of 9

Rev.1  
03/17/2011





Shape Factor Criteria shall be per TIA Shape Factors.

- 2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

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

- a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.
- b) Conductors and related devices and hardware (wire loads will be provided by NU).
- c) Electric Transmission Structure
  - i) The loads from the wireless communication equipment components based on NESC and NU Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.
  - ii) Shape Factor Multiplier:

| NESC Structure Shape                  | Cd  |
|---------------------------------------|-----|
| Polyround (for polygonal steel poles) | 1.3 |
| Flat                                  | 1.6 |
| Open Lattice                          | 3.2 |

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

| Mount Type                                      | Cable Cd | Pole Cd |
|-------------------------------------------------|----------|---------|
| Coaxial Cables on outside periphery (One layer) | 1.45     | 1.45    |
| Coaxial Cables mounted on stand offs            | 1.6      | 1.3     |

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

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

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

**Communication Antennas on Transmission Structures (CL&P & WMECo Only)**

|                                                     |                                              |             |                     |
|-----------------------------------------------------|----------------------------------------------|-------------|---------------------|
| <b>Northeast Utilities</b><br>Approved by: KMS (NU) | <b>Design</b><br>NU Confidential Information | OTRM 059    | Rev.1<br>03/17/2011 |
|                                                     |                                              | Page 3 of 9 |                     |

Wire Ld

TITLE Circular, New  
STRUCT #10185  
06/25/2004

Conductor

| Number of<br>Conductors per<br>phase | AHEAD         |           | BACK          |         |
|--------------------------------------|---------------|-----------|---------------|---------|
|                                      | BITTERN       | BITTERN   | BITTERN       | BITTERN |
| 2                                    | 1272.000      | 1272.000  | 1272.000      | 2       |
|                                      | 45/7 ACSR     | 45/7 ACSR | 45/7 ACSR     |         |
|                                      | 1.345         | 1.345     | 1.345         |         |
|                                      | 1.432         | 1.432     | 1.432         |         |
|                                      | TENSION (LBS) |           | TENSION (LBS) |         |
|                                      | AHEAD         | 10,000    | BACK          | 10,000  |

| LOADCASE   |  | NESC HEAVY |
|------------|--|------------|
| WIND (PSF) |  | 4          |
| ICE (IN)   |  | 0.50       |
| OLF ANG    |  | 1.65       |
| OLF WIND   |  | 2.50       |
| OLF WT     |  | 1.50       |

| STR    | ANGLE | WIND<br>SPAN | WGT<br>SPAN | H    | L      | V    |
|--------|-------|--------------|-------------|------|--------|------|
| BACK   | 0     | 469          | 445         | 1833 | -33000 | 3443 |
| AHEAD  | 0     | 469          | 445         | 1833 | 33000  | 3443 |
| TOTALS | 0.00  | 938          | 890         | 3666 | 0      | 6886 |

Wire Ld

TITLE Circular, New  
STRUCT #10185  
06/25/2004

Conductor

| Number of<br>Conductors per<br>phase | AHEAD     |           | BACK      |           |
|--------------------------------------|-----------|-----------|-----------|-----------|
|                                      | BITTERN   | BITTERN   | BITTERN   | BITTERN   |
| 2                                    | 1272.000  | 1272.000  | 1272.000  | 1272.000  |
|                                      | 45/7 ACSR | 45/7 ACSR | 45/7 ACSR | 45/7 ACSR |
| DIAM =                               | 1.345     |           | 1.345     |           |
| WEIGHT =                             | 1.432     |           | 1.432     |           |
| TENSION (LBS)                        |           | AHEAD     | BACK      |           |
|                                      |           | 12,696    | 12,696    |           |

| LOADCASE   |  | 1" RAD ICE | 1" RAD ICE |
|------------|--|------------|------------|
| WIND (PSF) |  | 0          |            |
| ICE (IN)   |  | 1.00       |            |
| OLF ANG    |  | 1.15       |            |
| OLF WIND   |  | 1.15       |            |
| OLF WT     |  | 1.15       |            |

| STR    | ANGLE | WIND<br>SPAN | WGT<br>SPAN | 1" RAD ICE |        |
|--------|-------|--------------|-------------|------------|--------|
|        |       |              |             | H          | L      |
| BACK   | 0     | 469          | 445         | 0          | -29201 |
| AHEAD  | 0     | 469          | 445         | 0          | 29201  |
| TOTALS | 0.00  | 938          | 890         | 0          | 0      |
|        |       |              |             |            | 8901   |

Wire Wind Ld

TITLE Cingular, New Milford  
STRUCT #10185

07/15/2004

| Conductor/Shield Wire/OPGW           |                       |                       |                       |         |
|--------------------------------------|-----------------------|-----------------------|-----------------------|---------|
| Number of<br>Conductors per<br>phase | AHEAD                 |                       | BACK                  |         |
|                                      | BITTERN               | BITTERN               | BITTERN               | BITTERN |
| 2                                    | 1272.000<br>45/7 ACSR | 1272.000<br>45/7 ACSR | 1272.000<br>45/7 ACSR | 2       |
|                                      | DIAM =                |                       | 1.345                 |         |
|                                      | WEIGHT =              |                       | 1.432                 |         |

| TENSION (LBS) | AHEAD | 9.475 | BACK | 9.475 |
|---------------|-------|-------|------|-------|
|---------------|-------|-------|------|-------|

| LOADCASE   | HI WIND | HI WIND | ▼ |
|------------|---------|---------|---|
| WIND (mph) | 100     |         |   |
| ICE (IN)   | 0.00    |         |   |
| OLF ANG    | 1.00    |         |   |
| OLF WT     | 1.00    |         |   |

| STR    | WIND<br>SPAN | WGT<br>SPAN | HI WIND<br>H | HI WIND<br>L | V    |
|--------|--------------|-------------|--------------|--------------|------|
| BACK   | 0            | 469         | 2374         | -18950       | 1274 |
| AHEAD  | 0            | 469         | 2374         | 18950        | 1274 |
| TOTALS | 0.0          | 938         | 890          | 0            | 2549 |



Wire Ld

TITLE Cingular New Milford  
STRUCT # 10185 06/24/2004

Conductor

| AHEAD  |        | BACK   |        |
|--------|--------|--------|--------|
| 3/8 AW | 3/8 AW | 3/8 AW | 3/8 AW |
|        | 0.000  |        | 0.000  |

7 #8 Al Weld

|          |       |       |
|----------|-------|-------|
| DIAM =   | 0.385 | 0.385 |
| WEIGHT = | 0.262 | 0.262 |

| TENSION (LBS) |       |
|---------------|-------|
| AHEAD         | BACK  |
| 4,200         | 4,200 |

| LOADCASE   | NESC HEAVY |
|------------|------------|
| WIND (PSF) | 4          |
| ICE (IN)   | 0.50       |
| OLF ANG    | 1.65       |
| OLF WIND   | 2.50       |
| OLF WT     | 1.50       |

| STR    | ANGLE | WIND SPAN | WGT SPAN | H    | NESC HEAVY L | V    |
|--------|-------|-----------|----------|------|--------------|------|
| BACK   | 0     | 469       | 445      | 542  | -6930        | 542  |
| AHEAD  | 0     | 469       | 445      | 542  | 6930         | 542  |
| TOTALS | 0.00  | 939       | 890      | 1083 | 0            | 1084 |

Wire Ld

TITLE Cingular, New Milford  
STRUCT # 10185 06/24/2004

| Conductor |        |        |       |
|-----------|--------|--------|-------|
| AHEAD     | 3/8 AW | 3/8 AW | BACK  |
| 0.000     | 0.000  | 0.000  | 0.000 |

7 #8 Al Weld

|               |             |            |
|---------------|-------------|------------|
| DIAM =        | 0.385       | 0.385      |
| WEIGHT =      | 0.262       | 0.262      |
| TENSION (LBS) | AHEAD 5,611 | BACK 5,611 |

| LOADCASE   | 1" RAD ICE | RAD ICE |
|------------|------------|---------|
| WIND (PSF) | 0          |         |
| ICE (IN)   | 1.00       |         |
| OLF ANG    | 1.15       |         |
| OLF WIND   | 1.15       |         |
| OLF WT     | 1.15       |         |

| STR    | WIND | SPAN | WGT | SPAN | H | 1" RAD ICE | L    | V    |
|--------|------|------|-----|------|---|------------|------|------|
| BACK   | 0    | 469  | 445 | 445  | 0 | -6453      | 1015 | 1015 |
| AHEAD  | 0    | 469  | 445 | 445  | 0 | 6453       | 1015 | 1015 |
| TOTALS | 0.00 | 939  | 890 | 890  | 0 | 0          | 2031 |      |

# Wire Wind Ld

TITLE Cingular, New Milford

STRUCT #10185

07/15/2004

## Conductor/Shield Wire/OPGW

| Number of<br>Conductors per<br>phase | AHEAD          |        | BACK         |        | Number of<br>Conductors per<br>phase |
|--------------------------------------|----------------|--------|--------------|--------|--------------------------------------|
|                                      | 3/8 AW         | 3/8 AW | 3/8 AW       | 3/8 AW |                                      |
| 1                                    | 0.000          | 0.000  | 0.000        | 0.000  | 1                                    |
|                                      | 7 #8 Al Weld   |        | 7 #8 Al Weld |        |                                      |
|                                      | DIAM = 0.385   |        | 0.385        |        |                                      |
|                                      | WEIGHT = 0.262 |        | 0.262        |        |                                      |

| TENSION (LBS) | AHEAD | 3,060 | BACK | 3,060 |
|---------------|-------|-------|------|-------|
|---------------|-------|-------|------|-------|

| LOADCASE   | HI WIND | HI WIND | ▼ |
|------------|---------|---------|---|
| WIND (mph) | 100     |         |   |
| ICE (IN)   | 0.00    |         |   |
| OLF ANG    | 1.00    |         |   |
| OLF WT     | 1.00    |         |   |

| STR    | ANGLE | WIND<br>SPAN | WGT<br>SPAN | H   | HI WIND<br>L | V   |
|--------|-------|--------------|-------------|-----|--------------|-----|
| BACK   | 0     | 469          | 445         | 340 | -3060        | 117 |
| AHEAD  | 0     | 469          | 445         | 340 | 3060         | 117 |
| TOTALS | 0.0   | 938          | 890         |     | 0            | 233 |

Ahead

Velocity (mph) 100  
Vel. Pres Coeff.k 1.4  
Gust Response 0.63

Back

Velocity (mph) 100  
Vel. Pres Coeff.k 1.4  
Gust Response 0.63

With  
Conductor  
Tension

AT&T ANTENNAS  
EL.  $\pm 175'-0"$  AGL

TOP CONNECTION  
EL.  $\pm 157'-0"$  AGL

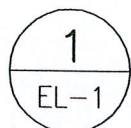
BOTTOM CONNECTION  
EL.  $\pm 135'-0"$  AGL

PROPOSED TWO (2) POWERWAVE  
P65-17-XLH-RR PANEL ANTENNAS, TWO  
(2) KMW AM-X-CD-16-65-00T-RET  
PANEL ANTENNAS, TWO (2) KATHREIN  
SCALA 800-10764 PANEL ANTENNAS AND  
SIX (6) CCI DTMBP7819VG12A TMA<sub>s</sub>  
MOUNTED ON THE EXISTING T-ARM  
CO-LOCATION KIT.

NOTE: EXISTING SIX (6) POWERWAVE  
7770 PANEL ANTENNAS, SIX (6)  
POWERWAVE LGP-21401 TMA<sub>s</sub>, AND  
SIX (6) POWERWAVE LGP-21901  
DIPLEXERS TO BE REMOVED.

EXIST. AT&T TWELVE (12)  
1-5/8" DIA. COAX CABLES  
BANDED TO THE EXTERIOR OF  
THE EXISTING CL&P STEEL  
POLE.

EXISTING 160' TALL  
CL&P STEEL POLE  
STRUCTURE NO. 10185



## TOWER ELEVATION

SCALE: NOT TO SCALE

### REVISIONS

|    |          |                      |
|----|----------|----------------------|
| 00 | 10/15/12 | ISSUED FOR NU REVIEW |
| 01 | 12/26/12 | CONSTRUCTION         |
|    |          |                      |
|    |          |                      |
|    |          |                      |

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CT2260  
CL&P 10185

100 OLD TOWN PARK RD  
NEW MILFORD, CT 06776

PROJECT NO. 12101.CO1  
DRAWN BY: TJL  
CHECKED BY: CFC  
SCALE: AS NOTED  
DATE: 10/15/12

TOWER AND MAST  
ELEVATION

EL-1

DWG. 1 OF 1



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

**Wind Speeds**

Basic Wind Speed

$V := 85$  mph (User Input per NU Mast Design Criteria Exception 1)

Basic Wind Speed with Ice

$V_i := 74$  mph (User Input per TIA/EIA-222-F Section 2.3.16)

**Heights above ground level, z**

Mast

$z_{\text{mast}} := 155.5$  ft (User Input)

AT&T

$z_{\text{att}} := 175$  ft (User Input)

Mount

$z_{\text{mnt}} := 175$  ft (User Input)

Coax

$z_{\text{coax}} := 155.5$  ft (User Input)

**Exposure Coefficients,  $k_z$**

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

Mast

$$K_{z_{\text{mast}}} := \left( \frac{z_{\text{mast}}}{33} \right)^{\frac{2}{7}} = 1.557$$

AT&T

$$K_{z_{\text{att}}} := \left( \frac{z_{\text{att}}}{33} \right)^{\frac{2}{7}} = 1.611$$

Mount

$$K_{z_{\text{mnt}}} := \left( \frac{z_{\text{mnt}}}{33} \right)^{\frac{2}{7}} = 1.611$$

Coax

$$K_{z_{\text{coax}}} := \left( \frac{z_{\text{coax}}}{33} \right)^{\frac{2}{7}} = 1.557$$

**Velocity Pressure without ice,  $q_z$**

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

Mast

$$q_{z_{\text{mast}}} := 0.00256 \cdot K_{z_{\text{mast}}} \cdot V^2 = 28.802$$

AT&T

$$q_{z_{\text{att}}} := 0.00256 \cdot K_{z_{\text{att}}} \cdot V^2 = 29.791$$

Mount

$$q_{z_{\text{mnt}}} := 0.00256 \cdot K_{z_{\text{mnt}}} \cdot V^2 = 29.791$$

Coax

$$q_{z_{\text{coax}}} := 0.00256 \cdot K_{z_{\text{coax}}} \cdot V^2 = 28.802$$

**Velocity Pressure with ice,  $q_{zICE}$**

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

Mast

$$q_{zICE_{\text{mast}}} := 0.00256 \cdot K_{z_{\text{mast}}} \cdot V_i^2 = 21.83$$

AT&T

$$q_{zICE_{\text{att}}} := 0.00256 \cdot K_{z_{\text{att}}} \cdot V_i^2 = 22.579$$

Mount

$$q_{zICE_{\text{mnt}}} := 0.00256 \cdot K_{z_{\text{mnt}}} \cdot V_i^2 = 22.579$$

Coax

$$q_{zICE_{\text{coax}}} := 0.00256 \cdot K_{z_{\text{coax}}} \cdot V_i^2 = 21.83$$

**TIA/EIA Common Factors:**

Gust Response Factor =

$G_H := 1.69$  (User Input per TIA/EIA-222-F Section 2.3.4)

Radial Ice Thickness =

$I_r := 0.50$  in (User Input per TIA/EIA-222-F Section 2.3.1)

Radial Ice Density =

$I_d := 56.00$  pcf (User Input)

**Development of Wind & Ice Load on PCS Mast**

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

**Mast Data:**

|                  |                               |              |
|------------------|-------------------------------|--------------|
|                  | (Pipe 12' Std.)               | (User Input) |
| Mast Shape =     | Round                         | (User Input) |
| Mast Diameter =  | $D_{\text{mast}} := 12.75$ in | (User Input) |
| Mast Length =    | $L_{\text{mast}} := 39$ ft    | (User Input) |
| Mast Thickness = | $t_{\text{mast}} := 0.375$ in | (User Input) |

$$C := \sqrt{Kz_{\text{mast}}} \cdot V \cdot \frac{D_{\text{mast}}}{12} = 113$$

$$\text{Mast Force Coefficient} = C_{F_{\text{mast}}} = 0.59 \quad (\text{per TIA/EIA-222-F Table 1})$$

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

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

**Total Mast Wind Force =**

$$qz_{\text{mast}} G_H C_{F_{\text{mast}}} A_{\text{mast}} = 31 \quad \text{plf} \quad \text{BLC 5}$$

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

$$\text{Mast Projected Surface Area w/ Ice} = A_{\text{ICE}_{\text{mast}}} := \frac{(D_{\text{mast}} + 2 \cdot I_r)}{12} = 1.146 \quad \text{sf/ft}$$

**Total Mast Wind Force w/ Ice =**

$$qz_{\text{ICE}_{\text{mast}}} G_H C_{F_{\text{mast}}} A_{\text{ICE}_{\text{mast}}} = 25 \quad \text{plf} \quad \text{BLC 4}$$

**Gravity Loads (without ice)**
**Weight of the mast =**

$$\text{Self Weight} \quad (\text{Computed internally by Risa-3D}) \quad \text{plf} \quad \text{BLC 1}$$

**Gravity Loads (ice only)**
**Ice Area per Linear Foot =**

$$A_{\text{imast}} := \frac{\pi}{4} \left[ (D_{\text{mast}} + I_r \cdot 2)^2 - D_{\text{mast}}^2 \right] = 20.8 \quad \text{sq in}$$

**Weight of Ice on Mast =**

$$W_{\text{ICE}_{\text{mast}}} := I_d \cdot \frac{A_{\text{imast}}}{144} = 8 \quad \text{plf} \quad \text{BLC 3}$$

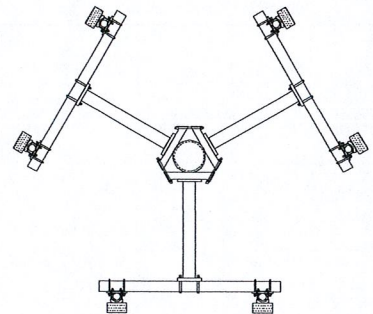


**Development of Wind & Ice Load on Antennas**

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

**Antenna Data:**

|                             |                                             |                                  |
|-----------------------------|---------------------------------------------|----------------------------------|
| Antenna Model =             | Powerwave P65-17-XLH-RR                     |                                  |
| Antenna Shape =             | Round                                       | (User Input)                     |
| Antenna Height =            | $L_{ant} := 96$                             | in (User Input)                  |
| Antenna Width =             | $W_{ant} := 12$                             | in (User Input)                  |
| Antenna Thickness =         | $T_{ant} := 6$                              | in (User Input)                  |
| Antenna Weight =            | $WT_{ant} := 62$                            | lbs (User Input)                 |
| Number of Antennas =        | $N_{ant} := 2$                              | (User Input)                     |
| Antenna Aspect Ratio =      | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 8.0$ |                                  |
| Antenna Force Coefficient = | $Ca_{ant} = 1.43$                           | (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  
Applied to All Antennas Simultaneously**

|                                  |                                                     |    |
|----------------------------------|-----------------------------------------------------|----|
| Surface Area for One Antenna =   | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 8$ | sf |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 16$            | sf |

**Total Antenna Wind Force =**

$$F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1155 \quad \text{lbs} \quad \text{BLC 5}$$

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

**Assumes Maximum Possible Wind Pressure  
Applied to All Antennas Simultaneously**

|                                         |                                                                      |    |
|-----------------------------------------|----------------------------------------------------------------------|----|
| Surface Area for One Antenna w/ Ice =   | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 8.8$ | sf |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 17.5$                     | sf |

**Total Antenna Wind Force w/ Ice =**

$$F_{i_{ant}} := qz_{ICEant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 958 \quad \text{lbs} \quad \text{BLC 4}$$

**Gravity Load (without ice)****Weight of All Antennas =**

$$WT_{ant} \cdot N_{ant} = 124 \quad \text{lbs} \quad \text{BLC 2}$$

**Gravity Loads (ice only)**

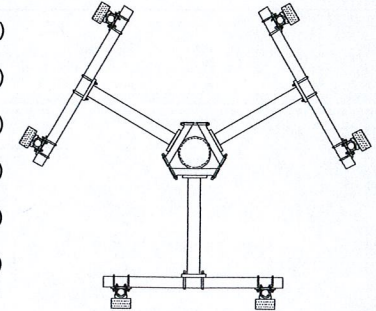
|                                 |                                                                                     |           |
|---------------------------------|-------------------------------------------------------------------------------------|-----------|
| Volume of Each Antenna =        | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6912$                             | cu in     |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1915$ | cu in     |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 62$                                  | lbs       |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 124$                                                    | lbs BLC 3 |

**Development of Wind & Ice Load on Antennas**

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

**Antenna Data:**

|                             |                                                    |
|-----------------------------|----------------------------------------------------|
| Antenna Model =             | KMW AM-X-CD-16-65-00T-RET                          |
| Antenna Shape =             | Round (User Input)                                 |
| Antenna Height =            | $L_{ant} := 72$ in (User Input)                    |
| Antenna Width =             | $W_{ant} := 11.8$ in (User Input)                  |
| Antenna Thickness =         | $T_{ant} := 5.9$ in (User Input)                   |
| Antenna Weight =            | $WT_{ant} := 48.5$ lbs (User Input)                |
| Number of Antennas =        | $N_{ant} := 2$ (User Input)                        |
| Antenna Aspect Ratio =      | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$        |
| 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  
Applied to All Antennas Simultaneously*

|                                  |                                                                    |                  |
|----------------------------------|--------------------------------------------------------------------|------------------|
| Surface Area for One Antenna =   | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$              | sf               |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 11.8$                         | sf               |
| Total Antenna Wind Force =       | $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 832$ | lbs <b>BLC 5</b> |

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

*Assumes Maximum Possible Wind Pressure  
Applied to All Antennas Simultaneously*

|                                         |                                                                              |                  |
|-----------------------------------------|------------------------------------------------------------------------------|------------------|
| Surface Area for One Antenna w/ Ice =   | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$         | sf               |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13$                               | sf               |
| Total Antenna Wind Force w/ Ice =       | $F_{i_{ant}} := qz_{ICEatt} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 693$ | lbs <b>BLC 4</b> |

**Gravity Load (without ice)**

Weight of All Antennas =

$$WT_{ant} \cdot N_{ant} = 97 \quad \text{lbs} \quad \text{BLC 2}$$

**Gravity Loads (ice only)**

|                                 |                                                                                     |                  |
|---------------------------------|-------------------------------------------------------------------------------------|------------------|
| Volume of Each Antenna =        | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$                             | cu in            |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1435$ | cu in            |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 46$                              | lbs              |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 93$                                                     | lbs <b>BLC 3</b> |

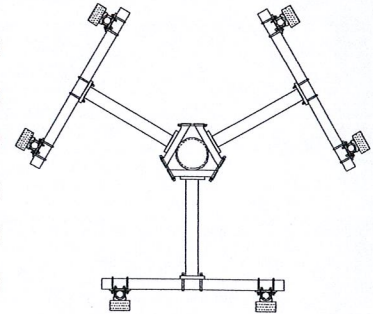


**Development of Wind & Ice Load on Antennas**

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

**Antenna Data:**

|                             |                                                   |
|-----------------------------|---------------------------------------------------|
| Antenna Model =             | Kathrein Scala 800-10764                          |
| Antenna Shape =             | Round (User Input)                                |
| Antenna Height =            | $L_{ant} := 55.2$ in (User Input)                 |
| Antenna Width =             | $W_{ant} := 11.8$ in (User Input)                 |
| Antenna Thickness =         | $T_{ant} := 6$ in (User Input)                    |
| Antenna Weight =            | $WT_{ant} := 40.8$ lbs (User Input)               |
| Number of Antennas =        | $N_{ant} := 2$ (User Input)                       |
| Antenna Aspect Ratio =      | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.7$       |
| 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  
Applied to All Antennas Simultaneously*

|                                  |                                                                    |                  |
|----------------------------------|--------------------------------------------------------------------|------------------|
| Surface Area for One Antenna =   | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.5$              | sf               |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 9$                            | sf               |
| Total Antenna Wind Force =       | $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 638$ | lbs <b>BLC 5</b> |

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

*Assumes Maximum Possible Wind Pressure  
Applied to All Antennas Simultaneously*

|                                         |                                                                           |                  |
|-----------------------------------------|---------------------------------------------------------------------------|------------------|
| Surface Area for One Antenna w/ Ice =   | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5$        | sf               |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 10$                            | sf               |
| Total Antenna Wind Force w/ Ice =       | $F_{Iant} := qz_{ICEatt} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 534$ | lbs <b>BLC 4</b> |

**Gravity Load (without ice)**

**Weight of All Antennas =**

$$WT_{ant} \cdot N_{ant} = 82 \quad \text{lbs} \quad \text{BLC 2}$$

**Gravity Loads (ice only)**

|                                 |                                                                                     |                  |
|---------------------------------|-------------------------------------------------------------------------------------|------------------|
| Volume of Each Antenna =        | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3908$                             | cu in            |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1127$ | cu in            |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 37$                                  | lbs              |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 73$                                                     | lbs <b>BLC 3</b> |



Subject:

Load Analysis of PCS Mast and AT&T  
Equipment on CL&P Pole # 10185

Location:

New Milford, CT

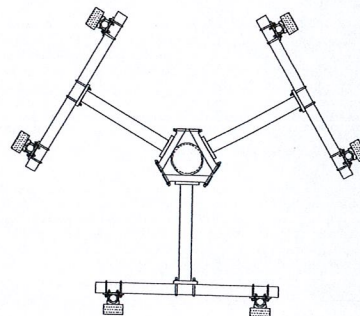
Rev. 1: 12/26/12

Prepared by: T.J.L. Checked by: C.F.C.  
Job No. 12101.CO1**Development of Wind & Ice Load on TMAs**

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

**TMA Data:**

|                         |                                                   |
|-------------------------|---------------------------------------------------|
| TMA Model =             | CCI DTMAP7819VG12A                                |
| TMA Shape =             | Flat (User Input)                                 |
| TMA Height =            | $L_{tma} := 14.25$ in (User Input)                |
| TMA Width =             | $W_{tma} := 11.46$ in (User Input)                |
| TMA Thickness =         | $T_{tma} := 4.17$ in (User Input)                 |
| TMA Weight =            | $WT_{tma} := 20$ lbs (User Input)                 |
| Number of TMAs =        | $N_{tma} := 6$ (User Input)                       |
| TMA Aspect Ratio =      | $Ar_{tma} := \frac{L_{tma}}{W_{tma}} = 1.2$       |
| TMA Force Coefficient = | $Ca_{tma} = 1.4$ (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  
Applied to ALL TMAs Simultaneously*

Surface Area for One TMA =

$$SA_{tma} := \frac{L_{tma} \cdot W_{tma}}{144} = 1.1 \quad sf$$

TMA Projected Surface Area =

$$A_{tma} := SA_{tma} \cdot N_{tma} = 6.8 \quad sf$$

Total TMA Wind Force =

$$F_{tma} := qz_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{tma} = 480 \quad lbs \quad \text{BLC 5}$$

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

*Assumes Maximum Possible Wind Pressure  
Applied to ALL TMAs Simultaneously*

Surface Area for One TMA w/ Ice =

$$SA_{ICEtma} := \frac{(L_{tma} + 1) \cdot (W_{tma} + 1)}{144} = 1.3 \quad sf$$

TMA Projected Surface Area w/ Ice =

$$A_{ICEtma} := SA_{ICEtma} \cdot N_{tma} = 7.9 \quad sf$$

Total TMA Wind Force w/ Ice =

$$F_{tma} := qz_{ICE} \cdot G_H \cdot Ca_{tma} \cdot A_{ICEtma} = 423 \quad lbs \quad \text{BLC 4}$$

**Gravity Load (without ice)**

Weight of All TMAs =

$$WT_{tma} \cdot N_{tma} = 120 \quad lbs \quad \text{BLC 2}$$

**Gravity Loads (ice only)**

Volume of Each TMA =

$$V_{tma} := L_{tma} \cdot W_{tma} \cdot T_{tma} = 681 \quad cu \text{ in}$$

Volume of Ice on Each TMA =

$$V_{ice} := (L_{tma} + 1)(W_{tma} + 1)(T_{tma} + 1) - V_{tma} = 301 \quad cu \text{ in}$$

Weight of Ice on Each TMA =

$$W_{ICEtma} := \frac{V_{ice}}{1728} \cdot Id = 10 \quad lbs$$

Weight of Ice on All TMAs =

$$W_{ICEtma} \cdot N_{tma} = 59 \quad lbs \quad \text{BLC 3}$$

Subject:

Load Analysis of PCS Mast and AT&T  
Equipment on CL&P Pole # 10185

Location:

New Milford, CT

Rev. 1: 12/26/12

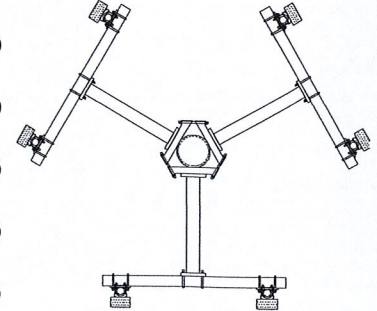
Prepared by: T.J.L. Checked by: C.F.C.  
Job No. 12101.CO1

**Development of Wind & Ice Load on Antenna Mounts**

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

**Mount Data:**

|                       |                        |                    |  |
|-----------------------|------------------------|--------------------|--|
| Mount Type:           | T-Arm Co-Location Kit  |                    |  |
| Mount Shape =         | Flat                   | (User Input)       |  |
| Mount Area =          | $CaA_{mnt} := 16.75$   | sq ft (User Input) |  |
| Mount Area w/ Ice =   | $CaA_{ICEmnt} := 22.4$ | sq ft (User Input) |  |
| Mount Weight =        | $WT_{mnt} := 550$      | lbs (User Input)   |  |
| Mount Weight w/ Ice = | $WT_{ICEmnt} := 700$   | lbs (User Input)   |  |



**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

Total Mount Wind Force =

$$F_{mnt} := qz_{mnt} \cdot G_H \cdot CaA_{mnt} = 843$$

lbs **BLC 5**

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

Total Mount Wind Force =

$$F_{mnt} := qz_{ICEmnt} \cdot G_H \cdot CaA_{ICEmnt} = 855$$

lbs **BLC 4**

**Gravity Loads (without ice)**

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

Weight of All Mounts =

$$WT_{mnt} = 550$$

lbs **BLC 2**

**Gravity Loads (ice only)**

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

Weight of Ice on All Mounts =

$$WT_{ICEmnt} - WT_{mnt} = 150$$

lbs **BLC 3**

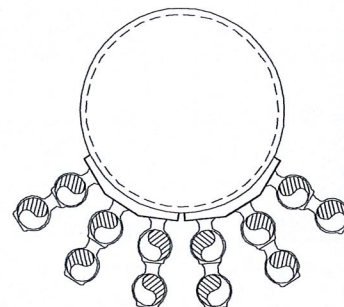


**Development of Wind & Ice Load on Coax Cables****Coax Cable Data:**

Coax Type =  
Shape =  
Coax Outside Diameter =  
Coax Cable Length =  
Weight of Coax per foot =  
Total Number of Coax =  
No. of Coax Projecting Outside Face of PCS Mast =

per TIA/EIA-222-F-96 Criteria

HELIAX 1-5/8"  
Round (User Input)  
 $D_{\text{coax}} := 1.98$  in (User Input)  
 $L_{\text{coax}} := 39$  ft (User Input)  
 $Wt_{\text{coax}} := 1.04$  plf (User Input)  
 $N_{\text{coax}} := 12$  (User Input)  
 $NP_{\text{coax}} := 4$  (User Input)



Coax aspect ratio,

$$Ar_{\text{coax}} := \frac{(L_{\text{coax}} \cdot 12)}{D_{\text{coax}}} = 236.4$$

Coax Cable Force Factor Coefficient =

$$Ca_{\text{coax}} = 1.2 \quad \text{TIA/EIA-222-F-96 Table 3}$$

**Wind Load (without ice)**

per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area =

$$A_{\text{coax}} := \frac{NP_{\text{coax}} \cdot D_{\text{coax}}}{12} = 0.7 \quad \text{sf/ft}$$

Total Coax Wind Force =

$$F_{\text{coax}} := qz_{\text{coax}} \cdot G_H \cdot Ca_{\text{coax}} \cdot A_{\text{coax}} = 39 \quad \text{plf} \quad \text{BLC 5}$$

**Wind Load (with ice)**

per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice =

$$A_{\text{ICE}_{\text{coax}}} := \frac{NP_{\text{coax}} (D_{\text{coax}} + 2 \cdot Ir)}{12} = 1 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{\text{ICE}_{\text{coax}}} := qz_{\text{ICE}_{\text{coax}}} \cdot G_H \cdot Ca_{\text{coax}} \cdot A_{\text{ICE}_{\text{coax}}} = 44 \quad \text{plf} \quad \text{BLC 4}$$

**Gravity Loads (without ice)**

Weight of all cables w/o ice

$$WT_{\text{coax}} := Wt_{\text{coax}} \cdot N_{\text{coax}} = 12 \quad \text{plf} \quad \text{BLC 2}$$

**Gravity Loads (ice only)**

Ice Area per Linear Foot =

$$Ai_{\text{coax}} := \frac{\pi}{4} [(D_{\text{coax}} + 2 \cdot Ir)^2 - D_{\text{coax}}^2] = 3.9 \quad \text{sq in}$$

Ice Weight All Coax per foot =

$$WTi_{\text{coax}} := Id \cdot \left( N_{\text{coax}} \cdot \frac{Ai_{\text{coax}}}{144} \right) = 18 \quad \text{plf} \quad \text{BLC 3}$$

|                                                                                                                                                           |                                                       |                                                                                                                                                                                                                                               |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>CEN TEK engineering, INC.</b><br><b>Consulting Engineers</b><br>63-2 North Branford Road<br>Branford, CT 06405<br>Ph. 203-488-0580 / Fax. 203-488-8587 |                                                       | <b>Subject: Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only</b><br><b>Tabulated Load Cases</b><br><b>Location: New Milford, CT</b><br>Date: 10/15/12      Prepared by: T.J.L.      Checked by: C.F.C.      Job No. 12101.CO1 |  |
| <b>Load Case</b>                                                                                                                                          | <b>Description</b>                                    |                                                                                                                                                                                                                                               |  |
| 1                                                                                                                                                         | Self Weight (Mast)                                    |                                                                                                                                                                                                                                               |  |
| 2                                                                                                                                                         | Weight of Appurtenances                               |                                                                                                                                                                                                                                               |  |
| 3                                                                                                                                                         | Weight of Ice Only on PCS Structure <sup>(1)</sup>    |                                                                                                                                                                                                                                               |  |
| 4                                                                                                                                                         | TIA/EIA Wind with Ice on PCS Structure <sup>(1)</sup> |                                                                                                                                                                                                                                               |  |
| 5                                                                                                                                                         | TIA/EIA Wind on PCS Structure <sup>(1)</sup>          |                                                                                                                                                                                                                                               |  |
| Footnotes:<br>(1) PCS Structure includes: Mast and Appurtenances                                                                                          |                                                       |                                                                                                                                                                                                                                               |  |



| <b>CENTEK engineering, INC.</b><br><b>Consulting Engineers</b><br>63-2 North Branford Road<br>Branford, CT 06405<br>Ph. 203-488-0580 / Fax 203-488-8587 |                                     | <b>Subject: Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only</b><br><b>Load Combinations Table</b><br><br><b>Location: New Milford, CT</b><br>Date: 10/15/12      Prepared by: T.J.L.      Checked by: C.F.C.      Job No. 12101.CO1 |        |         |            |            |            |            |            |            |            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|------------|------------|------------|------------|------------|------------|------------|
| Load Combination                                                                                                                                        | Description                         | Envelope Wind                                                                                                                                                                                                                                        |        |         |            |            |            |            |            |            |            |
|                                                                                                                                                         |                                     | Soultion                                                                                                                                                                                                                                             | Factor | P-Delta | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor | BLC Factor |
| 1                                                                                                                                                       | TIA/EIA Wind + Ice on PCS Structure | 1                                                                                                                                                                                                                                                    |        |         | 1          | 1          | 1          | 2          | 1          | 3          | 1          |
|                                                                                                                                                         |                                     |                                                                                                                                                                                                                                                      |        |         |            |            |            |            |            | 4          | 1          |
| 2                                                                                                                                                       | TIA/EIA Wind on PCS Structure       | 1                                                                                                                                                                                                                                                    |        |         | 1          | 1          | 1          | 2          | 1          | 5          | 1          |
| <b>Footnotes:</b><br>(1) BLC = Basic Load Case<br>(2) PCS Structure includes: Mast and Appurtenances                                                    |                                     |                                                                                                                                                                                                                                                      |        |         |            |            |            |            |            |            |            |

## 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     |
| Global Member Orientation Plane        | XZ    |

|                        |                    |
|------------------------|--------------------|
| Hot Rolled Steel Code  | AISC 9th: ASD      |
| Cold Formed Steel Code | AISI 1999: ASD     |
| Wood Code              | AF&PA NDS-97: ASD  |
| Wood Temperature       | < 100F             |
| Concrete Code          | ACI 318-02         |
| Masonry Code           | ACI 530-05/08: ASD |
| Aluminum Code          | AA ADM1-05: ASD    |

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

|                                       |             |
|---------------------------------------|-------------|
| Seismic Code                          | UBC 1997    |
| Seismic Base Elevation (ft)           | Not Entered |
| Ct X                                  | .035        |
| Ct Z                                  | .035        |
| T X (sec)                             | Not Entered |
| T Z (sec)                             | Not Entered |
| R X                                   | 8.5         |
| R Z                                   | 8.5         |
| Ct Exp. X                             | .75         |
| Ct Exp. Z                             | .75         |
| Ca                                    | .36         |
| Cv                                    | .54         |
| Nv                                    | 1           |
| SD1                                   | 1           |
| SDS                                   | 1           |
| S1                                    | 1           |
| Occupancy Code                        | 4           |
| Seismic Zone                          | 3           |
| Use Group                             | I           |
| Use Gravity Self Wt in Diaphragm Mass | Yes         |
| Use Deck Self Wt in Diaphragm Mass    | Yes         |
| Use Lateral Self Wt in Diaphragm Mass | Yes         |
| Seismic Detailing Code                | None        |
| Om X                                  | 1           |
| Om Z                                  | 1           |
| Rho X                                 | 1           |
| Rho Z                                 | 1           |

### Hot Rolled Steel Properties

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

### Hot Rolled Steel Design Parameters

|   | Label | Shape | Lengt... | Lbyy[ft] | Lbzz[ft] | Lcomp top[ft] | Lcomp bot[ft] | Kyy | Kzz | Cm... | Cm... | Cb | y sw... | z sw... | Function |
|---|-------|-------|----------|----------|----------|---------------|---------------|-----|-----|-------|-------|----|---------|---------|----------|
| 1 | M1    | Mast  | 40       |          |          |               |               |     |     |       |       |    |         |         | Lateral  |

### Hot Rolled Steel Section Sets

|   | Label | Shape     | Type | Design List | Material   | Design Rul... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|-------|-----------|------|-------------|------------|---------------|---------|-----------|-----------|---------|
| 1 | Mast  | PIPE 12.0 | Beam | Pipe        | A500 Gr.46 | Typical       | 13.6    | 262       | 262       | 523     |

### Member Primary Data

|   | Label | I Joint   | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material   | Design Rules |
|---|-------|-----------|---------|---------|-------------|---------------|------|-------------|------------|--------------|
| 1 | M1    | BOTCON... | TOPMAST |         |             | Mast          | Beam | Pipe        | A500 Gr.46 | Typical      |

### Joint Coordinates and Temperatures

|   | Label         | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diap... |
|---|---------------|--------|--------|--------|----------|---------------------|
| 1 | BOTCONNECTION | 0      | 0      | 0      | 0        |                     |
| 2 | TOPCONNECTION | 0      | 22     | 0      | 0        |                     |
| 3 | TOPMAST       | 0      | 40     | 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 | BOTCONNECTION | Reaction | Reaction | Reaction | Reaction         | Reaction         | Reaction         |         |
| 2 | TOPCONNECTION | Reaction |          | Reaction |                  |                  |                  |         |

### Joint Loads and Enforced Displacements

| Joint Label          | L,D,M | Direction | Magnitude[(k,k-ft), (in,rad), (k*s^2/f... |
|----------------------|-------|-----------|-------------------------------------------|
| No Data to Print ... |       |           |                                           |

### Member Point Loads (BLC 2 : Weight of Appurtenances)

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.124             | 40             |
| 2 | M1           | Y         | -.097             | 40             |
| 3 | M1           | Y         | -.082             | 40             |
| 4 | M1           | Y         | -.12              | 40             |
| 5 | M1           | Y         | -.55              | 40             |

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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.124             | 40             |
| 2 | M1           | Y         | -.093             | 40             |
| 3 | M1           | Y         | -.073             | 40             |
| 4 | M1           | Y         | -.059             | 40             |
| 5 | M1           | Y         | -.15              | 40             |

**Member Point Loads (BLC 4 : TIA/EIA Wind with Ice on PCS Str)**

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .958              | 40             |
| 2 | M1           | X         | .693              | 40             |
| 3 | M1           | X         | .534              | 40             |
| 4 | M1           | X         | .423              | 40             |
| 5 | M1           | X         | .855              | 40             |

**Member Point Loads (BLC 5 : TIA/EIA Wind on PCS Structure)**

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | 1.155             | 40             |
| 2 | M1           | X         | .832              | 40             |
| 3 | M1           | X         | .638              | 40             |
| 4 | M1           | X         | .48               | 40             |
| 5 | M1           | X         | .843              | 40             |

**Member Distributed Loads (BLC 2 : Weight of Appurtenances)**

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

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

|   | Member Label | Direction | Start Magnitude[k/ft,deg] | End Magnitude[k/f... | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|---------------------------|----------------------|----------------------|--------------------|
| 1 | M1           | Y         | -.008                     | -.008                | 0                    | 0                  |
| 2 | M1           | Y         | -.018                     | -.018                | 0                    | 0                  |

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

|   | Member Label | Direction | Start Magnitude[k/ft,deg] | End Magnitude[k/f... | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|---------------------------|----------------------|----------------------|--------------------|
| 1 | M1           | X         | .025                      | .025                 | 0                    | 0                  |
| 2 | M1           | X         | .044                      | .044                 | 0                    | 0                  |

**Member Distributed Loads (BLC 5 : TIA/EIA Wind on PCS Structure)**

|   | Member Label | Direction | Start Magnitude[k/ft,deg] | End Magnitude[k/f... | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|---------------------------|----------------------|----------------------|--------------------|
| 1 | M1           | X         | .031                      | .031                 | 0                    | 0                  |
| 2 | M1           | X         | .039                      | .039                 | 0                    | 0                  |

**Basic Load Cases**

|   | BLC Description                  | Category | X Grav... | Y Grav... | Z Gravity | Joint | Point | Distrib... | Area(... | Surfac... |
|---|----------------------------------|----------|-----------|-----------|-----------|-------|-------|------------|----------|-----------|
| 1 | Self Weight (PCS Mast)           | None     |           | -1        |           |       |       |            |          |           |
| 2 | Weight of Appurtenances          | None     |           |           |           |       | 5     | 1          |          |           |
| 3 | Weight of Ice Only on PCS Struct | None     |           |           |           |       | 5     | 2          |          |           |
| 4 | TIA/EIA Wind with Ice on PCS Str | None     |           |           |           |       | 5     | 2          |          |           |



### Basic Load Cases (Continued)

| BLC Description |                               | Category | X Grav... | Y Grav... | Z Gravity | Joint | Point | Distrib... | Area(... | Surfac... |
|-----------------|-------------------------------|----------|-----------|-----------|-----------|-------|-------|------------|----------|-----------|
| 5               | TIA/EIA Wind on PCS Structure | None     |           |           |           |       | 5     | 2          |          |           |

### Load Combinations

| Description                     | So... | PDelta | SRSS | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. | BLCFac.. |
|---------------------------------|-------|--------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1 TIA/EIA Wind + Ice on PCS ... | Yes   |        |      | 1        | 1        | 2        | 1        | 3        | 1        | 4        | 1        |          |          |
| 2 TIA/EIA Wind on PCS Struct... | 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 Momen... | LC | z-z Momen... | LC |
|--------|-----|----------|-----|------------|----|------------|----|--------------|----|--------------|----|--------------|----|
| 1      | M1  | 1        | max | 4.843      | 1  | -4.044     | 1  | 0            | 1  | 0            | 1  | -32.153      | 1  |
| 2      |     |          | min | 3.304      | 2  | -4.634     | 2  | 0            | 1  | 0            | 1  | -36.485      | 2  |
| 3      |     | 2        | max | 4          | 1  | -4.734     | 1  | 0            | 1  | 0            | 1  | 13.356       | 2  |
| 4      |     |          | min | 2.721      | 2  | -5.334     | 2  | 0            | 1  | 0            | 1  | 11.737       | 1  |
| 5      |     | 3        | max | 3.158      | 1  | -5.424     | 1  | 0            | 1  | 0            | 1  | 70.196       | 2  |
| 6      |     |          | min | 2.139      | 2  | -6.034     | 2  | 0            | 1  | 0            | 1  | 62.526       | 1  |
| 7      |     | 4        | max | 2.315      | 1  | 4.648      | 2  | 0            | 1  | 0            | 1  | 42.98        | 2  |
| 8      |     |          | min | 1.556      | 2  | 4.153      | 1  | 0            | 1  | 0            | 1  | 38.08        | 1  |
| 9      |     | 5        | max | 1.472      | 1  | 3.948      | 2  | 0            | 1  | 0            | 1  | 0            | 1  |
| 10     |     |          | min | .973       | 2  | 3.463      | 1  | 0            | 1  | 0            | 1  | 0            | 1  |

### Envelope Member Section Stresses

| Member | Sec | Axial[k] | LC  | y Shear... | LC | z Shear... | LC | y-Top[k] | LC | y-Bot[k] | LC | z-Top[k] | LC | z-Bot[k] | LC |
|--------|-----|----------|-----|------------|----|------------|----|----------|----|----------|----|----------|----|----------|----|
| 1      | M1  | 1        | max | .356       | 1  | -.595      | 1  | 0        | 1  | 10.653   | 2  | -9.388   | 1  | 0        | 1  |
| 2      |     |          | min | .243       | 2  | -.681      | 2  | 0        | 1  | 9.388    | 1  | -10.653  | 2  | 0        | 1  |
| 3      |     | 2        | max | .294       | 1  | -.696      | 1  | 0        | 1  | -3.427   | 1  | 3.9      | 2  | 0        | 1  |
| 4      |     |          | min | .2         | 2  | -.784      | 2  | 0        | 1  | -3.9     | 2  | 3.427    | 1  | 0        | 1  |
| 5      |     | 3        | max | .232       | 1  | -.798      | 1  | 0        | 1  | -18.257  | 1  | 20.496   | 2  | 0        | 1  |
| 6      |     |          | min | .157       | 2  | -.887      | 2  | 0        | 1  | -20.496  | 2  | 18.257   | 1  | 0        | 1  |
| 7      |     | 4        | max | .17        | 1  | .684       | 2  | 0        | 1  | -11.119  | 1  | 12.55    | 2  | 0        | 1  |
| 8      |     |          | min | .114       | 2  | .611       | 1  | 0        | 1  | -12.55   | 2  | 11.119   | 1  | 0        | 1  |
| 9      |     | 5        | max | .108       | 1  | .581       | 2  | 0        | 1  | 0        | 1  | 0        | 1  | 0        | 1  |
| 10     |     |          | min | .072       | 2  | .509       | 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     | BOTCONNECT.. | max   | 4.634   | 2  | 4.843 | 1 |    | 0     | 1  | 0         | 1 | 0  | 1         | 0 | 1  | -32.153   | 1 |    |
| 2     |              | min   | 4.044   | 1  | 3.304 | 2 |    | 0     | 1  | 0         | 1 | 0  | 1         | 0 | 1  | -36.485   | 2 |    |
| 3     | TOPCONNECT.. | max   | -10.267 | 1  | 0     | 1 |    | 0     | 1  | 0         | 1 | 0  | 1         | 0 | 1  | 0         | 1 |    |
| 4     |              | min   | -11.382 | 2  | 0     | 1 |    | 0     | 1  | 0         | 1 | 0  | 1         | 0 | 1  | 0         | 1 |    |
| 5     | Totals:      | max   | -6.223  | 1  | 4.843 | 1 |    | 0     | 1  |           |   |    |           | 0 | 1  | 0         | 1 |    |
| 6     |              | min   | -6.748  | 2  | 3.304 | 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 | BOTCONNECT.. | max | 0      | 1  | 0      | 2  | 0      | 1  | 0                | 1  | 0                | 1  | 0                | 2  |
| 2 |              | min | 0      | 2  | 0      | 1  | 0      | 1  | 0                | 1  | 0                | 1  | 0                | 1  |
| 3 | TOPCONNECT.. | max | 0      | 2  | -.002  | 2  | 0      | 1  | 0                | 1  | 0                | 1  | -7.462e-3        | 1  |
| 4 |              | min | 0      | 1  | -.003  | 1  | 0      | 1  | 0                | 1  | 0                | 1  | -8.396e-3        | 2  |
| 5 | TOPMAST      | max | 3.78   | 2  | -.003  | 2  | 0      | 1  | 0                | 1  | 0                | 1  | -1.937e-2        | 1  |
| 6 |              | min | 3.36   | 1  | -.004  | 1  | 0      | 1  | 0                | 1  | 0                | 1  | -2.181e-2        | 2  |

### Envelope AISC ASD Steel Code Checks

| Member | Shape | Code Check | Loc[ft] | LC      | Sh... | Loc[ft]   | .....Fa... | Ft [ksi] | Fb y-y [ksi] | Fb..... | AS...       |
|--------|-------|------------|---------|---------|-------|-----------|------------|----------|--------------|---------|-------------|
| 1      | M1    | PIPE_1...  | .597    | 22.0... | 2     | 03721.667 | 216...     | 36.708   | 40.379       | 40...   | 1.6...H1... |

Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 12101.CO1 / AT&T CT2260 CL&P # 10185 - Mast

Dec 26, 2012  
9:17 AM  
Checked By: \_\_\_\_\_

### ***Joint Reactions***

| LC |   | Joint Label   | X [k]   | Y [k]     | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|----|---|---------------|---------|-----------|-------|-----------|-----------|-----------|
| 1  | 1 | BOTCONNECTION | 4.044   | 4.843     | 0     | 0         | 0         | -32.153   |
| 2  | 1 | TOPCONNECTION | -10.267 | 0         | 0     | 0         | 0         | 0         |
| 3  | 1 | Totals:       | -6.223  | 4.843     | 0     |           |           |           |
| 4  | 1 | COG (ft):     | X: 0    | Y: 26.079 | Z: 0  |           |           |           |

Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 12101.CO1 / AT&T CT2260 CL&P # 10185 - Mast

Dec 26, 2012

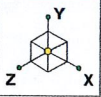
9:19 AM

Checked By: \_\_\_\_\_

### ***Joint Reactions***

| LC |   | Joint Label   | X [k]   | Y [k]    | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|----|---|---------------|---------|----------|-------|-----------|-----------|-----------|
| 1  | 2 | BOTCONNECTION | 4.634   | 3.304    | 0     | 0         | 0         | -36.485   |
| 2  | 2 | TOPCONNECTION | -11.382 | 0        | 0     | 0         | 0         | 0         |
| 3  | 2 | Totals:       | -6.748  | 3.304    | 0     |           |           |           |
| 4  | 2 | COG (ft):     | X: 0    | Y: 25.89 | Z: 0  |           |           |           |





| Code Check |         |
|------------|---------|
|            | No Calc |
|            | > 1.0   |
|            | .90-1.0 |
|            | .75-.90 |
|            | .50-.75 |
|            | 0-.50   |

TOPMAST

TOPCONNECTION

BOTCONNECTION

Solution: Envelope

CEN TEK Engineering, INC.

tjl, cfc

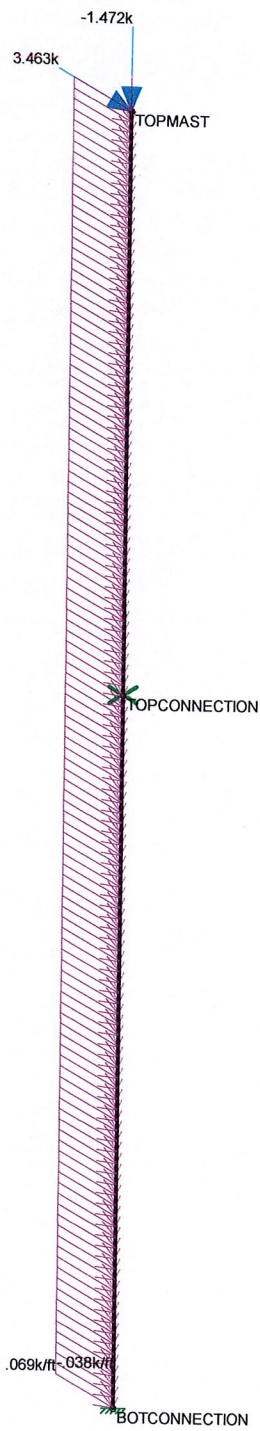
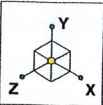
12101.CO1 / AT&T CT2260

CL&P # 10185 - Mast

Unity Check

Dec 26, 2012 at 9:16 AM

EIA-TIA Loads.r3d



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

CEN TEK Engineering, INC.

tjl, cfc

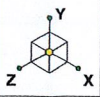
12101.CO1 / AT&T CT2260

CL&P # 10185 - Mast

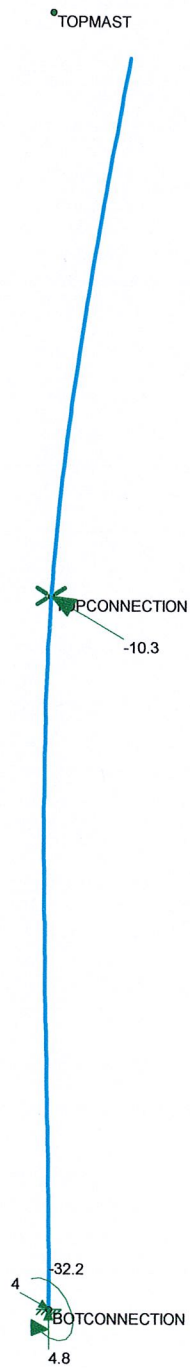
LC # 1 Loads

Dec 26, 2012 at 9:16 AM

EIA-TIA Loads.r3d



| Code Check |  |
|------------|--|
| No Calc    |  |
| > 1.0      |  |
| 90-1.0     |  |
| 75-90      |  |
| 50-75      |  |
| 0-50       |  |



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

CEN TEK Engineering, INC.

tjl, cfc

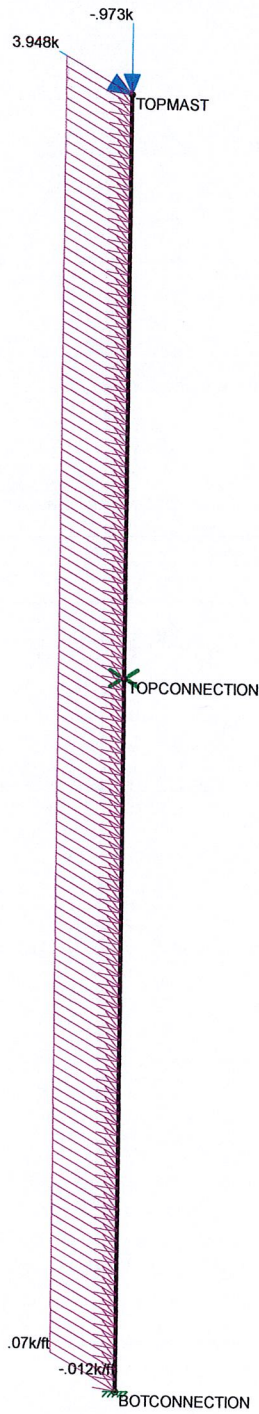
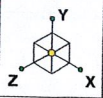
12101.CO1 / AT&T CT2260

CL&P # 10185 - Mast

LC # 1 - Reactions and Deflected Shape

Dec 26, 2012 at 9:18 AM

EIA-TIA Loads.r3d



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

CENTEK Engineering, INC.

tjl, cfc

12101.CO1 / AT&T CT2260

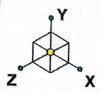
CL&P # 10185 - Mast

LC # 2 Loads

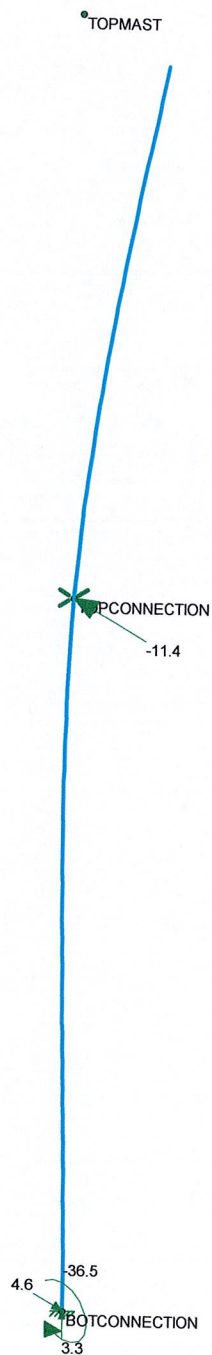
Dec 26, 2012 at 9:17 AM

EIA-TIA Loads.r3d





| Code Check |  |
|------------|--|
| No Calc    |  |
| > 1.0      |  |
| .90-1.0    |  |
| .75-.90    |  |
| .50-.75    |  |
| 0-.50      |  |



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

CENTEK Engineering, INC.

tjl, cfc

12101.CO1 / AT&T CT2260

CL&P # 10185 - Mast  
LC # 2 - Reactions and Deflected Shape

Dec 26, 2012 at 9:18 AM

EIA-TIA Loads.r3d

**PCS Mast Top Connection:**

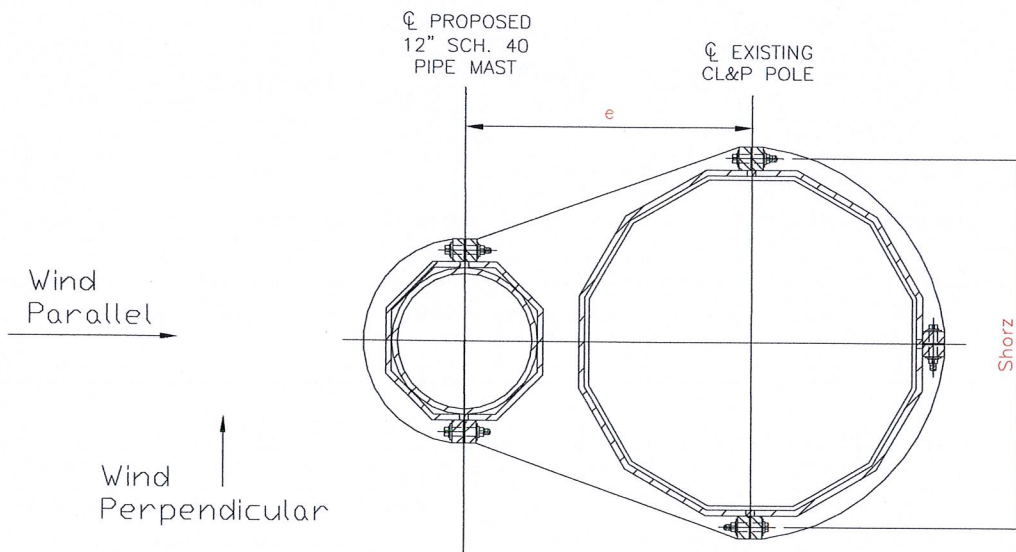
**Maximum Design Reactions at Brace:**

|              |                   |              |
|--------------|-------------------|--------------|
| Vertical =   | Vert := 0-kips    | (User Input) |
| Horizontal = | Horz := 11.4-kips | (User Input) |
| Moment =     | Moment := 0       | (User Input) |

**Bolt Data:**

|                                                 |                                 |              |
|-------------------------------------------------|---------------------------------|--------------|
| Bolt Grade =                                    | A325                            | (User Input) |
| Number of Bolts =                               | $n_b := 6$                      | (User Input) |
| Bolt Diameter =                                 | $d_b := 0.75\text{in}$          | (User Input) |
| Allowable Tensile Stress =                      | $F_{t.all} := 45\text{-ksi}$    | (User Input) |
| Allowable Shear Stress =                        | $F_{v.all} := 27\text{-ksi}$    | (User Input) |
| Bolt Eccentricity from C.L. Mast =              | $e := 22\text{-in}$             | (User Input) |
| Vertical Spacing Between Top and Bottom Bolts = | $S_{vert} := 9\text{-in}$       | (User Input) |
| Horizontal Spacing Between Bolts =              | $S_{horz} := 25.0625\text{-in}$ | (User Input) |

Bolt Area =  $a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442\text{-in}^2$



Check Bolt Stresses:**Wind Acting Parallel to Stiffener Plate:**

Shear Force per Bolt =

$$F_{v.conn} := \frac{Vert}{n_b} = 0 \text{ kips}$$

Shear Stress per Bolt =

$$F_{v.act} := \frac{F_{v.conn}}{a_b} = 0 \text{ ksi}$$

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

Condition1 = "OK"

Allowable Tensile Stress Adjusted for Shear =

$$F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 45 \text{ ksi} \quad (\text{AISC 9th Ed. Table J3.3})$$

Moment From Mast Eccentricity =

$$M_{par} := Vert \cdot e = 0 \text{ kips-in}$$

Total Tension Force =

$$F_{tension} := Horz = 11.4 \text{ kips}$$

Tension Force Each Bolt =

$$F_{tension.bolt} := \frac{F_{tension}}{n_b} + \frac{M_{par}}{S_{vert} \cdot 2} = 1.9 \text{ kips}$$

Tension Stress Each Bolt =

$$F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 4.3 \text{ ksi}$$

$$Condition2 := \text{if}(F_{t.act} < F_{t.adj}, "OK", "Overstressed")$$

Condition2 = "OK"

**Wind Acting Perpendicular to Stiffener Plate:**

Shear Force per Bolt =

$$F_{v.conn} := \frac{\sqrt{Vert^2 + Horz^2}}{n_b} = 1.9 \text{ kips}$$

Shear Stress per Bolt =

$$F_{v.act} := \frac{F_{v.conn}}{a_b} = 4.301 \text{ ksi}$$

$$Condition3 := \text{if}(F_{v.act} < F_{v.all}, "OK", "Overstressed")$$

Condition3 = "OK"

Allowable Tensile Stress Adjusted for Shear =

$$F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44.09 \text{ ksi} \quad (\text{AISC 9th Ed. Table J3.3})$$

Moment from Mast Eccentricity =

$$M_{perp} := Horz \cdot e = 251 \text{ kips-in}$$

Tension Force per Bolt =

$$F_{tension.conn} := \frac{M_{perp}}{S_{horz} \cdot 3} + \frac{M_{par}}{S_{vert} \cdot 2} = 3.336 \text{ kips}$$

Tension Stress Each Bolt =

$$F_{tension.act} := \frac{F_{tension.conn}}{a_b} = 7.55 \text{ ksi}$$

$$Condition4 := \text{if}(F_{tension.act} < F_{t.adj}, "OK", "Overstressed")$$

Condition4 = "OK"



**Mast Connection to Bottom Bracket:****Design Reactions at Brace:**

|          |                        |              |
|----------|------------------------|--------------|
| Axial =  | Axial := 3.3-kips      | (User Input) |
| Shear =  | Shear := 4.6-kips      | (User Input) |
| Moment = | Moment := 36.5-kips-ft | (User Input) |

**Anchor Bolt Data:**

|                                         |                        |              |
|-----------------------------------------|------------------------|--------------|
| Bolt Grade =                            | A325                   | (User Input) |
| Allowable Shear Stress =                | $F_v := 27\text{-ksi}$ | (User Input) |
| Allowable Tension Stress =              | $F_T := 45\text{-ksi}$ | (User Input) |
| Total Number of Bolts =                 | $n_b := 4$             | (User Input) |
| Number of Bolts Tension Side Parallel = | $n_{b,par} := 2$       | (User Input) |
| Number of Bolts Tension Side Diagonal = | $n_{b,diag} := 1$      | (User Input) |
| Bolt Diameter =                         | $d_b := 1.00\text{in}$ | (User Input) |
| Bolt Spacing X Direction =              | $S_x := 11\text{-in}$  | (User Input) |
| Bolt Spacing Z Direction =              | $S_z := 11\text{-in}$  | (User Input) |

**Base Plate Data:**

|                          |                          |              |
|--------------------------|--------------------------|--------------|
| Base Plate Steel =       | A36                      | (User Input) |
| Allowable Yield Stress = | $F_y := 36\text{-ksi}$   | (User Input) |
| Base Plate Width =       | $Pl_w := 14.5\text{-in}$ | (User Input) |
| Base Plate Thickness =   | $Pl_t := 1.0\text{-in}$  | (User Input) |
| Bolt Edge Distance =     | $B_E := 1.75\text{-in}$  | (User Input) |
| Pole Diameter =          | $D_p := 12.75\text{-in}$ | (User Input) |

**Base Plate Data:**

|                     |                           |              |
|---------------------|---------------------------|--------------|
| Weld Grade          | E70XX                     | (User Input) |
| Weld Yield Stress = | $F_{yw} := 70\text{-ksi}$ | (User Input) |
| Weld Size =         | $sw := 0.3125\text{-in}$  | (User Input) |



**Anchor Bolt Check:**

Bolt Area =

$$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.785 \cdot \text{in}^2$$

Bolt Spacing Diag. Direction =

$$S_{\text{diag}} := \sqrt{S_x^2 + S_z^2} = 15.56 \cdot \text{in}$$

Actual Shear Stress =

$$f_v := \frac{\text{Shear}}{a_b \cdot n_b} = 1.46 \cdot \text{ksi}$$

$$\text{Condition1} := \text{if}(f_v < F_v, \text{"OK"}, \text{"Overstressed"})$$

$$\text{Condition1} = \text{"OK"}$$

Allowable Tensile Stress Adjusted for Shear =

$$F_{t,\text{adj}} := \sqrt{F_T^2 - 4.39 \cdot f_v^2} = 44.895 \cdot \text{ksi}$$

Tension Load per Bolt Parallel =

$$T_{\text{par}} := \frac{\text{Moment}}{S_x \cdot n_{b,\text{par}}} - \frac{\text{Axial}}{n_b} = 19.08 \cdot \text{kips}$$

Tension Load per Bolt Diagonal =

$$T_{\text{diag}} := \frac{\text{Moment}}{S_{\text{diag}} \cdot n_{b,\text{diag}}} - \frac{\text{Axial}}{n_b} = 27.33 \cdot \text{kips}$$

Tension per bolt =

$$T := \text{if}(T_{\text{par}} > T_{\text{diag}}, T_{\text{par}}, T_{\text{diag}}) = 27.331 \cdot \text{kips}$$

Actual Tensile Stress =

$$f_t := \frac{T}{a_b} = 34.8 \cdot \text{ksi}$$

$$\text{Condition2} := \text{if}(f_t < F_{t,\text{adj}}, \text{"OK"}, \text{"Overstressed"})$$

$$\text{Condition2} = \text{"OK"}$$

**Base Plate Check:**

Allowable Bending Stress =

$$F_b := 1.33 \cdot 0.75 \cdot F_y = 35.91 \cdot \text{ksi}$$

Plate Bending Width =

$$Z := (P_{lw} \cdot \sqrt{2} - D_p) = 7.76 \cdot \text{in}$$

Moment Arm =

$$K := \frac{(S_{\text{diag}} - D_p)}{2} = 1.4 \cdot \text{in}$$

Moment in Base Plate =

$$M := K \cdot T = 38.35 \cdot \text{kips} \cdot \text{in}$$

Section Modulus =

$$S_z := \frac{1}{6} \cdot Z \cdot P_{lt}^2 = 1.29 \cdot \text{in}^3$$

Bending Stress =

$$f_b := \frac{M}{S_z} = 29.67 \cdot \text{ksi}$$

$$\text{Condition3} := \text{if}(f_b < F_b, \text{"OK"}, \text{"Overstressed"})$$

$$\text{Condition3} = \text{"OK"}$$

Base Plate to PCS Mast Weld Check:

Allowable Weld Stress =

$$F_w := 0.3 \cdot F_{yw} = 21 \text{ ksi}$$

Weld Area =

$$A_w := \frac{\pi}{4} \cdot \left[ (D_p + 2sw \cdot 0.707)^2 - D_p^2 \right] = 9 \text{ in}^2$$

Weld Moment of Inertia =

$$I_w := \frac{\pi}{64} \cdot \left[ (D_p + 2sw \cdot 0.707)^4 - D_p^4 \right] = 189.4 \text{ in}^4$$

$$c := \frac{D_p}{2} + sw \cdot 0.707 = 6.6 \text{ in}$$

Section Modulus of Weld =

$$S_w := \frac{I_w}{c} = 28.71 \text{ in}^3$$

Weld Stress =

$$f_w := \frac{\text{Moment}}{S_w} + \frac{\text{Shear}}{A_w} = 15.76 \text{ ksi}$$

$$\text{Condition4} := \text{if}(f_w < F_w, \text{"OK"}, \text{"Overstressed"})$$

$$\text{Condition4} = \text{"OK"}$$

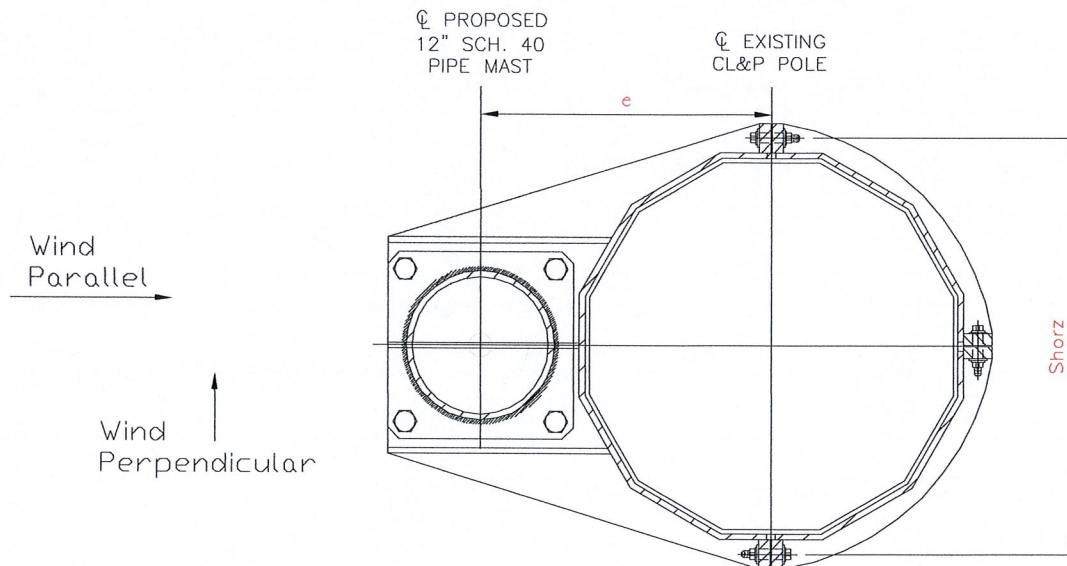
**PCS Mast Bottom Connection:****Maximum Design Reactions at Brace:**

|              |                        |              |
|--------------|------------------------|--------------|
| Vertical =   | Vert := 3.3-kips       | (User Input) |
| Horizontal = | Horz := 4.6-kips       | (User Input) |
| Moment =     | Moment := 36.5-ft-kips | (User Input) |

**Bolt Data:**

|                                                 |                                |              |
|-------------------------------------------------|--------------------------------|--------------|
| Bolt Grade =                                    | A325                           | (User Input) |
| Number of Bolts =                               | $n_b := 8$                     | (User Input) |
| Bolt Diameter =                                 | $d_b := 0.75\text{in}$         | (User Input) |
| Allowable Tensile Stress =                      | $F_{t.all} := 45\text{-ksi}$   | (User Input) |
| Allowable Shear Stress =                        | $F_{v.all} := 27\text{-ksi}$   | (User Input) |
| Bolt Eccentricity from C.L. Mast =              | $e := 22\text{-in}$            | (User Input) |
| Vertical Spacing Between Top and Bottom Bolts = | $S_{vert} := 8\text{-in}$      | (User Input) |
| Horizontal Spacing Between Bolts =              | $S_{horz} := 30.375\text{-in}$ | (User Input) |

$$\text{Bolt Area} = a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442\text{-in}^2$$





Check Bolt Stresses:**Wind Acting Parallel to Stiffener Plate:**

Shear Force per Bolt =

$$F_{v.conn} := \frac{Vert}{n_b} = 0.413\text{-kips}$$

Shear Stress per Bolt =

$$F_{v.act} := \frac{F_{v.conn}}{a_b} = 0.934\text{-ksi}$$

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

Condition1 = "OK"

Allowable Tensile Stress Adjusted for Shear =

$$F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44.96\text{-ksi} \quad (\text{AISC 9th Ed. Table J3.3})$$

Moment From Mast Eccentricity =

$$M_{par} := Vert \cdot e + \text{Moment} = 510.6\text{-kips-in}$$

Total Tension Force =

$$F_{tension} := \text{Horz} = 4.6\text{-kips}$$

Tension Force Each Bolt =

$$F_{tension.bolt} := \frac{F_{tension}}{n_b} + \frac{M_{par}}{S_{vert} \cdot 4} = 16.531\text{-kips}$$

Tension Stress Each Bolt =

$$F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 37.4\text{-ksi}$$

$$Condition2 := \text{if}(F_{t.act} < F_{t.adj}, \text{"OK"}, \text{"Overstressed"})$$

Condition2 = "OK"

**Wind Acting Perpendicular to Stiffener Plate:**

Shear Force per Bolt =

$$F_{v.conn} := \frac{\sqrt{\left(Vert + \frac{\text{Moment} \cdot 2}{S_{horz} \cdot n_b}\right)^2 + \text{Horz}^2}}{n_b} = 1.037\text{-kips}$$

Shear Stress per Bolt =

$$F_{v.act} := \frac{F_{v.conn}}{a_b} = 2.348\text{-ksi}$$

$$Condition3 := \text{if}(F_{v.act} < F_{v.all}, \text{"OK"}, \text{"Overstressed"})$$

Condition3 = "OK"

Allowable Tensile Stress Adjusted for Shear =

$$F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44.73\text{-ksi} \quad (\text{AISC 9th Ed. Table J3.3})$$

Moment from Mast Eccentricity =

$$M_{perp} := \text{Horz} \cdot e = 101\text{-kips-in}$$

Tension Force per Bolt =

$$F_{tension.conn} := \frac{M_{perp} \cdot 2}{S_{horz} \cdot n_b} + \frac{M_{par}}{S_{vert} \cdot 4} = 16.789\text{-kips}$$

Tension Stress Each Bolt =

$$F_{tension.act} := \frac{F_{tension.conn}}{a_b} = 38.003\text{-ksi}$$

$$Condition4 := \text{if}(F_{tension.act} < F_{t.adj}, \text{"OK"}, \text{"Overstressed"})$$

Condition4 = "OK"



Subject:

Load Analysis PCS Mast and AT&T  
Equipment on CL&P Pole #10185

Location:

New Milford, CT

Rev. 1: 12/26/12

Prepared by: T.J.L Checked by: C.F.C.  
Job No. 12101.CO1**Basic Components**

|                        |            |     |                                                   |
|------------------------|------------|-----|---------------------------------------------------|
| Heavy Wind Pressure =  | p := 4.00  | psf | (User Input NESC 2007 Figure 250-1 & Table 250-1) |
| Basic Windspeed =      | V := 100   | mph | (User Input NESC 2007 Figure 250-2(e))            |
| Radial Ice Thickness = | Ir := 0.50 | in  | (User Input)                                      |
| Radial Ice Density =   | Id := 56.0 | pcf | (User Input)                                      |

**Factors for Extreme Wind Calculation**

|                                            |            |    |                                                  |
|--------------------------------------------|------------|----|--------------------------------------------------|
| Elevation of Top of PCS Mast Above Grade = | TME := 175 | ft | (User Input)                                     |
| Multiplier Gust Response Factor =          | m := 1.25  |    | (User Input - Only for NESC Extreme wind case)   |
| NESC Factor =                              | kv := 1.43 |    | (User Input from NESC 2007 Table 250-3 equation) |
| Importance Factor =                        | I := 1.0   |    | (User Input from NESC 2007 Section 250.C.2)      |

$$\text{Velocity Pressure Coefficient} = K_z := 2.01 \cdot \left( \frac{TME}{900} \right)^{\frac{2}{9.5}} = 1.424 \quad (\text{NESC 2007 Table 250-2})$$

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

$$\text{Response Term} = B_s := \frac{1}{\left( 1 + 0.375 \cdot \frac{TME}{220} \right)} = 0.77 \quad (\text{NESC 2007 Table 250-3})$$

$$\text{Gust Response Factor} = G_{rf} := \frac{\left[ 1 + \left( 2.7 \cdot E_s \cdot B_s^{\frac{1}{2}} \right) \right]}{k_v^2} = 0.824 \quad (\text{NESC 2007 Table 250-3})$$

$$\text{Wind Pressure} = q_z := 0.00256 \cdot K_z \cdot V^2 \cdot G_{rf} \cdot I = 30 \quad \text{psf} \quad (\text{NESC 2007 Section 250.C.2})$$

**Shape Factors**

|                                                            |                            |              |
|------------------------------------------------------------|----------------------------|--------------|
| Shape Factor for Round Members =                           | Cd <sub>R</sub> := 1.3     | (User Input) |
| Shape Factor for Flat Members =                            | Cd <sub>F</sub> := 1.6     | (User Input) |
| Shape Factor for Coax Cables Attached to Outside of Pole = | Cd <sub>coax</sub> := 1.45 | (User Input) |

NUS Design Criteria Issued April 12, 2007

**Overload Factors**

NU Design Criteria Table

**Overload Factors for Wind Loads:**

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

**Overload Factors for Vertical Loads:**

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

**Development of Wind & Ice Load on Mast**
**Mast Data:**

(Pipe 12' Std.)

|                  |                            |                 |
|------------------|----------------------------|-----------------|
| Mast Shape =     | Round                      | (User Input)    |
| Mast Diameter =  | $D_{\text{mast}} := 12.75$ | in (User Input) |
| Mast Length =    | $L_{\text{mast}} := 39$    | ft (User Input) |
| Mast Thickness = | $t_{\text{mast}} := 0.375$ | in (User Input) |

**Wind Load (NESC Extreme)**

Mast Projected Surface Area =

$$A_{\text{mast}} := \frac{D_{\text{mast}}}{12} = 1.063 \quad \text{sf/ft}$$

Total Mast Wind Force (Above Top of Tower) =

$$qz \cdot C_d R \cdot A_{\text{mast}} m = 52$$

 plf **BLC 5**

Total Mast Wind Force (Below Top of Tower) =

$$qz \cdot C_d R \cdot A_{\text{mast}} = 41$$

 plf **BLC 5**
**Wind Load (NESE Heavy)**

Mast Projected Surface Area w/ Ice =

$$A_{\text{ICE mast}} := \frac{(D_{\text{mast}} + 2 \cdot I_r)}{12} = 1.146 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$p \cdot C_d R \cdot A_{\text{ICE mast}} = 6$$

 plf **BLC 4**
**Gravity Loads (without ice)**

Weight of the Mast =

Self Weight

(Computed internally by Risa-3D)

 plf **BLC 1**
**Gravity Loads (ice only)**

Ice Area per Linear Foot =

$$A_{\text{mast}} := \frac{\pi}{4} \left[ (D_{\text{mast}} + I_r \cdot 2)^2 - D_{\text{mast}}^2 \right] = 20.8 \quad \text{sq in}$$

Weight of Ice on Mast =

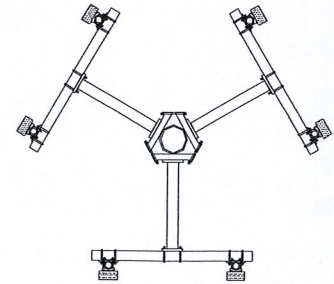
$$W_{\text{ICE mast}} := I_d \cdot \frac{A_{\text{mast}}}{144} = 8$$

 plf **BLC 3**



**Development of Wind & Ice Load on Antennas****Antenna Data:**

|                      |                                   |
|----------------------|-----------------------------------|
| Antenna Model =      | Powerwave P65-17-XLH-RR           |
| Antenna Shape =      | Flat (User Input)                 |
| Antenna Height =     | $L_{ant} := 96$ in (User Input)   |
| Antenna Width =      | $W_{ant} := 12$ in (User Input)   |
| Antenna Thickness =  | $T_{ant} := 6$ in (User Input)    |
| Antenna Weight =     | $WT_{ant} := 62$ lbs (User Input) |
| Number of Antennas = | $N_{ant} := 2$ (User Input)       |

**Wind Load (NESC Extreme)***Assumes Maximum Possible Wind Pressure  
Applied to all Antennas Simultaneously*

Surface Area for One Antenna =

$$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 8 \quad sf$$

Antenna Projected Surface Area =

$$A_{ant} := SA_{ant} \cdot N_{ant} = 16 \quad sf$$

Total Antenna Wind Force =

$$F_{ant1} := qz \cdot C_d \cdot A_{ant} \cdot m = 961 \quad lbs \quad \text{BLC 5}$$

**Wind Load (NESC Heavy)***Assumes Maximum Possible Wind Pressure  
Applied to all Antennas Simultaneously*

Surface Area for One Antenna w/ Ice =

$$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 8.8 \quad sf$$

Antenna Projected Surface Area w/ Ice =

$$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 17.5 \quad sf$$

Total Antenna Wind Force w/ Ice =

$$F_{ant1} := p \cdot C_d \cdot A_{ICEant} = 112 \quad lbs \quad \text{BLC 4}$$

**Gravity Load (without ice)**

Weight of All Antennas =

$$W_{t_{ant1}} := WT_{ant} \cdot N_{ant} = 124 \quad lbs \quad \text{BLC 2}$$

**Gravity Load (ice only)**

Volume of Each Antenna =

$$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6912 \quad cu \text{ in}$$

Volume of Ice on Each Antenna =

$$V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1915 \quad cu \text{ in}$$

Weight of Ice on Each Antenna =

$$W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_{ice} = 62 \quad lbs$$

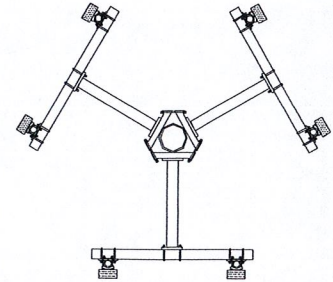
Weight of Ice on All Antennas =

$$W_{t_{ice,ant1}} := W_{ICEant} \cdot N_{ant} = 124 \quad lbs \quad \text{BLC 3}$$

## Development of Wind &amp; Ice Load on Antennas

## Antenna Data:

|                      |                           |                  |  |
|----------------------|---------------------------|------------------|--|
| Antenna Model =      | KMW AM-X-CD-16-65-00T-RET |                  |  |
| Antenna Shape =      | Flat                      | (User Input)     |  |
| Antenna Height =     | $L_{ant} := 72$           | in (User Input)  |  |
| Antenna Width =      | $W_{ant} := 11.8$         | in (User Input)  |  |
| Antenna Thickness =  | $T_{ant} := 5.9$          | in (User Input)  |  |
| Antenna Weight =     | $WT_{ant} := 48.5$        | lbs (User Input) |  |
| Number of Antennas = | $N_{ant} := 2$            | (User Input)     |  |



## Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure  
 Applied to all Antennas Simultaneously

|                                  |                                                       |    |  |
|----------------------------------|-------------------------------------------------------|----|--|
| Surface Area for One Antenna =   | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$ | sf |  |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 11.8$            | sf |  |

## Total Antenna Wind Force =

$$F_{ant1} := qz \cdot C_d \cdot F \cdot A_{ant} \cdot m = 708 \quad \text{lbs} \quad \text{BLC 5}$$

## Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure  
 Applied to all Antennas Simultaneously

|                                         |                                                                      |    |  |
|-----------------------------------------|----------------------------------------------------------------------|----|--|
| Surface Area for One Antenna w/ Ice =   | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ | sf |  |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13$                       | sf |  |

## Total Antenna Wind Force w/ Ice =

$$F_{ant1} := p \cdot C_d \cdot F \cdot A_{ICEant} = 83 \quad \text{lbs} \quad \text{BLC 4}$$

## Gravity Load (without ice)

## Weight of All Antennas =

$$W_{t_{ant1}} := WT_{ant} \cdot N_{ant} = 97 \quad \text{lbs} \quad \text{BLC 2}$$

## Gravity Load (ice only)

$$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013 \quad \text{cu in}$$

$$V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1435 \quad \text{cu in}$$

$$W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_{ice} = 46 \quad \text{lbs}$$

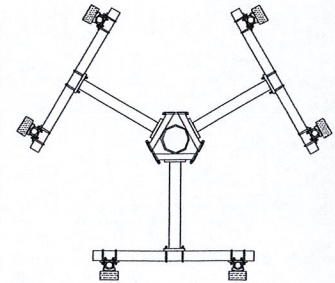
## Weight of Ice on All Antennas =

$$W_{t_{ice,ant1}} := W_{ICEant} \cdot N_{ant} = 93 \quad \text{lbs} \quad \text{BLC 3}$$



**Development of Wind & Ice Load on Antennas****Antenna Data:**

|                      |                                     |
|----------------------|-------------------------------------|
| Antenna Model =      | Kathrein Scala 800-10764            |
| Antenna Shape =      | Flat (User Input)                   |
| Antenna Height =     | $L_{ant} := 55.2$ in (User Input)   |
| Antenna Width =      | $W_{ant} := 11.8$ in (User Input)   |
| Antenna Thickness =  | $T_{ant} := 6$ in (User Input)      |
| Antenna Weight =     | $WT_{ant} := 40.8$ lbs (User Input) |
| Number of Antennas = | $N_{ant} := 2$ (User Input)         |

**Wind Load (NESC Extreme)**Assumes Maximum Possible Wind Pressure  
Applied to all Antennas Simultaneously

Surface Area for One Antenna =

$$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.5 \quad \text{sf}$$

Antenna Projected Surface Area =

$$A_{ant} := SA_{ant} \cdot N_{ant} = 9 \quad \text{sf}$$

Total Antenna Wind Force =

$$F_{ant1} := qz \cdot C_d \cdot F \cdot A_{ant} \cdot m = 543 \quad \text{lbs} \quad \text{BLC 5}$$

**Wind Load (NESC Heavy)**Assumes Maximum Possible Wind Pressure  
Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =

$$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5 \quad \text{sf}$$

Antenna Projected Surface Area w/ Ice =

$$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 10 \quad \text{sf}$$

Total Antenna Wind Force w/ Ice =

$$F_{ant1} := p \cdot C_d \cdot F \cdot A_{ICEant} = 64 \quad \text{lbs} \quad \text{BLC 4}$$

**Gravity Load (without ice)**

Weight of All Antennas =

$$W_{t_{ant1}} := WT_{ant} \cdot N_{ant} = 82 \quad \text{lbs} \quad \text{BLC 2}$$

**Gravity Load (ice only)**

Volume of Each Antenna =

$$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3908 \quad \text{cu in}$$

Volume of Ice on Each Antenna =

$$V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1127 \quad \text{cu in}$$

Weight of Ice on Each Antenna =

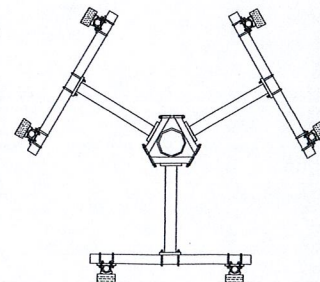
$$W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho \cdot Id = 37 \quad \text{lbs}$$

Weight of Ice on All Antennas =

$$W_{t_{ice,ant1}} := W_{ICEant} \cdot N_{ant} = 73 \quad \text{lbs} \quad \text{BLC 3}$$

**Development of Wind & Ice Load on TMAs****TMA Data:**

|                  |                                    |
|------------------|------------------------------------|
| TMA Model =      | CCI DTMBP7819VG12A TMA             |
| TMA Shape =      | Flat (User Input)                  |
| TMA Height =     | $L_{TMA} := 14.25$ in (User Input) |
| TMA Width =      | $W_{TMA} := 11.46$ in (User Input) |
| TMA Thickness =  | $T_{TMA} := 4.17$ in (User Input)  |
| TMA Weight =     | $WT_{TMA} := 20$ lbs (User Input)  |
| Number of TMAs = | $N_{TMA} := 6$ (User Input)        |

**Wind Load (NESC Extreme)***Assumes Maximum Possible Wind Pressure  
Applied to all TMAs Simultaneously*

Surface Area for One TMA =

$$SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.1 \quad \text{sf}$$

TMA Projected Surface Area =

$$A_{TMA} := SA_{TMA} \cdot N_{TMA} = 6.8 \quad \text{sf}$$

Total TMA Wind Force =

$$F_{TMA2} := qz \cdot C_d \cdot F \cdot A_{TMA} \cdot m = 409 \quad \text{lbs} \quad \text{BLC 5}$$

**Wind Load (NESC Heavy)***Assumes Maximum Possible Wind Pressure  
Applied to all TMAs Simultaneously*

Surface Area for One TMA w/ Ice =

$$SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.3 \quad \text{sf}$$

TMA Projected Surface Area w/ Ice =

$$A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 7.9 \quad \text{sf}$$

Total TMA Wind Force w/ Ice =

$$F_{TMA2} := p \cdot C_d \cdot F \cdot A_{ICETMA} = 51 \quad \text{lbs} \quad \text{BLC 4}$$

**Gravity Load (without ice)**

Weight of All TMAs =

$$W_{TMA2} := WT_{TMA} \cdot N_{TMA} = 120 \quad \text{lbs} \quad \text{BLC 2}$$

**Gravity Load (ice only)**

Volume of Each TMA =

$$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 681 \quad \text{cu in}$$

Volume of Ice on Each TMA =

$$V_{ice} := (L_{TMA} + 1) \cdot (W_{TMA} + 1) \cdot (T_{TMA} + 1) - V_{TMA} = 301 \quad \text{cu in}$$

Weight of Ice on Each TMA =

$$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot \rho_d = 10 \quad \text{lbs}$$

Weight of Ice on All TMAs =

$$W_{ice.TMA2} := W_{ICETMA} \cdot N_{TMA} = 59 \quad \text{lbs} \quad \text{BLC 3}$$



Subject:

Load Analysis PCS Mast and AT&T  
Equipment on CL&P Pole #10185

Location:

New Milford, CT

Rev. 1: 12/26/12

Prepared by: T.J.L Checked by: C.F.C.  
Job No. 12101.CO1

**Development of Wind & Ice Load on Antenna Mounts**

**Mount Data:**

Mount Type:

T-Arm Colocation Kit

Mount Projected Surface Area =

$CdAa := 20.6$  sf (User Input)

Mount Projected Surface Area w/ Ice =

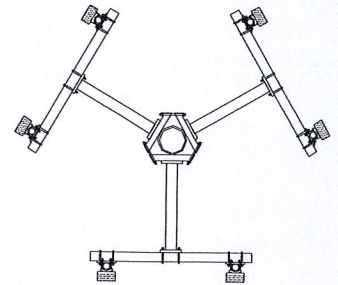
$CdAa_{ice} := 27.3$  sf (User Input)

Mount Weight =

$WT_{mnt} := 550$  lbs (User Input)

Mount Weight w/ Ice =

$WT_{mnt.ice} := 700$  lbs (User Input)



**Gravity Loads (without ice)**

Weight of All Mounts =

$Wt_{mnt1} := WT_{mnt} = 550$

lbs **BLC 2**

**Gravity Load (ice only)**

Weight of Ice on All Mounts =

$Wt_{ice.mnt1} := WT_{mnt.ice} - WT_{mnt} = 150$

lbs **BLC 3**

**Wind Load (NESC Heavy)**

Total Mount Wind Force w/ Ice =

$Fi_{mnt1} := p \cdot CdAa_{ice} = 109$

lbs **BLC 4**

**Wind Load (NESC Extreme)**

Total Mount Wind Force =

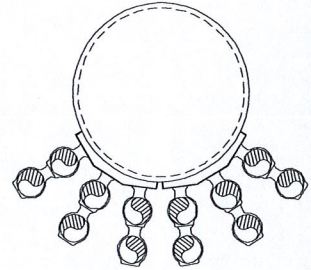
$F_{mnt1} := qz \cdot CdAa \cdot m = 773$

lbs **BLC 5**

**Development of Wind & Ice Load on Coax Cables**

**Coax Cable Data:**

|                                                   |                     |                  |
|---------------------------------------------------|---------------------|------------------|
| Coax Type =                                       | HELIAX 1-5/8"       |                  |
| Shape =                                           | Round               | (User Input)     |
| Coax Outside Diameter =                           | $D_{coax} := 1.98$  | in (User Input)  |
| Coax Cable Length =                               | $L_{coax} := 39$    | ft (User Input)  |
| Weight of Coax per foot =                         | $Wt_{coax} := 1.04$ | plf (User Input) |
| Total Number of Coax =                            | $N_{coax} := 12$    | (User Input)     |
| No. of Coax Projecting Outside Face of PCS Mast = | $NP_{coax} := 4$    | (User Input)     |



**Wind Load (NESC Extreme)**

Coax projected surface area =

$$A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.7 \quad \text{sf/ft}$$

Total Coax Wind Force (Above NU Structure) =

$$F_{coax} := qz \cdot C_d \cdot A_{coax} \cdot m = 36 \quad \text{plf} \quad \text{BLC 5}$$

Total Coax Wind Force (Below NU Structure) =

$$F_{coax} := qz \cdot C_d \cdot A_{coax} = 29 \quad \text{plf} \quad \text{BLC 5}$$

**Wind Load (NESC Heavy)**

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} D_{coax} + 2 \cdot Ir)}{12} = 0.7 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := p \cdot C_d \cdot A_{ICE_{coax}} = 4 \quad \text{plf} \quad \text{BLC 4}$$

**Gravity Loads (without ice)**

Weight of all cables w/o ice

$$WT_{coax} := Wt_{coax} \cdot N_{coax} = 12 \quad \text{plf} \quad \text{BLC 2}$$

**Gravity Load (ice only)**

Ice Area per Linear Foot =

$$A_{i_{coax}} := \frac{\pi}{4} \left[ (D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2 \right] = 3.9 \quad \text{sq in}$$

Ice Weight All Coax per foot =

$$WT_{i_{coax}} := Id \cdot \left( N_{coax} \cdot \frac{A_{i_{coax}}}{144} \right) = 18 \quad \text{plf} \quad \text{BLC 3}$$



**CEN TEK engineering, INC.**

**Consulting Engineers**

63-2 North Branford Road

Branford, CT 06405

Ph. 203-488-0580 / Fax. 203-488-8587

**Subject: Analysis of NESC Wind and Ice Loads  
for Obtaining PCS Structure Reactions Applied to CL&P Pole  
Tabulated Load Cases**

**Location: New Milford, CT**

Date: 10/15/12

Prepared by: T.J.L.

Checked by: C.F.C.

Job No. 12101.CO1

**Load Case**

**Description**

1

Self Weight (Mast)

2

Weight of Appurtenances

3

Weight of Ice Only on PCS Structure <sup>(1)</sup>

4

Weight of Extreme Ice Only on PCS Structure <sup>(1)</sup>

5

NESC Heavy Wind on PCS Structure <sup>(1)</sup>

6

NESC Extreme Wind on PCS Structure <sup>(1)</sup>

7

NESC Extreme Ice w/ Wind on PCS Structure <sup>(1)</sup>

**Footnotes:**

(1) PCS Structure includes: Mast and Appurtenances

|                                                                                                                                                           |                                           |                                                                                                                                                                                                                                                                                  |               |                |            |               |            |               |            |               |            |               |            |               |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|---------------|------------|
| <b>CEN TEK engineering, INC.</b><br><b>Consulting Engineers</b><br>63-2 North Branford Road<br>Branford, CT 06405<br>Ph. 203-488-0580 / Fax. 203-488-8587 |                                           | <b>Subject: Analysis of NESC Wind and Ice Loads<br/>for Obtaining PCS Structure Reactions Applied to CL&amp;P Pole<br/>Load Combinations Table</b><br><b>Location: New Milford, CT</b><br>Date: 10/15/12      Prepared by: T.J.L.      Checked by: C.F.C.      Job No. 12101.CO1 |               |                |            |               |            |               |            |               |            |               |            |               |            |
| <b>Load Combination</b>                                                                                                                                   | <b>Description</b>                        | <b>Envelope</b>                                                                                                                                                                                                                                                                  |               | <b>Wind</b>    |            |               |            |               |            |               |            |               |            |               |            |
|                                                                                                                                                           |                                           | <b>Soultion</b>                                                                                                                                                                                                                                                                  | <b>Factor</b> | <b>P-Delta</b> | <b>BLC</b> | <b>Factor</b> | <b>BLC</b> | <b>Factor</b> | <b>BLC</b> | <b>Factor</b> | <b>BLC</b> | <b>Factor</b> | <b>BLC</b> | <b>Factor</b> | <b>BLC</b> |
| 1                                                                                                                                                         | NESC Heavy Wind on PCS Structure          | 1                                                                                                                                                                                                                                                                                |               | 1              | 1.5        | 2             | 1.5        | 3             | 1.5        | 5             | 2.5        |               |            |               |            |
| 2                                                                                                                                                         | NESC Extreme Wind on PCS Structure        | 1                                                                                                                                                                                                                                                                                |               | 1              | 1          | 2             | 1          | 6             | 1          |               |            |               |            |               |            |
| 3                                                                                                                                                         | NESC Extreme Ice w/ Wind on PCS Structure | 1                                                                                                                                                                                                                                                                                |               | 1              | 1          | 2             | 1          | 4             | 1          | 7             | 1          |               |            |               |            |
| <b>Footnotes:</b><br>(1) BLC = Basic Load Case<br>(2) PCS Structure includes: Mast and Appurtenances                                                      |                                           |                                                                                                                                                                                                                                                                                  |               |                |            |               |            |               |            |               |            |               |            |               |            |

## 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     |
| Global Member Orientation Plane        | XZ    |

|                        |                    |
|------------------------|--------------------|
| Hot Rolled Steel Code  | AISC 9th: ASD      |
| Cold Formed Steel Code | AISI 1999: ASD     |
| Wood Code              | AF&PA NDS-97: ASD  |
| Wood Temperature       | < 100F             |
| Concrete Code          | ACI 318-02         |
| Masonry Code           | ACI 530-05/08: ASD |
| Aluminum Code          | AA ADM1-05: ASD    |

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

|                                       |             |
|---------------------------------------|-------------|
| Seismic Code                          | UBC 1997    |
| Seismic Base Elevation (ft)           | Not Entered |
| Ct X                                  | .035        |
| Ct Z                                  | .035        |
| T X (sec)                             | Not Entered |
| T Z (sec)                             | Not Entered |
| R X                                   | 8.5         |
| R Z                                   | 8.5         |
| Ct Exp. X                             | .75         |
| Ct Exp. Z                             | .75         |
| Ca                                    | .36         |
| Cv                                    | .54         |
| Nv                                    | 1           |
| SD1                                   | 1           |
| SDS                                   | 1           |
| S1                                    | 1           |
| Occupancy Code                        | 4           |
| Seismic Zone                          | 3           |
| Use Group                             | I           |
| Use Gravity Self Wt in Diaphragm Mass | Yes         |
| Use Deck Self Wt in Diaphragm Mass    | Yes         |
| Use Lateral Self Wt in Diaphragm Mass | Yes         |
| Seismic Detailing Code                | None        |
| Om X                                  | 1           |
| Om Z                                  | 1           |
| Rho X                                 | 1           |
| Rho Z                                 | 1           |

### Hot Rolled Steel Properties

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

### Hot Rolled Steel Design Parameters

|   | Label | Shape | Lengt... | Lbvy[ft] | Lbzz[ft] | Lcomp top[ft] | Lcomp bot[ft] | Kyy | Kzz | Cm... | Cm... | Cb | y sw... | z sw... | Function |
|---|-------|-------|----------|----------|----------|---------------|---------------|-----|-----|-------|-------|----|---------|---------|----------|
| 1 | M1    | Mast  | 40       |          |          |               |               |     |     |       |       |    |         |         | Lateral  |

### Hot Rolled Steel Section Sets

|   | Label | Shape     | Type | Design List | Material   | Design Rul... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|-------|-----------|------|-------------|------------|---------------|---------|-----------|-----------|---------|
| 1 | Mast  | PIPE 12.0 | Beam | Pipe        | A500 Gr.46 | Typical       | 13.6    | 262       | 262       | 523     |

### Member Primary Data

|   | Label | I Joint   | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material   | Design Rules |
|---|-------|-----------|---------|---------|-------------|---------------|------|-------------|------------|--------------|
| 1 | M1    | BOTCON... | TOPMAST |         |             | Mast          | Beam | Pipe        | A500 Gr.46 | Typical      |

### Joint Coordinates and Temperatures

|   | Label         | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diap... |
|---|---------------|--------|--------|--------|----------|---------------------|
| 1 | BOTCONNECTION | 0      | 0      | 0      | 0        |                     |
| 2 | TOPCONNECTION | 0      | 22     | 0      | 0        |                     |
| 3 | TOPMAST       | 0      | 40     | 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 | BOTCONNECTION | Reaction | Reaction | Reaction | Reaction         | Reaction         | Reaction         |         |
| 2 | TOPCONNECTION | Reaction |          | Reaction |                  |                  |                  |         |

### Joint Loads and Enforced Displacements

| Joint Label | L,D,M                | Direction | Magnitude[(k,k-ft), (in,rad), (k*s^2/f...] |
|-------------|----------------------|-----------|--------------------------------------------|
|             | No Data to Print ... |           |                                            |

### Member Point Loads (BLC 2 : Weight of Appurtenances)

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.124             | 40             |
| 2 | M1           | Y         | -.097             | 40             |
| 3 | M1           | Y         | -.082             | 40             |
| 4 | M1           | Y         | -.12              | 40             |
| 5 | M1           | Y         | -.55              | 40             |



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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.124             | 40             |
| 2 | M1           | Y         | -.093             | 40             |
| 3 | M1           | Y         | -.073             | 40             |
| 4 | M1           | Y         | -.059             | 40             |
| 5 | M1           | Y         | -.15              | 40             |

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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .112              | 40             |
| 2 | M1           | X         | .083              | 40             |
| 3 | M1           | X         | .064              | 40             |
| 4 | M1           | X         | .051              | 40             |
| 5 | M1           | X         | .109              | 40             |

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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .961              | 40             |
| 2 | M1           | X         | .708              | 40             |
| 3 | M1           | X         | .543              | 40             |
| 4 | M1           | X         | .409              | 40             |
| 5 | M1           | X         | .773              | 40             |

**Member Distributed Loads (BLC 2 : Weight of Appurtenances)**

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

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

|   | Member Label | Direction | Start Magnitude[k/ft,deg] | End Magnitude[k/f... | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|---------------------------|----------------------|----------------------|--------------------|
| 1 | M1           | Y         | -.008                     | -.008                | 0                    | 0                  |
| 2 | M1           | Y         | -.018                     | -.018                | 0                    | 0                  |

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

|   | Member Label | Direction | Start Magnitude[k/ft,deg] | End Magnitude[k/f... | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|---------------------------|----------------------|----------------------|--------------------|
| 1 | M1           | X         | .006                      | .006                 | 0                    | 0                  |
| 2 | M1           | X         | .004                      | .004                 | 0                    | 0                  |

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

|   | Member Label | Direction | Start Magnitude[k/ft,deg] | End Magnitude[k/f... | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|---------------------------|----------------------|----------------------|--------------------|
| 1 | M1           | X         | .041                      | .041                 | 0                    | 25                 |
| 2 | M1           | X         | .052                      | .052                 | 25                   | 0                  |
| 3 | M1           | X         | .029                      | .029                 | 0                    | 25                 |
| 4 | M1           | X         | .036                      | .036                 | 25                   | 0                  |

**Basic Load Cases**

|   | BLC Description         | Category | X Grav... | Y Grav... | Z Gravity | Joint | Point | Distrib... | Area(... | Surfac... |
|---|-------------------------|----------|-----------|-----------|-----------|-------|-------|------------|----------|-----------|
| 1 | Self Weight             | None     |           | -1        |           |       |       |            |          |           |
| 2 | Weight of Appurtenances | None     |           |           |           |       | 5     | 1          |          |           |

### Basic Load Cases (Continued)

|   | BLC Description                  | Category | X Grav... | Y Grav... | Z Gravity | Joint | Point | Distrib... | Area(... | Surfac... |
|---|----------------------------------|----------|-----------|-----------|-----------|-------|-------|------------|----------|-----------|
| 3 | Weight of Ice Only on PCS Struct | None     |           |           |           |       | 5     | 2          |          |           |
| 4 | NESC Heavy Wind on PCS Structure | None     |           |           |           |       | 5     | 2          |          |           |
| 5 | NESC Extreme Wind on PCS Structu | None     |           |           |           |       | 5     | 4          |          |           |

### Load Combinations

|   | Description                 | So... PDelta | SRSS | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... | BLCFac... |
|---|-----------------------------|--------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | NESC Heavy Wind on PCS ...  | Yes          |      | 1         | 1.5       | 2         | 1.5       | 3         | 1.5       | 4         | 2.5       |           |           |           |           |           |           |           |
| 2 | NESC Extreme Wind on PCS... | 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 Momen... | LC | z-z Momen... | LC      |
|----|--------|-----|-----|----------|-------|------------|--------|------------|----|--------------|----|--------------|----|--------------|---------|
| 1  | M1     | 1   | max | 7.265    | 1     | -1.212     | 1      | 0          | 1  | 0            | 1  | 0            | 1  | -9.807       | 1       |
| 2  |        |     |     | min      | 3.304 | 2          | -4.149 | 2          | 0  | 1            | 0  | 1            | 0  | 1            | -32.959 |
| 3  |        | 2   | max | 6        | 1     | -1.462     | 1      | 0          | 1  | 0            | 1  | 0            | 1  | 12.035       | 2       |
| 4  |        |     | min | 2.721    | 2     | -4.849     | 2      | 0          | 1  | 0            | 1  | 0            | 1  | 3.562        | 1       |
| 5  |        | 3   | max | 4.736    | 1     | -1.712     | 1      | 0          | 1  | 0            | 1  | 0            | 1  | 64.029       | 2       |
| 6  |        |     | min | 2.139    | 2     | -5.549     | 2      | 0          | 1  | 0            | 1  | 0            | 1  | 19.431       | 1       |
| 7  |        | 4   | max | 3.472    | 1     | 4.274      | 2      | 0          | 1  | 0            | 1  | 0            | 1  | 38.34        | 2       |
| 8  |        |     | min | 1.556    | 2     | 1.298      | 1      | 0          | 1  | 0            | 1  | 0            | 1  | 11.725       | 1       |
| 9  |        | 5   | max | 2.208    | 1     | 3.394      | 2      | 0          | 1  | 0            | 1  | 0            | 1  | 0            | 1       |
| 10 |        |     | min | .973     | 2     | 1.048      | 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 | .534       | 1  | -.178        | 1  | 0            | 1  | 9.624      | 2  | -2.864     | 1  | 0          | 1  | 0          | 1  |
| 2      |    |     | min | .243       | 2  | -.61         | 2  | 0            | 1  | 2.864      | 1  | -9.624     | 2  | 0          | 1  | 0          | 1  |
| 3      |    | 2   | max | .441       | 1  | -.215        | 1  | 0            | 1  | -1.04      | 1  | 3.514      | 2  | 0          | 1  | 0          | 1  |
| 4      |    |     | min | .2         | 2  | -.713        | 2  | 0            | 1  | -3.514     | 2  | 1.04       | 1  | 0          | 1  | 0          | 1  |
| 5      |    | 3   | max | .348       | 1  | -.252        | 1  | 0            | 1  | -5.674     | 1  | 18.695     | 2  | 0          | 1  | 0          | 1  |
| 6      |    |     | min | .157       | 2  | -.816        | 2  | 0            | 1  | -18.695    | 2  | 5.674      | 1  | 0          | 1  | 0          | 1  |
| 7      |    | 4   | max | .255       | 1  | .629         | 2  | 0            | 1  | -3.424     | 1  | 11.195     | 2  | 0          | 1  | 0          | 1  |
| 8      |    |     | min | .114       | 2  | .191         | 1  | 0            | 1  | -11.195    | 2  | 3.424      | 1  | 0          | 1  | 0          | 1  |
| 9      |    | 5   | max | .162       | 1  | .499         | 2  | 0            | 1  | 0          | 1  | 0          | 1  | 0          | 1  | 0          | 1  |
| 10     |    |     | min | .072       | 2  | .154         | 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     | BOTCONNECT.. | max | 4.149   | 2  | 7.265 | 1  | 0     | 1  | 0         | 1  | 0         | 1  | -9.807    | 1  |
| 2     |              | min | 1.212   | 1  | 3.304 | 2  | 0     | 1  | 0         | 1  | 0         | 1  | -32.959   | 2  |
| 3     | TOPCONNECT.. | max | -3.259  | 1  | 0     | 1  | 0     | 1  | 0         | 1  | 0         | 1  | 0         | 1  |
| 4     |              | min | -10.613 | 2  | 0     | 1  | 0     | 1  | 0         | 1  | 0         | 1  | 0         | 1  |
| 5     | Totals:      | max | -2.048  | 1  | 7.265 | 1  | 0     | 1  |           |    |           |    |           |    |
| 6     |              | min | -6.464  | 2  | 3.304 | 2  | 0     | 1  |           |    |           |    |           |    |

Company : CENTEK Engineering, INC.  
 Designer : tjf, cfc  
 Job Number : 12101.CO1 / AT&T CT2260 CL&P # 10185 - Mast

Dec 26, 2012  
 9:40 AM

Checked By: \_\_\_\_\_

### Envelope Joint Displacements

| Joint |              |     | X [in] | LC | Y [in] | LC | Z [in] | LC | X Rotation [...] | LC | Y Rotation [...] | LC | Z Rotation [...] | LC |
|-------|--------------|-----|--------|----|--------|----|--------|----|------------------|----|------------------|----|------------------|----|
| 1     | BOTCONNECT.. | max | 0      | 1  | 0      | 2  | 0      | 1  | 0                | 1  | 0                | 1  | 0                | 2  |
| 2     |              | min | 0      | 2  | 0      | 1  | 0      | 1  | 0                | 1  | 0                | 1  | 0                | 1  |
| 3     | TOPCONNECT.. | max | 0      | 2  | -.002  | 2  | 0      | 1  | 0                | 1  | 0                | 1  | -2.31e-3         | 1  |
| 4     |              | min | 0      | 1  | -.004  | 1  | 0      | 1  | 0                | 1  | 0                | 1  | -7.643e-3        | 2  |
| 5     | TOPMAST      | max | 3.425  | 2  | -.003  | 2  | 0      | 1  | 0                | 1  | 0                | 1  | -5.987e-3        | 1  |
| 6     |              | min | 1.04   | 1  | -.006  | 1  | 0      | 1  | 0                | 1  | 0                | 1  | -1.968e-2        | 2  |

### Envelope AISC ASD Steel Code Checks

| Member | Shape        | Code Check | Loc[ft] | LC | Sh...Loc[ft] | .....Fa... | Ft [ksi] | Fb y-y [ksi] | Fb..... | AS...      |
|--------|--------------|------------|---------|----|--------------|------------|----------|--------------|---------|------------|
| 1      | M1 PIPE_1... | .725       | 22.0... | 2  | .04521.667   | 212...     | 27.6     | 30.36        | 30...   | 1.6...H1.. |

Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 12101.CO1 / AT&T CT2260 CL&P # 10185 - Mast

Dec 26, 2012

9:43 AM

Checked By: \_\_\_\_\_

### ***Joint Reactions***

|   | LC | Joint Label   | X [k]  | Y [k]     | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|----|---------------|--------|-----------|-------|-----------|-----------|-----------|
| 1 | 1  | BOTCONNECTION | 1.212  | 7.265     | 0     | 0         | 0         | -9.807    |
| 2 | 1  | TOPCONNECTION | -3.259 | 0         | 0     | 0         | 0         | 0         |
| 3 | 1  | Totals:       | -2.048 | 7.265     | 0     |           |           |           |
| 4 | 1  | COG (ft):     | X: 0   | Y: 26.079 | Z: 0  |           |           |           |

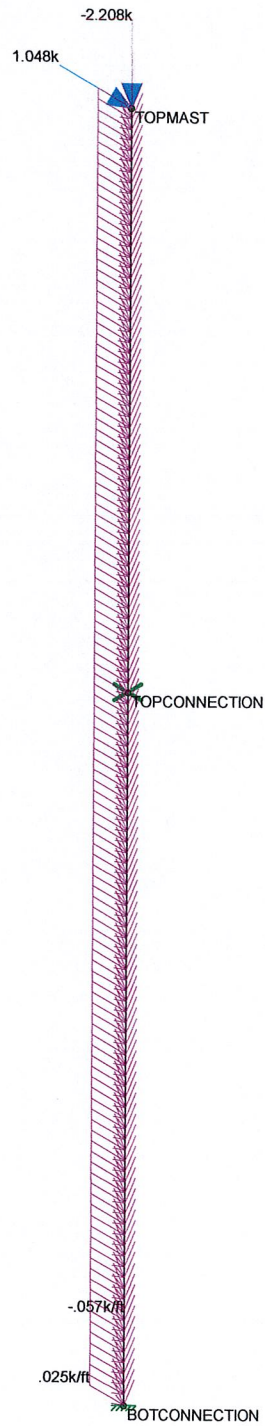
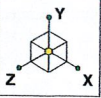


Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 12101.CO1 / AT&T CT2260 CL&P # 10185 - Mast

Dec 26, 2012  
9:43 AM  
Checked By: \_\_\_\_\_

### Joint Reactions

| LC |   | Joint Label   | X [k]   | Y [k]    | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|----|---|---------------|---------|----------|-------|-----------|-----------|-----------|
| 1  | 2 | BOTCONNECTION | 4.149   | 3.304    | 0     | 0         | 0         | -32.959   |
| 2  | 2 | TOPCONNECTION | -10.613 | 0        | 0     | 0         | 0         | 0         |
| 3  | 2 | Totals:       | -6.464  | 3.304    | 0     |           |           |           |
| 4  | 2 | COG (ft):     | X: 0    | Y: 25.89 | Z: 0  |           |           |           |



Loads: LC 1, NESC Heavy Wind on PCS Structure

CEN TEK Engineering, INC.

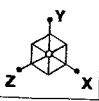
tjl, cfc

12101.CO1 / AT&T CT2260

CL&P # 10185 - Mast  
LC # 1 - Loads

Dec 26, 2012 at 9:41 AM

NESC Loads.r3d



TOPMAST

TOPCONNECTION  
-3.3

9.8  
1.2  
BOTCONNECTION  
7.3

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

CENTEK Engineering, INC.

tjl, cfc

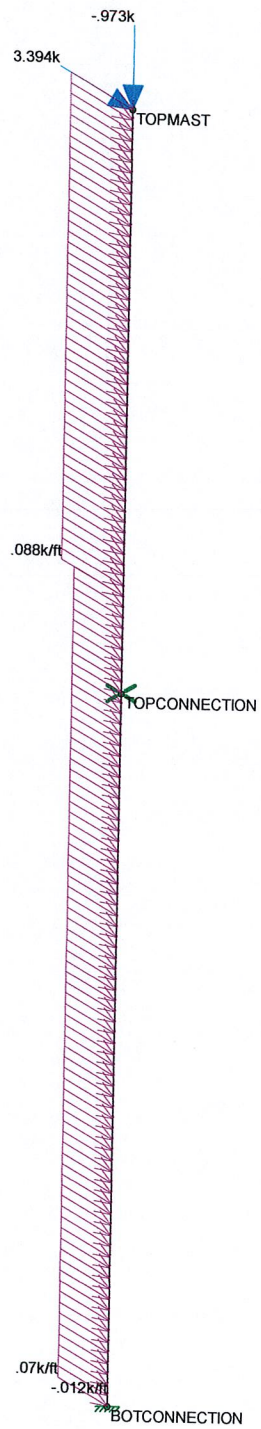
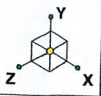
12101.CO1 / AT&T CT2260

CL&P # 10185 - Mast

LC # 1 - Reactions

Dec 26, 2012 at 9:42 AM

NESC Loads.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

CEN TEK Engineering, INC.

tjl, cfc

12101.CO1 / AT&T CT2260

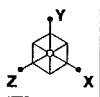
CL&P # 10185 - Mast

LC # 2 - Loads

Dec 26, 2012 at 9:41 AM

NESC Loads.r3d





TOPMAST

PCONNECTION  
-10.6

33  
4.1  
BOTCONNECTION  
3.3

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

|                           |                                           |                         |
|---------------------------|-------------------------------------------|-------------------------|
| CEN TEK Engineering, INC. | CL&P # 10185 - Mast<br>LC # 2 - Reactions |                         |
| tjl, cfc                  |                                           | Dec 26, 2012 at 9:43 AM |
| 12101.CO1 / AT&T CT2260   |                                           | NESC Loads.r3d          |

Subject:

Coax Cable on CL&P Pole #10185

Location:

New Milford, CT

Rev. 0: 10/15/12

Prepared by: T.J.L Checked by: C.F.C.  
Job No. 12101.CO1

### Coax Cable on CL&P Pole

Distance Between Coax Cable Attach Points =

Coaxial Cable Span

CoaxSpan := 10 .ft

(User Input)

Diameter of Coax Cable =

$D_{\text{coax}} := 1.98\text{-in}$

(User Input)

Weight of Coax Cable =

$W_{\text{coax}} := 1.04\text{-plf}$

(User Input)

Number of Coax Cables =

$N_{\text{coax}} := 12$

(User Input)

Number of Projected Coax Cables =

$NP_{\text{coax}} := 2$

(User Input)

Extreme Wind Pressure =

$q_z := 30\text{-psf}$

(User Input)

Heavy Wind Pressure =

$p := 4\text{-psf}$

(User Input)

Radial Ice Thickness =

$Ir := 0.5\text{-in}$

(User Input)

Radial Ice Density =

$Id := 56\text{-pcf}$

(User Input)

Shape Factor =

$Cd_{\text{coax}} := 1.6$

(User Input)

Overload Factor for NESC Heavy Wind Transverse Load =

$OF_{\text{HWT}} := 2.5$

(User Input)

Overload Factor for NESC Heavy Wind Vertical Load =

$OF_{\text{HWV}} := 1.5$

(User Input)

Overload Factor for NESC Extreme Wind Transverse Load =

$OF_{\text{EWT}} := 1.0$

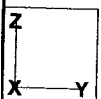
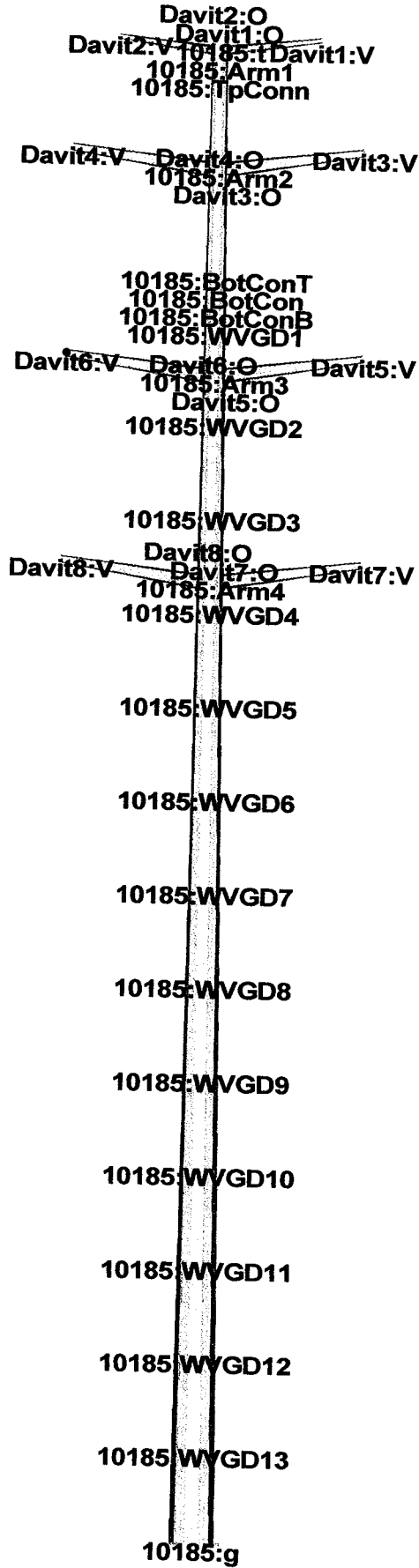
(User Input)

Overload Factor for NESC Extreme Wind Vertical Load =

$OF_{\text{EWV}} := 1.0$

(User Input)







Project Name : 12101.CO1 - New Milford, CT  
 Project Notes: CL&P # 10185/ AT&T - CT2260  
 Project File : J:\Jobs\1210100.WI\CO1 - CT2260 - New Milford\Rev (2)\Calcs\PLS-Pole\cl&p structure # 10185.pol  
 Date run : 9:21:22 AM Monday, January 07, 2013  
 by : PLS-POLE Version 11.11  
 Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\Jobs\1210100.wi\co1 - ct2260 - new milford\rev (2)\calcs\pls-pole\cl&p #10185.lca  
 \*\*\* Analysis Results:

Maximum element usage is 91.56% for Steel Pole "10185" in load case "NESC Extreme Wind"  
 Maximum insulator usage is 41.20% for Clamp "Clamp10" in load case "NESC Extreme Wind"

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. Bending Moment (ft-k) | Found. Usage % |
|---------------------------|-------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|-----------------------------|----------------|
| NESC Heavy Wind 10185:g   |             | -0.19              | -33.98             | 109.82             | 33.98              | 4423.71             | -25.72              | -0.03 4423.78               | 0.00           |
| NESC Extreme Wind 10185:g |             | -0.06              | -52.84             | 56.69              | 52.84              | 6304.95             | -39.88              | -0.03 6305.07               | 0.00           |

Summary of Tip Deflections For All Load Cases:

Note: positive 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 Wind 10185:t   |             | 0.86             | 103.51           | -3.85            | 103.58               | 0.06             | -5.71            | -0.00       |
| NESC Extreme Wind 10185:t |             | 2.02             | 145.48           | -7.52            | 145.69               | 0.15             | -8.17            | -0.01       |

Tubes Summary:

| Pole Label | Tube Num. | Weight (lbs) | Load Case         | Maximum Usage % | Resultant Moment (ft-k) |
|------------|-----------|--------------|-------------------|-----------------|-------------------------|
| 10185      | 1         | 5167         | NESC Extreme Wind | 76.50           | 1132.63                 |
| 10185      | 2         | 10260        | NESC Extreme Wind | 86.85           | 3250.98                 |
| 10185      | 3         | 16012        | NESC Extreme Wind | 91.56           | 6305.07                 |

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

Summary of Steel Pole Usages:

| Steel Pole Label | Pole Maximum Usage % | Load Case         | Segment Number | Weight (lbs) |
|------------------|----------------------|-------------------|----------------|--------------|
| 10185            | 91.56                | NESC Extreme Wind | 41             | 34496.8      |

Summary of Tubular Davit Usages:

Centek Engineering Inc - cl&p structure # 10185

| Tubular Davit Maximum<br>Label Usage % | Load Case Segment Weight<br>Number (lbs) |
|----------------------------------------|------------------------------------------|
| -----                                  | -----                                    |
| Davit1 13.69 NESC Heavy Wind           | 1 181.7                                  |
| Davit2 10.66 NESC Heavy Wind           | 1 181.7                                  |
| Davit3 30.86 NESC Heavy Wind           | 1 567.2                                  |
| Davit4 26.41 NESC Heavy Wind           | 1 567.2                                  |
| Davit5 31.00 NESC Heavy Wind           | 1 567.2                                  |
| Davit6 26.63 NESC Heavy Wind           | 1 567.2                                  |
| Davit7 31.22 NESC Heavy Wind           | 1 567.2                                  |
| Davit8 26.98 NESC Heavy Wind           | 1 567.2                                  |

\*\*\* Maximum Stress Summary for Each Load Case

#### Summary of Maximum Usages by Load Case:

| Load Case Maximum Element<br>Usage % Label | Element<br>Type  |
|--------------------------------------------|------------------|
| -----                                      | -----            |
| NESC Heavy Wind 65.46                      | 10185 Steel Pole |
| NESC Extreme Wind 91.56                    | 10185 Steel Pole |

#### Summary of Steel Pole Usages by Load Case:

| Load Case Maximum Steel Pole Segment<br>Usage % Label Number |          |
|--------------------------------------------------------------|----------|
| -----                                                        | -----    |
| NESC Heavy Wind 65.46                                        | 10185 41 |
| NESC Extreme Wind 91.56                                      | 10185 41 |

#### Summary of Base Plate Usages by Load Case:

| Load Case         | Pole Bend Length | Vertical Load | X Moment | Y Bending Moment | Bolt Moment Acting On Sum Bend Line | # Bolts | Max Bolt Load For Bend Line | Minimum Plate Thickness | Usage |         |       |       |
|-------------------|------------------|---------------|----------|------------------|-------------------------------------|---------|-----------------------------|-------------------------|-------|---------|-------|-------|
|                   | #                | (in)          | (kips)   | (ft-k)           | (ksi)                               | (ft-k)  | (kips)                      | (in)                    | %     |         |       |       |
| NESC Heavy Wind   | 10185            | 12            | 37.247   | 109.818          | 4423.708                            | -25.721 | 38.929                      | 181.247                 | 5     | 97.005  | 2.416 | 64.88 |
| NESC Extreme Wind | 10185            | 12            | 37.247   | 56.685           | 6304.947                            | -39.880 | 53.937                      | 251.125                 | 5     | 134.461 | 2.844 | 89.90 |

#### Summary of Tubular Davit Usages by Load Case:

| Load Case Maximum Tubular Davit Segment<br>Usage % Label Number |          |
|-----------------------------------------------------------------|----------|
| -----                                                           | -----    |
| NESC Heavy Wind 31.22                                           | Davit7 1 |
| NESC Extreme Wind 12.71                                         | Davit7 1 |

#### Summary of Insulator Usages:

| Insulator Insulator Maximum<br>Label Type Usage % | Load Case Weight (lbs) |
|---------------------------------------------------|------------------------|
| -----                                             | -----                  |
| Clamp1 Clamp 1.92                                 | NESC Heavy Wind 0.0    |
| Clamp2 Clamp 1.92                                 | NESC Heavy Wind 0.0    |
| Clamp3 Clamp 9.75                                 | NESC Heavy Wind 0.0    |

|         |       |       |                   |     |
|---------|-------|-------|-------------------|-----|
| Clamp4  | Clamp | 9.75  | NESC Heavy Wind   | 0.0 |
| Clamp5  | Clamp | 9.75  | NESC Heavy Wind   | 0.0 |
| Clamp6  | Clamp | 9.75  | NESC Heavy Wind   | 0.0 |
| Clamp7  | Clamp | 9.75  | NESC Heavy Wind   | 0.0 |
| Clamp8  | Clamp | 9.75  | NESC Heavy Wind   | 0.0 |
| Clamp9  | Clamp | 13.27 | NESC Extreme Wind | 0.0 |
| Clamp10 | Clamp | 41.20 | NESC Extreme Wind | 0.0 |
| Clamp11 | Clamp | 9.21  | NESC Heavy Wind   | 0.0 |
| Clamp12 | Clamp | 41.20 | NESC Extreme Wind | 0.0 |
| Clamp13 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp14 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp15 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp16 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp17 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp18 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp19 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp20 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp21 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp22 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp23 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp24 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |
| Clamp25 | Clamp | 0.58  | NESC Heavy Wind   | 0.0 |

```

*** Weight of structure (lbs):
Weight of Tubular Davit Arms:      3766.7
Weight of Steel Poles:             34496.8
Total:                             38263.5

```

```

*** End of Report

```





| Trans. Label | Long. Load | Length | Coef. | Override | Base             | Type | Tip  |   |     |         |   |   |            |       |
|--------------|------------|--------|-------|----------|------------------|------|------|---|-----|---------|---|---|------------|-------|
| Load         | Load       | (ft)   | (in)  | (in/ft)  | (ksi) (lbs/ft^3) |      | (ft) |   |     |         |   |   |            |       |
| CL&P10185    | 10185      | 160.00 | 0     | Yes      | 12F              | 21   | 59   | 0 | 1.3 | 3 tubes | 0 | 0 | Calculated | 0.000 |
| 0.0000       | 0.0000     |        |       |          |                  |      |      |   |     |         |   |   |            |       |

#### Steel Tubes Properties:

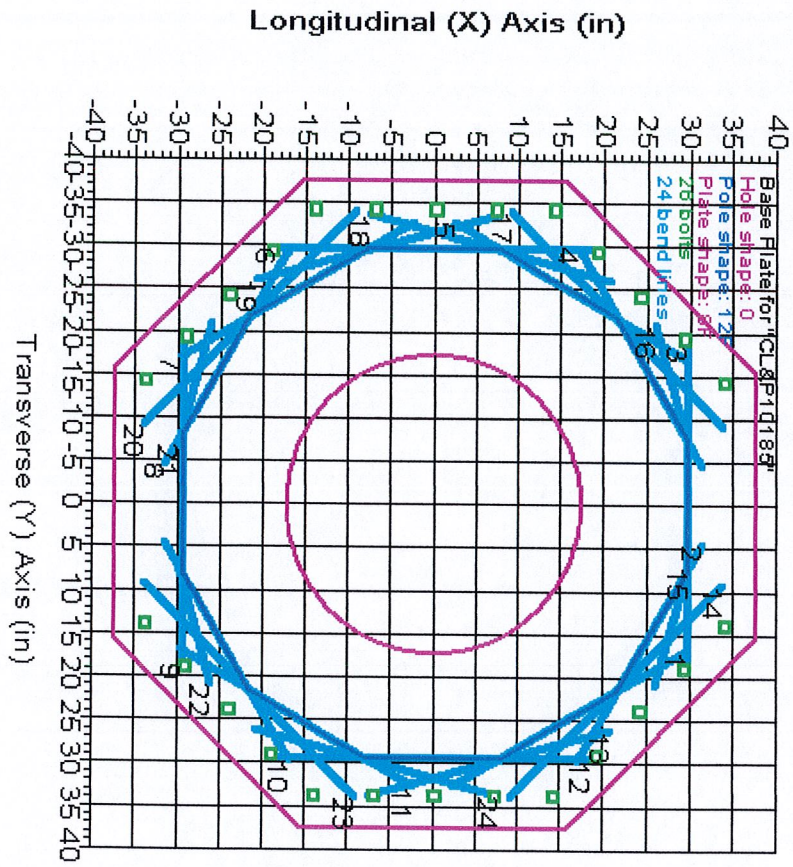
| Pole Tube Property No. | Length (ft) | Thickness (in) | Lap Length (ft) | Lap Gap (in) | Yield Stress (ksi) | Gap Stress (ksi) | Yield Moment (ft-k) | Tube Weight (lbs) | Center of Gravity (ft) | Tube Taper Diameter (in/ft) | Top Tube Diameter (in) | Tube Bot. 1.5x Diam. Lap Length (ft) |
|------------------------|-------------|----------------|-----------------|--------------|--------------------|------------------|---------------------|-------------------|------------------------|-----------------------------|------------------------|--------------------------------------|
| CL&P10185 1            | 55          | 0.3125         | 4.833           | 0.000        | 65.000             | 0.000            | 5167                | 29.76             | 0.24687                | 21.00                       | 34.58                  | 4.24                                 |
| CL&P10185 2            | 54.833      | 0.4375         | 6.250           | 0.000        | 65.000             | 0.000            | 10260               | 29.00             | 0.24687                | 32.76                       | 46.30                  | 5.68                                 |
| CL&P10185 3            | 61.25       | 0.46875        | 0.000           | 0.000        | 65.000             | 0.000            | 16012               | 32.14             | 0.24687                | 43.88                       | 59.00                  | 0.00                                 |

#### Base Plate Properties:

| Pole<br>Property | Plate Diam. | Plate Shape | Plate Thick. | Plate Weight | Bend Line<br>Length | Override | Hole<br>Diam. | Hole<br>Shape | Steel<br>Density | Steel<br>Yield<br>Stress | Bolt<br>Diam. | Bolt<br>Pattern | Bolt<br>Num. | Bolt<br>Cage X<br>Inertia | Bolt<br>Cage Y<br>Inertia |
|------------------|-------------|-------------|--------------|--------------|---------------------|----------|---------------|---------------|------------------|--------------------------|---------------|-----------------|--------------|---------------------------|---------------------------|
|                  | (in)        |             | (in)         | (lbs)        | (in)                | (in)     | (in)          |               | (lbs/ft^3)       | (ksi)                    | (in)          | (in)            |              | (in^4)                    | (in^4)                    |
| CL&P10185 75.000 | 8F          | 3.000       | 3058         | 0.000        | 35.000              | 0        | 490.00        | 60.000        | 2.250            | 68.000                   | 26            | 77631.09        | 50916.46     |                           |                           |

#### Base Plate Bolt Coordinates for Property "CL&P10185":

| Bolt X Coord. | Bolt Y Coord. | Bolt Angle (deg) |
|---------------|---------------|------------------|
| 0             | 1             | 0                |
| 0.2077        | 1             | 0                |
| 0.4154        | 1             | 0                |
| 0.5625        | 0.8566        | 0                |
| 0.7096        | 0.7069        | 0                |
| 0.8566        | 0.5625        | 0                |
| 1             | 0.4154        | 0                |



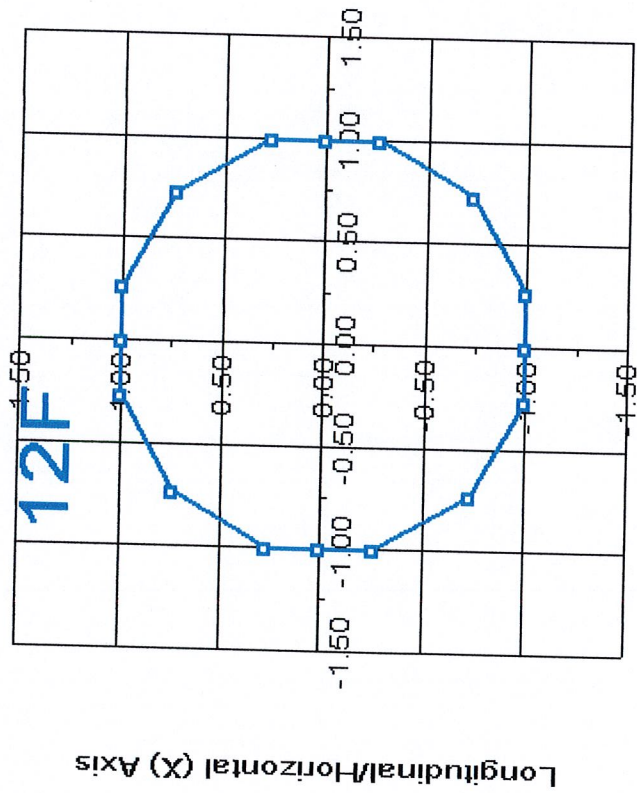
# Steel Pole Connectivity:

| Pole  | Tip   | Base X of Y of Z of Incln. | Inclin.              | Property | Attach. | Base                | Embed & Embed C.  |
|-------|-------|----------------------------|----------------------|----------|---------|---------------------|-------------------|
| Label | Joint | Joint Base                 | Base About X About Y | Set      | Labels  | Connect             | Override Override |
| (ft)  | (ft)  | (ft)                       | (deg)                | (deg)    |         |                     | (ft)              |
| 10185 |       | 0                          | 0                    | 0        | 0       | CL&P10185 21 labels | 0.00 0            |

## Relative Attachment Labels for Steel Pole "10185":

| Joint        | Distance From    | Global Z  |
|--------------|------------------|-----------|
| Label        | Origin/Top Joint | of Attach |
| (ft)         | (ft)             | (ft)      |
| 10185:Arm1   | 0.00             | 159.30    |
| 10185:Arm2   | 0.00             | 146.63    |
| 10185:Arm3   | 0.00             | 124.63    |
| 10185:Arm4   | 0.00             | 102.63    |
| 10185:TpConn | 0.00             | 157.00    |

|               |      |        |
|---------------|------|--------|
| 10185:BotConT | 0.00 | 135.50 |
| 10185:BotCon  | 0.00 | 135.00 |
| 10185:BotConB | 0.00 | 134.50 |
| 10185:WVGD1   | 0.00 | 130.00 |
| 10185:WVGD2   | 0.00 | 120.00 |
| 10185:WVGD3   | 0.00 | 110.00 |
| 10185:WVGD4   | 0.00 | 100.00 |
| 10185:WVGD5   | 0.00 | 90.00  |
| 10185:WVGD6   | 0.00 | 80.00  |
| 10185:WVGD7   | 0.00 | 70.00  |
| 10185:WVGD8   | 0.00 | 60.00  |
| 10185:WVGD9   | 0.00 | 50.00  |
| 10185:WVGD10  | 0.00 | 40.00  |
| 10185:WVGD11  | 0.00 | 30.00  |
| 10185:WVGD12  | 0.00 | 20.00  |
| 10185:WVGD13  | 0.00 | 10.00  |



Transverse/Vertical (Y) Axis

Pole Steel Properties:

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

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

|       |               |                   |        |       |       |          |          |          |      |      |       |       |         |
|-------|---------------|-------------------|--------|-------|-------|----------|----------|----------|------|------|-------|-------|---------|
| 10185 | 10185:t       | 10185:t Ori       | 0.00   | 21.00 | 20.79 | 1138.90  | 1138.90  | 1138.90  | 0.00 | 15.3 | 65.00 | 65.00 | 587.53  |
| 10185 | 10185:Arml    | 10185:Arml End    | 0.70   | 21.17 | 20.96 | 1167.68  | 1167.68  | 1167.68  | 0.00 | 15.5 | 65.00 | 65.00 | 587.53  |
| 10185 | 10185:Arml    | 10185:Arml Ori    | 0.70   | 21.17 | 20.96 | 1167.68  | 1167.68  | 1167.68  | 0.00 | 15.5 | 65.00 | 65.00 | 597.45  |
| 10185 | 10185:TpConn  | 10185:TpConn End  | 3.00   | 21.74 | 21.53 | 1265.63  | 1265.63  | 1265.63  | 0.00 | 16.0 | 65.00 | 65.00 | 597.45  |
| 10185 | 10185:TpConn  | 10185:TpConn Ori  | 3.00   | 21.74 | 21.53 | 1265.63  | 1265.63  | 1265.63  | 0.00 | 16.0 | 65.00 | 65.00 | 630.66  |
| 10185 | #10185:0      | Tube 1 End        | 8.00   | 22.97 | 22.77 | 1497.16  | 1497.16  | 1497.16  | 0.00 | 17.0 | 65.00 | 65.00 | 630.66  |
| 10185 | #10185:0      | Tube 1 Ori        | 8.00   | 22.98 | 22.77 | 1497.16  | 1497.16  | 1497.16  | 0.00 | 17.0 | 65.00 | 65.00 | 705.95  |
| 10185 | #10185:1      | Tube 1 End        | 10.69  | 23.64 | 23.44 | 1632.53  | 1632.53  | 1632.53  | 0.00 | 17.6 | 65.00 | 65.00 | 705.95  |
| 10185 | #10185:1      | Tube 1 Ori        | 10.69  | 23.64 | 23.44 | 1632.53  | 1632.53  | 1632.53  | 0.00 | 17.6 | 65.00 | 65.00 | 748.17  |
| 10185 | 10185:Arm2    | 10185:Arm2 End    | 13.38  | 24.30 | 24.10 | 1775.82  | 1775.82  | 1775.82  | 0.00 | 18.2 | 65.00 | 65.00 | 748.17  |
| 10185 | 10185:Arm2    | 10185:Arm2 Ori    | 13.38  | 24.30 | 24.10 | 1775.82  | 1775.82  | 1775.82  | 0.00 | 18.2 | 65.00 | 65.00 | 791.62  |
| 10185 | #10185:2      | Tube 1 End        | 18.38  | 25.54 | 25.35 | 2064.25  | 2064.25  | 2064.25  | 0.00 | 19.2 | 65.00 | 65.00 | 791.62  |
| 10185 | #10185:2      | Tube 1 Ori        | 18.38  | 25.54 | 25.35 | 2064.25  | 2064.25  | 2064.25  | 0.00 | 19.2 | 65.00 | 65.00 | 875.72  |
| 10185 | #10185:3      | Tube 1 End        | 21.44  | 26.29 | 26.10 | 2255.47  | 2255.47  | 2255.47  | 0.00 | 19.9 | 65.00 | 65.00 | 875.72  |
| 10185 | #10185:3      | Tube 1 Ori        | 21.44  | 26.29 | 26.10 | 2255.47  | 2255.47  | 2255.47  | 0.00 | 19.9 | 65.00 | 65.00 | 929.33  |
| 10185 | 10185:BotCont | 10185:BotCont End | 24.50  | 27.05 | 26.86 | 2458.15  | 2458.15  | 2458.15  | 0.00 | 20.5 | 65.00 | 65.00 | 929.33  |
| 10185 | 10185:BotCont | 10185:BotCont Ori | 24.50  | 27.05 | 26.86 | 2458.15  | 2458.15  | 2458.15  | 0.00 | 20.5 | 65.00 | 65.00 | 929.33  |
| 10185 | 10185:BotCon  | 10185:BotCon End  | 25.00  | 27.17 | 26.99 | 2492.36  | 2492.36  | 2492.36  | 0.00 | 20.6 | 65.00 | 65.00 | 984.53  |
| 10185 | 10185:BotCon  | 10185:BotCon Ori  | 25.00  | 27.17 | 26.99 | 2492.36  | 2492.36  | 2492.36  | 0.00 | 20.6 | 65.00 | 65.00 | 984.53  |
| 10185 | 10185:BotConB | 10185:BotConB End | 25.50  | 27.30 | 27.11 | 2526.87  | 2526.87  | 2526.87  | 0.00 | 20.7 | 65.00 | 65.00 | 993.69  |
| 10185 | 10185:BotConB | 10185:BotConB Ori | 25.50  | 27.30 | 27.11 | 2526.87  | 2526.87  | 2526.87  | 0.00 | 20.7 | 65.00 | 65.00 | 993.69  |
| 10185 | 10185:WVGD1   | 10185:WVGD1 End   | 30.00  | 28.41 | 28.23 | 2851.98  | 2851.98  | 2851.98  | 0.00 | 21.7 | 65.00 | 65.00 | 1002.90 |
| 10185 | 10185:WVGD1   | 10185:WVGD1 Ori   | 30.00  | 28.41 | 28.23 | 2851.98  | 2851.98  | 2851.98  | 0.00 | 21.7 | 65.00 | 65.00 | 1002.90 |
| 10185 | #10185:4      | Tube 1 End        | 32.69  | 29.07 | 28.90 | 3058.84  | 3058.84  | 3058.84  | 0.00 | 22.2 | 65.00 | 65.00 | 1087.66 |
| 10185 | #10185:4      | Tube 1 Ori        | 32.69  | 29.07 | 28.90 | 3058.84  | 3058.84  | 3058.84  | 0.00 | 22.2 | 65.00 | 65.00 | 1087.66 |
| 10185 | 10185:Arm3    | 10185:Arm3 End    | 35.38  | 29.73 | 29.56 | 3275.46  | 3275.46  | 3275.46  | 0.00 | 22.8 | 65.00 | 65.00 | 1139.93 |
| 10185 | 10185:Arm3    | 10185:Arm3 Ori    | 35.38  | 29.73 | 29.56 | 3275.46  | 3275.46  | 3275.46  | 0.00 | 22.8 | 65.00 | 65.00 | 1139.93 |
| 10185 | 10185:WVGD2   | 10185:WVGD2 End   | 40.00  | 30.87 | 30.71 | 3671.77  | 3671.77  | 3671.77  | 0.00 | 23.8 | 65.00 | 65.00 | 1193.42 |
| 10185 | 10185:WVGD2   | 10185:WVGD2 Ori   | 40.00  | 30.87 | 30.71 | 3671.77  | 3671.77  | 3671.77  | 0.00 | 23.8 | 65.00 | 65.00 | 1193.42 |
| 10185 | #10185:5      | Tube 1 End        | 45.00  | 32.11 | 31.95 | 4134.84  | 4134.84  | 4134.84  | 0.00 | 24.9 | 65.00 | 65.00 | 1288.34 |
| 10185 | #10185:5      | Tube 1 Ori        | 45.00  | 32.11 | 31.95 | 4134.84  | 4134.84  | 4134.84  | 0.00 | 24.9 | 65.00 | 65.00 | 1288.34 |
| 10185 | 10185:WVGD3   | 10185:WVGD3 End   | 50.00  | 33.34 | 33.19 | 4635.30  | 4635.30  | 4635.30  | 0.00 | 25.9 | 65.00 | 65.00 | 1395.05 |
| 10185 | 10185:WVGD3   | 10185:WVGD3 Ori   | 50.00  | 33.34 | 33.19 | 4635.30  | 4635.30  | 4635.30  | 0.00 | 25.9 | 65.00 | 65.00 | 1395.05 |
| 10185 | #10185:6      | SpliceT End       | 50.17  | 33.38 | 33.23 | 4652.68  | 4652.68  | 4652.68  | 0.00 | 25.9 | 65.00 | 65.00 | 1506.00 |
| 10185 | #10185:6      | SpliceT Ori       | 50.17  | 33.38 | 33.23 | 4652.68  | 4652.68  | 4652.68  | 0.00 | 25.9 | 65.00 | 65.00 | 1506.00 |
| 10185 | #10185:7      | SpliceB End       | 55.00  | 33.95 | 47.15 | 6779.65  | 6779.65  | 6779.65  | 0.00 | 18.1 | 65.00 | 65.00 | 1509.78 |
| 10185 | #10185:7      | SpliceB Ori       | 55.00  | 33.95 | 47.15 | 6779.65  | 6779.65  | 6779.65  | 0.00 | 18.1 | 65.00 | 65.00 | 1509.78 |
| 10185 | 10185:Arm4    | 10185:Arm4 End    | 57.38  | 34.54 | 47.97 | 7141.68  | 7141.68  | 7141.68  | 0.00 | 18.5 | 65.00 | 65.00 | 2163.16 |
| 10185 | 10185:Arm4    | 10185:Arm4 Ori    | 57.38  | 34.54 | 47.97 | 7141.68  | 7141.68  | 7141.68  | 0.00 | 18.5 | 65.00 | 65.00 | 2163.16 |
| 10185 | 10185:WVGD4   | 10185:WVGD4 End   | 60.00  | 35.19 | 48.88 | 7556.57  | 7556.57  | 7556.57  | 0.00 | 18.9 | 65.00 | 65.00 | 2239.99 |
| 10185 | 10185:WVGD4   | 10185:WVGD4 Ori   | 60.00  | 35.19 | 48.88 | 7556.57  | 7556.57  | 7556.57  | 0.00 | 18.9 | 65.00 | 65.00 | 2239.99 |
| 10185 | #10185:8      | Tube 2 End        | 65.00  | 36.42 | 50.62 | 8390.69  | 8390.69  | 8390.69  | 0.00 | 19.6 | 65.00 | 65.00 | 2326.47 |
| 10185 | #10185:8      | Tube 2 Ori        | 65.00  | 36.42 | 50.62 | 8390.69  | 8390.69  | 8390.69  | 0.00 | 19.6 | 65.00 | 65.00 | 2326.47 |
| 10185 | 10185:WVGD5   | 10185:WVGD5 End   | 70.00  | 37.66 | 52.36 | 9284.04  | 9284.04  | 9284.04  | 0.00 | 20.4 | 65.00 | 65.00 | 2495.72 |
| 10185 | 10185:WVGD5   | 10185:WVGD5 Ori   | 70.00  | 37.66 | 52.36 | 9284.04  | 9284.04  | 9284.04  | 0.00 | 20.4 | 65.00 | 65.00 | 2495.72 |
| 10185 | #10185:9      | Tube 2 End        | 75.00  | 38.89 | 54.09 | 10238.65 | 10238.65 | 10238.65 | 0.00 | 21.1 | 65.00 | 65.00 | 2670.92 |
| 10185 | #10185:9      | Tube 2 Ori        | 75.00  | 38.89 | 54.09 | 10238.65 | 10238.65 | 10238.65 | 0.00 | 21.1 | 65.00 | 65.00 | 2670.92 |
| 10185 | 10185:WVGD6   | 10185:WVGD6 End   | 80.00  | 40.12 | 55.83 | 11256.56 | 11256.56 | 11256.56 | 0.00 | 21.9 | 65.00 | 65.00 | 2852.06 |
| 10185 | 10185:WVGD6   | 10185:WVGD6 Ori   | 80.00  | 40.12 | 55.83 | 11256.56 | 11256.56 | 11256.56 | 0.00 | 21.9 | 65.00 | 65.00 | 2852.06 |
| 10185 | #10185:10     | Tube 2 End        | 85.00  | 41.36 | 57.57 | 12339.80 | 12339.80 | 12339.80 | 0.00 | 22.7 | 65.00 | 65.00 | 3039.15 |
| 10185 | #10185:10     | Tube 2 Ori        | 85.00  | 41.36 | 57.57 | 12339.80 | 12339.80 | 12339.80 | 0.00 | 22.7 | 65.00 | 65.00 | 3039.15 |
| 10185 | 10185:WVGD7   | 10185:WVGD7 End   | 90.00  | 42.59 | 59.30 | 13490.39 | 13490.39 | 13490.39 | 0.00 | 23.4 | 65.00 | 65.00 | 3232.18 |
| 10185 | 10185:WVGD7   | 10185:WVGD7 Ori   | 90.00  | 42.59 | 59.30 | 13490.39 | 13490.39 | 13490.39 | 0.00 | 23.4 | 65.00 | 65.00 | 3232.18 |
| 10185 | #10185:11     | Tube 2 End        | 94.38  | 43.67 | 60.82 | 14554.01 | 14554.01 | 14554.01 | 0.00 | 24.1 | 65.00 | 65.00 | 3431.15 |
| 10185 | #10185:11     | Tube 2 Ori        | 94.38  | 43.67 | 60.82 | 14554.01 | 14554.01 | 14554.01 | 0.00 | 24.1 | 65.00 | 65.00 | 3431.15 |
| 10185 | #10185:12     | SpliceT End       | 98.75  | 44.75 | 62.34 | 15672.13 | 15672.13 | 15672.13 | 0.00 | 24.7 | 65.00 | 65.00 | 3610.13 |
| 10185 | #10185:12     | SpliceT Ori       | 98.75  | 44.75 | 62.34 | 15672.13 | 15672.13 | 15672.13 | 0.00 | 24.7 | 65.00 | 65.00 | 3610.13 |
| 10185 | 10185:WVGD8   | 10185:WVGD8 End   | 100.00 | 44.19 | 65.89 | 16121.60 | 16121.60 | 16121.60 | 0.00 | 22.6 | 65.00 | 65.00 | 3793.66 |
| 10185 | 10185:WVGD8   | 10185:WVGD8 Ori   | 100.00 | 44.19 | 65.89 | 16121.60 | 16121.60 | 16121.60 | 0.00 | 22.6 | 65.00 | 65.00 | 3793.66 |
| 10185 |               |                   |        |       |       |          |          |          |      |      |       |       | 3952.48 |



|       |              |                  |        |       |       |          |          |      |      |       |       |         |         |  |  |  |  |  |  |
|-------|--------------|------------------|--------|-------|-------|----------|----------|------|------|-------|-------|---------|---------|--|--|--|--|--|--|
| 10185 | 10185:WVGD8  | 10185:WVGD8 Ori  | 100.00 | 44.19 | 65.89 | 16121.60 | 16121.60 | 0.00 | 22.6 | 65.00 | 65.00 | 3952.48 | 3952.48 |  |  |  |  |  |  |
| 10185 | #10185:13    | SpliceB End      | 105.00 | 45.42 | 67.75 | 17525.97 | 17525.97 | 0.00 | 23.3 | 65.00 | 65.00 | 4180.02 | 4180.02 |  |  |  |  |  |  |
| 10185 | #10185:13    | SpliceB Ori      | 105.00 | 45.42 | 67.75 | 17525.97 | 17525.97 | 0.00 | 23.3 | 65.00 | 65.00 | 4180.02 | 4180.02 |  |  |  |  |  |  |
| 10185 | 10185:WVGD9  | 10185:WVGD9 End  | 110.00 | 46.66 | 69.61 | 19009.61 | 19009.61 | 0.00 | 24.0 | 65.00 | 65.00 | 4413.92 | 4413.92 |  |  |  |  |  |  |
| 10185 | 10185:WVGD9  | 10185:WVGD9 Ori  | 110.00 | 46.66 | 69.61 | 19009.61 | 19009.61 | 0.00 | 24.0 | 65.00 | 65.00 | 4413.92 | 4413.92 |  |  |  |  |  |  |
| 10185 | #10185:14    | Tube 3 End       | 115.00 | 47.89 | 71.47 | 20574.71 | 20574.71 | 0.00 | 24.7 | 65.00 | 65.00 | 4654.20 | 4654.20 |  |  |  |  |  |  |
| 10185 | #10185:14    | Tube 3 Ori       | 115.00 | 47.89 | 71.47 | 20574.72 | 20574.72 | 0.00 | 24.7 | 65.00 | 65.00 | 4654.20 | 4654.20 |  |  |  |  |  |  |
| 10185 | 10185:WVGD10 | 10185:WVGD10 End | 120.00 | 49.12 | 73.34 | 22223.45 | 22223.45 | 0.00 | 25.4 | 65.00 | 65.00 | 4900.84 | 4900.84 |  |  |  |  |  |  |
| 10185 | 10185:WVGD10 | 10185:WVGD10 Ori | 120.00 | 49.13 | 73.34 | 22223.45 | 22223.45 | 0.00 | 25.4 | 65.00 | 65.00 | 4900.84 | 4900.84 |  |  |  |  |  |  |
| 10185 | #10185:15    | Tube 3 End       | 125.00 | 50.36 | 75.20 | 23958.00 | 23958.00 | 0.00 | 26.1 | 65.00 | 65.00 | 5153.85 | 5153.85 |  |  |  |  |  |  |
| 10185 | #10185:15    | Tube 3 Ori       | 125.00 | 50.36 | 75.20 | 23958.00 | 23958.00 | 0.00 | 26.1 | 65.00 | 65.00 | 5153.85 | 5153.85 |  |  |  |  |  |  |
| 10185 | 10185:WVGD11 | 10185:WVGD11 End | 130.00 | 51.59 | 77.06 | 25780.53 | 25780.53 | 0.00 | 26.8 | 65.00 | 65.00 | 5413.23 | 5413.23 |  |  |  |  |  |  |
| 10185 | 10185:WVGD11 | 10185:WVGD11 Ori | 130.00 | 51.59 | 77.06 | 25780.53 | 25780.53 | 0.00 | 26.8 | 65.00 | 65.00 | 5413.23 | 5413.23 |  |  |  |  |  |  |
| 10185 | #10185:16    | Tube 3 End       | 135.00 | 52.83 | 78.92 | 27693.23 | 27693.23 | 0.00 | 27.5 | 65.00 | 65.00 | 5678.97 | 5678.97 |  |  |  |  |  |  |
| 10185 | #10185:16    | Tube 3 Ori       | 135.00 | 52.83 | 78.92 | 27693.23 | 27693.23 | 0.00 | 27.5 | 65.00 | 65.00 | 5678.97 | 5678.97 |  |  |  |  |  |  |
| 10185 | 10185:WVGD12 | 10185:WVGD12 End | 140.00 | 54.06 | 80.78 | 29698.27 | 29698.27 | 0.00 | 28.2 | 65.00 | 65.00 | 5951.09 | 5951.09 |  |  |  |  |  |  |
| 10185 | 10185:WVGD12 | 10185:WVGD12 Ori | 140.00 | 54.06 | 80.78 | 29698.27 | 29698.27 | 0.00 | 28.2 | 65.00 | 65.00 | 5951.09 | 5951.09 |  |  |  |  |  |  |
| 10185 | #10185:17    | Tube 3 End       | 145.00 | 55.30 | 82.64 | 31797.82 | 31797.82 | 0.00 | 28.9 | 65.00 | 65.00 | 6229.57 | 6229.57 |  |  |  |  |  |  |
| 10185 | #10185:17    | Tube 3 Ori       | 145.00 | 55.30 | 82.64 | 31797.83 | 31797.83 | 0.00 | 28.9 | 65.00 | 65.00 | 6229.57 | 6229.57 |  |  |  |  |  |  |
| 10185 | 10185:WVGD13 | 10185:WVGD13 End | 150.00 | 56.53 | 84.50 | 33994.07 | 33994.07 | 0.00 | 29.6 | 65.00 | 65.00 | 6514.42 | 6514.42 |  |  |  |  |  |  |
| 10185 | 10185:WVGD13 | 10185:WVGD13 Ori | 150.00 | 56.53 | 84.50 | 33994.08 | 33994.08 | 0.00 | 29.6 | 65.00 | 65.00 | 6514.43 | 6514.43 |  |  |  |  |  |  |
| 10185 | #10185:18    | Tube 3 End       | 155.00 | 57.77 | 86.36 | 36289.20 | 36289.20 | 0.00 | 30.3 | 65.00 | 64.51 | 6754.24 | 6754.24 |  |  |  |  |  |  |
| 10185 | #10185:18    | Tube 3 Ori       | 155.00 | 57.77 | 86.36 | 36289.20 | 36289.20 | 0.00 | 30.3 | 65.00 | 64.51 | 6754.24 | 6754.24 |  |  |  |  |  |  |
| 10185 | 10185:g      | 10185:g End      | 160.00 | 59.00 | 88.22 | 38685.37 | 38685.37 | 0.00 | 31.0 | 65.00 | 63.82 | 6973.99 | 6973.99 |  |  |  |  |  |  |

Tubular Davit Properties:

| Davit Steel     | Stock | Steel Thickness | Base              | Tip      | Taper   | Drag  | Modulus Geometry | Strength Vertical | Tension Compres. | Long.    | Yield            | Weight   |
|-----------------|-------|-----------------|-------------------|----------|---------|-------|------------------|-------------------|------------------|----------|------------------|----------|
| Property Number | Shape | Shape           | Diameter          | Diameter | Coef.   | Coef. | of               | Check Capacity    | Capacity         | Capacity | Stress           | Density  |
| Label           |       |                 | or Depth or Depth |          |         |       | Elasticity       | Type              |                  |          |                  | Override |
| At End          |       |                 | (in)              | (in)     | (in/ft) |       | (ksi)            |                   | (lbs)            | (lbs)    | (ksi) (lbs/ft^3) |          |
| ARM 5 601420    | 6T    | 0.1875          | 10.7              | 6        | 0       | 1.3   | 29000 1 point    | Calculated        | 0                | 0        | 65               | 0        |
| ARM 6 601515    | 8T    | 0.25            | 18.5              | 9        | 0       | 1.3   | 29000 1 point    | Calculated        | 0                | 0        | 65               | 0        |

Intermediate Joints for Davit Property "ARM 5":

| Joint Horiz. Vert. | Label Offset Offset | (ft) | (ft) |
|--------------------|---------------------|------|------|
| V                  | 10                  | -1.2 |      |

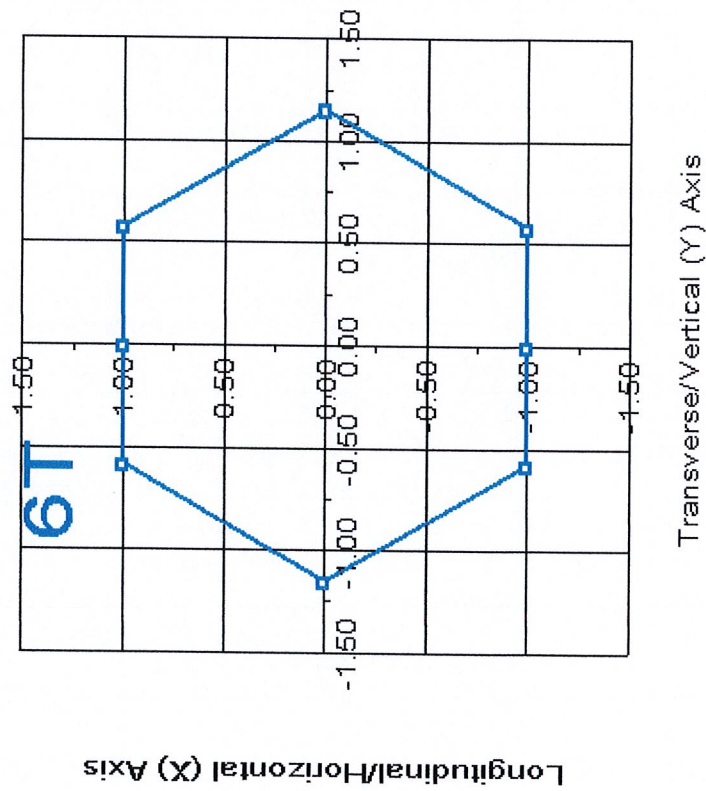
Intermediate Joints for Davit Property "ARM 6":

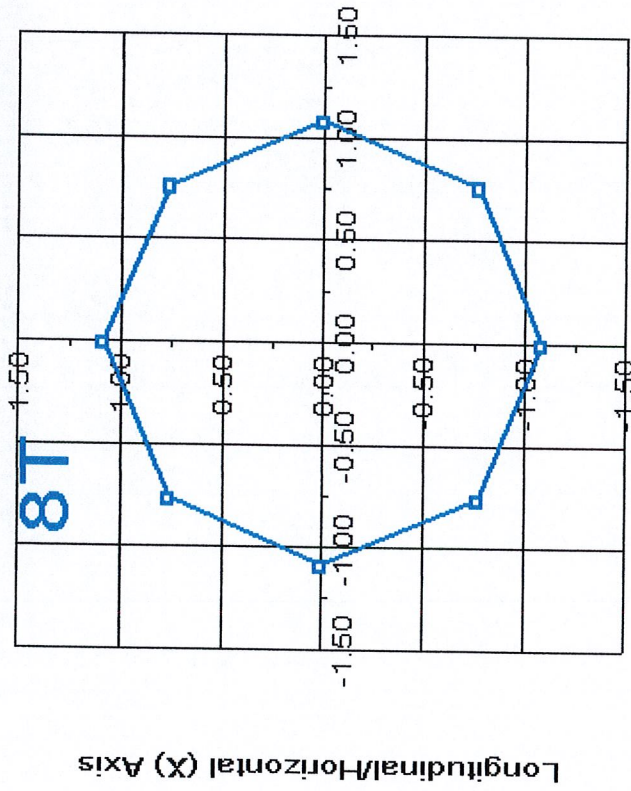
| Joint Horiz. Vert. | Label Offset Offset | (ft) | (ft) |
|--------------------|---------------------|------|------|
| V                  | 14.77               | -2   |      |

Tubular Davit Arm Connectivity:

| Davit | Attach | Davit Azimuth |
|-------|--------|---------------|
|-------|--------|---------------|

| Label  | Label Property Set | (deg) |
|--------|--------------------|-------|
| Davit1 | 10185:Arm1         | ARM 5 |
| Davit2 | 10185:Arm1         | ARM 5 |
| Davit3 | 10185:Arm2         | ARM 6 |
| Davit4 | 10185:Arm2         | ARM 6 |
| Davit5 | 10185:Arm3         | ARM 6 |
| Davit6 | 10185:Arm3         | ARM 6 |
| Davit7 | 10185:Arm4         | ARM 6 |
| Davit8 | 10185:Arm4         | ARM 6 |





Transverse/Vertical (Y) Axis

Tubular Davit Arm Steel Properties:

| Element Label | Joint Label | Joint Position | Rel. Dist. (ft) | Outer Diam. (in) | Area (in <sup>2</sup> ) | V-Moment Inertia (in <sup>4</sup> ) | H-Moment Inertia (in <sup>4</sup> ) | D/t  | W/t Max. | Fy (ksi) | Min. (ksi) | Fa ASCE V-Mom. (ft-k) | ASCE H-Mom. (ft-k) |
|---------------|-------------|----------------|-----------------|------------------|-------------------------|-------------------------------------|-------------------------------------|------|----------|----------|------------|-----------------------|--------------------|
| Davit1        | Davit1:0    | Origin         | 0.00            | 10.70            | 6.83                    | 104.83                              | 104.83                              | 0.00 | 27.2     | 65.00    | 65.00      | 91.92                 | 106.14             |
| Davit1        | #Davit1:0   | End            | 5.00            | 8.37             | 5.31                    | 49.39                               | 49.39                               | 0.00 | 20.0     | 65.00    | 65.00      | 55.38                 | 63.95              |
| Davit1        | #Davit1:1   | Origin         | 5.00            | 8.37             | 5.31                    | 49.39                               | 49.39                               | 0.00 | 20.0     | 65.00    | 65.00      | 55.38                 | 63.95              |
| Davit1        | #Davit1:1   | End            | 7.54            | 7.18             | 4.54                    | 30.91                               | 30.91                               | 0.00 | 16.3     | 65.00    | 65.00      | 40.37                 | 46.61              |
| Davit1        | #Davit1:1   | Origin         | 7.54            | 7.18             | 4.54                    | 30.91                               | 30.91                               | 0.00 | 16.3     | 65.00    | 65.00      | 40.37                 | 46.61              |
| Davit1        | Davit1:V    | End            | 10.07           | 6.00             | 3.78                    | 17.73                               | 17.73                               | 0.00 | 12.7     | 65.00    | 65.00      | 27.73                 | 32.02              |
| Davit2        | Davit2:0    | Origin         | 0.00            | 10.70            | 6.83                    | 104.83                              | 104.83                              | 0.00 | 27.2     | 65.00    | 65.00      | 91.92                 | 106.14             |
| Davit2        | #Davit2:0   | End            | 5.00            | 8.37             | 5.31                    | 49.39                               | 49.39                               | 0.00 | 20.0     | 65.00    | 65.00      | 55.38                 | 63.95              |
| Davit2        | #Davit2:1   | Origin         | 5.00            | 8.37             | 5.31                    | 49.39                               | 49.39                               | 0.00 | 20.0     | 65.00    | 65.00      | 55.38                 | 63.95              |
| Davit2        | #Davit2:1   | End            | 7.54            | 7.18             | 4.54                    | 30.91                               | 30.91                               | 0.00 | 16.3     | 65.00    | 65.00      | 40.37                 | 46.61              |
| Davit2        | Davit2:V    | End            | 10.07           | 6.00             | 3.78                    | 17.73                               | 17.73                               | 0.00 | 12.7     | 65.00    | 65.00      | 27.73                 | 32.02              |
| Davit3        | Davit3:0    | Origin         | 0.00            | 18.50            | 15.12                   | 665.56                              | 665.56                              | 0.00 | 26.5     | 65.00    | 65.00      | 360.08                | 360.08             |
| Davit3        | #Davit3:0   | End            | 5.00            | 15.31            | 12.48                   | 374.27                              | 374.27                              | 0.00 | 21.2     | 65.00    | 65.00      | 244.62                | 244.62             |
| Davit3        | #Davit3:0   | Origin         | 5.00            | 15.31            | 12.48                   | 374.27                              | 374.27                              | 0.00 | 21.2     | 65.00    | 65.00      | 244.62                | 244.62             |

|                  |        |       |       |       |        |        |      |      |       |       |        |        |
|------------------|--------|-------|-------|-------|--------|--------|------|------|-------|-------|--------|--------|
| Davit3 #Davit3:1 | End    | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit3 #Davit3:1 | Origin | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit3 Davit3:V  | End    | 14.90 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
| Davit4 Davit4:0  | Origin | 0.00  | 18.50 | 15.12 | 665.56 | 665.56 | 0.00 | 26.5 | 65.00 | 65.00 | 360.08 | 360.08 |
| Davit4 #Davit4:0 | End    | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit4 #Davit4:0 | Origin | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit4 #Davit4:1 | End    | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit4 #Davit4:1 | Origin | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit4 Davit4:V  | End    | 14.90 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
| Davit5 Davit5:0  | Origin | 0.00  | 18.50 | 15.12 | 665.56 | 665.56 | 0.00 | 26.5 | 65.00 | 65.00 | 360.08 | 360.08 |
| Davit5 #Davit5:0 | End    | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit5 #Davit5:0 | Origin | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit5 #Davit5:1 | End    | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit5 #Davit5:1 | Origin | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit5 Davit5:V  | End    | 14.90 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
| Davit6 Davit6:0  | Origin | 0.00  | 18.50 | 15.12 | 665.56 | 665.56 | 0.00 | 26.5 | 65.00 | 65.00 | 360.08 | 360.08 |
| Davit6 #Davit6:0 | End    | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit6 #Davit6:0 | Origin | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit6 #Davit6:1 | End    | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit6 #Davit6:1 | Origin | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit6 Davit6:V  | End    | 14.90 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
| Davit7 Davit7:0  | Origin | 0.00  | 18.50 | 15.12 | 665.56 | 665.56 | 0.00 | 26.5 | 65.00 | 65.00 | 360.08 | 360.08 |
| Davit7 #Davit7:0 | End    | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit7 #Davit7:0 | Origin | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit7 #Davit7:1 | End    | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit7 #Davit7:1 | Origin | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit7 Davit7:V  | End    | 14.90 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
| Davit8 Davit8:0  | Origin | 0.00  | 18.50 | 15.12 | 665.56 | 665.56 | 0.00 | 26.5 | 65.00 | 65.00 | 360.08 | 360.08 |
| Davit8 #Davit8:0 | End    | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit8 #Davit8:0 | Origin | 5.00  | 15.31 | 12.48 | 374.27 | 374.27 | 0.00 | 21.2 | 65.00 | 65.00 | 244.62 | 244.62 |
| Davit8 #Davit8:1 | End    | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit8 #Davit8:1 | Origin | 9.95  | 12.16 | 9.86  | 184.87 | 184.87 | 0.00 | 16.0 | 65.00 | 65.00 | 152.21 | 152.21 |
| Davit8 Davit8:V  | End    | 14.90 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |

\*\*\* Insulator Data

#### Clamp Properties:

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

#### Clamp Insulator Connectivity:

| Clamp Label | Structure And Tip Attach | Property Min. Required Set Vertical Load (uplift) | (lbs) |
|-------------|--------------------------|---------------------------------------------------|-------|
| Clamp1      | Davit1:V clamp           | No Limit                                          |       |
| Clamp2      | Davit2:V clamp           | No Limit                                          |       |
| Clamp3      | Davit3:V clamp           | No Limit                                          |       |



|         |               |       |          |
|---------|---------------|-------|----------|
| Clamp4  |               |       |          |
| Clamp5  | Davit4:V      | clamp | No Limit |
| Clamp6  | Davit5:V      | clamp | No Limit |
| Clamp7  | Davit6:V      | clamp | No Limit |
| Clamp8  | Davit7:V      | clamp | No Limit |
| Clamp9  | Davit8:V      | clamp | No Limit |
| Clamp10 | 10185:TpConn  | clamp | No Limit |
| Clamp11 | 10185:BotConn | clamp | No Limit |
| Clamp12 | 10185:BotConB | clamp | No Limit |
| Clamp13 | 10185:WVGD1   | clamp | No Limit |
| Clamp14 | 10185:WVGD2   | clamp | No Limit |
| Clamp15 | 10185:WVGD3   | clamp | No Limit |
| Clamp16 | 10185:WVGD4   | clamp | No Limit |
| Clamp17 | 10185:WVGD5   | clamp | No Limit |
| Clamp18 | 10185:WVGD6   | clamp | No Limit |
| Clamp19 | 10185:WVGD7   | clamp | No Limit |
| Clamp20 | 10185:WVGD8   | clamp | No Limit |
| Clamp21 | 10185:WVGD9   | clamp | No Limit |
| Clamp22 | 10185:WVGD10  | clamp | No Limit |
| Clamp23 | 10185:WVGD11  | clamp | No Limit |
| Clamp24 | 10185:WVGD12  | clamp | No Limit |
| Clamp25 | 10185:WVGD13  | clamp | No Limit |

Loads from file: j:\jobs\1210100.wi\col - ct2260 - new milford\rev (2)\calcs\pls-pole\cl&p #10185.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)                                           | 160.50 (ft) |                                                                                           |
| Structure height                                                             | 160.50 (ft) |                                                                                           |
| Structure height above ground                                                | 160.50 (ft) |                                                                                           |

**Vector Load Cases:**

[illegible]

### Point Loads for Load Case "NESC Heavy Wind":

| Joint Label   | Vertical   |  | Transverse |  | Longitudinal |                   | Load Comment |
|---------------|------------|--|------------|--|--------------|-------------------|--------------|
|               | Load (lbs) |  | Load (lbs) |  | Load (lbs)   |                   |              |
| Davit1:V      | 1084       |  | 1083       |  | 0            | Shield Wire       |              |
| Davit2:V      | 1084       |  | 1083       |  | 0            | Shield Wire       |              |
| Davit3:V      | 6886       |  | 3666       |  | 0            | Conductor         |              |
| Davit4:V      | 6886       |  | 3666       |  | 0            | Conductor         |              |
| Davit5:V      | 6886       |  | 3666       |  | 0            | Conductor         |              |
| Davit6:V      | 6886       |  | 3666       |  | 0            | Conductor         |              |
| Davit7:V      | 6886       |  | 3666       |  | 0            | Conductor         |              |
| Davit8:V      | 6886       |  | 3666       |  | 0            | Conductor         |              |
| 10185:TpConn  | 0          |  | 3259       |  | 0            | Top Connection    |              |
| 10185:BotConn | 0          |  | 0          |  | 9807         | Bottom Connection |              |
| 10185:BotCon  | 7265       |  | -1212      |  | 0            | Bottom Connection |              |
| 10185:BotConB | 0          |  | 0          |  | -9807        | Bottom Connection |              |
| 10185:WVGd1   | 460        |  | 66         |  | 0            | Coax Cables       |              |
| 10185:WVGd2   | 460        |  | 66         |  | 0            | Coax Cables       |              |
| 10185:WVGd3   | 460        |  | 66         |  | 0            | Coax Cables       |              |
| 10185:WVGd4   | 460        |  | 66         |  | 0            | Coax Cables       |              |

|             |     |    |   |             |
|-------------|-----|----|---|-------------|
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |
| 10185:WVGDS | 460 | 66 | 0 | Coax Cables |

Point Loads for Load Case "NESC Extreme Wind":

| Joint Label   | Vertical Load (lbs) | Transverse Load (lbs) | Longitudinal Load (lbs) | Comment           |
|---------------|---------------------|-----------------------|-------------------------|-------------------|
| -----         |                     |                       |                         |                   |
| Davit1:V      | 233                 | 680                   | 0                       | Shield Wire       |
| Davit2:V      | 233                 | 680                   | 0                       | Shield Wire       |
| Davit3:V      | 2549                | 4748                  | 0                       | Conductor         |
| Davit4:V      | 2549                | 4748                  | 0                       | Conductor         |
| Davit5:V      | 2549                | 4748                  | 0                       | Conductor         |
| Davit6:V      | 2549                | 4748                  | 0                       | Conductor         |
| Davit7:V      | 2549                | 4748                  | 0                       | Conductor         |
| Davit8:V      | 2549                | 4748                  | 0                       | Conductor         |
| 10185:TpConn  | 0                   | 10613                 | 0                       | Top Connection    |
| 10185:BotConn | 0                   | 0                     | 32959                   | Bottom Connection |
| 10185:BotConn | 3304                | -4149                 | 0                       | Bottom Connection |
| 10185:BotConn | 0                   | 0                     | -32959                  | Bottom Connection |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |
| 10185:WVGDS   | 125                 | 158                   | 0                       | Coax Cables       |

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

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.

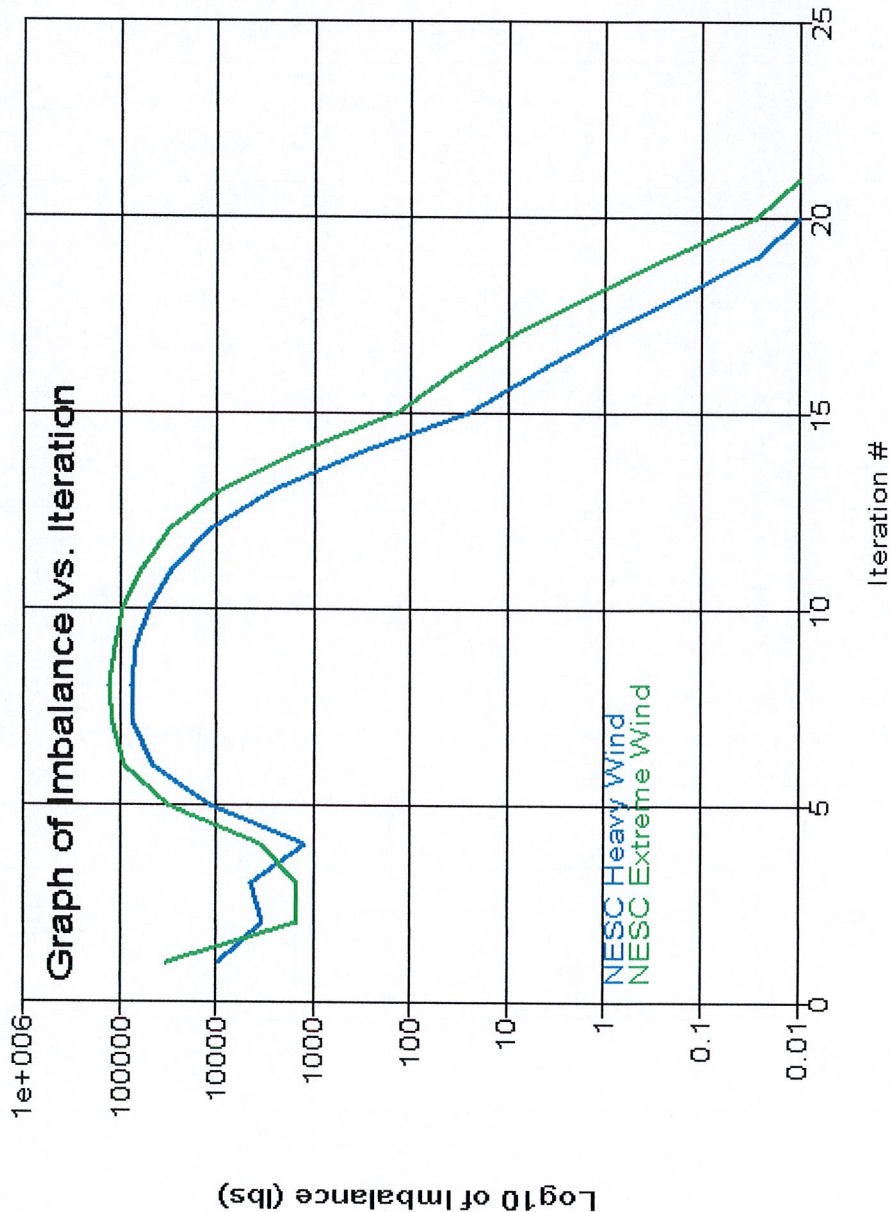
| Pole Label | Top Joint    | Bottom Joint | Section Top Z (ft) | Section Bottom Z (ft) | Section Average Elevation (ft) | Outer Diameter (in) | Reynolds Number | Drag Coef. | Adjusted Wind Pressure (psf) | Adjusted Ice Thickness (in) | Pole Vert. Load (lbs) | Pole Ice Vertical Load (lbs) | Pole Ice Wind Load (lbs) | Tran. Wind Load (lbs) | Long. Wind Load (lbs) |
|------------|--------------|--------------|--------------------|-----------------------|--------------------------------|---------------------|-----------------|------------|------------------------------|-----------------------------|-----------------------|------------------------------|--------------------------|-----------------------|-----------------------|
| -----      |              |              |                    |                       |                                |                     |                 |            |                              |                             |                       |                              |                          |                       |                       |
| 10185      | 10185:t      | 10185:Arm1   | 160.00             | 159.30                | 159.65                         | 21.086              | 1.65e+006       | 1.000      | 27.31                        | 0.00                        | 49.72                 | 33.60                        | 0.00                     | 33.60                 | 0.00                  |
| 10185      | 10185:Arm1   | 10185:TpConn | 159.30             | 157.00                | 158.15                         | 21.457              | 1.68e+006       | 1.000      | 27.31                        | 0.00                        | 166.28                | 112.33                       | 0.00                     | 112.33                | 0.00                  |
| 10185      | 10185:TpConn |              | 157.00             | 152.00                | 154.50                         | 22.358              | 1.75e+006       | 1.000      | 27.31                        | 0.00                        | 376.88                | 254.45                       | 0.00                     | 254.45                | 0.00                  |
| 10185      |              |              | 152.00             | 149.31                | 150.66                         | 23.307              | 1.82e+006       | 1.000      | 27.31                        | 0.00                        | 211.29                | 142.57                       | 0.00                     | 142.57                | 0.00                  |
| 10185      |              | 10185:Arm2   | 149.31             | 146.63                | 147.97                         | 23.970              | 1.88e+006       | 1.000      | 27.31                        | 0.00                        | 217.39                | 146.63                       | 0.00                     | 146.63                | 0.00                  |
| 10185      | 10185:Arm2   |              | 146.63             | 141.63                | 144.13                         | 24.919              | 1.95e+006       | 1.000      | 27.31                        | 0.00                        | 420.67                | 283.60                       | 0.00                     | 283.60                | 0.00                  |
| 10185      |              |              | 141.63             | 138.56                | 140.09                         | 25.914              | 2.03e+006       | 1.000      | 27.31                        | 0.00                        | 268.08                | 180.64                       | 0.00                     | 180.64                | 0.00                  |

|       |               |        |        |        |           |       |       |      |         |        |      |
|-------|---------------|--------|--------|--------|-----------|-------|-------|------|---------|--------|------|
| 10185 | 10185:BotCont | 138.56 | 135.50 | 26.670 | 2.09e+006 | 1.000 | 27.31 | 0.00 | 276.00  | 185.91 | 0.00 |
| 10185 | 10185:BotCon  | 135.50 | 135.00 | 27.110 | 2.12e+006 | 1.000 | 27.31 | 0.00 | 45.81   | 30.85  | 0.00 |
| 10185 | 10185:BotConB | 135.00 | 134.50 | 27.234 | 2.13e+006 | 1.000 | 27.31 | 0.00 | 46.02   | 30.99  | 0.00 |
| 10185 | 10185:WVGD1   | 134.50 | 130.00 | 27.851 | 2.18e+006 | 1.000 | 27.31 | 0.00 | 423.71  | 285.27 | 0.00 |
| 10185 | 10185:WVGD1   | 130.00 | 127.31 | 28.738 | 2.25e+006 | 1.000 | 27.31 | 0.00 | 261.20  | 175.80 | 0.00 |
| 10185 | 10185:Arm3    | 127.31 | 124.63 | 29.401 | 2.3e+006  | 1.000 | 27.31 | 0.00 | 474.27  | 319.02 | 0.00 |
| 10185 | 10185:WVGD2   | 124.63 | 120.00 | 30.304 | 2.37e+006 | 1.000 | 27.31 | 0.00 | 533.04  | 358.41 | 0.00 |
| 10185 | 10185:WVGD2   | 120.00 | 115.00 | 31.492 | 2.46e+006 | 1.000 | 27.31 | 0.00 | 554.14  | 372.46 | 0.00 |
| 10185 | 10185:WVGD3   | 115.00 | 110.00 | 32.727 | 2.56e+006 | 1.000 | 27.31 | 0.00 | 18.87   | 12.68  | 0.00 |
| 10185 | 10185:WVGD3   | 110.00 | 109.83 | 33.364 | 2.61e+006 | 1.000 | 27.31 | 0.00 | 1317.94 | 370.38 | 0.00 |
| 10185 | 10185:Arm4    | 109.83 | 105.00 | 33.669 | 2.63e+006 | 1.000 | 27.31 | 0.00 | 384.46  | 185.13 | 0.00 |
| 10185 | 10185:WVGD4   | 105.00 | 102.63 | 34.246 | 2.68e+006 | 1.000 | 27.31 | 0.00 | 432.57  | 208.31 | 0.00 |
| 10185 | 10185:WVGD4   | 102.63 | 100.00 | 34.863 | 2.73e+006 | 1.000 | 27.31 | 0.00 | 846.48  | 407.49 | 0.00 |
| 10185 | 10185:WVGD5   | 100.00 | 95.00  | 35.805 | 2.8e+006  | 1.000 | 27.31 | 0.00 | 876.02  | 421.54 | 0.00 |
| 10185 | 10185:WVGD5   | 95.00  | 90.00  | 37.039 | 2.9e+006  | 1.000 | 27.31 | 0.00 | 905.57  | 435.58 | 0.00 |
| 10185 | 10185:WVGD6   | 90.00  | 85.00  | 38.273 | 2.99e+006 | 1.000 | 27.31 | 0.00 | 935.11  | 449.63 | 0.00 |
| 10185 | 10185:WVGD6   | 85.00  | 80.00  | 39.508 | 3.09e+006 | 1.000 | 27.31 | 0.00 | 984.65  | 463.68 | 0.00 |
| 10185 | 10185:WVGD7   | 80.00  | 75.00  | 40.742 | 3.19e+006 | 1.000 | 27.31 | 0.00 | 994.20  | 477.73 | 0.00 |
| 10185 | 10185:WVGD7   | 75.00  | 70.00  | 41.977 | 3.28e+006 | 1.000 | 27.31 | 0.00 | 994.16  | 429.54 | 0.00 |
| 10185 | 10185:WVGD8   | 70.00  | 65.63  | 43.134 | 3.38e+006 | 1.000 | 27.31 | 0.00 | 916.78  | 440.29 | 0.00 |
| 10185 | 10185:WVGD8   | 65.63  | 61.25  | 44.214 | 3.46e+006 | 1.000 | 27.31 | 0.00 | 545.38  | 126.53 | 0.00 |
| 10185 | 10185:WVGD9   | 61.25  | 60.00  | 44.471 | 3.48e+006 | 1.000 | 27.31 | 0.00 | 2219.76 | 509.91 | 0.00 |
| 10185 | 10185:WVGD9   | 60.00  | 55.00  | 46.805 | 3.51e+006 | 1.000 | 27.31 | 0.00 | 1168.73 | 523.96 | 0.00 |
| 10185 | 10185:WVGD10  | 55.00  | 50.00  | 46.039 | 3.6e+006  | 1.000 | 27.31 | 0.00 | 1200.24 | 538.01 | 0.00 |
| 10185 | 10185:WVGD10  | 50.00  | 45.00  | 47.273 | 3.7e+006  | 1.000 | 27.31 | 0.00 | 1231.89 | 552.06 | 0.00 |
| 10185 | 10185:WVGD11  | 45.00  | 40.00  | 48.508 | 3.8e+006  | 1.000 | 27.31 | 0.00 | 1263.55 | 566.11 | 0.00 |
| 10185 | 10185:WVGD11  | 40.00  | 35.00  | 49.742 | 3.89e+006 | 1.000 | 27.31 | 0.00 | 1295.20 | 580.16 | 0.00 |
| 10185 | 10185:WVGD12  | 35.00  | 30.00  | 50.977 | 3.99e+006 | 1.000 | 27.31 | 0.00 | 1326.85 | 594.20 | 0.00 |
| 10185 | 10185:WVGD12  | 30.00  | 25.00  | 52.211 | 4.09e+006 | 1.000 | 27.31 | 0.00 | 1358.51 | 608.25 | 0.00 |
| 10185 | 10185:WVGD13  | 25.00  | 20.00  | 53.445 | 4.18e+006 | 1.000 | 27.31 | 0.00 | 1390.16 | 622.30 | 0.00 |
| 10185 | 10185:WVGD13  | 20.00  | 15.00  | 54.680 | 4.28e+006 | 1.000 | 27.31 | 0.00 | 1421.82 | 636.35 | 0.00 |
| 10185 | 10185:WVGD13  | 15.00  | 10.00  | 55.914 | 4.38e+006 | 1.000 | 27.31 | 0.00 | 1453.47 | 650.40 | 0.00 |
| 10185 | 10185:WVGD13  | 10.00  | 5.00   | 57.148 | 4.47e+006 | 1.000 | 27.31 | 0.00 | 1485.12 | 664.44 | 0.00 |
| 10185 | 10185:g       | 5.00   | 0.00   | 58.383 | 4.57e+006 | 1.000 | 27.31 | 0.00 |         |        | 0.00 |



\*\*\* Analysis Results:

Maximum element usage is 91.56% for Steel Pole "10185" in load case "NESC Extreme Wind"  
Maximum insulator usage is 41.20% for Clamp "Clamp10" in load case "NESC Extreme Wind"



\*\*\* Analysis Results for Load Case No. 1 "NESC Heavy Wind" - Number of iterations in SAPS 20

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

| 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) |
|-------------|--------------|--------------|--------------|-------------|-------------|-------------|------------|------------|------------|
| 10185:g     | 0            | 0            | 0            | 0.0000      | 0.0000      | 0.0000      | 0          | 0          | 0          |
| 10185:t     | 0.07185      | 8.626        | -0.3205      | -5.7148     | 0.0580      | -0.0012     | 0.07185    | 8.626      | 159.7      |
| 10185:Arm1  | 0.07114      | 8.556        | -0.317       | -5.7148     | 0.0580      | -0.0012     | 0.07114    | 8.556      | 159        |



|   |       |               |        |       |        |      |       |        |        |     |        |       |       |       |       |      |      |       |      |
|---|-------|---------------|--------|-------|--------|------|-------|--------|--------|-----|--------|-------|-------|-------|-------|------|------|-------|------|
| 3 | 10185 | 10185:Arm1    | Origin | 0.70  | 102.67 | 0.85 | -3.80 | 2.85   | -0.00  | 0.0 | -2.68  | 2.49  | -0.00 | -0.13 | 0.23  | 0.17 | 0.00 | 0.46  | 0.7  |
| 2 | 10185 | 10185:TpConn  | End    | 3.00  | 99.92  | 0.83 | -3.67 | 8.57   | -0.01  | 0.0 | -2.68  | 2.49  | -0.00 | -0.12 | 0.88  | 0.06 | 0.00 | 1.01  | 1.6  |
| 2 | 10185 | 10185:TpConn  | Origin | 3.00  | 99.92  | 0.83 | -3.67 | 8.57   | -0.01  | 0.0 | -2.76  | 5.86  | -0.01 | -0.13 | 0.88  | 0.14 | 0.00 | 1.04  | 1.6  |
| 2 | 10185 | Tube 1        | End    | 8.00  | 93.96  | 0.76 | -3.37 | 37.85  | -0.05  | 0.0 | -2.76  | 5.86  | -0.01 | -0.12 | 3.49  | 0.14 | 0.00 | 3.62  | 5.6  |
| 2 | 10185 | Tube 1        | Origin | 8.00  | 93.96  | 0.76 | -3.37 | 37.85  | -0.05  | 0.0 | -3.20  | 5.99  | -0.01 | -0.14 | 3.49  | 0.14 | 0.00 | 3.64  | 5.6  |
| 2 | 10185 | Tube 1        | End    | 10.69 | 90.77  | 0.73 | -3.21 | 53.96  | -0.08  | 0.0 | -3.20  | 5.99  | -0.01 | -0.14 | 4.69  | 0.14 | 0.00 | 4.83  | 7.4  |
| 2 | 10185 | 10185:Arm2    | Origin | 10.69 | 90.77  | 0.73 | -3.21 | 53.96  | -0.08  | 0.0 | -3.52  | 6.09  | -0.01 | -0.15 | 4.69  | 0.14 | 0.00 | 4.85  | 7.5  |
| 2 | 10185 | 10185:Arm2    | End    | 13.38 | 87.59  | 0.70 | -3.05 | 70.33  | -0.11  | 0.0 | -3.52  | 6.09  | -0.01 | -0.15 | 5.78  | 0.13 | 0.00 | 5.93  | 9.1  |
| 2 | 10185 | 10185:Arm2    | Origin | 13.38 | 87.59  | 0.70 | -3.05 | 87.07  | -0.14  | 0.0 | -18.68 | 15.04 | -0.03 | -0.77 | 7.15  | 0.33 | 0.00 | 7.95  | 12.2 |
| 2 | 10185 | Tube 1        | End    | 18.38 | 81.74  | 0.64 | -2.77 | 162.29 | -0.30  | 0.0 | -18.68 | 15.04 | -0.03 | -0.74 | 12.05 | 0.31 | 0.00 | 12.80 | 19.7 |
| 2 | 10185 | Tube 1        | Origin | 18.38 | 81.74  | 0.64 | -2.77 | 162.29 | -0.30  | 0.0 | -19.22 | 15.18 | -0.04 | -0.76 | 12.05 | 0.32 | 0.00 | 12.82 | 19.7 |
| 2 | 10185 | Tube 1        | End    | 21.44 | 78.21  | 0.60 | -2.60 | 208.76 | -0.41  | 0.0 | -19.22 | 15.18 | -0.04 | -0.74 | 14.61 | 0.31 | 0.00 | 15.35 | 23.6 |
| 2 | 10185 | Tube 1        | Origin | 21.44 | 78.21  | 0.60 | -2.60 | 208.76 | -0.41  | 0.0 | -19.64 | 15.27 | -0.04 | -0.75 | 14.61 | 0.31 | 0.00 | 15.37 | 23.6 |
| 2 | 10185 | 10185:BotConn | End    | 24.50 | 74.73  | 0.56 | -2.43 | 255.54 | -0.53  | 0.0 | -19.64 | 15.27 | -0.04 | -0.73 | 16.88 | 0.30 | 0.00 | 17.62 | 27.1 |
| 2 | 10185 | 10185:BotConn | Origin | 24.50 | 74.73  | 0.56 | -2.43 | 255.54 | -0.53  | 0.0 | -19.89 | 15.33 | -0.05 | -0.74 | 16.88 | 0.78 | 0.00 | 17.67 | 27.2 |
| 2 | 10185 | 10185:BotConn | End    | 25.00 | 74.17  | 0.56 | -2.40 | 263.20 | -5.45  | 0.0 | -19.89 | 15.33 | -0.05 | -0.74 | 17.31 | 0.78 | 0.00 | 18.10 | 27.8 |
| 2 | 10185 | 10185:BotConn | Origin | 25.00 | 74.17  | 0.56 | -2.40 | 263.20 | -5.45  | 0.0 | -27.31 | 14.82 | -0.05 | -1.01 | 17.31 | 0.78 | 0.00 | 18.37 | 28.3 |
| 2 | 10185 | 10185:BotConn | End    | 25.50 | 73.61  | 0.55 | -2.38 | 270.61 | -10.38 | 0.0 | -27.31 | 14.82 | -0.05 | -1.01 | 17.72 | 0.77 | 0.00 | 18.77 | 28.9 |
| 2 | 10185 | 10185:BotConn | Origin | 25.50 | 73.61  | 0.55 | -2.38 | 270.61 | -10.38 | 0.0 | -27.69 | 14.89 | -0.05 | -1.02 | 17.72 | 0.29 | 0.00 | 18.75 | 28.8 |
| 2 | 10185 | 10185:WVGD1   | End    | 30.00 | 68.63  | 0.50 | -2.14 | 337.60 | -10.60 | 0.0 | -27.69 | 14.89 | -0.05 | -0.98 | 20.35 | 0.28 | 0.00 | 21.33 | 32.8 |
| 2 | 10185 | 10185:WVGD1   | Origin | 30.00 | 68.63  | 0.50 | -2.14 | 337.60 | -10.60 | 0.0 | -28.68 | 15.09 | -0.05 | -1.02 | 20.35 | 0.28 | 0.00 | 21.37 | 32.9 |
| 2 | 10185 | Tube 1        | End    | 32.69 | 65.73  | 0.47 | -2.01 | 378.16 | -10.73 | 0.0 | -28.68 | 15.09 | -0.05 | -0.99 | 21.73 | 0.28 | 0.00 | 22.72 | 35.0 |
| 2 | 10185 | Tube 1        | Origin | 32.69 | 65.73  | 0.47 | -2.01 | 378.16 | -10.73 | 0.0 | -29.10 | 15.16 | -0.05 | -1.01 | 21.73 | 0.28 | 0.00 | 22.74 | 35.0 |
| 2 | 10185 | 10185:Arm3    | End    | 35.38 | 62.87  | 0.45 | -1.88 | 418.91 | -10.87 | 0.0 | -29.10 | 15.16 | -0.05 | -0.98 | 22.97 | 0.27 | 0.00 | 23.96 | 36.9 |
| 2 | 10185 | 10185:Arm3    | Origin | 35.38 | 62.87  | 0.45 | -1.88 | 435.36 | -10.89 | 0.0 | -44.47 | 23.90 | -0.07 | -1.50 | 23.87 | 0.43 | 0.00 | 25.39 | 39.1 |
| 2 | 10185 | 10185:WVGD2   | End    | 40.00 | 58.10  | 0.40 | -1.68 | 545.87 | -11.20 | 0.0 | -44.47 | 23.90 | -0.07 | -1.45 | 27.69 | 0.41 | 0.00 | 29.15 | 44.8 |
| 2 | 10185 | 10185:WVGD2   | Origin | 40.00 | 58.10  | 0.40 | -1.68 | 545.87 | -11.20 | 0.0 | -45.76 | 24.07 | -0.07 | -1.49 | 27.69 | 0.41 | 0.00 | 29.19 | 44.9 |
| 2 | 10185 | Tube 1        | End    | 45.00 | 53.15  | 0.36 | -1.47 | 666.19 | -11.54 | 0.0 | -45.76 | 24.07 | -0.07 | -1.43 | 31.18 | 0.40 | 0.00 | 32.62 | 50.2 |
| 2 | 10185 | Tube 1        | Origin | 45.00 | 53.15  | 0.36 | -1.47 | 666.19 | -11.54 | 0.0 | -46.67 | 24.12 | -0.07 | -1.46 | 31.18 | 0.40 | 0.00 | 32.65 | 50.2 |
| 2 | 10185 | 10185:WVGD3   | End    | 50.00 | 48.44  | 0.32 | -1.28 | 786.79 | -11.89 | 0.0 | -46.67 | 24.12 | -0.07 | -1.41 | 34.10 | 0.38 | 0.00 | 35.51 | 54.6 |

|   |       |             |        |        |       |      |       |         |        |     |        |       |       |       |       |      |      |       |      |
|---|-------|-------------|--------|--------|-------|------|-------|---------|--------|-----|--------|-------|-------|-------|-------|------|------|-------|------|
| 2 | 10185 | 10185:WVGD3 | Origin | 50.00  | 48.44 | 0.32 | -1.28 | 786.79  | -11.89 | 0.0 | -47.60 | 24.24 | -0.07 | -1.43 | 34.10 | 0.39 | 0.00 | 35.54 | 54.7 |
| 2 | 10185 | SpliceT     | End    | 50.17  | 48.29 | 0.32 | -1.27 | 790.83  | -11.90 | 0.0 | -47.60 | 24.24 | -0.07 | -1.43 | 34.18 | 0.39 | 0.00 | 35.62 | 54.8 |
| 2 | 10185 | SpliceT     | Origin | 50.17  | 48.29 | 0.32 | -1.27 | 790.83  | -11.90 | 0.0 | -48.65 | 24.32 | -0.07 | -1.46 | 34.18 | 0.39 | 0.00 | 35.65 | 54.9 |
| 2 | 10185 | SpliceB     | End    | 55.00  | 43.96 | 0.29 | -1.11 | 908.37  | -12.25 | 0.0 | -48.65 | 24.32 | -0.07 | -1.03 | 27.39 | 0.27 | 0.00 | 28.43 | 43.7 |
| 2 | 10185 | SpliceB     | Origin | 55.00  | 43.96 | 0.29 | -1.11 | 908.37  | -12.25 | 0.0 | -49.98 | 24.42 | -0.08 | -1.06 | 27.39 | 0.27 | 0.00 | 28.46 | 43.8 |
| 2 | 10185 | 10185:Arm4  | End    | 57.38  | 41.92 | 0.27 | -1.04 | 966.36  | -12.43 | 0.0 | -49.98 | 24.42 | -0.08 | -1.04 | 28.14 | 0.27 | 0.00 | 29.18 | 44.9 |
| 2 | 10185 | 10185:Arm4  | Origin | 57.38  | 41.92 | 0.27 | -1.04 | 982.35  | -12.44 | 0.0 | -65.55 | 32.87 | -0.09 | -1.37 | 28.60 | 0.36 | 0.00 | 29.98 | 46.1 |
| 2 | 10185 | 10185:WVGD4 | End    | 60.00  | 39.70 | 0.26 | -0.96 | 1068.63 | -12.67 | 0.0 | -65.55 | 32.87 | -0.09 | -1.34 | 29.95 | 0.36 | 0.00 | 31.30 | 48.2 |
| 2 | 10185 | 10185:WVGD4 | Origin | 60.00  | 39.70 | 0.26 | -0.96 | 1068.63 | -12.67 | 0.0 | -67.05 | 33.00 | -0.09 | -1.37 | 29.95 | 0.36 | 0.00 | 31.33 | 48.2 |
| 2 | 10185 | Tube 2      | End    | 65.00  | 35.65 | 0.23 | -0.82 | 1233.63 | -13.12 | 0.0 | -67.05 | 33.00 | -0.09 | -1.32 | 32.22 | 0.35 | 0.00 | 33.55 | 51.6 |
| 2 | 10185 | Tube 2      | Origin | 65.00  | 35.65 | 0.23 | -0.82 | 1233.63 | -13.11 | 0.0 | -68.46 | 33.04 | -0.09 | -1.35 | 32.22 | 0.35 | 0.00 | 33.58 | 51.7 |
| 2 | 10185 | 10185:WVGD5 | End    | 70.00  | 31.81 | 0.20 | -0.69 | 1398.81 | -13.57 | 0.0 | -68.46 | 33.04 | -0.09 | -1.31 | 34.13 | 0.33 | 0.00 | 35.44 | 54.5 |
| 2 | 10185 | 10185:WVGD5 | Origin | 70.00  | 31.81 | 0.20 | -0.69 | 1398.81 | -13.57 | 0.0 | -70.37 | 33.16 | -0.10 | -1.34 | 34.13 | 0.34 | 0.00 | 35.48 | 54.6 |
| 2 | 10185 | Tube 2      | End    | 75.00  | 28.20 | 0.18 | -0.58 | 1564.59 | -14.05 | 0.0 | -70.37 | 33.16 | -0.10 | -1.30 | 35.74 | 0.32 | 0.00 | 37.05 | 57.0 |
| 2 | 10185 | Tube 2      | Origin | 75.00  | 28.20 | 0.18 | -0.58 | 1564.59 | -14.05 | 0.0 | -71.88 | 33.18 | -0.10 | -1.33 | 35.74 | 0.32 | 0.00 | 37.08 | 57.0 |
| 2 | 10185 | 10185:WVGD6 | End    | 80.00  | 24.82 | 0.15 | -0.48 | 1730.47 | -14.54 | 0.0 | -71.88 | 33.18 | -0.10 | -1.29 | 37.09 | 0.31 | 0.00 | 38.39 | 59.1 |
| 2 | 10185 | 10185:WVGD6 | Origin | 80.00  | 24.82 | 0.15 | -0.48 | 1730.47 | -14.54 | 0.0 | -73.88 | 33.29 | -0.10 | -1.32 | 37.09 | 0.32 | 0.00 | 38.42 | 59.1 |
| 2 | 10185 | Tube 2      | End    | 85.00  | 21.66 | 0.13 | -0.40 | 1896.89 | -15.05 | 0.0 | -73.88 | 33.29 | -0.10 | -1.28 | 38.23 | 0.31 | 0.00 | 39.52 | 60.8 |
| 2 | 10185 | Tube 2      | Origin | 85.00  | 21.66 | 0.13 | -0.40 | 1896.89 | -15.05 | 0.0 | -75.47 | 33.30 | -0.11 | -1.31 | 38.23 | 0.31 | 0.00 | 39.54 | 60.8 |
| 2 | 10185 | 10185:WVGD7 | End    | 90.00  | 18.74 | 0.11 | -0.32 | 2063.38 | -15.59 | 0.0 | -75.47 | 33.30 | -0.11 | -1.27 | 39.17 | 0.30 | 0.00 | 40.44 | 62.2 |
| 2 | 10185 | 10185:WVGD7 | Origin | 90.00  | 18.74 | 0.11 | -0.32 | 2063.38 | -15.59 | 0.0 | -77.46 | 33.40 | -0.11 | -1.31 | 39.17 | 0.30 | 0.00 | 40.48 | 62.3 |
| 2 | 10185 | Tube 2      | End    | 94.38  | 16.36 | 0.10 | -0.27 | 2209.48 | -16.07 | 0.0 | -77.46 | 33.40 | -0.11 | -1.27 | 39.86 | 0.29 | 0.00 | 41.14 | 63.3 |
| 2 | 10185 | Tube 2      | Origin | 94.38  | 16.36 | 0.10 | -0.27 | 2209.48 | -16.07 | 0.0 | -78.93 | 33.40 | -0.12 | -1.30 | 39.86 | 0.29 | 0.00 | 41.16 | 63.3 |
| 2 | 10185 | SpliceT     | End    | 98.75  | 14.16 | 0.09 | -0.22 | 2355.61 | -16.57 | 0.0 | -78.93 | 33.40 | -0.12 | -1.27 | 40.44 | 0.28 | 0.00 | 41.71 | 64.2 |
| 2 | 10185 | SpliceT     | Origin | 98.75  | 14.16 | 0.09 | -0.22 | 2355.61 | -16.57 | 0.0 | -80.10 | 33.41 | -0.12 | -1.28 | 40.44 | 0.28 | 0.00 | 41.72 | 64.2 |
| 2 | 10185 | 10185:WVGD8 | End    | 100.00 | 13.56 | 0.08 | -0.20 | 2397.38 | -16.72 | 0.0 | -80.10 | 33.41 | -0.12 | -1.22 | 39.50 | 0.27 | 0.00 | 40.72 | 62.6 |
| 2 | 10185 | 10185:WVGD8 | Origin | 100.00 | 13.56 | 0.08 | -0.20 | 2397.38 | -16.72 | 0.0 | -82.70 | 33.54 | -0.12 | -1.26 | 39.50 | 0.27 | 0.00 | 40.76 | 62.7 |
| 2 | 10185 | SpliceB     | End    | 105.00 | 11.31 | 0.07 | -0.16 | 2565.09 | -17.32 | 0.0 | -82.70 | 33.54 | -0.12 | -1.22 | 39.96 | 0.26 | 0.00 | 41.18 | 63.4 |
| 2 | 10185 | SpliceB     | Origin | 105.00 | 11.31 | 0.07 | -0.16 | 2565.09 | -17.32 | 0.0 | -85.37 | 33.58 | -0.13 | -1.26 | 39.96 | 0.26 | 0.00 | 41.22 | 63.4 |



|   |       |              |               |      |      |       |         |        |     |         |       |       |       |       |      |      |       |      |
|---|-------|--------------|---------------|------|------|-------|---------|--------|-----|---------|-------|-------|-------|-------|------|------|-------|------|
| 2 | 10185 | 10185:WVGD9  | End 110.00    | 9.28 | 0.06 | -0.12 | 2732.96 | -17.95 | 0.0 | -85.37  | 33.58 | -0.13 | -1.23 | 40.32 | 0.25 | 0.00 | 41.55 | 63.9 |
| 2 | 10185 | 10185:WVGD9  | Origin 110.00 | 9.28 | 0.06 | -0.12 | 2732.96 | -17.95 | 0.0 | -87.72  | 33.66 | -0.13 | -1.26 | 40.32 | 0.26 | 0.00 | 41.58 | 64.0 |
| 2 | 10185 | Tube 3       | End 115.00    | 7.46 | 0.04 | -0.09 | 2901.23 | -18.60 | 0.0 | -87.72  | 33.66 | -0.13 | -1.23 | 40.59 | 0.25 | 0.00 | 41.82 | 64.3 |
| 2 | 10185 | Tube 3       | Origin 115.00 | 7.46 | 0.04 | -0.09 | 2901.23 | -18.60 | 0.0 | -89.66  | 33.66 | -0.14 | -1.25 | 40.59 | 0.25 | 0.00 | 41.84 | 64.4 |
| 2 | 10185 | 10185:WVGD10 | End 120.00    | 5.85 | 0.03 | -0.07 | 3069.51 | -19.28 | 0.0 | -89.66  | 33.66 | -0.14 | -1.22 | 40.78 | 0.24 | 0.00 | 42.00 | 64.6 |
| 2 | 10185 | 10185:WVGD10 | Origin 120.00 | 5.85 | 0.03 | -0.07 | 3069.51 | -19.28 | 0.0 | -92.10  | 33.74 | -0.14 | -1.26 | 40.78 | 0.24 | 0.00 | 42.04 | 64.7 |
| 2 | 10185 | Tube 3       | End 125.00    | 4.44 | 0.03 | -0.05 | 3238.18 | -19.98 | 0.0 | -92.10  | 33.74 | -0.14 | -1.22 | 40.91 | 0.24 | 0.00 | 42.13 | 64.8 |
| 2 | 10185 | Tube 3       | Origin 125.00 | 4.44 | 0.03 | -0.05 | 3238.18 | -19.98 | 0.0 | -94.14  | 33.74 | -0.15 | -1.25 | 40.91 | 0.24 | 0.00 | 42.16 | 64.9 |
| 2 | 10185 | 10185:WVGD11 | End 130.00    | 3.24 | 0.02 | -0.03 | 3406.87 | -20.71 | 0.0 | -94.14  | 33.74 | -0.15 | -1.22 | 40.98 | 0.23 | 0.00 | 42.20 | 64.9 |
| 2 | 10185 | 10185:WVGD11 | Origin 130.00 | 3.24 | 0.02 | -0.03 | 3406.87 | -20.71 | 0.0 | -96.67  | 33.81 | -0.15 | -1.25 | 40.98 | 0.23 | 0.00 | 42.23 | 65.0 |
| 2 | 10185 | Tube 3       | End 135.00    | 2.23 | 0.01 | -0.02 | 3575.93 | -21.47 | 0.0 | -96.67  | 33.81 | -0.15 | -1.22 | 41.00 | 0.23 | 0.00 | 42.22 | 65.0 |
| 2 | 10185 | Tube 3       | Origin 135.00 | 2.23 | 0.01 | -0.02 | 3575.93 | -21.47 | 0.0 | -98.79  | 33.82 | -0.16 | -1.25 | 41.00 | 0.23 | 0.00 | 42.25 | 65.0 |
| 2 | 10185 | 10185:WVGD12 | End 140.00    | 1.42 | 0.01 | -0.02 | 3745.02 | -22.26 | 0.0 | -98.79  | 33.82 | -0.16 | -1.22 | 40.97 | 0.22 | 0.00 | 42.19 | 64.9 |
| 2 | 10185 | 10185:WVGD12 | Origin 140.00 | 1.42 | 0.01 | -0.02 | 3745.02 | -22.26 | 0.0 | -101.42 | 33.89 | -0.16 | -1.26 | 40.97 | 0.22 | 0.00 | 42.23 | 65.0 |
| 2 | 10185 | Tube 3       | End 145.00    | 0.79 | 0.00 | -0.01 | 3914.48 | -23.08 | 0.0 | -101.42 | 33.89 | -0.16 | -1.23 | 40.91 | 0.22 | 0.00 | 42.14 | 64.8 |
| 2 | 10185 | Tube 3       | Origin 145.00 | 0.79 | 0.00 | -0.01 | 3914.48 | -23.08 | 0.0 | -103.63 | 33.90 | -0.17 | -1.25 | 40.91 | 0.22 | 0.00 | 42.16 | 64.9 |
| 2 | 10185 | 10185:WVGD13 | End 150.00    | 0.35 | 0.00 | -0.01 | 4083.96 | -23.93 | 0.0 | -103.63 | 33.90 | -0.17 | -1.23 | 40.81 | 0.21 | 0.00 | 42.04 | 64.7 |
| 2 | 10185 | 10185:WVGD13 | Origin 150.00 | 0.35 | 0.00 | -0.01 | 4083.96 | -23.93 | 0.0 | -106.35 | 33.97 | -0.18 | -1.26 | 40.81 | 0.21 | 0.00 | 42.07 | 64.7 |
| 2 | 10185 | Tube 3       | End 155.00    | 0.09 | 0.00 | -0.00 | 4253.82 | -24.81 | 0.0 | -106.35 | 33.97 | -0.18 | -1.23 | 40.69 | 0.21 | 0.00 | 41.92 | 65.0 |
| 2 | 10185 | Tube 3       | Origin 155.00 | 0.09 | 0.00 | -0.00 | 4253.82 | -24.81 | 0.0 | -108.65 | 33.98 | -0.18 | -1.26 | 40.69 | 0.21 | 0.00 | 41.95 | 65.0 |
| 2 | 10185 | 10185:g      | End 160.00    | 0.00 | 0.00 | 0.00  | 4423.71 | -25.72 | 0.0 | -108.65 | 33.98 | -0.18 | -1.23 | 40.54 | 0.20 | 0.00 | 41.78 | 65.5 |

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

| 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. At Usage Pt. % |
|---------------|-------------|----------------|-----------------|-------------------|------------------|------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|-----------|-----------|-----------|-----------|------------|---------------------|
| Davit1        | Davit1:0    | Origin         | 0.00            | 102.62            | 0.85             | -4.86            | -12.36            | -0.01             | -0.0              | 1.06               | 1.30               | 0.00               | 0.16      | 8.74      | 0.00      | 0.00      | 8.90       | 13.7                |
| Davit1        | #Davit1:0   | End            | 5.00            | 103.04            | 0.86             | -10.93           | -5.87             | -0.01             | -0.0              | 1.06               | 1.30               | 0.00               | 0.20      | 6.89      | 0.00      | 0.00      | 7.09       | 10.9                |
| Davit1        | #Davit1:0   | Origin         | 5.00            | 103.04            | 0.86             | -10.93           | -5.87             | -0.01             | -0.0              | 1.06               | 1.19               | 0.00               | 0.20      | 6.89      | 0.00      | 0.00      | 7.09       | 10.9                |
| Davit1        | #Davit1:1   | End            | 7.54            | 103.25            | 0.86             | -14.07           | -2.86             | -0.00             | -0.0              | 1.06               | 1.19               | 0.00               | 0.23      | 4.60      | 0.00      | 0.00      | 4.84       | 7.4                 |
| Davit1        | #Davit1:1   | Origin         | 7.54            | 103.25            | 0.86             | -14.07           | -2.86             | -0.00             | 0.0               | 1.07               | 1.13               | 0.00               | 0.23      | 4.60      | 0.00      | 0.00      | 4.84       | 7.4                 |
| Davit1        | Davit1:V    | End            | 10.07           | 103.46            | 0.86             | -17.24           | 0.00              | 0.00              | 0.0               | 1.07               | 1.13               | 0.00               | 0.28      | 0.00      | 0.64      | 0.00      | 1.14       | 1.8                 |
| Davit2        | Davit2:0    | Origin         | 0.00            | 102.72            | 0.85             | -2.75            | -9.53             | 0.01              | 0.0               | -1.33              | 1.01               | -0.00              | -0.20     | 6.74      | 0.00      | 0.00      | 6.93       | 10.7                |
| Davit2        | #Davit2:0   | End            | 5.00            | 103.72            | 0.87             | 3.07             | -4.47             | 0.01              | 0.0               | -1.33              | 1.01               | -0.00              | -0.25     | 5.24      | 0.00      | 0.00      | 5.50       | 8.5                 |

|                  |        |       |        |      |        |         |       |      |       |      |       |       |       |      |      |       |      |   |
|------------------|--------|-------|--------|------|--------|---------|-------|------|-------|------|-------|-------|-------|------|------|-------|------|---|
| Davit2 #Davit2:0 | Origin | 5.00  | 103.72 | 0.87 | 3.07   | -4.47   | 0.01  | 0.0  | -1.31 | 0.91 | -0.00 | -0.25 | 5.24  | 0.00 | 0.00 | 5.49  | 8.4  | 1 |
| Davit2 #Davit2:1 | End    | 7.54  | 104.21 | 0.87 | 5.98   | -2.16   | 0.00  | 0.0  | -1.31 | 0.91 | -0.00 | -0.29 | 3.48  | 0.00 | 0.00 | 3.77  | 5.8  | 1 |
| Davit2 #Davit2:1 | Origin | 7.54  | 104.21 | 0.87 | 5.98   | -2.16   | 0.00  | 0.0  | -1.30 | 0.85 | -0.00 | -0.29 | 3.48  | 0.00 | 0.00 | 3.77  | 5.8  | 1 |
| Davit2 Davit2:V  | End    | 10.07 | 104.70 | 0.88 | 8.86   | -0.00   | 0.00  | 0.0  | -1.30 | 0.85 | -0.00 | -0.34 | 0.00  | 0.48 | 0.00 | 0.90  | 1.4  | 3 |
| Davit3 #Davit3:0 | Origin | 0.00  | 87.53  | 0.70 | -4.25  | -109.87 | -0.11 | -0.0 | 3.41  | 7.68 | 0.01  | 0.23  | 19.83 | 0.00 | 0.00 | 20.06 | 30.9 | 1 |
| Davit3 #Davit3:0 | End    | 5.00  | 88.04  | 0.70 | -10.27 | -71.47  | -0.07 | -0.0 | 3.41  | 7.68 | 0.01  | 0.27  | 18.99 | 0.00 | 0.00 | 19.26 | 29.6 | 1 |
| Davit3 #Davit3:1 | Origin | 5.00  | 88.04  | 0.70 | -10.27 | -71.47  | -0.07 | -0.0 | 3.45  | 7.35 | 0.01  | 0.28  | 18.99 | 0.00 | 0.00 | 19.27 | 29.6 | 1 |
| Davit3 #Davit3:1 | End    | 9.95  | 88.56  | 0.71 | -16.51 | -35.08  | -0.03 | -0.0 | 3.45  | 7.35 | 0.01  | 0.35  | 14.98 | 0.00 | 0.00 | 15.33 | 23.6 | 1 |
| Davit3 Davit3:V  | Origin | 9.95  | 88.56  | 0.71 | -16.51 | -35.08  | -0.03 | -0.0 | 3.49  | 7.08 | 0.01  | 0.35  | 14.98 | 0.00 | 0.00 | 15.33 | 23.6 | 1 |
| Davit3 Davit3:V  | End    | 14.90 | 89.08  | 0.71 | -23.00 | -0.00   | 0.00  | 0.0  | 3.49  | 7.08 | 0.01  | 0.48  | 0.00  | 2.03 | 0.00 | 3.54  | 5.4  | 3 |
| Davit4 #Davit4:0 | Origin | 0.00  | 87.65  | 0.70 | -1.86  | -93.15  | 0.11  | 0.0  | -5.30 | 6.51 | -0.01 | -0.35 | 16.81 | 0.00 | 0.00 | 17.17 | 26.4 | 1 |
| Davit4 #Davit4:0 | End    | 5.00  | 88.70  | 0.71 | 3.82   | -60.59  | 0.07  | 0.0  | -5.30 | 6.51 | -0.01 | -0.42 | 16.10 | 0.00 | 0.00 | 16.52 | 25.4 | 1 |
| Davit4 #Davit4:1 | Origin | 5.00  | 88.70  | 0.71 | 3.82   | -60.59  | 0.07  | 0.0  | -5.20 | 6.23 | -0.01 | -0.42 | 16.10 | 0.00 | 0.00 | 16.52 | 25.4 | 1 |
| Davit4 #Davit4:1 | End    | 9.95  | 89.69  | 0.73 | 9.23   | -29.75  | 0.03  | 0.0  | -5.20 | 6.23 | -0.01 | -0.53 | 12.70 | 0.00 | 0.00 | 13.23 | 20.4 | 1 |
| Davit4 Davit4:V  | Origin | 9.95  | 89.69  | 0.73 | 9.23   | -29.75  | 0.03  | 0.0  | -5.12 | 6.01 | -0.01 | -0.52 | 12.70 | 0.00 | 0.00 | 13.22 | 20.3 | 1 |
| Davit4 Davit4:V  | End    | 14.90 | 90.63  | 0.74 | 14.42  | -0.00   | 0.00  | 0.0  | -5.12 | 6.01 | -0.01 | -0.71 | 0.00  | 1.72 | 0.00 | 3.06  | 4.7  | 3 |
| Davit5 #Davit5:0 | Origin | 0.00  | 62.82  | 0.44 | -3.19  | -110.42 | -0.09 | -0.0 | 3.33  | 7.72 | 0.01  | 0.22  | 19.93 | 0.00 | 0.00 | 20.15 | 31.0 | 1 |
| Davit5 #Davit5:0 | End    | 5.00  | 63.30  | 0.45 | -8.56  | -71.83  | -0.06 | -0.0 | 3.33  | 7.72 | 0.01  | 0.27  | 19.09 | 0.00 | 0.00 | 19.35 | 29.8 | 1 |
| Davit5 #Davit5:1 | Origin | 5.00  | 63.30  | 0.45 | -8.56  | -71.83  | -0.06 | -0.0 | 3.37  | 7.38 | 0.01  | 0.27  | 19.09 | 0.00 | 0.00 | 19.36 | 29.8 | 1 |
| Davit5 #Davit5:1 | End    | 9.95  | 63.79  | 0.45 | -14.17 | -35.26  | -0.03 | -0.0 | 3.37  | 7.38 | 0.01  | 0.34  | 15.06 | 0.00 | 0.00 | 15.40 | 23.7 | 1 |
| Davit5 Davit5:V  | Origin | 9.95  | 63.79  | 0.45 | -14.17 | -35.26  | -0.03 | -0.0 | 3.41  | 7.12 | 0.01  | 0.35  | 15.06 | 0.00 | 0.00 | 15.41 | 23.7 | 1 |
| Davit5 Davit5:V  | End    | 14.90 | 64.29  | 0.45 | -20.03 | -0.00   | 0.00  | 0.0  | 3.41  | 7.12 | 0.01  | 0.47  | 0.00  | 2.04 | 0.00 | 3.56  | 5.5  | 3 |
| Davit6 #Davit6:0 | Origin | 0.00  | 62.93  | 0.45 | -0.58  | -93.99  | 0.09  | 0.0  | -5.23 | 6.57 | -0.01 | -0.35 | 16.97 | 0.00 | 0.00 | 17.31 | 26.6 | 1 |
| Davit6 #Davit6:0 | End    | 5.00  | 63.84  | 0.46 | 4.47   | -61.14  | 0.06  | 0.0  | -5.23 | 6.57 | -0.01 | -0.42 | 16.25 | 0.00 | 0.00 | 16.67 | 25.6 | 1 |
| Davit6 #Davit6:1 | Origin | 5.00  | 63.84  | 0.46 | 4.47   | -61.14  | 0.06  | 0.0  | -5.13 | 6.28 | -0.01 | -0.41 | 16.25 | 0.00 | 0.00 | 16.66 | 25.6 | 1 |
| Davit6 #Davit6:1 | End    | 9.95  | 64.69  | 0.47 | 9.25   | -30.02  | 0.03  | 0.0  | -5.13 | 6.28 | -0.01 | -0.52 | 12.82 | 0.00 | 0.00 | 13.34 | 20.5 | 1 |
| Davit6 Davit6:V  | Origin | 9.95  | 64.69  | 0.47 | 9.25   | -30.02  | 0.03  | 0.0  | -5.06 | 6.06 | -0.01 | -0.51 | 12.82 | 0.00 | 0.00 | 13.33 | 20.5 | 1 |
| Davit6 Davit6:V  | End    | 14.90 | 65.49  | 0.48 | 13.81  | -0.00   | 0.00  | 0.0  | -5.06 | 6.06 | -0.01 | -0.70 | 0.00  | 1.73 | 0.00 | 3.08  | 4.7  | 3 |
| Davit7 #Davit7:0 | Origin | 0.00  | 41.87  | 0.27 | -2.26  | -111.23 | -0.06 | -0.0 | 3.20  | 7.77 | 0.00  | 0.21  | 20.08 | 0.00 | 0.00 | 20.29 | 31.2 | 1 |
| Davit7 #Davit7:0 | End    | 5.00  | 42.30  | 0.27 | -6.65  | -72.38  | -0.04 | -0.0 | 3.20  | 7.77 | 0.00  | 0.26  | 19.23 | 0.00 | 0.00 | 19.49 | 30.0 | 1 |
| Davit7 #Davit7:1 | Origin | 5.00  | 42.30  | 0.27 | -6.65  | -72.38  | -0.04 | -0.0 | 3.25  | 7.44 | 0.00  | 0.26  | 19.23 | 0.00 | 0.00 | 19.49 | 30.0 | 1 |
| Davit7 #Davit7:1 | End    | 9.95  | 42.75  | 0.28 | -11.28 | -35.54  | -0.02 | -0.0 | 3.25  | 7.44 | 0.00  | 0.33  | 15.18 | 0.00 | 0.00 | 15.51 | 23.9 | 1 |
| Davit7 Davit7:V  | Origin | 9.95  | 42.75  | 0.28 | -11.28 | -35.54  | -0.02 | -0.0 | 3.30  | 7.18 | 0.00  | 0.33  | 15.18 | 0.00 | 0.00 | 15.51 | 23.9 | 1 |
| Davit7 Davit7:V  | End    | 14.90 | 43.20  | 0.28 | -16.16 | -0.00   | 0.00  | 0.0  | 3.30  | 7.18 | 0.00  | 0.45  | 0.00  | 2.05 | 0.00 | 3.58  | 5.5  | 3 |
| Davit8 #Davit8:0 | Origin | 0.00  | 41.96  | 0.27 | 0.19   | -95.26  | 0.06  | 0.0  | -5.12 | 6.66 | -0.00 | -0.34 | 17.20 | 0.00 | 0.00 | 17.53 | 27.0 | 1 |
| Davit8 #Davit8:0 | End    | 5.00  | 42.66  | 0.28 | 4.28   | -61.98  | 0.04  | 0.0  | -5.12 | 6.66 | -0.00 | -0.41 | 16.47 | 0.00 | 0.00 | 16.88 | 26.0 | 1 |
| Davit8 #Davit8:1 | Origin | 5.00  | 42.66  | 0.28 | 4.28   | -61.98  | 0.04  | 0.0  | -5.03 | 6.37 | -0.00 | -0.40 | 16.47 | 0.00 | 0.00 | 16.87 | 26.0 | 1 |
| Davit8 #Davit8:1 | End    | 9.95  | 43.30  | 0.29 | 8.09   | -30.44  | 0.02  | 0.0  | -5.03 | 6.37 | -0.00 | -0.51 | 13.00 | 0.00 | 0.00 | 13.51 | 20.8 | 1 |
| Davit8 Davit8:V  | Origin | 9.95  | 43.30  | 0.29 | 8.09   | -30.44  | 0.02  | 0.0  | -4.96 | 6.15 | -0.00 | -0.50 | 13.00 | 0.00 | 0.00 | 13.50 | 20.8 | 1 |
| Davit8 Davit8:V  | End    | 14.90 | 43.90  | 0.29 | 11.68  | -0.00   | 0.00  | 0.0  | -4.96 | 6.15 | -0.00 | -0.68 | 0.00  | 1.76 | 0.00 | 3.12  | 4.8  | 3 |

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

| Clamp Force Label | Input Holding Capacity (kips) | Factored Holding Capacity (kips) | Usage % |
|-------------------|-------------------------------|----------------------------------|---------|
| Clamp1 1.532      | 80.00                         | 80.00                            | 1.92    |
| Clamp2 1.532      | 80.00                         | 80.00                            | 1.92    |
| Clamp3 7.801      | 80.00                         | 80.00                            | 9.75    |
| Clamp4 7.801      | 80.00                         | 80.00                            | 9.75    |

|         |       |       |       |       |
|---------|-------|-------|-------|-------|
| Clamp5  | 7.801 | 80.00 | 80.00 | 9.75  |
| Clamp6  | 7.801 | 80.00 | 80.00 | 9.75  |
| Clamp7  | 7.801 | 80.00 | 80.00 | 9.75  |
| Clamp8  | 7.801 | 80.00 | 80.00 | 9.75  |
| Clamp9  | 3.259 | 80.00 | 80.00 | 4.07  |
| Clamp10 | 9.807 | 80.00 | 80.00 | 12.26 |
| Clamp11 | 7.365 | 80.00 | 80.00 | 9.21  |
| Clamp12 | 9.807 | 80.00 | 80.00 | 12.26 |
| Clamp13 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp14 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp15 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp16 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp17 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp18 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp19 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp20 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp21 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp22 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp23 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp24 | 0.465 | 80.00 | 80.00 | 0.58  |
| Clamp25 | 0.465 | 80.00 | 80.00 | 0.58  |

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

| 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) |
|---------------|--------------|--------------|--------------|-------------|-------------|-------------|------------|------------|------------|
| 10185:g       | 0            | 0            | 0            | 0.0000      | 0.0000      | 0.0000      | 0          | 0          | 0          |
| 10185:t       | 0.1683       | 12.12        | -0.6266      | -8.1746     | 0.1496      | -0.0063     | 0.1683     | 12.12      | 159.4      |
| 10185:Arm1    | 0.1664       | 12.02        | -0.6195      | -8.1746     | 0.1496      | -0.0063     | 0.1664     | 12.02      | 158.7      |
| 10185:TpConn  | 0.1604       | 11.7         | -0.5961      | -8.1726     | 0.1496      | -0.0063     | 0.1604     | 11.7       | 156.4      |
| 10185:Arm2    | 0.1331       | 10.23        | -0.4919      | -8.0416     | 0.1495      | -0.0066     | 0.1331     | 10.23      | 146.1      |
| 10185:BotCont | 0.1039       | 8.709        | -0.3873      | -7.6193     | 0.1492      | -0.0077     | 0.1039     | 8.709      | 135.1      |
| 10185:BotCon  | 0.1026       | 8.643        | -0.3829      | -7.5951     | 0.1487      | -0.0077     | 0.1026     | 8.643      | 134.6      |
| 10185:BotConB | 0.1012       | 8.577        | -0.3785      | -7.5705     | 0.1473      | -0.0076     | 0.1012     | 8.577      | 134.1      |
| 10185:WVGd1   | 0.0902       | 7.992        | -0.3403      | -7.3403     | 0.1315      | -0.0061     | 0.0902     | 7.992      | 129.7      |
| 10185:Arm3    | 0.0786       | 7.319        | -0.2978      | -7.0481     | 0.1148      | -0.0046     | 0.0786     | 7.319      | 124.3      |
| 10185:WVGd2   | 0.06981      | 6.762        | -0.2641      | -6.7699     | 0.1020      | -0.0036     | 0.06981    | 6.762      | 119.7      |
| 10185:WVGd3   | 0.05404      | 5.638        | -0.2005      | -6.1075     | 0.0787      | -0.0020     | 0.05404    | 5.638      | 109.8      |
| 10185:Arm4    | 0.04469      | 4.881        | -0.1634      | -5.6756     | 0.0667      | -0.0014     | 0.04469    | 4.881      | 102.5      |
| 10185:WVGd4   | 0.04171      | 4.624        | -0.1488      | -5.5287     | 0.0632      | -0.0012     | 0.04171    | 4.624      | 99.85      |
| 10185:WVGd5   | 0.03172      | 3.71         | -0.1066      | -4.9466     | 0.0514      | -0.0007     | 0.03172    | 3.71       | 89.89      |
| 10185:WVGd6   | 0.02363      | 2.898        | -0.07344     | -4.3464     | 0.0415      | -0.0004     | 0.02363    | 2.898      | 79.93      |
| 10185:WVGd7   | 0.01712      | 2.192        | -0.04822     | -3.7442     | 0.0332      | -0.0002     | 0.01712    | 2.192      | 69.95      |
| 10185:WVGd8   | 0.01194      | 1.59         | -0.02985     | -3.1500     | 0.0262      | -0.0001     | 0.01194    | 1.59       | 59.97      |
| 10185:WVGd9   | 0.007899     | 1.09         | -0.0171      | -2.5748     | 0.0202      | -0.0000     | 0.007899   | 1.09       | 49.98      |
| 10185:WVGd10  | 0.004829     | 0.6884       | -0.008815    | -2.0184     | 0.0150      | -0.0000     | 0.004829   | 0.6884     | 39.99      |
| 10185:WVGd11  | 0.002601     | 0.3824       | -0.003897    | -1.4825     | 0.0105      | -0.0000     | 0.002601   | 0.3824     | 30         |
| 10185:WVGd12  | 0.00111      | 0.168        | -0.001364    | -0.9675     | 0.0066      | -0.0000     | 0.00111    | 0.168      | 20         |
| 10185:WVGd13  | 0.0002678    | 0.0418       | -0.0003283   | -0.4735     | 0.0031      | -0.0000     | 0.0002678  | 0.0418     | 10         |
| Davit1:O      | 0.1662       | 12.01        | -0.745       | -8.1746     | 0.1496      | -0.0063     | 0.1662     | 12.9       | 158.6      |
| Davit1:V      | 0.1667       | 12.08        | -2.186       | -8.2400     | 0.1496      | -0.0063     | 0.1667     | 22.97      | 158.3      |
| Davit2:O      | 0.1667       | 12.03        | -0.4941      | -8.1746     | 0.1496      | -0.0063     | 0.1667     | 11.15      | 158.8      |
| Davit2:V      | 0.1725       | 12.3         | 0.9131       | -8.1518     | 0.1496      | -0.0062     | 0.1725     | 1.422      | 161.4      |
| Davit3:O      | 0.1329       | 10.22        | -0.6335      | -8.0416     | 0.1495      | -0.0066     | 0.1329     | 11.23      | 146        |
| Davit3:V      | 0.1343       | 10.35        | -2.757       | -8.3021     | 0.1496      | -0.0066     | 0.1343     | 26.14      | 145.9      |
| Davit4:O      | 0.1334       | 10.24        | -0.3502      | -8.0416     | 0.1495      | -0.0066     | 0.1334     | 9.227      | 146.3      |
| Davit4:V      | 0.1424       | 10.66        | 1.678        | -7.9138     | 0.1497      | -0.0064     | 0.1424     | -5.122     | 150.3      |
| Davit5:O      | 0.07839      | 7.309        | -0.4499      | -7.0481     | 0.1148      | -0.0046     | 0.07839    | 8.548      | 124.2      |
| Davit5:V      | 0.07988      | 7.444        | -2.316       | -7.3166     | 0.1148      | -0.0046     | 0.07988    | 23.45      | 124.3      |
| Davit6:O      | 0.0788       | 7.328        | -0.1458      | -7.0481     | 0.1148      | -0.0046     | 0.0788     | 6.089      | 124.5      |
| Davit6:V      | 0.08528      | 7.68         | 1.632        | -6.9110     | 0.1149      | -0.0044     | 0.08528    | -8.329     | 128.3      |
| Davit7:O      | 0.04456      | 4.874        | -0.3037      | -5.6756     | 0.0667      | -0.0014     | 0.04456    | 6.313      | 102.3      |
| Davit7:V      | 0.04549      | 5.001        | -1.815       | -5.9551     | 0.0667      | -0.0013     | 0.04549    | 21.21      | 102.8      |
| Davit8:O      | 0.04483      | 4.888        | -0.01905     | -5.6756     | 0.0667      | -0.0014     | 0.04483    | 3.449      | 102.6      |
| Davit8:V      | 0.04851      | 5.153        | 1.41         | -5.5259     | 0.0668      | -0.0012     | 0.04851    | -11.06     | 106        |

Joint Support Reactions for Load Case "NESC Extreme Wind":

| Joint Label   | X Force Usage (kips) | X Force Usage % (kips) | Y Force Usage (kips) | Y Force Usage % (kips) | Z Comp. Uplift Result. Force Usage (kips) | Z Comp. Uplift Result. Force Usage % (kips) | Result. Usage % |
|---------------|----------------------|------------------------|----------------------|------------------------|-------------------------------------------|---------------------------------------------|-----------------|
| 10185:g       | -0.06                | 0.0                    | -52.84               | 0.0                    | 56.69                                     | 0.0                                         | 77.49           |
| 10185:t       | 0.0                  | 0.0                    | -0.0                 | 0.0                    | 6304.95                                   | 0.0                                         | -39.9           |
| 10185:Arm1    | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:TpConn  | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:Arm2    | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:BotCont | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:BotCon  | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:BotConB | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd1   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:Arm3    | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd2   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd3   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:Arm4    | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd4   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd5   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd6   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd7   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd8   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd9   | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd10  | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd11  | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd12  | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| 10185:WVGd13  | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit1:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit1:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit2:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit2:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit3:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit3:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit4:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit4:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit5:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit5:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit6:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit6:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit7:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit7:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit8:O      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |
| Davit8:V      | 0.0                  | 0.0                    | -0.0                 | 0.0                    | -0.03                                     | 0.0                                         | 0.0             |

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



| 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) | Trans. Shear (kips) | Long. Shear (kips) | P/A (ksi) | M/S (ksi) | V/Q (ksi) | T/R (ksi) | Res. (ksi) | Max. Usage Pt. % |
|---------------|----------------|----------------|-----------------|-------------------|------------------|------------------|-------------------------------|------------------------------|-------------------|--------------------|---------------------|--------------------|-----------|-----------|-----------|-----------|------------|------------------|
| 10185         | 10185:t        | Origin         | 0.00            | 145.48            | 2.02             | -7.52            | -0.00                         | -0.00                        | -0.0              | -0.02              | 0.02                | -0.00              | -0.00     | 0.00      | 0.00      | 0.00      | 0.00       | 0.0              |
| 10185         | 10185:Arm1     | End            | 0.70            | 144.29            | 2.00             | -7.43            | 0.01                          | -0.00                        | -0.0              | -0.02              | 0.02                | -0.00              | -0.00     | 0.00      | 0.00      | 0.00      | 0.00       | 0.0              |
| 10185         | 10185:Arm1     | Origin         | 0.70            | 144.29            | 2.00             | -7.43            | 1.82                          | -0.00                        | 0.0               | -0.74              | 1.57                | -0.00              | -0.04     | 0.05      | 0.15      | 0.00      | 0.27       | 0.4              |
| 10185         | 10185:TpConn   | End            | 3.00            | 140.36            | 1.92             | -7.15            | 5.44                          | -0.01                        | 0.0               | -0.74              | 1.57                | -0.00              | -0.03     | 0.56      | 0.04      | 0.00      | 0.60       | 0.9              |
| 10185         | 10185:TpConn   | Origin         | 3.00            | 140.36            | 1.92             | -7.15            | 5.44                          | -0.01                        | 0.0               | 0.50               | 12.30               | -0.00              | 0.02      | 0.00      | 1.16      | 0.00      | 2.01       | 3.1              |
| 10185         | Tube 1         | End            | 8.00            | 131.84            | 1.77             | -6.55            | 66.92                         | -0.03                        | 0.0               | 0.50               | 12.30               | -0.00              | 0.02      | 6.16      | 0.29      | 0.00      | 6.20       | 9.5              |
| 10185         | Tube 1         | Origin         | 8.00            | 131.84            | 1.77             | -6.55            | 66.92                         | -0.03                        | 0.0               | 0.19               | 12.53               | -0.00              | 0.01      | 6.16      | 0.29      | 0.00      | 6.19       | 9.5              |
| 10185         | Tube 1         | End            | 10.69           | 127.29            | 1.68             | -6.22            | 100.60                        | -0.04                        | 0.0               | 0.19               | 12.53               | -0.00              | 0.01      | 8.74      | 0.28      | 0.00      | 8.76       | 13.5             |
| 10185         | Tube 1         | Origin         | 10.69           | 127.29            | 1.68             | -6.22            | 100.60                        | -0.04                        | 0.0               | -0.03              | 12.70               | -0.01              | -0.00     | 8.74      | 0.29      | 0.00      | 8.76       | 13.5             |
| 10185         | 10185:Arm2     | End            | 13.38           | 122.76            | 1.60             | -5.90            | 134.75                        | -0.05                        | 0.0               | -0.03              | 12.70               | -0.01              | -0.00     | 11.07     | 0.28      | 0.00      | 11.08      | 17.0             |
| 10185         | 10185:Arm2     | Origin         | 13.38           | 122.76            | 1.60             | -5.90            | 134.75                        | -0.05                        | 0.0               | -0.03              | 12.70               | -0.01              | -0.00     | 11.07     | 0.28      | 0.00      | 11.08      | 17.0             |
| 10185         | Tube 1         | End            | 18.38           | 114.44            | 1.44             | -5.32            | 271.36                        | -0.20                        | 0.0               | -5.18              | 23.23               | -0.02              | -0.21     | 12.74     | 0.51      | 0.00      | 12.99      | 20.0             |
| 10185         | Tube 1         | Origin         | 18.38           | 114.44            | 1.44             | -5.32            | 271.36                        | -0.20                        | 0.0               | -5.18              | 23.23               | -0.02              | -0.20     | 20.15     | 0.49      | 0.00      | 20.37      | 31.3             |
| 10185         | Tube 1         | End            | 21.44           | 109.43            | 1.34             | -4.98            | 343.31                        | -0.27                        | 0.0               | -5.58              | 23.50               | -0.03              | -0.21     | 24.02     | 0.48      | 0.00      | 20.38      | 31.4             |
| 10185         | Tube 1         | Origin         | 21.44           | 109.43            | 1.34             | -4.98            | 343.31                        | -0.27                        | 0.0               | -5.58              | 23.50               | -0.03              | -0.21     | 24.02     | 0.48      | 0.00      | 20.38      | 31.4             |
| 10185         | 10185:BotConn  | End            | 24.50           | 104.51            | 1.25             | -4.65            | 415.89                        | -0.35                        | 0.0               | -5.90              | 23.70               | -0.03              | -0.23     | 24.02     | 0.48      | 0.00      | 24.26      | 37.3             |
| 10185         | 10185:BotConn  | Origin         | 24.50           | 104.51            | 1.25             | -4.65            | 415.89                        | -0.35                        | 0.0               | -5.90              | 23.70               | -0.03              | -0.23     | 24.02     | 0.48      | 0.00      | 24.26      | 37.3             |
| 10185         | 10185:BotConn  | End            | 25.00           | 103.71            | 1.23             | -4.59            | 427.80                        | -0.35                        | 0.0               | -6.01              | 23.81               | -0.03              | -0.22     | 27.46     | 0.47      | 0.00      | 27.70      | 42.6             |
| 10185         | 10185:BotConn  | Origin         | 25.00           | 103.71            | 1.23             | -4.59            | 427.80                        | -0.35                        | 0.0               | -6.01              | 23.81               | -0.03              | -0.22     | 27.46     | 0.47      | 0.00      | 27.70      | 42.6             |
| 10185         | 10185:BotConnB | End            | 25.50           | 102.92            | 1.21             | -4.54            | 437.88                        | -0.33                        | 0.0               | -9.88              | 20.17               | -0.04              | -0.37     | 33.88     | 0.38      | 0.00      | 28.82      | 44.3             |
| 10185         | 10185:BotConnB | Origin         | 25.50           | 102.92            | 1.21             | -4.54            | 437.88                        | -0.33                        | 0.0               | -9.88              | 20.17               | -0.04              | -0.37     | 33.88     | 0.38      | 0.00      | 28.82      | 44.3             |
| 10185         | 10185:WVGD1    | End            | 30.00           | 95.91             | 1.08             | -4.08            | 529.41                        | -0.33                        | 0.0               | -10.25             | 20.34               | -0.04              | -0.38     | 28.96     | 0.40      | 0.00      | 29.35      | 45.1             |
| 10185         | 10185:WVGD1    | Origin         | 30.00           | 95.91             | 1.08             | -4.08            | 529.41                        | -0.33                        | 0.0               | -10.25             | 20.34               | -0.04              | -0.38     | 28.96     | 0.40      | 0.00      | 29.35      | 45.1             |
| 10185         | Tube 1         | End            | 32.69           | 91.82             | 1.01             | -3.82            | 585.17                        | -0.33                        | 0.0               | -10.76             | 20.75               | -0.04              | -0.37     | 33.88     | 0.38      | 0.00      | 32.56      | 50.1             |
| 10185         | Tube 1         | Origin         | 32.69           | 91.82             | 1.01             | -3.82            | 585.17                        | -0.33                        | 0.0               | -10.76             | 20.75               | -0.04              | -0.37     | 33.88     | 0.38      | 0.00      | 32.56      | 50.1             |
| 10185         | 10185:Arm3     | End            | 35.38           | 87.82             | 0.94             | -3.57            | 641.42                        | -0.33                        | 0.0               | -11.08             | 20.93               | -0.04              | -0.37     | 35.43     | 0.37      | 0.00      | 35.81      | 55.1             |
| 10185         | 10185:Arm3     | Origin         | 35.38           | 87.82             | 0.94             | -3.57            | 641.42                        | -0.33                        | 0.0               | -11.08             | 20.93               | -0.04              | -0.37     | 35.43     | 0.37      | 0.00      | 35.81      | 55.1             |
| 10185         | 10185:WVGD2    | End            | 40.00           | 81.14             | 0.84             | -3.17            | 806.71                        | -0.33                        | 0.0               | -16.53             | 31.36               | -0.05              | -0.56     | 36.53     | 0.56      | 0.00      | 37.10      | 57.1             |
| 10185         | 10185:WVGD2    | Origin         | 40.00           | 81.14             | 0.84             | -3.17            | 806.71                        | -0.33                        | 0.0               | -16.53             | 31.36               | -0.05              | -0.56     | 36.53     | 0.56      | 0.00      | 37.10      | 57.1             |
| 10185         | Tube 1         | End            | 45.00           | 74.22             | 0.74             | -2.77            | 965.90                        | -0.34                        | 0.0               | -17.30             | 31.84               | -0.04              | -0.54     | 41.16     | 0.54      | 0.00      | 41.71      | 64.2             |
| 10185         | Tube 1         | Origin         | 45.00           | 74.22             | 0.74             | -2.77            | 965.90                        | -0.34                        | 0.0               | -17.30             | 31.84               | -0.04              | -0.54     | 41.16     | 0.54      | 0.00      | 41.71      | 64.2             |
| 10185         | 10185:WVGD3    | End            | 50.00           | 67.65             | 0.65             | -2.41            | 1126.69                       | -0.34                        | 0.0               | -18.02             | 32.16               | -0.04              | -0.54     | 45.43     | 0.53      | 0.00      | 46.00      | 70.8             |
| 10185         | 10185:WVGD3    | Origin         | 50.00           | 67.65             | 0.65             | -2.41            | 1126.69                       | -0.34                        | 0.0               | -18.02             | 32.16               | -0.04              | -0.54     | 45.43     | 0.53      | 0.00      | 46.00      | 70.8             |
| 10185         | SpliceT        | End            | 50.17           | 67.44             | 0.65             | -2.39            | 1132.11                       | -0.34                        | 0.0               | -18.52             | 32.49               | -0.04              | -0.56     | 49.14     | 0.52      | 0.00      | 49.59      | 76.3             |
| 10185         | SpliceT        | Origin         | 50.17           | 67.44             | 0.65             | -2.39            | 1132.11                       | -0.34                        | 0.0               | -18.52             | 32.49               | -0.04              | -0.56     | 49.14     | 0.52      | 0.00      | 49.59      | 76.3             |
| 10185         | SpliceB        | End            | 55.00           | 61.42             | 0.57             | -2.08            | 1290.16                       | -0.34                        | 0.0               | -19.27             | 32.70               | -0.04              | -0.58     | 49.14     | 0.52      | 0.00      | 49.72      | 76.5             |
| 10185         | SpliceB        | Origin         | 55.00           | 61.42             | 0.57             | -2.08            | 1290.16                       | -0.34                        | 0.0               | -19.27             | 32.70               | -0.04              | -0.58     | 49.14     | 0.52      | 0.00      | 49.72      | 76.5             |
| 10185         | 10185:Arm4     | End            | 57.38           | 58.57             | 0.54             | -1.94            | 1368.52                       | -0.34                        | 0.0               | -20.24             | 32.99               | -0.04              | -0.43     | 39.05     | 0.37      | 0.00      | 39.48      | 60.7             |
| 10185         | 10185:Arm4     | Origin         | 57.38           | 58.57             | 0.54             | -1.94            | 1368.52                       | -0.34                        | 0.0               | -20.24             | 32.99               | -0.04              | -0.43     | 39.05     | 0.37      | 0.00      | 39.48      | 60.7             |
| 10185         | 10185:WVGD4    | End            | 60.00           | 55.49             | 0.50             | -1.79            | 1501.99                       | -0.34                        | 0.0               | -25.96             | 43.24               | -0.05              | -0.53     | 42.23     | 0.47      | 0.00      | 40.41      | 63.2             |
| 10185         | 10185:WVGD4    | Origin         | 60.00           | 55.49             | 0.50             | -1.79            | 1501.99                       | -0.34                        | 0.0               | -25.96             | 43.24               | -0.05              | -0.53     | 42.23     | 0.47      | 0.00      | 40.41      | 63.2             |
| 10185         | Tube 2         | End            | 65.00           | 49.85             | 0.44             | -1.52            | 1720.38                       | -0.35                        | 0.0               | -26.87             | 43.68               | -0.05              | -0.55     | 42.22     | 0.47      | 0.00      | 42.76      | 65.8             |
| 10185         | Tube 2         | Origin         | 65.00           | 49.85             | 0.44             | -1.52            | 1720.38                       | -0.35                        | 0.0               | -26.87             | 43.68               | -0.05              | -0.55     | 42.22     | 0.47      | 0.00      | 42.76      | 65.8             |
| 10185         | 10185:WVGD5    | End            | 70.00           | 44.52             | 0.38             | -1.28            | 1940.52                       | -0.35                        | 0.0               | -27.95             | 44.03               | -0.05              | -0.55     | 45.05     | 0.46      | 0.00      | 45.59      | 70.1             |
| 10185         | 10185:WVGD5    | Origin         | 70.00           | 44.52             | 0.38             | -1.28            | 1940.52                       | -0.35                        | 0.0               | -27.95             | 44.03               | -0.05              | -0.55     | 45.05     | 0.46      | 0.00      | 45.59      | 70.1             |
| 10185         | Tube 2         | End            | 75.00           | 39.49             | 0.33             | -1.07            | 2163.27                       | -0.35                        | 0.0               | -29.18             | 44.55               | -0.05              | -0.56     | 47.45     | 0.45      | 0.00      | 48.02      | 73.9             |
| 10185         | Tube 2         | Origin         | 75.00           | 39.49             | 0.33             | -1.07            | 2163.27                       | -0.35                        | 0.0               | -29.18             | 44.55               | -0.05              | -0.56     | 47.45     | 0.45      | 0.00      | 48.02      | 73.9             |
| 10185         | 10185:WVGD6    | End            | 80.00           | 34.78             | 0.28             | -0.88            | 2387.81                       | -0.35                        | 0.0               | -30.33             | 44.91               | -0.05              | -0.54     | 51.27     | 0.43      | 0.00      | 50.09      | 77.1             |
| 10185         | 10185:WVGD6    | Origin         | 80.00           | 34.78             | 0.28             | -0.88            | 2387.81                       | -0.35                        | 0.0               | -30.33             | 44.91               | -0.05              | -0.54     | 51.27     | 0.43      | 0.00      | 50.09      | 77.1             |
| 10185         | Tube 2         | End            | 85.00           | 30.38             | 0.24             | -0.72            | 2615.00                       | -0.35                        | 0.0               | -31.63             | 45.44               | -0.05              | -0.57     | 51.27     | 0.43      | 0.00      | 51.82      | 79.7             |
| 10185         | Tube 2         | Origin         | 85.00           | 30.38             | 0.24             | -0.72            | 2615.00                       | -0.35                        | 0.0               | -31.63             | 45.44               | -0.05              | -0.57     | 51.27     | 0.43      | 0.00      | 51.82      | 79.7             |
| 10185         | 10185:WVGD7    | End            | 90.00           | 26.30             | 0.21             | -0.58            | 2844.03                       | -0.36                        | 0.0               | -32.85             | 45.81               | -0.05              | -0.57     | 52.78     | 0.42      | 0.00      | 53.34      | 82.1             |
| 10185         | 10185:WVGD7    | Origin         | 90.00           | 26.30             | 0.21             | -0.58            | 2844.03                       | -0.36                        | 0.0               | -32.85             | 45.81               | -0.05              | -0.57     | 52.78     | 0.42      | 0.00      | 53.34      | 82.1             |
| 10185         | Tube 2         | End            | 94.38           | 22.99             | 0.18             | -0.47            | 3046.68                       | -0.36                        | 0.0               | -34.13             | 46.32               | -0.05              | -0.58     | 54.06     | 0.41      | 0.00      | 54.64      | 84.1             |
| 10185         | Tube 2         | Origin         | 94.38           | 22.99             | 0.18             | -0.47            | 3046.68                       | -0.36                        | 0.0               | -34.13             | 46.32               | -0.05              | -0.58     | 54.06     | 0.41      | 0.00      | 54.64      | 84.1             |

|       |              |        |        |       |      |       |         |        |     |        |       |       |       |       |      |      |       |      |   |
|-------|--------------|--------|--------|-------|------|-------|---------|--------|-----|--------|-------|-------|-------|-------|------|------|-------|------|---|
| 10185 | Tube 2       | Origin | 94.38  | 22.99 | 0.18 | -0.47 | 3046.68 | -36.39 | 0.0 | -35.25 | 46.65 | -0.05 | -0.58 | 55.03 | 0.41 | 0.00 | 55.61 | 85.6 | 2 |
| 10185 | Splicer      | End    | 98.75  | 19.91 | 0.15 | -0.38 | 3250.78 | -36.61 | 0.0 | -35.25 | 46.65 | -0.05 | -0.57 | 55.87 | 0.40 | 0.00 | 56.44 | 86.8 | 2 |
| 10185 | Splicer      | Origin | 98.75  | 19.91 | 0.15 | -0.38 | 3250.78 | -36.60 | 0.0 | -36.11 | 46.87 | -0.05 | -0.58 | 55.87 | 0.40 | 0.00 | 56.45 | 86.8 | 2 |
| 10185 | 10185:WVGD8  | End    | 100.00 | 19.08 | 0.14 | -0.36 | 3309.37 | -36.67 | 0.0 | -36.11 | 46.87 | -0.05 | -0.55 | 54.59 | 0.38 | 0.00 | 55.14 | 84.8 | 2 |
| 10185 | 10185:WVGD8  | Origin | 100.00 | 19.08 | 0.14 | -0.36 | 3309.37 | -36.66 | 0.0 | -37.76 | 47.31 | -0.05 | -0.55 | 54.59 | 0.38 | 0.00 | 55.14 | 84.8 | 2 |
| 10185 | SplicesB     | End    | 105.00 | 15.93 | 0.12 | -0.27 | 3545.93 | -36.91 | 0.0 | -37.76 | 47.31 | -0.05 | -0.56 | 55.29 | 0.37 | 0.00 | 55.16 | 84.9 | 2 |
| 10185 | SplicesB     | Origin | 105.00 | 15.93 | 0.12 | -0.27 | 3545.93 | -36.90 | 0.0 | -39.69 | 47.72 | -0.05 | -0.59 | 55.29 | 0.37 | 0.00 | 55.85 | 85.9 | 2 |
| 10185 | 10185:WVGD9  | End    | 110.00 | 13.08 | 0.09 | -0.21 | 3784.51 | -37.16 | 0.0 | -39.69 | 47.72 | -0.05 | -0.59 | 55.88 | 0.36 | 0.00 | 56.47 | 86.9 | 2 |
| 10185 | 10185:WVGD9  | Origin | 110.00 | 13.08 | 0.09 | -0.21 | 3784.51 | -37.15 | 0.0 | -41.23 | 48.27 | -0.05 | -0.59 | 55.88 | 0.36 | 0.00 | 56.45 | 86.8 | 2 |
| 10185 | Tube 3       | End    | 115.00 | 10.52 | 0.08 | -0.15 | 4025.83 | -37.41 | 0.0 | -41.23 | 48.27 | -0.05 | -0.58 | 56.36 | 0.37 | 0.00 | 56.94 | 87.6 | 2 |
| 10185 | Tube 3       | Origin | 115.00 | 10.52 | 0.08 | -0.15 | 4025.83 | -37.40 | 0.0 | -42.68 | 48.65 | -0.05 | -0.58 | 56.36 | 0.36 | 0.00 | 56.96 | 87.6 | 2 |
| 10185 | 10185:WVGD10 | End    | 120.00 | 8.26  | 0.06 | -0.11 | 4269.10 | -37.66 | 0.0 | -42.68 | 48.65 | -0.05 | -0.58 | 56.76 | 0.35 | 0.00 | 57.34 | 88.2 | 2 |
| 10185 | 10185:WVGD10 | Origin | 120.00 | 8.26  | 0.06 | -0.11 | 4269.10 | -37.66 | 0.0 | -44.28 | 49.21 | -0.05 | -0.58 | 56.76 | 0.35 | 0.00 | 57.34 | 88.2 | 2 |
| 10185 | Tube 3       | End    | 125.00 | 6.28  | 0.04 | -0.07 | 4515.15 | -37.92 | 0.0 | -44.28 | 49.21 | -0.05 | -0.59 | 57.07 | 0.35 | 0.00 | 57.66 | 88.7 | 2 |
| 10185 | Tube 3       | Origin | 125.00 | 6.28  | 0.04 | -0.07 | 4515.15 | -37.92 | 0.0 | -45.79 | 49.61 | -0.05 | -0.61 | 57.07 | 0.35 | 0.00 | 57.66 | 88.7 | 2 |
| 10185 | 10185:WVGD11 | End    | 130.00 | 4.59  | 0.03 | -0.05 | 4763.21 | -38.18 | 0.0 | -45.79 | 49.61 | -0.05 | -0.59 | 57.32 | 0.34 | 0.00 | 57.94 | 89.1 | 2 |
| 10185 | 10185:WVGD11 | Origin | 130.00 | 4.59  | 0.03 | -0.05 | 4763.21 | -38.18 | 0.0 | -47.45 | 50.18 | -0.05 | -0.62 | 57.32 | 0.34 | 0.00 | 58.11 | 89.4 | 2 |
| 10185 | Tube 3       | End    | 135.00 | 3.17  | 0.02 | -0.03 | 5014.11 | -38.45 | 0.0 | -47.45 | 50.18 | -0.05 | -0.62 | 57.51 | 0.34 | 0.00 | 58.13 | 89.6 | 2 |
| 10185 | Tube 3       | Origin | 135.00 | 3.17  | 0.02 | -0.03 | 5014.11 | -38.45 | 0.0 | -49.02 | 50.59 | -0.06 | -0.62 | 57.51 | 0.33 | 0.00 | 58.25 | 89.6 | 2 |
| 10185 | 10185:WVGD12 | End    | 140.00 | 2.02  | 0.01 | -0.02 | 5267.07 | -38.72 | 0.0 | -49.02 | 50.59 | -0.06 | -0.61 | 57.64 | 0.33 | 0.00 | 58.27 | 89.7 | 2 |
| 10185 | 10185:WVGD12 | Origin | 140.00 | 2.02  | 0.01 | -0.02 | 5267.07 | -38.72 | 0.0 | -50.74 | 51.17 | -0.06 | -0.61 | 57.74 | 0.33 | 0.00 | 58.35 | 89.8 | 2 |
| 10185 | Tube 3       | End    | 145.00 | 1.13  | 0.01 | -0.01 | 5522.93 | -39.00 | 0.0 | -50.74 | 51.17 | -0.06 | -0.61 | 57.74 | 0.33 | 0.00 | 58.37 | 89.8 | 2 |
| 10185 | Tube 3       | Origin | 145.00 | 1.13  | 0.01 | -0.01 | 5522.93 | -39.00 | 0.0 | -52.36 | 51.60 | -0.06 | -0.63 | 57.74 | 0.32 | 0.00 | 58.41 | 89.9 | 2 |
| 10185 | 10185:WVGD13 | End    | 150.00 | 0.50  | 0.00 | -0.00 | 5780.91 | -39.29 | 0.0 | -52.36 | 51.60 | -0.06 | -0.62 | 57.79 | 0.32 | 0.00 | 58.43 | 89.9 | 2 |
| 10185 | 10185:WVGD13 | Origin | 150.00 | 0.50  | 0.00 | -0.00 | 5780.91 | -39.29 | 0.0 | -54.15 | 52.19 | -0.06 | -0.64 | 57.79 | 0.33 | 0.00 | 58.44 | 90.6 | 2 |
| 10185 | Tube 3       | End    | 155.00 | 0.13  | 0.00 | -0.00 | 6041.84 | -39.58 | 0.0 | -54.15 | 52.19 | -0.06 | -0.63 | 57.81 | 0.32 | 0.00 | 58.44 | 90.6 | 2 |
| 10185 | Tube 3       | Origin | 155.00 | 0.13  | 0.00 | -0.00 | 6041.84 | -39.58 | 0.0 | -55.83 | 52.62 | -0.06 | -0.65 | 57.81 | 0.32 | 0.00 | 58.46 | 90.6 | 2 |
| 10185 | 10185:g      | End    | 160.00 | 0.00  | 0.00 | 0.00  | 6304.95 | -39.88 | 0.0 | -55.83 | 52.62 | -0.06 | -0.63 | 57.79 | 0.31 | 0.00 | 58.43 | 91.6 | 2 |

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

| Element Label | Joint Label | Joint Position | Rel. Dist. (ft) | Trans. Defl. (in) | Long. Defl. (in) | Vert. Defl. (in) | Vert. Mom. (ft-k) | Horz. Tors. (ft-k) |              |             | Horz. Shear (kips) |                    | P/A (ksi) | M/S (ksi) | V/Q (ksi) | T/R (ksi) | Res. (ksi) | Max. Usage % | At Pt. |
|---------------|-------------|----------------|-----------------|-------------------|------------------|------------------|-------------------|--------------------|--------------|-------------|--------------------|--------------------|-----------|-----------|-----------|-----------|------------|--------------|--------|
|               |             |                |                 |                   |                  |                  |                   | Mom. (ft-k)        | Tors. (ft-k) | Mom. (kips) | Vert. Shear (kips) | Horz. Shear (kips) |           |           |           |           |            |              |        |
| Davit1        | Davit1:0    | Origin         | 0.00            | 144.18            | 1.99             | -8.94            | -3.02             | -0.01              | -0.0         | 0.69        | 0.35               | 0.00               | 0.10      | 2.14      | 0.00      | 0.00      | 2.24       | 3.4          | 1      |
| Davit1        | Davit1:0    | End            | 5.00            | 144.59            | 2.00             | -17.51           | -1.29             | -0.00              | -0.0         | 0.69        | 0.35               | 0.00               | 0.13      | 1.51      | 0.00      | 0.00      | 1.64       | 2.5          | 1      |
| Davit1        | Davit1:1    | Origin         | 5.00            | 144.59            | 2.00             | -17.51           | -1.29             | -0.00              | -0.0         | 0.69        | 0.27               | 0.00               | 0.13      | 1.51      | 0.00      | 0.00      | 1.64       | 2.5          | 1      |
| Davit1        | Davit1:1    | End            | 7.54            | 144.80            | 2.00             | -21.87           | -0.59             | -0.00              | -0.0         | 0.69        | 0.27               | 0.00               | 0.15      | 0.96      | 0.00      | 0.00      | 1.11       | 1.7          | 1      |
| Davit1        | Davit1:V    | Origin         | 7.54            | 144.80            | 2.00             | -21.87           | -0.59             | -0.00              | 0.0          | 0.69        | 0.23               | 0.00               | 0.15      | 0.96      | 0.00      | 0.00      | 1.11       | 1.7          | 1      |
| Davit1        | Davit1:V    | End            | 10.07           | 145.00            | 2.00             | -26.23           | 0.00              | 0.00               | 0.0          | 0.69        | 0.23               | 0.00               | 0.18      | 0.00      | 0.13      | 0.00      | 1.11       | 1.7          | 1      |
| Davit2        | Davit2:0    | Origin         | 0.00            | 144.39            | 2.00             | -5.93            | -1.23             | 0.01               | 0.0          | -0.75       | 0.16               | -0.00              | -0.11     | 0.87      | 0.00      | 0.00      | 0.98       | 1.5          | 1      |
| Davit2        | Davit2:0    | End            | 5.00            | 146.01            | 2.03             | 2.46             | -0.42             | 0.00               | 0.0          | -0.75       | 0.16               | -0.00              | -0.14     | 0.49      | 0.00      | 0.00      | 0.63       | 1.0          | 1      |
| Davit2        | Davit2:1    | Origin         | 5.00            | 146.01            | 2.03             | 2.46             | -0.42             | 0.00               | 0.0          | -0.73       | 0.10               | -0.00              | -0.14     | 0.49      | 0.00      | 0.00      | 0.63       | 1.0          | 1      |
| Davit2        | Davit2:1    | End            | 7.54            | 146.83            | 2.05             | 6.71             | -0.16             | 0.00               | 0.0          | -0.73       | 0.10               | -0.00              | -0.16     | 0.26      | 0.00      | 0.00      | 0.43       | 0.7          | 1      |
| Davit2        | Davit2:V    | Origin         | 7.54            | 146.83            | 2.05             | 6.71             | -0.16             | 0.00               | 0.0          | -0.72       | 0.06               | -0.00              | -0.16     | 0.26      | 0.00      | 0.00      | 0.42       | 0.7          | 1      |
| Davit2        | Davit2:V    | End            | 10.07           | 147.65            | 2.07             | 10.96            | -0.00             | 0.00               | 0.0          | -0.72       | 0.06               | -0.00              | -0.19     | 0.00      | 0.04      | 0.00      | 0.20       | 0.3          | 3      |
| Davit3        | Davit3:0    | Origin         | 0.00            | 122.64            | 1.59             | -7.60            | -41.19            | -0.10              | -0.0         | 4.77        | 2.97               | 0.01               | 0.32      | 7.44      | 0.00      | 0.00      | 7.75       | 11.9         | 1      |
| Davit3        | Davit3:0    | End            | 5.00            | 123.18            | 1.60             | -16.05           | -26.35            | -0.06              | -0.0         | 4.77        | 2.97               | 0.01               | 0.38      | 7.00      | 0.00      | 0.00      | 7.38       | 11.4         | 1      |
| Davit3        | Davit3:1    | Origin         | 5.00            | 123.18            | 1.60             | -16.05           | -26.35            | -0.06              | -0.0         | 4.77        | 2.75               | 0.01               | 0.38      | 7.00      | 0.00      | 0.00      | 7.38       | 11.4         | 1      |
| Davit3        | Davit3:1    | End            | 9.95            | 123.72            | 1.61             | -24.52           | -12.75            | -0.03              | -0.0         | 4.77        | 2.75               | 0.01               | 0.48      | 5.44      | 0.00      | 0.00      | 5.93       | 9.1          | 1      |
| Davit3        | Davit3:V    | Origin         | 9.95            | 123.72            | 1.61             | -24.52           | -12.75            | -0.03              | 0.0          | 4.77        | 2.57               | 0.01               | 0.48      | 5.44      | 0.00      | 0.00      | 5.93       | 9.1          | 1      |
| Davit3        | Davit3:V    | End            | 14.90           | 124.25            | 1.61             | -33.09           | 0.00              | 0.00               | 0.0          | 4.77        | 2.57               | 0.01               | 0.66      | 0.00      | 0.74      | 0.00      | 1.43       | 2.2          | 3      |
| Davit4        | Davit4:0    | Origin         | 0.00            | 122.88            | 1.60             | -4.20            | -20.80            | 0.10               | 0.0          | -5.38       | 1.56               | -0.01              | -0.36     | 3.75      | 0.00      | 0.00      | 4.11       | 6.3          | 1      |
| Davit4        | Davit4:0    | End            | 5.00            | 124.58            | 1.64             | 4.01             | -12.98            | 0.06               | 0.0          | -5.38       | 1.56               | -0.01              | -0.43     | 3.45      | 0.00      | 0.00      | 3.88       | 6.0          | 1      |

|                  |        |       |        |      |        |        |       |      |       |      |       |       |      |      |      |      |      |   |
|------------------|--------|-------|--------|------|--------|--------|-------|------|-------|------|-------|-------|------|------|------|------|------|---|
| Davit4 #Davit4:0 | Origin | 5.00  | 124.58 | 1.64 | 4.01   | -12.98 | 0.06  | 0.0  | -5.32 | 1.38 | -0.01 | -0.43 | 3.45 | 0.00 | 0.00 | 3.88 | 6.0  | 1 |
| Davit4 #Davit4:1 | End    | 9.95  | 126.26 | 1.67 | 12.10  | -6.13  | 0.03  | 0.0  | -5.32 | 1.38 | -0.01 | -0.54 | 2.62 | 0.00 | 0.00 | 3.16 | 4.9  | 1 |
| Davit4 #Davit4:1 | Origin | 9.95  | 126.26 | 1.67 | 12.10  | -6.13  | 0.03  | 0.0  | -5.28 | 1.24 | -0.01 | -0.54 | 2.62 | 0.00 | 0.00 | 3.16 | 4.9  | 1 |
| Davit4 Davit4:V  | End    | 14.90 | 127.92 | 1.71 | 20.14  | -0.00  | 0.00  | 0.0  | -5.28 | 1.24 | -0.01 | -0.73 | 0.00 | 0.35 | 0.00 | 0.95 | 1.5  | 3 |
| Davit5 Davit5:0  | Origin | 0.00  | 87.71  | 0.94 | -5.40  | -42.41 | -0.08 | -0.0 | 4.72  | 3.05 | 0.01  | 0.31  | 7.66 | 0.00 | 0.00 | 7.97 | 12.3 | 1 |
| Davit5 #Davit5:0 | End    | 5.00  | 88.25  | 0.95 | -12.81 | -27.16 | -0.05 | -0.0 | 4.72  | 3.05 | 0.01  | 0.38  | 7.22 | 0.00 | 0.00 | 7.60 | 11.7 | 1 |
| Davit5 #Davit5:0 | Origin | 5.00  | 88.25  | 0.95 | -12.81 | -27.16 | -0.05 | -0.0 | 4.72  | 2.83 | 0.01  | 0.38  | 7.22 | 0.00 | 0.00 | 7.60 | 11.7 | 1 |
| Davit5 #Davit5:1 | End    | 9.95  | 88.79  | 0.95 | -20.25 | -13.15 | -0.02 | -0.0 | 4.72  | 2.83 | 0.01  | 0.48  | 5.62 | 0.00 | 0.00 | 6.10 | 9.4  | 1 |
| Davit5 #Davit5:1 | Origin | 9.95  | 88.79  | 0.95 | -20.25 | -13.15 | -0.02 | -0.0 | 4.73  | 2.66 | 0.00  | 0.48  | 5.62 | 0.00 | 0.00 | 6.10 | 9.4  | 1 |
| Davit5 Davit5:V  | End    | 14.90 | 89.32  | 0.96 | -27.80 | 0.00   | 0.00  | 0.0  | 4.73  | 2.66 | 0.00  | 0.65  | 0.00 | 0.76 | 0.00 | 1.47 | 2.3  | 3 |
| Davit6 Davit6:0  | Origin | 0.00  | 87.94  | 0.95 | -1.75  | -22.22 | 0.08  | 0.0  | -5.35 | 1.66 | -0.01 | -0.35 | 4.01 | 0.00 | 0.00 | 4.36 | 6.7  | 1 |
| Davit6 #Davit6:0 | End    | 5.00  | 89.37  | 0.97 | 5.46   | -13.91 | 0.05  | 0.0  | -5.35 | 1.66 | -0.01 | -0.43 | 3.70 | 0.00 | 0.00 | 4.12 | 6.3  | 1 |
| Davit6 #Davit6:0 | Origin | 5.00  | 89.37  | 0.97 | 5.46   | -13.91 | 0.05  | 0.0  | -5.30 | 1.48 | -0.01 | -0.42 | 3.70 | 0.00 | 0.00 | 4.12 | 6.3  | 1 |
| Davit6 #Davit6:1 | End    | 9.95  | 90.77  | 1.00 | 12.54  | -6.59  | 0.02  | 0.0  | -5.30 | 1.48 | -0.01 | -0.54 | 2.82 | 0.00 | 0.00 | 3.35 | 5.2  | 1 |
| Davit6 #Davit6:1 | Origin | 9.95  | 90.77  | 1.00 | 12.54  | -6.59  | 0.02  | 0.0  | -5.26 | 1.33 | -0.00 | -0.53 | 2.82 | 0.00 | 0.00 | 3.35 | 5.2  | 1 |
| Davit6 Davit6:V  | End    | 14.90 | 92.16  | 1.02 | 19.58  | -0.00  | 0.00  | 0.0  | -5.26 | 1.33 | -0.00 | -0.73 | 0.00 | 0.38 | 0.00 | 0.98 | 1.5  | 3 |
| Davit7 Davit7:0  | Origin | 0.00  | 58.48  | 0.53 | -3.64  | -44.08 | -0.05 | -0.0 | 4.64  | 3.16 | 0.00  | 0.31  | 7.96 | 0.00 | 0.00 | 8.26 | 12.7 | 1 |
| Davit7 #Davit7:0 | End    | 5.00  | 58.99  | 0.54 | -9.62  | -28.27 | -0.03 | -0.0 | 4.64  | 3.16 | 0.00  | 0.37  | 7.51 | 0.00 | 0.00 | 7.88 | 12.1 | 1 |
| Davit7 #Davit7:0 | Origin | 5.00  | 58.99  | 0.54 | -9.62  | -28.27 | -0.03 | -0.0 | 4.65  | 2.94 | 0.00  | 0.37  | 7.51 | 0.00 | 0.00 | 7.89 | 12.1 | 1 |
| Davit7 #Davit7:1 | End    | 9.95  | 59.50  | 0.54 | -15.65 | -13.71 | -0.01 | -0.0 | 4.65  | 2.94 | 0.00  | 0.47  | 5.85 | 0.00 | 0.00 | 6.32 | 9.7  | 1 |
| Davit7 #Davit7:1 | Origin | 9.95  | 59.50  | 0.54 | -15.65 | -13.71 | -0.01 | 0.0  | 4.66  | 2.77 | 0.00  | 0.47  | 5.85 | 0.00 | 0.00 | 6.33 | 9.7  | 1 |
| Davit7 Davit7:V  | End    | 14.90 | 60.01  | 0.55 | -21.78 | 0.00   | 0.00  | 0.0  | 4.66  | 2.77 | 0.00  | 0.64  | 0.00 | 0.79 | 0.00 | 1.51 | 2.3  | 3 |
| Davit8 Davit8:0  | Origin | 0.00  | 58.65  | 0.54 | -0.23  | -24.16 | 0.05  | 0.0  | -5.31 | 1.80 | -0.00 | -0.35 | 4.36 | 0.00 | 0.00 | 4.71 | 7.3  | 1 |
| Davit8 #Davit8:0 | End    | 5.00  | 59.73  | 0.55 | 5.58   | -15.18 | 0.03  | 0.0  | -5.31 | 1.80 | -0.00 | -0.43 | 4.03 | 0.00 | 0.00 | 4.46 | 6.9  | 1 |
| Davit8 #Davit8:0 | Origin | 5.00  | 59.73  | 0.55 | 5.58   | -15.18 | 0.03  | 0.0  | -5.26 | 1.61 | -0.00 | -0.42 | 4.03 | 0.00 | 0.00 | 4.46 | 6.9  | 1 |
| Davit8 #Davit8:1 | End    | 9.95  | 60.79  | 0.57 | 11.28  | -7.23  | 0.01  | 0.0  | -5.26 | 1.61 | -0.00 | -0.53 | 3.09 | 0.00 | 0.00 | 3.62 | 5.6  | 1 |
| Davit8 #Davit8:1 | Origin | 9.95  | 60.79  | 0.57 | 11.28  | -7.23  | 0.01  | 0.0  | -5.22 | 1.46 | -0.00 | -0.53 | 3.09 | 0.00 | 0.00 | 3.62 | 5.6  | 1 |
| Davit8 Davit8:V  | End    | 14.90 | 61.84  | 0.58 | 16.93  | -0.00  | 0.00  | 0.0  | -5.22 | 1.46 | -0.00 | -0.72 | 0.00 | 0.42 | 0.00 | 1.02 | 1.6  | 3 |

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

| Clamp Label | Force (kips) | Input Holding Capacity (kips) | Factored Holding Capacity (kips) | Usage % |
|-------------|--------------|-------------------------------|----------------------------------|---------|
| Clamp1      | 0.719        | 80.00                         | 80.00                            | 0.90    |
| Clamp2      | 0.719        | 80.00                         | 80.00                            | 0.90    |
| Clamp3      | 5.389        | 80.00                         | 80.00                            | 6.74    |
| Clamp4      | 5.389        | 80.00                         | 80.00                            | 6.74    |
| Clamp5      | 5.389        | 80.00                         | 80.00                            | 6.74    |
| Clamp6      | 5.389        | 80.00                         | 80.00                            | 6.74    |
| Clamp7      | 5.389        | 80.00                         | 80.00                            | 6.74    |
| Clamp8      | 5.389        | 80.00                         | 80.00                            | 6.74    |
| Clamp9      | 10.613       | 80.00                         | 80.00                            | 13.27   |
| Clamp10     | 32.959       | 80.00                         | 80.00                            | 41.20   |
| Clamp11     | 5.304        | 80.00                         | 80.00                            | 6.63    |
| Clamp12     | 32.959       | 80.00                         | 80.00                            | 41.20   |
| Clamp13     | 0.201        | 80.00                         | 80.00                            | 0.25    |
| Clamp14     | 0.201        | 80.00                         | 80.00                            | 0.25    |
| Clamp15     | 0.201        | 80.00                         | 80.00                            | 0.25    |
| Clamp16     | 0.201        | 80.00                         | 80.00                            | 0.25    |
| Clamp17     | 0.201        | 80.00                         | 80.00                            | 0.25    |
| Clamp18     | 0.201        | 80.00                         | 80.00                            | 0.25    |

|         |       |       |       |      |
|---------|-------|-------|-------|------|
| Clamp19 | 0.201 | 80.00 | 80.00 | 0.25 |
| Clamp20 | 0.201 | 80.00 | 80.00 | 0.25 |
| Clamp21 | 0.201 | 80.00 | 80.00 | 0.25 |
| Clamp22 | 0.201 | 80.00 | 80.00 | 0.25 |
| Clamp23 | 0.201 | 80.00 | 80.00 | 0.25 |
| Clamp24 | 0.201 | 80.00 | 80.00 | 0.25 |
| Clamp25 | 0.201 | 80.00 | 80.00 | 0.25 |



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

Summary of Steel Pole Usages:

| Steel Pole Maximum<br>Label Usage % | Load Case Segment<br>Number (lbs) |
|-------------------------------------|-----------------------------------|
| 10185 91.56 NESC Extreme Wind       | 41 34496.8                        |

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 Load Max (kips) | Plate Thickness (in) | Actual Thickness (in) | Usage % |
|-------------------------|-----------|-------------|--------------|--------------|------------|------------|-------------|----------------------|------------------------|--------------|----------------------|----------------------|-----------------------|---------|
| 10185 NESC Heavy Wind   |           | 1           | 2.477        | 1.409        | 0.193      | 2.727      | 31.645      | 37.329               | 147.661                | 5            | 96.495               | 2.366                | 3.000                 | 62.22   |
| 10185 NESC Heavy Wind   |           | 2           | 2.620        | 0.379        | 1.409      | 2.477      | 29.060      | 21.942               | 79.706                 | 4            | 82.948               | 1.814                | 3.000                 | 36.57   |
| 10185 NESC Heavy Wind   |           | 3           | 2.458        | -1.552       | 2.458      | 1.552      | 37.247      | 6.186                | 28.800                 | 2            | 41.804               | 0.963                | 3.000                 | 10.31   |
| 10185 NESC Heavy Wind   |           | 4           | 1.409        | -2.477       | 2.620      | -0.379     | 29.060      | 19.143               | 69.538                 | 4            | -75.422              | 1.695                | 3.000                 | 31.91   |
| 10185 NESC Heavy Wind   |           | 5           | 0.193        | -2.727       | 2.477      | -1.409     | 31.645      | 33.992               | 134.459                | 5            | -88.558              | 2.258                | 3.000                 | 56.65   |
| 10185 NESC Heavy Wind   |           | 6           | -1.552       | -2.458       | 1.552      | -2.458     | 37.247      | 35.527               | 165.408                | 5            | -88.558              | 2.308                | 3.000                 | 59.21   |
| 10185 NESC Heavy Wind   |           | 7           | -2.477       | -1.409       | -0.193     | -2.727     | 31.645      | 33.633               | 133.040                | 5            | -88.047              | 2.246                | 3.000                 | 56.06   |
| 10185 NESC Heavy Wind   |           | 8           | -2.620       | -0.379       | -1.409     | -2.477     | 29.060      | 18.584               | 67.508                 | 4            | -74.500              | 1.670                | 3.000                 | 30.97   |
| 10185 NESC Heavy Wind   |           | 9           | -2.458       | 1.552        | -2.458     | -1.552     | 37.247      | 6.186                | 28.800                 | 2            | 43.443               | 0.963                | 3.000                 | 10.31   |
| 10185 NESC Heavy Wind   |           | 10          | -1.409       | 2.477        | -2.620     | 0.379      | 29.060      | 22.501               | 81.737                 | 4            | 83.870               | 1.837                | 3.000                 | 37.50   |
| 10185 NESC Heavy Wind   |           | 11          | -0.193       | 2.727        | -2.477     | 1.409      | 31.645      | 37.688               | 149.081                | 5            | 97.005               | 2.378                | 3.000                 | 62.81   |
| 10185 NESC Heavy Wind   |           | 12          | 1.552        | 2.458        | -1.552     | 2.458      | 37.247      | 38.929               | 181.247                | 5            | 97.005               | 2.416                | 3.000                 | 64.88   |
| 10185 NESC Heavy Wind   |           | 13          | 1.743        | 2.168        | -0.637     | 2.805      | 29.571      | 32.716               | 120.928                | 5            | 96.835               | 2.215                | 3.000                 | 54.53   |
| 10185 NESC Heavy Wind   |           | 14          | 2.833        | 0.766        | 0.766      | 2.833      | 35.085      | 23.172               | 101.626                | 5            | 96.325               | 1.864                | 3.000                 | 38.62   |
| 10185 NESC Heavy Wind   |           | 15          | 2.482        | 0.569        | 2.168      | 1.743      | 14.590      | 17.824               | 32.508                 | 2            | 55.520               | 1.635                | 3.000                 | 29.71   |
| 10185 NESC Heavy Wind   |           | 16          | 2.168        | -1.743       | 2.482      | -0.569     | 14.590      | 15.153               | 27.636                 | 2            | -48.476              | 1.508                | 3.000                 | 25.26   |
| 10185 NESC Heavy Wind   |           | 17          | 0.766        | -2.833       | 2.833      | -0.766     | 35.085      | 20.730               | 90.914                 | 5            | -88.558              | 1.763                | 3.000                 | 34.55   |
| 10185 NESC Heavy Wind   |           | 18          | -0.637       | -2.805       | 1.743      | -2.168     | 29.571      | 29.955               | 110.724                | 5            | -88.558              | 2.120                | 3.000                 | 49.92   |
| 10185 NESC Heavy Wind   |           | 19          | -1.743       | -2.168       | 0.637      | -2.805     | 29.571      | 29.783               | 110.087                | 5            | -88.388              | 2.114                | 3.000                 | 49.64   |
| 10185 NESC Heavy Wind   |           | 20          | -2.833       | -0.766       | -0.766     | -2.833     | 35.085      | 20.340               | 89.206                 | 5            | -87.877              | 1.747                | 3.000                 | 33.90   |
| 10185 NESC Heavy Wind   |           | 21          | -2.482       | -0.569       | -2.168     | -1.743     | 14.590      | 14.544               | 26.526                 | 2            | -47.072              | 1.477                | 3.000                 | 24.24   |
| 10185 NESC Heavy Wind   |           | 22          | -2.168       | 1.743        | -2.482     | 0.569      | 14.590      | 18.433               | 33.618                 | 2            | 56.924               | 1.663                | 3.000                 | 30.72   |
| 10185 NESC Heavy Wind   |           | 23          | -0.766       | 2.833        | -2.833     | 0.766      | 35.085      | 23.562               | 103.334                | 5            | 97.005               | 1.880                | 3.000                 | 39.27   |
| 10185 NESC Heavy Wind   |           | 24          | 0.637        | 2.805        | -1.743     | 2.168      | 29.571      | 32.888               | 121.565                | 5            | 97.005               | 2.221                | 3.000                 | 54.81   |
| 10185 NESC Extreme Wind |           | 1           | 2.477        | 1.409        | 0.193      | 2.727      | 31.645      | 51.502               | 203.721                | 5            | 133.669              | 2.779                | 3.000                 | 85.84   |
| 10185 NESC Extreme Wind |           | 2           | 2.620        | 0.379        | 1.409      | 2.477      | 29.060      | 29.712               | 107.930                | 4            | 114.325              | 2.111                | 3.000                 | 49.52   |
| 10185 NESC Extreme Wind |           | 3           | 2.458        | -1.552       | 2.458      | 1.552      | 37.247      | 8.816                | 41.048                 | 2            | 55.640               | 1.150                | 3.000                 | 14.69   |
| 10185 NESC Extreme Wind |           | 4           | 1.409        | -2.477       | 2.620      | -0.379     | 29.060      | 28.846               | 104.782                | 4            | -111.394             | 2.080                | 3.000                 | 48.08   |
| 10185 NESC Extreme Wind |           | 5           | 0.193        | -2.727       | 2.477      | -1.409     | 31.645      | 50.150               | 198.375                | 5            | -130.101             | 2.743                | 3.000                 | 83.58   |
| 10185 NESC Extreme Wind |           | 6           | -1.552       | -2.458       | 1.552      | -2.458     | 37.247      | 52.181               | 242.949                | 5            | -130.101             | 2.798                | 3.000                 | 86.97   |
| 10185 NESC Extreme Wind |           | 7           | -2.477       | -1.409       | -0.193     | -2.727     | 31.645      | 49.594               | 196.174                | 5            | -129.309             | 2.727                | 3.000                 | 82.66   |
| 10185 NESC Extreme Wind |           | 8           | -2.620       | -0.379       | -1.409     | -2.477     | 29.060      | 27.979               | 101.634                | 4            | -109.965             | 2.049                | 3.000                 | 46.63   |
| 10185 NESC Extreme Wind |           | 9           | -2.458       | 1.552        | -2.458     | -1.552     | 37.247      | 8.816                | 41.048                 | 2            | 58.181               | 1.150                | 3.000                 | 14.69   |
| 10185 NESC Extreme Wind |           | 10          | -1.409       | 2.477        | -2.620     | 0.379      | 29.060      | 30.579               | 111.079                | 4            | 115.755              | 2.142                | 3.000                 | 50.96   |
| 10185 NESC Extreme Wind |           | 11          | -0.193       | 2.727        | -2.477     | 1.409      | 31.645      | 52.058               | 205.922                | 5            | 134.461              | 2.794                | 3.000                 | 86.76   |
| 10185 NESC Extreme Wind |           | 12          | 1.552        | 2.458        | -1.552     | 2.458      | 37.247      | 53.937               | 251.125                | 5            | 134.461              | 2.844                | 3.000                 | 89.90   |
| 10185 NESC Extreme Wind |           | 13          | 1.743        | 2.168        | -0.637     | 2.805      | 29.571      | 45.284               | 167.386                | 5            | 134.197              | 2.606                | 3.000                 | 75.47   |
| 10185 NESC Extreme Wind |           | 14          | 2.833        | 0.766        | 0.766      | 2.833      | 35.085      | 31.715               | 139.091                | 5            | 133.405              | 2.181                | 3.000                 | 52.86   |
| 10185 NESC Extreme Wind |           | 15          | 2.482        | 0.569        | 2.168      | 1.743      | 14.590      | 23.875               | 43.543                 | 2            | 75.203               | 1.892                | 3.000                 | 39.79   |
| 10185 NESC Extreme Wind |           | 16          | 2.168        | -1.743       | 2.482      | -0.569     | 14.590      | 23.126               | 42.178                 | 2            | -73.019              | 1.863                | 3.000                 | 38.54   |
| 10185 NESC Extreme Wind |           | 17          | 0.766        | -2.833       | 2.833      | -0.766     | 35.085      | 30.857               | 135.329                | 5            | -130.101             | 2.151                | 3.000                 | 51.43   |

|       |      |              |    |        |        |        |        |        |        |         |   |          |       |       |       |
|-------|------|--------------|----|--------|--------|--------|--------|--------|--------|---------|---|----------|-------|-------|-------|
| 10185 | NESC | Extreme Wind | 18 | -0.637 | -2.805 | 1.743  | -2.168 | 29.571 | 44.038 | 162.778 | 5 | -130.101 | 2.570 | 3.000 | 73.40 |
| 10185 | NESC | Extreme Wind | 19 | -1.743 | -2.168 | 0.637  | -2.805 | 29.571 | 43.770 | 161.790 | 5 | -129.837 | 2.562 | 3.000 | 72.95 |
| 10185 | NESC | Extreme Wind | 20 | -2.833 | -0.766 | -0.766 | -2.833 | 35.085 | 30.253 | 132.680 | 5 | -129.045 | 2.130 | 3.000 | 50.42 |
| 10185 | NESC | Extreme Wind | 21 | -2.482 | -0.569 | -2.168 | -1.743 | 14.590 | 22.182 | 40.456  | 2 | -70.843  | 1.824 | 3.000 | 36.97 |
| 10185 | NESC | Extreme Wind | 22 | -2.168 | 1.743  | -2.482 | 0.569  | 14.590 | 24.819 | 45.266  | 2 | 77.380   | 1.929 | 3.000 | 41.37 |
| 10185 | NESC | Extreme Wind | 23 | -0.766 | 2.833  | -2.833 | 0.766  | 35.085 | 32.319 | 141.740 | 5 | 134.461  | 2.202 | 3.000 | 53.86 |
| 10185 | NESC | Extreme Wind | 24 | 0.637  | 2.805  | -1.743 | 2.168  | 29.571 | 45.551 | 168.374 | 5 | 134.461  | 2.614 | 3.000 | 75.92 |

# Summary of Tubular Davit Usages:

| Tubular Davit Maximum | Label | Usage % | Load Case  | Segment | Weight | Number | (lbs) |
|-----------------------|-------|---------|------------|---------|--------|--------|-------|
| Davit1                | 13.69 | NESC    | Heavy Wind | 1       | 181.7  |        |       |
| Davit2                | 10.66 | NESC    | Heavy Wind | 1       | 181.7  |        |       |
| Davit3                | 30.86 | NESC    | Heavy Wind | 1       | 181.7  |        |       |
| Davit4                | 26.41 | NESC    | Heavy Wind | 1       | 567.2  |        |       |
| Davit5                | 31.00 | NESC    | Heavy Wind | 1       | 567.2  |        |       |
| Davit6                | 26.63 | NESC    | Heavy Wind | 1       | 567.2  |        |       |
| Davit7                | 31.22 | NESC    | Heavy Wind | 1       | 567.2  |        |       |
| Davit8                | 26.98 | NESC    | Heavy Wind | 1       | 567.2  |        |       |

\*\*\* Maximum Stress Summary for Each Load Case

# Summary of Maximum Usages by Load Case:

| Load Case | Maximum Element | Element | Type             |
|-----------|-----------------|---------|------------------|
| NESC      | Heavy Wind      | 65.46   | 10185 Steel Pole |
| NESC      | Extreme Wind    | 91.56   | 10185 Steel Pole |

# Summary of Steel Pole Usages by Load Case:

| Load Case | Maximum Steel Pole Segment | Label | Number |
|-----------|----------------------------|-------|--------|
| NESC      | Heavy Wind                 | 65.46 | 10185  |
| NESC      | Extreme Wind               | 91.56 | 10185  |

# Summary of Base Plate Usages by Load Case:

| Load Case | Pole Bend Length Vertical | Label | Line # | (in)   | (kips)  | X Moment | (ft-k)  | Y Bending | Moment  | (ksi) | Bolt    | # Bolts | Max Bolt | Minimum | Usage |
|-----------|---------------------------|-------|--------|--------|---------|----------|---------|-----------|---------|-------|---------|---------|----------|---------|-------|
| NESC      | Heavy Wind                | 10185 | 12     | 37.247 | 109.818 | 4423.708 | -25.721 | 38.929    | 181.247 | 5     | 97.005  | 2.416   | 64.88    |         |       |
| NESC      | Extreme Wind              | 10185 | 12     | 37.247 | 56.685  | 6304.947 | -39.880 | 53.937    | 251.125 | 5     | 134.461 | 2.844   | 89.90    |         |       |

# Summary of Tubular Davit Usages by Load Case:

| Load Case | Maximum Tubular Davit Segment | Label | Number |
|-----------|-------------------------------|-------|--------|
| NESC      | Heavy Wind                    | 31.22 | Davit7 |
| NESC      | Extreme Wind                  | 12.71 | Davit7 |

Centek Engineering Inc - clsp structure # 10185

Summary of Insulator Usages:

| Insulator Label | Insulator Type | Insulator Maximum Usage % | Load Case Weight (lbs) |
|-----------------|----------------|---------------------------|------------------------|
| Clamp1          | Clamp          | 1.92                      | NESC Heavy Wind 0.0    |
| Clamp2          | Clamp          | 1.92                      | NESC Heavy Wind 0.0    |
| Clamp3          | Clamp          | 9.75                      | NESC Heavy Wind 0.0    |
| Clamp4          | Clamp          | 9.75                      | NESC Heavy Wind 0.0    |
| Clamp5          | Clamp          | 9.75                      | NESC Heavy Wind 0.0    |
| Clamp6          | Clamp          | 9.75                      | NESC Heavy Wind 0.0    |
| Clamp7          | Clamp          | 9.75                      | NESC Heavy Wind 0.0    |
| Clamp8          | Clamp          | 9.75                      | NESC Heavy Wind 0.0    |
| Clamp9          | Clamp          | 13.27                     | NESC Extreme Wind 0.0  |
| Clamp10         | Clamp          | 41.20                     | NESC Extreme Wind 0.0  |
| Clamp11         | Clamp          | 9.21                      | NESC Heavy Wind 0.0    |
| Clamp12         | Clamp          | 41.20                     | NESC Extreme Wind 0.0  |
| Clamp13         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp14         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp15         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp16         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp17         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp18         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp19         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp20         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp21         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp22         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp23         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp24         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |
| Clamp25         | Clamp          | 0.58                      | NESC Heavy Wind 0.0    |

Loads At Insulator Attachments For All Load Cases:

| Load Case       | Insulator Label | Insulator Type | Structure Attach |               |               | Structure Attach |               |               | Structure Attach |               |               |
|-----------------|-----------------|----------------|------------------|---------------|---------------|------------------|---------------|---------------|------------------|---------------|---------------|
|                 |                 |                | Label            | Load X (kips) | Load Y (kips) | Load X (kips)    | Load Y (kips) | Load Z (kips) | Load X (kips)    | Load Y (kips) | Load Z (kips) |
| NESC Heavy Wind | Clamp1          | Clamp          | Davit1:V         | 0.000         | 1.083         | 0.000            | 1.084         | 1.532         | 0.000            | 1.084         | 1.532         |
| NESC Heavy Wind | Clamp2          | Clamp          | Davit2:V         | 0.000         | 1.083         | 0.000            | 1.084         | 1.532         | 0.000            | 1.084         | 1.532         |
| NESC Heavy Wind | Clamp3          | Clamp          | Davit3:V         | 0.000         | 3.666         | 0.000            | 3.666         | 6.886         | 0.000            | 3.666         | 6.886         |
| NESC Heavy Wind | Clamp4          | Clamp          | Davit4:V         | 0.000         | 3.666         | 0.000            | 3.666         | 6.886         | 0.000            | 3.666         | 6.886         |
| NESC Heavy Wind | Clamp5          | Clamp          | Davit5:V         | 0.000         | 3.666         | 0.000            | 3.666         | 6.886         | 0.000            | 3.666         | 6.886         |
| NESC Heavy Wind | Clamp6          | Clamp          | Davit6:V         | 0.000         | 3.666         | 0.000            | 3.666         | 6.886         | 0.000            | 3.666         | 6.886         |
| NESC Heavy Wind | Clamp7          | Clamp          | Davit7:V         | 0.000         | 3.666         | 0.000            | 3.666         | 6.886         | 0.000            | 3.666         | 6.886         |
| NESC Heavy Wind | Clamp8          | Clamp          | Davit8:V         | 0.000         | 3.666         | 0.000            | 3.666         | 6.886         | 0.000            | 3.666         | 6.886         |
| NESC Heavy Wind | Clamp9          | Clamp          | 10185:TpConn     | 0.000         | 3.259         | 0.000            | 3.259         | 3.259         | 0.000            | 3.259         | 3.259         |
| NESC Heavy Wind | Clamp10         | Clamp          | 10185:BotConn    | 9.807         | 0.000         | 9.807            | 0.000         | 0.000         | 9.807            | 0.000         | 0.000         |
| NESC Heavy Wind | Clamp11         | Clamp          | 10185:BotConn    | 0.000         | -1.212        | 0.000            | -1.212        | 7.365         | 0.000            | 7.365         | 7.365         |
| NESC Heavy Wind | Clamp12         | Clamp          | 10185:BotConn    | -9.807        | 0.000         | -9.807           | 0.000         | 0.000         | 9.807            | 0.000         | 0.000         |
| NESC Heavy Wind | Clamp13         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |
| NESC Heavy Wind | Clamp14         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |
| NESC Heavy Wind | Clamp15         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |
| NESC Heavy Wind | Clamp16         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |
| NESC Heavy Wind | Clamp17         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |
| NESC Heavy Wind | Clamp18         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |
| NESC Heavy Wind | Clamp19         | Clamp          | 10185:WVGDI      | 0.000         | 0.066         | 0.000            | 0.066         | 0.465         | 0.000            | 0.066         | 0.465         |

|                   |         |       |               |         |        |       |        |
|-------------------|---------|-------|---------------|---------|--------|-------|--------|
| NESC Heavy Wind   | Clamp20 | Clamp | 10185:WVGD8   | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Heavy Wind   | Clamp21 | Clamp | 10185:WVGD9   | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Heavy Wind   | Clamp22 | Clamp | 10185:WVGD10  | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Heavy Wind   | Clamp23 | Clamp | 10185:WVGD11  | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Heavy Wind   | Clamp24 | Clamp | 10185:WVGD12  | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Heavy Wind   | Clamp25 | Clamp | 10185:WVGD13  | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Extreme Wind | Clamp1  | Clamp | Davit1:V      | 0.000   | 0.066  | 0.460 | 0.465  |
| NESC Extreme Wind | Clamp2  | Clamp | Davit2:V      | 0.000   | 0.680  | 0.233 | 0.465  |
| NESC Extreme Wind | Clamp3  | Clamp | Davit3:V      | 0.000   | 0.680  | 0.233 | 0.719  |
| NESC Extreme Wind | Clamp4  | Clamp | Davit4:V      | 0.000   | 4.748  | 2.549 | 5.389  |
| NESC Extreme Wind | Clamp5  | Clamp | Davit5:V      | 0.000   | 4.748  | 2.549 | 5.389  |
| NESC Extreme Wind | Clamp6  | Clamp | Davit6:V      | 0.000   | 4.748  | 2.549 | 5.389  |
| NESC Extreme Wind | Clamp7  | Clamp | Davit7:V      | 0.000   | 4.748  | 2.549 | 5.389  |
| NESC Extreme Wind | Clamp8  | Clamp | Davit8:V      | 0.000   | 4.748  | 2.549 | 5.389  |
| NESC Extreme Wind | Clamp9  | Clamp | 10185:TpConn  | 0.000   | 10.613 | 0.000 | 10.613 |
| NESC Extreme Wind | Clamp10 | Clamp | 10185:BotConn | 32.959  | 0.000  | 0.000 | 32.959 |
| NESC Extreme Wind | Clamp11 | Clamp | 10185:BotConn | 0.000   | -4.149 | 3.304 | 5.304  |
| NESC Extreme Wind | Clamp12 | Clamp | 10185:BotConn | -32.959 | 0.000  | 0.000 | 32.959 |
| NESC Extreme Wind | Clamp13 | Clamp | 10185:WVGD1   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp14 | Clamp | 10185:WVGD2   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp15 | Clamp | 10185:WVGD3   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp16 | Clamp | 10185:WVGD4   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp17 | Clamp | 10185:WVGD5   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp18 | Clamp | 10185:WVGD6   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp19 | Clamp | 10185:WVGD7   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp20 | Clamp | 10185:WVGD8   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp21 | Clamp | 10185:WVGD9   | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp22 | Clamp | 10185:WVGD10  | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp23 | Clamp | 10185:WVGD11  | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp24 | Clamp | 10185:WVGD12  | 0.000   | 0.158  | 0.125 | 0.201  |
| NESC Extreme Wind | Clamp25 | Clamp | 10185:WVGD13  | 0.000   | 0.158  | 0.125 | 0.201  |

Overturning Moments For User Input Concentrated Loads:

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

| Load Case                      | Total Tran. Load (kips) | Total Long. Load (kips) | Total Vert. Load (kips) | Transverse Overturning Moment (ft-k) | Longitudinal Overturning Moment (ft-k) |
|--------------------------------|-------------------------|-------------------------|-------------------------|--------------------------------------|----------------------------------------|
| NESC Heavy Wind                | 27.067                  | 0.000                   | 56.729                  | 3540.989                             | 9.807                                  |
| NESC Extreme Wind              | 38.366                  | 0.000                   | 20.689                  | 5075.479                             | 32.959                                 |
| *** Weight of structure (lbs): |                         |                         |                         |                                      |                                        |
| Weight of Tubular Davit Arms:  |                         |                         |                         | 3766.7                               |                                        |
| Weight of Steel Poles:         |                         |                         |                         | 34496.8                              |                                        |
| Total:                         |                         |                         |                         | 38263.5                              |                                        |

\*\*\* End of Report

Subject:

Location:

Rev. 2: 1/7/13

Anchor Bolt Analysis  
CL&P Pole #10185

New Milford, CT

Prepared by: T.J.L. Checked by: C.F.C.  
Job No. 12101.CO1

## Anchor Bolt Analysis:

### Input Data:

#### Bolt Force:

Maximum Tensile Force =

$$T_{Max} := 135\text{-kips}$$

(User Input from PLS-Pole)

#### Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =

$$N := 26$$

(User Input)

Bolt "Column" Distance =

$$l := 3.0\text{-in}$$

(User Input)

Bolt Ultimate Strength =

$$F_u := 100\text{-ksi}$$

(User Input)

Bolt Yield Strength =

$$F_y := 75\text{-ksi}$$

(User Input)

Bolt Modulus =

$$E := 29000\text{-ksi}$$

(User Input)

Diameter of Anchor Bolts =

$$D := 2.25\text{-in}$$

(User Input)

Threads per Inch =

$$n := 4.5$$

(User Input)

## Anchor Bolt Analysis:

### Calculated Anchor Bolt Properties:

Net Area of Bolt =

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

### Bolt Tension Check:

Allowable Tensile Force (Net Area) =

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

Bolt Tension % of Capacity =

$$\frac{T_{Max}}{T_{ALL.Net}} = 55.4\%$$

Condition1 =

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

Condition1 = "OK"



**Foundation:****Input Data:**Tower Data

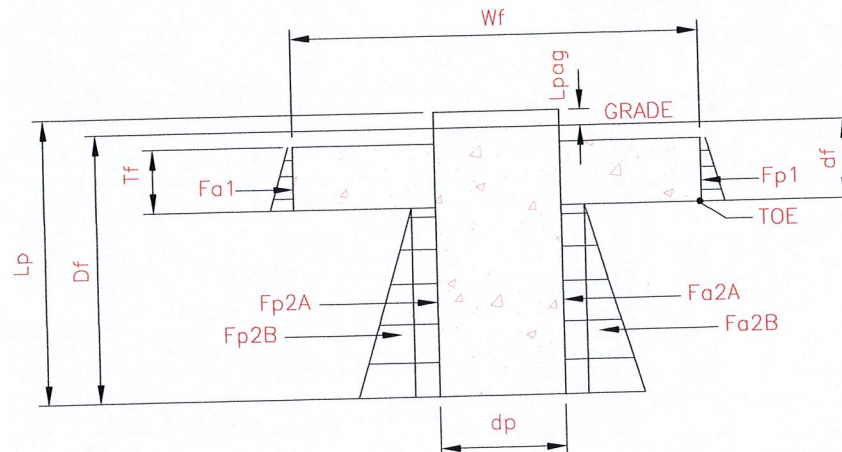
|                     |                                                                         |              |
|---------------------|-------------------------------------------------------------------------|--------------|
| Overturing Moment = | $OM := 6305 \cdot \text{ft-kips} \cdot 1.1 = 6936 \cdot \text{ft-kips}$ | (User Input) |
| Shear Force =       | $Shear := 52.84 \cdot \text{kip} \cdot 1.1 = 58 \cdot \text{kips}$      | (User Input) |
| Axial Force =       | $Axial := 56.69 \cdot \text{kip} \cdot 1.1 = 62 \cdot \text{kips}$      | (User Input) |
| Tower Height =      | $H_t := 160 \cdot \text{ft}$                                            | (User Input) |

Footing Data:

|                                        |                                  |              |
|----------------------------------------|----------------------------------|--------------|
| Overall Depth of Footing =             | $D_f := 16 \cdot \text{ft}$      | (User Input) |
| Length of Pier =                       | $L_p := 16.5 \cdot \text{ft}$    | (User Input) |
| Extension of Pier Above Grade =        | $L_{pag} := 0.5 \cdot \text{ft}$ | (User Input) |
| Diameter of Cassion =                  | $d_p := 8 \cdot \text{ft}$       | (User Input) |
| Thickness of Footing =                 | $T_f := 4 \cdot \text{ft}$       | (User Input) |
| Width of Footing =                     | $W_f := 20 \cdot \text{ft}$      | (User Input) |
| Water Depth =                          | $D_{water} := 0 \cdot \text{ft}$ | (User Input) |
| Distance From Grade to Bottom of Pad = | $d_f := 4.5 \cdot \text{ft}$     | (User Input) |

Material Properties:

|                                               |                                         |                                     |
|-----------------------------------------------|-----------------------------------------|-------------------------------------|
| Concrete Compressive Strength =               | $f_c := 3000 \cdot \text{psi}$          | (User Input)                        |
| Steel Reinforcement Yield Strength =          | $f_y := 60000 \cdot \text{psi}$         | (User Input)                        |
| Anchor Bolt Yield Strength =                  | $f_{ya} := 75000 \cdot \text{psi}$      | (User Input)                        |
| Internal Friction Angle of Soil (mat) =       | $\Phi_{s1} := 30 \cdot \text{deg}$      | (User Input)                        |
| Internal Friction Angle of Soil (below mat) = | $\Phi_{s2} := 38.5 \cdot \text{deg}$    | (User Input)                        |
| Allowable Soil Bearing Capacity =             | $q_s := 4000 \cdot \text{psf}$          | (User Input) (Conservative)         |
| Unit Weight of Soil =                         | $\gamma_{soil} := 130 \cdot \text{pcf}$ | (User Input)                        |
| Unit Weight of Concrete =                     | $\gamma_{conc} := 150 \cdot \text{pcf}$ | (User Input)                        |
| Foundation Bouyancy =                         | $Bouyancy := 0$                         | (User Input) (Yes=1 / No=0)         |
| Depth to Neglect =                            | $n := 0 \cdot \text{ft}$                | (User Input)                        |
| Cohesion of Clay Type Soil =                  | $c := 0 \cdot \text{ksf}$               | (User Input) (Use 0 for Sandy Soil) |
| Seismic Zone Factor =                         | $Z := 2$                                | (User Input) (UBC-1997 Fig 23-2)    |


**Calculated Factors:**

Coefficient of Lateral Soil Pressure =

$$K_{p1} := \frac{1 + \sin(\Phi_{s1})}{1 - \sin(\Phi_{s1})} = 3$$

$$K_{a1} := \frac{(1 - \sin(\Phi_{s1}))}{(1 + \sin(\Phi_{s1}))} = 0.333$$

$$K_{p2} := \frac{1 + \sin(\Phi_{s2})}{1 - \sin(\Phi_{s2})} = 4.3$$

$$K_{a2} := \frac{(1 - \sin(\Phi_{s2}))}{(1 + \sin(\Phi_{s2}))} = 0.233$$

**Stability of Footing:**

Passive Pressure 1 =

$$P_{p1.top} := K_{p1} \cdot \gamma_{soil} \cdot (0) = 0 \text{ ksf}$$

$$P_{p1.bot} := K_{p1} \cdot \gamma_{soil} \cdot (T_f) = 1.56 \text{ ksf}$$

$$P_{p1.ave} := \frac{P_{p1.top} + P_{p1.bot}}{2} = 0.78 \text{ ksf}$$

Active Pressure 1 =

$$P_{a1.top} := K_{a1} \cdot \gamma_{soil} \cdot (0) = 0 \text{ ksf}$$

$$P_{a1.bot} := K_{a1} \cdot \gamma_{soil} \cdot T_f = 0.173 \text{ ksf}$$

$$P_{a1.ave} := \frac{P_{a1.top} + P_{a1.bot}}{2} = 0.087 \text{ ksf}$$

Area of Pressure 1 =

$$A_{p1} := T_f \cdot W_f = 80 \text{ ft}^2$$

Forces 1 =

$$F_{p1} := P_{p1.ave} \cdot A_{p1} = 62.4 \text{ kip}$$

$$F_{a1} := P_{a1.ave} \cdot A_{p1} = 6.933 \text{ kip}$$

Ultimate Shear 1 =

$$S_{u1} := (F_{p1} - F_{a1}) = 55.5 \text{ kip}$$



Passive Pressure 2 =

$$P_{p2.top} := K_{p2} \cdot \gamma_{soil} \cdot d_f = 2.514 \cdot \text{ksf}$$

$$P_{p2.bot} := K_{p2} \cdot \gamma_{soil} \cdot D_f = 8.94 \cdot \text{ksf}$$

Active Pressure 2 =

$$P_{a2.top} := K_{a2} \cdot \gamma_{soil} \cdot d_f = 0.136 \cdot \text{ksf}$$

$$P_{a2.bot} := K_{a2} \cdot \gamma_{soil} \cdot D_f = 0.484 \cdot \text{ksf}$$

Area of Pressure 2 =

$$A_{p2} := (D_f - d_f) \cdot d_p = 92 \cdot \text{ft}^2$$

Forces 2 =

$$F_{p2A} := P_{p2.top} \cdot A_{p2} = 231.33 \cdot \text{kips}$$

$$F_{a2A} := P_{a2.top} \cdot A_{p2} = 12.5 \cdot \text{kips}$$

$$F_{p2B} := \frac{1}{2} \cdot (P_{p2.bot} - P_{p2.top}) \cdot A_{p2} = 295.588 \cdot \text{kips}$$

$$F_{a2B} := \frac{1}{2} \cdot (P_{a2.bot} - P_{a2.top}) \cdot A_{p2} = 16 \cdot \text{kips}$$

Ultimate Shear 2 =

$$S_{u2A} := F_{p2A} - F_{a2A} = 218.8 \cdot \text{kip}$$

$$S_{u2B} := F_{p2B} - F_{a2B} = 279.6 \cdot \text{kip}$$

Weight of Concrete Mat =

$$W_{Tmat} := \left( W_f^2 - \frac{d_p^2 \cdot \pi}{4} \right) \cdot T_f \cdot \gamma_{conc} = 209.84 \cdot \text{kip}$$

Weight of Concrete Caission =

$$W_{Tcaission} := \left( \frac{d_p^2 \cdot \pi}{4} \cdot L_p \right) \cdot \gamma_{conc} = 124.41 \cdot \text{kip}$$

Weight of Soil Above Mat =

$$W_{Ts} := \left[ \left( W_f^2 - \frac{d_p^2 \cdot \pi}{4} \right) \cdot (d_f - T_f) \right] \cdot \gamma_{soil} = 22.73 \cdot \text{kip}$$

Total Weight =

$$W_{tot} := W_{Tmat} + W_{Tcaission} + W_{Ts} + \text{Axial} = 419.34 \cdot \text{kips}$$

Overturing Moment =

$$M_{ot} := OM + \text{Shear} \cdot (d_f + L_{pag}) = 7226 \cdot \text{kip} \cdot \text{ft}$$

Resisting Moment =

$$M_r := (W_{tot}) \cdot \frac{W_f}{2} + S_{u1} \cdot T_f \cdot \frac{1}{3} + S_{u2A} \cdot \frac{(D_f - d_f)}{2} + S_{u2B} \cdot \frac{2 \cdot (D_f - d_f)}{3} = 7669 \cdot \text{kip} \cdot \text{ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 1.06$$

Factor of Safety Required =

$$FS_{req} := 1.0$$

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

$$\text{Overturing\_Check} = \text{"Okay"}$$

**Bearing Pressure Check:**

Area of Mat =  $A_{mat} := W_f^2 - \frac{d_p^2 \cdot \pi}{4} = 349.735 \text{ ft}^2$

Section Modulus of Mat =  $S_{mat} := \frac{W_f^3}{6} - \frac{d_p^3 \cdot \pi}{32} = 1283 \cdot \text{ft}^3$

Axial Force @ Base of Mat =  $P_{mat} := W_{T_{mat}} + W_{T_s} = 232.573 \cdot \text{kips}$

Resisting Moment Capacity of Caisson =  $M_{cap} := S_{u2A} \cdot \left[ \frac{1}{2} \cdot (D_f - d_f) + d_f + L_{pag} \right] + S_{u2B} \cdot \left[ \frac{2}{3} \cdot (D_f - d_f) + d_f + L_{pag} \right] = 5894 \text{ kip-ft}$

Residual Moment @ Base of Mat =  $M_{mat} := (OM - M_{cap}) + \text{Shear} \cdot (d_f + L_{pag}) - \left( S_{u1} \cdot T_f \cdot \frac{1}{3} \right) = 1259 \cdot \text{kip-ft}$

Maximum Pressure in Mat =  $P_{max} := \frac{P_{mat}}{A_{mat}} + \frac{M_{mat}}{S_{mat}} = 1.646 \cdot \text{ksf}$

Max\_Pressure\_Check := if( $P_{max} < q_s$ , "Okay", "No Good")

Max\_Pressure\_Check = "Okay"

Minimum Pressure in Mat =  $P_{min} := \frac{P_{mat}}{A_{mat}} - \frac{M_{mat}}{S_{mat}} = -0.316 \cdot \text{ksf}$

Min\_Pressure\_Check := if( $(P_{min} \geq 0) \cdot (P_{min} < q_s)$ , "Okay", "No Good")

Min\_Pressure\_Check = "No Good"

Distance to Resultant of Pressure Distribution =  $X_p := \frac{P_{max}}{P_{max} - P_{min}} \cdot \frac{1}{3} = 5.593 \text{ ft}$

Distance to Kern =  $X_k := \frac{W_f}{6} = 3.333 \text{ ft}$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity =  $e := \frac{M_{mat}}{P_{mat}} = 5.411 \text{ ft}$

Adjusted Soil Pressure =  $P_a := \frac{2 \cdot P_{mat}}{3 \cdot W_f \left( \frac{W_f}{2} - e \right)} = 1.689 \cdot \text{ksf}$

$q_{adj} := \text{if}(P_{min} < 0, P_a, P_{max}) = 1.689 \cdot \text{ksf}$

Pressure\_Check := if( $q_{adj} < q_s$ , "Okay", "No Good")

Pressure\_Check = "Okay"



|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  |                                     |  |
|--------------------------------------------|--|-----------------------|--|--------------------------|--|-----------------------|--|------------------------|--|--------------------------------------|--|-------------------------------------|--|
| RFDS NAME:                                 |  | CT2260                |  | DATE:                    |  | 11/16/2012 11:24      |  | RF DESIGN ENG:         |  | Section 1 - RFDS GENERAL INFORMATION |  | RF PERF ENG:                        |  |
| ISSUE:                                     |  | Preliminary           |  | Approved? (Y/N)          |  | Y                     |  | RF DESIGN PHONE:       |  | Radu Alecsandru                      |  | RF PERF PHONE:                      |  |
| REVISION:                                  |  | V02                   |  | RF MANAGER:              |  | Cameron Syme          |  | RF DESIGN EMAIL:       |  | ra9161@att.com                       |  | RF PERF EMAIL:                      |  |
| INITIATIVE / PROJECT:                      |  | LTE Wave 4 Prelim     |  |                          |  |                       |  |                        |  |                                      |  | TBD (Y/N):                          |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | GSM FREQUENCY:                      |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | UMTS FREQUENCY:                     |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | I-PLAN JOB # 1:                     |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | I-PLAN JOB # 2:                     |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | I-PLAN JOB # 3:                     |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | I-PLAN JOB # 4:                     |  |
| USID:                                      |  | 03905                 |  | FA LOCATION CODE:        |  | 10050959              |  | LOCATION NAME:         |  | New Milford-Park Rd                  |  | ORACLE PRJT # 1:                    |  |
| REGION:                                    |  | North East            |  | MARKET CLUSTER:          |  | New England           |  | MARKET:                |  | CT                                   |  | ORACLE PRJT # 2:                    |  |
| ADDRESS:                                   |  | Park Rd               |  | CITY:                    |  | New Milford           |  | STATE:                 |  | CT                                   |  | ORACLE PRJT # 3:                    |  |
| ZIP CODE:                                  |  | 06776                 |  | COUNTY:                  |  | Litchfield            |  | MSA/MSA:               |  | TBD                                  |  | ORACLE PRJT # 4:                    |  |
| LATITUDE (D-M-S):                          |  | 41° 32' 6.49"         |  | LONGITUDE (D-M-S):       |  | 73° 25' 29.49"        |  | LAT (DEC. DEG.):       |  | 41.535136                            |  | SEARCH RING NAME:                   |  |
| DIRECTIONS, ACCESS AND EQUIPMENT LOCATION: |  | TBD                   |  |                          |  |                       |  |                        |  |                                      |  | SEARCH RING ID:                     |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | BTA:                                |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | LONG (DEC. DEG.):                   |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | BORDER CELL WITH CONTIG:            |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | AM STUDY REQ'D (Y/N):               |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  | FREQ COORD:                         |  |
| CGSA - NO FILING TRIGGERED:                |  | TBD                   |  | CGSA LOSS:               |  | TBD                   |  | PCS REDUCED - UPS ZIP: |  | TBD                                  |  |                                     |  |
| CGSA - MINOR FILING NEEDED:                |  | TBD                   |  | CGSA EXT AGMT NEEDED:    |  | TBD                   |  | PCS POPS REDUCED:      |  | TBD                                  |  |                                     |  |
| CGSA - MAJOR FILING NEEDED:                |  | TBD                   |  | CGSA SCORE/CAND UPDATED: |  | TBD                   |  |                        |  |                                      |  |                                     |  |
| STRUCTURE AT&T OWNED?:                     |  | TBD                   |  | GROUND ELEVATION (ft):   |  | TBD                   |  | STRUCTURE TYPE:        |  | POWER POLE                           |  | MKT LOCATION 850 MHZ CALL SIGN(S):  |  |
| ADDITIONAL REGULATORY?:                    |  | TBD                   |  | HEIGHT OVERALL (ft):     |  | TBD                   |  | FCC ASR NUMBER:        |  |                                      |  | MKT LOCATION 1900 MHZ CALL SIGN(S): |  |
| SUB-LEASE RIGHTS?:                         |  | TBD                   |  | STRUCTURE HEIGHT (ft):   |  | TBD                   |  |                        |  |                                      |  | MKT LOCATION 700 MHZ CALL SIGN(S):  |  |
| LIGHTING TYPE:                             |  | TBD                   |  |                          |  |                       |  |                        |  |                                      |  | MKT LOCATION AWS MHZ CALL SIGN(S):  |  |
|                                            |  |                       |  |                          |  |                       |  |                        |  |                                      |  |                                     |  |
| ALPHA                                      |  | PSAP NAME:            |  | PSAP ID:                 |  | E911 PHASE:           |  | MPC SVC PROVIDER:      |  | LMU REQUIRED:                        |  | ESRN:                               |  |
| BETA                                       |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| GAMMA                                      |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| DELTA                                      |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| EPSILON                                    |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| PSI                                        |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| 4-DIGIT SITE ID:                           |  | 2260                  |  | COW OR TOY?:             |  |                       |  |                        |  |                                      |  |                                     |  |
| CELL SITE TYPE:                            |  | SECTORIZED            |  | SITE TYPE:               |  | NO                    |  | CELLULAR NETWORK:      |  |                                      |  | GO                                  |  |
| BTS LOCATION ID:                           |  | TBD                   |  | ORIGINATING CO:          |  | MACRO                 |  | OPS DISTRICT:          |  |                                      |  | CT-N                                |  |
|                                            |  |                       |  |                          |  | ATT                   |  |                        |  |                                      |  | Bridge                              |  |
| GSM RBSs                                   |  | UMTS 1ST CARRIER RBSs |  | UMTS 2ND CARRIER RBSs    |  | UMTS 3RD CARRIER RBSs |  | UMTS 4TH CARRIER RBSs  |  |                                      |  |                                     |  |
| MSC                                        |  | MBSP01                |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| BSC/RNC                                    |  | BRPTC/TBSC06          |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| IAC                                        |  | 05015                 |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| RAC                                        |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| EQUIPMENT VENDOR                           |  | NOKIA                 |  | ERICSSON                 |  | ERICSSON              |  | ERICSSON               |  | ERICSSON                             |  | ERICSSON                            |  |
| EQUIPMENT TYPE                             |  | TBD                   |  | RBS3206                  |  | 1900 Radio Kit        |  | 850 RRUY OBIF          |  | N/A                                  |  | N/A                                 |  |
| LOCATION                                   |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  | TBD                                  |  | TBD                                 |  |
| CABINET LOCATION                           |  | TBD                   |  | TBD                      |  | TBD                   |  | TBD                    |  |                                      |  |                                     |  |



|                                                       |  | Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI) |                                                           |                                                           |                                                           |
|-------------------------------------------------------|--|-----------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                           |  | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS)       | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                |  | TxRx-TxRx                                                       | TxRx-TxRx                                                 |                                                           | TxRx-TxRx                                                 |
| TECHNOLOGY                                            |  | UMTS / MC 850                                                   | UMTS / 1900                                               |                                                           | GSM / 850                                                 |
| RRH LOCATION (Top/Bottom/None)                        |  | N/A                                                             | N/A                                                       |                                                           | N/A                                                       |
| FEEDERS TYPE                                          |  | 1 5/8" - RFS                                                    | 1 5/8" - RFS                                              |                                                           | 1 5/8" - RFS                                              |
| Feeder Length (feet)                                  |  | 265'                                                            | 265'                                                      |                                                           | 265'                                                      |
| ANTENNA ATOLL                                         |  |                                                                 |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                  |  | 7770                                                            |                                                           |                                                           | 7770                                                      |
| ANTENNA VENDOR                                        |  | Powerwave                                                       |                                                           |                                                           | Powerwave                                                 |
| ANTENNA SIZE (H x W x D)                              |  | 55.0 x 11.0 x 5.0                                               |                                                           |                                                           | 55.0 x 11.0 x 5.0                                         |
| ANTENNA WEIGHT                                        |  | 35                                                              |                                                           |                                                           | 35                                                        |
| ANTENNA GAIN                                          |  | 13.5 dBi                                                        | 16.5 dBi                                                  |                                                           | 13.5 dBi                                                  |
| AZIMUTH                                               |  | 30°                                                             |                                                           |                                                           | 30°                                                       |
| RADIATION CENTER (feet)                               |  | 175"                                                            |                                                           |                                                           | 175"                                                      |
| ANTENNA TIP HEIGHT                                    |  | 177'                                                            |                                                           |                                                           | 177'                                                      |
| ELECTRICAL TILT (700/850/1900/AWS)                    |  | 0°                                                              | 0°                                                        |                                                           | 177'                                                      |
| MECHANICAL DOWN TILT                                  |  | 0°                                                              |                                                           |                                                           | 2°                                                        |
| FEEDER AMOUNT                                         |  | 2                                                               |                                                           |                                                           | 0°                                                        |
| Antenna RET Motor (QTY/MODEL)                         |  | 1 / Powerwave / 7020 (DB)                                       |                                                           |                                                           | 2                                                         |
| Antenna RET Splitter (QTY/MODEL)                      |  |                                                                 |                                                           |                                                           | 1 / Powerwave / 7020 (DB)                                 |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)       |  |                                                                 |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                |  |                                                                 |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site |  |                                                                 |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                  |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| TMA/LNA (TYPE/MODEL)                                  |  | 2 / Powerwave / 1000860                                         |                                                           |                                                           | N/A                                                       |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                 |  | Polyphaser / 1000860                                            |                                                           |                                                           | N/A                                                       |
| POU FOR TMAS (QTY/MODEL) usually per site             |  | LGP 12104 (1900 AND 850 Bypass TMA)                             |                                                           |                                                           | N/A                                                       |
| SURGE ARRESTOR (QTY/MODEL)                            |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| DUPLEXER (QTY/MODEL)                                  |  | 0 + 2 / Powerwave / LGP 13519                                   |                                                           |                                                           | 1 / Polyphaser / 1000860                                  |
| HYBRID COMBINER (QTY/MODEL)                           |  | N/A                                                             |                                                           |                                                           | 2 + 2 / Powerwave / LGP 13519                             |
| DUPLEXER (QTY/MODEL)                                  |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| FILTER (QTY/MODEL)                                    |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| RX/AT KIT MODULE?                                     |  | No Rx/AT                                                        | No Rx/AT                                                  |                                                           | N/A                                                       |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)              |  | N/A / No LLC                                                    | N/A / No LLC                                              |                                                           | No Rx/AT                                                  |
| SCPA/MCPA MODULE?                                     |  | N/A                                                             | N/A                                                       |                                                           | N/A / No LLC                                              |
| Additional Component1                                 |  | Powerwave                                                       |                                                           |                                                           | N/A                                                       |
| Additional Component2                                 |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| Additional Component3                                 |  | Daisy chain to ANT4                                             |                                                           |                                                           | N/A                                                       |
| MAGNETIC DECLINATION                                  |  | -14°                                                            |                                                           |                                                           | Daisy chain to CILOC from ANT4                            |
| HATCHPLATE POWER (Watts)                              |  | TBD                                                             | TBD                                                       |                                                           | -14°                                                      |
| ERP (Watts)                                           |  | TBD                                                             | TBD                                                       |                                                           | TBD                                                       |
| Local Market Note1                                    |  |                                                                 |                                                           |                                                           | TBD                                                       |
| Local Market Note2                                    |  |                                                                 |                                                           |                                                           |                                                           |
| Local Market Note3                                    |  |                                                                 |                                                           |                                                           |                                                           |
| Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA  |  |                                                                 |                                                           |                                                           |                                                           |
| ANTENNA CONFIG (FROM BACK):                           |  | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS)       | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                |  | TxRx-TxRx                                                       | TxRx-TxRx                                                 |                                                           | TxRx-TxRx                                                 |
| TECHNOLOGY                                            |  | UMTS / MC 850                                                   | UMTS / 1900                                               |                                                           | GSM / 850                                                 |
| RRH LOCATION (Top/Bottom/None)                        |  | N/A                                                             | N/A                                                       |                                                           | N/A                                                       |
| FEEDERS TYPE                                          |  | 1 5/8" - RFS                                                    | 1 5/8" - RFS                                              |                                                           | 1 5/8" - RFS                                              |
| Feeder Length (feet)                                  |  | 265'                                                            | 265'                                                      |                                                           | 265'                                                      |
| ANTENNA ATOLL                                         |  |                                                                 |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                  |  | 7770                                                            |                                                           |                                                           | 7770                                                      |
| ANTENNA VENDOR                                        |  | Powerwave                                                       |                                                           |                                                           | Powerwave                                                 |
| ANTENNA SIZE (H x W x D)                              |  | 55.0 x 11.0 x 5.0                                               |                                                           |                                                           | 55.0 x 11.0 x 5.0                                         |
| ANTENNA WEIGHT                                        |  | 35                                                              |                                                           |                                                           | 35                                                        |
| ANTENNA GAIN                                          |  | 13.5 dBi                                                        | 16.5 dBi                                                  |                                                           | 13.5 dBi                                                  |
| AZIMUTH                                               |  | 150°                                                            |                                                           |                                                           | 150°                                                      |
| RADIATION CENTER (feet)                               |  | 175"                                                            |                                                           |                                                           | 175"                                                      |
| ANTENNA TIP HEIGHT                                    |  | 177'                                                            |                                                           |                                                           | 177'                                                      |
| ELECTRICAL TILT (700/850/1900/AWS)                    |  | 0°                                                              | 0°                                                        |                                                           | 5°                                                        |
| MECHANICAL DOWN TILT                                  |  | 0°                                                              |                                                           |                                                           | 0°                                                        |
| FEEDER AMOUNT                                         |  | 2                                                               |                                                           |                                                           | 2                                                         |
| Antenna RET Motor (QTY/MODEL)                         |  | 1 / Powerwave / 7020 (DB)                                       |                                                           |                                                           | 1 / Powerwave / 7020 (DB)                                 |
| Antenna RET Splitter (QTY/MODEL)                      |  |                                                                 |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)       |  |                                                                 |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                |  |                                                                 |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site |  |                                                                 |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                  |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| TMA/LNA (TYPE/MODEL)                                  |  | 2 / Powerwave / 1000860                                         |                                                           |                                                           | N/A                                                       |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                 |  | Polyphaser / 1000860                                            |                                                           |                                                           | N/A                                                       |
| POU FOR TMAS (QTY/MODEL) usually per site             |  | LGP 12104 (1900 AND 850 Bypass TMA)                             |                                                           |                                                           | N/A                                                       |
| SURGE ARRESTOR (QTY/MODEL)                            |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| DUPLEXER (QTY/MODEL)                                  |  | 0 + 2 / Powerwave / LGP 13519                                   |                                                           |                                                           | 1 / Polyphaser / 1000860                                  |
| HYBRID COMBINER (QTY/MODEL)                           |  | N/A                                                             |                                                           |                                                           | 2 + 2 / Powerwave / LGP 13519                             |
| DUPLEXER (QTY/MODEL)                                  |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| FILTER (QTY/MODEL)                                    |  | N/A                                                             |                                                           |                                                           | N/A                                                       |
| RX/AT KIT MODULE?                                     |  | No Rx/AT                                                        | No Rx/AT                                                  |                                                           | N/A                                                       |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)              |  | N/A / No LLC                                                    | N/A / No LLC                                              |                                                           | No Rx/AT                                                  |
| SCPA/MCPA MODULE?                                     |  | N/A                                                             | N/A                                                       |                                                           | N/A / No LLC                                              |



| Section 18D - CURRENT SECTOR/CELL INFORMATION - DELTA |                                                           |                                                           |                                                           |                                                           |
|-------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                           | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                |                                                           |                                                           |                                                           |                                                           |
| TECHNOLOGY                                            |                                                           |                                                           |                                                           |                                                           |
| RRH LOCATION (Top/Bottom/None)                        |                                                           |                                                           |                                                           |                                                           |
| FEEDERS TYPE                                          |                                                           |                                                           |                                                           |                                                           |
| Feeder Length (feet)                                  |                                                           |                                                           |                                                           |                                                           |
| ANTENNA ATOLL                                         |                                                           |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                  |                                                           |                                                           |                                                           |                                                           |
| ANTENNA VENDOR                                        |                                                           |                                                           |                                                           |                                                           |
| ANTENNA SIZE (H x W x D)                              |                                                           |                                                           |                                                           |                                                           |
| ANTENNA WEIGHT                                        |                                                           |                                                           |                                                           |                                                           |
| ANTENNA GAIN                                          |                                                           |                                                           |                                                           |                                                           |
| AZIMUTH                                               |                                                           |                                                           |                                                           |                                                           |
| RADIATION CENTER (feet)                               |                                                           |                                                           |                                                           |                                                           |
| ANTENNA TIP HEIGHT                                    |                                                           |                                                           |                                                           |                                                           |
| ELECTRICAL TILT (700/850/1900/AWS)                    |                                                           |                                                           |                                                           |                                                           |
| MECHANICAL DOWNTILT                                   |                                                           |                                                           |                                                           |                                                           |
| FEEDER AMOUNT                                         |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Motor (QTY/MODEL)                         |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Splitter (QTY/MODEL)                      |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)       |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                |                                                           |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site |                                                           |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| TMA/LNA (TYPE/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                 |                                                           |                                                           |                                                           |                                                           |
| PDU FOR TMAS (QTY/MODEL) usually per site             |                                                           |                                                           |                                                           |                                                           |
| SURGE ARRESTOR (QTY/MODEL)                            |                                                           |                                                           |                                                           |                                                           |
| DIPLEXER (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| HYBRID COMBINER (QTY/MODEL)                           |                                                           |                                                           |                                                           |                                                           |
| DUPLEXER (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| FILTER (QTY/MODEL)                                    |                                                           |                                                           |                                                           |                                                           |
| RX/AT KIT MODULE?                                     |                                                           |                                                           |                                                           |                                                           |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)              |                                                           |                                                           |                                                           |                                                           |
| SCPA/MCPA MODULE?                                     |                                                           |                                                           |                                                           |                                                           |
| Additional Component1                                 |                                                           |                                                           |                                                           |                                                           |
| Additional Component2                                 |                                                           |                                                           |                                                           |                                                           |
| Additional Component3                                 |                                                           |                                                           |                                                           |                                                           |
| MAGNETIC DECLINATION                                  |                                                           |                                                           |                                                           |                                                           |
| HATCHPLATE POWER (Watts)                              |                                                           |                                                           |                                                           |                                                           |
| ERP (Watts)                                           |                                                           |                                                           |                                                           |                                                           |
| Local Market Note1                                    |                                                           |                                                           |                                                           |                                                           |
| Local Market Note2                                    |                                                           |                                                           |                                                           |                                                           |
| Local Market Note3                                    |                                                           |                                                           |                                                           |                                                           |

| Section 18E - CURRENT SECTOR/CELL INFORMATION - EPSILON |                                                           |                                                           |                                                           |                                                           |
|---------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                             | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                  |                                                           |                                                           |                                                           |                                                           |
| TECHNOLOGY                                              |                                                           |                                                           |                                                           |                                                           |
| RRH LOCATION (Top/Bottom/None)                          |                                                           |                                                           |                                                           |                                                           |
| FEEDERS TYPE                                            |                                                           |                                                           |                                                           |                                                           |
| Feeder Length (feet)                                    |                                                           |                                                           |                                                           |                                                           |
| ANTENNA ATOLL                                           |                                                           |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                    |                                                           |                                                           |                                                           |                                                           |
| ANTENNA VENDOR                                          |                                                           |                                                           |                                                           |                                                           |
| ANTENNA SIZE (H x W x D)                                |                                                           |                                                           |                                                           |                                                           |
| ANTENNA WEIGHT                                          |                                                           |                                                           |                                                           |                                                           |
| ANTENNA GAIN                                            |                                                           |                                                           |                                                           |                                                           |
| AZIMUTH                                                 |                                                           |                                                           |                                                           |                                                           |
| RADIATION CENTER (feet)                                 |                                                           |                                                           |                                                           |                                                           |
| ANTENNA TIP HEIGHT                                      |                                                           |                                                           |                                                           |                                                           |
| ELECTRICAL TILT (700/850/1900/AWS)                      |                                                           |                                                           |                                                           |                                                           |
| MECHANICAL DOWNTILT                                     |                                                           |                                                           |                                                           |                                                           |
| FEEDER AMOUNT                                           |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Motor (QTY/MODEL)                           |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Splitter (QTY/MODEL)                        |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)         |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                  |                                                           |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site   |                                                           |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                    |                                                           |                                                           |                                                           |                                                           |
| TMA/LNA (TYPE/MODEL)                                    |                                                           |                                                           |                                                           |                                                           |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                   |                                                           |                                                           |                                                           |                                                           |
| PDU FOR TMAS (QTY/MODEL) usually per site               |                                                           |                                                           |                                                           |                                                           |
| SURGE ARRESTOR (QTY/MODEL)                              |                                                           |                                                           |                                                           |                                                           |
| DIPLEXER (QTY/MODEL)                                    |                                                           |                                                           |                                                           |                                                           |
| HYBRID COMBINER (QTY/MODEL)                             |                                                           |                                                           |                                                           |                                                           |
| DUPLEXER (QTY/MODEL)                                    |                                                           |                                                           |                                                           |                                                           |
| FILTER (QTY/MODEL)                                      |                                                           |                                                           |                                                           |                                                           |
| RX/AT KIT MODULE?                                       |                                                           |                                                           |                                                           |                                                           |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)                |                                                           |                                                           |                                                           |                                                           |
| SCPA/MCPA MODULE?                                       |                                                           |                                                           |                                                           |                                                           |
| Additional Component1                                   |                                                           |                                                           |                                                           |                                                           |
| Additional Component2                                   |                                                           |                                                           |                                                           |                                                           |
| Additional Component3                                   |                                                           |                                                           |                                                           |                                                           |
| MAGNETIC DECLINATION                                    |                                                           |                                                           |                                                           |                                                           |
| HATCHPLATE POWER (Watts)                                |                                                           |                                                           |                                                           |                                                           |
| ERP (Watts)                                             |                                                           |                                                           |                                                           |                                                           |
| Local Market Note1                                      |                                                           |                                                           |                                                           |                                                           |
| Local Market Note2                                      |                                                           |                                                           |                                                           |                                                           |
| Local Market Note3                                      |                                                           |                                                           |                                                           |                                                           |

| Section 18F - CURRENT SECTOR/CELL INFORMATION - ZETA  |                                                           |                                                           |                                                           |                                                           |
|-------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                           | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                |                                                           |                                                           |                                                           |                                                           |
| TECHNOLOGY                                            |                                                           |                                                           |                                                           |                                                           |
| RRH LOCATION (Top/Bottom/None)                        |                                                           |                                                           |                                                           |                                                           |
| FEEDERS TYPE                                          |                                                           |                                                           |                                                           |                                                           |
| Feeder Length (feet)                                  |                                                           |                                                           |                                                           |                                                           |
| ANTENNA ATOLL                                         |                                                           |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                  |                                                           |                                                           |                                                           |                                                           |
| ANTENNA VENDOR                                        |                                                           |                                                           |                                                           |                                                           |
| ANTENNA SIZE (H x W x D)                              |                                                           |                                                           |                                                           |                                                           |
| ANTENNA WEIGHT                                        |                                                           |                                                           |                                                           |                                                           |
| ANTENNA GAIN                                          |                                                           |                                                           |                                                           |                                                           |
| AZIMUTH                                               |                                                           |                                                           |                                                           |                                                           |
| RADIATION CENTER (feet)                               |                                                           |                                                           |                                                           |                                                           |
| ANTENNA TIP HEIGHT                                    |                                                           |                                                           |                                                           |                                                           |
| ELECTRICAL TILT (700/850/1900/AWS)                    |                                                           |                                                           |                                                           |                                                           |
| MECHANICAL DOWNTILT                                   |                                                           |                                                           |                                                           |                                                           |
| FEEDER AMOUNT                                         |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Motor (QTY/MODEL)                         |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Splitter (QTY/MODEL)                      |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)       |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                |                                                           |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site |                                                           |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| TMA/LNA (TYPE/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                 |                                                           |                                                           |                                                           |                                                           |
| PDU FOR TMAS (QTY/MODEL) usually per site             |                                                           |                                                           |                                                           |                                                           |
| SURGE ARRESTOR (QTY/MODEL)                            |                                                           |                                                           |                                                           |                                                           |
| DIPLEXER (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| HYBRID COMBINER (QTY/MODEL)                           |                                                           |                                                           |                                                           |                                                           |
| DUPLEXER (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| FILTER (QTY/MODEL)                                    |                                                           |                                                           |                                                           |                                                           |
| RX/AT KIT MODULE?                                     |                                                           |                                                           |                                                           |                                                           |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)              |                                                           |                                                           |                                                           |                                                           |
| SCPA/MCPA MODULE?                                     |                                                           |                                                           |                                                           |                                                           |
| Additional Component1                                 |                                                           |                                                           |                                                           |                                                           |
| Additional Component2                                 |                                                           |                                                           |                                                           |                                                           |
| Additional Component3                                 |                                                           |                                                           |                                                           |                                                           |
| MAGNETIC DECLINATION                                  |                                                           |                                                           |                                                           |                                                           |
| HATCHPLATE POWER (Watts)                              |                                                           |                                                           |                                                           |                                                           |
| ERP (Watts)                                           |                                                           |                                                           |                                                           |                                                           |
| Local Market Note1                                    |                                                           |                                                           |                                                           |                                                           |
| Local Market Note2                                    |                                                           |                                                           |                                                           |                                                           |
| Local Market Note3                                    |                                                           |                                                           |                                                           |                                                           |







| Section 16D - NEW/PROPOSED SECTOR/CELL INFORMATION - DELTA |                                                           |                                                           |                                                           |                                                           |
|------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                                | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                     |                                                           |                                                           |                                                           |                                                           |
| TECHNOLOGY                                                 |                                                           |                                                           |                                                           |                                                           |
| RRH LOCATION (Top/Bottom/None)                             |                                                           |                                                           |                                                           |                                                           |
| FEEDERS TYPE                                               |                                                           |                                                           |                                                           |                                                           |
| Feeder Length (feet)                                       |                                                           |                                                           |                                                           |                                                           |
| ANTENNA ATOLL                                              |                                                           |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                       |                                                           |                                                           |                                                           |                                                           |
| ANTENNA VENDOR                                             |                                                           |                                                           |                                                           |                                                           |
| ANTENNA SIZE (H x W x D)                                   |                                                           |                                                           |                                                           |                                                           |
| ANTENNA WEIGHT                                             |                                                           |                                                           |                                                           |                                                           |
| ANTENNA GAIN                                               |                                                           |                                                           |                                                           |                                                           |
| AZIMUTH                                                    |                                                           |                                                           |                                                           |                                                           |
| RADIATION CENTER (feet)                                    |                                                           |                                                           |                                                           |                                                           |
| ANTENNA TIP HEIGHT                                         |                                                           |                                                           |                                                           |                                                           |
| ELECTRICAL TILT (700/850/1900/AWS)                         |                                                           |                                                           |                                                           |                                                           |
| MECHANICAL DOWNTILT                                        |                                                           |                                                           |                                                           |                                                           |
| FEEDER AMOUNT                                              |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Motor (QTY/MODEL)                              |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Splitter (QTY/MODEL)                           |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)            |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                     |                                                           |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site      |                                                           |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                       |                                                           |                                                           |                                                           |                                                           |
| TMA/LNA (TYPE/MODEL)                                       |                                                           |                                                           |                                                           |                                                           |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                      |                                                           |                                                           |                                                           |                                                           |
| PDU FOR TMA (QTY/MODEL) usually per site                   |                                                           |                                                           |                                                           |                                                           |
| SURGE ARRESTOR (QTY/MODEL)                                 |                                                           |                                                           |                                                           |                                                           |
| DIPLEXER (QTY/MODEL)                                       |                                                           |                                                           |                                                           |                                                           |
| HYBRID COMBINER (QTY/MODEL)                                |                                                           |                                                           |                                                           |                                                           |
| DUPLEXER (QTY/MODEL)                                       |                                                           |                                                           |                                                           |                                                           |
| FILTER (QTY/MODEL)                                         |                                                           |                                                           |                                                           |                                                           |
| RX/IT KIT MODULE?                                          |                                                           |                                                           |                                                           |                                                           |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)                   |                                                           |                                                           |                                                           |                                                           |
| SCPA/MCPA MODULE?                                          |                                                           |                                                           |                                                           |                                                           |
| Additional Component1                                      |                                                           |                                                           |                                                           |                                                           |
| Additional Component2                                      |                                                           |                                                           |                                                           |                                                           |
| Additional Component3                                      |                                                           |                                                           |                                                           |                                                           |
| MAGNETIC DECLINATION                                       |                                                           |                                                           |                                                           |                                                           |
| HATCHPLATE POWER (Watts)                                   |                                                           |                                                           |                                                           |                                                           |
| ERP (Watts)                                                |                                                           |                                                           |                                                           |                                                           |
| Local Market Note1                                         |                                                           |                                                           |                                                           |                                                           |
| Local Market Note2                                         |                                                           |                                                           |                                                           |                                                           |
| Local Market Note3                                         |                                                           |                                                           |                                                           |                                                           |

| Section 16E - NEW/PROPOSED SECTOR/CELL INFORMATION - EPSILON |                                                           |                                                           |                                                           |                                                           |
|--------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                                  | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                       |                                                           |                                                           |                                                           |                                                           |
| TECHNOLOGY                                                   |                                                           |                                                           |                                                           |                                                           |
| RRH LOCATION (Top/Bottom/None)                               |                                                           |                                                           |                                                           |                                                           |
| FEEDERS TYPE                                                 |                                                           |                                                           |                                                           |                                                           |
| Feeder Length (feet)                                         |                                                           |                                                           |                                                           |                                                           |
| ANTENNA ATOLL                                                |                                                           |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                         |                                                           |                                                           |                                                           |                                                           |
| ANTENNA VENDOR                                               |                                                           |                                                           |                                                           |                                                           |
| ANTENNA SIZE (H x W x D)                                     |                                                           |                                                           |                                                           |                                                           |
| ANTENNA WEIGHT                                               |                                                           |                                                           |                                                           |                                                           |
| ANTENNA GAIN                                                 |                                                           |                                                           |                                                           |                                                           |
| AZIMUTH                                                      |                                                           |                                                           |                                                           |                                                           |
| RADIATION CENTER (feet)                                      |                                                           |                                                           |                                                           |                                                           |
| ANTENNA TIP HEIGHT                                           |                                                           |                                                           |                                                           |                                                           |
| ELECTRICAL TILT (700/850/1900/AWS)                           |                                                           |                                                           |                                                           |                                                           |
| MECHANICAL DOWNTILT                                          |                                                           |                                                           |                                                           |                                                           |
| FEEDER AMOUNT                                                |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Motor (QTY/MODEL)                                |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Splitter (QTY/MODEL)                             |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)              |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                       |                                                           |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site        |                                                           |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                         |                                                           |                                                           |                                                           |                                                           |
| TMA/LNA (TYPE/MODEL)                                         |                                                           |                                                           |                                                           |                                                           |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                        |                                                           |                                                           |                                                           |                                                           |
| PDU FOR TMA (QTY/MODEL) usually per site                     |                                                           |                                                           |                                                           |                                                           |
| SURGE ARRESTOR (QTY/MODEL)                                   |                                                           |                                                           |                                                           |                                                           |
| DIPLEXER (QTY/MODEL)                                         |                                                           |                                                           |                                                           |                                                           |
| HYBRID COMBINER (QTY/MODEL)                                  |                                                           |                                                           |                                                           |                                                           |
| DUPLEXER (QTY/MODEL)                                         |                                                           |                                                           |                                                           |                                                           |
| FILTER (QTY/MODEL)                                           |                                                           |                                                           |                                                           |                                                           |
| RX/IT KIT MODULE?                                            |                                                           |                                                           |                                                           |                                                           |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)                     |                                                           |                                                           |                                                           |                                                           |
| SCPA/MCPA MODULE?                                            |                                                           |                                                           |                                                           |                                                           |
| Additional Component1                                        |                                                           |                                                           |                                                           |                                                           |
| Additional Component2                                        |                                                           |                                                           |                                                           |                                                           |
| Additional Component3                                        |                                                           |                                                           |                                                           |                                                           |
| MAGNETIC DECLINATION                                         |                                                           |                                                           |                                                           |                                                           |
| HATCHPLATE POWER (Watts)                                     |                                                           |                                                           |                                                           |                                                           |
| ERP (Watts)                                                  |                                                           |                                                           |                                                           |                                                           |
| Local Market Note1                                           |                                                           |                                                           |                                                           |                                                           |
| Local Market Note2                                           |                                                           |                                                           |                                                           |                                                           |
| Local Market Note3                                           |                                                           |                                                           |                                                           |                                                           |

| Section 16F - NEW/PROPOSED SECTOR/CELL INFORMATION - ZETA |                                                           |                                                           |                                                           |                                                           |
|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| ANTENNA CONFIG (FROM BACK):                               | ANTENNA 1<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 2<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 3<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) | ANTENNA 4<br>GSM, UMTS (850 / 1900) or<br>LTE (700 / AWS) |
| TX/RX?                                                    |                                                           |                                                           |                                                           |                                                           |
| TECHNOLOGY                                                |                                                           |                                                           |                                                           |                                                           |
| RRH LOCATION (Top/Bottom/None)                            |                                                           |                                                           |                                                           |                                                           |
| FEEDERS TYPE                                              |                                                           |                                                           |                                                           |                                                           |
| Feeder Length (feet)                                      |                                                           |                                                           |                                                           |                                                           |
| ANTENNA ATOLL                                             |                                                           |                                                           |                                                           |                                                           |
| ANTENNA MAKE - MODEL                                      |                                                           |                                                           |                                                           |                                                           |
| ANTENNA VENDOR                                            |                                                           |                                                           |                                                           |                                                           |
| ANTENNA SIZE (H x W x D)                                  |                                                           |                                                           |                                                           |                                                           |
| ANTENNA WEIGHT                                            |                                                           |                                                           |                                                           |                                                           |
| ANTENNA GAIN                                              |                                                           |                                                           |                                                           |                                                           |
| AZIMUTH                                                   |                                                           |                                                           |                                                           |                                                           |
| RADIATION CENTER (feet)                                   |                                                           |                                                           |                                                           |                                                           |
| ANTENNA TIP HEIGHT                                        |                                                           |                                                           |                                                           |                                                           |
| ELECTRICAL TILT (700/850/1900/AWS)                        |                                                           |                                                           |                                                           |                                                           |
| MECHANICAL DOWNTILT                                       |                                                           |                                                           |                                                           |                                                           |
| FEEDER AMOUNT                                             |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Motor (QTY/MODEL)                             |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Splitter (QTY/MODEL)                          |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Earth (Grounding) Clamp (QTY/MODEL)           |                                                           |                                                           |                                                           |                                                           |
| Antenna RET Surge Arrestor (QTY/MODEL)                    |                                                           |                                                           |                                                           |                                                           |
| Antenna RET CONTROL UNIT (QTY/MODEL) usually per site     |                                                           |                                                           |                                                           |                                                           |
| DC BLOCK (QTY/MODEL)                                      |                                                           |                                                           |                                                           |                                                           |
| TMA/LNA (TYPE/MODEL)                                      |                                                           |                                                           |                                                           |                                                           |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)                     |                                                           |                                                           |                                                           |                                                           |
| PDU FOR TMA (QTY/MODEL) usually per site                  |                                                           |                                                           |                                                           |                                                           |
| SURGE ARRESTOR (QTY/MODEL)                                |                                                           |                                                           |                                                           |                                                           |
| DIPLEXER (QTY/MODEL)                                      |                                                           |                                                           |                                                           |                                                           |
| HYBRID COMBINER (QTY/MODEL)                               |                                                           |                                                           |                                                           |                                                           |
| DUPLEXER (QTY/MODEL)                                      |                                                           |                                                           |                                                           |                                                           |
| FILTER (QTY/MODEL)                                        |                                                           |                                                           |                                                           |                                                           |
| RX/IT KIT MODULE?                                         |                                                           |                                                           |                                                           |                                                           |
| TRIPLEXER or NARROW BAND LLC (QTY/MODEL)                  |                                                           |                                                           |                                                           |                                                           |
| SCPA/MCPA MODULE?                                         |                                                           |                                                           |                                                           |                                                           |
| Additional Component1                                     |                                                           |                                                           |                                                           |                                                           |
| Additional Component2                                     |                                                           |                                                           |                                                           |                                                           |
| Additional Component3                                     |                                                           |                                                           |                                                           |                                                           |
| MAGNETIC DECLINATION                                      |                                                           |                                                           |                                                           |                                                           |
| HATCHPLATE POWER (Watts)                                  |                                                           |                                                           |                                                           |                                                           |
| ERP (Watts)                                               |                                                           |                                                           |                                                           |                                                           |
| Local Market Note1                                        |                                                           |                                                           |                                                           |                                                           |
| Local Market Note2                                        |                                                           |                                                           |                                                           |                                                           |
| Local Market Note3                                        |                                                           |                                                           |                                                           |                                                           |



Kathrein's X-polarized antennas are designed for use in digital polarization diversity systems.

- X-polarized (+45° and -45°).
- UV resistant fiberglass radomes.
- Wideband vector dipole technology.
- DC Grounded metallic parts for impulse suppression.
- RET motor housed inside the radome and field replaceable.

#### General specifications:

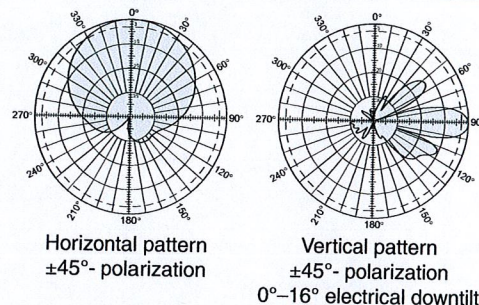
|                                    |                                          |
|------------------------------------|------------------------------------------|
| Frequency range                    | 698–894 MHz // 1710–2170 MHz             |
| Impedance                          | 50 ohms                                  |
| VSWR                               | <1.5:1                                   |
| Intermodulation (2x20w)            | IM3:< -150 dBc                           |
| Polarization                       | +45° and -45°                            |
| Connector                          | 4 x 7-16 DIN female (long neck)          |
| Isolation                          | intrasystem >30 dB // intersystem >35 dB |
| See reverse for order information. |                                          |

#### IRT specifications:

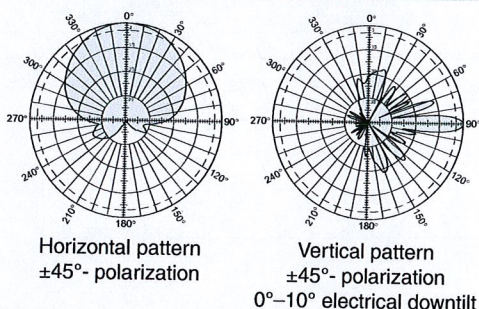
|                                            |                                                                                                                                              |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Logical interface ex factory <sup>1)</sup> | AISG 1.1                                                                                                                                     |
| Protocols                                  | AISG 1.1 and 3GPP/AISG 2.0 compliant                                                                                                         |
| Hardware interface <sup>2)</sup>           | 2 x 8pin connector acc. IEC 60130-9;<br>according to AISG:<br>– RCUin (male): Control / Daisy chain in<br>– RCUout (female): Daisy chain out |
| Power supply                               | 10–30 V                                                                                                                                      |
| Power Consumption                          | <1 W (standby); <8.5 W (motor activated)                                                                                                     |
| Adjustment time (full range)               | 40 seconds                                                                                                                                   |
| Adjustment cycles                          | >50,000                                                                                                                                      |
| Certification                              | FCC 15.107 Class B Computing Devices                                                                                                         |

| Specifications:                                                     | 698–806 MHz                               | 824–894 MHz                               | 1710–1755 MHz                             | 1850–1990 MHz                             | 2110–2170 MHz                             |
|---------------------------------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| Gain                                                                | 14.3 dBi                                  | 14.8 dBi                                  | 17.3 dBi                                  | 17.5 dBi                                  | 17.3 dBi                                  |
| Front-to-back ratio                                                 | >30 dB (co-polar)<br>32 dB (average)      | >27 dB (co-polar)<br>30 dB (average)      | >30 dB (co-polar)<br>34 dB (average)      | >30 dB (co-polar)<br>34 dB (average)      | >30 dB (co-polar)<br>34 dB (average)      |
| Maximum input power per input                                       | 500 watts (at 50°C)                       | 500 watts (at 50°C)                       | 300 watts (at 50°C)                       | 300 watts (at 50°C)                       | 300 watts (at 50°C)                       |
| +45° and -45° polarization horizontal beamwidth                     | 68° (half-power)                          | 65° (half-power)                          | 61° (half-power)                          | 60° (half-power)                          | 61° (half-power)                          |
| +45° and -45° polarization vertical beamwidth                       | 15° (half-power)                          | 13.5° (half-power)                        | 7.5° (half-power)                         | 7.5° (half-power)                         | 7.5° (half-power)                         |
| Electrical downtilt continuously adjustable                         | 0°–16°                                    | 0°–16°                                    | 0°–10°                                    | 0°–10°                                    | 0°–10°                                    |
| Min sidelobe suppression for first sidelobe above main beam average | 0° 8° 16° T<br>17 16 16 dB<br>19 19 18 dB | 0° 8° 16° T<br>18 16 16 dB<br>22 20 20 dB | 0° 5° 10° T<br>18 18 17 dB<br>20 20 20 dB | 0° 5° 10° T<br>18 18 17 dB<br>20 20 20 dB | 0° 5° 10° T<br>18 18 17 dB<br>20 20 20 dB |
| Cross polar ratio                                                   |                                           |                                           |                                           |                                           |                                           |
| Main direction                                                      | 0°                                        | 0°                                        | 0°                                        | 0°                                        | 0°                                        |
| Sector                                                              | ±60°                                      | ±60°                                      | ±60°                                      | ±60°                                      | ±60°                                      |
|                                                                     | 25 dB (typical)<br>>10 dB, 15 dB (avg)    | 25 dB (typical)<br>>8 dB, 14 dB (avg)     | 25 dB (typical)<br>>8 dB, 14 dB (avg)     | 25 dB (typical)<br>>10 dB, 16 dB (avg)    | 25 dB (typical)<br>>8 dB, 14 dB (avg)     |
| Tracking                                                            | 1.5 db                                    | 1.5 db                                    | 2.0 db                                    | 1.0 db                                    | 2.0 db                                    |
| Squint                                                              | ±2.5°                                     | ±4°                                       | ±4°                                       | ±1.5°                                     | ±4°                                       |

#### 698–894 MHz



#### 1710–2170 MHz



<sup>1)</sup> The protocol of the logical interface can be switched from AISG 1.1 to 3GPP/AISG 2.0 and vice versa with a vendor specific command. Start-up operation of the RCU 86010149 is possible in an RET system supporting AISG 1.1 or supporting 3GPP/AISG 2.0 after performing a layer 2 reset before address assignment. The protocol can also be changed as follows: AISG 1.1 to 3GPP: Enter "3GPP" into the additional data field "Installer's ID" and perform a layer 7 reset or a power reset. 3GPP to AISG 1.1: Enter "AISG 1.1" into the additional datafield "Installer's ID" and perform a layer 2 reset or a power reset. After switching the protocol any other information can be entered into the "Installer's ID" field.

<sup>2)</sup> The tightening torque for fixing the connector must be 0.5 – 1.0 Nm ("hand-tightened"). The connector should be tightened by hand only!



11223-D  
936.4133



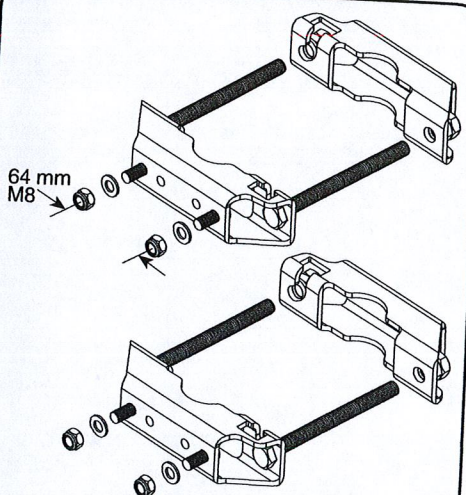
Feb 25, 2011



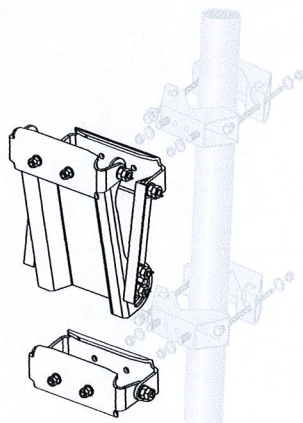


#### Mechanical specifications:

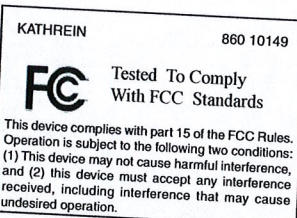
|                       |                                                                          |
|-----------------------|--------------------------------------------------------------------------|
| Weight                | 40.8 lb (18.5 kg)                                                        |
| Dimensions            | 55.2 x 11.8 x 6 inches<br>(1403 x 300 x 152 mm)                          |
| Wind load             | at 93 mph (150kph)                                                       |
| Front/Side/Rear       | 156 lbf / 59 lbf / 160 lbf<br>(690 N) / (260 N) / (710 N)                |
| Mounting category     | M (Medium)                                                               |
| Wind survival rating* | 150 mph (240 kph)                                                        |
| Shipping dimensions   | 64.8 x 12.6 x 7.5 inches<br>(1646 x 322 x 190 mm)                        |
| Shipping weight       | 50 lb (22.7 kg)                                                          |
| Mounting              | Mounting hardware included for 2 to 4.6 inch<br>(50 to 115 mm) OD masts. |



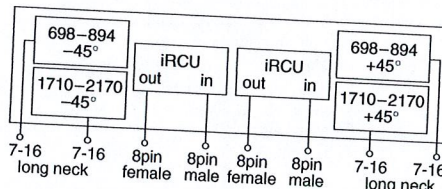
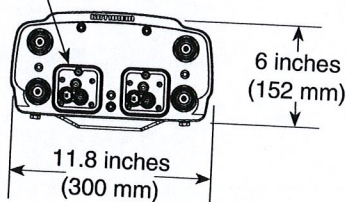
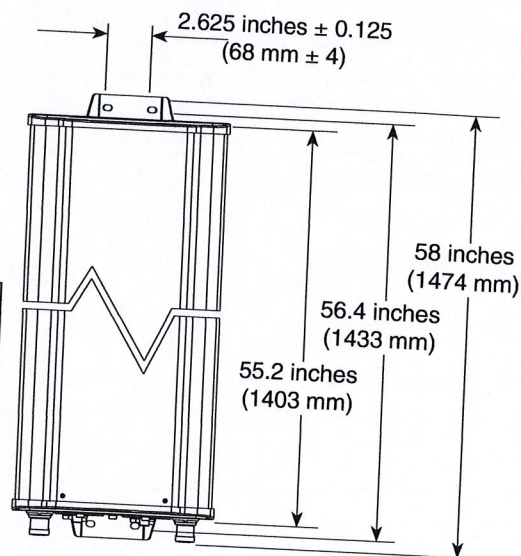
**Mounting Brackets**  
for use with 2-point mount antennas  
Mast dia. 2-4.5 inches (50-115 mm)  
Weight: 4.4 lb (2 kg)



**Mechanical Tilt Brackets**  
for use with 2-point mount antennas  
Weight: 13 lb (5.9 kg)  
(Model 850 10007)



Note: Refer to part number 860 10149 for the specifications of the remote control actuator.



#### Order Information:

| Model       | Description                                                                                                   |
|-------------|---------------------------------------------------------------------------------------------------------------|
| 800 10764   | Dualband antenna with mounting bracket<br>0°-16° // 0°-10° electrical downtilt                                |
| 800 10764 K | Dualband antenna with<br>mounting bracket and mechanical tilt bracket<br>0°-16° // 0°-10° electrical downtilt |

\* Mechanical design is based on environmental conditions as stipulated in TIA-222-G-2 (December 2009) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

All specifications are subject to change without notice. The latest specifications are available at [www.kathrein-scala.com](http://www.kathrein-scala.com).

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Email: [communications@kathrein.com](mailto:communications@kathrein.com) Internet: [www.kathrein-scala.com](http://www.kathrein-scala.com)

# P65-17-XLH-RR

## Dual Broadband Antennas

POLARIZATION: Dual linear  $\pm 45^\circ$   
 FREQUENCY (MHz): 698-894, 1710-2170  
 HORIZONTAL BEAM WIDTH (\*): 65, 65  
 GAIN (dBi dBd): 17.2/15.1 17.5/15.4  
 TILT: 0-7, 0-8  
 LENGTH: 96"

|                                                               | 698-894            |           | 1710-2170          |           |           |
|---------------------------------------------------------------|--------------------|-----------|--------------------|-----------|-----------|
| Frequency range (MHz)                                         | 698-806            | 806-894   | 1710-1880          | 1850-1990 | 1900-2170 |
| Frequency band (MHz)                                          | 16.4/14.3          | 17.2/15.1 | 16.9/14.8          | 17.2/15.1 | 17.5/15.4 |
| Gain (dBi/dBd)                                                | Dual Linear +/- 45 |           | Dual Linear +/- 45 |           |           |
| Polarization                                                  | 50                 |           | 50                 |           |           |
| Nominal Impedance ( $\Omega$ )                                | < 1.5:1            |           | < 1.5:1            |           |           |
| VSWR                                                          | 70                 | 63        | 60                 | 63        | 60        |
| Horizontal beam width, -3 dB ( $^\circ$ )                     | 8.4                |           | 6.5                |           |           |
| Vertical beam width, -3 dB ( $^\circ$ )                       | 0 to 7             |           | 0 to 8             |           |           |
| Electrical down tilt ( $^\circ$ )                             | > 16               |           | > 16               |           |           |
| Side lobe suppression, vertical 1st upper (dB)                | > 30               |           | > 30               |           |           |
| Isolation between inputs (dB)                                 | > 40               |           | > 40               |           |           |
| Inter band Isolation (dB)                                     | < 2                |           | < 2                |           |           |
| Tracking, horizontal plane $\pm 60^\circ$ (dB)                | < 0.5              |           | < 0.5              |           |           |
| Vertical beam squint ( $^\circ$ )                             | > 25               |           | > 30               |           |           |
| Front to back ratio (dB) $180^\circ \pm 30^\circ$ copolar     | > 22               |           | > 25               |           |           |
| Front to back ratio (dB) $180^\circ \pm 30^\circ$ total power | > 15               |           | > 15               |           |           |
| Cross polar discrimination (XPD) $0^\circ$ (dB)               | 10                 |           | 10                 |           |           |
| Cross polar discrimination (XPD) $\pm 60^\circ$ (dB)          | < -153             |           | < -153             |           |           |
| IM3, 2xTx&43dBm (dBc)                                         | 500                |           | 300                |           |           |
| Power handling, average per input (W)                         | 1000               |           | 600                |           |           |
| Power handling, average total (W)                             |                    |           |                    |           |           |

|                                                           |                                                         |
|-----------------------------------------------------------|---------------------------------------------------------|
| Connector                                                 | 4 x 7/16 DIN Female, IP67, 4 x AISG [2 x i-RET 8510.40] |
| Connector position                                        | Bottom                                                  |
| Dimensions, HxWxD, mm(ft)                                 | 2445x312x148(96"x12"x6")                                |
| Mounting                                                  | Pre-mounted Tilt Brackets                               |
| Weight, with brackets, kg (lbs)                           | 28.2 (62)                                               |
| Weight, without brackets, kg (lbs)                        | 22.7 (50)                                               |
| Wind load, frontal/lateral/rear side 42 m/s<br>Cd=1.6 (N) | 1006 / 147 / 1273                                       |
| Maximum operational wind speed, m/s (mph)                 | 45 (100)                                                |
| Survival wind speed, m/s (mph)                            | 67 (150)                                                |
| Lightning protection                                      | DC Ground                                               |
| Operating Temperature                                     | -40°C to +60°C                                          |
| Radome Material                                           | PVC, IP55                                               |
| Radome colour                                             | Light Grey                                              |
| Packing size, HxWxD, mm (ft)                              | 2610 x 427 x 275 (102.8" x 17" x 11")                   |
| Shipping weight, kg (lbs)                                 | 37 (81)                                                 |
| RET                                                       | iRET AISGv1.1, MET and AISGv2.0 Available               |
| Brackets                                                  | 7256.00, 7454.00A                                       |



\*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

For detailed patterns visit <http://www.powerwave.com/rpa/>.



**AM-X-CD-16-65-00T-RET(6' 65° Dual Broadband Antenna)**

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V12°

1710 ~ 2170MHz, X-pol., H65° / V6.0°

**Electrical Specification**

|                                                         |                                                                                                               |                                                                                                             |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Frequency Range                                         | 698~894MHz                                                                                                    | 1710~2170MHz                                                                                                |
| Impedance                                               | 50Ω                                                                                                           |                                                                                                             |
| Polarization                                            | Dual, Slant ±45°                                                                                              |                                                                                                             |
| Gain                                                    | 15.5dBi / 13.35dBd @ 698-806MHz<br>16.0dBi / 13.85dBd @ 824-894MHz                                            | 17.3dBi / 15.15dBd @ 1710-1755MHz<br>17.4dBi / 15.25dBd @ 1850-1900MHz<br>17.1dBi / 14.95dBd @ 2110-2155MHz |
| Beamwidth                                               | Horizontal                                                                                                    | 65° @ 698-806MHz<br>63° @ 824-894MHz                                                                        |
|                                                         | Vertical                                                                                                      | 65° @ 1710-1755MHz<br>67° @ 1850-1900MHz<br>69° @ 2110-2155MHz                                              |
|                                                         | Horizontal                                                                                                    | 12.3° @ 698-806MHz<br>11.5° @ 824-894MHz                                                                    |
|                                                         | Vertical                                                                                                      | 6.5° @ 1710-1755MHz<br>6.0° @ 1850-1900MHz<br>5.7° @ 2110-2155MHz                                           |
| VSWR                                                    | ≤1.5:1                                                                                                        |                                                                                                             |
| Front-to-Back Ratio                                     | ≥27 dB                                                                                                        |                                                                                                             |
| Electrical Downtilt Range                               | 2° ~ 16°                                                                                                      | 0° ~ 10°                                                                                                    |
| Isolation Between Ports                                 | ≥30 dB                                                                                                        |                                                                                                             |
| Isolation Between Ports of Different Frequency Elements | ≥35 dB                                                                                                        |                                                                                                             |
| Cross Pole Discrimination                               | 10.0 dB @ ±60°<br>15.0 dBi @ 0°                                                                               |                                                                                                             |
| First Upper Side Lobe Suppression                       | 16dB                                                                                                          |                                                                                                             |
| Side Lobe Suppression                                   | > 16 dB @ 0-6° Tilt<br>> 18 dB @ 7-12° Tilt<br>(Up to 10° from Boresight)                                     | > 16 dB @ 0-6° Tilt<br>> 18 dB @ 7-10° Tilt<br>(Up to 10° from Boresight)                                   |
| Passive Intermodulation                                 | ≤ -150 dBc @ 2x20w                                                                                            |                                                                                                             |
| Input Maximum CW Power                                  | 500 W                                                                                                         | 300 W                                                                                                       |
| Environmental Compliance                                | IP65 for Radome<br>IP67 for Connectors                                                                        |                                                                                                             |
| RET Motor Configuration                                 | Field Replaceable RET Electronic Control Module /<br>RET Motor is internal to antenna & not field replaceable |                                                                                                             |
| Compliant with AISG 1.1 and 2.0                         | AISG 1.1 and 2.0                                                                                              |                                                                                                             |

**Mechanical Specification**

|                        |                                        |
|------------------------|----------------------------------------|
| Dimension (W×D×H)      | 11.8×5.9×72 inches<br>(300×150×1829mm) |
| Weight (Without clamp) | 48.5 lbs (22.0 kg)                     |
| Connector              | 4 x 7/16 DIN(F), Long Neck             |
| Max Wind Speed         | 150 mph                                |
| Wind Load (@150 mph)   | 1891 N                                 |



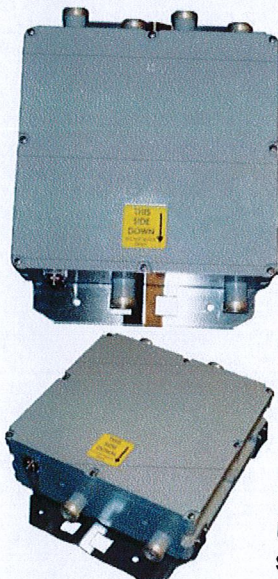
# Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338

Fax: 201-342-3339

www.cciproduts.com

## General Information



CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Duplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.



**Model**  
**DTMABP7819VG12A**

## Contents:

|                                            |   |
|--------------------------------------------|---|
| General Info and Technical Description     | 1 |
| Electrical & Mechanical Specs (AISG TMA)   | 2 |
| Block Diagram & Outline Drawing (AISG TMA) | 3 |

## Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

## Technical Description

The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are diplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.



## Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications



| Description                           | Typical Specifications                                                                 |
|---------------------------------------|----------------------------------------------------------------------------------------|
| <b>Electrical Specifications</b>      |                                                                                        |
| 700 Band & Cellular Frequency Range   | 698 to 894 MHz                                                                         |
| PCS Receive Frequency Range           | 1850 – 1910 MHz                                                                        |
| PCS Transmit Frequency Range          | 1930 - 1990 MHz                                                                        |
| PCS Amplifier Gain                    | 6 to 12 dB Adjustable in 0.25 dB steps via AISG                                        |
| PCS Gain Variation                    | ±1.0 dB                                                                                |
| PCS System Noise Figure               | 1.4 dB (@ +25°C), 1.6 dB (@ +65°C),<br>At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C) |
| PCS Input Third Order Intercept Point | +12 dBm Min @ Max. Gain                                                                |
| Input/Output Return Loss              | 18 dB Min. all ports, 15 dB Min. Bypass Mode                                           |
| Insertion Loss                        |                                                                                        |
| 700 Band & Cellular Passband          | < 0.2 dB, 0.1 dB typical                                                               |
| PCS Transmit Passband                 | 0.4 dB Typical                                                                         |
| PCS Transmit Passband Ripple          | ±0.2 dB                                                                                |
| PCS Bypass Mode, Rx Passband          | 1.6 dB (@ +25°C), 1.8 dB (@ +65°C),<br>At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C) |
| PCS Bypass Mode, Rx Passband Ripple   | ±1 dB                                                                                  |
| Filter Characteristics                |                                                                                        |
| 700 Band & Cellular Path Rejection    | 70 dB @ 1850 - 1990 MHz                                                                |
| PCS Path Rejection                    | 80 dB @ 698 - 894 MHz                                                                  |
| Continuous Average Power              | 200 Watts max                                                                          |
| Peak Envelope Power                   | 2 kW max                                                                               |
| Intermodulation Performance           |                                                                                        |
| IMD at ANT port in Rx Band            | -112 dBm Min. (2 x +43 dBm tones)                                                      |
| Operating Voltage                     | +10V to +30V DC provided via coax or AISG                                              |
| Power Consumption                     | ≤ 2.1 Watts                                                                            |
| <b>Mechanical Specifications</b>      |                                                                                        |
| Connectors                            | DIN 7-16 Female (Long Neck) x 6, AISG x 1                                              |
| Dimensions (Body Only)                | 10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)                   |
| Dimensions (with Bracket)             | 14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)                  |
| Weight (w/o Bracket)                  | 19.18 Lbs. (8.7 Kg)                                                                    |
| Mounting                              | Pole/Wall Mounting Bracket                                                             |
| <b>Environmental Specifications</b>   |                                                                                        |
| Operating Temperature                 | -40° C to +65°C                                                                        |
| Lightning Protection                  | 8/20us, ±2KA max, 10 strikes each, IEC61000-4-5                                        |
| Enclosure                             | IP65 (Unit Body), IP68 (Connector)                                                     |
| MTBF                                  | >500,000 hours                                                                         |

All specifications are subject to change. The latest specifications are available at [www.cciproductions.com](http://www.cciproductions.com)

**Communication Components Inc.**

Tel: 201-342-3338

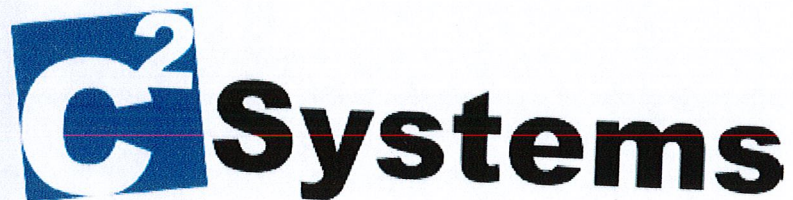
CCI Confidential

Fax: 201-342-3339

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Revision 1.0





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Calculated Radio Frequency Emissions



at&t

CT2260

(New Milford)

100 Old Town Park Road, New Milford, CT 06776

(a.k.a. 5 Old Town Park Road)

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February 7, 2013

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## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the transmission tower mast located at 100 Old Town Park Road in New Milford, CT. The coordinates of the tower are 41° 32' 6.73" N, 73° 25' 29.57" W.

AT&T is proposing the following modifications:

- 1) Remove six dual-band (850/1900 MHz) antennas (two per sector);
- 2) Install six multi-band (700/850/1900/2100 MHz) antennas (two per sector) for their LTE/GSM/UMTS networks.

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ( $\text{mW}/\text{cm}^2$ ). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

### 3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left( \frac{1.6^2 \times \text{EIRP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

$$R = \text{Radial Distance} = \sqrt{H^2 + V^2}$$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.



## 4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower.

Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

| Carrier             | Antenna Height (Feet) | Operating Frequency (MHz) | Number of Trans. | ERP Per Transmitter (Watts) | Power Density (mw/cm <sup>2</sup> ) | Limit        | %MPE         |
|---------------------|-----------------------|---------------------------|------------------|-----------------------------|-------------------------------------|--------------|--------------|
| <i>New Cingular</i> | 175                   | 1930                      | 3                | 427                         | 0.0150                              | 1.0000       | 1.50%        |
| <i>New Cingular</i> | 175                   | 880                       | 6                | 296                         | 0.0209                              | 0.5867       | 3.55%        |
| AT&T UMTS           | 175                   | 880                       | 2                | 1294                        | 0.0030                              | 0.5867       | 0.52%        |
| AT&T UMTS           | 175                   | 1900                      | 2                | 1294                        | 0.0030                              | 1.0000       | 0.30%        |
| AT&T LTE            | 175                   | 734                       | 1                | 1615                        | 0.0019                              | 0.4893       | 0.39%        |
| AT&T GSM            | 175                   | 880                       | 1                | 647                         | 0.0008                              | 0.5867       | 0.13%        |
| AT&T GSM            | 175                   | 1900                      | 4                | 777                         | 0.0036                              | 1.0000       | 0.36%        |
|                     |                       |                           |                  |                             |                                     | <b>Total</b> | <b>1.70%</b> |

**Table 1: Carrier Information**<sup>1 2 3</sup>

<sup>1</sup> The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

<sup>2</sup> In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

<sup>3</sup> Antenna height listed for AT&T is in reference to the Centek Engineering Structural Analysis dated January 8, 2013.



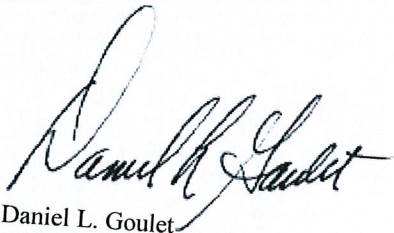
## 5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **1.70% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

## 6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet  
C Squared Systems, LLC

February 7, 2013

Date

### **Attachment A: References**

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board



## Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

### (A) Limits for Occupational/Controlled Exposure<sup>4</sup>

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                  | 6                                                                 |
| 3.0-30                | 1842/f                            | 4.89/f                            | (900/f <sup>2</sup> )*                  | 6                                                                 |
| 30-300                | 61.4                              | 0.163                             | 1.0                                     | 6                                                                 |
| 300-1500              | -                                 | -                                 | f/300                                   | 6                                                                 |
| 1500-100,000          | -                                 | -                                 | 5                                       | 6                                                                 |

### (B) Limits for General Population/Uncontrolled Exposure<sup>5</sup>

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                  | 30                                                                |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f <sup>2</sup> )*                  | 30                                                                |
| 30-300                | 27.5                              | 0.073                             | 0.2                                     | 30                                                                |
| 300-1500              | -                                 | -                                 | f/1500                                  | 30                                                                |
| 1500-100,000          | -                                 | -                                 | 1.0                                     | 30                                                                |

f = frequency in MHz \* Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

<sup>4</sup> Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

<sup>5</sup> General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure



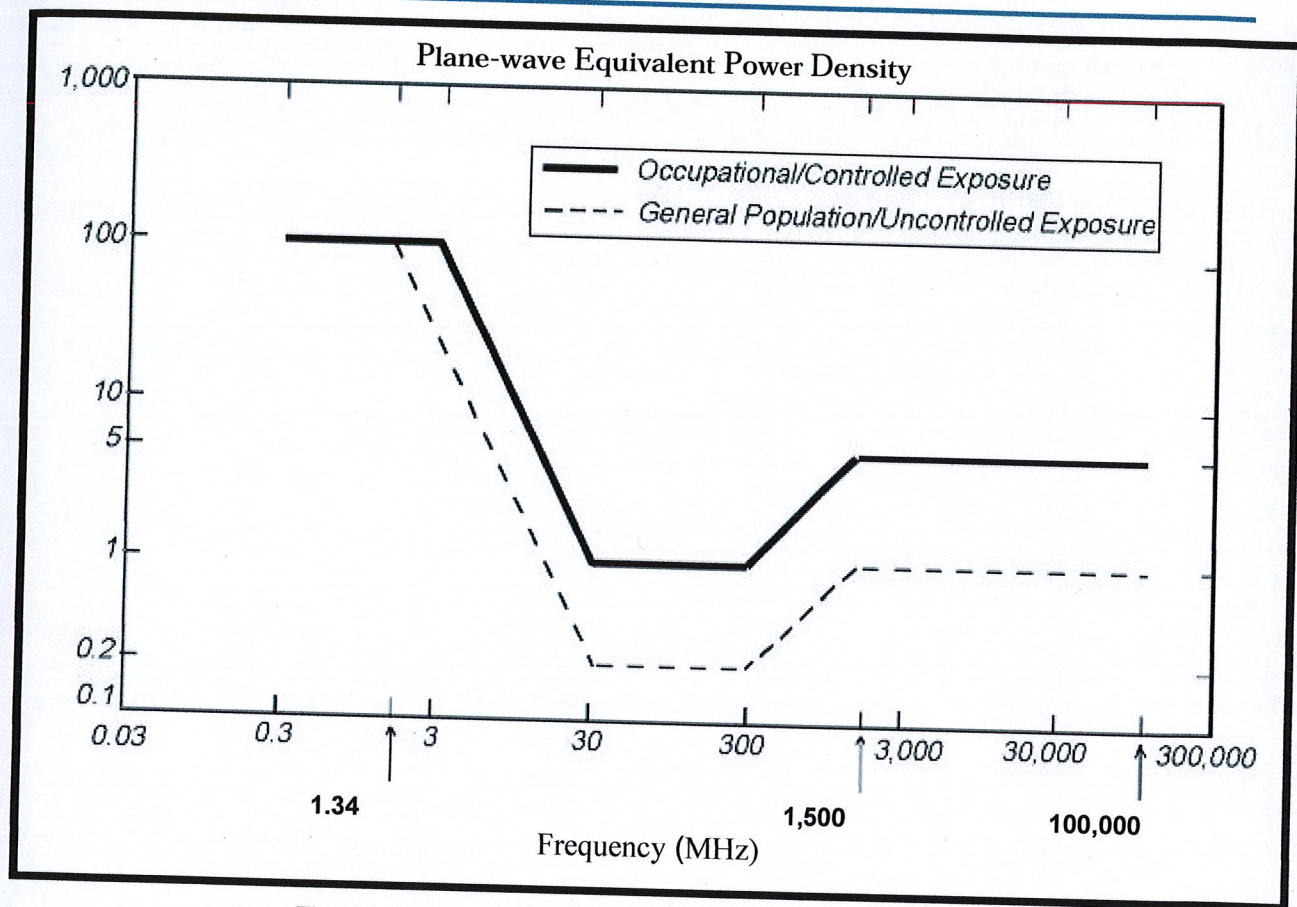
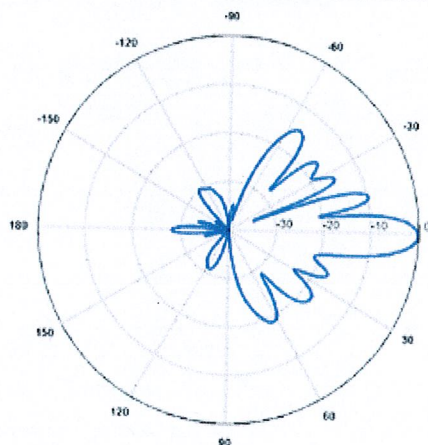


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

**Attachment C: AT&T Antenna Data Sheets and Electrical Patterns**

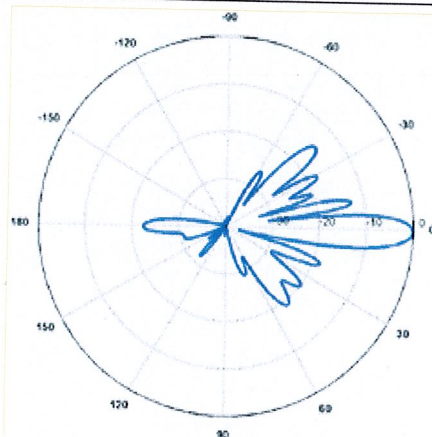
**700 MHz**

Manufacturer: Powerwave  
 Model #: P65-17-XLH-RR  
 Frequency Band: 698-806 MHz  
 Gain: 14.3 dBd  
 Vertical Beamwidth: 8.4°  
 Horizontal Beamwidth: 70°  
 Polarization: Dual Linear  $\pm 45^\circ$   
 Size L x W x D: 96.0" x 12.0" x 6.0"



**850 MHz**

Manufacturer: Powerwave  
 Model #: P65-17-XLH-RR  
 Frequency Band: 806-894 MHz  
 Gain: 15.1 dBd  
 Vertical Beamwidth: 8.4°  
 Horizontal Beamwidth: 63°  
 Polarization: Dual Linear  $\pm 45^\circ$   
 Size L x W x D: 96.0" x 12.0" x 6.0"



**1900 MHz**

Manufacturer: Powerwave  
 Model #: P65-17-XLH-RR  
 Frequency Band: 1850-1990 MHz  
 Gain: 15.1 dBd  
 Vertical Beamwidth: 6.5°  
 Horizontal Beamwidth: 63°  
 Polarization: Dual Linear  $\pm 45^\circ$   
 Size L x W x D: 96.0" x 12.0" x 6.0"

