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
Web Site: portal.ct.gov/csc

**VIA ELECTRONIC MAIL**

May 16, 2024

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
hredding@saigrp.com

RE: **EM-AT&T-107-221031** – AT&T notice of intent to modify an existing telecommunications facility located at 298 Ridge Road, Orange, Connecticut. **Request for Project Change.**

Dear Hollis Redding:

The Connecticut Siting Council (Council) is in receipt of your correspondence of May 8, 2024 and associated documents including a revised Structural Analysis performed by Centek Engineering dated April 15, 2024 and stamped and signed by Timothy Lynn; a revised Mount Analysis dated February 16, 2024 performed by TEP Northeast and stamped and signed by Daniel Hamm; and revised construction drawings dated May 1, 2024 prepared by TEP Northeast and stamped and signed by Daniel Hamm; associated with the above-referenced exempt modification request acknowledged by the Council on November 9, 2022.

The Council hereby acknowledges the revised documents with the following conditions:

1. Prior to AT&T's antenna installation, antenna mount modifications shall be installed in accordance with the Mount Analysis prepared by TEP Northeast dated February 16, 2024 and stamped and signed by Daniel Hamm; and
2. Within 45 days following completion of equipment installation, AT&T shall provide documentation certified by a Professional Engineer that its installation complied with the recommendations of the Mount Analysis.

This approval applies only to the project change in the correspondence dated May 8, 2024.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/ANM/dll

c: The Honorable James M. Zeoli, First Selectperson, Town of Orange ( jzeoli@orange-ct.gov)

May 8, 2024

Ms. Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re:
EM-AT&T-107-221031 Change of Approval Request New Cingular Wireless PCS LLC (“AT&T”)
Site CT2267 Facility located at 298 Ridge Road, Orange, CT 06477

Dear Ms. Bachman:

AT&T received CT Siting Council approval on November 28, 2022, to make modifications to its Facility placed on an Eversource Structure located at 298 Ridge Road, Orange, CT. AT&T also received an extension of time for construction to November 28, 2024. After these approvals were received, Eversource requested AT&T rerun the structural & mount analyses to account for the most updated CT budling code standards. No changes were made to the equipment per the approvals, but the analysis documents have been updated with the current codes, so the results are different.

AT&T respectfully requests the original CT Siting Council approval be changed to include the updated documentation. Attached are the revised structural & mount analyses, updated plans and original and extension approvals for your review.

Please let me know if you have any questions. Thank you for your time and consideration.
Sincerely,

*Hollis M. Redding*

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
Mobile: 860-834-6964
hredding@saigrp.com

CENTEK engineering

Centered on Solutions℠

# Structural Analysis of Antenna Mast and Pole

AT&T Site Ref: CT2267

Eversource Structure No. 3848
96' Electric Transmission Pole

298 Ridge Road
Orange, CT

CENTEK Project No. 22021.02

~~Date: April 6, 2022~~
Rev 3: April 15, 2024

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

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

# Table of Contents

## Introduction

The purpose of this report is to analyze the existing mast and 96' utility pole located on at 298 Ridge Road in Orange, CT for the proposed antenna and equipment upgrade by AT&T.

The existing/proposed loads consist of the following:

- AT&T MOBILITY (Existing to Remain):
  Cables: Twenty four (24) 1-5/8" ∅ coax cables running on the exterior of the pole as indicated in section 4 of this report.
  Mast: HSS14x0.625 x 30-ft long pipe conforming to ASTM A500 Gr. B (Fy = 42 ksi).
- **AT&T MOBILITY (Existing to Remove):**
  **Antennas: Nine (9) Andrew SBNH-1D6565C panel antennas, three (3) CCI OPA-65R-LCUU-H8 panel antennas and twelve (12) CCI DTMABP7819VG12A TMA's mounted on a Triple T-Arm w/ handrail with a RAD center elevation of 111-ft above grade.**
- **AT&T MOBILITY (Proposed):**
  **Antennas: Three (3) CCI TPA65R-BU8D panel antennas, three (3) CCI DMP65R-BU8D panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson AIR6419 panel antennas, three (3) Kaelus TMA2124F03V5-2D TMAs, six (6) Kaelus TMA2104F00V1-1 TMAs and one (1) Raycap DC6 surge arrestor mounted on a Triple T-Arm w/ handrail with a RAD center elevation of 111-ft above grade.**
  **Cables: One (1) fiber cable and two (2) DC cables running on the exterior of the pole as indicated in section 4 of this report.**

## Primary assumptions used in the analysis

- ASCE Manual No. 48-19, "Design of Steel Transmission Pole Structures", defines steel stresses for evaluation of the utility pole.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed within the antenna mast unless specified otherwise.
- Antenna 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.
- Antenna 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.
- Properties used in Lpile @ caisson rock socket conservatively based on weak rock as follows:
  - Uniaxial Compressive Strength = 250psi
  - Rock Quality Designation (RQD) = 50%
  - Effective Weight = 135pcf

## Analysis

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

The existing mast consisting of HSS14x0.625 x 30-ft long pipe connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA-222-H standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA-222-H loading and for NESC/EVERSOURCE loading are listed in report Sections 6 and 8, respectively.

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

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

## Design Basis

Our analysis was performed in accordance with ASCE 48-19, "Design of Steel Transmission Pole Structures", NESC C2-2023 and Eversource Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2023 ~ Construction Grade B, and ASCE Manual No. 48-19.

  Load cases considered:

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

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

  *Note 1: NESC C2-2023, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)*

- MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with TIA-222-H and AISC standards.

Load cases considered:

Load Case 1:
Wind Speed...................................... 130 mph (2022 CSBC Appendix-P)
Radial Ice Thickness.............................. 0"

Load Case 2:
Wind Pressure.................................... 50 mph wind pressure
Radial Ice Thickness.............................. 1.0"

## *Results*

- MAST ASSEMBLY

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

| Member | Stress Ratio (% of capacity) | Result |
|---|---|---|
| HSS14x0.625 | 75.2% | **PASS** |
| Mast to Base Plate Weld[1] | 98.7% | **PASS** |

Note 1 – Critical connection component.

- 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. 48-19, "Design of Steel Transmission Pole Structures", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

A maximum usage of **80.63%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

| Tower Section | Elevation | Stress Ratio (% of capacity) | Result |
|---|---|---|---|
| Tube Number 1 | 48.50-96.00' (AGL) | 80.63% | **PASS** |

BASE PLATE:

The base plate was found to be within allowable limits.

| Tower Component | Design Limit | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Base Plate | Bending | 77.75% | **PASS** |

- FOUNDATION AND ANCHORS

The existing foundation consists of a 7.0-ft ∅ x 18-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615 Gr. 75 anchor bolts embedded approximately 7-ft-6-in into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01007-60010.

<u>BASE REACTIONS:</u>

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

| Load Case | Shear | Axial | Moment |
|---|---|---|---|
| NESC Heavy Wind | 17.24 kips | 67.00 kips | 1329.30 ft-kips |
| NESC Extreme Wind | 39.08 kips | 36.38 kips | 3183.47 ft-kips |

Note 1 – 10% increase to be applied to tower base reactions for foundation verification per OTRM 051

<u>ANCHOR BOLTS:</u>

The anchor bolts were found to be within allowable limits.

| Tower Component | Design Limit | Stress Ratio (% of capacity) | Result |
|---|---|---|---|
| Anchor Bolts | Tension | 60.0% | **PASS** |

<u>FOUNDATION:</u>

The foundation with the proposed modifications was found to be within allowable limits.

| Foundation | Design Limit | Proposed Loading [(1)] | Result |
|---|---|---|---|
| Reinforced Concrete Caisson | Moment Capacity | 55.1% | **PASS** |
| | Shear Capacity | 84.8% | **PASS** |
| | Lateral Deflection | 2.00 in.[(2)] | **PASS** |

Note 1: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.
*Note 2:* *Lateral* deflection limited to L/100 per OTRM 051 Rev 5 dated 7/19/10. (L/100 = 18*12/100=2.16-in)

## <u>*Conclusion*</u>

This analysis shows that the subject utility pole **<u>is adequate</u>** to support the proposed AT&T equipment upgrade.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

## STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

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

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE

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

Modeling Features:

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

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and drag coefficients) according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Automatic tracking of part numbers and costs

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

## Introduction

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

ANSI Standard TIA-222-H covering the design of telecommunications structures specifies LRFD design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed code defined percentage of failure strength.

ANSI Standard C2-2023 (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 Eversource 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 1700-year recurrence for TIA-222-H risk category III and a 100-year recurrence for NESC Grade B. The second is a winter condition combining wind and ice loadings.

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

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

## *PCS Mast*

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

## *ELECTRIC TRANSMISSION TOWER*

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled “Eversource 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 2023 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

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

### Attachment A
### Eversource Design Criteria

| | | Attachment A ES Design Criteria | Basic Wind Speed | Pressure | Height Factor | Gust Factor | Load or Stress Factor | Force Coef. - Shape Factor |
|---|---|---|---|---|---|---|---|---|
| | | | V (MPH) | Q (PSF) | Kz | Gh | | |
| Ice Condition | TIA/EIA | Antenna Mount | TIA | TIA (0.75Wi) | TIA | TIA | TIA, Section 3.1.1.1 disallowed for connection design | TIA |
| Ice Condition | NESC Heavy | Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress) | ----- | 4 | 1 | 1 | 2.5 | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| Ice Condition | NESC Heavy | Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces) | ----- | 4 | 1 | 1 | 2.5 | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| Ice Condition | NESC Heavy | Conductors: | Conductor Loads Provided by ES | | | | | |
| High Wind Condition | TIA/EIA | Antenna Mount | 85 | TIA | TIA | TIA | TIA, Section 3.1.1.1 disallowed for connection design | TIA |
| High Wind Condition | NESC Extreme Wind | Tower/Pole Analysis with antennas extending above top of Tower/Pole | For wind speed use OTRM 060 Map 1,<br>Rule 250C: Extreme Wind Loading<br>Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| High Wind Condition | NESC Extreme Wind | Tower/Pole Analysis with antennas below top of Tower/Pole | For wind speed use OTRM 060 Map 1,<br>Rule 250C: Extreme Wind Loading<br>Height above ground is based on overall height to top of tower/pole | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| High Wind Condition | NESC Extreme Wind | Conductors: | Conductor Loads Provided by ES | | | | | |
| NESC Extreme Ice with Wind Condition* | | Tower/Pole Analysis with antennas extending above top of Tower/Pole | For wind speed use OTRM 060 Map 1,<br>Rule 250D: Extreme Ice with Wind Loading<br>4 PSF Wind Load 1.25 x Gust Response Factor<br>Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| NESC Extreme Ice with Wind Condition* | | Tower/Pole Analysis with antennas below top of Tower/Pole | For wind speed use OTRM 060 Map 1,<br>Rule 250D: Extreme Ice with Wind Loading<br>4 PSF Wind Load<br>Height above ground is based on overall height to top of tower/pole | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| NESC Extreme Ice with Wind Condition* | | Conductors: | Conductor Loads Provided by ES | | | | | |
| | | *Only for structures installed after 2007 | | | | | | |

determined from NESC applied loading conditions (not TIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

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

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

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

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

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

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

PLS-CADD Version 12.30    11:15:02 AM Friday, December 21, 2012
Northeast Utilities System
Project Name: 'c:\cps\pls-cadd\mn345 project final models\prj-dev\imagery\peaserd_eastdevon_final_pls.DON'
Line Title: '345-kV/115-kV 3827, 1640, 1685, 1776, 1497, & 1350'

Criteria Notes:
NESC Heavy per Rule 250B, Page 161
Extreme Wind Loading per Rule 250C, Page 161, Coefficients and Gust Response Factors per Equations in Tables 250-2, 250-3
90 MPH Basic Wind Speed, 3 second Gust Wind Speed, Figure 250-2 Beginning on Page 166
Grade B Construction "Method A" per Table 253-1, Page 173 and Table 261-1A, Page 182
Tension Limits per Rule 261H1, Page 179
Insulator Strength Reduction per Rule 277, Page 188 Should be applied to Insulator Strengths when Modeling Insulators
2002 NESC C2-2002 Criteria File for PLS-CADD Created December 21, 2001

Structure 24277 (just North of Durham Rd) moved 50` south per homeowner request.  Structure height increased 5 ft. to maintain ground clearance.
1-27-06 Moved structure 24257 100` NE to accomodate homeowner request.
Homeowner request - Structures 24102 & 3915 were moved 100 ft. North for aesthetic purposes.
Homeowner request - Structure 3910 moved 90 ft. South out of line of sight.
Homeowner requests - Neighborhoods of Salem Rd, Country Ct., & Brookwood Ct. requested 135` typ. split phase.
do not change these areas structure heights.
Homeowner request - Structures 24098 & 3911 moved South to property line.
Structure 3808 raised 10 ft. to meet road clearance requirements
12-5-06: Structure 3807 moved 15 ft. South to avoid existing 3808 guy wires.
3848: Moved 5 ft. South towards 3847 per field request, too close to rock wall and distribution lines.
3848: Moved 5 ft. North back to original spot per email from Jason Cabral. Rock wall will be moved, PAR said there should be no
impact to adjacent distribution lines.
3807: (1-24-07) Moved approx. 20 ft. southwest to get structure away from existing 1640 guy locations to accomodate construction.
3849: (1-24-07) Moved approx. 14 ft. southwest to get structure away from existing 1640 guy locations to accomodate construction.
3888: (1-24-07) Moved approx. 20 ft. north to get structure away from existing 1640 guy locations to accomodate construction.
5-22-07 : Moved structure 24043 20 ft. northeast per homeowner request.  This was a field call from Tim Arvin.
6-11-07: Moved structure 3911 5 ft. South to avoid underground utilities to two residences.
10-17-07: Moved structure 24002 46.5 ft. north per field request.
10-24-07: Moved structure 24045 11.75 ft. east per field request.
1-4-08:  Moved structure 24091 17 ft. south to avoid underground storm water drainage pipe.

Weather Cases

| WC # | Description | Air Density Factor (psf/mph^2) | Wind Vel. (mph) | Wind Pres. (psf) | Wire Ice Thick (in) | Wire Ice Density (lbs/ft^3) | Wire Ice Load (lbs/ft) | Wire Temp (deg F) | Ambient Temp (deg F) | Weather Load Factor | NESC Constant (lbs/ft) | Wire Wind Height Adjust Model | Wire Gust Response Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | NESC Heavy | 0.00256 | 40 | 4.0 | 0.50 | 57.000 | 0.00 | 0 | 0 | 1.00 | 0.30 | None | 1 |
| 2 | 0F 4psf w/ ice | 0.00256 | 40 | 4.0 | 0.50 | 57.000 | 0.00 | 0 | 0 | 1.00 | 0.00 | None | 1 |
| 3 | 0F 4psf w/o ice | 0.00256 | 40 | 4.0 | 0.00 | 0.000 | 0.00 | 0 | 0 | 1.00 | 0.00 | None | 1 |
| 4 | NESC Ext Wind | 0.00256 | 112 | 32.1 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 5 | ASCE Ice/Wind | 0.00256 | 50 | 6.4 | 0.75 | 57.000 | 0.00 | 32 | 32 | 1.00 | 0.00 | None | 1 |
| 6 | Maximum Operating | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 285 | 285 | 1.00 | 0.00 | None | 1 |
| 7 | NESC Blowout 6PSF | 0.00256 | 48 | 6.0 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 8 | 3# Wind (SWING 1) | 0.00256 | 34 | 3.0 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 9 | 6# Wind (SWING 2) | 0.00256 | 48 | 6.0 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 10 | 60 mph Wind (SWING 3) | 0.00256 | 60 | 9.2 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 11 | GALLOPING (SWING) | 0.00256 | 28 | 2.0 | 0.50 | 57.000 | 0.00 | 32 | 32 | 1.00 | 0.00 | None | 1 |
| 12 | GALLOPING (SAG) | 0.00256 | 0 | 0.0 | 0.50 | 57.000 | 0.00 | 32 | 32 | 1.00 | 0.00 | None | 1 |
| 13 | -20 Deg F | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | -20 | -20 | 1.00 | 0.00 | None | 1 |
| 14 | 0 Deg F | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 0 | 0 | 1.00 | 0.00 | None | 1 |
| 15 | 50 Deg F | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 50 | 50 | 1.00 | 0.00 | None | 1 |
| 16 | 60 Deg F | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 17 | 120 Deg F | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 120 | 120 | 1.00 | 0.00 | None | 1 |
| 18 | NU Ice | 0.00256 | 0 | 0.0 | 1.00 | 57.000 | 0.00 | 0 | 0 | 1.00 | 0.00 | None | 1 |
| 19 | NU Blowout | 0.00256 | 60 | 9.2 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 20 | Construction | 0.00256 | 30 | 2.3 | 0.00 | 0.000 | 0.00 | 30 | 30 | 1.00 | 0.00 | None | 1 |
| 21 | UI Ice | 0.00256 | 56 | 8.0 | 0.50 | 57.000 | 0.00 | 0 | 0 | 1.00 | 0.00 | None | 1 |
| 22 | NU Extreme Wind 90mph | 0.00256 | 90 | 20.7 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 23 | 9psf Wind 60 deg F | 0.00256 | 59 | 9.0 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 24 | Tower High Wind | 0.00256 | 80 | 16.4 | 0.00 | 0.000 | 0.00 | 60 | 60 | 1.00 | 0.00 | None | 1 |
| 25 | UI Heavy Ice (Tower) | 0.00256 | 0 | 0.0 | 1.50 | 57.000 | 0.00 | 32 | 32 | 1.00 | 0.00 | None | 1 |
| 26 | ADSS Survey Temp | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 85 | 85 | 1.00 | 0.00 | None | 1 |
| 27 | ADSS 90 Deg Case | 0.00256 | 0 | 0.0 | 0.00 | 0.000 | 0.00 | 90 | 90 | 1.00 | 0.00 | None | 1 |

Structure Loads Criteria

| LC # | WC # | Load Case Description | Cable Condition | Wind Dir. | Bisect Wind Angle | Wire Vert. Load Factor | Wire + Struct. Wind Load Factor | Wire Tension Load Factor | Struct Weight Load Factor | Struct Wind Area Factor | Struct. Wind Load Model | Struct. Ice Thick (in) | Struct. Ice Density (lbs/ft^3) | Pole Tip Deflection Check | Pole Tip Deflect Limit % or (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | NESC Heavy NA+ | Load RS | NA+ | | 1.50 | 2.50 | 1.65 | 1.50 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 2 | 1 | NESC Heavy NA- | Load RS | NA- | | 1.50 | 2.50 | 1.65 | 1.50 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 3 | 1 | NESC Uplift NA+ | Load RS | NA+ | | 1.00 | 2.50 | 1.65 | 1.00 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 4 | 1 | NESC Uplift NA- | Load RS | NA- | | 1.00 | 2.50 | 1.65 | 1.00 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 5 | 4 | NESC Ext Wind NA | Load RS | NA+ | | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 6 | 4 | NESC Ext Wind NA | Load RS | NA- | | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 7 | 1 | NESC Ins NA+ | Load RS | NA+ | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 8 | 1 | NESC Ins NA- | Load RS | NA- | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | Pre V7 Standard | 0.00 | 0.000 | No Limit | 0.00 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 5 | ASCE Ice/Wind NA | Load | RS | NA+ | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 10 | 5 | ASCE Ice/Wind NA | Load | RS | NA- | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 11 | 18 | NU Ice | Load | RS | NA+ | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 12 | 24 | Tower High Wind | Load | RS | NA+ | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 13 | 24 | Tower High Wind | Load | RS | NA- | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 14 | 1 | Broken SW NA+ | Load | RS | NA+ | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 15 | 1 | Broken SW NA- | Load | RS | NA- | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 16 | 1 | Cond SW NA+ | Load | RS | NA+ | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 17 | 1 | Cond SW NA- | Load | RS | NA- | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 18 | 1 | Deadend Tower NA | Load | RS | NA+ | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 19 | 1 | Deadend Tower NA | Load | RS | NA- | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 20 | 25 | UI Havey Ice Tow | Load | RS | NA+ | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |
| 21 | 25 | UI Havey Ice Tow | Load | RS | NA- | 1.10 | 1.10 | 1.10 | 1.10 | 1.00 | Pre V7 | Standard | 0.00 | 0.000 | No Limit | 0.00 |

Cable Load Adjustments for each Load Case

| LC # | WC # | Load Case Description | Struct Groups On Which To Apply | Command 1 Wire(s) Set: Phase: Side: | Command 1 | Command 1 Value (lbs) (deg) (%) |
|---|---|---|---|---|---|---|
| 1 | 1 | NESC Heavy NA+ | 'All' | | | |
| 2 | 1 | NESC Heavy NA- | 'All' | | | |
| 3 | 1 | NESC Uplift NA+ | 'All' | | | |
| 4 | 1 | NESC Uplift NA- | 'All' | | | |
| 5 | 4 | NESC Ext Wind NA | 'All' | | | |
| 6 | 4 | NESC Ext Wind NA | 'All' | | | |
| 7 | 1 | NESC Ins NA+ | 'All' | | | |
| 8 | 1 | NESC Ins NA- | 'All' | | | |
| 9 | 5 | ASCE Ice/Wind NA | 'All' | | | |
| 10 | 5 | ASCE Ice/Wind NA | 'All' | | | |
| 11 | 18 | NU Ice | 'All' | | | |
| 12 | 24 | Tower High Wind | 'TOWER' | | | |
| 13 | 24 | Tower High Wind | 'TOWER' | | | |
| 14 | 1 | Broken SW NA+ | 'TOWER no DE' | 1:1:Ahead | # Broken Subconductors | 1.0 |
| 15 | 1 | Broken SW NA- | 'TOWER no DE' | 1:1:Ahead | # Broken Subconductors | 1.0 |
| 16 | 1 | Cond SW NA+ | 'TOWER no DE' | 2:1:Ahead | # Broken Subconductors | 1.0 |
| 17 | 1 | Cond SW NA- | 'TOWER no DE' | 2:1:Ahead | # Broken Subconductors | 1.0 |
| 18 | 1 | Deadend Tower NA | 'TOWER has DE' | Ahead Spans | # Broken Subconductors | 1.0 |
| 19 | 1 | Deadend Tower NA | 'TOWER has DE' | Ahead Spans | # Broken Subconductors | 1.0 |
| 20 | 25 | UI Havey Ice Tow | 'TOWER' | | | |
| 21 | 25 | UI Havey Ice Tow | 'TOWER' | | | |

Span and Wire Summary For Structure Range

Span azimuth is measured clockwise from structure transverse axis (0=transverse, 90=back, 270=ahead)
Azimuth of structure transverse axis is 147.3608 (deg) measured clockwise from North.

| Str. No. | Str. Name | LC # | WC # | Load Case Description | Set No. | Phase No. | Attach. Joint Labels | Back span Cable Name | Len. (ft) | Azi. (deg) | Horiz. Load (lbs/ft) | Vert. Load (lbs/ft) | Horiz. Tension (lbs) | Ahead span Cable Name | Len. (ft) | Azi. (deg) | Horiz. Load (lbs/ft) | Vert. Load (lbs/ft) | Horiz. Tension (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | NESC Heavy NA+ | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.77 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.77 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.26 | 1.61 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.61 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | NESC Heavy NA- | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.77 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.77 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.26 | 1.61 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.61 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | NESC Uplift NA+ | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.18 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.18 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.26 | 1.08 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.08 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | NESC Uplift NA- | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.18 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.18 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.26 | 1.08 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.08 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | NESC Ext Wind NA | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.90 | 0.52 | 6836 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.90 | 0.52 | 6840 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.50 | 0.49 | 5737 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.50 | 0.49 | 5740 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | NESC Ext Wind NA | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.90 | 0.52 | 6836 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.90 | 0.52 | 6840 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.50 | 0.49 | 5737 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.50 | 0.49 | 5740 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | NESC Ins NA+ | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 0.55 | 1.18 | 6472 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 0.55 | 1.18 | 6473 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 0.50 | 1.08 | 5921 | 19#10_alumoweld_tight.wir | 466 | 270 | 0.50 | 1.08 | 5921 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | NESC Ins NA- | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 0.55 | 1.18 | 6472 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 0.55 | 1.18 | 6473 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 0.50 | 1.08 | 5921 | 19#10_alumoweld_tight.wir | 466 | 270 | 0.50 | 1.08 | 5921 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | ASCE Ice/Wind NA | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.26 | 1.95 | 7952 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.26 | 1.95 | 7954 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15791 | lapwing_tight.wir | 464 | 270 | 1.76 | 4.28 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15791 | lapwing_tight.wir | 464 | 270 | 1.76 | 4.28 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15791 | lapwing_tight.wir | 464 | 270 | 1.76 | 4.28 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.18 | 1.79 | 7283 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.18 | 1.79 | 7284 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15796 | lapwing_tight.wir | 466 | 270 | 1.76 | 4.28 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15796 | lapwing_tight.wir | 466 | 270 | 1.76 | 4.28 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15796 | lapwing_tight.wir | 466 | 270 | 1.76 | 4.28 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | ASCE Ice/Wind NA | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.26 | 1.95 | 7952 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.26 | 1.95 | 7954 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15791 | lapwing_tight.wir | 464 | 270 | 1.76 | 4.28 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15791 | lapwing_tight.wir | 464 | 270 | 1.76 | 4.28 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15791 | lapwing_tight.wir | 464 | 270 | 1.76 | 4.28 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 1.18 | 1.79 | 7283 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.18 | 1.79 | 7284 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15796 | lapwing_tight.wir | 466 | 270 | 1.76 | 4.28 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15796 | lapwing_tight.wir | 466 | 270 | 1.76 | 4.28 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 1.76 | 4.28 | 15796 | lapwing_tight.wir | 466 | 270 | 1.76 | 4.28 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | NU Ice | 1 | 1 | GL:E | brugg_57ay104acs-3c_115.wir | 387 | 90 | 0.00 | 2.77 | 9310 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 0.00 | 2.77 | 9310 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 2 | 1 | TL | lapwing_tight.wir | 387 | 90 | 0.00 | 5.40 | 19169 | lapwing_tight.wir | 464 | 270 | 0.00 | 5.40 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 3 | 1 | ML | lapwing_tight.wir | 387 | 90 | 0.00 | 5.40 | 19169 | lapwing_tight.wir | 464 | 270 | 0.00 | 5.40 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 4 | 1 | BL | lapwing_tight.wir | 387 | 90 | 0.00 | 5.40 | 19169 | lapwing_tight.wir | 464 | 270 | 0.00 | 5.40 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 5 | 1 | GR:E | 19#10_alumoweld_tight.wir | 387 | 90 | 0.00 | 2.56 | 8492 | 19#10_alumoweld_tight.wir | 466 | 270 | 0.00 | 2.56 | 8492 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 6 | 1 | TR | lapwing_tight.wir | 387 | 90 | 0.00 | 5.40 | 19169 | lapwing_tight.wir | 466 | 270 | 0.00 | 5.40 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 7 | 1 | MR | lapwing_tight.wir | 387 | 90 | 0.00 | 5.40 | 19169 | lapwing_tight.wir | 466 | 270 | 0.00 | 5.40 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 8 | 1 | BR | lapwing_tight.wir | 387 | 90 | 0.00 | 5.40 | 19169 | lapwing_tight.wir | 466 | 270 | 0.00 | 5.40 | 19169 |

Wire Loads In Span Coordinate System For Structure Range

Wire loads expressed in span coordinate system (Longitudinal axis is line connecting attach. points)
Note: Loads in this report do not include load from counter weights, insulator weight or insulator wind area.

| Str. No. | Str. Name | LC # | WC # | Load Case Description | Set No. | Phase No. | Attach. Joint Labels | --Loads from back span-- Vert. (lbs) | Trans. (lbs) | Long. (lbs) | -Loads from ahead span- Vert. (lbs) | Trans. (lbs) | Long. (lbs) | Warnings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | NESC Heavy NA+ | 1 | 1 | GL:E | 696 | 266 | 10679 | 177 | 319 | 10680 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 2 | 1 | TL | 1722 | 404 | 22624 | 497 | 484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 3 | 1 | ML | 1722 | 404 | 22624 | 497 | 484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 4 | 1 | BL | 1722 | 404 | 22624 | 497 | 484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 5 | 1 | GR:E | 629 | 244 | 9769 | 165 | 293 | 9770 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 6 | 1 | TR | 1722 | 404 | 22624 | 505 | 487 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 7 | 1 | MR | 1722 | 404 | 22624 | 505 | 487 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 8 | 1 | BR | 1722 | 404 | 22624 | 505 | 487 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | NESC Heavy NA- | 1 | 1 | GL:E | 696 | -266 | 10679 | 177 | -319 | 10680 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 2 | 1 | TL | 1722 | -404 | 22624 | 497 | -484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 3 | 1 | ML | 1722 | -404 | 22624 | 497 | -484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 4 | 1 | BL | 1722 | -404 | 22624 | 497 | -484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 5 | 1 | GR:E | 629 | -244 | 9769 | 165 | -293 | 9770 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 6 | 1 | TR | 1722 | -404 | 22624 | 505 | -487 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 7 | 1 | MR | 1722 | -404 | 22624 | 505 | -487 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 8 | 1 | BR | 1722 | -404 | 22624 | 505 | -487 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | NESC Uplift NA+ | 1 | 1 | GL:E | 464 | 266 | 10679 | 118 | 319 | 10680 | |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 2 | 1 | TL | 1148 | 404 | 22624 | 331 | 484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 3 | 1 | ML | 1148 | 404 | 22624 | 331 | 484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 4 | 1 | BL | 1148 | 404 | 22624 | 331 | 484 | 22624 | |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 5 | 1 | GR:E | 420 | 244 | 9769 | 110 | 293 | 9770 | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 6 | 1 | TR | 1148 | 404 | 22624 | 337 | 487 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 7 | 1 | MR | 1148 | 404 | 22624 | 337 | 487 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 8 | 1 | BR | 1148 | 404 | 22624 | 337 | 487 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | NESC Uplift NA- | 1 | 1 | GL:E | 464 | -266 | 10679 | 118 | -319 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 2 | 1 | TL | 1148 | -404 | 22624 | 331 | -484 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 3 | 1 | ML | 1148 | -404 | 22624 | 331 | -484 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 4 | 1 | BL | 1148 | -404 | 22624 | 331 | -484 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 5 | 1 | GR:E | 420 | -244 | 9769 | 110 | -293 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 6 | 1 | TR | 1148 | -404 | 22624 | 337 | -487 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 7 | 1 | MR | 1148 | -404 | 22624 | 337 | -487 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 8 | 1 | BR | 1148 | -404 | 22624 | 337 | -487 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | NESC Ext Wind NA | 1 | 1 | GL:E | 405 | 368 | 6836 | -84 | 442 | 6840 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 2 | 1 | TL | 1062 | 858 | 15223 | 3 | 1029 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 3 | 1 | ML | 1062 | 858 | 15223 | 3 | 1028 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 4 | 1 | BL | 1062 | 858 | 15223 | 3 | 1028 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 5 | 1 | GR:E | 352 | 290 | 5737 | -56 | 349 | 5740 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 6 | 1 | TR | 1062 | 858 | 15223 | 7 | 1034 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 7 | 1 | MR | 1062 | 858 | 15223 | 7 | 1034 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 8 | 1 | BR | 1062 | 858 | 15223 | 7 | 1034 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | NESC Ext Wind NA | 1 | 1 | GL:E | 405 | -368 | 6836 | -84 | -442 | 6840 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 2 | 1 | TL | 1062 | -858 | 15223 | 3 | -1029 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 3 | 1 | ML | 1062 | -858 | 15223 | 3 | -1028 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 4 | 1 | BL | 1062 | -858 | 15223 | 3 | -1028 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 5 | 1 | GR:E | 352 | -290 | 5737 | -56 | -349 | 5740 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 6 | 1 | TR | 1062 | -858 | 15223 | 7 | -1034 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 7 | 1 | MR | 1062 | -858 | 15223 | 7 | -1034 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 8 | 1 | BR | 1062 | -858 | 15223 | 7 | -1034 | 15230 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | NESC Ins NA+ | 1 | 1 | GL:E | 464 | 106 | 6472 | 118 | 128 | 6473 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 2 | 1 | TL | 1148 | 162 | 13711 | 331 | 194 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 3 | 1 | ML | 1148 | 162 | 13711 | 331 | 194 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 4 | 1 | BL | 1148 | 162 | 13711 | 331 | 194 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 5 | 1 | GR:E | 420 | 97 | 5921 | 110 | 117 | 5921 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 6 | 1 | TR | 1148 | 162 | 13711 | 337 | 195 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 7 | 1 | MR | 1148 | 162 | 13711 | 337 | 195 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 8 | 1 | BR | 1148 | 162 | 13711 | 337 | 195 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | NESC Ins NA- | 1 | 1 | GL:E | 464 | -106 | 6472 | 118 | -128 | 6473 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 2 | 1 | TL | 1148 | -162 | 13711 | 331 | -194 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 3 | 1 | ML | 1148 | -162 | 13711 | 331 | -194 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 4 | 1 | BL | 1148 | -162 | 13711 | 331 | -194 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 5 | 1 | GR:E | 420 | -97 | 5921 | 110 | -117 | 5921 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 6 | 1 | TR | 1148 | -162 | 13711 | 337 | -195 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 7 | 1 | MR | 1148 | -162 | 13711 | 337 | -195 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 8 | 1 | BR | 1148 | -162 | 13711 | 337 | -195 | 13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | ASCE Ice/Wind NA | 1 | 1 | GL:E | 733 | 244 | 7952 | 216 | 293 | 7954 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 2 | 1 | TL | 1536 | 342 | 15791 | 523 | 409 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 3 | 1 | ML | 1536 | 342 | 15791 | 523 | 409 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 4 | 1 | BL | 1536 | 342 | 15791 | 523 | 409 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 5 | 1 | GR:E | 671 | 228 | 7283 | 199 | 275 | 7284 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 6 | 1 | TR | 1536 | 342 | 15796 | 530 | 411 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 7 | 1 | MR | 1536 | 342 | 15796 | 530 | 411 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 8 | 1 | BR | 1536 | 342 | 15796 | 530 | 411 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | ASCE Ice/Wind NA | 1 | 1 | GL:E | 733 | -244 | 7952 | 216 | -293 | 7954 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 2 | 1 | TL | 1536 | -342 | 15791 | 523 | -409 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 3 | 1 | ML | 1536 | -342 | 15791 | 523 | -409 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 4 | 1 | BL | 1536 | -342 | 15791 | 523 | -409 | 15792 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 5 | 1 | GR:E | 671 | -228 | 7283 | 199 | -275 | 7284 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 6 | 1 | TR | 1536 | -342 | 15796 | 530 | -411 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 7 | 1 | MR | 1536 | -342 | 15796 | 530 | -411 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 8 | 1 | BR | 1536 | -342 | 15796 | 530 | -411 | 15797 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | NU Ice | 1 | 1 | GL:E | 952 | 0 | 9310 | 366 | 0 | 9310 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 2 | 1 | TL | 1902 | 0 | 19169 | 680 | 0 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 3 | 1 | ML | 1902 | 0 | 19169 | 680 | 0 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 4 | 1 | BL | 1902 | 0 | 19169 | 680 | 0 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 5 | 1 | GR:E | 875 | 0 | 8492 | 343 | 0 | 8492 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 6 | 1 | TR | 1902 | 0 | 19169 | 689 | 0 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 7 | 1 | MR | 1902 | 0 | 19169 | 689 | 0 | 19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 8 | 1 | BR | 1902 | 0 | 19169 | 689 | 0 | 19169 |

Wire Loads In Structure Coordinate System For Structure Range

Note: Loads in this report include load from counter weights, insulator weight and insulator wind area.

| Str. No. | Str. Name | LC # | WC # | Load Case Description | Set No. | Phase No. | Attach. Joint Labels | ----Structure Loads---- Vert. | Trans. (lbs) | Long. | --Loads from back span-- Vert. | Trans. (lbs) | Long. | -Loads from ahead span- Vert. | Trans. (lbs) | Long. | Warnings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | NESC Heavy NA+ | 1 | 1 | GL:E | 872 | 659 | -1 | 696 | 302 | 10678 | 177 | 356 | -10679 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 2 | 1 | TL | 2369 | 1055 | -1 | 1797 | 487 | 22622 | 572 | 568 | -22623 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 3 | 1 | ML | 2369 | 1056 | -1 | 1797 | 487 | 22622 | 572 | 569 | -22623 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 4 | 1 | BL | 2369 | 1057 | -1 | 1797 | 487 | 22622 | 572 | 570 | -22623 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 5 | 1 | GR:E | 795 | 603 | -1 | 629 | 277 | 9768 | 165 | 326 | -9769 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 6 | 1 | TR | 2377 | 1055 | -1 | 1797 | 487 | 22622 | 580 | 568 | -22623 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 7 | 1 | MR | 2377 | 1054 | -1 | 1797 | 487 | 22622 | 580 | 567 | -22623 | |
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | | 8 | 1 | BR | 2377 | 1053 | -1 | 1797 | 487 | 22622 | 580 | 566 | -22623 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | NESC Heavy NA- | 1 | 1 | GL:E | 872 | -511 | -1 | 696 | -229 | 10680 | 177 | -282 | -10681 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 2 | 1 | TL | 2369 | -743 | -1 | 1797 | -332 | 22625 | 572 | -411 | -22626 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 3 | 1 | ML | 2369 | -742 | -1 | 1797 | -332 | 22625 | 572 | -410 | -22626 | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 4 | 1 | BL | 2369 | -741 | -1 | 1797 | -332 | 22625 | 572 | -409 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 5 | 1 | GR:E | 795 | -471 | -1 | 629 | -210 | 9770 | 165 | -260 | -9771 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 6 | 1 | TR | 2377 | -748 | -1 | 1797 | -332 | 22625 | 580 | -416 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 7 | 1 | MR | 2377 | -749 | -1 | 1797 | -332 | 22625 | 580 | -417 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | | 8 | 1 | BR | 2377 | -750 | -1 | 1797 | -332 | 22625 | 580 | -418 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | NESC Uplift NA+ | 1 | 1 | GL:E | 582 | 659 | -1 | 464 | 302 | 10678 | 118 | 356 | -10679 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 2 | 1 | TL | 1579 | 1055 | -1 | 1198 | 487 | 22622 | 381 | 568 | -22623 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 3 | 1 | ML | 1579 | 1056 | -1 | 1198 | 487 | 22622 | 381 | 569 | -22623 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 4 | 1 | BL | 1579 | 1057 | -1 | 1198 | 487 | 22622 | 381 | 570 | -22623 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 5 | 1 | GR:E | 530 | 603 | -1 | 420 | 277 | 9768 | 110 | 326 | -9769 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 6 | 1 | TR | 1585 | 1055 | -1 | 1198 | 487 | 22622 | 387 | 568 | -22623 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 7 | 1 | MR | 1585 | 1054 | -1 | 1198 | 487 | 22622 | 387 | 567 | -22623 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | | 8 | 1 | BR | 1585 | 1053 | -1 | 1198 | 487 | 22622 | 387 | 566 | -22623 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | NESC Uplift NA- | 1 | 1 | GL:E | 582 | -511 | -1 | 464 | -229 | 10680 | 118 | -282 | -10681 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 2 | 1 | TL | 1579 | -743 | -1 | 1198 | -332 | 22625 | 381 | -411 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 3 | 1 | ML | 1579 | -742 | -1 | 1198 | -332 | 22625 | 381 | -410 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 4 | 1 | BL | 1579 | -741 | -1 | 1198 | -332 | 22625 | 381 | -409 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 5 | 1 | GR:E | 530 | -471 | -1 | 420 | -210 | 9770 | 110 | -260 | -9771 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 6 | 1 | TR | 1585 | -748 | -1 | 1198 | -332 | 22625 | 387 | -416 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 7 | 1 | MR | 1585 | -749 | -1 | 1198 | -332 | 22625 | 387 | -417 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | | 8 | 1 | BR | 1585 | -750 | -1 | 1198 | -332 | 22625 | 387 | -418 | -22626 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | NESC Ext Wind NA | 1 | 1 | GL:E | 321 | 858 | -3 | 405 | 392 | 6835 | -84 | 466 | -6838 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 2 | 1 | TL | 1175 | 2027 | -6 | 1117 | 928 | 15220 | 58 | 1099 | -15226 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 3 | 1 | ML | 1175 | 2028 | -6 | 1117 | 928 | 15220 | 58 | 1100 | -15226 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 4 | 1 | BL | 1175 | 2028 | -6 | 1117 | 928 | 15220 | 58 | 1101 | -15226 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 5 | 1 | GR:E | 296 | 678 | -3 | 352 | 310 | 5736 | -56 | 369 | -5739 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 6 | 1 | TR | 1179 | 2030 | -7 | 1117 | 928 | 15220 | 62 | 1102 | -15226 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 7 | 1 | MR | 1179 | 2029 | -7 | 1117 | 928 | 15220 | 62 | 1102 | -15226 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | | 8 | 1 | BR | 1179 | 2029 | -7 | 1117 | 928 | 15220 | 62 | 1101 | -15226 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | NESC Ext Wind NA | 1 | 1 | GL:E | 321 | -763 | -4 | 405 | -345 | 6838 | -84 | -418 | -6841 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 2 | 1 | TL | 1175 | -1817 | -8 | 1117 | -824 | 15226 | 58 | -993 | -15233 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 3 | 1 | ML | 1175 | -1816 | -8 | 1117 | -824 | 15226 | 58 | -992 | -15233 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 4 | 1 | BL | 1175 | -1815 | -8 | 1117 | -824 | 15226 | 58 | -992 | -15233 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 5 | 1 | GR:E | 296 | -601 | -3 | 352 | -271 | 5738 | -56 | -330 | -5741 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 6 | 1 | TR | 1179 | -1824 | -8 | 1117 | -823 | 15226 | 62 | -1000 | -15233 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 7 | 1 | MR | 1179 | -1824 | -8 | 1117 | -823 | 15226 | 62 | -1001 | -15233 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | | 8 | 1 | BR | 1179 | -1825 | -8 | 1117 | -823 | 15226 | 62 | -1002 | -15233 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | NESC Ins NA+ | 1 | 1 | GL:E | 582 | 279 | -1 | 464 | 128 | 6472 | 118 | 150 | -6472 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 2 | 1 | TL | 1579 | 454 | -0 | 1198 | 211 | 13711 | 381 | 244 | -13711 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 3 | 1 | ML | 1579 | 455 | -0 | 1198 | 211 | 13711 | 381 | 244 | -13711 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 4 | 1 | BL | 1579 | 456 | -0 | 1198 | 211 | 13711 | 381 | 245 | -13711 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 5 | 1 | GR:E | 530 | 255 | -1 | 420 | 118 | 5920 | 110 | 137 | -5921 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 6 | 1 | TR | 1585 | 453 | -0 | 1198 | 211 | 13711 | 387 | 243 | -13711 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 7 | 1 | MR | 1585 | 453 | -0 | 1198 | 211 | 13711 | 387 | 242 | -13711 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | | 8 | 1 | BR | 1585 | 452 | -0 | 1198 | 211 | 13711 | 387 | 242 | -13711 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | NESC Ins NA- | 1 | 1 | GL:E | 582 | -189 | -1 | 464 | -84 | 6472 | 118 | -105 | -6473 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 2 | 1 | TL | 1579 | -265 | -1 | 1198 | -117 | 13712 | 381 | -148 | -13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 3 | 1 | ML | 1579 | -264 | -1 | 1198 | -117 | 13712 | 381 | -147 | -13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 4 | 1 | BL | 1579 | -264 | -1 | 1198 | -117 | 13712 | 381 | -147 | -13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 5 | 1 | GR:E | 530 | -175 | -1 | 420 | -77 | 5921 | 110 | -97 | -5922 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 6 | 1 | TR | 1585 | -268 | -1 | 1198 | -117 | 13712 | 387 | -151 | -13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 7 | 1 | MR | 1585 | -268 | -1 | 1198 | -117 | 13712 | 387 | -151 | -13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | | 8 | 1 | BR | 1585 | -269 | -1 | 1198 | -117 | 13712 | 387 | -152 | -13712 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | ASCE Ice/Wind NA | 1 | 1 | GL:E | 948 | 592 | -1 | 733 | 271 | 7952 | 216 | 321 | -7953 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 2 | 1 | TL | 2169 | 867 | -1 | 1591 | 399 | 15789 | 578 | 468 | -15790 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 3 | 1 | ML | 2168 | 868 | -1 | 1591 | 399 | 15789 | 578 | 469 | -15790 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 4 | 1 | BL | 2168 | 868 | -1 | 1591 | 399 | 15789 | 578 | 469 | -15790 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 5 | 1 | GR:E | 871 | 552 | -1 | 671 | 253 | 7282 | 199 | 299 | -7283 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 6 | 1 | TR | 2176 | 867 | -1 | 1591 | 399 | 15795 | 585 | 468 | -15796 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 7 | 1 | MR | 2176 | 866 | -1 | 1591 | 399 | 15795 | 585 | 467 | -15796 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | | 8 | 1 | BR | 2176 | 866 | -1 | 1591 | 399 | 15795 | 585 | 466 | -15796 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | ASCE Ice/Wind NA | 1 | 1 | GL:E | 948 | -482 | -1 | 733 | -217 | 7953 | 216 | -265 | -7955 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 2 | 1 | TL | 2169 | -649 | -2 | 1591 | -291 | 15792 | 578 | -358 | -15793 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 3 | 1 | ML | 2168 | -648 | -2 | 1591 | -291 | 15792 | 578 | -357 | -15793 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 4 | 1 | BL | 2168 | -647 | -2 | 1591 | -291 | 15792 | 578 | -356 | -15793 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 5 | 1 | GR:E | 871 | -454 | -1 | 671 | -204 | 7283 | 199 | -250 | -7285 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 6 | 1 | TR | 2176 | -653 | -1 | 1591 | -291 | 15797 | 585 | -362 | -15799 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 7 | 1 | MR | 2176 | -653 | -1 | 1591 | -291 | 15797 | 585 | -362 | -15799 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | | 8 | 1 | BR | 2176 | -654 | -1 | 1591 | -291 | 15797 | 585 | -363 | -15799 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | NU Ice | 1 | 1 | GL:E | 1318 | 64 | 0 | 952 | 32 | 9310 | 366 | 33 | -9310 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 2 | 1 | TL | 2693 | 132 | 0 | 1957 | 66 | 19169 | 735 | 67 | -19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 3 | 1 | ML | 2692 | 133 | 0 | 1957 | 66 | 19169 | 735 | 68 | -19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 4 | 1 | BL | 2692 | 134 | 0 | 1957 | 66 | 19169 | 735 | 69 | -19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 5 | 1 | GR:E | 1218 | 58 | -0 | 875 | 29 | 8492 | 343 | 28 | -8492 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 6 | 1 | TR | 2701 | 130 | -0 | 1957 | 66 | 19169 | 744 | 64 | -19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 7 | 1 | MR | 2702 | 129 | -0 | 1957 | 66 | 19169 | 744 | 64 | -19169 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | | 8 | 1 | BR | 2702 | 128 | -0 | 1957 | 66 | 19169 | 744 | 63 | -19169 |

Wire Load Induced Ground Line Moments For Single Pole Centered At Structure Origin For Structure Range

Note: not applicable to guyed structures or frames. These approximate values do not include nonlinear (P-delta) effects or wind on pole. ??

| Str. No. | Str. Name | LC # | WC # | Load Case Description | Vert. Load (kips) | Trans. Shear (kips) | Long. Shear (kips) | Resultant Shear (kips) | Trans. Moment (ft-k) | Long. Moment (ft-k) | Resultant Moment (ft-k) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | NESC Heavy NA+ | 15.904 | 7.591 | -0.005 | 7.591 | 597.614 | -0.430 | 597.614 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | NESC Heavy NA- | 15.904 | -5.453 | -0.009 | 5.453 | -430.944 | -0.749 | 430.945 |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | NESC Uplift NA+ | 10.603 | 7.591 | -0.005 | 7.591 | 597.659 | -0.430 | 597.659 |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | NESC Uplift NA- | 10.603 | -5.453 | -0.009 | 5.453 | -430.900 | -0.749 | 430.900 |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | NESC Ext Wind NA | 7.679 | 13.708 | -0.044 | 13.708 | 1064.945 | -3.474 | 1064.950 |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | NESC Ext Wind NA | 7.679 | -12.285 | -0.053 | 12.285 | -954.094 | -4.098 | 954.103 |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | NESC Ins NA+ | 10.603 | 3.257 | -0.004 | 3.257 | 256.210 | -0.293 | 256.210 |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | NESC Ins NA- | 10.603 | -1.961 | -0.005 | 1.961 | -155.214 | -0.421 | 155.214 |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | ASCE Ice/Wind NA | 14.852 | 6.347 | -0.008 | 6.347 | 501.326 | -0.675 | 501.327 |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | ASCE Ice/Wind NA | 14.852 | -4.840 | -0.012 | 4.840 | -383.845 | -0.949 | 383.847 |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | NU Ice | 18.718 | 0.909 | 0.000 | 0.909 | 70.825 | 0.000 | 70.825 |

Basic factored design wind pressure on structure For Structure Range

| Str. No. | Str. Name | LC # | WC # | Load Case Description | Trans. Wind Press. (psf) | Long. Wind Press. (psf) | Notes |
|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 1 | 1 | NESC Heavy NA+ | 10.0 | 0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 2 | 1 | NESC Heavy NA- | -10.0 | -0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 3 | 1 | NESC Uplift NA+ | 10.0 | 0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 4 | 1 | NESC Uplift NA- | -10.0 | -0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 5 | 4 | NESC Ext Wind NA | 35.3 | 0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 6 | 4 | NESC Ext Wind NA | -35.3 | -0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 7 | 1 | NESC Ins NA+ | 4.0 | 0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 8 | 1 | NESC Ins NA- | -4.0 | -0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 9 | 5 | ASCE Ice/Wind NA | 7.0 | 0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 10 | 5 | ASCE Ice/Wind NA | -7.0 | -0.0 | |
| 3848 | 11-cdcsp-02-uwx.095 | 11 | 18 | NU Ice | 0.0 | 0.0 | |

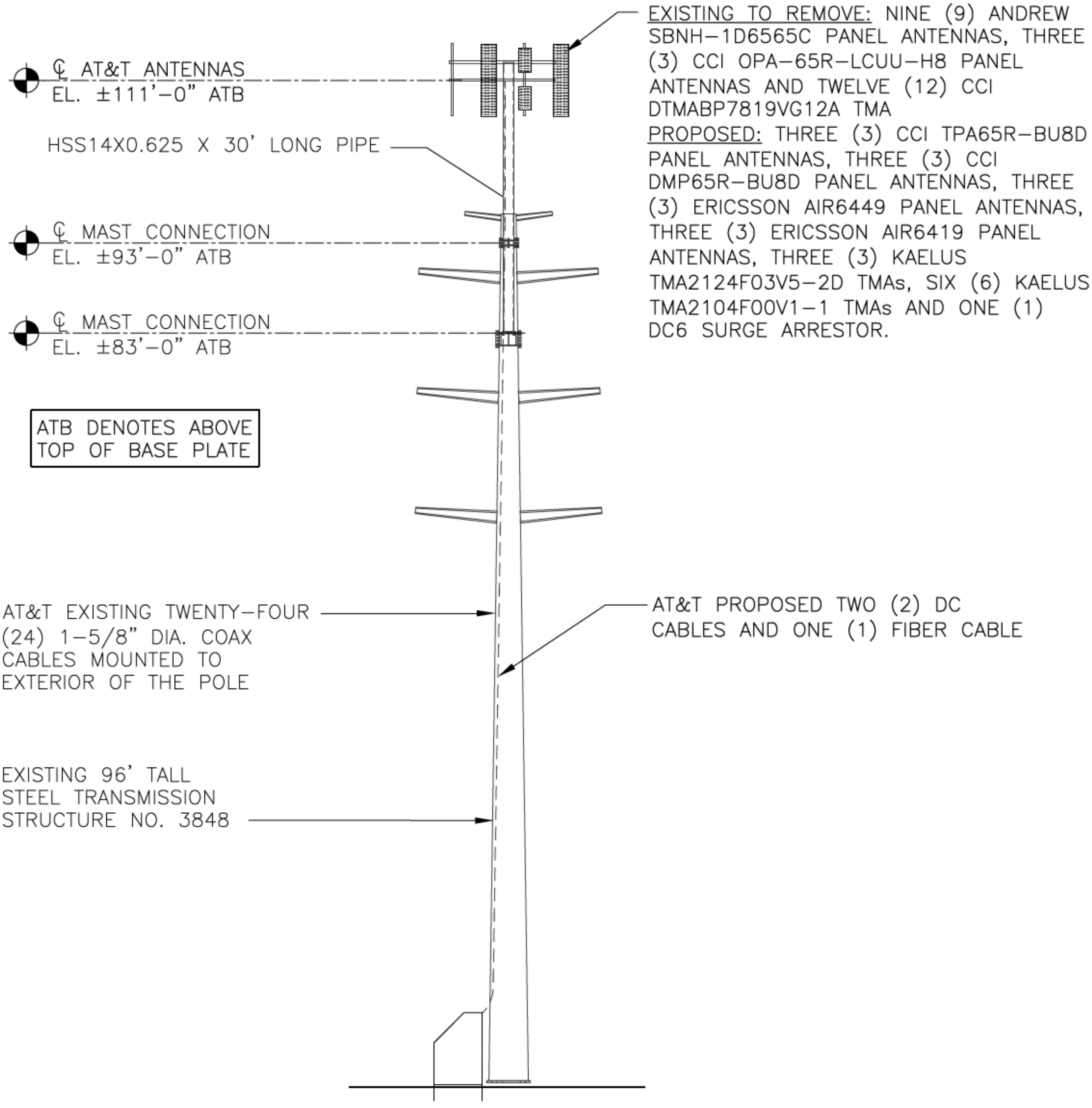
Detailed Manufacturer Loading For Structure Range

Note: Loads in this report include load from counter weights, insulator weight and insulator wind area.

| Str. No. | Str. Name | Line Angle (deg) | LC # | WC # | Load Case Description | Set No. | Phase No. | Attach. Joint Labels | Structure Attach X (ft) | Structure Attach Y (ft) | Structure Attach Z (ft) | Height (ft) | Dead End | Wires Per Phase Back | Wires Per Phase Ahead | Structure Loads Vert. (lbs) | Structure Loads Trans. (lbs) | Structure Loads Long. (lbs) | Loads from back span Vert. (lbs) | Loads from back span Trans. (lbs) | Loads from back span Long. (lbs) | Loads from ahead span Vert. (lbs) | Loads from ahead span Trans. (lbs) | Loads from ahead span Long. (lbs) | Warnings | Cable Name | Back span Len. (ft) | Back span Azi. (deg) | Back span Horiz. Load (lbs/ft) | Back span Vert. Load (lbs/ft) | Back span Horiz. Tension (lbs) | Back span Cable Name | Ahead span Len. (ft) | Ahead span Azi. (deg) | Ahead span Horiz. Load (lbs/ft) | Ahead span Vert. Load (lbs/ft) | Ahead span Horiz. Tension (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | NESC Heavy NA+ | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 872 | 659 | -1 | 696 | 302 | 10678 | 177 | 356 | -10679 | | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.77 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.77 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 2369 | 1055 | -1 | 1797 | 487 | 22622 | 572 | 568 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 2369 | 1056 | -1 | 1797 | 487 | 22622 | 572 | 569 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 2369 | 1057 | -1 | 1797 | 487 | 22622 | 572 | 570 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 795 | 603 | -1 | 629 | 277 | 9768 | 165 | 326 | -9769 | | 19#10_alumoweld_tight.wir | 387 | 90 | 1.26 | 1.61 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.61 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 2377 | 1055 | -1 | 1797 | 487 | 22622 | 580 | 568 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 2377 | 1054 | -1 | 1797 | 487 | 22622 | 580 | 567 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 1 | 1 | | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 2377 | 1053 | -1 | 1797 | 487 | 22622 | 580 | 566 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | NESC Heavy NA- | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 872 | -511 | -1 | 696 | -229 | 10680 | 177 | -282 | -10681 | | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.77 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.77 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 2369 | -743 | -1 | 1797 | -332 | 22625 | 572 | -411 | -22626 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 2369 | -742 | -1 | 1797 | -332 | 22625 | 572 | -410 | -22626 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 2369 | -741 | -1 | 1797 | -332 | 22625 | 572 | -409 | -22626 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 795 | -471 | -1 | 629 | -210 | 9770 | 165 | -260 | -9771 | | 19#10_alumoweld_tight.wir | 387 | 90 | 1.26 | 1.61 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.61 | 9770 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 2377 | -748 | -1 | 1797 | -332 | 22625 | 580 | -416 | -22626 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 2377 | -749 | -1 | 1797 | -332 | 22625 | 580 | -417 | -22626 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 2 | 1 | | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 2377 | -750 | -1 | 1797 | -332 | 22625 | 580 | -418 | -22626 | | lapwing_tight.wir | 387 | 90 | 2.09 | 4.56 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 4.56 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | NESC Uplift NA+ | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 582 | 659 | -1 | 464 | 302 | 10678 | 118 | 356 | -10679 | | brugg_57ay104acs-3c_115.wir | 387 | 90 | 1.37 | 1.18 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.18 | 10680 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 1579 | 1055 | -1 | 1198 | 487 | 22622 | 381 | 568 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 1579 | 1056 | -1 | 1198 | 487 | 22622 | 381 | 569 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 1579 | 1057 | -1 | 1198 | 487 | 22622 | 381 | 570 | -22623 | | lapwing_tight.wir | 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 530 | 603 | -1 | 420 | 277 | 9768 | 110 | 326 | -9769 | 19#10_alumoweld_tight.wir |
| 387 | 90 | 1.26 | 1.08 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.08 | 9770 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 1585 | 1055 | -1 | 1198 | 487 | 22622 | 387 | 568 | -22623 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 1585 | 1054 | -1 | 1198 | 487 | 22622 | 387 | 567 | -22623 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 3 | 1 | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 1585 | 1053 | -1 | 1198 | 487 | 22622 | 387 | 566 | -22623 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 NESC Uplift NA- | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 582 | -511 | -1 | 464 | -229 | 10680 | 118 | -282 | -10681 | brugg_57ay104acs-3c_115.wir |
| 387 | 90 | 1.37 | 1.18 | 10679 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.37 | 1.18 | 10680 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 1579 | -743 | -1 | 1198 | -332 | 22625 | 381 | -411 | -22626 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 1579 | -742 | -1 | 1198 | -332 | 22625 | 381 | -410 | -22626 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 1579 | -741 | -1 | 1198 | -332 | 22625 | 381 | -409 | -22626 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 464 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 530 | -471 | -1 | 420 | -210 | 9770 | 110 | -260 | -9771 | 19#10_alumoweld_tight.wir |
| 387 | 90 | 1.26 | 1.08 | 9769 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.26 | 1.08 | 9770 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 1585 | -748 | -1 | 1198 | -332 | 22625 | 387 | -416 | -22626 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 1585 | -749 | -1 | 1198 | -332 | 22625 | 387 | -417 | -22626 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 4 | 1 | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 1585 | -750 | -1 | 1198 | -332 | 22625 | 387 | -418 | -22626 | lapwing_tight.wir |
| 387 | 90 | 2.09 | 3.04 | 22624 | lapwing_tight.wir | 466 | 270 | 2.09 | 3.04 | 22624 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 NESC Ext Wind NA | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 321 | 858 | -3 | 405 | 392 | 6835 | -84 | 466 | -6838 | brugg_57ay104acs-3c_115.wir |
| 387 | 90 | 1.90 | 0.52 | 6836 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.90 | 0.52 | 6840 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 1175 | 2027 | -6 | 1117 | 928 | 15220 | 58 | 1099 | -15226 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 1175 | 2028 | -6 | 1117 | 928 | 15220 | 58 | 1100 | -15226 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 1175 | 2028 | -6 | 1117 | 928 | 15220 | 58 | 1101 | -15226 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 296 | 678 | -3 | 352 | 310 | 5736 | -56 | 369 | -5739 | 19#10_alumoweld_tight.wir |
| 387 | 90 | 1.50 | 0.49 | 5737 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.50 | 0.49 | 5740 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 1179 | 2030 | -7 | 1117 | 928 | 15220 | 62 | 1102 | -15226 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 1179 | 2029 | -7 | 1117 | 928 | 15220 | 62 | 1102 | -15226 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 5 | 4 | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 1179 | 2029 | -7 | 1117 | 928 | 15220 | 62 | 1101 | -15226 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 NESC Ext Wind NA | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 321 | -763 | -4 | 405 | -345 | 6838 | -84 | -418 | -6841 | brugg_57ay104acs-3c_115.wir |
| 387 | 90 | 1.90 | 0.52 | 6836 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 1.90 | 0.52 | 6840 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 1175 | -1817 | -8 | 1117 | -824 | 15226 | 58 | -993 | -15233 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 1175 | -1816 | -8 | 1117 | -824 | 15226 | 58 | -992 | -15233 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 1175 | -1815 | -8 | 1117 | -824 | 15226 | 58 | -992 | -15233 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 464 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 296 | -601 | -3 | 352 | -271 | 5738 | -56 | -330 | -5741 | 19#10_alumoweld_tight.wir |
| 387 | 90 | 1.50 | 0.49 | 5737 | 19#10_alumoweld_tight.wir | 466 | 270 | 1.50 | 0.49 | 5740 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 1179 | -1824 | -8 | 1117 | -823 | 15226 | 62 | -1000 | -15233 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 1179 | -1824 | -8 | 1117 | -823 | 15226 | 62 | -1001 | -15233 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 6 | 4 | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 1179 | -1825 | -8 | 1117 | -823 | 15226 | 62 | -1002 | -15233 | lapwing_tight.wir |
| 387 | 90 | 4.43 | 1.97 | 15223 | lapwing_tight.wir | 466 | 270 | 4.43 | 1.97 | 15230 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 NESC Ins NA+ | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 582 | 279 | -1 | 464 | 128 | 6472 | 118 | 150 | -6472 | brugg_57ay104acs-3c_115.wir |
| 387 | 90 | 0.55 | 1.18 | 6472 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 0.55 | 1.18 | 6473 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 1579 | 454 | -0 | 1198 | 211 | 13711 | 381 | 244 | -13711 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 1579 | 455 | -0 | 1198 | 211 | 13711 | 381 | 244 | -13711 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 1579 | 456 | -0 | 1198 | 211 | 13711 | 381 | 245 | -13711 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 530 | 255 | -1 | 420 | 118 | 5920 | 110 | 137 | -5921 | 19#10_alumoweld_tight.wir |
| 387 | 90 | 0.50 | 1.08 | 5921 | 19#10_alumoweld_tight.wir | 466 | 270 | 0.50 | 1.08 | 5921 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 1585 | 453 | -0 | 1198 | 211 | 13711 | 387 | 243 | -13711 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 1585 | 453 | -0 | 1198 | 211 | 13711 | 387 | 242 | -13711 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 7 | 1 | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 1585 | 452 | -0 | 1198 | 211 | 13711 | 387 | 242 | -13711 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 NESC Ins NA- | 1 | 1 | GL:E | 0.0 | -4.8 | 95.0 | 95.0 | N | 1 | 1 | 582 | -189 | -1 | 464 | -84 | 6472 | 118 | -105 | -6473 | brugg_57ay104acs-3c_115.wir |
| 387 | 90 | 0.55 | 1.18 | 6472 | brugg_57ay104acs-3c_115.wir | 465 | 270 | 0.55 | 1.18 | 6473 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 2 | 1 | TL | 0.0 | -9.9 | 88.5 | 88.5 | N | 1 | 1 | 1579 | -265 | -1 | 1198 | -117 | 13712 | 381 | -148 | -13712 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 3 | 1 | ML | 0.0 | -10.1 | 75.5 | 75.5 | N | 1 | 1 | 1579 | -264 | -1 | 1198 | -117 | 13712 | 381 | -147 | -13712 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 4 | 1 | BL | 0.0 | -10.2 | 62.5 | 62.5 | N | 1 | 1 | 1579 | -264 | -1 | 1198 | -117 | 13712 | 381 | -147 | -13712 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 464 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 5 | 1 | GR:E | 0.0 | 4.8 | 95.0 | 95.0 | N | 1 | 1 | 530 | -175 | -1 | 420 | -77 | 5921 | 110 | -97 | -5922 | 19#10_alumoweld_tight.wir |
| 387 | 90 | 0.50 | 1.08 | 5921 | 19#10_alumoweld_tight.wir | 466 | 270 | 0.50 | 1.08 | 5921 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 6 | 1 | TR | 0.0 | 9.9 | 88.5 | 88.5 | N | 1 | 1 | 1585 | -268 | -1 | 1198 | -117 | 13712 | 387 | -151 | -13712 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 7 | 1 | MR | 0.0 | 10.1 | 75.5 | 75.5 | N | 1 | 1 | 1585 | -268 | -1 | 1198 | -117 | 13712 | 387 | -151 | -13712 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |
| 3848 | 11-cdcsp-02-uwx.095 | 0.39 | 8 | 1 | 8 | 1 | BR | 0.0 | 10.2 | 62.5 | 62.5 | N | 1 | 1 | 1585 | -269 | -1 | 1198 | -117 | 13712 | 387 | -152 | -13712 | lapwing_tight.wir |
| 387 | 90 | 0.83 | 3.04 | 13711 | lapwing_tight.wir | 466 | 270 | 0.83 | 3.04 | 13712 | | | | | | | | | | | | | | |

```
 3848 11-cdcsp-02-uwx.095  0.39  9   5 ASCE Ice/Wind NA    1     1    GL:E      0.0   -4.8   95.0   95.0   N    1    1     948    592    -1     733    271    7952     216    321   -7953          brugg_57ay104acs-3c_115.wir
387   90    1.26    1.95    7952   brugg_57ay104acs-3c_115.wir  465  270   1.26   1.95    7954
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     2     1      TL      0.0   -9.9   88.5   88.5   N    1    1    2169    867    -1    1591    399   15789     578    468  -15790          lapwing_tight.wir
387   90    1.76    4.28   15791   lapwing_tight.wir            464  270   1.76   4.28   15792
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     3     1      ML      0.0  -10.1   75.5   75.5   N    1    1    2168    868    -1    1591    399   15789     578    469  -15790          lapwing_tight.wir
387   90    1.76    4.28   15791   lapwing_tight.wir            464  270   1.76   4.28   15792
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     4     1      BL      0.0  -10.2   62.5   62.5   N    1    1    2168    868    -1    1591    399   15789     578    469  -15790          lapwing_tight.wir
387   90    1.76    4.28   15791   lapwing_tight.wir            464  270   1.76   4.28   15792
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     5     1    GR:E      0.0    4.8   95.0   95.0   N    1    1     871    552    -1     671    253    7282     199    299   -7283          19#10_alumoweld_tight.wir
387   90    1.18    1.79    7283   19#10_alumoweld_tight.wir    466  270   1.18   1.79    7284
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     6     1      TR      0.0    9.9   88.5   88.5   N    1    1    2176    867    -1    1591    399   15795     585    468  -15796          lapwing_tight.wir
387   90    1.76    4.28   15796   lapwing_tight.wir            466  270   1.76   4.28   15797
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     7     1      MR      0.0   10.1   75.5   75.5   N    1    1    2176    866    -1    1591    399   15795     585    467  -15796          lapwing_tight.wir
387   90    1.76    4.28   15796   lapwing_tight.wir            466  270   1.76   4.28   15797
 3848 11-cdcsp-02-uwx.095  0.39  9   5                     8     1      BR      0.0   10.2   62.5   62.5   N    1    1    2176    866    -1    1591    399   15795     585    466  -15796          lapwing_tight.wir
387   90    1.76    4.28   15796   lapwing_tight.wir            466  270   1.76   4.28   15797
 3848 11-cdcsp-02-uwx.095  0.39 10   5 ASCE Ice/Wind NA    1     1    GL:E      0.0   -4.8   95.0   95.0   N    1    1     948   -482    -1     733   -217    7953     216   -265   -7955          brugg_57ay104acs-3c_115.wir
387   90    1.26    1.95    7952   brugg_57ay104acs-3c_115.wir  465  270   1.26   1.95    7954
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     2     1      TL      0.0   -9.9   88.5   88.5   N    1    1    2169   -649    -2    1591   -291   15792     578   -358  -15793          lapwing_tight.wir
387   90    1.76    4.28   15791   lapwing_tight.wir            464  270   1.76   4.28   15792
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     3     1      ML      0.0  -10.1   75.5   75.5   N    1    1    2168   -648    -2    1591   -291   15792     578   -357  -15793          lapwing_tight.wir
387   90    1.76    4.28   15791   lapwing_tight.wir            464  270   1.76   4.28   15792
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     4     1      BL      0.0  -10.2   62.5   62.5   N    1    1    2168   -647    -2    1591   -291   15792     578   -356  -15793          lapwing_tight.wir
387   90    1.76    4.28   15791   lapwing_tight.wir            464  270   1.76   4.28   15792
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     5     1    GR:E      0.0    4.8   95.0   95.0   N    1    1     871   -454    -1     671   -204    7283     199   -250   -7285          19#10_alumoweld_tight.wir
387   90    1.18    1.79    7283   19#10_alumoweld_tight.wir    466  270   1.18   1.79    7284
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     6     1      TR      0.0    9.9   88.5   88.5   N    1    1    2176   -653    -1    1591   -291   15797     585   -362  -15799          lapwing_tight.wir
387   90    1.76    4.28   15796   lapwing_tight.wir            466  270   1.76   4.28   15797
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     7     1      MR      0.0   10.1   75.5   75.5   N    1    1    2176   -653    -1    1591   -291   15797     585   -362  -15799          lapwing_tight.wir
387   90    1.76    4.28   15796   lapwing_tight.wir            466  270   1.76   4.28   15797
 3848 11-cdcsp-02-uwx.095  0.39 10   5                     8     1      BR      0.0   10.2   62.5   62.5   N    1    1    2176   -654    -1    1591   -291   15797     585   -363  -15799          lapwing_tight.wir
387   90    1.76    4.28   15796   lapwing_tight.wir            466  270   1.76   4.28   15797
 3848 11-cdcsp-02-uwx.095  0.39 11  18 NU Ice              1     1    GL:E      0.0   -4.8   95.0   95.0   N    1    1    1318     64     0     952     32    9310     366     33   -9310          brugg_57ay104acs-3c_115.wir
387   90    0.00    2.77    9310   brugg_57ay104acs-3c_115.wir  465  270   0.00   2.77    9310
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     2     1      TL      0.0   -9.9   88.5   88.5   N    1    1    2693    132     0    1957     66   19169     735     67  -19169          lapwing_tight.wir
387   90    0.00    5.40   19169   lapwing_tight.wir            464  270   0.00   5.40   19169
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     3     1      ML      0.0  -10.1   75.5   75.5   N    1    1    2692    133     0    1957     66   19169     735     68  -19169          lapwing_tight.wir
387   90    0.00    5.40   19169   lapwing_tight.wir            464  270   0.00   5.40   19169
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     4     1      BL      0.0  -10.2   62.5   62.5   N    1    1    2692    134     0    1957     66   19169     735     69  -19169          lapwing_tight.wir
387   90    0.00    5.40   19169   lapwing_tight.wir            464  270   0.00   5.40   19169
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     5     1    GR:E      0.0    4.8   95.0   95.0   N    1    1    1218     58    -0     875     29    8492     343     28   -8492          19#10_alumoweld_tight.wir
387   90    0.00    2.56    8492   19#10_alumoweld_tight.wir    466  270   0.00   2.56    8492
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     6     1      TR      0.0    9.9   88.5   88.5   N    1    1    2701    130    -0    1957     66   19169     744     64  -19169          lapwing_tight.wir
387   90    0.00    5.40   19169   lapwing_tight.wir            466  270   0.00   5.40   19169
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     7     1      MR      0.0   10.1   75.5   75.5   N    1    1    2702    129    -0    1957     66   19169     744     64  -19169          lapwing_tight.wir
387   90    0.00    5.40   19169   lapwing_tight.wir            466  270   0.00   5.40   19169
 3848 11-cdcsp-02-uwx.095  0.39 11  18                     8     1      BR      0.0   10.2   62.5   62.5   N    1    1    2702    128    -0    1957     66   19169     744     63  -19169          lapwing_tight.wir
387   90    0.00    5.40   19169   lapwing_tight.wir            466  270   0.00   5.40   19169
```




1 / EL-1 **TOWER & MAST ELEVATION**

SCALE: NOT TO SCALE

| REVISIONS | | |
|---|---|---|
| 00 | 4/6/22 | CONSTRUCTION |
| | | |
| | | |
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| | |
|---|---|
| PROJECT NO: | 22021.02 |
| DRAWN BY: | TJL |
| CHECKED BY: | CFC |
| SCALE: | AS NOTED |
| DATE: | 4/6/22 |

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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

### Wind Speeds

| | | | |
|---|---|---|---|
| Basic Wind Speed | $V := 130$ | mph | (User Input - 2022 CSBC Appendix P) |
| Basic Wind Speed with Ice | $V_i := 50$ | mph | (User Input per Annex B of TIA-222-H) |
| Basic Wind Speed Service Loads | $V_{Ser} := 60$ | mph | (User Input - TIA-222-H Section 2.8.3) |

### Input

| | | | |
|---|---|---|---|
| Structure Type = | $Structure\_Type := Pole$ | | (User Input) |
| Structure Category = | $SC := III$ | | (User Input) |
| Exposure Category = | $Exp := C$ | | (User Input) |
| Structure Height = | $h := 96$ | ft | (User Input) |
| Height to Center of Antennas = | $z_{ant} := 111$ | ft | (User Input) |
| Height to Center of Mast = | $z_{Mast1} := 108$ | ft | (User Input) |
| Radial Ice Thickness = | $t_i := 1.0$ | in | (User Input per Annex B of TIA-222-H) |
| Radial Ice Density = | $Id := 56.00$ | pcf | (User Input) |
| Topographic Factor = | $K_{zt} := 1.0$ | | (User Input) |
| Shielding Factor for Appurtenances = | $K_a := 1.0$ | | (User Input) |
| Mean Base Elevation of structure above sea level = | $Z_s := 150$ | | |
| Ground Elevation Factor = | $K_e := e^{-0.0000362 \cdot Z_s} = 0.995$ | | |
| Gust Response Factor = | $G_H := 1.35$ | | (User Input - Section 2.6.9.4 of TIA-222-H) |

### Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-H)

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

Importance Factors =

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \\ 1.25 & \text{if } SC = 4 \end{cases} = 1.15$$

(Per Table 2-3 of TIA-222-H)

$K_{iz} := \left(\frac{z_{ant}}{33}\right)^{0.1} = 1.129$

$t_{izant} := t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.298$

Velocity Pressure Coefficient Antennas = $Kz_{ant} := 2.01 \cdot \left(\left(\frac{z_{ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.294$

Velocity Pressure w/o Ice Antennas = $qz_{ant} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{ant} \cdot V^2 = 52.886$

Velocity Pressure with Ice Antennas = $qz_{ice.ant} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{ant} \cdot V_i^2 = 7.823$

Velocity Pressure Service = $qz_{ant.Ser} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_{dSer} \cdot Kz_{ant} \cdot V_{Ser}^2 = 10.08$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.126$

$t_{izMast1} := t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 1.295$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01 \cdot \left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.286$

Velocity Pressure w/o Ice Mast = $qz_{Mast1} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast1} \cdot V^2 = 52.581$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 = 7.778$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 = 10.022$

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

**Mast Data:**

| | | | |
|---|---|---|---|
| | (HSS14x0.625) | | (User Input) |
| Mast Shape = | *Round* | | (User Input) |
| Mast Diameter = | $D_{mast} := 14$ | in | (User Input) |
| Mast Length = | $L_{mast} := 30$ | ft | (User Input) |
| Mast Thickness = | $t_{mast} := 0.625$ | in | (User Input) |
| Mast Aspect Ratio = | $Ar_{mast} := \frac{12 \cdot L_{mast}}{D_{mast}} = 25.7$ | | |
| Mast Force Coefficient = | $Ca_{mast} = 1.2$ | | |

**Gravity Loads (without ice)**

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

**Gravity Loads (ice only)**

| | | | |
|---|---|---|---|
| Ice Area per Linear Foot = | $Ai_{mast} := \frac{\pi}{4} \cdot \left(\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^2\right) = 62.2$ | sq in | |
| Weight of Ice on Mast = | $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 24$ | plf | **BLC 3** |

**Wind Load (with ice)**

| | | | |
|---|---|---|---|
| Mast Projected Surface Area w/ Ice = | $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.382$ | sf/ft | |
| Total Mast Wind Force w/ Ice = | $qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 17$ | plf | **BLC 4** |

**Wind Load (without ice)**

| | | | |
|---|---|---|---|
| Mast Projected Surface Area = | $A_{mast} := \frac{D_{mast}}{12} = 1.167$ | sf/ft | |
| Total Mast Wind Force = | $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 99$ | plf | **BLC 5** |

**Wind Load (Service)**

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

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | CCI DMP65R-BU8D | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 96$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 20.7$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 7.7$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 115$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$ | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.3$ | | |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 345$ | lbs | BLC 2 |

### Gravity Loads (ice only)

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 8350$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 271$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 812$ | lbs | BLC 3 |

### Wind Load (with ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 16$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 47.9$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 655$ | lbs | BLC 4 |

### Wind Load (without ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 13.8$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 41.4$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 3828$ | lbs | BLC 5 |

### Wind Load (Service)

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 730$ | lbs | BLC 6 |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | | |
|---|---|---|---|---|
| Antenna Model = | CCI TPA65R-BU8D | | | |
| Antenna Shape = | Flat | | (User Input) | |
| Antenna Height = | $L_{ant} := 96$ | in | (User Input) | |
| Antenna Width = | $W_{ant} := 20.7$ | in | (User Input) | |
| Antenna Thickness = | $T_{ant} := 7.7$ | in | (User Input) | |
| Antenna Weight = | $WT_{ant} := 110$ | lbs | (User Input) | |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) | |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$ | | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.3$ | | | |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 330$ | lbs | BLC 2 |

### Gravity Loads (ice only)

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 8350$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 271$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 812$ | lbs | BLC 3 |

### Wind Load (with ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 16$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 47.9$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 655$ | lbs | BLC 4 |

### Wind Load (without ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 13.8$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 41.4$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 3828$ | lbs | BLC 5 |

### Wind Load (Service)

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 730$ | lbs | BLC 6 |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | | |
|---|---|---|---|---|
| Antenna Model = | Ericsson AIR6419 | | | |
| Antenna Shape = | Flat | | (User Input) | |
| Antenna Height = | $L_{ant} := 31.1$ | in | (User Input) | |
| Antenna Width = | $W_{ant} := 16.1$ | in | (User Input) | |
| Antenna Thickness = | $T_{ant} := 7.3$ | in | (User Input) | |
| Antenna Weight = | $WT_{ant} := 56$ | lbs | (User Input) | |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) | |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.9$ | | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.2$ | | | |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 168$ | lbs | BLC 2 |

### Gravity Loads (ice only)

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3655$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 2580$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 84$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 251$ | lbs | BLC 3 |

### Wind Load (with ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 4.4$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13.1$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 166$ | lbs | BLC 4 |

### Wind Load (without ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.5$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 10.4$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 894$ | lbs | BLC 5 |

### Wind Load (Service)

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 170$ | lbs | BLC 6 |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | Ericsson AIR6449 | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 30.6$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 15.9$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 10.6$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 96$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.9$ | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.2$ | | |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 288$ | lbs | **BLC 2** |

### Gravity Loads (ice only)

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5157$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 2946$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 95$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 286$ | lbs | **BLC 3** |

### Wind Load (with ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 4.3$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 12.8$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 162$ | lbs | **BLC 4** |

### Wind Load (without ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.4$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 10.1$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 868$ | lbs | **BLC 5** |

### Wind Load (Service)

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 166$ | lbs | **BLC 6** |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | | |
|---|---|---|---|---|
| Antenna Model = | Kaelus TMA2124F03V5-2D | | | |
| Antenna Shape = | Flat | | (User Input) | |
| Antenna Height = | $L_{ant} := 9.7$ | in | (User Input) | |
| Antenna Width = | $W_{ant} := 10.4$ | in | (User Input) | |
| Antenna Thickness = | $T_{ant} := 8.3$ | in | (User Input) | |
| Antenna Weight = | $WT_{ant} := 36$ | lbs | (User Input) | |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) | |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 0.9$ | | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.2$ | | | |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 108$ | lbs | **BLC 2** |

**Gravity Loads (ice only)**

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 837$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 904$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 29$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 88$ | lbs | **BLC 3** |

**Wind Load (with ice)**

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 1.1$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 3.3$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 42$ | lbs | **BLC 4** |

**Wind Load (without ice)**

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.7$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 2.1$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 180$ | lbs | **BLC 5** |

**Wind Load (Service)**

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 34$ | lbs | **BLC 6** |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | Kaelus TMA2104F00V1-1 | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 8.7$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 7.9$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 4.1$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 17$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 6$ | | (User Input) |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.1$ | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.2$ | | |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 102$ | lbs | BLC 2 |

### Gravity Loads (ice only)

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 282$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 512$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 17$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 100$ | lbs | BLC 3 |

### Wind Load (with ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 0.8$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.9$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 63$ | lbs | BLC 4 |

### Wind Load (without ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.5$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 2.9$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 245$ | lbs | BLC 5 |

### Wind Load (Service)

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 47$ | lbs | BLC 6 |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | | |
|---|---|---|---|---|
| Antenna Model = | Raycap DC6-48-60-18-8C | | | |
| Antenna Shape = | Flat | | (User Input) | |
| Antenna Height = | $L_{ant} := 31.4$ | in | (User Input) | |
| Antenna Width = | $W_{ant} := 18.28$ | in | (User Input) | |
| Antenna Thickness = | $T_{ant} := 10.24$ | in | (User Input) | |
| Antenna Weight = | $WT_{ant} := 26$ | lbs | (User Input) | |
| Number of Antennas = | $N_{ant} := 1$ | | (User Input) | |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.7$ | | | |
| Antenna Force Coefficient = | $Ca_{ant} = 1.2$ | | | |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 26$ | lbs | BLC 2 |

### Gravity Loads (ice only)

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5878$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant}) \cdot (T_{ant} + 2 \cdot t_{izant}) - V_{ant} = 3233$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 105$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 105$ | lbs | BLC 3 |

### Wind Load (with ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izant}) \cdot (W_{ant} + 2 \cdot t_{izant})}{144} = 4.9$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.9$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 62$ | lbs | BLC 4 |

### Wind Load (without ice)

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 4$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 342$ | lbs | BLC 5 |

### Wind Load (Service)

| | | | |
|---|---|---|---|
| Total Antenna Wind Force Service Loads = | $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 65$ | lbs | BLC 6 |

## Development of Wind & Ice Load on Antenna Mounts

**Mount Data:**

Mount Type: Platform w/ Handrail

| | | | |
|---|---|---|---|
| Mount Shape = | *Flat* | | |
| Mount Projected Surface Area = | $CaAa := 24$ | sf | (User Input) |
| Mount Projected Surface Area w/ Ice = | $CaAa_{ice} := 28$ | sf | (User Input) |
| Mount Weight = | $WT_{mnt} := 3300$ | lbs | (User Input) |
| Mount Weight w/ Ice = | $WT_{mnt.ice} := 3800$ | lbs | (User Input) |

**Gravity Loads (without ice)**

| | | | |
|---|---|---|---|
| Weight of All Mounts = | $WT_{mnt} = 3300$ | lbs | **BLC 2** |

**Gravity Loads (ice only)**

| | | | |
|---|---|---|---|
| Weight of Ice on All Mounts = | $WT_{mnt.ice} - WT_{mnt} = 500$ | lbs | **BLC 3** |

**Wind Load (with ice)**

| | | | |
|---|---|---|---|
| Total Mount Wind Force = | $Fi_{mnt} := qz_{ice.ant} \cdot G_H \cdot CaAa_{ice} = 296$ | lbs | **BLC 4** |

**Wind Load (without ice)**

| | | | |
|---|---|---|---|
| Total Mount Wind Force = | $F_{mnt} := qz_{ant} \cdot G_H \cdot CaAa = 1713$ | lbs | **BLC 5** |

**Wind Load (Service)**

| | | | |
|---|---|---|---|
| Total Mount Wind Force = | $Fi_{mnt} := qz_{ant.Ser} \cdot G_H \cdot CaAa = 327$ | lbs | **BLC 6** |

## Development of Wind & Ice Load on Coax Cables

### Cable Data:

| | | | |
|---|---|---|---|
| Type = | 1-5/8" | | |
| Shape = | *Round* | | (User Input) |
| Coax Outside Diameter = | $D_{coax} := 1.98$ | in | (User Input) |
| Coax Cable Length = | $L_{coax} := 10$ | ft | (User Input) |
| Weight of Coax per foot = | $Wt_{coax} := 1.04$ | plf | (User Input) |
| Total Number of Coax = | $N_{coax} := 27$ | | (User Input - 24 Coax, 1 Hybrid & 2 DC) |
| No. of Coax Projecting Outside Face of Mast = | $NP_{coax} := 6$ | | (User Input) |

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 60.6$

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

### Gravity Loads (without ice)

Weight of all cables w/o ice: $WT_{coax} := Wt_{coax} \cdot N_{coax} = 28$ plf **BLC 2**

### Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4} \cdot \left( \left( D_{coax} + 2 \cdot t_{izMast1} \right)^2 - D_{coax}^{\ 2} \right) = 13.3$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 140$ plf **BLC 3**

### Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1.2$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 15$ plf **BLC 4**

### Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 1$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 84$ plf **BLC 5**

### Wind Load (Service )

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 16$ plf **BLC 6**

***Model Settings***

| | |
|---|---|
| Number of Reported Sections | 5 |
| Number of Internal Sections | 100 |
| Member Area Load Mesh Size ($in^2$) | 144 |
| Consider Shear Deformation | Yes |
| Consider Torsional Warping | Yes |
| Approximate Mesh Size (in) | 12 |
| Transfer Forces Between Intersecting Wood Walls | Yes |
| Increase Wood Wall Nailing Capacity for Wind Loads | Yes |
| Include P-Delta for Walls | Yes |
| Optimize Masonry and Wood Walls | No |
| Maximum Number of Iterations | 3 |
| Single | No |
| Multiple (Optimum) | Yes |
| Maximum | No |

| | |
|---|---|
| Global Axis corresponding to vertical direction | Y |
| Convert Existing Data | Yes |
| Default Global Plane for z-axis | XZ |
| Plate Local Axis Orientation | Nodal |

| | |
|---|---|
| Hot Rolled Steel | AISC 15th (360-16): LRFD |
| Stiffness Adjustment | Yes (Iterative) |
| Notional Annex | None |
| Connections | AISC 14th (360-10): ASD |
| Cold Formed Steel | AISI 1999: ASD |
| Stiffness Adjustment | Yes (Iterative) |
| Wood | AF&PA NDS-91/97: ASD |
| Temperature | < 100F |
| Concrete | ACI 318-02 |
| Masonry | ACI 530-05: ASD |
| Aluminum | AA ADM1-05: ASD |
| Structure Type | Building |
| Stiffness Adjustment | Yes (Iterative) |
| Stainless | AISC 14th (360-10): ASD |
| Stiffness Adjustment | Yes (Iterative) |

| | |
|---|---|
| Analysis Methodology | PCA Load Contour Method |
| Parme Beta Factor | 0.65 |

| | |
|---|---|
| Compression Stress Block | Rectangular Stress Block |
| Analyze using Cracked Sections | Yes |
| Leave room for horizontal rebar splices (2*d bar spacing) | Yes |
| List forces which were ignored for design in the Detail Report | Yes |

| | |
|---|---|
| Column Min Steel | 1 |
| Column Max Steel | 8 |
| Rebar Material Spec | ASTM A615 |
| Warn if beam-column framing arrangement is not understood | No |
| Number of Shear Regions | 4 |
| Region 2 & 3 Spacing Increase Increment (in) | 4 |

| | |
|---|---|
| Code | UBC 1997 |

***Model Settings (Continued)***

| | |
|---|---|
| Occupancy Cat | 4 |
| Seismic Zone | 3 |
| Base Elevation (ft) | |
| Include the weight of the structure in base shear calcs | No |
| $C_a$ | 0.36 |
| $C_v$ | 0.54 |
| T Z (sec) | |
| T X (sec) | |
| $C_t$Z | 0.035 |
| $C_t$X | 0.035 |
| R Z | 8.5 |
| R X | 8.5 |
| $\Omega_0$Z | 1 |
| $\Omega_0$X | 1 |
| ρ Z | 1 |
| ρ X | 1 |

### Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm. Coeff. [1e⁵°F⁻¹] | Density [k/ft³] | Yield [ksi] | Ry | Fu [ksi] | Rt |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A36 Gr.36 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 36 | 1.5 | 58 | 1.2 |
| 2 | A572 Gr.50 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 50 | 1.1 | 65 | 1.2 |
| 3 | A992 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 50 | 1.1 | 65 | 1.2 |
| 4 | A500 Gr.42 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 42 | 1.3 | 58 | 1.1 |
| 5 | A500 Gr.46 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 46 | 1.2 | 62 | 1.1 |
| 6 | A53 Gr. B | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 35 | 1.5 | 60 | 1.2 |

### Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design Rule | Area [in²] | Iyy [in⁴] | Izz [in⁴] | J [in⁴] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mast | HSS14.000X0.625 | Column | Pipe | A500 Gr.42 | Typical | 24.5 | 552 | 552 | 1100 |

### Hot Rolled Steel Design Parameters

| | Label | Shape | Length [ft] | Channel Conn. | a [ft] | Function |
|---|---|---|---|---|---|---|
| 1 | M1 | Mast | 30 | N/A | N/A | Lateral |

### Member Primary Data

| | Label | I Node | J Node | Section/Shape | Type | Design List | Material | Design Rule |
|---|---|---|---|---|---|---|---|---|
| 1 | M1 | BOTCONN | TOPMAST | Mast | Column | Pipe | A500 Gr.42 | Typical |

### Node Coordinates

| | Label | X [ft] | Y [ft] | Z [ft] | Detach From Diaphragm |
|---|---|---|---|---|---|
| 1 | BOTCONN | 0 | 0 | 0 | |
| 2 | TOPCONN | 0 | 10 | 0 | |
| 3 | TOPMAST | 0 | 30 | 0 | |

### Node Boundary Conditions

| | Node Label | X [k/in] | Y [k/in] | Z [k/in] | X Rot [k-ft/rad] | Y Rot [k-ft/rad] | Z Rot [k-ft/rad] |
|---|---|---|---|---|---|---|---|
| 1 | BOTCONN | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 2 | TOPCONN | Reaction | | Reaction | | | |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | Y | -0.345 | 28 |
| 2 | M1 | Y | -0.33 | 28 |
| 3 | M1 | Y | -0.168 | 28 |
| 4 | M1 | Y | -0.288 | 28 |
| 5 | M1 | Y | -0.108 | 28 |
| 6 | M1 | Y | -0.102 | 28 |
| 7 | M1 | Y | -0.026 | 28 |
| 8 | M1 | Y | -3.3 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | Y | -0.812 | 28 |
| 2 | M1 | Y | -0.812 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 3 | M1 | Y | -0.251 | 28 |
| 4 | M1 | Y | -0.286 | 28 |
| 5 | M1 | Y | -0.088 | 28 |
| 6 | M1 | Y | -0.1 | 28 |
| 7 | M1 | Y | -0.105 | 28 |
| 8 | M1 | Y | -0.5 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | X | 0.655 | 28 |
| 2 | M1 | X | 0.655 | 28 |
| 3 | M1 | X | 0.166 | 28 |
| 4 | M1 | X | 0.162 | 28 |
| 5 | M1 | X | 0.042 | 28 |
| 6 | M1 | X | 0.063 | 28 |
| 7 | M1 | X | 0.062 | 28 |
| 8 | M1 | X | 0.296 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | X | 3.828 | 28 |
| 2 | M1 | X | 3.828 | 28 |
| 3 | M1 | X | 0.894 | 28 |
| 4 | M1 | X | 0.868 | 28 |
| 5 | M1 | X | 0.18 | 28 |
| 6 | M1 | X | 0.245 | 28 |
| 7 | M1 | X | 0.342 | 28 |
| 8 | M1 | X | 1.713 | 28 |

### Member Point Loads (BLC 6 : Service Wind)

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | X | 0.73 | 28 |
| 2 | M1 | X | 0.73 | 28 |
| 3 | M1 | X | 0.17 | 28 |
| 4 | M1 | X | 0.166 | 28 |
| 5 | M1 | X | 0.034 | 28 |
| 6 | M1 | X | 0.047 | 28 |
| 7 | M1 | X | 0.065 | 28 |
| 8 | M1 | X | 0.327 | 28 |

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

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | Y | -0.028 | -0.028 | 0 | 26 |

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

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | Y | -0.024 | -0.024 | 20 | %100 |
| 2 | M1 | Y | -0.024 | -0.024 | 0 | 20 |
| 3 | M1 | Y | -0.14 | -0.14 | 0 | 26 |

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

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | 0.017 | 0.017 | 20 | %100 |
| 2 | M1 | X | 0.017 | 0.017 | 0 | 20 |
| 3 | M1 | X | 0.015 | 0.015 | 0 | 26 |

### Member Distributed Loads (BLC 5 : TIA Wind)

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | 0.099 | 0.099 | 20 | %100 |
| 2 | M1 | X | 0.099 | 0.099 | 0 | 20 |
| 3 | M1 | X | 0.084 | 0.084 | 0 | 26 |

### Member Distributed Loads (BLC 6 : Service Wind)

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | 0.019 | 0.019 | 20 | %100 |
| 2 | M1 | X | 0.019 | 0.019 | 0 | 20 |
| 3 | M1 | X | 0.016 | 0.016 | 0 | 26 |

### Basic Load Cases

| | BLC Description | Category | Y Gravity | Point | Distributed |
|---|---|---|---|---|---|
| 1 | Self Weight | None | -1 | | |
| 2 | Weight of Appurtenances | None | | 8 | 1 |
| 3 | Weight of Ice Only | None | | 8 | 3 |
| 4 | TIA Wind with Ice | None | | 8 | 3 |
| 5 | TIA Wind | None | | 8 | 3 |
| 6 | Service Wind | None | | 8 | 3 |

### Load Combinations

| | Description | Solve | P-Delta | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.2D + 1.0W | Yes | Y | 1 | 1.2 | 2 | 1.2 | 5 | 1 | | |
| 2 | 0.9D + 1.0W | Yes | Y | 1 | 0.9 | 2 | 0.9 | 5 | 1 | | |
| 3 | 1.2D +1.0Di + 1.0Wi | Yes | Y | 1 | 1.2 | 2 | 1.2 | 3 | 1 | 4 | 1 |
| 4 | 1.0D + 1.0WService | Yes | Y | 1 | 1 | 2 | 1 | 6 | 1 | | |

### Envelope Node Reactions

| | Node Label | | X [k] | LC | Y [k] | LC | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | BOTCONN | max | 35.198 | 1 | 16.789 | 3 | 0 | 4 | 0 | 4 | 0 | 4 | -20.292 | 3 |
| 1 | | min | 6.243 | 3 | 7.106 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -114.435 | 1 |
| 2 | TOPCONN | max | -9.244 | 3 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 4 |
| 3 | | min | -52.25 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 4 | Totals: | max | -3.001 | 3 | 16.789 | 3 | 0 | 4 | | | | | | |
| 5 | | min | -17.052 | 1 | 7.106 | 2 | 0 | 1 | | | | | | |

### Envelope Node Displacements

| | Node Label | | X [in] | LC | Y [in] | LC | Z [in] | LC | X Rotation [rad] | LC | Y Rotation [rad] | LC | Z Rotation [rad] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | BOTCONN | max | 0 | 3 | 0 | 2 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 1 |
| 1 | | min | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 3 |
| 2 | TOPCONN | max | 0 | 1 | -0.001 | 2 | 0 | 4 | 0 | 4 | 0 | 4 | -1.288e-3 | 3 |

***Envelope Node Displacements (Continued)***

| | Node Label | | X [in] | LC | Y [in] | LC | Z [in] | LC | X Rotation [rad] | LC | Y Rotation [rad] | LC | Z Rotation [rad] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | | min | 0 | 3 | -0.003 | 3 | 0 | 1 | 0 | 1 | 0 | 1 | -7.264e-3 | 1 |
| 4 | TOPMAST | max | 5.833 | 1 | -0.003 | 2 | 0 | 4 | 0 | 4 | 0 | 4 | -5.552e-3 | 3 |
| 5 | | min | 1.035 | 3 | -0.007 | 3 | 0 | 1 | 0 | 1 | 0 | 1 | -3.129e-2 | 1 |

***Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks***

| | Member | Shape | Code Check | Loc[ft] | LC | Shear Check | Loc[ft] | LC | phi*Pnc [k] | phi*Pnt [k] | phi*Mn y-y [k-ft] | phi*Mn z-z [k-ft] | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | M1 | HSS14.000X0.625 | 0.752 | 10 | 1 | 0.133 | 10 | 1 | 650.468 | 926.1 | 330.75 | 330.75 | 1 | H1-1b |

***Node Reactions***

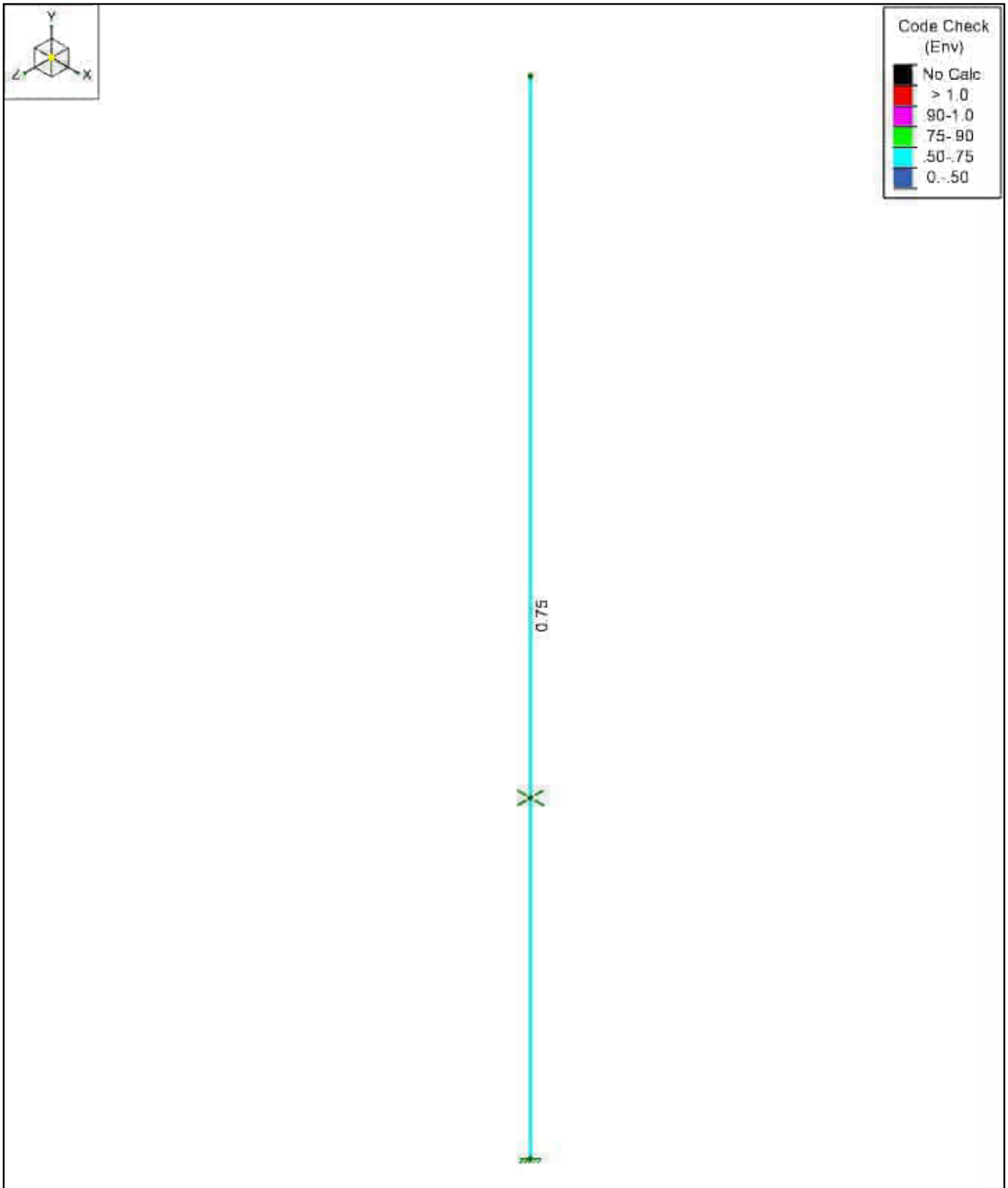
| | LC | Node Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | BOTCONN | 35.198 | 9.475 | 0 | 0 | 0 | -114.435 |
| 1 | 1 | TOPCONN | -52.25 | 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | Totals: | -17.052 | 9.475 | 0 | | | |
| 3 | 1 | COG (ft): | X: 0 | Y: 22.499 | Z: 0 | | | |

***Node Reactions***

| | LC | Node Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 0 | 2 | BOTCONN | 35.125 | 7.106 | 0 | 0 | 0 | -114.199 |
| 1 | 2 | TOPCONN | -52.177 | 0 | 0 | 0 | 0 | 0 |
| 2 | 2 | Totals: | -17.052 | 7.106 | 0 | | | |
| 3 | 2 | COG (ft): | X: 0 | Y: 22.499 | Z: 0 | | | |

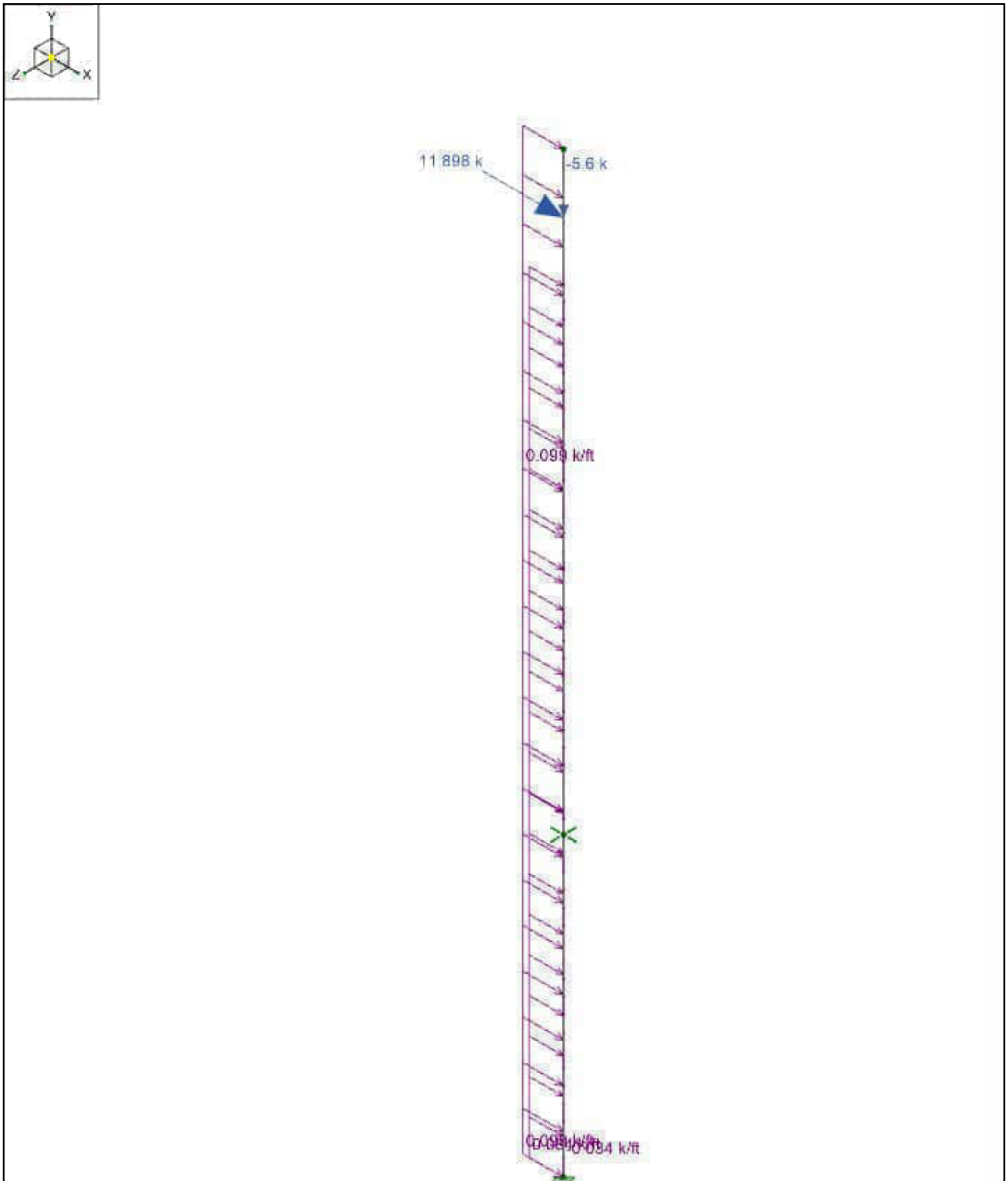
***Node Reactions***

| | LC | Node Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 0 | 3 | BOTCONN | 6.243 | 16.789 | 0 | 0 | 0 | -20.292 |
| 1 | 3 | TOPCONN | -9.244 | 0 | 0 | 0 | 0 | 0 |
| 2 | 3 | Totals: | -3.001 | 16.789 | 0 | | | |
| 3 | 3 | COG (ft): | X: 0 | Y: 21.086 | Z: 0 | | | |



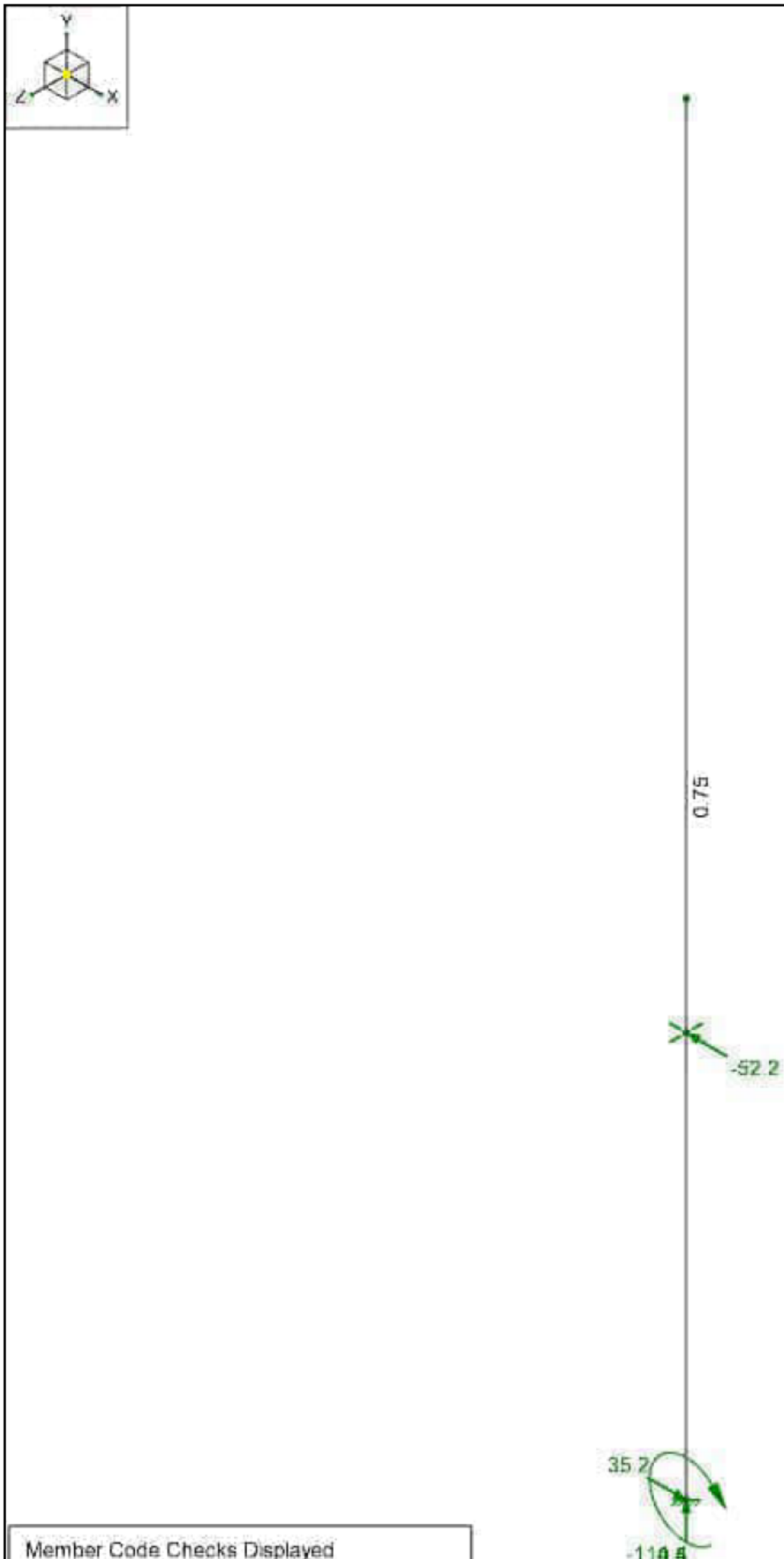

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-1 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |



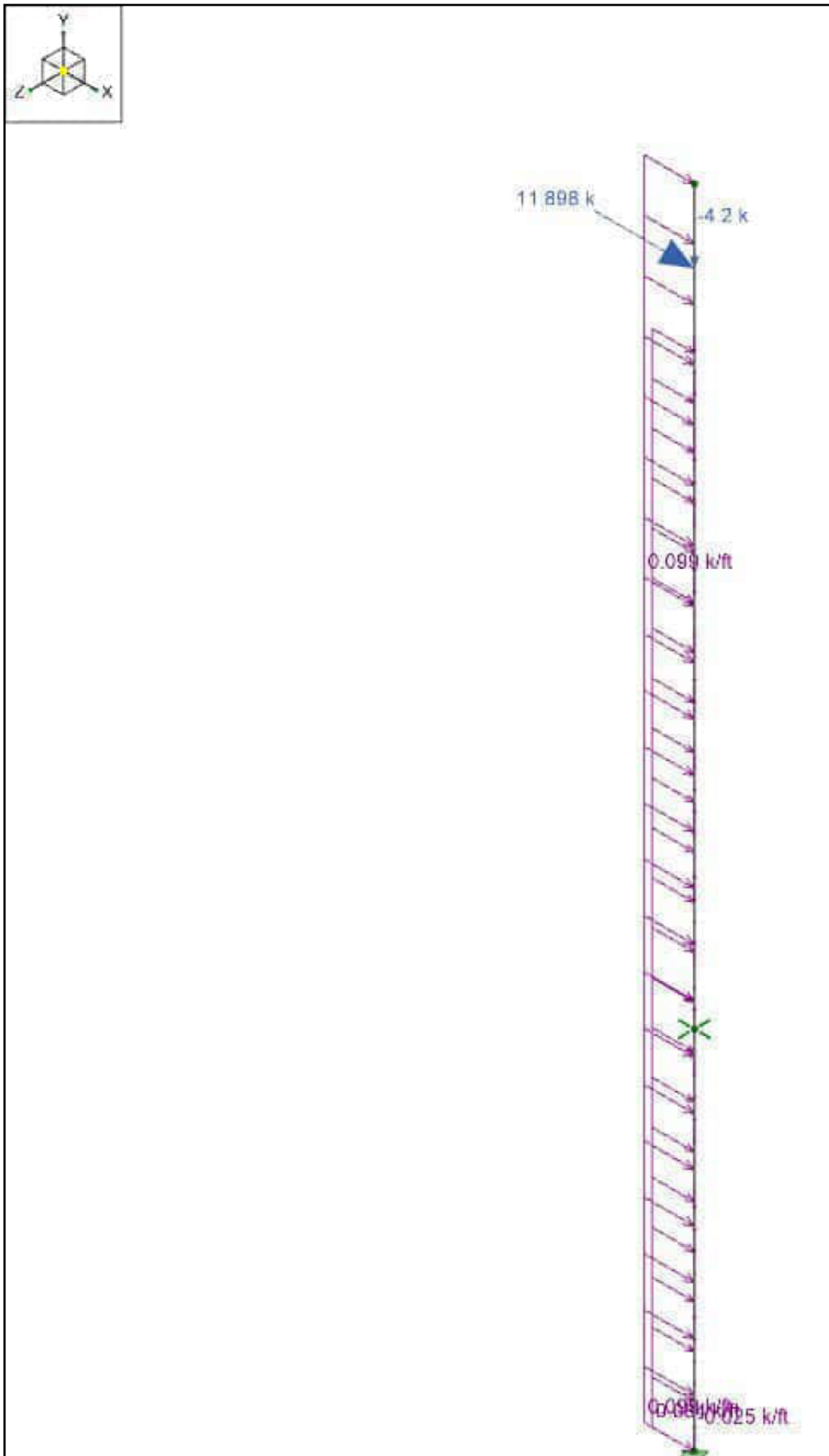

Loads: LC 1, 1.2D + 1.0W

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-1 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |



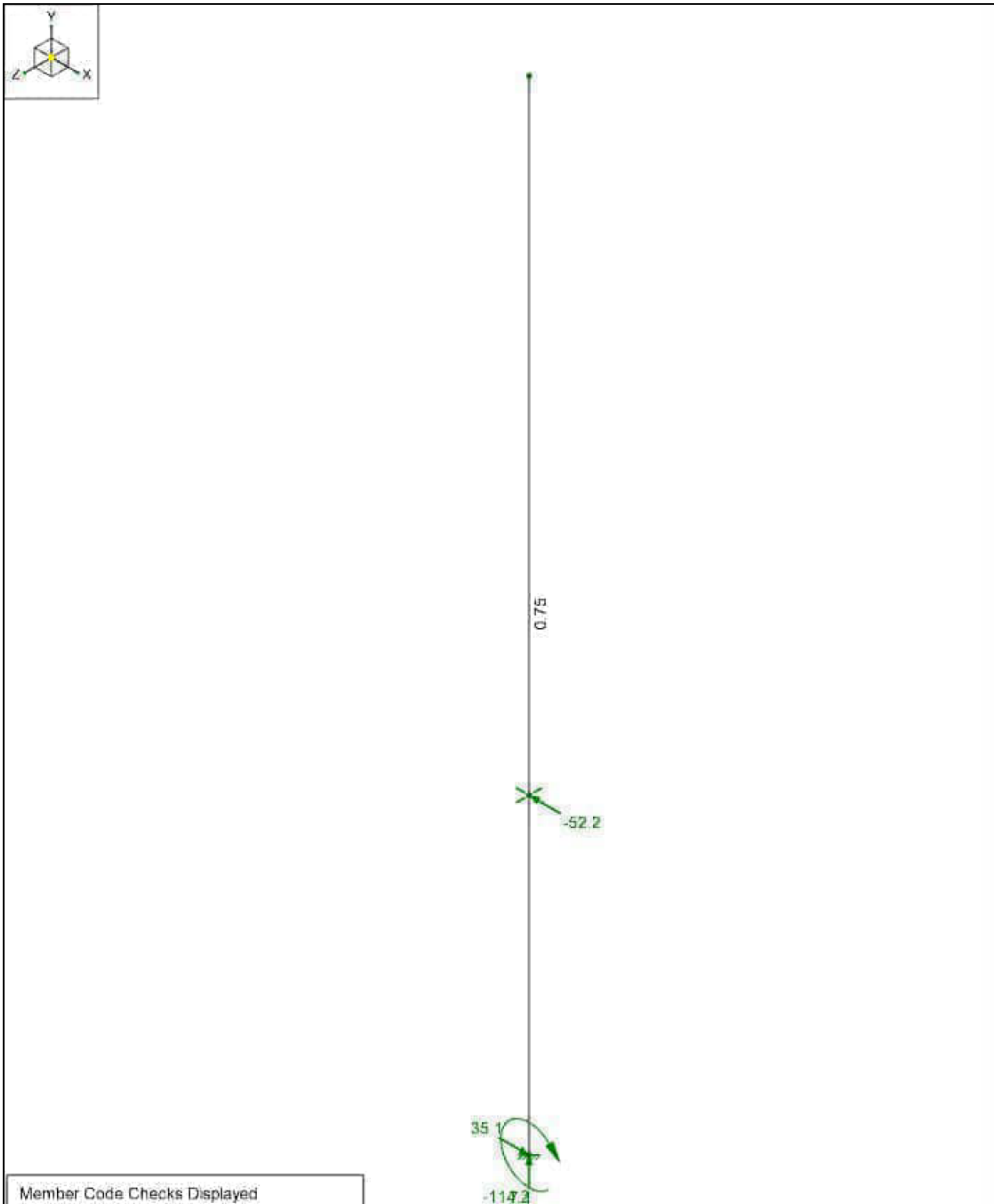

Member Code Checks Displayed
Results for LC 1, 1.2D + 1.0W
Reaction and Moment Units are kips and kip-ft

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-2 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |



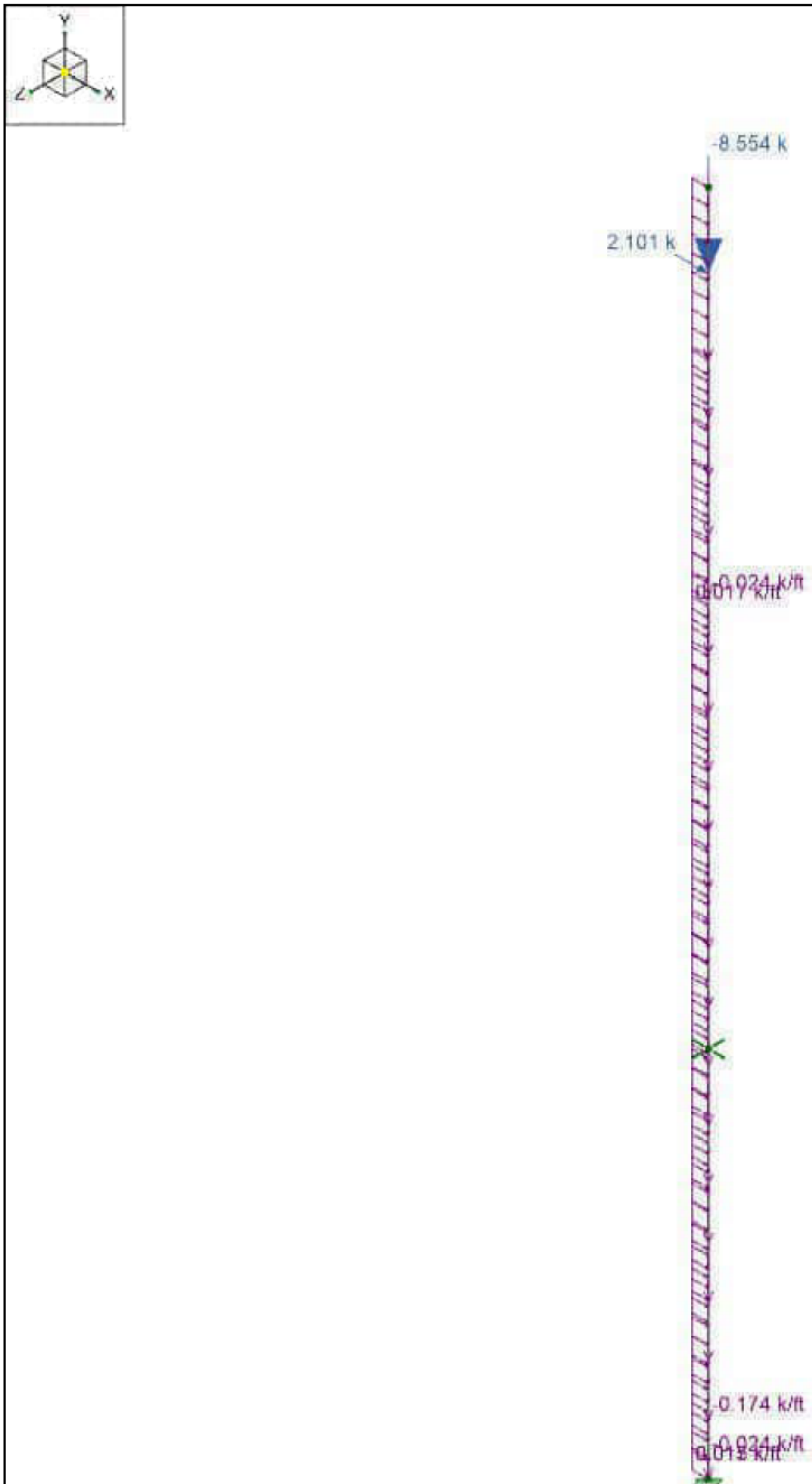

Loads: LC 2, 0.9D + 1.0W

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-2 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |



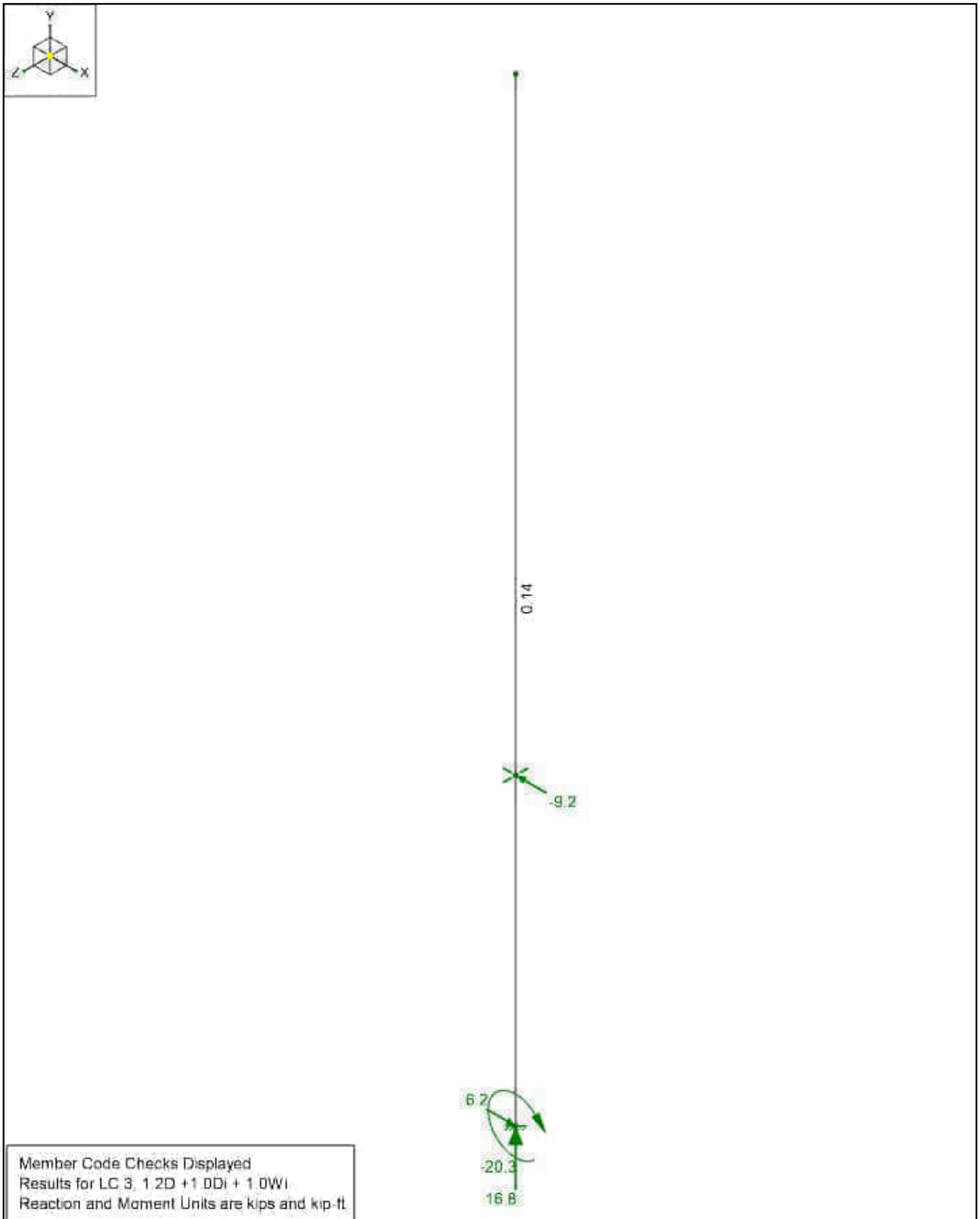

Member Code Checks Displayed
Results for LC 2, 0.9D + 1.0W
Reaction and Moment Units are kips and kip-ft

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-3 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |



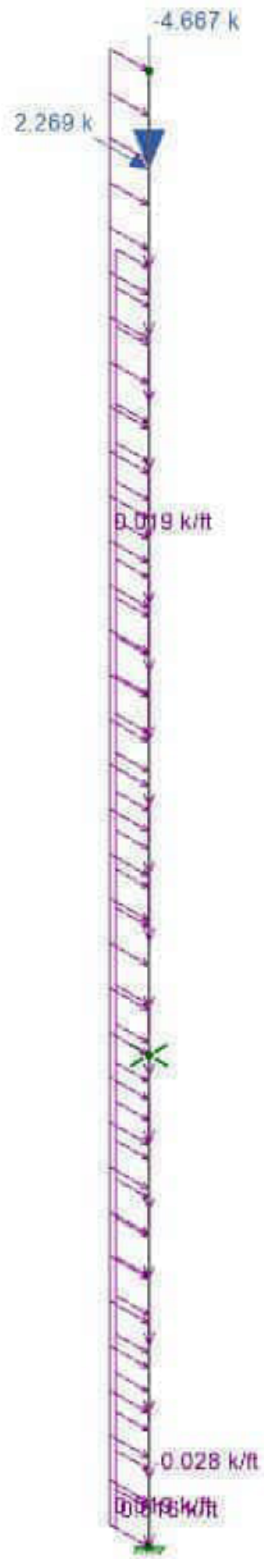

Loads: LC 3, 1.2D +1.0Di + 1.0Wi

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-4 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |




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

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-4 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |

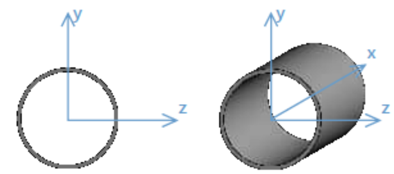




Loads: LC 4, 1.0D + 1.0WService

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, INC. | Strcuture #3848 - Mast | SK-5 |
| | TJL | | TIA.r3d |
| | 22021.02 /AT&T 2267 | | |

# Detail Report: M1

**Load Combination:** LC 4: 1.0D + 1.0WService **Code check:** 0.147 (axial/bending)




## Input Data

| | | | |
|---|---|---|---|
| **Shape:** | HSS14.000X0.625 | **I Node:** | BOTCONN |
| **Member Type:** | Column | **J Node:** | TOPMAST |
| **Length (ft):** | 30 | **I Release:** | Fixed |
| **Material Type:** | Hot Rolled Steel | **J Release:** | Fixed |
| **Design Rule:** | Typical | **I Offset:** | N/A |
| **Internal Sections:** | 97 | **J Offset:** | N/A |
| **Design Code:** | AISC 15th (360-16): LRFD | **T/C Only:** | Both Way |

## Material Properties

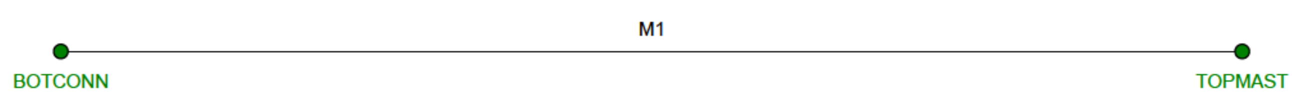
| | | | | | |
|---|---|---|---|---|---|
| **Material:** | A500 Gr.42 | **Therm. Coeff. (/1E5 F):** | 0.65 | **$F_u$ (ksi):** | 58 |
| **E (ksi):** | 29000 | **Density (k/ft$^3$):** | 0.49 | **$R_t$:** | 1.1 |
| **G (ksi):** | 11154 | **$F_y$ (ksi):** | 42 | | |
| **Nu:** | 0.3 | **$R_y$:** | 1.3 | | |

## Shape Properties

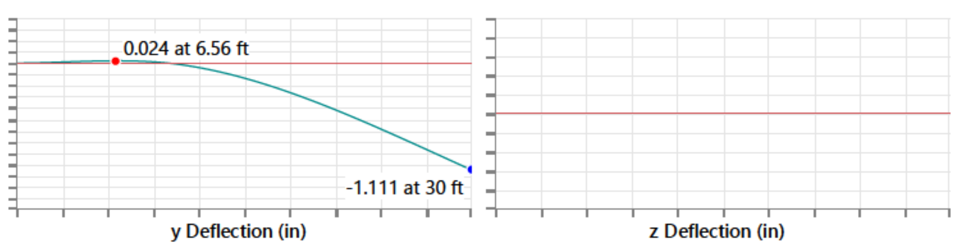
| | | | | | |
|---|---|---|---|---|---|
| **d (in):** | 14 | **Area (in$^2$):** | 24.5 | **$I_{zz}$ (in$^4$):** | 552 |
| **t (in):** | 0.581 | **J (in$^4$):** | 1100 | | |
| **Z (in$^3$):** | 105 | **$I_{yy}$ (in$^4$):** | 552 | | |

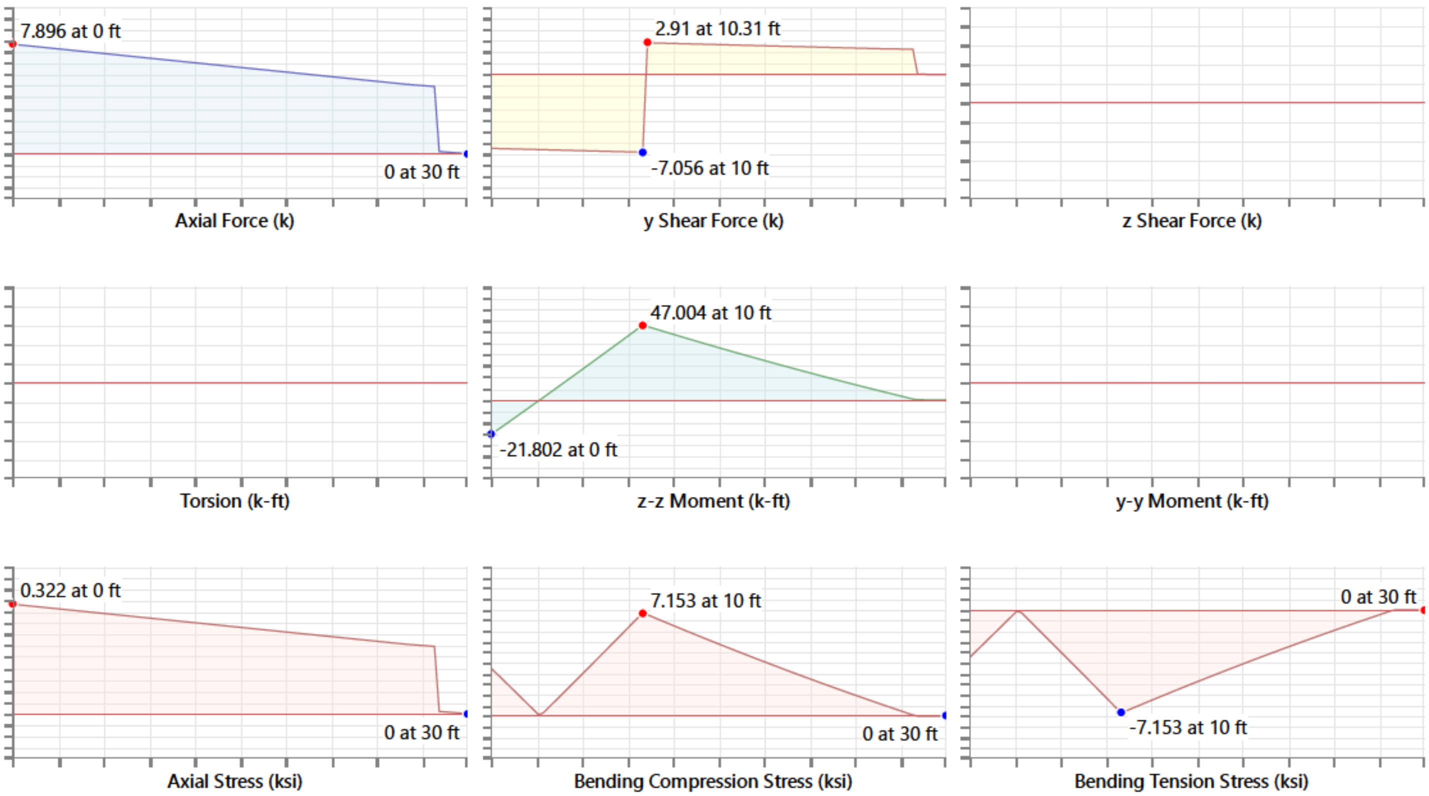
## Design Properties

| | | | | | |
|---|---|---|---|---|---|
| **$L_{b\ y\text{-}y}$ (ft):** | 30 | **$K_{y\text{-}y}$:** | 1 | **Seismic DR:** | None |
| **$L_{b\ z\text{-}z}$ (ft):** | 30 | **$K_{z\text{-}z}$:** | 1 | **Max Defl Ratio:** | L/324 |
| **$L_{comp\ top}$ (ft):** | 30 | **y sway:** | No | **Max Defl Location:** | 30 |
| **$L_{comp\ bot}$ (ft):** | 30 | **z sway:** | No | **Span:** | N/A |
| **$L_{torque}$ (ft):** | 30 | **Function:** | Lateral | **$\tau_b$:** | 1 |




**Diagrams:**






## AISC 15th (360-16): LRFD Code Check

| Limit State | Required | Available | Unity Check | Result |
|---|---|---|---|---|
| **Applied Loading - Bending/Axial** | - | - | - | - |
| **Applied Loading - Shear + Torsion** | - | - | - | - |
| **Axial Tension Analysis** | 0 k | 926.1 k | - | - |
| **Axial Compression Analysis** | 6.782 k | 650.468 k | - | - |
| **Flexural Analysis** | 47.004 k-ft | 330.75 k-ft | - | - |
| **Shear Analysis** | 7.056 k | 277.83 k | **0.025** | **PASS** |
| **Bending & Axial Interaction Check (UC Bending Max)** | - | - | **0.147** | **PASS** |
| **Torsional Analysis** | 0 k-ft | 310.598 k-ft | **0** | **PASS** |

## Mast Top Connection:

**Maximum Design Reactions at Brace:**

| | | |
|---|---|---|
| Vertical = | $Vert := 0 \cdot kips$ | (User Input) |
| Horizontal = | $Horz := 52.5 \cdot kips$ | (User Input) |
| Moment = | $Moment := 0$ | (User Input) |

**Bolt Data:**

| | | |
|---|---|---|
| Bolt Grade = | A325 | (User Input) |
| Number of Bolts = | $n_b := 6$ | (User Input) |
| Bolt Diameter = | $d_b := 0.75 \cdot in$ | (User Input) |
| Nominal Tensile Strength = | $F_{nt} := 90 \cdot ksi$ | (User Input) |
| Nominal Shear Strength = | $F_{nv} := 54 \cdot ksi$ | (User Input) |
| Resistance Factor = | $\phi := 0.75$ | (User Input) |
| Bolt Eccentricity from C.L. Mast = | $e := 22.25 \cdot in$ | (User Input) |
| Vertical Spacing Between Top and Bottom Bolts = | $S_{vert} := 9 \cdot in$ | (User Input) |
| Horizontal Spacing Between Bolts = | $S_{horz} := 24 \cdot in$ | (User Input) |
| Bolt Area = | $a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442\ in^2$ | |

**Check Bolt Stresses:**

**Wind Acting Parallel to Stiffener Plate:**

Shear Stress per Bolt = $f_v := \dfrac{Vert}{n_b \cdot a_b} = 0\ ksi$

$Condition1 := \mathbf{if}\left(f_v < \phi \cdot F_{nv}, \text{“OK”}, \text{“Overstressed”}\right)$

$Condition1 = \text{“OK”}$ $\qquad \dfrac{f_v}{(\phi \cdot F_{nv})} = 0$

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

Tension Force Each Bolt = $F_{tension.bolt} := \dfrac{Horz}{n_b} + \dfrac{Vert \cdot e}{S_{vert} \cdot 2} = 8.75\ kips$

Tension Stress Each Bolt = $f_t := \dfrac{F_{tension.bolt}}{a_b} = 19.8\ ksi$

$Condition2 := \mathbf{if}\left(f_t < \phi \cdot F'_{nt}, \text{“OK”}, \text{“Overstressed”}\right)$

$Condition2 = \text{“OK”}$ $\qquad \dfrac{f_t}{(\phi \cdot F'_{nt})} = 29.3\%$

**Wind Acting Perpendicular to Stiffener Plate:**

Shear Stress per Bolt = $f_v := \dfrac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 19.806\ ksi$

$Condition3 := \mathbf{if}\left(f_v < \phi \cdot F_{nv}, \text{“OK”}, \text{“Overstressed”}\right)$

$Condition3 = \text{“OK”}$ $\qquad \dfrac{f_v}{(\phi \cdot F_{nv})} = 48.9\%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} \text{if } 1.3 \cdot F_{nt} - \dfrac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ \quad \left(1.3 \cdot F_{nt} - \dfrac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) \\ \text{else} \\ \quad F_{nt} \end{cases} = 72.99\ ksi$

Tension Force per Bolt = $F_{tension.conn} := \dfrac{Horz \cdot e}{S_{horz} \cdot \dfrac{n_b}{2}} + \dfrac{Vert \cdot e}{S_{vert} \cdot 2} = 16.224\ kips$

Tension Stress Each Bolt = $f_t := \dfrac{F_{tension.conn}}{a_b} = 36.724\ ksi$

$Condition4 := \mathbf{if}\left(f_t < \phi \cdot F'_{nt}, \text{“OK”}, \text{“Overstressed”}\right)$

$Condition4 = \text{“OK”}$ $\qquad \dfrac{f_t}{(\phi \cdot F'_{nt})} = 67.1\%$

## Mast Connection to Bottom Bracket:

### Design Reactions at Brace:

| | | |
|---|---|---|
| Axial (Max) = | $Axial_{max} := 16.8 \cdot kip$ | (User Input) |
| Axial (Min) = | $Axial_{min} := 7.1 \cdot kip$ | (User Input) |
| Horz = | $Horz := 35.4 \cdot kip$ | (User Input) |
| Moment = | $Moment := 115 \cdot kip \cdot ft$ | (User Input) |

### Anchor Bolt Data:

| | | |
|---|---|---|
| Bolt Grade = | A325 | (User Input) |
| Design Shear Stress = | $F_v := 40.5 \cdot ksi$ | (User Input) |
| Design Tension Stress = | $F_T := 67.5 \cdot ksi$ | (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 = | $d_b := 1.25 \cdot in$ | (User Input) |
| Bolt Spacing X Direction = | $S_x := 14 \cdot in$ | (User Input) |
| Bolt Spacing Z Direction = | $S_z := 14 \cdot in$ | (User Input) |

### Base Plate Data:

| | | |
|---|---|---|
| Base Plate Steel = | A36 | (User Input) |
| Allowable Yield Stress = | $F_y := 36 \cdot ksi$ | (User Input) |
| Base Plate Width = | $Pl_w := 18 \cdot in$ | (User Input) |
| Base Plate Thickness = | $Pl_t := 1.75 \cdot in$ | (User Input) |
| Bolt Edge Distance = | $B_E := 2 \cdot in$ | (User Input) |
| Pole Diameter = | $D_p := 14 \cdot in$ | (User Input) |

### Base Plate Data:

| | | |
|---|---|---|
| Weld Grade | E70XX | (User Input) |
| Weld Yield Stress = | $F_{yw} := 70 \cdot ksi$ | (User Input) |
| Weld Size = | $sw := 0.5 \cdot in$ | (User Input) |

**Anchor Bolt Check:**

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 1.227\ in^2$

Shear per bolt = $V_{bolt} := \frac{Horz}{n_b} = 8.85\ kip$

Actual Shear Stress = $f_v := \frac{V_{bolt}}{a_b} = 7.21\ ksi$

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

$Condition1 = \text{"OK"}$

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^{\,2} + S_z^{\,2}} = 19.8\ in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x \cdot n_{b.par}} - \frac{Axial_{min}}{n_b} = 47.51\ kip$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} - \frac{Axial_{min}}{n_b} = 67.93\ kip$

Tension per bolt = $T := \textbf{if}\ (T_{par} > T_{diag}, T_{par}, T_{diag}) = 67.926\ kip$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = 55.35\ ksi$

$Condition2 := \textbf{if}\ (f_t < F_T, \text{"OK"}, \text{"Overstressed"})$

$Condition2 = \text{"OK"}$

**Base Plate Check:**

Design Bending Stress = $F_b := 0.9 \cdot F_y = 32.4\ ksi$

Plate Bending Width = $Z := \left(Pl_w \cdot \sqrt{2} - D_p\right) = 11.46\ in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 2.9\ in$

Load per Bolt Diagonal = $P_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} + \frac{Axial_{max}}{n_b} = 73.9\ kip$

Moment in Base Plate = $M := K \cdot P_{diag} = 214.27\ kip \cdot in$

Plastic Section Modulus = $Z := \frac{1}{4} \cdot Z \cdot Pl_t^{\,2} = 8.77\ in^3$

Bending Stress = $f_b := \frac{M}{Z} = 24.43\ ksi$

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

$Condition3 = \text{"OK"}$

**Base Plate to PCS Mast Weld Check:**

Design Weld Stress = $F_w := 0.45 \cdot F_{yw} = 31.5\ ksi$

Weld Area = $A_w := \frac{\pi}{4} \cdot \left( \left( D_p + 2 \cdot sw \cdot 0.707 \right)^2 - D_p^{\,2} \right) = 15.94\ in^2$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left( \left( D_p + 2 \cdot sw \cdot 0.707 \right)^4 - D_p^{\,4} \right) = 410.76\ in^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 7.35\ in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 55.86\ in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Horz}{A_w} = 26.93\ ksi$

$Condition4 := \textbf{if} \left( f_w < F_w, \text{“OK”}, \text{“Overstressed”} \right)$

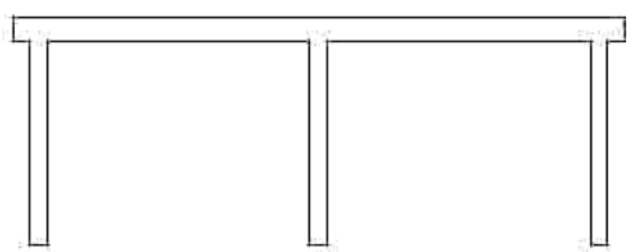
$Condition4 = \text{“OK”}$

**Gusset Plate Data:**

| | | |
|---|---|---|
| Yield Strength = | $F_y := 36 \cdot ksi$ | (User Input) |
| Tensile Strength = | $F_u := 58 \cdot ksi$ | (User Input) |
| Plate Height = | $Pl_h := 15 \cdot in$ | (User Input) |
| Plate Thickness = | $Pl_t := 0.5 \cdot in$ | (User Input) |
| Number of Plates = | $n_{plt} := 3$ | (User Input) |
| Distance from CL Pole to Face of Collar = | $d := 9.5 \cdot in$ | (User Input) |
| Section Modulus Gusset Assembly = | $S_x := 92 \cdot in^3$ | (User Input) |
| Dist. Between Outer 2 Gusset Plates = | $d_{plt} := 19.5 \cdot in$ | (User Input) |

**Resistance Factors:**

| | | |
|---|---|---|
| Yielding Factor = | $\phi_t := 0.9$ | (User Input) |
| Rupture Factor = | $\phi_r := 0.75$ | (User Input) |
| Shear Factor = | $\phi_v := 0.9$ | (User Input) |



| | |
|---|---|
| Plate Gross Area = | $A_g := Pl_h \cdot Pl_t = 7.5\ in^2$ |
| Effective Net Area = | $A_{en} := A_g = 7.5\ in^2$ |
| Tensile Yielding = | $P_{at} := \phi_t \cdot F_y \cdot A_g = 243\ kip$ |
| Tensile Rupture = | $P_{ar} := \phi_r \cdot F_u \cdot A_{en} = 326.25\ kip$ |
| Design Tension = | $Pa. := min\left(P_{at}, P_{ar}\right) = 243\ kip$ |
| Design Shear = | $V_n := \phi_v \cdot 0.6 \cdot F_y \cdot A_g = 145.8\ kip$ |
| Design Bending Stress = | $F_b := 0.9 \cdot F_y = 32.4\ ksi$ |

**Wind Acting Parallel to Stiffener Plates:**

Moment Parallel = $M_{par} := Moment + Axial_{max} \cdot d = (1.5 \cdot 10^3)\ kip \cdot in$

Bending Stress = $f_b := \frac{M_{par}}{S_x} = 16.73\ ksi$

Max Tension = $T_{max} := \frac{Horz}{n_{plt}} = 11.8\ kip$

Max Shear = $V_{max} := \frac{Axial_{max}}{n_{plt}} = 5.6\ kip$

$Condition4 := \text{if}\left(\frac{f_b}{F_b} + \frac{T_{max}}{Pa.} + \frac{V_{max}}{V_n} < 1, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition4 = \text{"OK"}$

$\frac{f_b}{F_b} + \frac{T_{max}}{Pa.} + \frac{V_{max}}{V_n} = 60.3\%$

**Wind Acting Perpendicular to Stiffener Plates:**

Moment Parallel = $M_{par} := Axial_{max} \cdot d = 159.6\ in \cdot kip$

Moment Perpendicular = $M_{perp} := Horz \cdot d = 336.3\ in \cdot kip$

Bending Stress = $f_b := \frac{M_{par}}{S_x} = 1.73\ ksi$

Max Tension = $T_{max} := \frac{M_{perp}}{d_{plt}} = 17.246\ kip$

Max Shear = $V_{max} := \frac{Axial_{max} + Horz}{n_{plt}} + \frac{Moment}{d_{plt}} = 88.169\ kip$

$Condition5 := \text{if}\left(\frac{f_b}{F_b} + \frac{T_{max}}{Pa.} + \frac{V_{max}}{V_n} < 1, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition5 = \text{"OK"}$

$\frac{f_b}{F_b} + \frac{T_{max}}{Pa.} + \frac{V_{max}}{V_n} = 72.9\%$

**Weld Data:**

Weld Yield Stress = $F_{yw} := 70 \cdot ksi$ (User Input)

Design Weld Stress = $F_w := 0.45 \cdot F_{yw} = 31.5\ ksi$

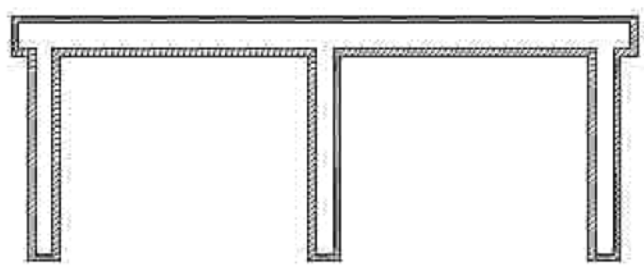
Weld Size = $sw := 0.3125 \cdot in$ (User Input)

Weld Area = $A_w := 29.5 \cdot in^2$ (User Input)

Section Modulus of Weld = $S_x := 82.4 \cdot in^3$ (User Input)

Section Modulus of Weld = $S_z := 160 \cdot in^3$ (User Input)

Weld Area of 1 Gusset = $A_{w1} := 2.8 \cdot in^2$ (User Input)



**Wind Acting Parallel to Stiffener Plates:**

Moment Parallel = $M_{par} := Moment + Axial_{max} \cdot d = \left(1.5 \cdot 10^3\right)\ in \cdot kip$

Weld Stress = $f_w := \frac{M_{par}}{S_x} + \frac{Axial_{max} + Horz}{A_w} = 20.45\ ksi$

$Condition6 := \text{if}\left(f_w < F_w, \text{“OK”}, \text{“Overstressed”}\right)$

$Condition6 = \text{“OK”}$

$\frac{f_w}{F_w} = 64.9\%$

**Wind Acting Perpendicular to Stiffener Plates:**

Moment Parallel = $M_{par} := Axial_{max} \cdot d = 159.6\ in \cdot kip$

Moment Perpendicular = $M_{perp} := Horz \cdot d = 336.3\ in \cdot kip$

Weld Stress = $f_w := \frac{M_{par}}{S_x} + \frac{M_{perp}}{S_z} + \frac{Axial_{max} + Horz}{A_w} + \frac{Moment}{\left(d_{plt} \cdot A_{w1}\right)} = 31.08\ ksi$

$Condition7 := \text{if}\left(f_w < F_w, \text{“OK”}, \text{“Overstressed”}\right)$

$Condition7 = \text{“OK”}$

$\frac{f_w}{F_w} = 98.7\%$

## Mast Bottom Connection:

### Maximum Design Reactions at Brace:

| | | |
|---|---|---|
| Vertical = | $Vert := 16.8 \cdot kips$ | (User Input) |
| Horizontal = | $Horz := 35.4 \cdot kips$ | (User Input) |
| Moment = | $Moment := 115 \cdot ft \cdot kips$ | (User Input) |

### Bolt Data:

| | | |
|---|---|---|
| Bolt Grade = | A325 | (User Input) |
| Number of Bolts = | $n_b := 12$ | (User Input) |
| Bolt Diameter = | $d_b := 1 \cdot in$ | (User Input) |
| Nominal Tensile Strength = | $F_{nt} := 90 \cdot ksi$ | (User Input) |
| Nominal Shear Strength = | $F_{nv} := 54 \cdot ksi$ | (User Input) |
| Resistance Factor = | $\phi := 0.75$ | (User Input) |
| Bolt Eccentricity from C.L. Mast = | $e := 22.25 \cdot in$ | (User Input) |
| Horizontal Spacing Between Bolts = | $S_{horz} := 29.375 \cdot in$ | (User Input) |
| Bolt Area = | $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\ 2} = 0.785\ in^2$ | |
| Vertical Spacing From Plate CL to Bolt 1 = | $d_1 := 2 \cdot in$ | (User Input) |
| Vertical Spacing From Plate CL to Bolt 2 = | $d_2 := 6 \cdot in$ | (User Input) |
| Vertical Spacing From Plate CL to Bolt 3= | $d_3 := 10 \cdot in$ | (User Input) |
| Bolt Polar Moment of Inertia = | $I_p := 4 \cdot (d_1)^2 + 4 \cdot (d_2)^2 + 4 \cdot (d_3)^2 = 560\ in^2$ | |

**Check Bolt Stresses:**

**Wind Acting Parallel to Stiffener Plate:**

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 1.783\ ksi$

$Condition1 := \mathbf{if}\ (f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"})$

$Condition1 = \text{"OK"}$

$\frac{f_v}{(\phi \cdot F_{nv})} = 4.4\%$

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

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment) \cdot d_3}{I_p} = 34.3\ kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 43.6\ ksi$

$Condition2 := \mathbf{if}\ (f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"})$

$Condition2 = \text{"OK"}$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 64.6\%$

**Wind Acting Perpendicular to Stiffener Plate:**

Shear Stress per Bolt = $f_v := \sqrt{\left(\frac{Vert}{n_b \cdot a_b} + \frac{(Moment) \cdot 2}{S_{horz} \cdot n_b \cdot a_b}\right)^2 + \left(\frac{Horz}{n_b \cdot a_b}\right)^2} = 12.337\ ksi$

$Condition3 := \mathbf{if}\ (f_v < \phi \cdot F_{nv}, \text{"OK"}, \text{"Overstressed"})$

$Condition3 = \text{"OK"}$

$\frac{f_v}{(\phi \cdot F_{nv})} = 30.5\%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \begin{cases} 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{else} \end{cases} = 89.58\ ksi$

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e \cdot d_3}{I_p} = 11.144\ kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 14.189\ ksi$

$Condition4 := \mathbf{if}\ (f_t < \phi \cdot F'_{nt}, \text{"OK"}, \text{"Overstressed"})$

$Condition4 = \text{"OK"}$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 21.1\%$

**Basic Components**

| | | | |
|---|---|---|---|
| Heavy Wind Pressure = | $p := 4.00 \cdot psf$ | | (User Input NESC 2023 Figure 250-1 & Table 250-1) |
| Basic Windspeed = | $V := 110$ | mph | (User Input) |
| Radial Ice Thickness = | $Ir := 0.50 \cdot in$ | | (User Input NESC 2023 Figure 250-1 & Table 250-1) |
| Radial Ice Density = | $Id := 56.0\ pcf$ | | (User Input) |

**Factors for Extreme Wind Calculation**

| | | | |
|---|---|---|---|
| CL Elevation of Antennas= | $TME := 113$ | ft | (User Input) |
| Multiplier Gust Response Factor = | $m := 1.25$ | | (User Input - Only for NESC Extreme wind case) |
| Velocity Pressure Coefficient = | $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.299$ | | (NESC 2023 Table 250-2) |
| Turbulence Intensity Constant = | $C_{exp} := 0.2$ | | (NESC 2023 Table 250-3) |
| Integral Length Scale of Turbulence Constant = | $L_s := 220$ | | (NESC 2023 Table 250-3) |
| Effective Height = | $z_s := 0.67 \cdot TME = 75.71$ | | (NESC 2023 Table 250-3) |
| Turbulence Intensity = | $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.174$ | | (NESC 2023 Table 250-3) |
| Response Term = | $B_t := \left(\frac{1}{\left(1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right)}\right)^{0.5} = 0.916$ | | (NESC 2023 Table 250-3) |
| Gust Response Factor = | $Grf := \frac{\left(1 + \left(4.61 \cdot I_z \cdot B_t\right)\right)}{\left(1 + 6.1 \cdot I_z\right)} = 0.841$ | | (NESC 2023 Table 250-3) |
| Wind Pressure = | $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot psf = 33.8\ \frac{lb}{ft^2}$ | | (NESC 2023 Section 250.C.1) |

**Shape Factors**

| | | |
|---|---|---|
| Shape Factor for Round Members = | $Cd_R := 1.3$ | (User Input) |
| Shape Factor for Flat Members = | $Cd_F := 1.6$ | (User Input) |
| Shape Factor for Open Lattice = | $Cd_{OL} := 3.2$ | (User Input) |
| Shape Factor for Coax Cables Attached to Pole = | $Cd_{coax} := 1.6$ | (User Input) |

**Overload Factors**

**Overload Factors for Wind Loads:**

| | | | |
|---|---|---|---|
| **NESC Heavy Loading =** | **2.5** | (User Input) | Apply in Risa-3D Analysis |
| **NESC Extreme Loading =** | **1.0** | (User Input) | Apply in Risa-3D Analysis |
| **NESC Extreme Ice w/ Wind 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 |
| **NESC Extreme Ice w/ Wind Loading =** | **1.0** | (User Input) | Apply in Risa-3D Analysis |

## Development of Wind & Ice Load on Mast

**Mast Data:** (HSS14x0.625)

| | | | |
|---|---|---|---|
| Mast Shape = | *Round* | (User Input) | |
| Mast Diameter = | $D_{mast} := 14 \cdot in$ | (User Input) | |
| Mast Length = | $L_{mast} := 30 \cdot ft$ | (User Input) | |
| Mast Thickness = | $t_{mast} := 0.625 \cdot in$ | (User Input) | |
| **Gravity Loads (without ice)** | | | |
| Weight of the Mast = | Self Weight | **(Computed internally by Risa-3D)** | **BLC 1** |
| **Gravity Loads (ice only)** | | | |
| Ice Area per Linear Foot = | $Ai_{mast} := \frac{\pi}{4} \cdot \left( \left( D_{mast} + Ir \cdot 2 \right)^2 - D_{mast}^{\ 2} \right) = 0.2\ ft^2$ | | |
| Weight of Ice on Mast = | $W_{ICEmast} := Id \cdot Ai_{mast} = 9\ \frac{lb}{ft}$ | | **BLC 3** |
| **Wind Load (NESE Heavy)** | | | |
| Mast Projected Surface Area w/ Ice = | $AICE_{mast} := \left( D_{mast} + 2 \cdot Ir \right) = 1.25\ ft$ | (per ft) | |
| Total Mast Wind Force w/ Ice = | $p \cdot Cd_{coax} \cdot AICE_{mast} = 8\ \frac{lb}{ft}$ | | **BLC 4** |
| **Wind Load (NESC Extreme)** | | | |
| Mast Projected Surface Area = | $A_{mast} := D_{mast} = 1.167\ ft$ | (per ft) | |
| Total Mast Wind Force (Above Structure) = | $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 79\ \frac{lb}{ft}$ | | **BLC 5** |
| Total Mast Wind Force (Below Structure) = | $qz \cdot Cd_{coax} \cdot A_{mast} = 63\ \frac{lb}{ft}$ | | **BLC 5** |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

Antenna Model = CCI DMP65R-BU8D

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 96 \cdot in$ (User Input)

Antenna Width = $W_{ant} := 20.7 \cdot in$ (User Input)

Antenna Thickness = $T_{ant} := 7.7 \cdot in$ (User Input)

Antenna Weight = $WT_{ant} := 115 \cdot lb$ (User Input)

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

### Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 345\ lb$ **BLC 2**

### Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 15301\ in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 3011\ in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot Id = 98\ lb$

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 293\ lb$ **BLC 3**

### Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 14.6\ ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 43.9\ ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 281\ lb$ **BLC 4**

### Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 13.8\ ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 41.4\ ft^2$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2802\ lb$ **BLC 5**

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | |
|---|---|---|
| Antenna Model = | CCI TPA65R-BU8D | |
| Antenna Shape = | Flat | (User Input) |
| Antenna Height = | $L_{ant} := 96 \cdot in$ | (User Input) |
| Antenna Width = | $W_{ant} := 20.7 \cdot in$ | (User Input) |
| Antenna Thickness = | $T_{ant} := 7.7 \cdot in$ | (User Input) |
| Antenna Weight = | $WT_{ant} := 110 \cdot lb$ | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | (User Input) |

### Gravity Load (without ice)

| | | |
|---|---|---|
| Weight of All Antennas = | $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 330\ lb$ | BLC 2 |

### Gravity Load (ice only)

| | | |
|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 15301\ in^3$ | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 3011\ in^3$ | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := V_{ice} \cdot Id = 98\ lb$ | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 293\ lb$ | BLC 3 |

### Wind Load (NESC Heavy)

| | | |
|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 14.6\ ft^2$ | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 43.9\ ft^2$ | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 281\ lb$ | BLC 4 |

### Wind Load (NESC Extreme)

| | | |
|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := L_{ant} \cdot W_{ant} = 13.8\ ft^2$ | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 41.4\ ft^2$ | |
| Total Antenna Wind Force = | $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2802\ lb$ | BLC 5 |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | |
|---|---|---|
| Antenna Model = | Ericsson AIR6419 | |
| Antenna Shape = | Flat | (User Input) |
| Antenna Height = | $L_{ant} := 31.1 \cdot in$ | (User Input) |
| Antenna Width = | $W_{ant} := 16.1 \cdot in$ | (User Input) |
| Antenna Thickness = | $T_{ant} := 7.3 \cdot in$ | (User Input) |
| Antenna Weight = | $WT_{ant} := 56 \cdot lb$ | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | (User Input) |

**Gravity Load (without ice)**

| | | |
|---|---|---|
| Weight of All Antennas = | $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 168\ lb$ | BLC 2 |

**Gravity Load (ice only)**

| | | |
|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3655\ in^3$ | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 901\ in^3$ | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := V_{ice} \cdot Id = 29\ lb$ | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 88\ lb$ | BLC 3 |

**Wind Load (NESC Heavy)**

| | | |
|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 3.8\ ft^2$ | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 11.4\ ft^2$ | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 73\ lb$ | BLC 4 |

**Wind Load (NESC Extreme)**

| | | |
|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := L_{ant} \cdot W_{ant} = 3.5\ ft^2$ | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 10.4\ ft^2$ | |
| Total Antenna Wind Force = | $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 706\ lb$ | BLC 5 |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | Ericsson AIR6449 | | |
| Antenna Shape = | Flat | (User Input) | |
| Antenna Height = | $L_{ant} := 30.6 \cdot in$ | (User Input) | |
| Antenna Width = | $W_{ant} := 15.9 \cdot in$ | (User Input) | |
| Antenna Thickness = | $T_{ant} := 10.6 \cdot in$ | (User Input) | |
| Antenna Weight = | $WT_{ant} := 96 \cdot lb$ | (User Input) | |
| Number of Antennas = | $N_{ant} := 3$ | (User Input) | |
| **Gravity Load (without ice)** | | | |
| Weight of All Antennas = | $Wt_{ant4} := WT_{ant} \cdot N_{ant} = 288\ lb$ | | **BLC 2** |
| **Gravity Load (ice only)** | | | |
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5157\ in^3$ | | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 1038\ in^3$ | | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := V_{ice} \cdot Id = 34\ lb$ | | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant4} := W_{ICEant} \cdot N_{ant} = 101\ lb$ | | **BLC 3** |
| **Wind Load (NESC Heavy)** | | | |
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 3.7\ ft^2$ | | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 11.1\ ft^2$ | | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant4} := p \cdot Cd_F \cdot A_{ICEant} = 71\ lb$ | | **BLC 4** |
| **Wind Load (NESC Extreme)** | | | |
| Surface Area for One Antenna = | $SA_{ant} := L_{ant} \cdot W_{ant} = 3.4\ ft^2$ | | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 10.1\ ft^2$ | | |
| Total Antenna Wind Force = | $F_{ant4} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 686\ lb$ | | **BLC 5** |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | Kaelus TMA2124F03V5-2D | | |
| Antenna Shape = | Flat | (User Input) | |
| Antenna Height = | $L_{ant} := 9.7 \cdot in$ | (User Input) | |
| Antenna Width = | $W_{ant} := 10.4 \cdot in$ | (User Input) | |
| Antenna Thickness = | $T_{ant} := 8.3 \cdot in$ | (User Input) | |
| Antenna Weight = | $WT_{ant} := 36 \cdot lb$ | (User Input) | |
| Number of Antennas = | $N_{ant} := 3$ | (User Input) | |
| **Gravity Load (without ice)** | | | |
| Weight of All Antennas = | $Wt_{ant5} := WT_{ant} \cdot N_{ant} = 108\ lb$ | | **BLC 2** |
| **Gravity Load (ice only)** | | | |
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 837\ in^3$ | | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 297\ in^3$ | | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := V_{ice} \cdot Id = 10\ lb$ | | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant5} := W_{ICEant} \cdot N_{ant} = 29\ lb$ | | **BLC 3** |
| **Wind Load (NESC Heavy)** | | | |
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 0.8\ ft^2$ | | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2.5\ ft^2$ | | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant5} := p \cdot Cd_F \cdot A_{ICEant} = 16\ lb$ | | **BLC 4** |
| **Wind Load (NESC Extreme)** | | | |
| Surface Area for One Antenna = | $SA_{ant} := L_{ant} \cdot W_{ant} = 0.7\ ft^2$ | | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 2.1\ ft^2$ | | |
| Total Antenna Wind Force = | $F_{ant5} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 142\ lb$ | | **BLC 5** |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | Kaelus TMA2104F00V1-1 | | |
| Antenna Shape = | Flat | (User Input) | |
| Antenna Height = | $L_{ant} := 8.7 \cdot in$ | (User Input) | |
| Antenna Width = | $W_{ant} := 7.9 \cdot in$ | (User Input) | |
| Antenna Thickness = | $T_{ant} := 4.1 \cdot in$ | (User Input) | |
| Antenna Weight = | $WT_{ant} := 17 \cdot lb$ | (User Input) | |
| Number of Antennas = | $N_{ant} := 6$ | (User Input) | |

**Gravity Load (without ice)**

| | | |
|---|---|---|
| Weight of All Antennas = | $Wt_{ant6} := WT_{ant} \cdot N_{ant} = 102\ lb$ | **BLC 2** |

**Gravity Load (ice only)**

| | | |
|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 282\ in^3$ | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 158\ in^3$ | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := V_{ice} \cdot Id = 5\ lb$ | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant6} := W_{ICEant} \cdot N_{ant} = 31\ lb$ | **BLC 3** |

**Wind Load (NESC Heavy)**

| | | |
|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 0.6\ ft^2$ | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 3.6\ ft^2$ | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant6} := p \cdot Cd_F \cdot A_{ICEant} = 23\ lb$ | **BLC 4** |

**Wind Load (NESC Extreme)**

| | | |
|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := L_{ant} \cdot W_{ant} = 0.5\ ft^2$ | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 2.9\ ft^2$ | |
| Total Antenna Wind Force = | $F_{ant6} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 194\ lb$ | **BLC 5** |

## Development of Wind & Ice Load on Antennas

### Antenna Data:

| | | | |
|---|---|---|---|
| Antenna Model = | Raycap DC6-48-60-18-8C | | |
| Antenna Shape = | Flat | (User Input) | |
| Antenna Height = | $L_{ant} := 31.4 \cdot in$ | (User Input) | |
| Antenna Width = | $W_{ant} := 18.28 \cdot in$ | (User Input) | |
| Antenna Thickness = | $T_{ant} := 10.24 \cdot in$ | (User Input) | |
| Antenna Weight = | $WT_{ant} := 26 \cdot lb$ | (User Input) | |
| Number of Antennas = | $N_{ant} := 1$ | (User Input) | |

### Gravity Load (without ice)

| | | |
|---|---|---|
| Weight of All Antennas = | $Wt_{ant7} := WT_{ant} \cdot N_{ant} = 26\ lb$ | BLC 2 |

### Gravity Load (ice only)

| | | |
|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5878\ in^3$ | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 1144\ in^3$ | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := V_{ice} \cdot Id = 37\ lb$ | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant7} := W_{ICEant} \cdot N_{ant} = 37\ lb$ | BLC 3 |

### Wind Load (NESC Heavy)

| | | |
|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) = 4.3\ ft^2$ | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.3\ ft^2$ | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant7} := p \cdot Cd_F \cdot A_{ICEant} = 28\ lb$ | BLC 4 |

### Wind Load (NESC Extreme)

| | | |
|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := L_{ant} \cdot W_{ant} = 4\ ft^2$ | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 4\ ft^2$ | |
| Total Antenna Wind Force = | $F_{ant7} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 270\ lb$ | BLC 5 |

## Development of Wind & Ice Load on Antenna Mounts

**Mount Data:**

Mount Type = Platform with Handrail

| | | |
|---|---|---|
| Mount Shape = | Flat | (User Input) |
| Mount Projected Surface Area = | $CdAa := 24 \cdot sf$ | (User Input) |
| Mount Projected Surface Area w/ Ice = | $CdAa_{ice} := 28 \cdot sf$ | (User Input) |
| Mount Weight = | $WT_{mnt} := 3300 \cdot lb$ | (User Input) |
| Mount Weight w/ Ice = | $WT_{mnt.ice} := 3800 \cdot lb$ | (User Input) |

**Gravity Loads (without ice)**

| | | | |
|---|---|---|---|
| Weight of All Mounts = | $Wt_{mnt1} := WT_{mnt} = 3300\ lb$ | lbs | BLC 2 |

**Gravity Load (ice only)**

| | | | |
|---|---|---|---|
| Weight of Ice on All Mounts = | $Wt_{ice.mnt1} := (WT_{mnt.ice} - WT_{mnt}) = 500\ lb$ | lbs | BLC 3 |

**Wind Load (NESC Heavy)**

| | | | |
|---|---|---|---|
| Total Mount Wind Force w/ Ice = | $Fi_{mnt1} := p \cdot CdAa_{ice} = 112\ lb$ | lbs | BLC 4 |

**Wind Load (NESC Extreme)**

| | | | |
|---|---|---|---|
| Total Mount Wind Force = | $F_{mnt1} := qz \cdot CdAa \cdot m = 1015\ lb$ | lbs | BLC 5 |

## Development of Wind & Ice Load on Coax Cables

### Coax Cable Data:

Coax Type = 1-5/8" Coax Cable

Shape = *Round* (User Input)

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

Coax Cable Length = $L_{coax} := 10 \cdot ft$ (User Input)

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

Total Number of Coax = $N_{coax} := 27$ (User Input - 24 Coax, 1 Hybrid & 2 DC)

No. of Coax Projecting Outside Face of Member = $NP_{coax} := 6$ (User Input)

### Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 28 \frac{lb}{ft}$ **BLC 2**

### Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot Ai_{coax} = 41 \frac{lb}{ft}$ **BLC 3**

### Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := NP_{coax} \cdot \left( D_{coax} + 2 \cdot Ir \right) = 17.9\ in$

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 10 \frac{lb}{ft}$ **BLC 4**

### Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \left( NP_{coax} \cdot D_{coax} \right) = 11.9\ in$

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 67 \frac{lb}{ft}$ **BLC 5**

## *Model Settings*

| | |
|---|---|
| Number of Reported Sections | 5 |
| Number of Internal Sections | 100 |
| Member Area Load Mesh Size (in$^2$) | 144 |
| Consider Shear Deformation | Yes |
| Consider Torsional Warping | Yes |
| Approximate Mesh Size (in) | 12 |
| Transfer Forces Between Intersecting Wood Walls | Yes |
| Increase Wood Wall Nailing Capacity for Wind Loads | Yes |
| Include P-Delta for Walls | Yes |
| Optimize Masonry and Wood Walls | No |
| Maximum Number of Iterations | 3 |
| Single | No |
| Multiple (Optimum) | Yes |
| Maximum | No |

| | |
|---|---|
| Global Axis corresponding to vertical direction | Y |
| Convert Existing Data | Yes |
| Default Global Plane for z-axis | XZ |
| Plate Local Axis Orientation | Nodal |

| | |
|---|---|
| Hot Rolled Steel | AISC 15th (360-16): LRFD |
| Stiffness Adjustment | Yes (Iterative) |
| Notional Annex | None |
| Connections | AISC 14th (360-10): ASD |
| Cold Formed Steel | AISI 1999: ASD |
| Stiffness Adjustment | Yes (Iterative) |
| Wood | AF&PA NDS-91/97: ASD |
| Temperature | < 100F |
| Concrete | ACI 318-02 |
| Masonry | ACI 530-05: ASD |
| Aluminum | AA ADM1-05: ASD |
| Structure Type | Building |
| Stiffness Adjustment | Yes (Iterative) |
| Stainless | AISC 14th (360-10): ASD |
| Stiffness Adjustment | Yes (Iterative) |

| | |
|---|---|
| Analysis Methodology | PCA Load Contour Method |
| Parme Beta Factor | 0.65 |

| | |
|---|---|
| Compression Stress Block | Rectangular Stress Block |
| Analyze using Cracked Sections | Yes |
| Leave room for horizontal rebar splices (2*d bar spacing) | Yes |
| List forces which were ignored for design in the Detail Report | Yes |

| | |
|---|---|
| Column Min Steel | 1 |
| Column Max Steel | 8 |
| Rebar Material Spec | ASTM A615 |
| Warn if beam-column framing arrangement is not understood | No |
| Number of Shear Regions | 4 |
| Region 2 & 3 Spacing Increase Increment (in) | 4 |

| | |
|---|---|
| Code | UBC 1997 |

***Model Settings (Continued)***

| | |
|---|---|
| Occupancy Cat | 4 |
| Seismic Zone | 3 |
| Base Elevation (ft) | |
| Include the weight of the structure in base shear calcs | No |
| $C_a$ | 0.36 |
| $C_v$ | 0.54 |
| T Z (sec) | |
| T X (sec) | |
| $C_t$Z | 0.035 |
| $C_t$X | 0.035 |
| R Z | 8.5 |
| R X | 8.5 |
| $\Omega_0$Z | 1 |
| $\Omega_0$X | 1 |
| ρ Z | 1 |
| ρ X | 1 |

### Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm. Coeff. [1e⁵°F⁻¹] | Density [k/ft³] | Yield [ksi] | Ry | Fu [ksi] | Rt |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A36 Gr.36 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 36 | 1.5 | 58 | 1.2 |
| 2 | A572 Gr.50 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 50 | 1.1 | 58 | 1.2 |
| 3 | A992 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 50 | 1.1 | 58 | 1.2 |
| 4 | A500 Gr.42 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 42 | 1.3 | 58 | 1.1 |
| 5 | A500 Gr.46 | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 46 | 1.2 | 58 | 1.1 |
| 6 | A53 Gr. B | 29000 | 11154 | 0.3 | 0.65 | 0.49 | 35 | 1.5 | 58 | 1.2 |

### Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design Rule | Area [in²] | Iyy [in⁴] | Izz [in⁴] | J [in⁴] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mast | HSS14.000X0.625 | Column | Pipe | A500 Gr.42 | Typical | 24.5 | 552 | 552 | 1100 |

### Hot Rolled Steel Design Parameters

| | Label | Shape | Length [ft] | Channel Conn. | a [ft] | Function |
|---|---|---|---|---|---|---|
| 1 | M1 | Mast | 30 | N/A | N/A | Lateral |

### Member Primary Data

| | Label | I Node | J Node | Section/Shape | Type | Design List | Material | Design Rule |
|---|---|---|---|---|---|---|---|---|
| 1 | M1 | BOTCONN | TOPMAST | Mast | Column | Pipe | A500 Gr.42 | Typical |

### Node Coordinates

| | Label | X [ft] | Y [ft] | Z [ft] | Detach From Diaphragm |
|---|---|---|---|---|---|
| 1 | BOTCONN | 0 | 0 | 0 | |
| 2 | TOPCONN | 0 | 10 | 0 | |
| 3 | TOPMAST | 0 | 30 | 0 | |

### Node Boundary Conditions

| | Node Label | X [k/in] | Y [k/in] | Z [k/in] | X Rot [k-ft/rad] | Y Rot [k-ft/rad] | Z Rot [k-ft/rad] |
|---|---|---|---|---|---|---|---|
| 1 | BOTCONN | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 2 | TOPCONN | Reaction | | Reaction | | | |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | Y | -0.345 | 28 |
| 2 | M1 | Y | -0.33 | 28 |
| 3 | M1 | Y | -0.168 | 28 |
| 4 | M1 | Y | -0.288 | 28 |
| 5 | M1 | Y | -0.108 | 28 |
| 6 | M1 | Y | -0.102 | 28 |
| 7 | M1 | Y | -0.026 | 28 |
| 8 | M1 | Y | -3.3 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | Y | -0.293 | 28 |
| 2 | M1 | Y | -0.293 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 3 | M1 | Y | -0.088 | 28 |
| 4 | M1 | Y | -0.101 | 28 |
| 5 | M1 | Y | -0.029 | 28 |
| 6 | M1 | Y | -0.031 | 28 |
| 7 | M1 | Y | -0.037 | 28 |
| 8 | M1 | Y | -0.5 | 28 |

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

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | X | 0.281 | 28 |
| 2 | M1 | X | 0.281 | 28 |
| 3 | M1 | X | 0.073 | 28 |
| 4 | M1 | X | 0.071 | 28 |
| 5 | M1 | X | 0.016 | 28 |
| 6 | M1 | X | 0.023 | 28 |
| 7 | M1 | X | 0.028 | 28 |
| 8 | M1 | X | 0.112 | 28 |

### Member Point Loads (BLC 5 : NESC Extreme Wind)

| | Member Label | Direction | Magnitude [k, k-ft] | Location [(ft, %)] |
|---|---|---|---|---|
| 1 | M1 | X | 2.802 | 28 |
| 2 | M1 | X | 2.802 | 28 |
| 3 | M1 | X | 0.706 | 28 |
| 4 | M1 | X | 0.686 | 28 |
| 5 | M1 | X | 0.142 | 28 |
| 6 | M1 | X | 0.194 | 28 |
| 7 | M1 | X | 0.27 | 28 |
| 8 | M1 | X | 1.015 | 28 |

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

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | Y | -0.028 | -0.028 | 0 | 26 |

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

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | Y | -0.009 | -0.009 | 0 | %100 |
| 2 | M1 | Y | -0.041 | -0.041 | 0 | 26 |

### Member Distributed Loads (BLC 4 : NESC Heavy Wind)

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | 0.008 | 0.008 | 0 | %100 |
| 2 | M1 | X | 0.01 | 0.01 | 0 | 26 |

### Member Distributed Loads (BLC 5 : NESC Extreme Wind)

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | 0.063 | 0.063 | 0 | 13 |
| 2 | M1 | X | 0.079 | 0.079 | 13 | %100 |

**Member Distributed Loads (BLC 5 : NESC Extreme Wind) (Continued)**

| | Member Label | Direction | Start Magnitude [k/ft, F, ksf, k-ft/ft] | End Magnitude [k/ft, F, ksf, k-ft/ft] | Start Location [(ft, %)] | End Location [(ft, %)] |
|---|---|---|---|---|---|---|
| 3 | M1 | X | 0.055 | 0.055 | 0 | 13 |
| 4 | M1 | X | 0.067 | 0.067 | 13 | 26 |

**Basic Load Cases**

| | BLC Description | Category | Y Gravity | Point | Distributed |
|---|---|---|---|---|---|
| 1 | Self Weight | None | -1 | | |
| 2 | Weight of Appurtenances | None | | 8 | 1 |
| 3 | Weight of Ice Only | None | | 8 | 2 |
| 4 | NESC Heavy Wind | None | | 8 | 2 |
| 5 | NESC Extreme Wind | None | | 8 | 4 |

**Load Combinations**

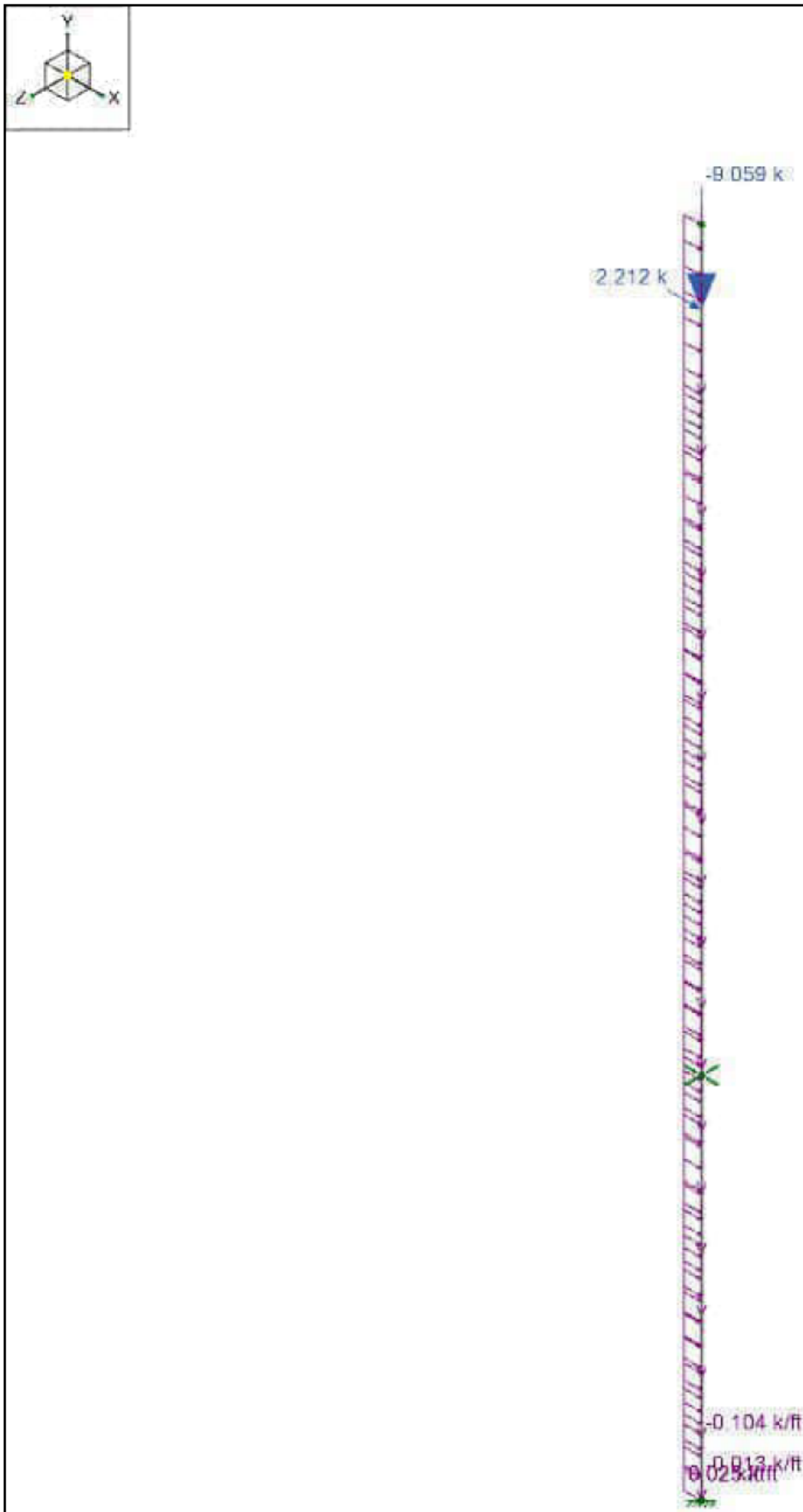
| | Description | Solve | P-Delta | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | NESC Heavy Wind | Yes | Y | 1 | 1.5 | 2 | 1.5 | 3 | 1.5 | 4 | 2.5 |
| 2 | NESC Extreme Wind | Yes | Y | 1 | 1 | 2 | 1 | 5 | 1 | | |

***Node Reactions***

| | LC | Node Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | BOTCONN | 6.739 | 15.906 | 0 | 0 | 0 | -21.987 |
| 1 | 1 | TOPCONN | -10.202 | 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | Totals: | -3.463 | 15.906 | 0 | | | |
| 3 | 1 | COG (ft): | X: 0 | Y: 22.065 | Z: 0 | | | |

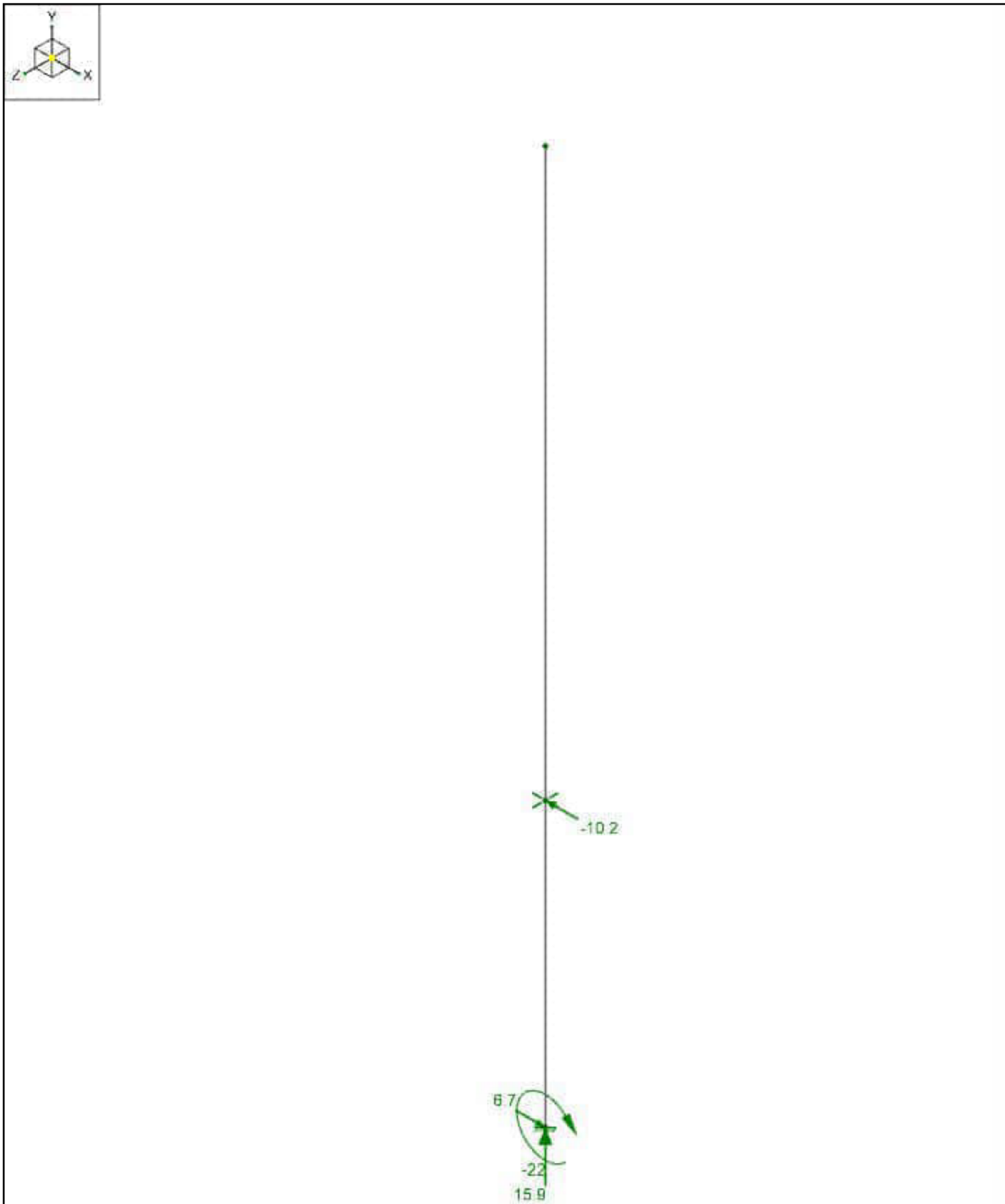
***Node Reactions***

| | LC | Node Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 0 | 2 | BOTCONN | 25.861 | 7.896 | 0 | 0 | 0 | -83.953 |
| 1 | 2 | TOPCONN | -38.226 | 0 | 0 | 0 | 0 | 0 |
| 2 | 2 | Totals: | -12.365 | 7.896 | 0 | | | |
| 3 | 2 | COG (ft): | X: 0 | Y: 22.499 | Z: 0 | | | |



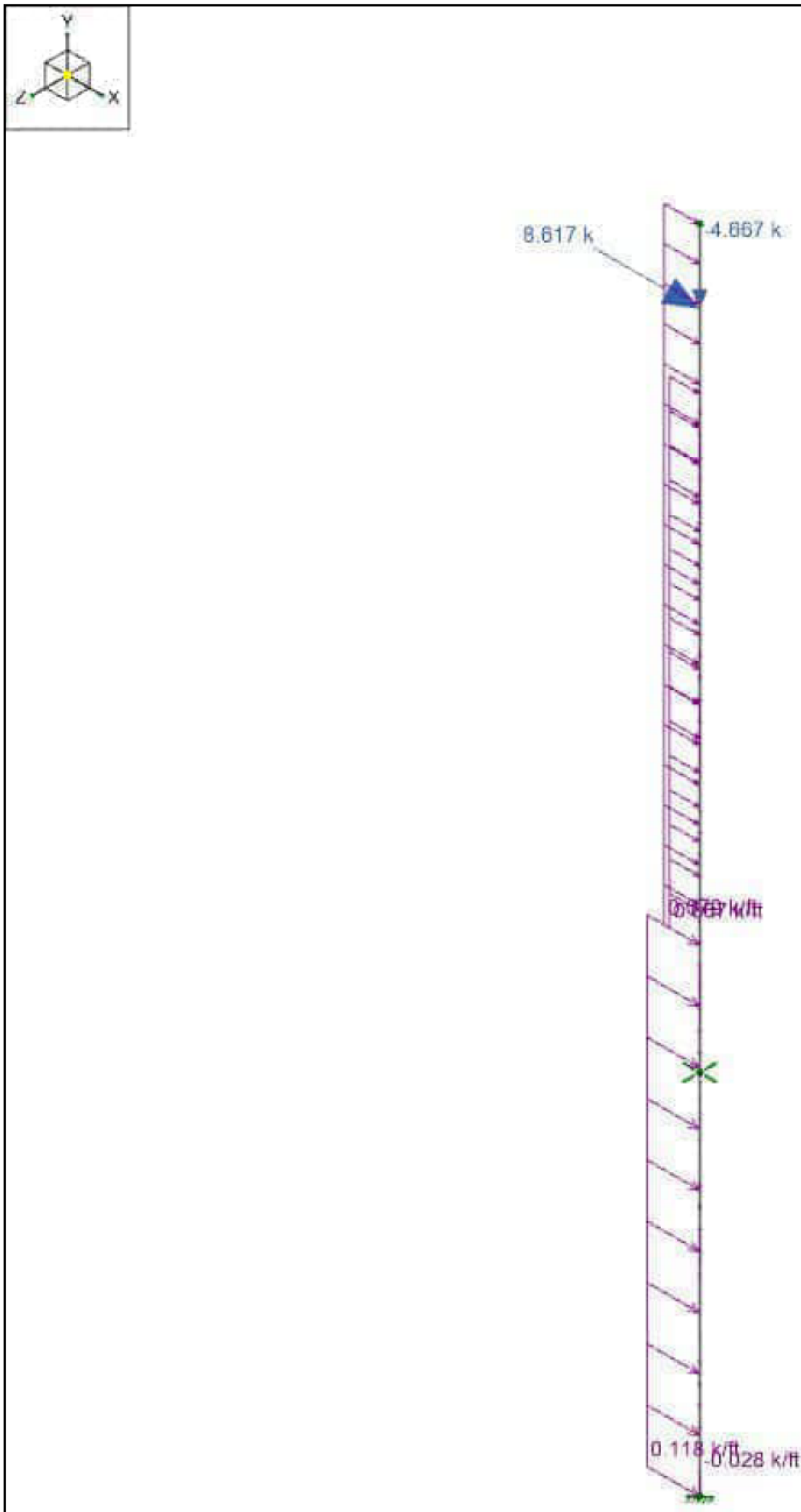

Loads: LC 1, NESC Heavy Wind

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, Inc. | Structure # 3848 - Mast | |
| | TJL | | NESC.r3d |
| | 22021.02 /AT&T 2267 | | |




Results for LC 1, NESC Heavy Wind
Reaction and Moment Units are kips and kip-ft

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, Inc. | Structure # 3848 - Mast | |
| | TJL | | NESC.r3d |
| | 22021.02 /AT&T 2267 | | |




Loads: LC 2, NESC Extreme Wind

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, Inc. | Structure # 3848 - Mast | |
| | TJL | | NESC.r3d |
| | 22021.02 /AT&T 2267 | | |


Results for LC 2, NESC Extreme Wind
Reaction and Moment Units are kips and kip-ft

| | | | |
|---|---|---|---|
| RISA | CENTEK Engineering, Inc. | Structure # 3848 - Mast | |
| | TJL | | NESC.r3d |
| | 22021.02 /AT&T 2267 | | |

## Coax Cable on Pole

| | | | |
|---|---|---|---|
| Coaxial Cable Span | $Coax_{Span} := 10 \cdot ft$ | | (User Input) |
| Heavy Wind Pressure = | $p := 4 \cdot psf$ | | (User Input NESC 2023 Figure 250-1 & Table 250-1) |
| Radial Ice Thickness = | $Ir := 0.5 \cdot in$ | | (User Input NESC 2023 Figure 250-1 & Table 250-1) |
| Radial Ice Density = | $Id := 56 \cdot pcf$ | | (User Input) |
| Basic Windspeed = | $V := 110$ | mph | (User Input) |
| Height to Top of Coax Above Grade = | $TC := 96$ | ft | (User Input) |
| Multiplier Gust Response Factor = | $m := 1.00$ | | (User Input - Only for NESC Extreme wind case) |
| Velocity Pressure Coefficient = | $Kz := 2.01 \cdot \left(\frac{0.67 \cdot TC}{900}\right)^{\frac{2}{9.5}} = 1.153$ | | (NESC 2023 Table 250-2) |
| Turbulence Intensity Constant = | $C_{exp} := 0.2$ | | (NESC 2023 Table 250-3) |
| Integral Length Scale of Turbulence Constant = | $L_s := 220$ | | (NESC 2023 Table 250-3) |
| Effective Height = | $z_s := 0.67 \cdot TC = 64.32$ | | (NESC 2023 Table 250-3) |
| Turbulence Intensity = | $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.179$ | | (NESC 2023 Table 250-3) |
| Response Term = | $B_t := \left(\frac{1}{\left(1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right)}\right)^{0.5} = 0.927$ | | (NESC 2023 Table 250-3) |
| Gust Response Factor = | $Grf := \frac{\left(1 + \left(4.61 \cdot I_z \cdot B_t\right)\right)}{\left(1 + 6.1 \cdot I_z\right)} = 0.844$ | | (NESC 2023 Table 250-3) |
| Wind Pressure = | $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 30.1$ | psf | (NESC 2023 Section 250.C.1) |
| Diameter of Coax Cable = | $D_{coax} := 1.98 \cdot in$ | | (User Input) |
| Weight of Coax Cable = | $W_{coax} := 1.04 \cdot plf$ | | (User Input) |
| Number of Coax Cables = | $N_{coax} := 27$ | | (User Input) |
| Number of Projected Coax Cables = | $NP_{coax} := 6$ | | (User Input) |

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

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

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

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

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

Projected width without Ice = $A := (NP_{coax} \cdot D_{coax}) = 11.88\ in$

Projected width with Ice = $A_{ice} := (NP_{coax} \cdot D_{coax} + 2 \cdot Ir) = 12.88\ in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 40.904\ plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$Heavy\_WInd_{Vert} = 1035\ lb$ $Heavy\_Wind_{Trans} = 172\ lb$

Extreme Wind Vertical Load =

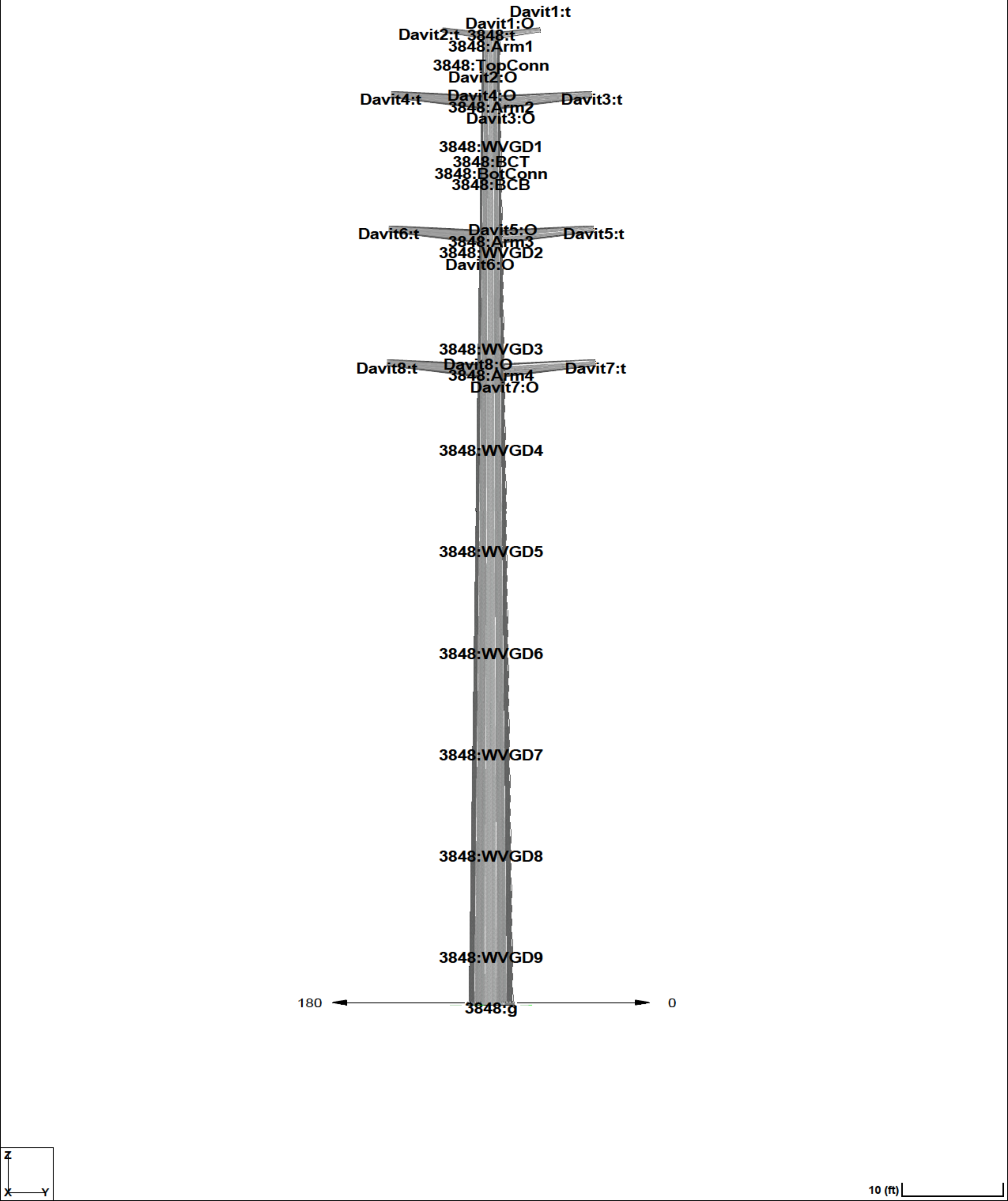
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

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

$Extreme\_Wind_{Vert} = 281\ lb$ $Extreme\_Wind_{Trans} = 477\ lb$

Centek Engineering Inc,  Project: "cl&p structure # 3848"
PLS-POLE Version 18.01,  2:23:22 PM Monday, February 26, 2024
Undeformed geometry displayed



Project Name : 22021.02 - Orange, CT
Project Notes: Pole # 3848/ AT&T - CT2267
Project File : J:\Jobs\2202100.WI\02_CT2267\05_Structural\Tower\Backup Documentation\Rev (2)\Calcs\PLS Pole\cl&p structure # 3848.pol
Date run : 2:14:46 PM Monday, February 26, 2024
by : PLS-POLE Version 18.01
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: J:\Jobs\2202100.WI\02_CT2267\05_Structural\Tower\Backup Documentation\Rev (2)\Calcs\PLS Pole\cl&p #3848.lca

*** Analysis Results:

Maximum element usage is 80.63% for Steel Pole "3848" in load case "NESC Extreme Wind"
Maximum insulator usage is 83.95% for Clamp "Clamp20" in load case "NESC Extreme Wind"

**Foundation Design Forces For All Load Cases:**

**Note: loads are factored.**

| Load Case | Foundation Description | Axial Force (kips) | Shear Force (kips) | Resultant Force (kips) | Bending Moment (ft-k) | Foundation Usage % |
|---|---|---|---|---|---|---|
| NESC Heavy Wind | 3848:g | 67.00 | 17.24 | 69.19 | 1329.30 | 0.00 |
| NESC Extreme Wind | 3848:g | 36.38 | 39.08 | 53.39 | 3183.47 | 0.00 |

**Summary of Joint Support Reactions For All Load Cases:**

| Load Case | Joint Label | Long. Force (kips) | Tran. Force (kips) | Vert. Force (kips) | Shear Force (kips) | Tran. Moment (ft-k) | Long. Moment (ft-k) | Bending Moment (ft-k) | Vert. Moment (ft-k) | Found. Usage % |
|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy Wind | 3848:g | -0.11 | -17.24 | -67.00 | 17.24 | 1329.29 | -4.56 | 1329.30 | -0.00 | 0.00 |
| NESC Extreme Wind | 3848:g | 0.01 | -39.08 | -36.38 | 39.08 | 3183.47 | 2.35 | 3183.47 | -0.03 | 0.00 |

**Summary of Tip Deflections For All Load Cases:**

**Note: positive tip load results in positive deflection**

| Load Case | Joint Label | Long. Defl. (in) | Tran. Defl. (in) | Vert. Defl. (in) | Resultant Defl. (in) | Long. Rot. (deg) | Tran. Rot. (deg) | Twist (deg) |
|---|---|---|---|---|---|---|---|---|
| NESC Heavy Wind | 3848:t | 0.04 | 20.66 | -0.30 | 20.66 | 0.00 | -2.02 | 0.00 |
| NESC Extreme Wind | 3848:t | -0.04 | 52.67 | -1.74 | 52.70 | -0.00 | -5.40 | 0.00 |

**Tubes Summary:**

| Pole Label | Tube Num. | Weight (lbs) | Load Case | Maximum Usage % | Resultant Moment (ft-k) |
|---|---|---|---|---|---|
| 3848 | 1 | 4530 | NESC Extreme Wind | 80.63 | 1309.81 |
| 3848 | 2 | 3652 | NESC Extreme Wind | 72.60 | 2092.19 |
| 3848 | 3 | 5711 | NESC Extreme Wind | 77.23 | 3183.47 |

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

**Summary of Steel Pole Usages:**

| Steel Pole Label | Maximum Usage % | Load Case | Height AGL (ft) | Segment Number | Weight (lbs) |
|---|---|---|---|---|---|
| 3848 | 80.63 | NESC Extreme Wind | 50.8 | 17 | 16194.8 |

**Summary of Tubular Davit Usages:**

| Tubular Davit Label | Maximum Usage % | Load Case | Height AGL (ft) | Segment Number | Weight (lbs) |
|---|---|---|---|---|---|
| Davit1 | 9.76 | NESC Heavy Wind | 95.8 | 1 | 49.5 |
| Davit2 | 8.90 | NESC Heavy Wind | 95.8 | 1 | 49.5 |
| Davit3 | 10.19 | NESC Heavy Wind | 89.1 | 1 | 280.0 |
| Davit4 | 9.49 | NESC Heavy Wind | 89.1 | 1 | 280.0 |
| Davit5 | 10.21 | NESC Heavy Wind | 75.8 | 1 | 280.0 |
| Davit6 | 9.52 | NESC Heavy Wind | 75.8 | 1 | 280.0 |
| Davit7 | 10.23 | NESC Heavy Wind | 62.6 | 1 | 280.0 |
| Davit8 | 9.55 | NESC Heavy Wind | 62.6 | 1 | 280.0 |

*** Maximum Stress Summary for Each Load Case

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

| Load Case | Maximum Usage % | Element Label | Element Type |
|---|---|---|---|
| NESC Heavy Wind | 52.52 | 3848 | Base Plate |
| NESC Extreme Wind | 80.63 | 3848 | Steel Pole |

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

| Load Case | Maximum Usage % | Steel Pole Label | Height AGL (ft) | Segment Number |
|---|---|---|---|---|
| NESC Heavy Wind | 33.59 | 3848 | 2.5 | 28 |
| NESC Extreme Wind | 80.63 | 3848 | 50.8 | 17 |

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

| Load Case | Pole Label | Bend Line # | Length (in) | Vertical Load (kips) | X Moment (ft-k) | Y Moment (ft-k) | Bending Stress (ksi) | Bolt Moment Sum (ft-k) | # Bolts Acting On Bend Line | Max Bolt Load For Bend Line (kips) | Minimum Plate Thickness (in) | Usage % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy Wind | 3848 | 1 | 14.076 | 64.700 | 2085.347 | -7.146 | 31.512 | 46.588 | -2 | 98.231 | 1.993 | 52.52 |
| NESC Extreme Wind | 3848 | 8 | 14.076 | 34.080 | 3183.472 | 2.351 | 46.651 | 68.970 | 2 | 145.714 | 2.425 | 77.75 |

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

| Load Case | Maximum Usage % | Tubular Davit Label | Height AGL (ft) | Segment Number |
|---|---|---|---|---|
| NESC Heavy Wind | 10.23 | Davit7 | 62.6 | 1 |

| | | | | |
|---|---|---|---|---|
| NESC Extreme Wind | 5.46 | Davit7 | 62.6 | 1 |

**Summary of Insulator Usages:**

| Insulator Label | Insulator Type | Maximum Usage % | Load Case | Weight (lbs) |
|---|---|---|---|---|
| Clamp1 | Clamp | 1.00 | NESC Heavy Wind | 0.0 |
| Clamp2 | Clamp | 1.09 | NESC Heavy Wind | 0.0 |
| Clamp3 | Clamp | 2.60 | NESC Heavy Wind | 0.0 |
| Clamp4 | Clamp | 2.59 | NESC Heavy Wind | 0.0 |
| Clamp5 | Clamp | 2.60 | NESC Heavy Wind | 0.0 |
| Clamp6 | Clamp | 2.59 | NESC Heavy Wind | 0.0 |
| Clamp7 | Clamp | 2.60 | NESC Heavy Wind | 0.0 |
| Clamp8 | Clamp | 2.59 | NESC Heavy Wind | 0.0 |
| Clamp9 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp10 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp11 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp12 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp13 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp14 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp15 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp16 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp17 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp18 | Clamp | 38.23 | NESC Extreme Wind | 0.0 |
| Clamp19 | Clamp | 27.04 | NESC Extreme Wind | 0.0 |
| Clamp20 | Clamp | 83.95 | NESC Extreme Wind | 0.0 |
| Clamp21 | Clamp | 83.95 | NESC Extreme Wind | 0.0 |

*** Weight of structure (lbs):

| | |
|---|---|
| Weight of Tubular Davit Arms: | 1779.3 |
| Weight of Steel Poles: | 16194.8 |
| Total: | 17974.1 |

*** End of Report

```
***************************************************************************
*                                                                         *
*                              PLS-POLE                                   *
*                  POLE AND FRAME ANALYSIS AND DESIGN                     *
*               Copyright Power Line Systems 1999-2023                    *
*                                                                         *
***************************************************************************
```

Project Name : 22021.02 - Orange, CT
Project Notes: Pole # 3848/ AT&T - CT2267
Project File : J:\Jobs\2202100.WI\02_CT2267\05_Structural\Tower\Backup Documentation\Rev (2)\Calcs\PLS Pole\cl&p structure # 3848.pol
Date run     : 2:14:45 PM Monday, February 26, 2024
by           : PLS-POLE Version 18.01
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Modeling options:
- Offset Arms from Pole/Mast: Yes
- Offset Braces from Pole/Mast: Yes
- Offset Guys from Pole/Mast: Yes
- Offset Posts from Pole/Mast: Yes
- Offset Strains from Pole/Mast: Yes
- Use Alternate Convergence Process: No
- Steel poles and tubular arms checked with ASCE/SEI 48-19

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

**Steel Pole Properties:**

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

| Long. Label |  | Length (ft) | Length (ft) |  |  | (in) | (in) | (in/ft) | Coef. |  | Override (ksi) | Override (lbs/ft^3) | Base | Type | Tip (ft) | Load (kips) | Long. Load (kips) |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CL&P3848 | 3848 | 96.00 | 0 | Yes | 12F | 20 | 52.53 | 0 | 1.6 | 3 tubes | 0 | 0 |  | Calculated | 0.000 | 0.0000 | 0.0000 | Galvanized Steel |

**Steel Tubes Properties:**

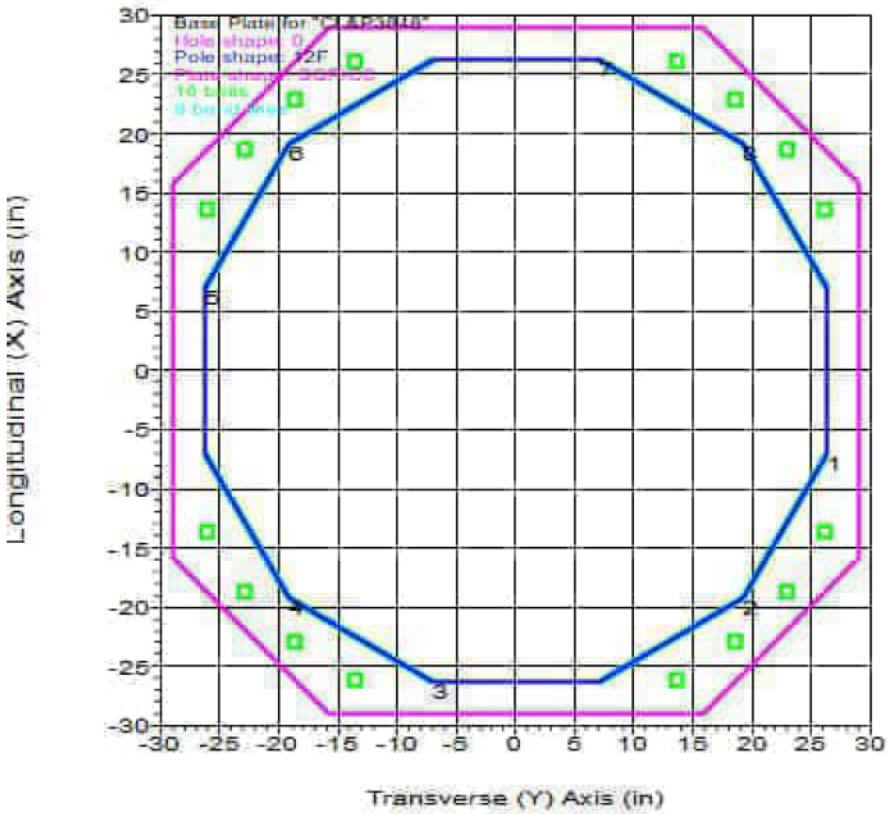
| Pole Property | Tube No. | Length (ft) | Thickness (in) | Lap Length (ft) | Lap Factor | Lap Gap or Butt Offset (in) | Yield Stress (ksi) | Moment Cap. Override (ft-k) | Tube Weight (lbs) | Center of Gravity (ft) | Calculated Taper (in/ft) | Tube Top Diameter (in) | Tube Bot. Diameter (in) | 1.5x Diam. Lap Length (ft) | Actual Overlap (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CL&P3848 | 1 | 47.5 | 0.3125 | 4.583 | 0.000 | 0.000 | 65.000 | 0.000 | 4530 | 26.08 | 0.34538 | 20.00 | 36.41 | 4.473 | 4.583 |
| CL&P3848 | 2 | 23.5 | 0.375 | 0.000 | 0.000 | 0.000 | 65.000 | 0.000 | 3652 | 12.17 | 0.34538 | 34.20 | 42.31 | 5.195 | 0.000 |
| CL&P3848 | 3 | 29.583 | 0.375 | 0.000 | 0.000 | 0.000 | 65.000 | 0.000 | 5711 | 15.33 | 0.34538 | 42.31 | 52.53 | 0.000 | 0.000 |

**Base Plate Properties:**

| Pole Property | Plate Diam. (in) | Plate Shape | Plate Thick. (in) | Plate Weight (lbs) | Bend Line Length Override (in) | Hole Diam. (in) | Hole Shape | Steel Density (lbs/ft^3) | Steel Yield Stress (ksi) | Bolt Diam. (in) | Bolt Pattern Diam. (in) | Num. Of Bolts | Bolt Cage X Inertia (in^4) | Bolt Cage Y Inertia (in^4) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CL&P3848 | 58.000 | SQP/CC | 2.750 | 2302 | 0.000 | 0.000 | 0 | 490.00 | 60.000 | 2.250 | 59.000 | 16 | 27647.55 | 27647.55 |

**Base Plate Bolt Coordinates for Property "CL&P3848":**

| Bolt X Coord. | Bolt Y Coord. | Bolt Angle (deg) |
|---|---|---|
| 0.4619 | 0.8856 | 0 |
| 0.6314 | 0.7754 | 0 |
| 0.7754 | 0.6314 | 0 |
| 0.8856 | 0.4619 | 0 |



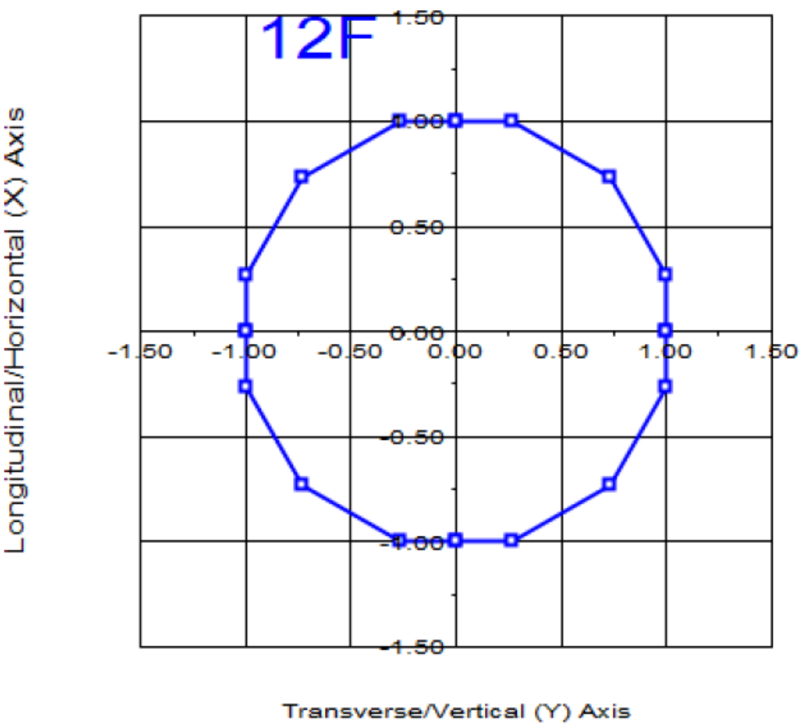

**Steel Pole Connectivity:**

| Pole Label | Tip Joint | Base Joint | X of Base (ft) | Y of Base (ft) | Z of Base (ft) | Inclin. About X (deg) | Inclin. About Y (deg) | Property Set | Attach. Labels | Base Connect | Embed % Override | Embed C. Override (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | | | 0 | 0 | 0 | 0 | 0 | CL&P3848 | 17 labels | | 0.00 | 0 |

**Relative Attachment Labels for Steel Pole "3848":**

| Joint Label | Distance From Origin/Top Joint (ft) | Global Z of Attach (ft) |
|---|---|---|
| 3848:Arm1 | 0.00 | 95.54 |
| 3848:Arm2 | 0.00 | 88.90 |
| 3848:Arm3 | 0.00 | 75.65 |
| 3848:Arm4 | 0.00 | 62.40 |
| 3848:WVGD1 | 0.00 | 85.00 |

| | | |
|---|---|---|
| 3848:WVGD2 | 0.00 | 75.00 |
| 3848:WVGD3 | 0.00 | 65.00 |
| 3848:WVGD4 | 0.00 | 55.00 |
| 3848:WVGD5 | 0.00 | 45.00 |
| 3848:WVGD6 | 0.00 | 35.00 |
| 3848:WVGD7 | 0.00 | 25.00 |
| 3848:WVGD8 | 0.00 | 15.00 |
| 3848:WVGD9 | 0.00 | 5.00 |
| 3848:TopConn | 0.00 | 93.00 |
| 3848:BotConn | 0.00 | 83.00 |
| 3848:BCT | 0.00 | 83.50 |
| 3848:BCB | 0.00 | 82.50 |




**Pole Steel Properties:**

| Element Label | Joint Label | Joint Position | Rel. Dist. (ft) | Outer Diam. (in) | Area (in^2) | T-Moment Inertia (in^4) | L-Moment Inertia (in^4) | D/t | W/t Max. | Fy (ksi) | Fa Min. (ksi) | T-Moment Capacity (ft-k) | L-Moment Capacity (ft-k) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:t | 3848:t Ori | 0.00 | 20.00 | 19.78 | 981.62 | 981.62 | 0.00 | 14.5 | 65.00 | 65.00 | 531.71 | 531.71 |
| 3848 | 3848:Arm1 | 3848:Arm1 End | 0.46 | 20.16 | 19.94 | 1005.47 | 1005.47 | 0.00 | 14.6 | 65.00 | 65.00 | 540.35 | 540.35 |
| 3848 | 3848:Arm1 | 3848:Arm1 Ori | 0.46 | 20.16 | 19.94 | 1005.47 | 1005.47 | 0.00 | 14.6 | 65.00 | 65.00 | 540.35 | 540.35 |
| 3848 | 3848:TopConn | 3848:TopConn End | 3.00 | 21.04 | 20.82 | 1144.88 | 1144.88 | 0.00 | 15.4 | 65.00 | 65.00 | 589.60 | 589.60 |
| 3848 | 3848:TopConn | 3848:TopConn Ori | 3.00 | 21.04 | 20.82 | 1144.88 | 1144.88 | 0.00 | 15.4 | 65.00 | 65.00 | 589.60 | 589.60 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:Arm2 | 3848:Arm2 | End | 7.10 | 22.45 | 22.25 | 1396.19 | 1396.19 | 0.00 | 16.6 | 65.00 | 65.00 | 673.63 | 673.63 |
| 3848 | 3848:Arm2 | 3848:Arm2 | Ori | 7.10 | 22.45 | 22.25 | 1396.19 | 1396.19 | 0.00 | 16.6 | 65.00 | 65.00 | 673.63 | 673.63 |
| 3848 | 3848:WVGD1 | 3848:WVGD1 | End | 11.00 | 23.80 | 23.60 | 1666.49 | 1666.49 | 0.00 | 17.7 | 65.00 | 65.00 | 758.58 | 758.58 |
| 3848 | 3848:WVGD1 | 3848:WVGD1 | Ori | 11.00 | 23.80 | 23.60 | 1666.49 | 1666.49 | 0.00 | 17.7 | 65.00 | 65.00 | 758.58 | 758.58 |
| 3848 | 3848:BCT | 3848:BCT | End | 12.50 | 24.32 | 24.12 | 1779.21 | 1779.21 | 0.00 | 18.2 | 65.00 | 65.00 | 792.64 | 792.64 |
| 3848 | 3848:BCT | 3848:BCT | Ori | 12.50 | 24.32 | 24.12 | 1779.21 | 1779.21 | 0.00 | 18.2 | 65.00 | 65.00 | 792.64 | 792.64 |
| 3848 | 3848:BotConn | 3848:BotConn | End | 13.00 | 24.49 | 24.29 | 1817.88 | 1817.88 | 0.00 | 18.3 | 65.00 | 65.00 | 804.15 | 804.15 |
| 3848 | 3848:BotConn | 3848:BotConn | Ori | 13.00 | 24.49 | 24.29 | 1817.88 | 1817.88 | 0.00 | 18.3 | 65.00 | 65.00 | 804.15 | 804.15 |
| 3848 | 3848:BCB | 3848:BCB | End | 13.50 | 24.66 | 24.47 | 1857.11 | 1857.11 | 0.00 | 18.5 | 65.00 | 65.00 | 815.75 | 815.75 |
| 3848 | 3848:BCB | 3848:BCB | Ori | 13.50 | 24.66 | 24.47 | 1857.11 | 1857.11 | 0.00 | 18.5 | 65.00 | 65.00 | 815.75 | 815.75 |
| 3848 | #3848:0 | Tube 1 | End | 16.93 | 25.85 | 25.66 | 2141.26 | 2141.26 | 0.00 | 19.5 | 65.00 | 65.00 | 897.50 | 897.50 |
| 3848 | #3848:0 | Tube 1 | Ori | 16.93 | 25.85 | 25.66 | 2141.27 | 2141.27 | 0.00 | 19.5 | 65.00 | 65.00 | 897.50 | 897.50 |
| 3848 | 3848:Arm3 | 3848:Arm3 | End | 20.35 | 27.03 | 26.85 | 2453.02 | 2453.02 | 0.00 | 20.5 | 65.00 | 65.00 | 983.15 | 983.15 |
| 3848 | 3848:Arm3 | 3848:Arm3 | Ori | 20.35 | 27.03 | 26.85 | 2453.03 | 2453.03 | 0.00 | 20.5 | 65.00 | 65.00 | 983.15 | 983.15 |
| 3848 | 3848:WVGD2 | 3848:WVGD2 | End | 21.00 | 27.25 | 27.07 | 2514.99 | 2514.99 | 0.00 | 20.7 | 65.00 | 65.00 | 999.73 | 999.73 |
| 3848 | 3848:WVGD2 | 3848:WVGD2 | Ori | 21.00 | 27.25 | 27.07 | 2514.99 | 2514.99 | 0.00 | 20.7 | 65.00 | 65.00 | 999.73 | 999.73 |
| 3848 | #3848:1 | Tube 1 | End | 26.00 | 28.98 | 28.81 | 3030.24 | 3030.24 | 0.00 | 22.2 | 65.00 | 65.00 | 1132.77 | 1132.77 |
| 3848 | #3848:1 | Tube 1 | Ori | 26.00 | 28.98 | 28.81 | 3030.24 | 3030.24 | 0.00 | 22.2 | 65.00 | 65.00 | 1132.77 | 1132.77 |
| 3848 | 3848:WVGD3 | 3848:WVGD3 | End | 31.00 | 30.71 | 30.54 | 3611.46 | 3611.46 | 0.00 | 23.6 | 65.00 | 65.00 | 1274.12 | 1274.12 |
| 3848 | 3848:WVGD3 | 3848:WVGD3 | Ori | 31.00 | 30.71 | 30.54 | 3611.46 | 3611.46 | 0.00 | 23.6 | 65.00 | 65.00 | 1274.12 | 1274.12 |
| 3848 | 3848:Arm4 | 3848:Arm4 | End | 33.60 | 31.61 | 31.44 | 3941.61 | 3941.61 | 0.00 | 24.4 | 65.00 | 65.00 | 1351.03 | 1351.03 |
| 3848 | 3848:Arm4 | 3848:Arm4 | Ori | 33.60 | 31.61 | 31.44 | 3941.61 | 3941.61 | 0.00 | 24.4 | 65.00 | 65.00 | 1351.03 | 1351.03 |
| 3848 | #3848:2 | Tube 1 | End | 37.30 | 32.88 | 32.73 | 4444.15 | 4444.15 | 0.00 | 25.5 | 65.00 | 65.00 | 1464.11 | 1464.11 |
| 3848 | #3848:2 | Tube 1 | Ori | 37.30 | 32.88 | 32.73 | 4444.15 | 4444.15 | 0.00 | 25.5 | 65.00 | 65.00 | 1464.12 | 1464.12 |
| 3848 | 3848:WVGD4 | 3848:WVGD4 | End | 41.00 | 34.16 | 34.01 | 4987.70 | 4987.70 | 0.00 | 26.6 | 65.00 | 65.00 | 1581.75 | 1581.75 |
| 3848 | 3848:WVGD4 | 3848:WVGD4 | Ori | 41.00 | 34.16 | 34.01 | 4987.70 | 4987.70 | 0.00 | 26.6 | 65.00 | 65.00 | 1581.75 | 1581.75 |
| 3848 | #3848:3 | SpliceT | End | 42.92 | 34.82 | 34.68 | 5286.13 | 5286.13 | 0.00 | 27.2 | 65.00 | 65.00 | 1644.52 | 1644.52 |
| 3848 | #3848:3 | SpliceT | Ori | 42.92 | 34.82 | 34.68 | 5286.13 | 5286.13 | 0.00 | 27.2 | 65.00 | 65.00 | 1644.52 | 1644.52 |
| 3848 | #3848:4 | SpliceB | End | 47.50 | 35.78 | 42.69 | 6850.22 | 6850.22 | 0.00 | 22.9 | 65.00 | 65.00 | 2074.05 | 2074.05 |
| 3848 | #3848:4 | SpliceB | Ori | 47.50 | 35.78 | 42.69 | 6850.22 | 6850.22 | 0.00 | 22.9 | 65.00 | 65.00 | 2074.05 | 2074.05 |
| 3848 | 3848:WVGD5 | 3848:WVGD5 | End | 51.00 | 36.99 | 44.15 | 7576.04 | 7576.04 | 0.00 | 23.8 | 65.00 | 65.00 | 2218.85 | 2218.85 |
| 3848 | 3848:WVGD5 | 3848:WVGD5 | Ori | 51.00 | 36.99 | 44.15 | 7576.04 | 7576.04 | 0.00 | 23.8 | 65.00 | 65.00 | 2218.85 | 2218.85 |
| 3848 | #3848:5 | Tube 2 | End | 56.00 | 38.72 | 46.23 | 8699.27 | 8699.27 | 0.00 | 25.0 | 65.00 | 65.00 | 2434.18 | 2434.18 |
| 3848 | #3848:5 | Tube 2 | Ori | 56.00 | 38.72 | 46.23 | 8699.28 | 8699.28 | 0.00 | 25.0 | 65.00 | 65.00 | 2434.18 | 2434.18 |
| 3848 | 3848:WVGD6 | 3848:WVGD6 | End | 61.00 | 40.44 | 48.31 | 9928.38 | 9928.38 | 0.00 | 26.2 | 65.00 | 65.00 | 2659.47 | 2659.47 |
| 3848 | 3848:WVGD6 | 3848:WVGD6 | Ori | 61.00 | 40.44 | 48.31 | 9928.38 | 9928.38 | 0.00 | 26.2 | 65.00 | 65.00 | 2659.47 | 2659.47 |
| 3848 | #3848:6 | Tube 2 | End | 63.71 | 41.38 | 49.44 | 10640.09 | 10640.09 | 0.00 | 26.9 | 65.00 | 65.00 | 2785.68 | 2785.68 |
| 3848 | #3848:6 | Tube 2 | Ori | 63.71 | 41.38 | 49.44 | 10640.09 | 10640.09 | 0.00 | 26.9 | 65.00 | 65.00 | 2785.68 | 2785.68 |
| 3848 | #3848:7 | SpliceT | End | 66.42 | 42.31 | 50.57 | 11385.02 | 11385.02 | 0.00 | 27.6 | 65.00 | 65.00 | 2914.82 | 2914.82 |
| 3848 | #3848:7 | SpliceT | Ori | 66.42 | 42.31 | 50.57 | 11385.02 | 11385.02 | 0.00 | 27.6 | 65.00 | 65.00 | 2914.82 | 2914.82 |
| 3848 | 3848:WVGD7 | 3848:WVGD7 | End | 71.00 | 43.90 | 52.48 | 12723.30 | 12723.30 | 0.00 | 28.7 | 65.00 | 65.00 | 3139.99 | 3139.99 |
| 3848 | 3848:WVGD7 | 3848:WVGD7 | Ori | 71.00 | 43.90 | 52.48 | 12723.30 | 12723.30 | 0.00 | 28.7 | 65.00 | 65.00 | 3139.99 | 3139.99 |
| 3848 | #3848:8 | Tube 3 | End | 76.00 | 45.62 | 54.56 | 14298.64 | 14298.64 | 0.00 | 29.9 | 65.00 | 64.88 | 3388.85 | 3388.85 |
| 3848 | #3848:8 | Tube 3 | Ori | 76.00 | 45.62 | 54.56 | 14298.64 | 14298.64 | 0.00 | 29.9 | 65.00 | 64.88 | 3388.85 | 3388.85 |
| 3848 | 3848:WVGD8 | 3848:WVGD8 | End | 81.00 | 47.35 | 56.64 | 15998.93 | 15998.93 | 0.00 | 31.2 | 65.00 | 63.67 | 3585.33 | 3585.33 |
| 3848 | 3848:WVGD8 | 3848:WVGD8 | Ori | 81.00 | 47.35 | 56.64 | 15998.93 | 15998.93 | 0.00 | 31.2 | 65.00 | 63.67 | 3585.33 | 3585.33 |
| 3848 | #3848:9 | Tube 3 | End | 86.00 | 49.08 | 58.72 | 17828.94 | 17828.94 | 0.00 | 32.4 | 65.00 | 62.46 | 3781.51 | 3781.51 |
| 3848 | #3848:9 | Tube 3 | Ori | 86.00 | 49.08 | 58.72 | 17828.94 | 17828.94 | 0.00 | 32.4 | 65.00 | 62.46 | 3781.51 | 3781.51 |
| 3848 | 3848:WVGD9 | 3848:WVGD9 | End | 91.00 | 50.80 | 60.81 | 19793.44 | 19793.44 | 0.00 | 33.6 | 65.00 | 61.24 | 3976.82 | 3976.82 |
| 3848 | 3848:WVGD9 | 3848:WVGD9 | Ori | 91.00 | 50.80 | 60.81 | 19793.44 | 19793.44 | 0.00 | 33.6 | 65.00 | 61.24 | 3976.82 | 3976.82 |
| 3848 | 3848:g | 3848:g | End | 96.00 | 52.53 | 62.89 | 21897.19 | 21897.19 | 0.00 | 34.9 | 65.00 | 60.03 | 4170.72 | 4170.72 |

**Tubular Davit Properties:**

**Davit Stock Steel Thickness Base Tip Taper Drag Modulus Geometry Strength Vertical Tension Compres. Long. Yield Weight**
**Steel Texture**
**Property Number Shape Diameter Diameter Coef. of Check Capacity Capacity Capacity Capacity Stress Density**
**Shape**

| Label<br>At End | | | | or Depth | or Depth | | | | Elasticity | | Type | | | | | | Override |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (in) | (in) | (in) | (in/ft) | | | (ksi) | | | (lbs) | (lbs) | (lbs) | (lbs) | (ksi) | (lbs/ft^3) |
| 20702-M | 20702-M | 8T | 0.1875 | 7 | 5 | 0 | 1.3 | | 29000 | 1 point | Calculated | 0 | 0 | 0 | 0 | 65 | 0 |
| 20702-N | 20702-N | 8T | 0.25 | 15 | 7.5 | 0 | 1.3 | | 29000 | 1 point | Calculated | 0 | 0 | 0 | 0 | 65 | 0 |

**Intermediate Joints for Davit Property "20702-M":**

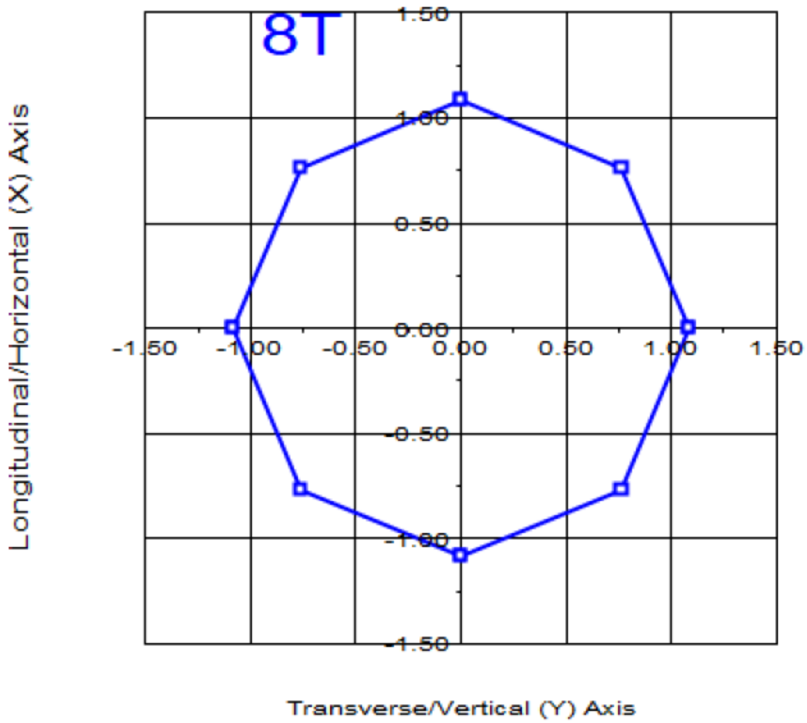
| Joint Label | Horz. Offset (ft) | Vert. Offset (ft) |
|---|---|---|
| t | 4 | -0.5 |

**Intermediate Joints for Davit Property "20702-N":**

| Joint Label | Horz. Offset (ft) | Vert. Offset (ft) |
|---|---|---|
| t | 9 | -0.75 |

**Tubular Davit Arm Connectivity:**

| Davit Label | Attach Label | Davit Property Set | Azimuth (deg) |
|---|---|---|---|
| Davit1 | 3848:Arm1 | 20702-M | 0 |
| Davit2 | 3848:Arm1 | 20702-M | 180 |
| Davit3 | 3848:Arm2 | 20702-N | 0 |
| Davit4 | 3848:Arm2 | 20702-N | 180 |
| Davit5 | 3848:Arm3 | 20702-N | 0 |
| Davit6 | 3848:Arm3 | 20702-N | 180 |
| Davit7 | 3848:Arm4 | 20702-N | 0 |
| Davit8 | 3848:Arm4 | 20702-N | 180 |




**Tubular Davit Arm Steel Properties:**

| Element Label | Joint Label | Joint Position | Rel. Dist. (ft) | Outer Diam. (in) | Area (in^2) | V-Moment Inertia (in^4) | H-Moment Inertia (in^4) | D/t | W/t Max. | Fy (ksi) | Fa Min. (ksi) | V-Moment Capacity (ft-k) | H-Moment Capacity (ft-k) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Davit1 | Davit1:O | Origin | 0.00 | 7.00 | 4.23 | 25.98 | 25.98 | 0.00 | 11.3 | 65.00 | 65.00 | 37.15 | 37.15 |
| Davit1 | Davit1:t | End | 4.03 | 5.00 | 2.99 | 9.16 | 9.16 | 0.00 | 6.9 | 65.00 | 65.00 | 18.35 | 18.35 |
| Davit2 | Davit2:O | Origin | 0.00 | 7.00 | 4.23 | 25.98 | 25.98 | 0.00 | 11.3 | 65.00 | 65.00 | 37.15 | 37.15 |
| Davit2 | Davit2:t | End | 4.03 | 5.00 | 2.99 | 9.16 | 9.16 | 0.00 | 6.9 | 65.00 | 65.00 | 18.35 | 18.35 |
| Davit3 | Davit3:O | Origin | 0.00 | 15.00 | 12.22 | 351.41 | 351.41 | 0.00 | 20.7 | 65.00 | 65.00 | 234.48 | 234.48 |
| Davit3 | #Davit3:0 | End | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit3 | #Davit3:0 | Origin | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit3 | Davit3:t | End | 9.03 | 7.50 | 6.01 | 41.77 | 41.77 | 0.00 | 8.3 | 65.00 | 65.00 | 55.74 | 55.74 |
| Davit4 | Davit4:O | Origin | 0.00 | 15.00 | 12.22 | 351.41 | 351.41 | 0.00 | 20.7 | 65.00 | 65.00 | 234.48 | 234.48 |
| Davit4 | #Davit4:0 | End | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit4 | #Davit4:0 | Origin | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit4 | Davit4:t | End | 9.03 | 7.50 | 6.01 | 41.77 | 41.77 | 0.00 | 8.3 | 65.00 | 65.00 | 55.74 | 55.74 |
| Davit5 | Davit5:O | Origin | 0.00 | 15.00 | 12.22 | 351.41 | 351.41 | 0.00 | 20.7 | 65.00 | 65.00 | 234.48 | 234.48 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Davit5 | #Davit5:0 | End | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit5 | #Davit5:0 | Origin | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit5 | Davit5:t | End | 9.03 | 7.50 | 6.01 | 41.77 | 41.77 | 0.00 | 8.3 | 65.00 | 65.00 | 55.74 | 55.74 |
| Davit6 | Davit6:O | Origin | 0.00 | 15.00 | 12.22 | 351.41 | 351.41 | 0.00 | 20.7 | 65.00 | 65.00 | 234.48 | 234.48 |
| Davit6 | #Davit6:0 | End | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit6 | #Davit6:0 | Origin | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit6 | Davit6:t | End | 9.03 | 7.50 | 6.01 | 41.77 | 41.77 | 0.00 | 8.3 | 65.00 | 65.00 | 55.74 | 55.74 |
| Davit7 | Davit7:O | Origin | 0.00 | 15.00 | 12.22 | 351.41 | 351.41 | 0.00 | 20.7 | 65.00 | 65.00 | 234.48 | 234.48 |
| Davit7 | #Davit7:0 | End | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit7 | #Davit7:0 | Origin | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit7 | Davit7:t | End | 9.03 | 7.50 | 6.01 | 41.77 | 41.77 | 0.00 | 8.3 | 65.00 | 65.00 | 55.74 | 55.74 |
| Davit8 | Davit8:O | Origin | 0.00 | 15.00 | 12.22 | 351.41 | 351.41 | 0.00 | 20.7 | 65.00 | 65.00 | 234.48 | 234.48 |
| Davit8 | #Davit8:0 | End | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit8 | #Davit8:0 | Origin | 4.52 | 11.25 | 9.11 | 145.79 | 145.79 | 0.00 | 14.5 | 65.00 | 65.00 | 129.70 | 129.70 |
| Davit8 | Davit8:t | End | 9.03 | 7.50 | 6.01 | 41.77 | 41.77 | 0.00 | 8.3 | 65.00 | 65.00 | 55.74 | 55.74 |

*** Insulator Data

**Clamp Properties:**

| Label | Stock Number | Holding Capacity (lbs) | Hardware Capacity (lbs) | Notes |
|---|---|---|---|---|
| clamp2 | clamp2 | 1e+05 | 0 | |

**Clamp Insulator Connectivity:**

| Clamp Label | Structure And Tip Attach | Property Set | Min. Required Vertical Load (uplift) (lbs) |
|---|---|---|---|
| Clamp1 | Davit1:t | clamp2 | No Limit |
| Clamp2 | Davit2:t | clamp2 | No Limit |
| Clamp3 | Davit3:t | clamp2 | No Limit |
| Clamp4 | Davit4:t | clamp2 | No Limit |
| Clamp5 | Davit5:t | clamp2 | No Limit |
| Clamp6 | Davit6:t | clamp2 | No Limit |
| Clamp7 | Davit7:t | clamp2 | No Limit |
| Clamp8 | Davit8:t | clamp2 | No Limit |
| Clamp9 | 3848:WVGD1 | clamp2 | No Limit |
| Clamp10 | 3848:WVGD2 | clamp2 | No Limit |
| Clamp11 | 3848:WVGD3 | clamp2 | No Limit |
| Clamp12 | 3848:WVGD4 | clamp2 | No Limit |
| Clamp13 | 3848:WVGD5 | clamp2 | No Limit |
| Clamp14 | 3848:WVGD6 | clamp2 | No Limit |
| Clamp15 | 3848:WVGD7 | clamp2 | No Limit |
| Clamp16 | 3848:WVGD8 | clamp2 | No Limit |
| Clamp17 | 3848:WVGD9 | clamp2 | No Limit |
| Clamp18 | 3848:TopConn | clamp2 | No Limit |
| Clamp19 | 3848:BotConn | clamp2 | No Limit |
| Clamp20 | 3848:BCT | clamp2 | No Limit |
| Clamp21 | 3848:BCB | clamp2 | No Limit |

Material List Options:
Show Parts: YES
Decompose Assemblies: NO
Show Assemblies: YES

**Material List**

| Stock Number | Item Description | Quantity | Unit of Measure |
|---|---|---|---|
| 20702-M | Tubular Davit property: 20702-M | 2.00 | Each |
| 20702-N | Tubular Davit property: 20702-N | 6.00 | Each |
| clamp2 | Clamp property: clamp2 | 21.00 | Each |
| 3848 | Steel Pole property: CL&P3848 | 1.00 | Each |

*** Loads Data

Loads from file: J:\Jobs\2202100.WI\02_CT2267\05_Structural\Tower\Backup Documentation\Rev (2)\Calcs\PLS Pole\cl&p #3848.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) | 96.04 (ft) | |
| Structure height | 96.04 (ft) | |
| Structure height above ground | 96.04 (ft) | |

**Vector Load Cases:**

| Load Case Description | Dead Load Factor | Wind Area Factor | SF for Steel Poles Tubular Arms and Towers | SF for Wood Poles | SF for Conc. Pole Ult. | SF for Pole Conc. First Crack | SF for Conc. Zero Tens. | SF for Guys and Cables | SF for Non Tubular Arms | SF for Braces | SF for Insuls. | SF for Hardware | SF For Found. | Point Loads | Wind/Ice Model | Trans. Wind Pressure (psf) | Longit. Wind Pressure (psf) | Ice Thick. (in) | Ice Density (lbs/ft^3) | Temperature (deg F) | Deflection Check | Deflection Limit % or (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy Wind | 1.5000 | 2.5000 | 1.00000 | 0.6500 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 1.0000 | 21 loads | Wind on All | 4 | 0 | 0.000 | 56.000 | 60.0 | No Limit | 0 |
| NESC Extreme Wind | 1.0000 | 1.0000 | 1.00000 | 0.6500 | 0.0000 | 1.0000 | 0.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 0.0000 | 1.0000 | 21 loads | NESC 2023 | 31 | 0 | 0.000 | 0.000 | 60.0 | No Limit | 0 |

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

| Joint Label | Vertical Load (lbs) | Transverse Load (lbs) | Longitudinal Load (lbs) | Load Comment |
|---|---|---|---|---|
| Davit1:t | 795 | 603 | -1 | Shield Wire |
| Davit2:t | 872 | 659 | -1 | Shield Wire |
| Davit3:t | 2377 | 1055 | -1 | Conductor |
| Davit4:t | 2369 | 1055 | -1 | Conductor |
| Davit5:t | 2377 | 1054 | -1 | Conductor |
| Davit6:t | 2369 | 1056 | -1 | Conductor |
| Davit7:t | 2377 | 1053 | -1 | Conductor |
| Davit8:t | 2369 | 1057 | -1 | Conductor |
| 3848:TopConn | 0 | 10202 | 0 | Top Connection |
| 3848:BotConn | 15906 | -6739 | 0 | Bottom Connection |
| 3848:BCT | 0 | 21987 | 0 | |
| 3848:BCB | 0 | -21987 | 0 | |
| 3848:WVGD1 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD2 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD3 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD4 | 1035 | 172 | 0 | Coax Cables |

| | | | | |
|---|---|---|---|---|
| 3848:WVGD5 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD6 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD7 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD8 | 1035 | 172 | 0 | Coax Cables |
| 3848:WVGD9 | 1035 | 172 | 0 | Coax Cables |

**Point Loads for Load Case "NESC Extreme Wind":**

| Joint Label | Vertical Load (lbs) | Transverse Load (lbs) | Longitudinal Load (lbs) | Load Comment |
|---|---|---|---|---|
| Davit1:t | 296 | 678 | -3 | Shield Wire |
| Davit2:t | 321 | 858 | -3 | Shield Wire |
| Davit3:t | 1179 | 2030 | -7 | Conductor |
| Davit4:t | 1175 | 2027 | -6 | Conductor |
| Davit5:t | 1179 | 2029 | -7 | Conductor |
| Davit6:t | 1175 | 2028 | -6 | Conductor |
| Davit7:t | 1179 | 2029 | -7 | Conductor |
| Davit8:t | 1175 | 2028 | -6 | Conductor |
| 3848:TopConn | 0 | 38226 | 0 | Top Connection |
| 3848:BotConn | 7896 | -25861 | 0 | Bottom Connection |
| 3848:BCT | 0 | 83953 | 0 | |
| 3848:BCB | 0 | -83953 | 0 | |
| 3848:WVGD1 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD2 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD3 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD4 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD5 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD6 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD7 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD8 | 281 | 477 | 0 | Coax Cables |
| 3848:WVGD9 | 281 | 477 | 0 | Coax Cables |

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

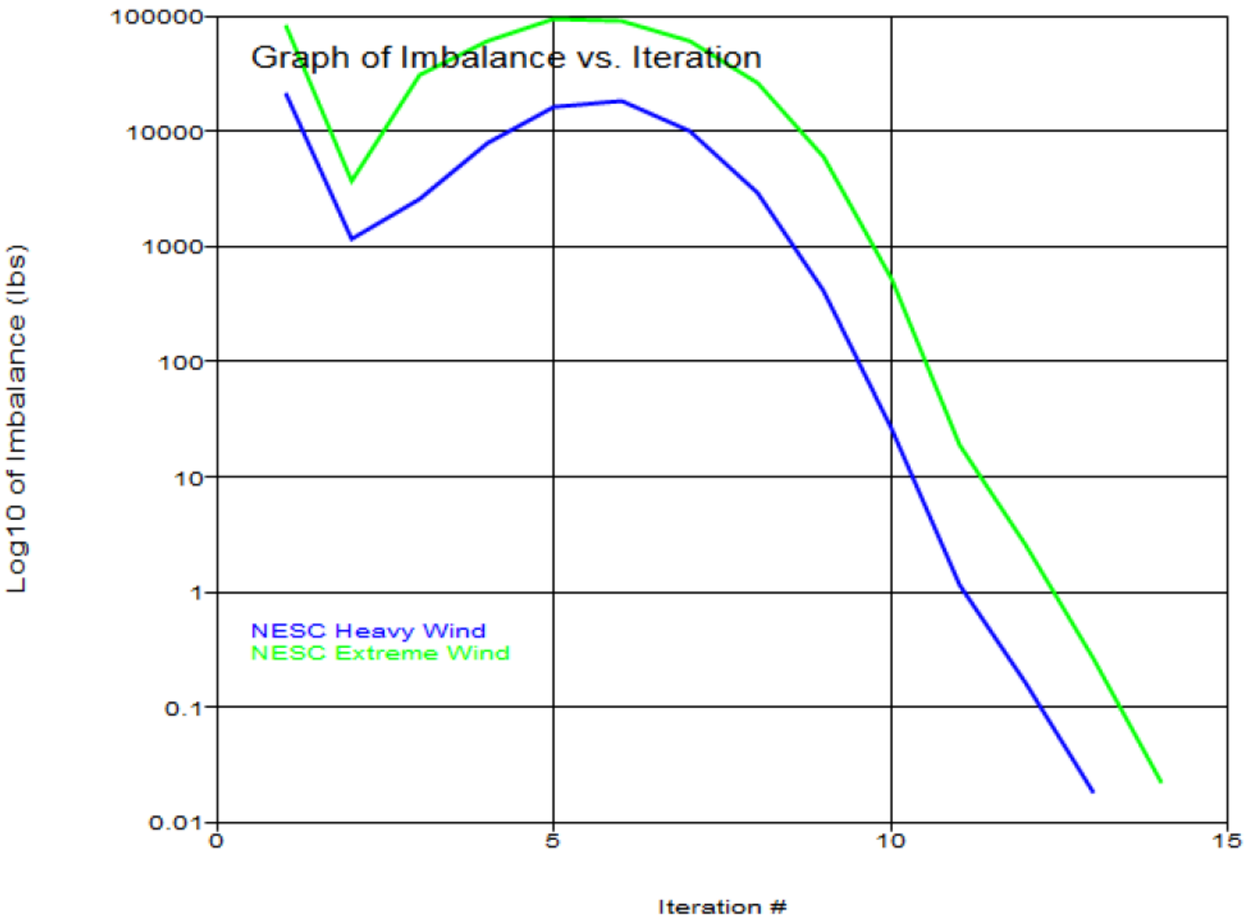
**Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.**
**Wind load is calculated for the undeformed shape of a pole.**

| 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 Wind Load (lbs) | Pole Ice Vertical Load (lbs) | Pole Ice Wind Load (lbs) | Tran. Wind Load (lbs) | Long. Wind Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:t | 3848:Arm1 | 96.00 | 95.54 | 95.77 | 20.079 | 1.65e+06 | 1.000 | 30.13 | 0.00 | 30.95 | 23.09 | 0.00 | 0.00 | 23.09 | 0.00 |
| 3848 | 3848:Arm1 | 3848:TopConn | 95.54 | 93.00 | 94.27 | 20.597 | 1.69e+06 | 1.000 | 30.13 | 0.00 | 176.30 | 131.45 | 0.00 | 0.00 | 131.45 | 0.00 |
| 3848 | 3848:TopConn | 3848:Arm2 | 93.00 | 88.90 | 90.95 | 21.745 | 1.79e+06 | 1.000 | 30.13 | 0.00 | 300.74 | 224.05 | 0.00 | 0.00 | 224.05 | 0.00 |
| 3848 | 3848:Arm2 | 3848:WVGD1 | 88.90 | 85.00 | 86.95 | 23.126 | 1.9e+06 | 1.000 | 30.13 | 0.00 | 303.90 | 226.20 | 0.00 | 0.00 | 226.20 | 0.00 |
| 3848 | 3848:WVGD1 | 3848:BCT | 85.00 | 83.50 | 84.25 | 24.058 | 1.98e+06 | 1.000 | 30.13 | 0.00 | 121.78 | 90.60 | 0.00 | 0.00 | 90.60 | 0.00 |
| 3848 | 3848:BCT | 3848:BotConn | 83.50 | 83.00 | 83.25 | 24.404 | 2.01e+06 | 1.000 | 30.13 | 0.00 | 41.19 | 30.63 | 0.00 | 0.00 | 30.63 | 0.00 |
| 3848 | 3848:BotConn | 3848:BCB | 83.00 | 82.50 | 82.75 | 24.576 | 2.02e+06 | 1.000 | 30.13 | 0.00 | 41.48 | 30.85 | 0.00 | 0.00 | 30.85 | 0.00 |
| 3848 | 3848:BCB | | 82.50 | 79.07 | 80.79 | 25.254 | 2.08e+06 | 1.000 | 30.13 | 0.00 | 292.25 | 217.28 | 0.00 | 0.00 | 217.28 | 0.00 |
| 3848 | | 3848:Arm3 | 79.07 | 75.65 | 77.36 | 26.438 | 2.17e+06 | 1.000 | 30.13 | 0.00 | 306.12 | 227.47 | 0.00 | 0.00 | 227.47 | 0.00 |
| 3848 | 3848:Arm3 | 3848:WVGD2 | 75.65 | 75.00 | 75.32 | 27.141 | 2.23e+06 | 1.000 | 30.13 | 0.00 | 59.26 | 44.02 | 0.00 | 0.00 | 44.02 | 0.00 |
| 3848 | 3848:WVGD2 | | 75.00 | 70.00 | 72.50 | 28.116 | 2.31e+06 | 1.000 | 30.13 | 0.00 | 475.33 | 352.94 | 0.00 | 0.00 | 352.94 | 0.00 |
| 3848 | | 3848:WVGD3 | 70.00 | 65.00 | 67.50 | 29.843 | 2.45e+06 | 1.000 | 30.13 | 0.00 | 504.85 | 374.62 | 0.00 | 0.00 | 374.62 | 0.00 |
| 3848 | 3848:WVGD3 | 3848:Arm4 | 65.00 | 62.40 | 63.70 | 31.156 | 2.56e+06 | 1.000 | 30.13 | 0.00 | 274.62 | 203.69 | 0.00 | 0.00 | 203.69 | 0.00 |
| 3848 | 3848:Arm4 | | 62.40 | 58.70 | 60.55 | 32.245 | 2.65e+06 | 1.000 | 30.13 | 0.00 | 403.75 | 299.36 | 0.00 | 0.00 | 299.36 | 0.00 |
| 3848 | | 3848:WVGD4 | 58.70 | 55.00 | 56.85 | 33.522 | 2.75e+06 | 1.000 | 30.13 | 0.00 | 419.90 | 311.22 | 0.00 | 0.00 | 311.22 | 0.00 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:WVGD4 | | 55.00 | 53.08 | 54.04 | 34.492 | 2.83e+06 | 1.000 | 30.13 | 0.00 | 224.03 | 166.00 | 0.00 | 0.00 | 166.00 | 0.00 |
| 3848 | | | 53.08 | 48.50 | 50.79 | 35.302 | 2.9e+06 | 1.000 | 30.13 | 0.00 | 1204.05 | 406.18 | 0.00 | 0.00 | 406.18 | 0.00 |
| 3848 | | 3848:WVGD5 | 48.50 | 45.00 | 46.75 | 36.385 | 2.99e+06 | 1.000 | 30.13 | 0.00 | 517.20 | 319.72 | 0.00 | 0.00 | 319.72 | 0.00 |
| 3848 | 3848:WVGD5 | | 45.00 | 40.00 | 42.50 | 37.853 | 3.11e+06 | 1.000 | 30.13 | 0.00 | 768.85 | 475.16 | 0.00 | 0.00 | 475.16 | 0.00 |
| 3848 | | 3848:WVGD6 | 40.00 | 35.00 | 37.50 | 39.580 | 3.25e+06 | 1.000 | 30.13 | 0.00 | 804.28 | 496.84 | 0.00 | 0.00 | 496.84 | 0.00 |
| 3848 | 3848:WVGD6 | | 35.00 | 32.29 | 33.65 | 40.911 | 3.36e+06 | 1.000 | 30.13 | 0.00 | 450.47 | 278.19 | 0.00 | 0.00 | 278.19 | 0.00 |
| 3848 | | | 32.29 | 29.58 | 30.94 | 41.846 | 3.44e+06 | 1.000 | 30.13 | 0.00 | 460.87 | 284.55 | 0.00 | 0.00 | 284.55 | 0.00 |
| 3848 | | 3848:WVGD7 | 29.58 | 25.00 | 27.29 | 43.105 | 3.54e+06 | 1.000 | 30.13 | 0.00 | 803.50 | 495.97 | 0.00 | 0.00 | 495.97 | 0.00 |
| 3848 | 3848:WVGD7 | | 25.00 | 20.00 | 22.50 | 44.760 | 3.68e+06 | 1.000 | 30.13 | 0.00 | 910.56 | 561.87 | 0.00 | 0.00 | 561.87 | 0.00 |
| 3848 | | 3848:WVGD8 | 20.00 | 15.00 | 17.50 | 46.487 | 3.82e+06 | 1.000 | 30.13 | 0.00 | 945.98 | 583.55 | 0.00 | 0.00 | 583.55 | 0.00 |
| 3848 | 3848:WVGD8 | | 15.00 | 10.00 | 12.50 | 48.214 | 3.96e+06 | 1.000 | 30.13 | 0.00 | 981.41 | 605.23 | 0.00 | 0.00 | 605.23 | 0.00 |
| 3848 | | 3848:WVGD9 | 10.00 | 5.00 | 7.50 | 49.941 | 4.1e+06 | 1.000 | 30.13 | 0.00 | 1016.84 | 626.91 | 0.00 | 0.00 | 626.91 | 0.00 |
| 3848 | 3848:WVGD9 | 3848:g | 5.00 | 0.00 | 2.50 | 51.668 | 4.25e+06 | 1.000 | 30.13 | 0.00 | 1052.27 | 648.58 | 0.00 | 0.00 | 648.58 | 0.00 |

*** Analysis Results:

Maximum element usage is 80.63% for Steel Pole "3848" in load case "NESC Extreme Wind"
Maximum insulator usage is 83.95% for Clamp "Clamp20" in load case "NESC Extreme Wind"




*** Analysis Results for Load Case No. 1 "NESC Heavy Wind" - Number of iterations in SAPS 13

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 3848:g | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 3848:t | 0.003552 | 1.721 | -0.02467 | -2.0204 | 0.0032 | 0.0001 | 0.003552 | 1.721 | 95.98 |
| 3848:Arm1 | 0.003527 | 1.705 | -0.02439 | -2.0204 | 0.0032 | 0.0001 | 0.003527 | 1.705 | 95.52 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3848:TopConn | 0.003385 | 1.616 | -0.0228 | -2.0190 | 0.0032 | 0.0001 | 0.003385 | 1.616 | 92.98 |
| 3848:Arm2 | 0.003155 | 1.471 | -0.02025 | -1.9935 | 0.0032 | 0.0000 | 0.003155 | 1.471 | 88.88 |
| 3848:WVGD1 | 0.002938 | 1.337 | -0.0179 | -1.9348 | 0.0032 | 0.0000 | 0.002938 | 1.337 | 84.98 |
| 3848:BCT | 0.002855 | 1.287 | -0.01704 | -1.9053 | 0.0032 | 0.0000 | 0.002855 | 1.287 | 83.48 |
| 3848:BotConn | 0.002827 | 1.27 | -0.01675 | -1.8942 | 0.0032 | 0.0000 | 0.002827 | 1.27 | 82.98 |
| 3848:BCB | 0.002799 | 1.254 | -0.01646 | -1.8822 | 0.0032 | 0.0000 | 0.002799 | 1.254 | 82.48 |
| 3848:Arm3 | 0.002422 | 1.039 | -0.01285 | -1.7080 | 0.0031 | 0.0000 | 0.002422 | 1.039 | 75.63 |
| 3848:WVGD2 | 0.002387 | 1.02 | -0.01253 | -1.6913 | 0.0031 | 0.0000 | 0.002387 | 1.02 | 74.99 |
| 3848:WVGD3 | 0.00186 | 0.7469 | -0.0084 | -1.4258 | 0.0029 | 0.0000 | 0.00186 | 0.7469 | 64.99 |
| 3848:Arm4 | 0.001729 | 0.6836 | -0.007526 | -1.3561 | 0.0028 | 0.0000 | 0.001729 | 0.6836 | 62.39 |
| 3848:WVGD4 | 0.001377 | 0.521 | -0.005406 | -1.1566 | 0.0026 | 0.0000 | 0.001377 | 0.521 | 54.99 |
| 3848:WVGD5 | 0.0009517 | 0.3409 | -0.003378 | -0.9086 | 0.0022 | 0.0000 | 0.0009517 | 0.3409 | 45 |
| 3848:WVGD6 | 0.0005933 | 0.2017 | -0.002037 | -0.6833 | 0.0018 | 0.0000 | 0.0005933 | 0.2017 | 35 |
| 3848:WVGD7 | 0.0003117 | 0.1008 | -0.001162 | -0.4711 | 0.0014 | 0.0000 | 0.0003117 | 0.1008 | 25 |
| 3848:WVGD8 | 0.0001159 | 0.03567 | -0.0005886 | -0.2728 | 0.0008 | 0.0000 | 0.0001159 | 0.03567 | 15 |
| 3848:WVGD9 | 1.382e-05 | 0.003997 | -0.0001797 | -0.0878 | 0.0003 | 0.0000 | 1.382e-05 | 0.003997 | 5 |
| Davit1:O | 0.003524 | 1.705 | -0.054 | -2.0204 | 0.0032 | 0.0001 | 0.003524 | 2.545 | 95.49 |
| Davit1:t | 0.003534 | 1.72 | -0.2008 | -2.1364 | 0.0032 | 0.0002 | 0.003534 | 6.56 | 95.84 |
| Davit2:O | 0.003529 | 1.706 | 0.005225 | -2.0204 | 0.0032 | 0.0001 | 0.003529 | 0.8657 | 95.55 |
| Davit2:t | 0.003562 | 1.725 | 0.141 | -1.9160 | 0.0032 | -0.0001 | 0.003562 | -3.115 | 96.18 |
| Davit3:O | 0.003153 | 1.471 | -0.0528 | -1.9935 | 0.0032 | 0.0000 | 0.003153 | 2.406 | 88.84 |
| Davit3:t | 0.003163 | 1.492 | -0.3817 | -2.1614 | 0.0032 | 0.0001 | 0.003163 | 11.43 | 89.26 |
| Davit4:O | 0.003158 | 1.472 | 0.01229 | -1.9935 | 0.0032 | 0.0000 | 0.003158 | 0.5364 | 88.91 |
| Davit4:t | 0.003219 | 1.502 | 0.3107 | -1.8382 | 0.0032 | -0.0000 | 0.003219 | -8.434 | 89.96 |
| Davit5:O | 0.002419 | 1.038 | -0.04641 | -1.7080 | 0.0031 | 0.0000 | 0.002419 | 2.165 | 75.6 |
| Davit5:t | 0.002434 | 1.058 | -0.3304 | -1.8762 | 0.0031 | 0.0001 | 0.002434 | 11.18 | 76.07 |
| Davit6:O | 0.002424 | 1.039 | 0.02072 | -1.7080 | 0.0031 | 0.0000 | 0.002424 | -0.08688 | 75.67 |
| Davit6:t | 0.002479 | 1.064 | 0.2744 | -1.5523 | 0.0031 | -0.0000 | 0.002479 | -9.062 | 76.67 |
| Davit7:O | 0.001727 | 0.6832 | -0.03869 | -1.3561 | 0.0028 | 0.0000 | 0.001727 | 2 | 62.36 |
| Davit7:t | 0.001745 | 0.6994 | -0.2674 | -1.5248 | 0.0028 | 0.0001 | 0.001745 | 11.02 | 62.88 |
| Davit8:O | 0.001731 | 0.684 | 0.02364 | -1.3561 | 0.0028 | 0.0000 | 0.001731 | -0.633 | 62.42 |
| Davit8:t | 0.001776 | 0.7028 | 0.2222 | -1.2000 | 0.0028 | -0.0000 | 0.001776 | -9.614 | 63.37 |

**Joint Support Reactions for Load Case "NESC Heavy Wind":**

| Joint Label | X Force (kips) | X Usage % | Y Force (kips) | Y Usage % | H-Shear Usage % | Z Force (kips) | Comp. Usage % | Uplift Usage % | Result. Force (kips) | Result. Usage % | X Moment (ft-k) | X-M. Usage % | Y Moment (ft-k) | Y-M. Usage % | H-Bend-M Usage % | Z Moment (ft-k) | Z-M. Usage % | Max. Usage % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848:g | -0.11 | 0.0 | -17.24 | 0.0 | 0.0 | -67.00 | 0.0 | 0.0 | 69.19 | 0.0 | 1329.29 | 0.0 | -4.6 | 0.0 | 0.0 | -0.00 | 0.0 | 0.0 |

**Detailed Steel Pole 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) | Trans. Mom. (Local Mx) (ft-k) | Long. Mom. (Local My) (ft-k) | Tors. Mom. (ft-k) | Axial Force (kips) | Tran. Shear (kips) | Long. Shear (kips) | P/A (ksi) | M/S. (ksi) | V/Q. (ksi) | T/R. (ksi) | Res. (ksi) | Max. Usage % | At Pt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:t | Origin | 0.00 | 20.66 | 0.04 | -0.30 | -0.00 | -0.00 | -0.0 | -0.02 | 0.01 | -0.00 | -0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 5 |
| 3848 | 3848:Arm1 | End | 0.46 | 20.46 | 0.04 | -0.29 | 0.00 | -0.00 | -0.0 | -0.02 | 0.01 | -0.00 | -0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 4 |
| 3848 | 3848:Arm1 | Origin | 0.46 | 20.46 | 0.04 | -0.29 | 0.30 | 0.00 | 0.0 | -1.95 | 1.38 | 0.00 | -0.10 | 0.00 | 0.14 | 0.00 | 0.26 | 0.4 | 5 |
| 3848 | 3848:TopConn | End | 3.00 | 19.39 | 0.04 | -0.27 | 3.80 | 0.00 | 0.0 | -1.95 | 1.38 | 0.00 | -0.09 | 0.42 | 0.00 | 0.00 | 0.51 | 0.8 | 2 |
| 3848 | 3848:TopConn | Origin | 3.00 | 19.39 | 0.04 | -0.27 | 3.80 | 0.00 | 0.0 | -1.95 | 11.68 | -0.00 | -0.09 | 0.00 | 1.14 | 0.00 | 1.98 | 3.0 | 5 |
| 3848 | 3848:Arm2 | End | 7.10 | 17.66 | 0.04 | -0.24 | 51.74 | -0.01 | 0.0 | -1.95 | 11.68 | -0.00 | -0.09 | 4.99 | 0.00 | 0.00 | 5.08 | 7.8 | 2 |
| 3848 | 3848:Arm2 | Origin | 7.10 | 17.66 | 0.04 | -0.24 | 53.51 | -0.01 | 0.0 | -7.92 | 14.12 | -0.00 | -0.36 | 5.16 | 0.00 | 0.00 | 5.52 | 8.5 | 2 |
| 3848 | 3848:WVGD1 | End | 11.00 | 16.05 | 0.04 | -0.21 | 108.50 | -0.02 | 0.0 | -7.92 | 14.12 | -0.00 | -0.34 | 9.30 | 0.00 | 0.00 | 9.63 | 14.8 | 2 |
| 3848 | 3848:WVGD1 | Origin | 11.00 | 16.05 | 0.04 | -0.21 | 108.50 | -0.02 | 0.0 | -9.28 | 14.41 | -0.01 | -0.39 | 9.30 | 0.00 | 0.00 | 9.69 | 14.9 | 2 |
| 3848 | 3848:BCT | End | 12.50 | 15.45 | 0.03 | -0.20 | 130.12 | -0.03 | 0.0 | -9.28 | 14.41 | -0.01 | -0.38 | 10.67 | 0.00 | 0.00 | 11.06 | 17.0 | 2 |
| 3848 | 3848:BCT | Origin | 12.50 | 15.45 | 0.03 | -0.20 | 130.12 | -0.03 | 0.0 | -8.67 | 36.42 | -0.01 | -0.36 | 10.67 | 0.00 | 0.00 | 11.03 | 17.0 | 2 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:BotConn | End | 13.00 | 15.25 | 0.03 | -0.20 | 148.33 | -0.03 | 0.0 | -8.67 | 36.42 | -0.01 | -0.36 | 11.99 | 0.00 | 0.00 | 12.35 | 19.0 | 2 |
| 3848 | 3848:BotConn | Origin | 13.00 | 15.25 | 0.03 | -0.20 | 148.33 | -0.03 | 0.0 | -24.86 | 30.23 | -0.01 | -1.02 | 11.99 | 0.00 | 0.00 | 13.01 | 20.0 | 2 |
| 3848 | 3848:BCB | End | 13.50 | 15.05 | 0.03 | -0.20 | 163.44 | -0.04 | 0.0 | -24.86 | 30.23 | -0.01 | -1.02 | 13.02 | 0.00 | 0.00 | 14.04 | 21.6 | 2 |
| 3848 | 3848:BCB | Origin | 13.50 | 15.05 | 0.03 | -0.20 | 163.44 | -0.04 | 0.0 | -25.85 | 8.30 | -0.01 | -1.06 | 13.02 | 0.00 | 0.00 | 14.08 | 21.7 | 2 |
| 3848 | Tube 1 | End | 16.93 | 13.73 | 0.03 | -0.17 | 191.89 | -0.07 | 0.0 | -25.85 | 8.30 | -0.01 | -1.01 | 13.90 | 0.00 | 0.00 | 14.91 | 22.9 | 2 |
| 3848 | Tube 1 | Origin | 16.93 | 13.73 | 0.03 | -0.17 | 191.89 | -0.07 | 0.0 | -26.31 | 8.39 | -0.01 | -1.03 | 13.90 | 0.00 | 0.00 | 14.92 | 23.0 | 2 |
| 3848 | 3848:Arm3 | End | 20.35 | 12.47 | 0.03 | -0.15 | 220.65 | -0.12 | 0.0 | -26.31 | 8.39 | -0.01 | -0.98 | 14.59 | 0.00 | 0.00 | 15.57 | 24.0 | 2 |
| 3848 | 3848:Arm3 | Origin | 20.35 | 12.47 | 0.03 | -0.15 | 222.41 | -0.12 | 0.0 | -32.11 | 10.72 | -0.01 | -1.20 | 14.71 | 0.00 | 0.00 | 15.90 | 24.5 | 2 |
| 3848 | 3848:WVGD2 | End | 21.00 | 12.24 | 0.03 | -0.15 | 229.33 | -0.13 | 0.0 | -32.11 | 10.72 | -0.01 | -1.19 | 14.91 | 0.00 | 0.00 | 16.10 | 24.8 | 2 |
| 3848 | 3848:WVGD2 | Origin | 21.00 | 12.24 | 0.03 | -0.15 | 229.33 | -0.13 | 0.0 | -33.55 | 11.00 | -0.02 | -1.24 | 14.91 | 0.00 | 0.00 | 16.15 | 24.8 | 2 |
| 3848 | Tube 1 | End | 26.00 | 10.53 | 0.03 | -0.12 | 284.34 | -0.21 | 0.0 | -33.55 | 11.00 | -0.02 | -1.16 | 16.32 | 0.00 | 0.00 | 17.48 | 26.9 | 2 |
| 3848 | Tube 1 | Origin | 26.00 | 10.53 | 0.03 | -0.12 | 284.34 | -0.21 | 0.0 | -34.31 | 11.14 | -0.02 | -1.19 | 16.32 | 0.00 | 0.00 | 17.51 | 26.9 | 2 |
| 3848 | 3848:WVGD3 | End | 31.00 | 8.96 | 0.02 | -0.10 | 340.02 | -0.32 | 0.0 | -34.31 | 11.14 | -0.02 | -1.12 | 17.35 | 0.00 | 0.00 | 18.47 | 28.4 | 2 |
| 3848 | 3848:WVGD3 | Origin | 31.00 | 8.96 | 0.02 | -0.10 | 340.02 | -0.32 | 0.0 | -35.95 | 11.44 | -0.03 | -1.18 | 17.35 | 0.00 | 0.00 | 18.53 | 28.5 | 2 |
| 3848 | 3848:Arm4 | End | 33.60 | 8.20 | 0.02 | -0.09 | 369.81 | -0.38 | 0.0 | -35.95 | 11.44 | -0.03 | -1.14 | 17.80 | 0.00 | 0.00 | 18.94 | 29.1 | 2 |
| 3848 | 3848:Arm4 | Origin | 33.60 | 8.20 | 0.02 | -0.09 | 371.54 | -0.38 | 0.0 | -42.01 | 13.77 | -0.03 | -1.34 | 17.88 | 0.00 | 0.00 | 19.22 | 29.6 | 2 |
| 3848 | Tube 1 | End | 37.30 | 7.19 | 0.02 | -0.08 | 422.46 | -0.49 | 0.0 | -42.01 | 13.77 | -0.03 | -1.28 | 18.76 | 0.00 | 0.00 | 20.04 | 30.8 | 2 |
| 3848 | Tube 1 | Origin | 37.30 | 7.19 | 0.02 | -0.08 | 422.46 | -0.49 | 0.0 | -42.65 | 13.87 | -0.03 | -1.30 | 18.76 | 0.00 | 0.00 | 20.06 | 30.9 | 2 |
| 3848 | 3848:WVGD4 | End | 41.00 | 6.25 | 0.02 | -0.06 | 473.75 | -0.61 | 0.0 | -42.65 | 13.87 | -0.03 | -1.25 | 19.47 | 0.00 | 0.00 | 20.73 | 31.9 | 2 |
| 3848 | 3848:WVGD4 | Origin | 41.00 | 6.25 | 0.02 | -0.06 | 473.75 | -0.61 | 0.0 | -44.19 | 14.14 | -0.04 | -1.30 | 19.47 | 0.00 | 0.00 | 20.77 | 32.0 | 2 |
| 3848 | SpliceT | End | 42.92 | 5.80 | 0.02 | -0.06 | 500.86 | -0.67 | 0.0 | -44.19 | 14.14 | -0.04 | -1.27 | 19.80 | 0.00 | 0.00 | 21.08 | 32.4 | 2 |
| 3848 | SpliceT | Origin | 42.92 | 5.80 | 0.02 | -0.06 | 500.86 | -0.67 | 0.0 | -45.28 | 14.25 | -0.04 | -1.31 | 19.80 | 0.00 | 0.00 | 21.11 | 32.5 | 2 |
| 3848 | SpliceB | End | 47.50 | 4.79 | 0.01 | -0.05 | 566.17 | -0.85 | 0.0 | -45.28 | 14.25 | -0.04 | -1.06 | 17.75 | 0.00 | 0.00 | 18.81 | 28.9 | 2 |
| 3848 | SpliceB | Origin | 47.50 | 4.79 | 0.01 | -0.05 | 566.17 | -0.85 | 0.0 | -46.59 | 14.39 | -0.04 | -1.09 | 17.75 | 0.00 | 0.00 | 18.84 | 29.0 | 2 |
| 3848 | 3848:WVGD5 | End | 51.00 | 4.09 | 0.01 | -0.04 | 616.52 | -1.01 | 0.0 | -46.59 | 14.39 | -0.04 | -1.06 | 18.07 | 0.00 | 0.00 | 19.12 | 29.4 | 2 |
| 3848 | 3848:WVGD5 | Origin | 51.00 | 4.09 | 0.01 | -0.04 | 616.52 | -1.01 | 0.0 | -48.61 | 14.72 | -0.05 | -1.10 | 18.07 | 0.00 | 0.00 | 19.17 | 29.5 | 2 |
| 3848 | Tube 2 | End | 56.00 | 3.20 | 0.01 | -0.03 | 690.12 | -1.26 | 0.0 | -48.61 | 14.72 | -0.05 | -1.05 | 18.44 | 0.00 | 0.00 | 19.49 | 30.0 | 2 |
| 3848 | Tube 2 | Origin | 56.00 | 3.20 | 0.01 | -0.03 | 690.12 | -1.26 | 0.0 | -49.82 | 14.90 | -0.06 | -1.08 | 18.44 | 0.00 | 0.00 | 19.51 | 30.0 | 2 |
| 3848 | 3848:WVGD6 | End | 61.00 | 2.42 | 0.01 | -0.02 | 764.60 | -1.54 | 0.0 | -49.82 | 14.90 | -0.06 | -1.03 | 18.70 | 0.00 | 0.00 | 19.73 | 30.4 | 2 |
| 3848 | 3848:WVGD6 | Origin | 61.00 | 2.42 | 0.01 | -0.02 | 764.60 | -1.54 | 0.0 | -51.82 | 15.22 | -0.06 | -1.07 | 18.70 | 0.00 | 0.00 | 19.77 | 30.4 | 2 |
| 3848 | Tube 2 | End | 63.71 | 2.05 | 0.01 | -0.02 | 805.84 | -1.71 | 0.0 | -51.82 | 15.22 | -0.06 | -1.05 | 18.81 | 0.00 | 0.00 | 19.86 | 30.6 | 2 |
| 3848 | Tube 2 | Origin | 63.71 | 2.05 | 0.01 | -0.02 | 805.84 | -1.71 | 0.0 | -52.52 | 15.33 | -0.07 | -1.06 | 18.81 | 0.00 | 0.00 | 19.88 | 30.6 | 2 |
| 3848 | SpliceT | End | 66.42 | 1.71 | 0.01 | -0.02 | 847.35 | -1.88 | 0.0 | -52.52 | 15.33 | -0.07 | -1.04 | 18.91 | 0.00 | 0.00 | 19.95 | 30.7 | 2 |
| 3848 | SpliceT | Origin | 66.42 | 1.71 | 0.01 | -0.02 | 847.35 | -1.88 | 0.0 | -53.49 | 15.47 | -0.07 | -1.06 | 18.91 | 0.00 | 0.00 | 19.96 | 30.7 | 2 |
| 3848 | 3848:WVGD7 | End | 71.00 | 1.21 | 0.00 | -0.01 | 918.26 | -2.21 | 0.0 | -53.49 | 15.47 | -0.07 | -1.02 | 19.02 | 0.00 | 0.00 | 20.04 | 30.8 | 2 |
| 3848 | 3848:WVGD7 | Origin | 71.00 | 1.21 | 0.00 | -0.01 | 918.26 | -2.21 | 0.0 | -55.83 | 15.85 | -0.08 | -1.06 | 19.02 | 0.00 | 0.00 | 20.08 | 30.9 | 2 |
| 3848 | Tube 3 | End | 76.00 | 0.77 | 0.00 | -0.01 | 997.51 | -2.60 | 0.0 | -55.83 | 15.85 | -0.08 | -1.02 | 19.11 | 0.00 | 0.00 | 20.13 | 31.0 | 2 |
| 3848 | Tube 3 | Origin | 76.00 | 0.77 | 0.00 | -0.01 | 997.51 | -2.60 | 0.0 | -57.25 | 16.07 | -0.09 | -1.05 | 19.11 | 0.00 | 0.00 | 20.16 | 31.1 | 2 |
| 3848 | 3848:WVGD8 | End | 81.00 | 0.43 | 0.00 | -0.01 | 1077.84 | -3.03 | 0.0 | -57.25 | 16.07 | -0.09 | -1.01 | 19.15 | 0.00 | 0.00 | 20.17 | 31.7 | 2 |
| 3848 | 3848:WVGD8 | Origin | 81.00 | 0.43 | 0.00 | -0.01 | 1077.84 | -3.03 | 0.0 | -59.76 | 16.47 | -0.09 | -1.06 | 19.15 | 0.00 | 0.00 | 20.21 | 31.7 | 2 |
| 3848 | Tube 3 | End | 86.00 | 0.19 | 0.00 | -0.00 | 1160.18 | -3.49 | 0.0 | -59.76 | 16.47 | -0.09 | -1.02 | 19.18 | 0.00 | 0.00 | 20.19 | 32.3 | 2 |
| 3848 | Tube 3 | Origin | 86.00 | 0.19 | 0.00 | -0.00 | 1160.18 | -3.49 | 0.0 | -61.28 | 16.70 | -0.10 | -1.04 | 19.18 | 0.00 | 0.00 | 20.22 | 32.4 | 2 |
| 3848 | 3848:WVGD9 | End | 91.00 | 0.05 | 0.00 | -0.00 | 1243.69 | -4.00 | 0.0 | -61.28 | 16.70 | -0.10 | -1.01 | 19.17 | 0.00 | 0.00 | 20.18 | 32.9 | 2 |
| 3848 | 3848:WVGD9 | Origin | 91.00 | 0.05 | 0.00 | -0.00 | 1243.69 | -4.00 | 0.0 | -63.90 | 17.12 | -0.11 | -1.05 | 19.17 | 0.00 | 0.00 | 20.22 | 33.0 | 2 |
| 3848 | 3848:g | End | 96.00 | 0.00 | 0.00 | 0.00 | 1329.29 | -4.56 | 0.0 | -63.90 | 17.12 | -0.11 | -1.02 | 19.15 | 0.00 | 0.00 | 20.17 | 33.6 | 2 |

**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. Usage % | At Pt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Davit1 | Davit1:O | Origin | 0.00 | 20.46 | 0.04 | -0.65 | -3.56 | 0.00 | -0.0 | 0.53 | 0.88 | -0.00 | 0.12 | 6.22 | 0.00 | 0.00 | 6.35 | 9.8 | 1 |
| Davit1 | Davit1:t | End | 4.03 | 20.64 | 0.04 | -2.41 | 0.00 | 0.00 | -0.0 | 0.53 | 0.88 | -0.00 | 0.18 | 0.00 | 0.61 | 0.00 | 1.08 | 1.7 | 3 |
| Davit2 | Davit2:O | Origin | 0.00 | 20.47 | 0.04 | 0.06 | -3.20 | -0.00 | 0.0 | -0.79 | 0.79 | 0.00 | -0.19 | 5.60 | 0.00 | 0.00 | 5.79 | 8.9 | 1 |
| Davit2 | Davit2:t | End | 4.03 | 20.70 | 0.04 | 1.69 | -0.00 | 0.00 | 0.0 | -0.79 | 0.79 | 0.00 | -0.27 | 0.00 | 0.55 | 0.00 | 0.99 | 1.5 | 3 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Davit3 | Davit3:O | Origin | 0.00 | 17.65 | 0.04 | -0.63 | -23.62 | 0.01 | -0.0 | 0.93 | 2.72 | -0.00 | 0.08 | 6.55 | 0.00 | 0.00 | 6.62 | 10.2 | 1 |
| Davit3 | #Davit3:0 | End | 4.52 | 17.78 | 0.04 | -2.56 | -11.33 | 0.00 | -0.0 | 0.93 | 2.72 | -0.00 | 0.10 | 5.68 | 0.00 | 0.00 | 5.78 | 8.9 | 1 |
| Davit3 | #Davit3:0 | Origin | 4.52 | 17.78 | 0.04 | -2.56 | -11.33 | 0.00 | 0.0 | 0.94 | 2.51 | -0.00 | 0.10 | 5.68 | 0.00 | 0.00 | 5.78 | 8.9 | 1 |
| Davit3 | Davit3:t | End | 9.03 | 17.91 | 0.04 | -4.58 | 0.00 | 0.00 | 0.0 | 0.94 | 2.51 | -0.00 | 0.16 | 0.00 | 0.87 | 0.00 | 1.51 | 2.3 | 3 |
| Davit4 | Davit4:O | Origin | 0.00 | 17.66 | 0.04 | 0.15 | -21.86 | -0.01 | 0.0 | -1.36 | 2.52 | 0.00 | -0.11 | 6.06 | 0.00 | 0.00 | 6.17 | 9.5 | 1 |
| Davit4 | #Davit4:0 | End | 4.52 | 17.85 | 0.04 | 1.98 | -10.47 | -0.00 | 0.0 | -1.36 | 2.52 | 0.00 | -0.15 | 5.24 | 0.00 | 0.00 | 5.39 | 8.3 | 1 |
| Davit4 | #Davit4:0 | Origin | 4.52 | 17.85 | 0.04 | 1.98 | -10.47 | -0.00 | 0.0 | -1.33 | 2.32 | 0.00 | -0.15 | 5.24 | 0.00 | 0.00 | 5.39 | 8.3 | 1 |
| Davit4 | Davit4:t | End | 9.03 | 18.02 | 0.04 | 3.73 | -0.00 | 0.00 | 0.0 | -1.33 | 2.32 | 0.00 | -0.22 | 0.00 | 0.80 | 0.00 | 1.41 | 2.2 | 3 |
| Davit5 | Davit5:O | Origin | 0.00 | 12.46 | 0.03 | -0.56 | -23.66 | 0.01 | -0.0 | 0.91 | 2.73 | -0.00 | 0.07 | 6.56 | 0.00 | 0.00 | 6.63 | 10.2 | 1 |
| Davit5 | #Davit5:0 | End | 4.52 | 12.57 | 0.03 | -2.22 | -11.35 | 0.00 | -0.0 | 0.91 | 2.73 | -0.00 | 0.10 | 5.69 | 0.00 | 0.00 | 5.79 | 8.9 | 1 |
| Davit5 | #Davit5:0 | Origin | 4.52 | 12.57 | 0.03 | -2.22 | -11.35 | 0.00 | 0.0 | 0.93 | 2.51 | -0.00 | 0.10 | 5.69 | 0.00 | 0.00 | 5.79 | 8.9 | 1 |
| Davit5 | Davit5:t | End | 9.03 | 12.69 | 0.03 | -3.96 | 0.00 | 0.00 | 0.0 | 0.93 | 2.51 | -0.00 | 0.15 | 0.00 | 0.87 | 0.00 | 1.51 | 2.3 | 3 |
| Davit6 | Davit6:O | Origin | 0.00 | 12.47 | 0.03 | 0.25 | -21.92 | -0.01 | 0.0 | -1.35 | 2.53 | 0.00 | -0.11 | 6.08 | 0.00 | 0.00 | 6.19 | 9.5 | 1 |
| Davit6 | #Davit6:0 | End | 4.52 | 12.63 | 0.03 | 1.81 | -10.50 | -0.00 | 0.0 | -1.35 | 2.53 | 0.00 | -0.15 | 5.26 | 0.00 | 0.00 | 5.41 | 8.3 | 1 |
| Davit6 | #Davit6:0 | Origin | 4.52 | 12.63 | 0.03 | 1.81 | -10.50 | -0.00 | 0.0 | -1.32 | 2.32 | 0.00 | -0.14 | 5.26 | 0.00 | 0.00 | 5.40 | 8.3 | 1 |
| Davit6 | Davit6:t | End | 9.03 | 12.77 | 0.03 | 3.29 | -0.00 | 0.00 | 0.0 | -1.32 | 2.32 | 0.00 | -0.22 | 0.00 | 0.80 | 0.00 | 1.41 | 2.2 | 3 |
| Davit7 | Davit7:O | Origin | 0.00 | 8.20 | 0.02 | -0.46 | -23.71 | 0.01 | -0.0 | 0.89 | 2.73 | -0.00 | 0.07 | 6.57 | 0.00 | 0.00 | 6.65 | 10.2 | 1 |
| Davit7 | #Davit7:0 | End | 4.52 | 8.29 | 0.02 | -1.79 | -11.38 | 0.00 | -0.0 | 0.89 | 2.73 | -0.00 | 0.10 | 5.70 | 0.00 | 0.00 | 5.80 | 8.9 | 1 |
| Davit7 | #Davit7:0 | Origin | 4.52 | 8.29 | 0.02 | -1.79 | -11.38 | 0.00 | -0.0 | 0.91 | 2.52 | -0.00 | 0.10 | 5.70 | 0.00 | 0.00 | 5.80 | 8.9 | 1 |
| Davit7 | Davit7:t | End | 9.03 | 8.39 | 0.02 | -3.21 | 0.00 | 0.00 | -0.0 | 0.91 | 2.52 | -0.00 | 0.15 | 0.00 | 0.87 | 0.00 | 1.52 | 2.3 | 3 |
| Davit8 | Davit8:O | Origin | 0.00 | 8.21 | 0.02 | 0.28 | -21.99 | -0.01 | 0.0 | -1.33 | 2.54 | 0.00 | -0.11 | 6.10 | 0.00 | 0.00 | 6.21 | 9.5 | 1 |
| Davit8 | #Davit8:0 | End | 4.52 | 8.32 | 0.02 | 1.52 | -10.53 | -0.00 | 0.0 | -1.33 | 2.54 | 0.00 | -0.15 | 5.28 | 0.00 | 0.00 | 5.42 | 8.3 | 1 |
| Davit8 | #Davit8:0 | Origin | 4.52 | 8.32 | 0.02 | 1.52 | -10.53 | -0.00 | 0.0 | -1.31 | 2.33 | 0.00 | -0.14 | 5.28 | 0.00 | 0.00 | 5.42 | 8.3 | 1 |
| Davit8 | Davit8:t | End | 9.03 | 8.43 | 0.02 | 2.67 | -0.00 | 0.00 | 0.0 | -1.31 | 2.33 | 0.00 | -0.22 | 0.00 | 0.81 | 0.00 | 1.41 | 2.2 | 3 |

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

| Clamp Label | Force (kips) | Input Holding Capacity (kips) | Factored Holding Capacity (kips) | Holding Usage % | Input Hardware Capacity (kips) | Factored Hardware Capacity (kips) | Hardware Usage % | Max. Usage % |
|---|---|---|---|---|---|---|---|---|
| Clamp1 | 0.998 | 100.00 | 100.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Clamp2 | 1.093 | 100.00 | 100.00 | 1.09 | 0.00 | 0.00 | 0.00 | 1.09 |
| Clamp3 | 2.601 | 100.00 | 100.00 | 2.60 | 0.00 | 0.00 | 0.00 | 2.60 |
| Clamp4 | 2.593 | 100.00 | 100.00 | 2.59 | 0.00 | 0.00 | 0.00 | 2.59 |
| Clamp5 | 2.600 | 100.00 | 100.00 | 2.60 | 0.00 | 0.00 | 0.00 | 2.60 |
| Clamp6 | 2.594 | 100.00 | 100.00 | 2.59 | 0.00 | 0.00 | 0.00 | 2.59 |
| Clamp7 | 2.600 | 100.00 | 100.00 | 2.60 | 0.00 | 0.00 | 0.00 | 2.60 |
| Clamp8 | 2.594 | 100.00 | 100.00 | 2.59 | 0.00 | 0.00 | 0.00 | 2.59 |
| Clamp9 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp10 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp11 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp12 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp13 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp14 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp15 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp16 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp17 | 1.049 | 100.00 | 100.00 | 1.05 | 0.00 | 0.00 | 0.00 | 1.05 |
| Clamp18 | 10.202 | 100.00 | 100.00 | 10.20 | 0.00 | 0.00 | 0.00 | 10.20 |
| Clamp19 | 17.275 | 100.00 | 100.00 | 17.27 | 0.00 | 0.00 | 0.00 | 17.27 |
| Clamp20 | 21.987 | 100.00 | 100.00 | 21.99 | 0.00 | 0.00 | 0.00 | 21.99 |
| Clamp21 | 21.987 | 100.00 | 100.00 | 21.99 | 0.00 | 0.00 | 0.00 | 21.99 |

*** Analysis Results for Load Case No. 2 "NESC Extreme Wind" - Number of iterations in SAPS 14

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 3848:g | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 3848:t | -0.003232 | 4.389 | -0.1447 | -5.3993 | -0.0035 | 0.0001 | -0.003232 | 4.389 | 95.86 |
| 3848:Arm1 | -0.003204 | 4.346 | -0.1426 | -5.3993 | -0.0035 | 0.0001 | -0.003204 | 4.346 | 95.4 |
| 3848:TopConn | -0.003047 | 4.107 | -0.1313 | -5.3974 | -0.0035 | 0.0001 | -0.003047 | 4.107 | 92.87 |
| 3848:Arm2 | -0.002795 | 3.722 | -0.1133 | -5.3174 | -0.0035 | 0.0001 | -0.002795 | 3.722 | 88.78 |
| 3848:WVGD1 | -0.002558 | 3.366 | -0.09697 | -5.1299 | -0.0034 | 0.0001 | -0.002558 | 3.366 | 84.9 |
| 3848:BCT | -0.002468 | 3.233 | -0.09105 | -5.0358 | -0.0034 | 0.0001 | -0.002468 | 3.233 | 83.41 |
| 3848:BotConn | -0.002438 | 3.189 | -0.08911 | -5.0006 | -0.0034 | 0.0001 | -0.002438 | 3.189 | 82.91 |
| 3848:BCB | -0.002408 | 3.146 | -0.08721 | -4.9615 | -0.0034 | 0.0001 | -0.002408 | 3.146 | 82.41 |
| 3848:Arm3 | -0.002013 | 2.585 | -0.06409 | -4.4167 | -0.0032 | 0.0001 | -0.002013 | 2.585 | 75.58 |
| 3848:WVGD2 | -0.001977 | 2.535 | -0.06217 | -4.3663 | -0.0032 | 0.0001 | -0.001977 | 2.535 | 74.94 |
| 3848:WVGD3 | -0.001454 | 1.839 | -0.03767 | -3.6024 | -0.0028 | 0.0001 | -0.001454 | 1.839 | 64.96 |
| 3848:Arm4 | -0.00133 | 1.68 | -0.03274 | -3.4100 | -0.0026 | 0.0001 | -0.00133 | 1.68 | 62.36 |
| 3848:WVGD4 | -0.00101 | 1.273 | -0.0214 | -2.8743 | -0.0023 | 0.0001 | -0.00101 | 1.273 | 54.98 |
| 3848:WVGD5 | -0.0006539 | 0.8287 | -0.01127 | -2.2322 | -0.0018 | 0.0000 | -0.0006539 | 0.8287 | 44.99 |
| 3848:WVGD6 | -0.0003812 | 0.4881 | -0.005254 | -1.6650 | -0.0013 | 0.0000 | -0.0003812 | 0.4881 | 34.99 |
| 3848:WVGD7 | -0.0001871 | 0.243 | -0.002039 | -1.1407 | -0.0009 | 0.0000 | -0.0001871 | 0.243 | 25 |
| 3848:WVGD8 | -6.481e-05 | 0.08571 | -0.000596 | -0.6572 | -0.0005 | 0.0000 | -6.481e-05 | 0.08571 | 15 |
| 3848:WVGD9 | -7.037e-06 | 0.009568 | -0.0001025 | -0.2106 | -0.0002 | 0.0000 | -7.037e-06 | 0.009568 | 5 |
| Davit1:o | -0.0032 | 4.343 | -0.2217 | -5.3993 | -0.0035 | 0.0001 | -0.0032 | 5.183 | 95.32 |
| Davit1:t | -0.003234 | 4.372 | -0.6024 | -5.4442 | -0.0035 | 0.0005 | -0.003234 | 9.212 | 95.44 |
| Davit2:o | -0.003207 | 4.35 | -0.06359 | -5.3993 | -0.0035 | 0.0001 | -0.003207 | 3.51 | 95.48 |
| Davit2:t | -0.003273 | 4.415 | 0.3097 | -5.3796 | -0.0036 | -0.0003 | -0.003273 | -0.4252 | 96.35 |
| Davit3:o | -0.002791 | 3.718 | -0.2 | -5.3174 | -0.0035 | 0.0001 | -0.002791 | 4.654 | 88.7 |
| Davit3:t | -0.002843 | 3.749 | -1.045 | -5.3991 | -0.0035 | 0.0006 | -0.002843 | 13.68 | 88.6 |
| Davit4:o | -0.002799 | 3.726 | -0.02658 | -5.3174 | -0.0035 | 0.0001 | -0.002799 | 2.791 | 88.87 |
| Davit4:t | -0.002916 | 3.834 | 0.7989 | -5.2592 | -0.0036 | -0.0003 | -0.002916 | -6.102 | 90.44 |
| Davit5:o | -0.00201 | 2.581 | -0.1508 | -4.4167 | -0.0032 | 0.0001 | -0.00201 | 3.708 | 75.5 |
| Davit5:t | -0.00207 | 2.612 | -0.8539 | -4.5006 | -0.0032 | 0.0006 | -0.00207 | 12.74 | 75.54 |
| Davit6:o | -0.002016 | 2.588 | 0.02264 | -4.4167 | -0.0032 | 0.0001 | -0.002016 | 1.462 | 75.67 |
| Davit6:t | -0.002116 | 2.672 | 0.708 | -4.3562 | -0.0033 | -0.0003 | -0.002116 | -7.455 | 77.1 |
| Davit7:o | -0.001329 | 1.677 | -0.1111 | -3.4100 | -0.0026 | 0.0001 | -0.001329 | 2.994 | 62.28 |
| Davit7:t | -0.001392 | 1.706 | -0.6556 | -3.4961 | -0.0027 | 0.0005 | -0.001392 | 12.02 | 62.49 |
| Davit8:o | -0.001332 | 1.682 | 0.04559 | -3.4100 | -0.0026 | 0.0001 | -0.001332 | 0.365 | 62.44 |
| Davit8:t | -0.001415 | 1.742 | 0.5738 | -3.3469 | -0.0027 | -0.0003 | -0.001415 | -8.575 | 63.72 |

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

| Joint Label | X Force (kips) | X Usage % | Y Force (kips) | Y Usage % | H-Shear Usage % | Z Force (kips) | Comp. Usage % | Uplift Usage % | Result. Force (kips) | Result. Usage % | X Moment (ft-k) | X-M. Usage % | Y Moment (ft-k) | Y-M. Usage % | H-Bend-M Usage % | Z Moment (ft-k) | Z-M. Usage % | Max. Usage % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848:g | 0.01 | 0.0 | -39.08 | 0.0 | 0.0 | -36.38 | 0.0 | 0.0 | 53.39 | 0.0 | 3183.47 | 0.0 | 2.4 | 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) | Tran. Shear (kips) | Long. Shear (kips) | P/A (ksi) | M/S. (ksi) | V/Q. (ksi) | T/R. (ksi) | Res. (ksi) | Max. Usage % | At Pt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | 3848:t | Origin | 0.00 | 52.67 | -0.04 | -1.74 | -0.00 | 0.00 | -0.0 | -0.02 | 0.01 | -0.00 | -0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 5 |
| 3848 | 3848:Arm1 | End | 0.46 | 52.16 | -0.04 | -1.71 | 0.01 | -0.00 | -0.0 | -0.02 | 0.01 | -0.00 | -0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 4 |
| 3848 | 3848:Arm1 | Origin | 0.46 | 52.16 | -0.04 | -1.71 | 0.77 | 0.00 | 0.0 | -0.68 | 1.70 | 0.01 | -0.03 | 0.00 | 0.17 | 0.00 | 0.30 | 0.5 | 5 |
| 3848 | 3848:TopConn | End | 3.00 | 49.29 | -0.04 | -1.58 | 5.08 | 0.02 | 0.0 | -0.68 | 1.70 | 0.01 | -0.03 | 0.56 | 0.00 | 0.00 | 0.59 | 0.9 | 2 |
| 3848 | 3848:TopConn | Origin | 3.00 | 49.29 | -0.04 | -1.58 | 5.08 | 0.02 | 0.0 | 2.66 | 39.95 | 0.01 | 0.13 | 0.00 | 3.91 | 0.00 | 6.77 | 10.4 | 5 |
| 3848 | 3848:Arm2 | End | 7.10 | 44.67 | -0.03 | -1.36 | 169.05 | 0.04 | 0.0 | 2.66 | 39.95 | 0.01 | 0.12 | 16.31 | 0.00 | 0.00 | 16.43 | 25.3 | 2 |
| 3848 | 3848:Arm2 | Origin | 7.10 | 44.67 | -0.03 | -1.36 | 172.32 | 0.05 | 0.0 | -0.25 | 44.52 | 0.02 | -0.01 | 16.63 | 0.00 | 0.00 | 16.64 | 25.6 | 2 |
| 3848 | 3848:WVGD1 | End | 11.00 | 40.40 | -0.03 | -1.16 | 345.76 | 0.12 | 0.0 | -0.25 | 44.52 | 0.02 | -0.01 | 29.63 | 0.00 | 0.00 | 29.64 | 45.6 | 2 |
| 3848 | 3848:WVGD1 | Origin | 11.00 | 40.40 | -0.03 | -1.16 | 345.76 | 0.12 | 0.0 | -0.82 | 45.19 | 0.02 | -0.03 | 29.63 | 0.00 | 0.00 | 29.66 | 45.6 | 2 |
| 3848 | 3848:BCT | End | 12.50 | 38.80 | -0.03 | -1.09 | 413.54 | 0.14 | 0.0 | -0.82 | 45.19 | 0.02 | -0.03 | 33.92 | 0.00 | 0.00 | 33.95 | 52.2 | 2 |
| 3848 | 3848:BCT | Origin | 12.50 | 38.80 | -0.03 | -1.09 | 413.54 | 0.14 | 0.0 | 6.44 | 128.89 | 0.02 | 0.27 | 33.92 | 0.00 | 0.00 | 34.18 | 52.6 | 2 |
| 3848 | 3848:BotConn | End | 13.00 | 38.27 | -0.03 | -1.07 | 477.99 | 0.15 | 0.0 | 6.44 | 128.89 | 0.02 | 0.27 | 38.64 | 0.00 | 0.00 | 38.90 | 59.9 | 2 |
| 3848 | 3848:BotConn | Origin | 13.00 | 38.27 | -0.03 | -1.07 | 477.99 | 0.15 | 0.0 | -3.81 | 103.85 | 0.02 | -0.16 | 38.64 | 0.00 | 0.00 | 38.80 | 59.7 | 2 |
| 3848 | 3848:BCB | End | 13.50 | 37.75 | -0.03 | -1.05 | 529.91 | 0.16 | 0.0 | -3.81 | 103.85 | 0.02 | -0.16 | 42.23 | 0.00 | 0.00 | 42.38 | 65.2 | 2 |
| 3848 | 3848:BCB | Origin | 13.50 | 37.75 | -0.03 | -1.05 | 529.91 | 0.16 | 0.0 | -11.36 | 20.32 | 0.02 | -0.46 | 42.23 | 0.00 | 0.00 | 42.69 | 65.7 | 2 |
| 3848 | Tube 1 | End | 16.93 | 34.28 | -0.03 | -0.90 | 599.55 | 0.21 | 0.0 | -11.36 | 20.32 | 0.02 | -0.44 | 43.43 | 0.00 | 0.00 | 43.87 | 67.5 | 2 |
| 3848 | Tube 1 | Origin | 16.93 | 34.28 | -0.03 | -0.90 | 599.55 | 0.21 | 0.0 | -11.76 | 20.51 | 0.02 | -0.46 | 43.43 | 0.00 | 0.00 | 43.88 | 67.5 | 2 |
| 3848 | 3848:Arm3 | End | 20.35 | 31.02 | -0.02 | -0.77 | 669.85 | 0.27 | 0.0 | -11.76 | 20.51 | 0.02 | -0.44 | 44.29 | 0.00 | 0.00 | 44.73 | 68.8 | 2 |
| 3848 | 3848:Arm3 | Origin | 20.35 | 31.02 | -0.02 | -0.77 | 673.09 | 0.28 | 0.0 | -14.59 | 24.90 | 0.03 | -0.54 | 44.51 | 0.00 | 0.00 | 45.05 | 69.3 | 2 |
| 3848 | 3848:WVGD2 | End | 21.00 | 30.42 | -0.02 | -0.75 | 689.17 | 0.30 | 0.0 | -14.59 | 24.90 | 0.03 | -0.54 | 44.81 | 0.00 | 0.00 | 45.35 | 69.8 | 2 |
| 3848 | 3848:WVGD2 | Origin | 21.00 | 30.42 | -0.02 | -0.75 | 689.17 | 0.30 | 0.0 | -15.19 | 25.56 | 0.03 | -0.56 | 44.81 | 0.00 | 0.00 | 45.37 | 69.8 | 2 |
| 3848 | Tube 1 | End | 26.00 | 26.05 | -0.02 | -0.59 | 816.94 | 0.43 | 0.0 | -15.19 | 25.56 | 0.03 | -0.53 | 46.88 | 0.00 | 0.00 | 47.41 | 72.9 | 2 |
| 3848 | Tube 1 | Origin | 26.00 | 26.05 | -0.02 | -0.59 | 816.94 | 0.43 | 0.0 | -15.85 | 25.85 | 0.03 | -0.55 | 46.88 | 0.00 | 0.00 | 47.43 | 73.0 | 2 |
| 3848 | 3848:WVGD3 | End | 31.00 | 22.07 | -0.02 | -0.45 | 946.18 | 0.57 | 0.0 | -15.85 | 25.85 | 0.03 | -0.52 | 48.28 | 0.00 | 0.00 | 48.80 | 75.1 | 2 |
| 3848 | 3848:WVGD3 | Origin | 31.00 | 22.07 | -0.02 | -0.45 | 946.18 | 0.57 | 0.0 | -16.62 | 26.57 | 0.03 | -0.54 | 48.28 | 0.00 | 0.00 | 48.82 | 75.1 | 2 |
| 3848 | 3848:Arm4 | End | 33.60 | 20.15 | -0.02 | -0.39 | 1015.37 | 0.63 | 0.0 | -16.62 | 26.57 | 0.03 | -0.53 | 48.86 | 0.00 | 0.00 | 49.39 | 76.0 | 2 |
| 3848 | 3848:Arm4 | Origin | 33.60 | 20.15 | -0.02 | -0.39 | 1018.58 | 0.64 | 0.0 | -19.74 | 30.99 | 0.04 | -0.63 | 49.01 | 0.00 | 0.00 | 49.64 | 76.4 | 2 |
| 3848 | Tube 1 | End | 37.30 | 17.61 | -0.01 | -0.32 | 1133.19 | 0.78 | 0.0 | -19.74 | 30.99 | 0.04 | -0.60 | 50.32 | 0.00 | 0.00 | 50.92 | 78.3 | 2 |
| 3848 | Tube 1 | Origin | 37.30 | 17.61 | -0.01 | -0.32 | 1133.19 | 0.78 | 0.0 | -20.29 | 31.23 | 0.04 | -0.62 | 50.32 | 0.00 | 0.00 | 50.94 | 78.4 | 2 |
| 3848 | 3848:WVGD4 | End | 41.00 | 15.28 | -0.01 | -0.26 | 1248.66 | 0.91 | 0.0 | -20.29 | 31.23 | 0.04 | -0.60 | 51.32 | 0.00 | 0.00 | 51.92 | 79.9 | 2 |
| 3848 | 3848:WVGD4 | Origin | 41.00 | 15.28 | -0.01 | -0.26 | 1248.66 | 0.91 | 0.0 | -20.98 | 31.90 | 0.04 | -0.62 | 51.32 | 0.00 | 0.00 | 51.94 | 79.9 | 2 |
| 3848 | SpliceT | End | 42.92 | 14.15 | -0.01 | -0.23 | 1309.81 | 0.98 | 0.0 | -20.98 | 31.90 | 0.04 | -0.61 | 51.78 | 0.00 | 0.00 | 52.39 | 80.6 | 2 |
| 3848 | SpliceT | Origin | 42.92 | 14.15 | -0.01 | -0.23 | 1309.81 | 0.98 | 0.0 | -21.82 | 32.14 | 0.03 | -0.63 | 51.78 | 0.00 | 0.00 | 52.41 | 80.6 | 2 |
| 3848 | SpliceB | End | 47.50 | 11.66 | -0.01 | -0.17 | 1457.10 | 1.14 | 0.0 | -21.82 | 32.14 | 0.03 | -0.51 | 45.67 | 0.00 | 0.00 | 46.19 | 71.1 | 2 |
| 3848 | SpliceB | Origin | 47.50 | 11.66 | -0.01 | -0.17 | 1457.10 | 1.14 | 0.0 | -22.82 | 32.44 | 0.03 | -0.53 | 45.67 | 0.00 | 0.00 | 46.21 | 71.1 | 2 |
| 3848 | 3848:WVGD5 | End | 51.00 | 9.94 | -0.01 | -0.14 | 1570.63 | 1.26 | 0.0 | -22.82 | 32.44 | 0.03 | -0.52 | 46.02 | 0.00 | 0.00 | 46.54 | 71.6 | 2 |
| 3848 | 3848:WVGD5 | Origin | 51.00 | 9.94 | -0.01 | -0.14 | 1570.63 | 1.26 | 0.0 | -23.87 | 33.25 | 0.03 | -0.54 | 46.02 | 0.00 | 0.00 | 46.56 | 71.6 | 2 |
| 3848 | Tube 2 | End | 56.00 | 7.75 | -0.01 | -0.09 | 1736.86 | 1.42 | 0.0 | -23.87 | 33.25 | 0.03 | -0.52 | 46.39 | 0.00 | 0.00 | 46.91 | 72.2 | 2 |
| 3848 | Tube 2 | Origin | 56.00 | 7.75 | -0.01 | -0.09 | 1736.86 | 1.42 | 0.0 | -24.82 | 33.64 | 0.03 | -0.54 | 46.39 | 0.00 | 0.00 | 46.93 | 72.2 | 2 |
| 3848 | 3848:WVGD6 | End | 61.00 | 5.86 | -0.00 | -0.06 | 1905.04 | 1.57 | 0.0 | -24.82 | 33.64 | 0.03 | -0.51 | 46.57 | 0.00 | 0.00 | 47.08 | 72.4 | 2 |
| 3848 | 3848:WVGD6 | Origin | 61.00 | 5.86 | -0.00 | -0.06 | 1905.04 | 1.57 | 0.0 | -25.84 | 34.43 | 0.03 | -0.53 | 46.57 | 0.00 | 0.00 | 47.11 | 72.5 | 2 |
| 3848 | Tube 2 | End | 63.71 | 4.95 | -0.00 | -0.05 | 1998.31 | 1.64 | 0.0 | -25.84 | 34.43 | 0.03 | -0.52 | 46.64 | 0.00 | 0.00 | 47.16 | 72.6 | 2 |
| 3848 | Tube 2 | Origin | 63.71 | 4.95 | -0.00 | -0.05 | 1998.31 | 1.64 | 0.0 | -26.38 | 34.66 | 0.03 | -0.53 | 46.64 | 0.00 | 0.00 | 47.17 | 72.6 | 2 |
| 3848 | SpliceT | End | 66.42 | 4.13 | -0.00 | -0.04 | 2092.19 | 1.72 | 0.0 | -26.38 | 34.66 | 0.03 | -0.52 | 46.67 | 0.00 | 0.00 | 47.19 | 72.6 | 2 |
| 3848 | SpliceT | Origin | 66.42 | 4.13 | -0.00 | -0.04 | 2092.19 | 1.72 | 0.0 | -27.13 | 34.98 | 0.03 | -0.54 | 46.67 | 0.00 | 0.00 | 47.20 | 72.6 | 2 |
| 3848 | 3848:WVGD7 | End | 71.00 | 2.92 | -0.00 | -0.02 | 2252.49 | 1.84 | 0.0 | -27.13 | 34.98 | 0.03 | -0.52 | 46.64 | 0.00 | 0.00 | 47.16 | 72.5 | 2 |
| 3848 | 3848:WVGD7 | Origin | 71.00 | 2.92 | -0.00 | -0.02 | 2252.49 | 1.84 | 0.0 | -28.41 | 35.89 | 0.02 | -0.54 | 46.64 | 0.00 | 0.00 | 47.18 | 72.6 | 2 |
| 3848 | Tube 3 | End | 76.00 | 1.85 | -0.00 | -0.01 | 2431.94 | 1.96 | 0.0 | -28.41 | 35.89 | 0.02 | -0.52 | 46.57 | 0.00 | 0.00 | 47.09 | 72.6 | 2 |
| 3848 | Tube 3 | Origin | 76.00 | 1.85 | -0.00 | -0.01 | 2431.94 | 1.96 | 0.0 | -29.49 | 36.36 | 0.02 | -0.54 | 46.57 | 0.00 | 0.00 | 47.11 | 72.6 | 2 |
| 3848 | 3848:WVGD8 | End | 81.00 | 1.03 | -0.00 | -0.01 | 2613.71 | 2.08 | 0.0 | -29.49 | 36.36 | 0.02 | -0.52 | 46.42 | 0.00 | 0.00 | 46.94 | 73.7 | 2 |
| 3848 | 3848:WVGD8 | Origin | 81.00 | 1.03 | -0.00 | -0.01 | 2613.71 | 2.08 | 0.0 | -30.88 | 37.32 | 0.02 | -0.55 | 46.42 | 0.00 | 0.00 | 46.97 | 73.8 | 2 |
| 3848 | Tube 3 | End | 86.00 | 0.45 | -0.00 | -0.00 | 2800.30 | 2.18 | 0.0 | -30.88 | 37.32 | 0.02 | -0.53 | 46.26 | 0.00 | 0.00 | 46.79 | 74.9 | 2 |
| 3848 | Tube 3 | Origin | 86.00 | 0.45 | -0.00 | -0.00 | 2800.30 | 2.18 | 0.0 | -32.02 | 37.82 | 0.02 | -0.55 | 46.26 | 0.00 | 0.00 | 46.81 | 74.9 | 2 |
| 3848 | 3848:WVGD9 | End | 91.00 | 0.11 | -0.00 | -0.00 | 2989.39 | 2.27 | 0.0 | -32.02 | 37.82 | 0.02 | -0.53 | 46.05 | 0.00 | 0.00 | 46.57 | 76.0 | 2 |
| 3848 | 3848:WVGD9 | Origin | 91.00 | 0.11 | -0.00 | -0.00 | 2989.39 | 2.27 | 0.0 | -33.48 | 38.82 | 0.02 | -0.55 | 46.05 | 0.00 | 0.00 | 46.60 | 76.1 | 2 |
| 3848 | 3848:g | End | 96.00 | 0.00 | 0.00 | 0.00 | 3183.47 | 2.35 | 0.0 | -33.48 | 38.82 | 0.02 | -0.53 | 45.83 | 0.00 | 0.00 | 46.36 | 77.2 | 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. Mom. (ft-k) | Tors. Mom. (ft-k) | Axial Force (kips) | Vert. Shear (kips) | Horz. Shear (kips) | P/A (ksi) | M/S. (ksi) | V/Q. (ksi) | T/R. (ksi) | Res. (ksi) | Max. Usage % | At Pt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Davit1 | Davit1:O | Origin | 0.00 | 52.11 | -0.04 | -2.66 | -1.37 | 0.01 | -0.0 | 0.67 | 0.34 | -0.00 | 0.16 | 2.40 | 0.00 | 0.00 | 2.56 | 3.9 | 1 |
| Davit1 | Davit1:t | End | 4.03 | 52.46 | -0.04 | -7.23 | 0.00 | -0.00 | -0.0 | 0.67 | 0.34 | -0.00 | 0.22 | 0.00 | 0.24 | 0.00 | 0.47 | 0.7 | 3 |
| Davit2 | Davit2:O | Origin | 0.00 | 52.20 | -0.04 | -0.76 | -0.60 | -0.01 | -0.0 | -0.91 | 0.15 | 0.00 | -0.22 | 1.06 | 0.00 | 0.00 | 1.27 | 2.0 | 1 |
| Davit2 | Davit2:t | End | 4.03 | 52.98 | -0.04 | 3.72 | -0.00 | -0.00 | -0.0 | -0.91 | 0.15 | 0.00 | -0.31 | 0.00 | 0.10 | 0.00 | 0.35 | 0.5 | 3 |
| Davit3 | Davit3:O | Origin | 0.00 | 44.62 | -0.03 | -2.40 | -11.61 | 0.06 | 0.0 | 2.04 | 1.36 | -0.01 | 0.17 | 3.22 | 0.00 | 0.00 | 3.39 | 5.2 | 1 |
| Davit3 | #Davit3:0 | End | 4.52 | 44.81 | -0.03 | -7.45 | -5.49 | 0.03 | 0.0 | 2.04 | 1.36 | -0.01 | 0.22 | 2.75 | 0.00 | 0.00 | 2.97 | 4.6 | 1 |
| Davit3 | #Davit3:0 | Origin | 4.52 | 44.81 | -0.03 | -7.45 | -5.49 | 0.03 | -0.0 | 2.04 | 1.21 | -0.01 | 0.22 | 2.75 | 0.00 | 0.00 | 2.97 | 4.6 | 1 |
| Davit3 | Davit3:t | End | 9.03 | 44.99 | -0.03 | -12.54 | 0.00 | -0.00 | -0.0 | 2.04 | 1.21 | -0.01 | 0.34 | 0.00 | 0.42 | 0.00 | 0.80 | 1.2 | 3 |
| Davit4 | Davit4:O | Origin | 0.00 | 44.72 | -0.03 | -0.32 | -8.35 | -0.05 | -0.0 | -2.24 | 0.99 | 0.01 | -0.18 | 2.32 | 0.00 | 0.00 | 2.50 | 3.8 | 1 |
| Davit4 | #Davit4:0 | End | 4.52 | 45.36 | -0.03 | 4.65 | -3.88 | -0.03 | -0.0 | -2.24 | 0.99 | 0.01 | -0.25 | 1.94 | 0.00 | 0.00 | 2.19 | 3.4 | 1 |
| Davit4 | #Davit4:0 | Origin | 4.52 | 45.36 | -0.03 | 4.65 | -3.88 | -0.03 | -0.0 | -2.21 | 0.86 | 0.01 | -0.24 | 1.94 | 0.00 | 0.00 | 2.19 | 3.4 | 1 |
| Davit4 | Davit4:t | End | 9.03 | 46.01 | -0.03 | 9.59 | -0.00 | -0.00 | -0.0 | -2.21 | 0.86 | 0.01 | -0.37 | 0.00 | 0.30 | 0.00 | 0.63 | 1.0 | 3 |
| Davit5 | Davit5:O | Origin | 0.00 | 30.98 | -0.02 | -1.81 | -11.90 | 0.06 | 0.0 | 2.02 | 1.39 | -0.01 | 0.17 | 3.30 | 0.00 | 0.00 | 3.46 | 5.3 | 1 |
| Davit5 | #Davit5:0 | End | 4.52 | 31.16 | -0.02 | -6.01 | -5.63 | 0.03 | 0.0 | 2.02 | 1.39 | -0.01 | 0.22 | 2.82 | 0.00 | 0.00 | 3.04 | 4.7 | 1 |
| Davit5 | #Davit5:0 | Origin | 4.52 | 31.16 | -0.02 | -6.01 | -5.63 | 0.03 | -0.0 | 2.02 | 1.25 | -0.01 | 0.22 | 2.82 | 0.00 | 0.00 | 3.04 | 4.7 | 1 |
| Davit5 | Davit5:t | End | 9.03 | 31.35 | -0.02 | -10.25 | 0.00 | -0.00 | -0.0 | 2.02 | 1.25 | -0.01 | 0.34 | 0.00 | 0.43 | 0.00 | 0.82 | 1.3 | 3 |
| Davit6 | Davit6:O | Origin | 0.00 | 31.06 | -0.02 | 0.27 | -8.67 | -0.05 | -0.0 | -2.22 | 1.03 | 0.01 | -0.18 | 2.40 | 0.00 | 0.00 | 2.59 | 4.0 | 1 |
| Davit6 | #Davit6:0 | End | 4.52 | 31.56 | -0.02 | 4.40 | -4.04 | -0.03 | -0.0 | -2.22 | 1.03 | 0.01 | -0.24 | 2.02 | 0.00 | 0.00 | 2.27 | 3.5 | 1 |
| Davit6 | #Davit6:0 | Origin | 4.52 | 31.56 | -0.02 | 4.40 | -4.04 | -0.03 | -0.0 | -2.20 | 0.89 | 0.01 | -0.24 | 2.02 | 0.00 | 0.00 | 2.26 | 3.5 | 1 |
| Davit6 | Davit6:t | End | 9.03 | 32.06 | -0.03 | 8.50 | -0.00 | -0.00 | -0.0 | -2.20 | 0.89 | 0.01 | -0.37 | 0.00 | 0.31 | 0.00 | 0.65 | 1.0 | 3 |
| Davit7 | Davit7:O | Origin | 0.00 | 20.13 | -0.02 | -1.33 | -12.22 | 0.06 | 0.0 | 2.00 | 1.42 | -0.01 | 0.16 | 3.39 | 0.00 | 0.00 | 3.55 | 5.5 | 1 |
| Davit7 | #Davit7:0 | End | 4.52 | 20.30 | -0.02 | -4.58 | -5.79 | 0.03 | 0.0 | 2.00 | 1.42 | -0.01 | 0.22 | 2.90 | 0.00 | 0.00 | 3.12 | 4.8 | 1 |
| Davit7 | #Davit7:0 | Origin | 4.52 | 20.30 | -0.02 | -4.58 | -5.79 | 0.03 | -0.0 | 2.00 | 1.28 | -0.01 | 0.22 | 2.90 | 0.00 | 0.00 | 3.12 | 4.8 | 1 |
| Davit7 | Davit7:t | End | 9.03 | 20.47 | -0.02 | -7.87 | 0.00 | -0.00 | -0.0 | 2.00 | 1.28 | -0.01 | 0.33 | 0.00 | 0.44 | 0.00 | 0.84 | 1.3 | 3 |
| Davit8 | Davit8:O | Origin | 0.00 | 20.18 | -0.02 | 0.55 | -9.03 | -0.05 | -0.0 | -2.20 | 1.07 | 0.01 | -0.18 | 2.50 | 0.00 | 0.00 | 2.68 | 4.1 | 1 |
| Davit8 | #Davit8:0 | End | 4.52 | 20.54 | -0.02 | 3.73 | -4.21 | -0.03 | -0.0 | -2.20 | 1.07 | 0.01 | -0.24 | 2.11 | 0.00 | 0.00 | 2.35 | 3.6 | 1 |
| Davit8 | #Davit8:0 | Origin | 4.52 | 20.54 | -0.02 | 3.73 | -4.21 | -0.03 | -0.0 | -2.18 | 0.93 | 0.01 | -0.24 | 2.11 | 0.00 | 0.00 | 2.35 | 3.6 | 1 |
| Davit8 | Davit8:t | End | 9.03 | 20.90 | -0.02 | 6.89 | -0.00 | -0.00 | -0.0 | -2.18 | 0.93 | 0.01 | -0.36 | 0.00 | 0.32 | 0.00 | 0.67 | 1.0 | 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) | Holding Usage % | Input Hardware Capacity (kips) | Factored Hardware Capacity (kips) | Hardware Usage % | Max. Usage % |
|---|---|---|---|---|---|---|---|---|
| Clamp1 | 0.740 | 100.00 | 100.00 | 0.74 | 0.00 | 0.00 | 0.00 | 0.74 |
| Clamp2 | 0.916 | 100.00 | 100.00 | 0.92 | 0.00 | 0.00 | 0.00 | 0.92 |
| Clamp3 | 2.348 | 100.00 | 100.00 | 2.35 | 0.00 | 0.00 | 0.00 | 2.35 |
| Clamp4 | 2.343 | 100.00 | 100.00 | 2.34 | 0.00 | 0.00 | 0.00 | 2.34 |
| Clamp5 | 2.347 | 100.00 | 100.00 | 2.35 | 0.00 | 0.00 | 0.00 | 2.35 |
| Clamp6 | 2.344 | 100.00 | 100.00 | 2.34 | 0.00 | 0.00 | 0.00 | 2.34 |
| Clamp7 | 2.347 | 100.00 | 100.00 | 2.35 | 0.00 | 0.00 | 0.00 | 2.35 |
| Clamp8 | 2.344 | 100.00 | 100.00 | 2.34 | 0.00 | 0.00 | 0.00 | 2.34 |
| Clamp9 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Clamp10 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp11 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp12 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp13 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp14 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp15 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp16 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp17 | 0.554 | 100.00 | 100.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.55 |
| Clamp18 | 38.226 | 100.00 | 100.00 | 38.23 | 0.00 | 0.00 | 0.00 | 38.23 |
| Clamp19 | 27.040 | 100.00 | 100.00 | 27.04 | 0.00 | 0.00 | 0.00 | 27.04 |
| Clamp20 | 83.953 | 100.00 | 100.00 | 83.95 | 0.00 | 0.00 | 0.00 | 83.95 |
| Clamp21 | 83.953 | 100.00 | 100.00 | 83.95 | 0.00 | 0.00 | 0.00 | 83.95 |

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

**Summary of Steel Pole Usages:**

| Steel Pole Label | Maximum Usage % | Load Case | Height AGL (ft) | Segment Number | Weight (lbs) |
|---|---|---|---|---|---|
| 3848 | 80.63 | NESC Extreme Wind | 50.8 | 17 | 16194.8 |

**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 Max Load (kips) | Min Plate Thickness (in) | Actual Thickness (in) | Usage % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3848 | NESC Heavy Wind | 1 | -0.586 | 2.189 | -1.602 | 1.602 | 14.076 | 31.512 | 46.588 | -2 | 98.231 | 1.993 | 2.750 | 52.52 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 2 | -1.602 | 1.602 | -2.189 | 0.586 | 14.076 | 21.042 | 31.109 | -2 | 71.358 | 1.629 | 2.750 | 35.07 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 3 | -2.189 | -0.586 | -1.602 | -1.602 | 14.076 | 18.087 | 26.741 | -2 | -62.706 | 1.510 | 2.750 | 30.15 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 4 | -1.602 | -1.602 | -0.586 | -2.189 | 14.076 | 28.629 | 42.326 | -2 | -89.808 | 1.900 | 2.750 | 47.71 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 5 | 0.586 | -2.189 | 1.602 | -1.602 | 14.076 | 28.763 | 42.524 | -2 | -90.144 | 1.904 | 2.750 | 47.94 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 6 | 1.602 | -1.602 | 2.189 | -0.586 | 14.076 | 18.293 | 27.045 | -2 | -63.271 | 1.518 | 2.750 | 30.49 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 7 | 2.189 | 0.586 | 1.602 | 1.602 | 14.076 | 20.836 | 30.804 | -2 | 70.794 | 1.621 | 2.750 | 34.73 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Heavy Wind | 8 | 1.602 | 1.602 | 0.586 | 2.189 | 14.076 | 31.378 | 46.390 | -2 | 97.895 | 1.989 | 2.750 | 52.30 | Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2 |
| 3848 | NESC Extreme Wind | 1 | -0.586 | 2.189 | -1.602 | 1.602 | 14.076 | 46.607 | 68.905 | 2 | 145.604 | 2.424 | 2.750 | 77.68 | |
| 3848 | NESC Extreme Wind | 2 | -1.602 | 1.602 | -2.189 | 0.586 | 14.076 | 30.557 | 45.177 | 2 | 104.368 | 1.963 | 2.750 | 50.93 | |
| 3848 | NESC Extreme Wind | 3 | -2.189 | -0.586 | -1.602 | -1.602 | 14.076 | 29.177 | 43.136 | 2 | -100.294 | 1.918 | 2.750 | 48.63 | |
| 3848 | NESC Extreme Wind | 4 | -1.602 | -1.602 | -0.586 | -2.189 | 14.076 | 45.203 | 66.830 | 2 | -141.455 | 2.387 | 2.750 | 75.34 | |
| 3848 | NESC Extreme Wind | 5 | 0.586 | -2.189 | 1.602 | -1.602 | 14.076 | 45.159 | 66.765 | 2 | -141.344 | 2.386 | 2.750 | 75.26 | |
| 3848 | NESC Extreme Wind | 6 | 1.602 | -1.602 | 2.189 | -0.586 | 14.076 | 29.109 | 43.036 | 2 | -100.108 | 1.915 | 2.750 | 48.52 | |
| 3848 | NESC Extreme Wind | 7 | 2.189 | 0.586 | 1.602 | 1.602 | 14.076 | 30.625 | 45.277 | 2 | 104.554 | 1.965 | 2.750 | 51.04 | |
| 3848 | NESC Extreme Wind | 8 | 1.602 | 1.602 | 0.586 | 2.189 | 14.076 | 46.651 | 68.970 | 2 | 145.714 | 2.425 | 2.750 | 77.75 | |

**Summary of Tubular Davit Usages:**

| Tubular Davit Label | Maximum Usage % | Load Case | Height AGL (ft) | Segment Number | Weight (lbs) |
|---|---|---|---|---|---|
| Davit1 | 9.76 | NESC Heavy Wind | 95.8 | 1 | 49.5 |
| Davit2 | 8.90 | NESC Heavy Wind | 95.8 | 1 | 49.5 |
| Davit3 | 10.19 | NESC Heavy Wind | 89.1 | 1 | 280.0 |
| Davit4 | 9.49 | NESC Heavy Wind | 89.1 | 1 | 280.0 |
| Davit5 | 10.21 | NESC Heavy Wind | 75.8 | 1 | 280.0 |
| Davit6 | 9.52 | NESC Heavy Wind | 75.8 | 1 | 280.0 |
| Davit7 | 10.23 | NESC Heavy Wind | 62.6 | 1 | 280.0 |
| Davit8 | 9.55 | NESC Heavy Wind | 62.6 | 1 | 280.0 |

*** Maximum Stress Summary for Each Load Case

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

| Load Case | Maximum Usage % | Element Label | Element Type |
|---|---|---|---|
| NESC Heavy Wind | 52.52 | 3848 | Base Plate |
| NESC Extreme Wind | 80.63 | 3848 | Steel Pole |

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

| Load Case | Maximum Usage % | Steel Pole Label | Height AGL (ft) | Segment Number |
|---|---|---|---|---|
| NESC Heavy Wind | 33.59 | 3848 | 2.5 | 28 |
| NESC Extreme Wind | 80.63 | 3848 | 50.8 | 17 |

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

| Load Case | Pole Label | Bend Line # | Length (in) | Vertical Load (kips) | X Moment (ft-k) | Y Moment (ft-k) | Bending Stress (ksi) | Bolt Moment Sum (ft-k) | # Bolts Acting On Bend Line | Max Bolt Load For Bend Line (kips) | Minimum Plate Thickness (in) | Usage % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy Wind | 3848 | 1 | 14.076 | 64.700 | 2085.347 | -7.146 | 31.512 | 46.588 | -2 | 98.231 | 1.993 | 52.52 |
| NESC Extreme Wind | 3848 | 8 | 14.076 | 34.080 | 3183.472 | 2.351 | 46.651 | 68.970 | 2 | 145.714 | 2.425 | 77.75 |

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

| Load Case | Maximum Usage % | Tubular Davit Label | Height AGL (ft) | Segment Number |
|---|---|---|---|---|
| NESC Heavy Wind | 10.23 | Davit7 | 62.6 | 1 |
| NESC Extreme Wind | 5.46 | Davit7 | 62.6 | 1 |

**Summary of Insulator Usages:**

| Insulator Label | Insulator Type | Maximum Usage % | Load Case | Weight (lbs) |
|---|---|---|---|---|
| Clamp1 | Clamp | 1.00 | NESC Heavy Wind | 0.0 |
| Clamp2 | Clamp | 1.09 | NESC Heavy Wind | 0.0 |
| Clamp3 | Clamp | 2.60 | NESC Heavy Wind | 0.0 |
| Clamp4 | Clamp | 2.59 | NESC Heavy Wind | 0.0 |
| Clamp5 | Clamp | 2.60 | NESC Heavy Wind | 0.0 |
| Clamp6 | Clamp | 2.59 | NESC Heavy Wind | 0.0 |
| Clamp7 | Clamp | 2.60 | NESC Heavy Wind | 0.0 |
| Clamp8 | Clamp | 2.59 | NESC Heavy Wind | 0.0 |
| Clamp9 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp10 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp11 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp12 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp13 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp14 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp15 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp16 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |
| Clamp17 | Clamp | 1.05 | NESC Heavy Wind | 0.0 |

| | | | | |
|---|---|---|---|---|
| Clamp18 | Clamp | 38.23 | NESC Extreme Wind | 0.0 |
| Clamp19 | Clamp | 27.04 | NESC Extreme Wind | 0.0 |
| Clamp20 | Clamp | 83.95 | NESC Extreme Wind | 0.0 |
| Clamp21 | Clamp | 83.95 | NESC Extreme Wind | 0.0 |

**Loads At Insulator Attachments For All Load Cases:**

| Load Case | Insulator Label | Insulator Type | Structure Attach Label | Structure Attach Load X (kips) | Structure Attach Load Y (kips) | Structure Attach Load Z (kips) | Structure Attach Load Res. (kips) |
|---|---|---|---|---|---|---|---|
| NESC Heavy Wind | Clamp1 | Clamp | Davit1:t | -0.001 | 0.603 | 0.795 | 0.998 |
| NESC Heavy Wind | Clamp2 | Clamp | Davit2:t | -0.001 | 0.659 | 0.872 | 1.093 |
| NESC Heavy Wind | Clamp3 | Clamp | Davit3:t | -0.001 | 1.055 | 2.377 | 2.601 |
| NESC Heavy Wind | Clamp4 | Clamp | Davit4:t | -0.001 | 1.055 | 2.369 | 2.593 |
| NESC Heavy Wind | Clamp5 | Clamp | Davit5:t | -0.001 | 1.054 | 2.377 | 2.600 |
| NESC Heavy Wind | Clamp6 | Clamp | Davit6:t | -0.001 | 1.056 | 2.369 | 2.594 |
| NESC Heavy Wind | Clamp7 | Clamp | Davit7:t | -0.001 | 1.053 | 2.377 | 2.600 |
| NESC Heavy Wind | Clamp8 | Clamp | Davit8:t | -0.001 | 1.057 | 2.369 | 2.594 |
| NESC Heavy Wind | Clamp9 | Clamp | 3848:WVGD1 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp10 | Clamp | 3848:WVGD2 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp11 | Clamp | 3848:WVGD3 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp12 | Clamp | 3848:WVGD4 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp13 | Clamp | 3848:WVGD5 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp14 | Clamp | 3848:WVGD6 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp15 | Clamp | 3848:WVGD7 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp16 | Clamp | 3848:WVGD8 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp17 | Clamp | 3848:WVGD9 | 0.000 | 0.172 | 1.035 | 1.049 |
| NESC Heavy Wind | Clamp18 | Clamp | 3848:TopConn | 0.000 | 10.202 | 0.000 | 10.202 |
| NESC Heavy Wind | Clamp19 | Clamp | 3848:BotConn | 0.000 | -6.739 | 15.906 | 17.275 |
| NESC Heavy Wind | Clamp20 | Clamp | 3848:BCT | 0.000 | 21.987 | 0.000 | 21.987 |
| NESC Heavy Wind | Clamp21 | Clamp | 3848:BCB | 0.000 | -21.987 | 0.000 | 21.987 |
| NESC Extreme Wind | Clamp1 | Clamp | Davit1:t | -0.003 | 0.678 | 0.296 | 0.740 |
| NESC Extreme Wind | Clamp2 | Clamp | Davit2:t | -0.003 | 0.858 | 0.321 | 0.916 |
| NESC Extreme Wind | Clamp3 | Clamp | Davit3:t | -0.007 | 2.030 | 1.179 | 2.348 |
| NESC Extreme Wind | Clamp4 | Clamp | Davit4:t | -0.006 | 2.027 | 1.175 | 2.343 |
| NESC Extreme Wind | Clamp5 | Clamp | Davit5:t | -0.007 | 2.029 | 1.179 | 2.347 |
| NESC Extreme Wind | Clamp6 | Clamp | Davit6:t | -0.006 | 2.028 | 1.175 | 2.344 |
| NESC Extreme Wind | Clamp7 | Clamp | Davit7:t | -0.007 | 2.029 | 1.179 | 2.347 |
| NESC Extreme Wind | Clamp8 | Clamp | Davit8:t | -0.006 | 2.028 | 1.175 | 2.344 |
| NESC Extreme Wind | Clamp9 | Clamp | 3848:WVGD1 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp10 | Clamp | 3848:WVGD2 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp11 | Clamp | 3848:WVGD3 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp12 | Clamp | 3848:WVGD4 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp13 | Clamp | 3848:WVGD5 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp14 | Clamp | 3848:WVGD6 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp15 | Clamp | 3848:WVGD7 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp16 | Clamp | 3848:WVGD8 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp17 | Clamp | 3848:WVGD9 | 0.000 | 0.477 | 0.281 | 0.554 |
| NESC Extreme Wind | Clamp18 | Clamp | 3848:TopConn | 0.000 | 38.226 | 0.000 | 38.226 |
| NESC Extreme Wind | Clamp19 | Clamp | 3848:BotConn | 0.000 | -25.861 | 7.896 | 27.040 |
| NESC Extreme Wind | Clamp20 | Clamp | 3848:BCT | 0.000 | 83.953 | 0.000 | 83.953 |
| NESC Extreme Wind | Clamp21 | Clamp | 3848:BCB | 0.000 | -83.953 | 0.000 | 83.953 |

**Overturning Moments For User Input Concentrated Loads:**

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

| Load Case | Total Tran. Load (kips) | Total Long. Load (kips) | Total Vert. Load (kips) | Transverse Overturning Moment (ft-k) | Longitudinal Overturning Moment (ft-k) | Torsional Moment (ft-k) |
|---|---|---|---|---|---|---|
| NESC Heavy Wind | 12.603 | -0.008 | 41.126 | 1085.758 | 0.650 | 0.000 |
| NESC Extreme Wind | 30.365 | -0.045 | 18.104 | 2763.030 | 3.556 | -0.030 |

*** Weight of structure (lbs):

| | |
|---|---|
| Weight of Tubular Davit Arms: | 1779.3 |
| Weight of Steel Poles: | 16194.8 |
| Total: | 17974.1 |

*** End of Report

## Anchor Bolt Analysis:

### Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 146 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 39 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 16$ (User Input)

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

Bolt Ultimate Strength = $F_u := 100 \cdot ksi$ (User Input)

Bolt Yield Strength = $F_y := 75 \cdot ksi$ (User Input)

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

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

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

### Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.4\ kips$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 750.5\ psi$

Tensile Stress Permitted = $F_t := 0.75 \cdot F_u = 75\ ksi$

Shear Stress Permitted = $F_v := 0.35 \cdot F_u = 35\ ksi$

Permitted Axial Tensile Stress in Conjunction with Shear = $F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 74.98\ ksi$

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 60\%$

Condition1 = $Condition1 := \text{if}\left(\frac{T_{Max}}{F_{tv} \cdot A_s} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition1 = \text{"OK"}$

## Caisson Foundation:

Input Data:

| | | |
|---|---|---|
| Shear Force = | $S := 39.1 \cdot k \cdot 1.1 = 43\ kips$ | USER INPUT-FROM PLS-Pole |
| Overturning Moment = | $M := 3183.5 \cdot ft \cdot k \cdot 1.1 = 3502\ ft \cdot k$ | USER INPUT-FROM PLS-Pole |
| Applied Axial Load = | $A1 := 36.4 \cdot k \cdot 1.1 = 40\ kips$ | USER INPUT-FROM PLS-Pole |
| Bending Moment = | $Mu := 3675 \cdot ft \cdot k$ | USER INPUT--FROM LPILE |
| Moment Capacity = | $Mn := 7416 \cdot ft \cdot k$ | USER INPUT--FROM LPILE |
| Max Shear = | $V_u := 770945 \cdot lb$ | USER INPUT--FROM LPILE |
| Foundation Diameter = | $d := 7 \cdot ft$ | USER INPUT |
| Overall Length of Caisson = | $L_c := 18 \cdot ft$ | USER INPUT |
| Depth From Top of Caisson to Grade = | $L_{pag} := 1.0 \cdot ft$ | USER INPUT |
| Number of Rebar = | $n := 27$ | USER INPUT |
| Area of Rebar = | $Ar := 1.56 \cdot in^2$ | USER INPUT |
| Rebar Yield Strength = | $fy := 60 \cdot ksi$ | USER INPUT |
| Concrete Comp Strength = | $f'c := 3000\ psi$ | USER INPUT |
| Area of Shear Reinforcement = | $A_v := 1.2 \cdot in^2$ | USER INPUT = (2)*(Area of #7) per 11.4.7.3 |
| Spacing of Shear Reinforcement = | $s := 8 \cdot in$ | |

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9 \cdot Mn}{Mu} = 1.82$

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

$FOSCheck := \text{if}\ (FS \geq FS_{reqd}, \text{"OK"}, \text{"NO GOOD"})$

$FOSCheck = \text{"OK"}$

$\frac{FS_{reqd}}{FS} = 55.1\%$

Check Shear Capacity:

Shear Strength Reduction Factor = $\phi := 0.75$

Area of Concrete Pier = $A_c := \frac{1}{4} \cdot \pi \cdot d^2 = 5542\ in^2$

Nominal Shear Strength by Concrete = $V_c := 2 \cdot \sqrt{f'c} \cdot psi \cdot A_c = 607\ kips$

Nominal Shear Strength by Steel = $V_s := \frac{(A_v \cdot fy \cdot 0.8 \cdot d)}{s} = 605\ kips$

Design Shear Strength = $\phi V_n := \phi \cdot (V_c + V_s) = 909\ kips$

$ShearCheck := \text{if}\ (\phi V_n \geq V_u, \text{"OK"}, \text{"NO GOOD"})$

$ShearCheck = \text{"OK"}$

$\frac{V_u}{\phi V_n} = 84.8\%$

================================================================================

LPile for Windows, Version 2022-12.010

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method


================================================================================

This copy of LPile is being used by:

Centek
Centek

Serial Number of Security Device: 156264506



--------------------------------------------------------------------------------
Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\Jobs\2202100.WI\02_CT2267\05_Structural\Tower\Backup Documentation\Rev (2)\Calcs\MathCAD\Foundation\

Name of input data file:
Caisson Analysis.lp12d

Name of output report file:
Caisson Analysis.lp12o

Name of plot output file:
Caisson Analysis.lp12p

Name of runtime message file:
Caisson Analysis.lp12r

--------------------------------------------------------------------------------

Date and Time of Analysis

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Date:  February 26, 2024          Time:  14:29:56

---

Problem Title

---

22021.02/ CT2267 - Orange/ Pole # 3848

Job Number:

Client:

Engineer:

Description:

---

Program Options and Settings

---

Computational Options:
 - Conventional Analysis
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)

```
Analysis Control Options:
 - Maximum number of iterations allowed                =          250
 - Deflection tolerance for convergence                =   1.0000E-05 in
 - Maximum allowable deflection                        =     100.0000 in
 - Number of pile increments                           =          100
```

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Use of p-y modification factors for p-y curves not selected
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Compute pile-head foundation stiffness matrix
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:
- Output files use decimal points to denote decimal symbols.
- Report only summary tables of pile-head deflection, maximum bending moment, and maximum shear force in output report file.
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

---

## Pile Structural Properties and Geometry

---

Number of pile sections defined = 1
Total length of pile = 18.000 ft
Depth of ground surface below top of pile = 1.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

| Point No. | Depth Below Pile Head feet | Pile Diameter inches |
|---|---|---|
| 1 | 0.000 | 84.0000 |
| 2 | 18.000 | 84.0000 |

Input Structural Properties for Pile Sections:

---

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 18.000000 ft

```
   Shaft Diameter                                        =    84.000000 in



--------------------------------------------------------------------------------
                Control Data for Pile-head Stiffness Computations
--------------------------------------------------------------------------------

  Computation Method 0 - Use loads from Load Case 1

  Number of K-matrix points to generate                  =           10
  Point distribution method                              = logarithmic distribution



--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 2 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer             =     1.000000 ft
   Distance from top of pile to bottom of layer          =    11.000000 ft
   Effective unit weight at top of layer                 =   100.224000 pcf
   Effective unit weight at bottom of layer              =   100.224000 pcf
   Friction angle at top of layer                        =    30.000000 deg.
   Friction angle at bottom of layer                     =    30.000000 deg.
   Subgrade k at top of layer                            =    90.000000 pci
   Subgrade k at bottom of layer                         =    90.000000 pci


Layer 2 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer             =    11.000000 ft
   Distance from top of pile to bottom of layer          =    18.000000 ft
   Effective unit weight at top of layer                 =   134.784000 pcf
   Effective unit weight at bottom of layer              =   134.784000 pcf
   Uniaxial compressive strength at top of layer         =   250.000000 psi
   Uniaxial compressive strength at bottom of layer      =   250.000000 psi
   Initial modulus of rock at top of layer               =      500000. psi
   Initial modulus of rock at bottom of layer            =      500000. psi
   RQD of rock at top of layer                           =    50.000000 %
   RQD of rock at bottom of layer                        =    50.000000 %
   k rm of rock at top of layer                          =    0.0005000
   k rm of rock at bottom of layer                       =    0.0005000
```

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

---

## Summary of Input Soil Properties

---

| Layer Num. | Soil Type Name or (p-y Curve Type) | Layer Depth ft | Effective Unit Wt. pcf | Angle of Friction deg. | Uniaxial qu psi | RQD % | E50 or krm | kpy pci | Rock Mass Modulus psi |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Sand | 1.0000 | 100.2240 | 30.0000 | -- | -- | -- | 90.0000 | -- |
| | (Reese, et al.) | 11.0000 | 100.2240 | 30.0000 | -- | -- | -- | 90.0000 | -- |
| 2 | Weak | 11.0000 | 134.7840 | -- | 250.0000 | 50.0000 | 5.00E-04 | -- | 500000. |
| | Rock | 18.0000 | 134.7840 | -- | 250.0000 | 50.0000 | 5.00E-04 | -- | 500000. |

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## Static Loading Type

---

Static loading criteria were used when computing p-y curves for all analyses.

---

## Pile-head Loading and Pile-head Fixity Conditions

---

Number of loads specified = 1

| Load No. | Load Type | Condition 1 | Condition 2 | Axial Thrust Force, lbs | Compute Top y vs. Pile Length | Run Analysis |
|---|---|---|---|---|---|---|
| 1 | 1 | V = 43000. lbs | M = 42024000. in-lbs | 40000. | No | Yes |

V = shear force applied normal to pile axis

M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

---

## Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

### Pile Section No. 1:

### Dimensions and Properties of Drilled Shaft (Bored Pile):

| | | |
|---|---|---|
| Length of Section | = | 18.000000 ft |
| Shaft Diameter | = | 84.000000 in |
| Concrete Cover Thickness (to edge of long. rebar) | = | 2.295327 in |
| Number of Reinforcing Bars | = | 27 bars |
| Yield Stress of Reinforcing Bars | = | 60000. psi |
| Modulus of Elasticity of Reinforcing Bars | = | 29000000. psi |
| Gross Area of Shaft | = | 5542. sq. in. |
| Total Area of Reinforcing Steel | = | 42.120000 sq. in. |
| Area Ratio of Steel Reinforcement | = | 0.76 percent |
| Edge-to-Edge Bar Spacing | = | 7.645171 in |
| Maximum Concrete Aggregate Size | = | 0.750000 in |
| Ratio of Bar Spacing to Aggregate Size | = | 10.19 |
| Offset of Center of Rebar Cage from Center of Pile | = | 0.0000 in |

### Axial Structural Capacities:

| | | |
|---|---|---|
| Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As | = | 16551.306 kips |
| Tensile Load for Cracking of Concrete | = | -2132.635 kips |
| Nominal Axial Tensile Capacity | = | -2527.200 kips |

Reinforcing Bar Dimensions and Positions Used in Computations:

| Bar Number | Bar Diam. inches | Bar Area sq. in. | X inches | Y inches |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| ---------- | ---------- | ---------- | ---------- | ---------- |
| 1 | 1.410000 | 1.560000 | 38.999673 | 0.00000 |
| 2 | 1.410000 | 1.560000 | 37.948431 | 8.993943 |
| 3 | 1.410000 | 1.560000 | 34.851380 | 17.503021 |
| 4 | 1.410000 | 1.560000 | 29.875482 | 25.068506 |
| 5 | 1.410000 | 1.560000 | 23.288990 | 31.282542 |
| 6 | 1.410000 | 1.560000 | 15.446981 | 35.810128 |
| 7 | 1.410000 | 1.560000 | 6.772222 | 38.407180 |
| 8 | 1.410000 | 1.560000 | -2.26763 | 38.933691 |
| 9 | 1.410000 | 1.560000 | -11.18523 | 37.361277 |
| 10 | 1.410000 | 1.560000 | -19.49984 | 33.774707 |
| 11 | 1.410000 | 1.560000 | -26.76320 | 28.367334 |
| 12 | 1.410000 | 1.560000 | -32.58375 | 21.430670 |
| 13 | 1.410000 | 1.560000 | -36.64770 | 13.338674 |
| 14 | 1.410000 | 1.560000 | -38.73597 | 4.527586 |
| 15 | 1.410000 | 1.560000 | -38.73597 | -4.52759 |
| 16 | 1.410000 | 1.560000 | -36.64770 | -13.33867 |
| 17 | 1.410000 | 1.560000 | -32.58375 | -21.43067 |
| 18 | 1.410000 | 1.560000 | -26.76320 | -28.36733 |
| 19 | 1.410000 | 1.560000 | -19.49984 | -33.77471 |
| 20 | 1.410000 | 1.560000 | -11.18523 | -37.36128 |
| 21 | 1.410000 | 1.560000 | -2.26763 | -38.93369 |
| 22 | 1.410000 | 1.560000 | 6.772222 | -38.40718 |
| 23 | 1.410000 | 1.560000 | 15.446981 | -35.81013 |
| 24 | 1.410000 | 1.560000 | 23.288990 | -31.28254 |
| 25 | 1.410000 | 1.560000 | 29.875482 | -25.06851 |
| 26 | 1.410000 | 1.560000 | 34.851380 | -17.50302 |
| 27 | 1.410000 | 1.560000 | 37.948431 | -8.99394 |

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 7.645 inches
between bars 18 and 19.

Ratio of bar spacing to maximum aggregate size = 10.19

Concrete Properties:
--------------------

| | | |
|---|---|---|
| Compressive Strength of Concrete | = | 3000. psi |
| Modulus of Elasticity of Concrete | = | 3122019. psi |
| Modulus of Rupture of Concrete | = | -410.79192 psi |
| Compression Strain at Peak Stress | = | 0.001634 |
| Tensile Strain at Fracture of Concrete | = | -0.0001160 |
| Maximum Coarse Aggregate Size | = | 0.750000 in |

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

| Number | Axial Thrust Force kips |
| --- | --- |
| 1 | 40.000 |

---

Summary of Results for Nominal Moment Capacity for Section 1

---

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

| Load No. | Axial Thrust kips | Nominal Mom. Cap. in-kip | Max. Comp. Strain | Max. Tens. Strain |
| --- | --- | --- | --- | --- |
| 1 | 40.000 | 88993.752 | 0.00300000 | -0.01470111 |

Note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318,
or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding
bending stiffnesses computed for common resistance factor values used for
reinforced concrete sections.

| Axial Load No. | Resist. Factor | Nominal Ax. Thrust kips | Nominal Moment Cap in-kips | Ult. (Fac) Ax. Thrust kips | Ult. (Fac) Moment Cap in-kips | Bend. Stiff. at Ult Mom kip-in^2 |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 0.65 | 40.000000 | 88994. | 26.000000 | 57846. | 1.8481E+09 |
| 1 | 0.75 | 40.000000 | 88994. | 30.000000 | 66745. | 1.7948E+09 |

MAX CAPACITY = 88994 IN-KIPS /12 = 7,416 FT-KIPS

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 0.90 | 40.000000 | 88994. | 36.000000 | 80094. | 1.2199E+09 |

---

## Layering Correction Equivalent Depths of Soil & Rock Layers

---

| Layer No. | Top of Layer Below Pile Head ft | Equivalent Top Depth Below Grnd Surf ft | Same Layer Type As Layer Above | Layer is Rock or is Below Rock Layer | F0 Integral for Layer lbs | F1 Integral for Layer lbs |
|---|---|---|---|---|---|---|
| 1 | 1.0000 | 0.00 | N.A. | No | 0.00 | 327706. |
| 2 | 11.0000 | 10.0000 | No | Yes | N.A. | N.A. |

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

---

## Summary of Pile-head Responses for Conventional Analyses

---

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

| Load Case No. | Load Type 1 | Pile-head Load 1 | Load Type 2 | Pile-head Load 2 | Axial Loading lbs | Pile-head Deflection inches | Pile-head Rotation radians | Max Shear in Pile lbs | Max Moment in Pile in-lbs |
|---|---|---|---|---|---|---|---|---|---|
| 1 | V, lb | 43000. | M, in-lb | 4.20E+07 | 40000. | 2.0079 | -0.01331 | -770945. | 4.41E+07 |

MAX MOMENT = 44100000 IN-LBS /12000 = 3,675 FT-KIPS

MAX SHEAR = 770945 LBS

Maximum pile-head deflection = 2.0079130672 inches
Maximum pile-head rotation = -0.0133135993 radians = -0.762813 deg.

---

Computed Pile-head Stiffness Matrix Values
K[2,2], K[2,3], K[3,2], K[3,3] for Pile Head

---

Computations are based on the pile-head loads defined in Load Case 1

The K[2,2] and K[3,2] stiffnesses are computed using the specified pile-head shear force and rotation (Type 2) pile-head condition.

K[2,2] = abs(Shear Reaction/Top y)     K[3,2] = abs(Moment Reaction/Top y)

| Pile-Top Deflection inches | Pile-Top Rotation radians | Pile-Top Shear Reac. lbs | Pile-Top Mom. Reac. in-lbs | K[2,2] V/y lb/in. | K[3,2] M/y in-lb/in. |
|---|---|---|---|---|---|
| 0.0001558 | 0.00000 | 4300. | 346249. | 27599899. | 2222428597. |
| 0.0006281 | 0.00000 | 15950. | 1319107. | 25395227. | 2100270671. |
| 0.0009485 | 0.00000 | 22765. | 1916286. | 23999590. | 2020246210. |
| 0.0011905 | 0.00000 | 27600. | 2348378. | 23182648. | 1972541994. |
| 0.0013908 | 0.00000 | 31350. | 2690596. | 22541244. | 1934580741. |
| 0.0015553 | 0.00000 | 34414. | 2970454. | 22127766. | 1909939350. |
| 0.0017037 | 0.00000 | 37005. | 3212172. | 21721073. | 1885455046. |
| 0.0018319 | 0.00000 | 39250. | 3421153. | 21426167. | 1867591757. |
| 0.0019559 | 0.00000 | 41229. | 3611513. | 21079516. | 1846481951. |
| 0.0020645 | 0.00000 | 43000. | 3780466. | 20827937. | 1831146862. |

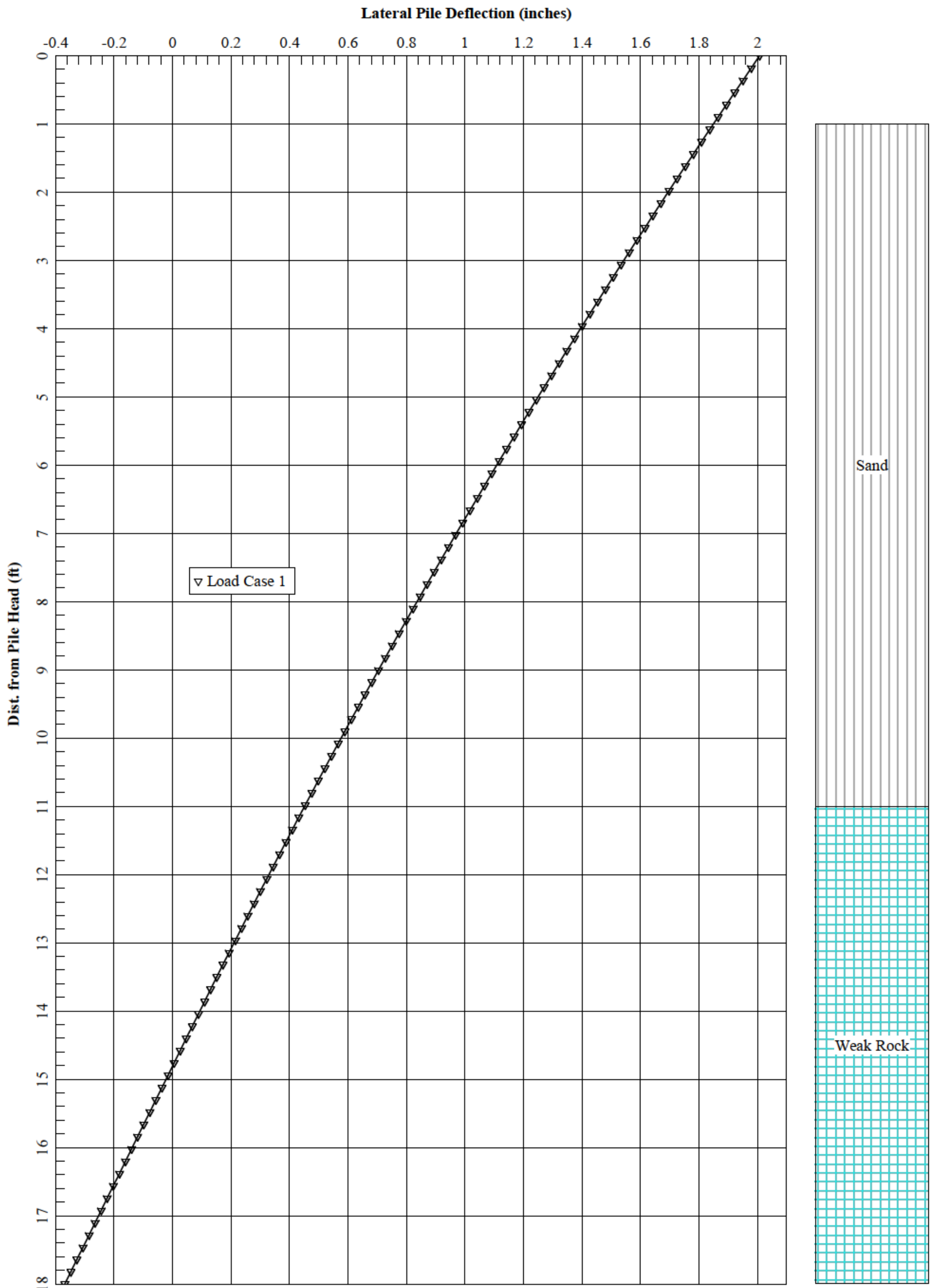
The K[2,3] and K[3,3] stiffnesses are computed using the specified deflection and moment (Type 4) pile-head condition.

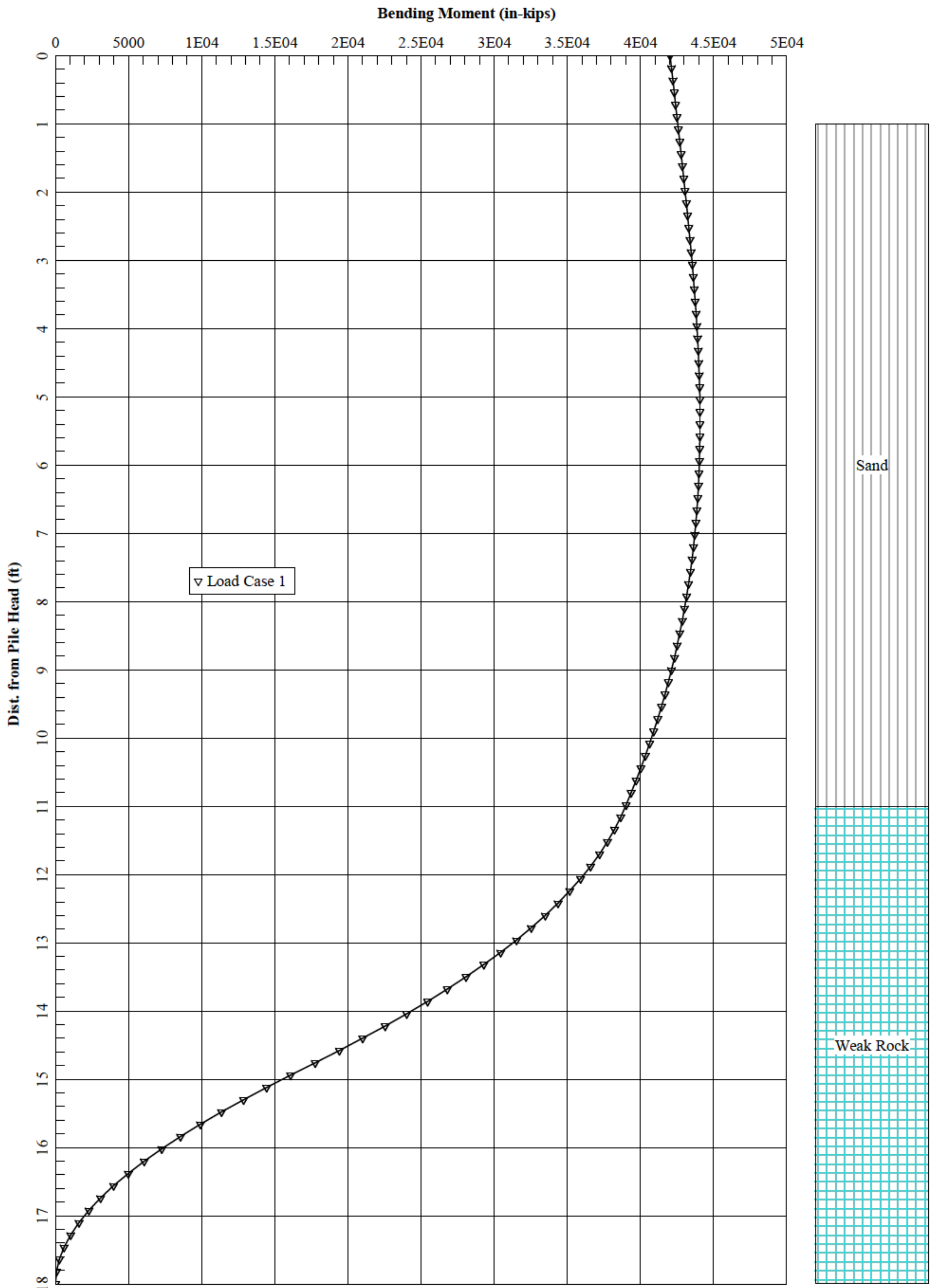
K[2,3] = abs(Shear Force/Top Rotation)     K[3,3] = abs(Moment/Top Rotation)

| Pile-Top Deflection inches | Pile-Top Rotation radians | Pile-Top Shear Reac. lbs | Pile-Top Mom. Reac. in-lbs | K[2,3] V/rot. lb/rad | K[3,3] M/rot. in-lb/rad |
|---|---|---|---|---|---|
| 0.00000 | 0.00001858 | 36856. | 4202400. | 1983280859. | 2.26140E+11 |
| 0.00000 | 0.00008048 | 118472. | 15587836. | 1472088484. | 1.93688E+11 |
| 0.00000 | 0.0001214 | 159842. | 22247889. | 1316505726. | 1.83240E+11 |
| 0.00000 | 0.0002849 | 189211. | 26973272. | 664160609. | 9.46804E+10 |
| 0.00000 | 0.0004880 | 214654. | 30638564. | 439877761. | 6.27857E+10 |
| 0.00000 | 0.0006203 | 235110. | 33633325. | 379021732. | 5.42203E+10 |
| 0.00000 | 0.0007368 | 252680. | 36165360. | 342933102. | 4.90830E+10 |

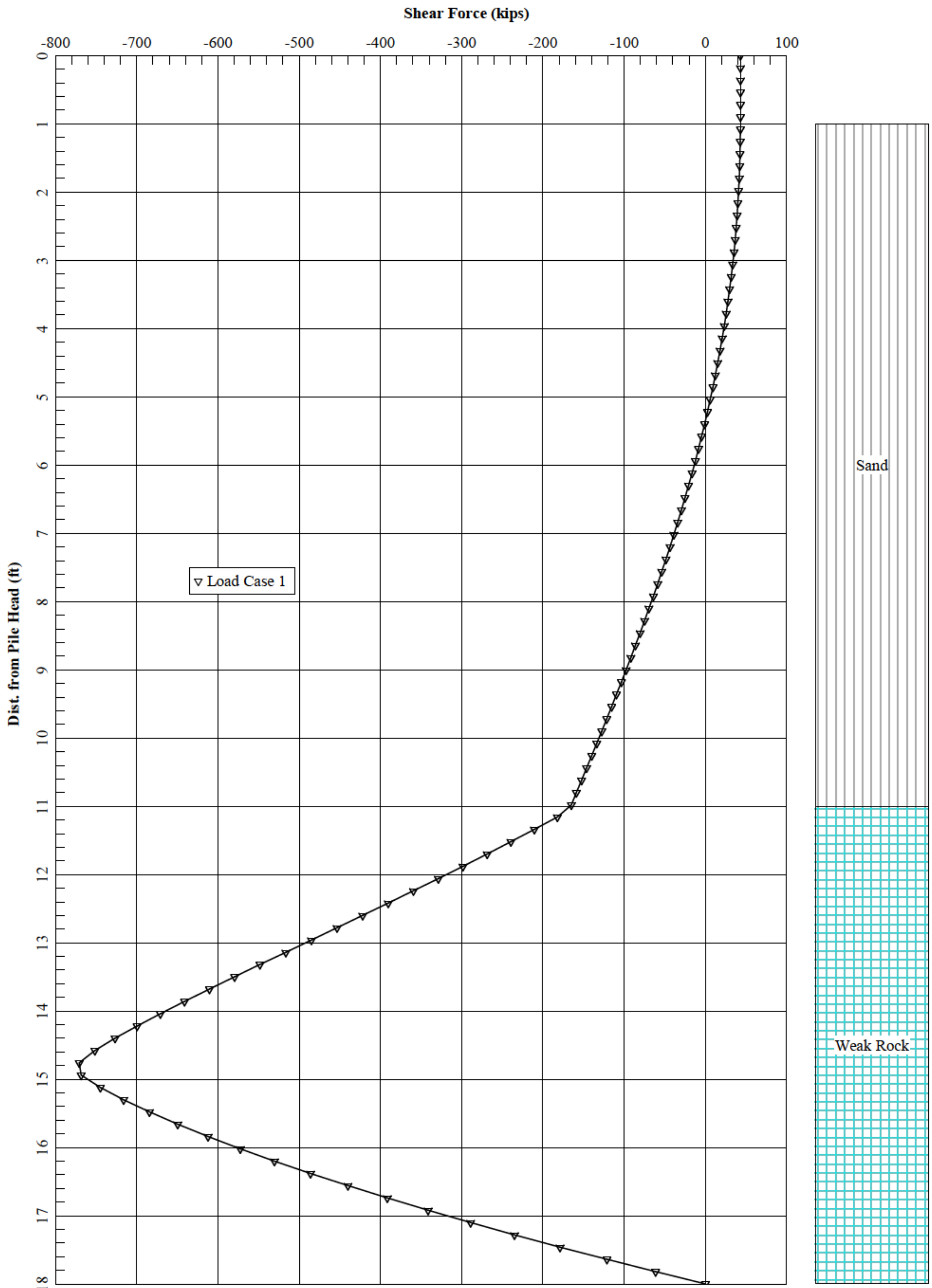
| | | | | | |
|---|---|---|---|---|---|
| 0.00000 | 0.0008315 | 267660. | 38358708. | 321908643. | 4.61331E+10 |
| 0.00000 | 0.0009092 | 280555. | 40293378. | 308585157. | 4.43190E+10 |
| 0.00000 | 0.0009716 | 291697. | 42024000. | 300229309. | 4.32532E+10 |

The analysis ended normally.


Lateral Pile Deflection (inches)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Dist. from Pile Head (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Load Case 1
Sand
Weak Rock



Bending Moment (in-kips)
0
5000
1E04
1.5E04
2E04
2.5E04
3E04
3.5E04
4E04
4.5E04
5E04
Dist. from Pile Head (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Load Case 1
Sand
Weak Rock


Shear Force (kips)
-800
-700
-600
-500
-400
-300
-200
-100
0
100
Dist. from Pile Head (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Load Case 1
Sand
Weak Rock

## Section 1 - RFDS GENERAL INFORMATION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RFDS NAME: | CT2267 | DATE: | 9/30/2014 | RF DESIGN ENG: | Md Mateen | RF PERF ENG: | |
| ISSUE: | Bronze Standard | Approved? (Y/N): | Yes | RF DESIGN PHONE: | 8602586382 | RF PERF PHONE: | |
| REVISION: | Final | RF MANAGER: | Cameron Syme | RF DESIGN EMAIL: | MM093Q@ATT.COM | RF PERF EMAIL: | |

C-Band, DoD and Multicarrier SOW

| | | | | | |
|---|---|---|---|---|---|
| RFDS PROGRAM TYPE: | 2021 5G NR Radio | | | | |
| RFDS TECHNOLOGY: | 5G NR 1SR CBAND | | | | |
| STATE/STATUS: | Final/Approved | | | | |
| ADDITIONAL WORKFLOW NOTIFICATIONS: | | RFDS ID: | 4732036 | | |
| RFDS VERSION: | 5.00 | Created By: | mh705r | Updated By: | mh705r |
| UMTS FREQUENCY: | 850,1900 | Created: | 9/8/2021 | Updated: | 1/14/2022 |
| LTE FREQUENCY: | 700,1900 | Estimated SQIN: | 15,899 | Expiration: | |
| 5G FREQUENCY: | | RER Initiative: | | Calculation ID: | 20211110081655120 3 |
| IPLAN JOB # 1: | ER_-RCTB-21-02099 | PRD \|\| SUB GRP #1: | 5G NR Radio \|\| 5G NR 1SR CBand | | |
| IPLAN JOB # 2: | ER_-RCTB-21-01255 | PRD \|\| SUB GRP #2: | Cell Site RF Modifications \|\| BBU Add | | |
| IPLAN JOB # 3: | ER_-RCTB-21-01169 | PRD \|\| SUB GRP #3: | Cell Site RF Modifications \|\| 5G NR Upgrade | | |
| IPLAN JOB # 4: | ER_-RCTB-21-00540 | PRD \|\| SUB GRP #4: | 5G NR Radio \|\| 5G NR 1DR-1 | | |
| IPLAN JOB # 5: | ER_-RCTB-21-00492 | PRD \|\| SUB GRP #5: | LTE Software Carrier \|\| LTE 4C | | |
| IPLAN JOB # 6: | ER_-RCTB-21-00429 | PRD \|\| SUB GRP #6: | LTE Next Carrier \|\| LTE 3C | | |
| IPLAN JOB # 7: | ER_-RCTB-21-00936 | PRD \|\| SUB GRP #7: | 5G NR Software Radio \|\| 5G NR Activation | | |
| IPLAN JOB # 8: | ER_-RCTB-21-00893 | PRD \|\| SUB GRP #8: | 5G NR Radio \|\| 5G NR 1SR CBand | | |

## Section 2 - LOCATION INFORMATION

| | | | | | |
|---|---|---|---|---|---|
| USID: | 135348 | FA LOCATION CODE: | 10141359 | LOCATION NAME: | ORANGE CT RIDGE ROAD |
| REGION: | NORTHEAST | MARKET CLUSTER: | NEW ENGLAND | MARKET: | CONNECTICUT |
| ADDRESS: | 298 RIDGE ROAD | CITY: | ORANGE | STATE: | CT |
| ZIP CODE: | 06477 | COUNTY: | NEW HAVEN | LONG (DEC. DEG.): | -73.0442600 |
| LATITUDE (D-M-S): | 41d 15m 30.456s | LONGITUDE (D-M-S): | -73d -2m -39.336s | LAT (DEC. DEG.): | 41.2584600 |

DIRECTIONS, ACCESS AND EQUIPMENT LOCATION: FROM HARTFORD, TAKE RT 91 SOUTH TO EXIT 17 ROUTE 15 SOUTH. TAKE EXIT 56 AND TURN RIGHT ONTO GRASSY HILL ROAD. TURN LEFT ONTO CLARK LANE. TAKE SECOND RIGHT ONTO RIDGE ROAD. RRU'S ARE IN THE SHELTER, ALL COAX UP THE POLE. THE COMBO IS 0043 ON THE GATE, 12345678 DOOR COMBO. 5509 NU GATE.

| | | | | | |
|---|---|---|---|---|---|
| ORACLE PRJT # 1: | 2051A103L7 | PACE JOB #1: | MRCTB052645 | | |
| ORACLE PRJT # 2: | 2051A0Z70W | PACE JOB #2: | MRCTB051144 | | |
| ORACLE PRJT # 3: | 2051A0Z7EF | PACE JOB #3: | MRCTB050790 | | |
| ORACLE PRJT # 4: | 2051A0Z74D | PACE JOB #4: | MRCTB051256 | | |
| ORACLE PRJT # 5: | 2051A0Z7E5 | PACE JOB #5: | MRCTB050915 | | |
| ORACLE PRJT # 6: | 2051A0Z794 | PACE JOB #6: | MRCTB051353 | | |
| ORACLE PRJT # 7: | | PACE JOB #7: | MRCTB051426 | | |
| ORACLE PRJT # 8: | 2051A0Z7QX | PACE JOB #8: | MRCTB051476 | | |
| BORDER CELL WITH CONTOUR COORD: | | SEARCH RING NAME: | | | |
| AM STUDY REQ'D (Y/N): | No | SEARCH RING ID: | | | |
| FREQ COORD: | | BTA: | | MSA / RSA: | |
| | | | | | |
| | | LAC(UMTS): | 05991 | | |
| RF DISTRICT: | TBD | | | | |
| RF ZONE: | TBD | RNC(UMTS): | BRIDGEPORT RNC05 | | |
| | | MME POOL ID(LTE): | FF01 | | |
| PARENT NAME(UMTS): | BRPTCT04CR0R05 | | | | |

## Section 3 - LICENSE COVERAGE/FILING INFORMATION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| COBA - NO FILING TRIGGERED (Yes/No): | No | COBA LOSS: | | PCS REDUCED - UPS ZIP: | | COBA CALL SIGNS: | |
| COBA - MINOR FILING NEEDED (Yes/No): | No | COBA EXT AGMT NEEDED: | | PCS POPS REDUCED: | | | |
| COBA - MAJOR FILING NEEDED (Yes/No): | Yes | COBA SCORECARD UPDATED: | | | | | |

## Section 4 - TOWER/REGULATORY INFORMATION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STRUCTURE AT&T OWNED?: | Yes | GROUND ELEVATION (ft): | 0 | STRUCTURE TYPE: | UTILITY | MARKET LOCATION 700 MHz Band: | |
| ADDITIONAL REGULATORY?: | Yes | HEIGHT OVERALL (ft): | 97.50 | FCC ASR NUMBER: | 0 | MARKET LOCATION 850 MHz Band: | |
| SUB-LEASE RIGHTS?: | Yes | STRUCTURE HEIGHT (ft): | 97.50 | | | MARKET LOCATION 1900 MHz Band: | |
| LIGHTING TYPE: | NOT REQUIRED | | | | | MARKET LOCATION AWS Band: | |
| | | | | | | MARKET LOCATION WCS Band: | |
| | | | | | | MARKET LOCATION Future Band: | |

## Section 5 - E-911 INFORMATION - existing

| | PSAP NAME: | PSAP ID: | E911 PHASE: | MPC SVC PROVIDER: | LMU REQUIRED: | ESRN: | DATE LIVE PH1: | DATE LIVE PH2: |
|---|---|---|---|---|---|---|---|---|
| SECTOR A E-911 | | | | INTRADO | | 0 | | |
| SECTOR B | | | | INTRADO | | 0 | | |
| SECTOR C | | | | INTRADO | | 0 | | |
| SECTOR D | | | | | | | | |
| SECTOR E | | | | | | | | |
| SECTOR F | | | | | | | | |
| OMNI | | | | | | | | |

## Section 5 - E-911 INFORMATION - final

| | PSAP NAME: | PSAP ID: | E911 PHASE: | MPC SVC PROVIDER: | LMU REQUIRED: | ESRN: | DATE LIVE PH1: | DATE LIVE PH2: |
|---|---|---|---|---|---|---|---|---|
| SECTOR A E-911 | | | | INTRADO | | 0 | | |
| SECTOR B | | | | INTRADO | | 0 | | |
| SECTOR C | | | | INTRADO | | 0 | | |
| SECTOR D | | | | | | | | |
| SECTOR E | | | | | | | | |
| SECTOR F | | | | | | | | |
| OMNI | | | | | | | | |

## Section 6/7 - BBU INFORMATION - existing

| | BBU 1 | BBU 2 |
|---|---|---|
| BBU ID: | 333304 | 458566 |
| TECHNOLOGY: | UMTS | LTE |
| BBU NAME: | CTU2267 | CTL02267 |
| BBU USID: | 135348 | 135348 |
| CELL ID / BCF: | CTU2267 | CTL02267 |
| BTA/TID: | 318W | 318L |
| 4-9 DIGIT SITE ID: | 2267 | 2267 |
| COW OR TOY?: | No | No |
| CELL SITE TYPE: | SECTORIZED | SECTORIZED |
| SITE TYPE: | MACRO-CONVENTIONAL | MACRO-CONVENTIONAL |
| BTS LOCATION ID: | INTERNAL | INTERNAL |
| BASE STATION TYPE: | BASE | OVERLAY |
| EQUIPMENT NAME: | NORTH STREET, MILFORD CT UMTS | NORTH STREET, MILFORD CT LTE |
| DISASTER PRIORITY: | 0 | 0 |
| EQUIPMENT VENDOR: | ERICSSON | ERICSSON |
| EQUIPMENT TYPE (Model): | | 6601 INDOOR MU |
| BASEBAND CONFIGURATION : | | |
| MARKET STATE CODE: | | CT |
| NODE B NUMBER: | 0 | 2267 |
| SIDEHAUL SWITCH VENDOR: | | |
| SIDEHAUL SWITCH MODEL: | | |
| SIDEHAUL SWITCH NAME: | | |
| CSS - CTS COMMON ID: | CTU2267 | CTL02267 |
| CSS - SECONDARY FUNCTION ID: | | |

## Section 6/7 - BBU INFORMATION - final

| | BBU 1 | BBU 2 |
|---|---|---|
| BBU ID: | 458566 | 0 |
| TECHNOLOGY: | LTE | LTE,5G |
| BBU NAME: | CTL02267 | CTL06267R,CTCN002267 |
| BBU USID: | 135348 | 135348 |
| CELL ID / BCF: | CTL02267 | CTCN002267 |
| BTA/TID: | 318L | 321L |
| 4-9 DIGIT SITE ID: | 2267 | 2267 |
| COW OR TOY?: | No | No |
| CELL SITE TYPE: | SECTORIZED | SECTORIZED |
| SITE TYPE: | MACRO-CONVENTIONAL | MACRO-CONVENTIONAL |
| BTS LOCATION ID: | INTERNAL | INTERNAL |
| BASE STATION TYPE: | OVERLAY | OVERLAY |
| EQUIPMENT NAME: | NORTH STREET, MILFORD CT LTE | NORTH STREET, MILFORD CT LTE |
| DISASTER PRIORITY: | 0 | 0 |
| EQUIPMENT VENDOR: | ERICSSON | ERICSSON |
| EQUIPMENT TYPE (Model): | BASEBAND 6630 | BASEBAND 6630 |
| BASEBAND CONFIGURATION : | 1x6601 / 1x6630 / 1xXMU03 | xxxxx / 1x6630 / xxxxx + IDLe |
| MARKET STATE CODE: | CT | CT,CTC |
| NODE B NUMBER: | 2267 | 6267,2267 |
| SIDEHAUL SWITCH VENDOR: | | |
| SIDEHAUL SWITCH MODEL: | | |
| SIDEHAUL SWITCH NAME: | | |
| CSS - CTS COMMON ID: | CTL02267 | |
| CSS - SECONDARY FUNCTION ID: | | |

## Section 7b - Radio INFORMATION - existing

## Section 7b - Radio INFORMATION - final

## Section 8 - RBS/SECTOR ASSOCIATION - existing

| | BBU 1 | BBU 2 |
|---|---|---|
| CTS Common ID | CTU2267 | CTL02267 |
| Soft Sector IDs | CTU22677 | CTL02267_7A_1 |
| | CTU22678 | CTL02267_7B_1 |
| | CTU22679 | CTL02267_7C_1 |
| | CTV22671 | CTL02267_9A_1 |
| | CTV22672 | CTL02267_9A_2 |
| | CTV22673 | CTL02267_9B_1 |
| | CTV2267A | CTL02267_9B_2 |
| | CTV2267B | CTL02267_9C_1 |
| | CTV2267C | CTL02267_9C_2 |

## Section 8 - RBS/SECTOR ASSOCIATION - final

| | BBU 1 | BBU 2 |
|---|---|---|
| CTS Common ID | CTL02267 | CTL06267R,CTCN002267 |
| Soft Sector IDs | CTL02267_7A_1 | CTCN002267_N002A_1 |
| | CTL02267_7A_3_F | CTCN002267_N002B_1 |
| | CTL02267_7B_1 | CTCN002267_N002C_1 |
| | CTL02267_7B_3_F | CTCN002267_N005A_1 |
| | CTL02267_7C_1 | CTCN002267_N005B_1 |
| | CTL02267_7C_3_F | CTCN002267_N005C_1 |
| | | CTCN002267_N066A_1 |
| | | CTCN002267_N066B_1 |
| | | CTCN002267_N066C_1 |
| | | CTL06267_2A_2 |
| | | CTL06267_2B_2 |
| | | CTL06267_2C_2 |
| | | CTL06267_9A_1 |
| | | CTL06267_9A_2 |
| | | CTL06267_9B_1 |
| | | CTL06267_9B_2 |
| | | CTL06267_9C_1 |
| | | CTL06267_9C_2 |

## Section 9 - SOFT SECTOR ID - existing

| | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 2ND 1900 | LTE 4TH 1900 | LTE 4TH AWS | LTE 5TH 700 | 5G 1ST 850 | 5G 1ST 1900 | 5G 1ST AWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USBID (excluding Hard Sector) | 135348.850.3G.1 | 135348.1900.3G.1 | 135348.850.3G.2 | | | | | | | | | |
| SECTOR A SOFT SECTOR ID | CTV22671 | CTU22677 | CTV2267A | CTL02267_7A_1 | CTL02267_9A_1 | CTL02267_9A_2 | | | | | | |
| SECTOR B | CTV22672 | CTU22678 | CTV2267B | CTL02267_7B_1 | CTL02267_9B_1 | CTL02267_9B_2 | | | | | | |
| SECTOR C | CTV22673 | CTU22679 | CTV2267C | CTL02267_7C_1 | CTL02267_9C_1 | CTL02267_9C_2 | | | | | | |
| SECTOR D | | | | | | | | | | | | |
| SECTOR E | | | | | | | | | | | | |
| SECTOR F | | | | | | | | | | | | |
| OMNI | | | | | | | | | | | | |

## Section 9 - SOFT SECTOR ID - final

| | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 2ND 1900 | LTE 4TH 1900 | LTE 4TH AWS | LTE 5TH 700 | 5G 1ST 850 | 5G 1ST 1900 | 5G 1ST AWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USBID (excluding Hard Sector) | | | | | | | | | | | | |
| SECTOR A SOFT SECTOR ID | | | | CTL02267_7A_1 | CTL06267_9A_1 | | CTL06267_9A_2 | CTL06267_2A_2 | CTL02267_7A_3_F | CTCN002267_N005 | CTCN002267_N002 | CTCN002267_N066A_1 |
| SECTOR B | | | | CTL02267_7B_1 | CTL06267_9B_1 | | CTL06267_9B_2 | CTL06267_2B_2 | CTL02267_7B_3_F | CTCN002267_N005 | CTCN002267_N002 | CTCN002267_N066B_1 |
| SECTOR C | | | | CTL02267_7C_1 | CTL06267_9C_1 | | CTL06267_9C_2 | CTL06267_2C_2 | CTL02267_7C_3_F | CTCN002267_N005 | CTCN002267_N002 | CTCN002267_N066C_1 |
| SECTOR D | | | | | | | | | | | | |
| SECTOR E | | | | | | | | | | | | |
| SECTOR F | | | | | | | | | | | | |
| OMNI | | | | | | | | | | | | |

## Section 9 - Cell Number - existing

| | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 2ND 1900 | LTE 4TH 1900 | LTE 4TH AWS | LTE 5TH 700 | 5G 1ST 850 | 5G 1ST 1900 | 5G 1ST AWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USBID (excluding Hard Sector) | 135348.850.3G.1 | 135348.1900.3G.1 | 135348.850.3G.2 | | | | | | | | | |
| SECTOR A CELL NUMBER | | | | 15 | 8 | 178 | | | | | | |
| SECTOR B | | | | 16 | 9 | 179 | | | | | | |
| SECTOR C | | | | 17 | 10 | 180 | | | | | | |
| SECTOR D | | | | | | | | | | | | |
| SECTOR E | | | | | | | | | | | | |
| SECTOR F | | | | | | | | | | | | |
| OMNI | | | | | | | | | | | | |

## Section 9 - Cell Number - final

| | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 2ND 1900 | LTE 4TH 1900 | LTE 4TH AWS | LTE 5TH 700 | 5G 1ST 850 | 5G 1ST 1900 | 5G 1ST AWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USBID (excluding Hard Sector) | | | | | | | | | | | | |
| SECTOR A CELL NUMBER | | | | 15 | 8 | | 178 | 192 | 171 | 25 | 26 | 27 |
| SECTOR B | | | | 16 | 9 | | 179 | 193 | 172 | 49 | 50 | 51 |
| SECTOR C | | | | 17 | 10 | | 180 | 194 | 173 | 73 | 74 | 75 |
| SECTOR D | | | | | | | | | | | | |
| SECTOR E | | | | | | | | | | | | |
| SECTOR F | | | | | | | | | | | | |
| OMNI | | | | | | | | | | | | |

## Section 10 - CID/SAC - existing

| | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 2ND 1900 | LTE 4TH 1900 | LTE 4TH AWS | LTE 5TH 700 | 5G 1ST 850 | 5G 1ST 1900 | 5G 1ST AWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SECTOR A CID/SAC | 22671 | 22677 | 22674 | | | | | | | | | |
| SECTOR B | 22672 | 22678 | 22675 | | | | | | | | | |
| SECTOR C | 22673 | 22679 | 22676 | | | | | | | | | |
| SECTOR D | | | | | | | | | | | | |
| SECTOR E | | | | | | | | | | | | |
| SECTOR F | | | | | | | | | | | | |
| OMNI | | | | | | | | | | | | |

## Section 10 - CID/SAC - final

| | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 2ND 1900 | LTE 4TH 1900 | LTE 4TH AWS | LTE 5TH 700 | 5G 1ST 850 | 5G 1ST 1900 | 5G 1ST AWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SECTOR A CID/SAC | | | | | | | | | | | | |
| SECTOR B | | | | | | | | | | | | |
| SECTOR C | | | | | | | | | | | | |
| SECTOR D | | | | | | | | | | | | |
| SECTOR E | | | | | | | | | | | | |
| SECTOR F | | | | | | | | | | | | |
| OMNI | | | | | | | | | | | | |

## Section 15A - CURRENT TOWER CONFIGURATION - SECTOR A (OR OMNI)

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | | ANTENNA POSITION 6 | | ANTENNA POSITION 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA MAKE - MODEL | SBNH-1D6565C | | SBNH-1D6565C | | SBNH-1D6565C | | OPA-65R-LCUU-H8 | | | | | | | |
| ANTENNA VENDOR | Andrew | | Andrew | | Andrew | | CCI Products | | | | | | | |
| ANTENNA SIZE (H x W x D) | 96.4X11.9X7.1 | | 96.4X11.9X7.1 | | 96.4X11.9X7.1 | | 92.7X14.4X7 | | | | | | | |
| ANTENNA WEIGHT | 60.8 | | 60.8 | | 60.8 | | 88 | | | | | | | |
| AZIMUTH | 70 | | 70 | | 70 | | 70 | | | | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | | | | |
| RADIATION CENTER (feet) | 111 | | 111 | | 111 | | 111 | | | | | | | |
| ANTENNA TIP HEIGHT | 115 | | 115 | | 115 | | 115 | | | | | | | |
| MECHANICAL DOWNTILT | 0 | | 0 | | 0 | | 0 | | | | | | | |
| FEEDER AMOUNT | 4 | | 2 | | 2 | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | Built in | | Built in | | Built in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | | | | | 6 | APTDC-BDFDM-DBW | | | | | | |
| DIPLEXER (QTY/MODEL) | 2 | CM1007-DBPXBC-003 | | CM1007-DBPXBC-003 | | CM1007-DBPXBC-003 | 2 | CM1007-DBPXBC-003 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | 1 | Powerwave 7070 | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | AISG Diplexer | | | | | | AISG Diplexer | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | | | | | 1 | RRUS-11 B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | | | | | 1 | RRUS-12 B2 + RRUS-A2 B25 | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 1 | PORT 1 | | 135348.A.850.3G.1 | CTV22671 | CTV22671 | | UMTS 850 | 1D6565C_850MHz_04DT | 13.41 | 70 | 4 | Bottom | Commscope 1-5/8 (850) | 140 | | | | | | 635.33 | | 1 | |
| | PORT 2 | | 135348.A.850.3G.2 | CTV2267A | CTV2267A | | UMTS 850 | 1D6565C_850MHz_04DT | 13.41 | 70 | 4 | Bottom | Commscope 1-5/8 (850) | 140 | | | | | | 635.33 | | 1 | |
| | PORT 3 | | 135348.A.1900.3G.1 | CTU22677 | CTU22677 | | UMTS 1900 | 1D6565C_1950MHz_04DT | 17 | 70 | 4 | Bottom | Commscope 1-5/8 (1900) | 140 | | | | | | 1172.2 | | 2 | |
| ANTENNA POSITION 2 | PORT 1 | | | | | | GSM | | | 70 | 0 | | | | | | | | | | | | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | GSM | | | 70 | 0 | | | | | | | | | | | | |
| ANTENNA POSITION 4 | PORT 1 | | 135348.A.700.4G.1 | CTL02267_7A_1 | CTL02267_7A_1 | | LTE 700 | H8_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 7 | |
| | PORT 3 | | 135348.A.1900.4G.1 | CTL02267_9A_1 | CTL02267_9A_1 | | LTE 1900 | H8_1948MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.8483 | | 8 | |
| | PORT 4 | | 135348.A.1900.4G.2 | CTL02267_9A_2 | CTL02267_9A_2 | | LTE 1900 | H8_1948MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.8483 | | 8 | |

## Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | | ANTENNA POSITION 6 | | ANTENNA POSITION 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA MAKE - MODEL | SBNH-1D6565C | | SBNH-1D6565C | | SBNH-1D6565C | | OPA-65R-LCUU-H8 | | | | | | | |
| ANTENNA VENDOR | Andrew | | Andrew | | Andrew | | CCI Products | | | | | | | |
| ANTENNA SIZE (H x W x D) | 96.4X11.9X7.1 | | 96.4X11.9X7.1 | | 96.4X11.9X7.1 | | 92.7X14.4X7 | | | | | | | |
| ANTENNA WEIGHT | 60.8 | | 60.8 | | 60.8 | | 88 | | | | | | | |
| AZIMUTH | 190 | | 190 | | 190 | | 190 | | | | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | | | | |
| RADIATION CENTER (feet) | 111 | | 111 | | 111 | | 111 | | | | | | | |
| ANTENNA TIP HEIGHT | 115 | | 115 | | 115 | | 115 | | | | | | | |
| MECHANICAL DOWNTILT | 0 | | 0 | | 0 | | 0 | | | | | | | |
| FEEDER AMOUNT | 4 | | 2 | | 2 | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | Built in | | Built in | | Built in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | | | | | 6 | APTDC-BDFDM-DBW | | | | | | |
| DIPLEXER (QTY/MODEL) | 2 | CM1007-DBPXBC-003 | | CM1007-DBPXBC-003 | | CM1007-DBPXBC-003 | 2 | CM1007-DBPXBC-003 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | AISG Diplexer | | | | | | AISG Diplexer | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | | | | | 1 | RRUS-11 B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | | | | | 1 | RRUS-12 B2 + RRUS-A2 B25 | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 1 | PORT 1 | | 135348.B.850.3G.1 | CTV22672 | CTV22672 | | UMTS 850 | 1D6565C_850MHz_04DT | 13.41 | 190 | 4 | Bottom | Commscope 1-5/8 (850) | 140 | | | | | | 635.33 | | 9 | |
| | PORT 2 | | 135348.B.850.3G.2 | CTV2267B | CTV2267B | | UMTS 850 | 1D6565C_850MHz_04DT | 13.41 | 190 | 4 | Bottom | Commscope 1-5/8 (850) | 140 | | | | | | 635.33 | | 9 | |
| | PORT 3 | | 135348.B.1900.3G.1 | CTU22678 | CTU22678 | | UMTS 1900 | 1D6565C_1950MHz_04DT | 17 | 190 | 4 | Bottom | Commscope 1-5/8 (1900) | 140 | | | | | | 1172.2 | | 10 | |
| ANTENNA POSITION 2 | PORT 1 | | | | | | GSM | | | 190 | 0 | | | | | | | | | | | | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | GSM | | | 190 | 0 | | | | | | | | | | | | |
| ANTENNA POSITION 4 | PORT 1 | | 135348.B.700.4G.1 | CTL02267_7B_1 | CTL02267_7B_1 | | LTE 700 | H8_719MHz_04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 15 | |
| | PORT 3 | | 135348.B.1900.4G.1 | CTL02267_9B_1 | CTL02267_9B_1 | | LTE 1900 | H8_1948MHz_03DT | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.8483 | | 16 | |
| | PORT 4 | | 135348.B.1900.4G.2 | CTL02267_9B_2 | CTL02267_9B_2 | | LTE 1900 | H8_1948MHz_03DT | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.8483 | | 16 | |

## Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | | ANTENNA POSITION 6 | | ANTENNA POSITION 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA MAKE - MODEL | SBNH-1D6565C | | SBNH-1D6565C | | SBNH-1D6565C | | OPA-65R-LCUU-H8 | | | | | | | |
| ANTENNA VENDOR | Andrew | | Andrew | | Andrew | | CCI Products | | | | | | | |
| ANTENNA SIZE (H x W x D) | 96.4X11.9X7.1 | | 96.4X11.9X7.1 | | 96.4X11.9X7.1 | | 92.7X14.4X7 | | | | | | | |
| ANTENNA WEIGHT | 60.8 | | 60.8 | | 60.8 | | 88 | | | | | | | |
| AZIMUTH | 310 | | 310 | | 310 | | 310 | | | | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | | | | |
| RADIATION CENTER (feet) | 111 | | 111 | | 111 | | 111 | | | | | | | |
| ANTENNA TIP HEIGHT | 115 | | 115 | | 115 | | 115 | | | | | | | |
| MECHANICAL DOWNTILT | 0 | | 0 | | 0 | | 0 | | | | | | | |
| FEEDER AMOUNT | 4 | | 2 | | 2 | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | Built in | | Built in | | Built in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | | | | | 6 | APTDC-BDFDM-DBW | | | | | | |
| DIPLEXER (QTY/MODEL) | 2 | CM1007-DBPXBC-003 | | CM1007-DBPXBC-003 | | CM1007-DBPXBC-003 | 2 | CM1007-DBPXBC-003 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | 1 | 12A (Twin 700/850 Bypass) | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | AISG Diplexer | | | | | | AISG Diplexer | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | | | | | 1 | RRUS-11 B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | | | | | 1 | RRUS-12 B2 + RRUS-A2 B25 | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 1 | PORT 1 | | 135348.C.850.3G.1 | CTV22673 | CTV22673 | | UMTS 850 | 1D6565C_850MHz_04DT | 13.41 | 310 | 4 | Bottom | Commscope 1-5/8 (850) | 140 | | | | | | 635.33 | | 17 | |
| | PORT 2 | | 135348.C.850.3G.2 | CTV2267C | CTV2267C | | UMTS 850 | 1D6565C_850MHz_04DT | 13.41 | 310 | 4 | Bottom | Commscope 1-5/8 (850) | 140 | | | | | | 635.33 | | 17 | |
| | PORT 3 | | 135348.C.1900.3G.1 | CTU22679 | CTU22679 | | UMTS 1900 | 1D6565C_1950MHz_04DT | 17 | 310 | 4 | Bottom | Commscope 1-5/8 (1900) | 140 | | | | | | 1172.2 | | 18 | |
| ANTENNA POSITION 2 | PORT 1 | | | | | | GSM | | | 310 | 0 | | | | | | | | | | | | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | GSM | | | 310 | 0 | | | | | | | | | | | | |
| ANTENNA POSITION 4 | PORT 1 | | 135348.C.700.4G.1 | CTL02267_7C_1 | CTL02267_7C_1 | | LTE 700 | H8_719MHz_04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 23 | |
| | PORT 3 | | 135348.C.1900.4G.1 | CTL02267_9C_1 | CTL02267_9C_1 | | LTE 1900 | H8_1948MHz_03DT | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.8483 | | 24 | |
| | PORT 4 | | 135348.C.1900.4G.2 | CTL02267_9C_2 | CTL02267_9C_2 | | LTE 1900 | H8_1948MHz_03DT | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.8483 | | 24 | |

## Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | | ANTENNA POSITION 6 | | ANTENNA POSITION 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing Antenna? | | | | | | | | | | | | | | |
| ANTENNA MAKE - MODEL | | | TPA65R-BU8DA-K | | AIR6449 B77D+AIR6419 B77G STACKED | | DMP65R-BU8DA | | | | | | | |
| ANTENNA VENDOR | | | CCI | | Ericsson | | CCI | | | | | | | |
| ANTENNA SIZE (H x W x D) | | | 96X20.7X7.7 | | 30.4X15.9X8.1 | | 96.0X20.7X7.7 | | | | | | | |
| ANTENNA WEIGHT | | | 87.1 | | 81.6 | | 95.7 | | | | | | | |
| AZIMUTH | | | 70 | | 70 | | 70 | | | | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | | | | |
| RADIATION CENTER (feet) | | | 111 | | 111 | | 111 | | | | | | | |
| ANTENNA TIP HEIGHT | | | 115 | | 115 | | 115 | | | | | | | |
| MECHANICAL DOWNTILT | | | 0 | | 0 | | 0 | | | | | | | |
| FEEDER AMOUNT | | | | | Fiber | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | | | Built in | | Built-in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | 12 | TSXDC-4310FM | | | 8 | TSXDC-4310FM | | | | | | |
| DIPLEXER (QTY/MODEL) | | | 2 | CBC61923T-DS-43 | | | 2 | DBC0115F1V91-2 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | | | 1 | TMA2124F03V5-2D | | | 2 | TMA2104F00V1-1 | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | | | | | | | | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | 1 | DC6-48-60-18 | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | 1 | 4478 B14 | | | 1 | 4449 B5/B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | with another band | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | 1 | 8843 B2/B66A | | | | | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | with another band | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6449 B77D | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6419 B77G | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | 2 | K SBT 782-11055 | | | 2 | K SBT 782-11055 | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | 2 | APTDC-BDFDM-DB | | | 2 | APTDC-BDFDM-DB | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | - Follow Antenna and radios positions as per PD.<br>- Decom UMTS and remove unused line elements. | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | 2x6630+1xXMU+IDLe+6648+Xcede. | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 2 | PORT 1 | | | CTL02267_7A_3_F | CTL02267_7A_3_F | | LTE 700 | K_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 3 | |
| | PORT 3 | | | CTL06267_9A_1 | CTL06267_9A_1 | | LTE 1900 | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 4 | | | CTL06267_9A_2 | CTL06267_9A_2 | | LTE 1900 | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 7 | | | CTL06267_2A_2 | CTL06267_2A_2 | | LTE AWS | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 8 | | | CTCN002267_N066A_1 | CTCN002267_N066A_1 | | 5G AWS | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 11 | | | CTCN002267_N002A_1 | CTCN002267_N002A_1 | | 5G 1900 | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | 5G CBAND | | | 70 | 0 | Integrated | Fiber | 0 | | | | | | | | 5 | |
| ANTENNA POSITION 4 | PORT 1 | | | CTL02267_7A_1 | CTL02267_7A_1 | | LTE 700 | BU8DA_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 7 | |
| | PORT 2 | | | CTCN002267_N005A_1 | CTCN002267_N005A_1 | | 5G 850 | BU8DA_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 7 | |

# Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | | ANTENNA POSITION 6 | | ANTENNA POSITION 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing Antenna? | | | | | | | | | | | | | | |
| ANTENNA MAKE - MODEL | | | TPA65R-BU8DA-K | | AIR6449 B77D+AIR6419 B77G STACKED | | DMP65R-BU8DA | | | | | | | |
| ANTENNA VENDOR | | | CCI | | Ericsson | | CCI | | | | | | | |
| ANTENNA SIZE (H x W x D) | | | 96X20.7X7.7 | | 30.4X15.9X8.1 | | 96.0X20.7X7.7 | | | | | | | |
| ANTENNA WEIGHT | | | 87.1 | | 81.6 | | 95.7 | | | | | | | |
| AZIMUTH | | | 190 | | 190 | | 190 | | | | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | | | | |
| RADIATION CENTER (feet) | | | 111 | | 111 | | 111 | | | | | | | |
| ANTENNA TIP HEIGHT | | | 115 | | 115 | | 115 | | | | | | | |
| MECHANICAL DOWNTILT | | | 0 | | 0 | | 0 | | | | | | | |
| FEEDER AMOUNT | | | | | Fiber | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | | | Built in | | Built-in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | 12 | TSXDC-4310FM | | | 8 | TSXDC-4310FM | | | | | | |
| DIPLEXER (QTY/MODEL) | | | 2 | CBC61923T-DS-43 | | | 2 | DBC0115F1V91-2 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | | | 1 | TMA2124F03V5-2D | | | 2 | TMA2104F00V1-1 | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | | | | | | | | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | 1 | 4478 B14 | | | 1 | 4449 B5/B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | with another band | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | 1 | 8843 B2/B66A | | | | | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | with another band | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6449 B77D | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6419 B77G | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | 2 | K SBT 782-11055 | | | 2 | K SBT 782-11055 | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | 2 | APTDC-BDFDM-DB | | | 2 | APTDC-BDFDM-DB | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | - Follow Antenna and radios positions as per PD.<br>- Decom UMTS and remove unused line elements. | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | 2x6630+1xXMU+IDLe+6648+Xcede. | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RX/AIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 2 | PORT 1 | | | CTL02267_7B_3_F | CTL02267_7B_3_F | | LTE 700 | K_719MHz_04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 11 | |
| | PORT 3 | | | CTL06267_9B_1 | CTL06267_9B_1 | | LTE 1900 | K_1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 4 | | | CTL06267_9B_2 | CTL06267_9B_2 | | LTE 1900 | K_1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 7 | | | CTL06267_2B_2 | CTL06267_2B_2 | | LTE AWS | K_1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 8 | | | CTCN002267_N066B_1 | CTCN002267_N066B_1 | | 5G AWS | K_1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 11 | | | CTCN002267_N002B_1 | CTCN002267_N002B_1 | | 5G 1900 | K_1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | 5G CBAND | | | 190 | 0 | Integrated | Fiber | 0 | | | | | | | | 13 | |
| ANTENNA POSITION 4 | PORT 1 | | | CTL02267_7B_1 | CTL02267_7B_1 | | LTE 700 | BU8DA_719MHz_04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 15 | |
| | PORT 2 | | | CTCN002267_N005B_1 | CTCN002267_N005B_1 | | 5G 850 | BU8DA_719MHz_04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 15 | |

## Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing Antenna? | | | | | | | | | | | |
| ANTENNA MAKE - MODEL | | | TPA65R-BU8DA-K | | AIR6449 B77D+AIR6419 B77G STACKED | | DMP65R-BU8DA | | | | |
| ANTENNA VENDOR | | | CCI | | Ericsson | | CCI | | | | |
| ANTENNA SIZE (H x W x D) | | | 96X20.7X7.7 | | 30.4X15.9X8.1 | | 96.0X20.7X7.7 | | | | |
| ANTENNA WEIGHT | | | 87.1 | | 81.6 | | 95.7 | | | | |
| AZIMUTH | | | 310 | | 310 | | 310 | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | |
| RADIATION CENTER (feet) | | | 111 | | 111 | | 111 | | | | |
| ANTENNA TIP HEIGHT | | | 115 | | 115 | | 115 | | | | |
| MECHANICAL DOWNTILT | | | 0 | | 0 | | 0 | | | | |
| FEEDER AMOUNT | | | | | Fiber | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | | | Built in | | Built-in | | Built in | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | 12 | TSXDC-4310FM | | | 8 | TSXDC-4310FM | | | |
| DIPLEXER (QTY/MODEL) | | | 2 | CBC61923T-DS-43 | | | 2 | DBC0115F1V91-2 | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | | | 1 | TMA2124F03V5-2D | | | 2 | TMA2104F00V1-1 | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | | | | | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | 1 | 4478 B14 | | | 1 | 4449 B5/B12 | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | with another band | | | |
| RRH - 1900 band (QTY/MODEL) | | | 1 | 8843 B2/B66A | | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | with another band | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6449 B77D | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6419 B77G | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | 2 | K SBT 782-11055 | | | 2 | K SBT 782-11055 | | | |
| Additional Component 2 (QTY/MODEL) | | | 2 | APTDC-BDFDM-DB | | | 2 | APTDC-BDFDM-DB | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | |
| Local Market Note 1 | - Follow Antenna and radios positions as per PD.<br>- Decom UMTS and remove unused line elements. | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | |
| Local Market Note 3 | 2x6630+1xXMU+IDLe+6648+Xcede. | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 2 | PORT 1 | | | CTL02267_7C_3_F | CTL02267_7C_3_F | | LTE 700 | K _719MHz_04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 19 | |
| | PORT 3 | | | CTL06267_9C_1 | CTL06267_9C_1 | | LTE 1900 | K _1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 4 | | | CTL06267_9C_2 | CTL06267_9C_2 | | LTE 1900 | K _1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 7 | | | CTL06267_2C_2 | CTL06267_2C_2 | | LTE AWS | K _1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 8 | | | CTCN002267_N066C_1 | CTCN002267_N066C_1 | | 5G AWS | K _1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 11 | | | CTCN002267_N002C_1 | CTCN002267_N002C_1 | | 5G 1900 | K _1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | 5G CBAND | | | 310 | 0 | Integrated | Fiber | 0 | | | | | | | | 21 | |
| ANTENNA POSITION 4 | PORT 1 | | | CTL02267_7C_1 | CTL02267_7C_1 | | LTE 700 | BU8DA_719MHz _04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 23 | |
| | PORT 2 | | | CTCN002267_N005C_1 | CTCN002267_N005C_1 | | 5G 850 | BU8DA_719MHz _04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 23 | |

# Section 16.5A - SCOPING TOWER CONFIGURATION - SECTOR A (OR OMNI)

# Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | ANTENNA POSITION 2 | ANTENNA POSITION 3 | ANTENNA POSITION 4 | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|---|---|---|---|---|---|---|---|
| ANTENNA MAKE - MODEL | | TPA65R-BU8DA-K | AIR6449 B77D+AIR6419 B77G STACKED | DMP65R-BU8DA | | | |
| ANTENNA VENDOR | | CCI | Ericsson | CCI | | | |
| ANTENNA SIZE (H x W x D) | | 96X20.7X7.7 | 30.4X15.9X8.1 | 96.0X20.7X7.7 | | | |
| ANTENNA WEIGHT | | 87.1 | 81.8 | 95.7 | | | |
| AZIMUTH | | 70 | 70 | 70 | | | |
| MAGNETIC DECLINATION | | | | | | | |
| RADIATION CENTER (feet) | | 111 | 111 | 111 | | | |
| ANTENNA TIP HEIGHT | | 115 | 115 | 115 | | | |
| MECHANICAL DOWNTILT | | 0 | 0 | 0 | | | |
| FEEDER AMOUNT | | 4 | Fiber | 4 | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | |

| | Pos. 1 QTY | Pos. 1 MODEL | Pos. 2 QTY | Pos. 2 MODEL | Pos. 3 QTY | Pos. 3 MODEL | Pos. 4 QTY | Pos. 4 MODEL | Pos. 5 QTY | Pos. 5 MODEL | Pos. 6 QTY | Pos. 6 MODEL | Pos. 7 QTY | Pos. 7 MODEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | | | Built in | | Built-in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | 12 | TSXDC-4310FM | | | 8 | TSXDC-4310FM | | | | | | |
| DIPLEXER (QTY/MODEL) | | | 2 | CBC61923T-DS-43 | | | 2 | DBC0115F1V91-2 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | | | 1 | TMA2124F03V5-2D | | | 2 | TMA2104F00V1-1 | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | | | | | | | | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | 1 | DC6-48-60-18 | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | 1 | 4478 B14 | | | 1 | 4449 B5/B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | with another band | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | 1 | 8843 B2/B66A | | | | | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | with another band | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6449 B77D | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6419 B77G | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | 2 | K SBT 782-11055 | | | 2 | K SBT 782-11055 | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | 2 | APTDC-BDFDM-DB | | | 2 | APTDC-BDFDM-DB | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | - Follow Antenna and radios positions as per PD.<br>- Decom UMTS and remove unused line elements. | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | 2x6630+1xXMU+IDLe+6648+Xcede. | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 2 | PORT 1 | 135348.A.700.4 G.tmp5 | | CTL02267_7A_3_F | CTL02267_7A_3_F | | LTE 700 | K_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 3 | |
| | PORT 3 | 135348.A.1900.4 G.tmp1 | | CTL06267_9A_1 | CTL06267_9A_1 | | LTE 1900 | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 4 | 135348.A.1900.4 G.tmp4 | | CTL06267_9A_2 | CTL06267_9A_2 | | LTE 1900 | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 7 | 135348.A.AWS.4 G.tmp4 | | CTL06267_2A_2 | CTL06267_2A_2 | | LTE AWS | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 8 | 135348.A.AWS.5 G.tmp1 | | CTCN002267_N066A_1 | CTCN002267_N066A_1 | | 5G AWS | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| | PORT 11 | 135348.A.1900.5 G.tmp1 | | CTCN002267_N002A_1 | CTCN002267_N002A_1 | | 5G 1900 | K_1948MHz_04D | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 4 | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | 5G CBAND | | | 70 | 0 | Integrated | Fiber | 0 | | | | | | | | 5 | |
| ANTENNA POSITION 4 | PORT 1 | 135348.A.700.4 G.1 | | CTL02267_7A_1 | CTL02267_7A_1 | | LTE 700 | BU8DA_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 7 | |
| | PORT 2 | 135348.A.850.5 G.tmp1 | | CTCN002267_N005A_1 | CTCN002267_N005A_1 | | 5G 850 | BU8DA_719MHz_04DT | 15.3 | 70 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 7 | |

## Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA MAKE - MODEL | | | TPA65R-BU8DA-K | | AIR6449 B77D+AIR6419 B77G STACKED | | DMP65R-BU8DA | | | | |
| ANTENNA VENDOR | | | CCI | | Ericsson | | CCI | | | | |
| ANTENNA SIZE (H x W x D) | | | 96X20.7X7.7 | | 30.4X15.9X8.1 | | 96.0X20.7X7.7 | | | | |
| ANTENNA WEIGHT | | | 87.1 | | 81.6 | | 95.7 | | | | |
| AZIMUTH | | | 190 | | 190 | | 190 | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | |
| RADIATION CENTER (feet) | | | 111 | | 111 | | 111 | | | | |
| ANTENNA TIP HEIGHT | | | 115 | | 115 | | 115 | | | | |
| MECHANICAL DOWNTILT | | | 0 | | 0 | | 0 | | | | |
| FEEDER AMOUNT | | | 4 | | Fiber | | 4 | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | | | Built in | | Built-in | | Built in | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | 12 | TSXDC-4310FM | | | 8 | TSXDC-4310FM | | | |
| DIPLEXER (QTY/MODEL) | | | 2 | CBC61923T-DS-43 | | | 2 | DBC0115F1V91-2 | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | | | 1 | TMA2124F03V5-2D | | | 2 | TMA2104F00V1-1 | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | | | | | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | 1 | 4478 B14 | | | 1 | 4449 B5/B12 | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | with another band | | | |
| RRH - 1900 band (QTY/MODEL) | | | 1 | 8843 B2/B66A | | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | with another band | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6449 B77D | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6419 B77G | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | 2 | K SBT 782-11055 | | | 2 | K SBT 782-11055 | | | |
| Additional Component 2 (QTY/MODEL) | | | 2 | APTDC-BDFDM-DB | | | 2 | APTDC-BDFDM-DB | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | |
| Local Market Note 1 | - Follow Antenna and radios positions as per PD.<br>- Decom UMTS and remove unused line elements. | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | |
| Local Market Note 3 | 2x6630+1xXMU+IDLe+6648+Xcede. | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 2 | PORT 1 | 135348.B.700.4 G.tmp5 | | CTL02267_7B_3 _F | CTL02267_7B_3 _F | | LTE 700 | K _719MHz_04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 11 | |
| | PORT 3 | 135348.B.1900.4 G.tmp1 | | CTL06267_9B_1 | CTL06267_9B_1 | | LTE 1900 | K _1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 4 | 135348.B.1900.4 G.tmp4 | | CTL06267_9B_2 | CTL06267_9B_2 | | LTE 1900 | K _1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 7 | 135348.B.AWS.4 G.tmp4 | | CTL06267_2B_2 | CTL06267_2B_2 | | LTE AWS | K _1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 8 | 135348.B.AWS.5 G.tmp1 | | CTCN002267_N 066B_1 | CTCN002267_N 066B_1 | | 5G AWS | K _1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| | PORT 11 | 135348.B.1900.5 G.tmp1 | | CTCN002267_N 002B_1 | CTCN002267_N 002B_1 | | 5G 1900 | K _1948MHz_03D | 15.3 | 190 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 12 | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | 5G CBAND | | | 190 | 0 | Integrated | Fiber | 0 | | | | | | | | 13 | |
| ANTENNA POSITION 4 | PORT 1 | 135348.B.700.4 G.1 | | CTL02267_7B_1 | CTL02267_7B_1 | | LTE 700 | BU8DA_719MHz _04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 15 | |
| | PORT 2 | 135348.B.850.5 G.tmp1 | | CTCN002267_N 005B_1 | CTCN002267_N 005B_1 | | 5G 850 | BU8DA_719MHz _04DT | 15.3 | 190 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 15 | |

## Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

| ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified) | ANTENNA POSITION 1 | | ANTENNA POSITION 2 | | ANTENNA POSITION 3 | | ANTENNA POSITION 4 | | ANTENNA POSITION 5 | | ANTENNA POSITION 6 | | ANTENNA POSITION 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA MAKE - MODEL | | | TPA65R-BU8DA-K | | AIR6449 B77D+AIR6419 B77G STACKED | | DMP65R-BU8DA | | | | | | | |
| ANTENNA VENDOR | | | CCI | | Ericsson | | CCI | | | | | | | |
| ANTENNA SIZE (H x W x D) | | | 96X20.7X7.7 | | 30.4X15.9X8.1 | | 96.0X20.7X7.7 | | | | | | | |
| ANTENNA WEIGHT | | | 87.1 | | 81.6 | | 95.7 | | | | | | | |
| AZIMUTH | | | 310 | | 310 | | 310 | | | | | | | |
| MAGNETIC DECLINATION | | | | | | | | | | | | | | |
| RADIATION CENTER (feet) | | | 111 | | 111 | | 111 | | | | | | | |
| ANTENNA TIP HEIGHT | | | 115 | | 115 | | 115 | | | | | | | |
| MECHANICAL DOWNTILT | | | 0 | | 0 | | 0 | | | | | | | |
| FEEDER AMOUNT | | | 4 | | Fiber | | 4 | | | | | | | |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP) | | | | | | | | | | | | | | |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) | | | | | | | | | | | | | | |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches) | | | | | | | | | | | | | | |
| Antenna RET Motor (QTY/MODEL) | | | | Built in | | Built-in | | Built in | | | | | | |
| SURGE ARRESTOR (QTY/MODEL) | | | 12 | TSXDC-4310FM | | | 8 | TSXDC-4310FM | | | | | | |
| DIPLEXER (QTY/MODEL) | | | 2 | CBC61923T-DS-43 | | | 2 | DBC0115F1V91-2 | | | | | | |
| DUPLEXER (QTY/MODEL) | | | | | | | | | | | | | | |
| Antenna RET CONTROL UNIT (QTY/MODEL) | | | | | | | | | | | | | | |
| DC BLOCK (QTY/MODEL) | | | | | | | | | | | | | | |
| TMA/LNA (QTY/MODEL) | | | 1 | TMA2124F03V5-2D | | | 2 | TMA2104F00V1-1 | | | | | | |
| CURRENT INJECTORS FOR TMA (QTY/MODEL) | | | | | | | | | | | | | | |
| PDU FOR TMAS (QTY/MODEL) | | | | | | | | | | | | | | |
| FILTER (QTY/MODEL) | | | | | | | | | | | | | | |
| SQUID (QTY/MODEL) | | | | | | | | | | | | | | |
| FIBER TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| DC TRUNK (QTY/MODEL) | | | | | | | | | | | | | | |
| REPEATER (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH - 700 band (QTY/MODEL) | | | 1 | 4478 B14 | | | 1 | 4449 B5/B12 | | | | | | |
| RRH - 850 band (QTY/MODEL) | | | | | | | | with another band | | | | | | |
| RRH - 1900 band (QTY/MODEL) | | | 1 | 8843 B2/B66A | | | | | | | | | | |
| RRH - AWS band (QTY/MODEL) | | | | with another band | | | | | | | | | | |
| RRH - WCS band (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional RRH #1 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6449 B77D | | | | | | | | |
| Additional RRH #2 - any band (QTY/MODEL) | | | | | 1 | integrated within: AIR6419 B77G | | | | | | | | |
| RRH_7B_1 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_2 (QTY/MODEL) | | | | | | | | | | | | | | |
| RRH_7B_3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Additional Component 1 (QTY/MODEL) | | | 2 | K SBT 782-11055 | | | 2 | K SBT 782-11055 | | | | | | |
| Additional Component 2 (QTY/MODEL) | | | 2 | APTDC-BDFDM-DB | | | 2 | APTDC-BDFDM-DB | | | | | | |
| Additional Component 3 (QTY/MODEL) | | | | | | | | | | | | | | |
| Local Market Note 1 | - Follow Antenna and radios positions as per PD.<br>- Decom UMTS and remove unused line elements. | | | | | | | | | | | | | |
| Local Market Note 2 | | | | | | | | | | | | | | |
| Local Market Note 3 | 2x6630+1xXMU+IDLe+6648+Xcede. | | | | | | | | | | | | | |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Atoll) | ATOLL TXID | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/ Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RXAIT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANTENNA POSITION 2 | PORT 1 | 135348.C.700.4G.tmp5 | | CTL02267_7C_3_F | CTL02267_7C_3_F | | LTE 700 | K_719MHz_04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 19 | |
| | PORT 3 | 135348.C.1900.4G.tmp1 | | CTL06267_9C_1 | CTL06267_9C_1 | | LTE 1900 | K_1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 4 | 135348.C.1900.4G.tmp4 | | CTL06267_9C_2 | CTL06267_9C_2 | | LTE 1900 | K_1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 7 | 135348.C.AWS.4G.tmp4 | | CTL06267_2C_2 | CTL06267_2C_2 | | LTE AWS | K_1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 8 | 135348.C.AWS.5G.tmp1 | | CTCN002267_N066C_1 | CTCN002267_N066C_1 | | 5G AWS | K_1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| | PORT 11 | 135348.C.1900.5G.tmp1 | | CTCN002267_N002C_1 | CTCN002267_N002C_1 | | 5G 1900 | K_1948MHz_03D | 15.3 | 310 | 3 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 3380.6483 | | 20 | |
| ANTENNA POSITION 3 | PORT 1 | | | | | | 5G CBAND | | | 310 | 0 | Integrated | Fiber | 0 | | | | | | | | 21 | |
| ANTENNA POSITION 4 | PORT 1 | 135348.C.700.4G.1 | | CTL02267_7C_1 | CTL02267_7C_1 | | LTE 700 | BU8DA_719MHz_04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 23 | |
| | PORT 2 | 135348.C.850.5G.tmp1 | | CTCN002267_N005C_1 | CTCN002267_N005C_1 | | 5G 850 | BU8DA_719MHz_04DT | 15.3 | 310 | 4 | Bottom | Commscope 1-5/8 (700) | 140 | | | | | | 931.1078 | | 23 | |

CCI

Antennas
MultiPort Series

DATA SHEET

# Diplexed Multi-Band Antenna

DMP65R-BU8D

- Eight foot (2.4 m) internally multiplexed MultiBand antenna, including eight external RF ports (12 RF ports internal), with a 65° azimuth beamwidth covering 698-896 MHz and 1695-2400 MHz frequencies
- Four wide high band ports covering 1695-2400 MHz and four wide low band ports covering 698-896 MHz in a single antenna enclosure
- Innovative Multiplexed/RET Control configuration, supporting Dual Band Radio Configurations (B12/B5 and B29/B5). The antenna provides Dual 4T4R (4x4 MIMO) capability, while providing independent RET control, an Industry First
- Innovative Low and High Band Array configuration allows for 4T4R (4x4 MIMO) on Low Band and 4T4R (4x4 MIMO) High Band Arrays, using full length arrays (non stacked), all in a 20.7" (525 mm) width enclosure, an Industry First
- Industry leading antenna topology and RET shielding techniques drastically mitigate PIM propagation from B12/B14/B29 operations, allowing for superior Network performance
- Full Spectrum Compliance for PCS, AWS-3 and WCS frequencies and 700/850 MHz Dual Band Radio Configurations
  •
- LTE Optimized FBR and SPR performance, providing for an efficient use of valuable radio capacity
- LTE Optimized Boresight and Sector XPD and USL performance, essential for LTE Performance
- Exceeds minimum PIM performance requirements
- Equipped with new 4.3-10 connector, which is 40% smaller than traditional 7/16 DIN connector
- Ordering options for External RET Controllers (Type 1) or Internally Integrated RET Controllers (Type 17)

## Overview

The CCI internally multiplexed MultiBand array is an eight port (12 RF ports internal) antenna, with four wide band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz. The antenna provides the capability to deploy 4T4R (4x4 MIMO) in the high band, with separate RET control. The antenna also provides the capability to provide independent RET control for 700/850 MHz Dual Band Radio Configurations, while maintaining 4T4R (4x4 MIMO) across the low band ports.

CCI antennas are designed and produced to ISO 9001 certification standards for reliability and quality in our state-of-the-art manufacturing facilities.

## Applications

- 4x4 MIMO for the High Band and 4X4 MIMO Low Band ports
- Ready for Network Standardization on 4.3-10 DIN connectors
- With CCI's multiband antennas, wireless providers can connect multiple platforms to a single antenna, reducing tower load, lease expense, deployment time and installation costs

SPECIFICATIONS

## Diplexed Multi-Band Antenna

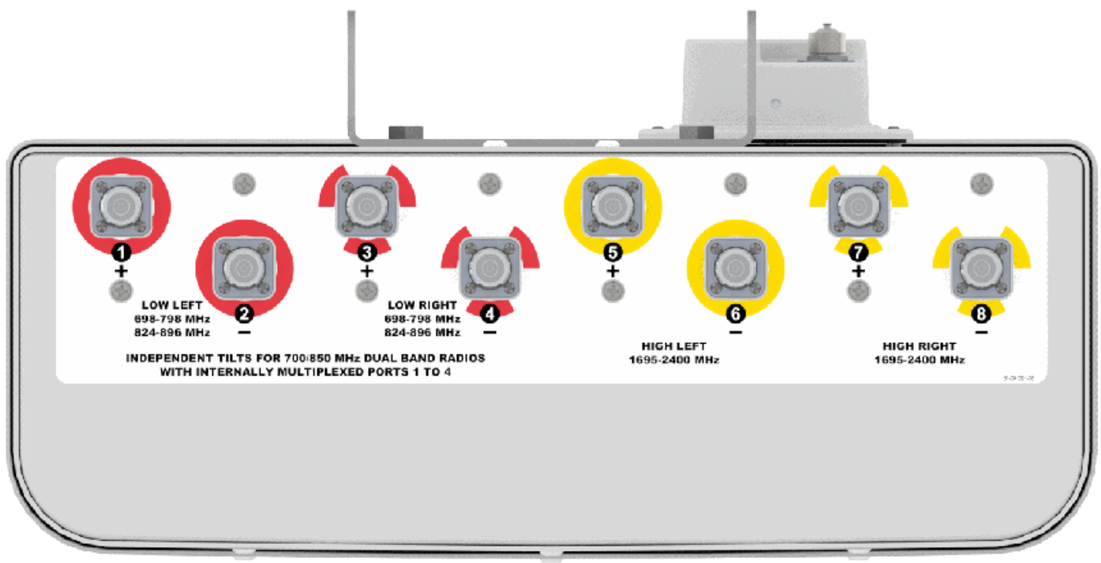
**DMP65R-BU8D**

### Mechanical

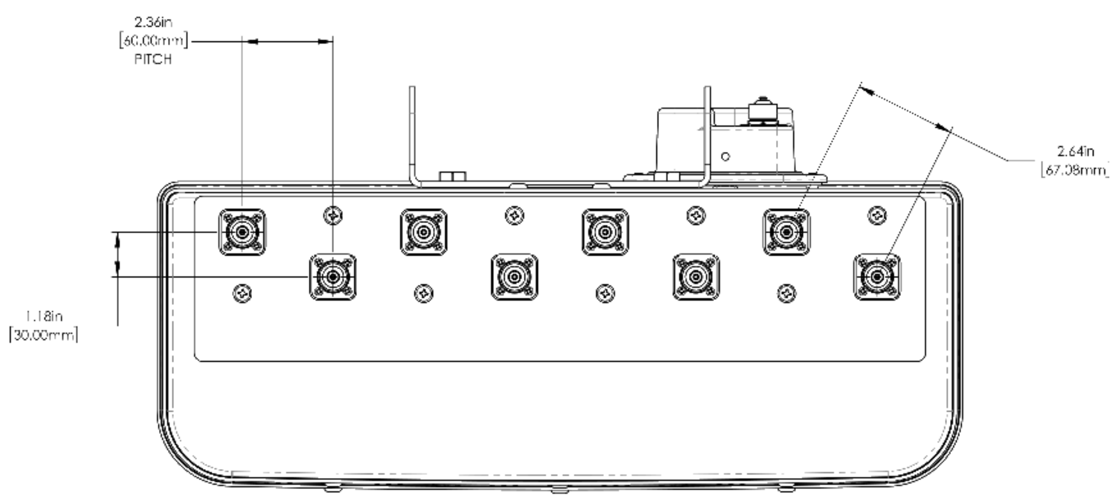
| | |
|---|---|
| Dimensions (LxWxD) | 96.0x20.7x7.7 in (2438x525x197 mm) |
| Survival Wind Speed | > 150 mph (> 241 kph) |
| Front Wind Load | 457 lbs (2033 N) @ 100 mph (161 kph) |
| Side Wind Load | 209 lbs (929 N) @ 100 mph (161 kph) |
| Equivalent Flat Plate Area | 17.9 ft$^2$ (1.7 m$^2$) |
| Weight * | 95.7 lbs (43.4 kg) |
| Connector | 8 x 4.3-10 female |
| Mounting Pole | 2 to 5 in (5 to 12 cm) |

** Weight excludes mounting*

*Bottom View*




*Connector Spacing*

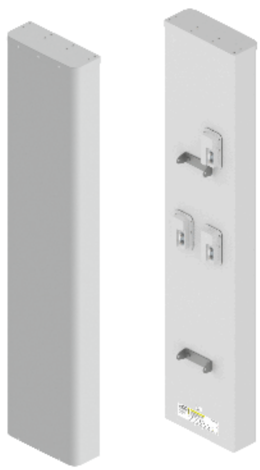


Antennas MultiPort Series

DATA SHEET

# Multi-Band Twelve-Port Antenna

TPA65R-BU8D



- Eight foot (2.4 m) multiband, twelve port antenna with a 65° azimuth beamwidth covering 698-896 MHz and 1695-2400 MHz frequencies
- Eight high band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz in a single antenna enclosure
- Innovative Low and High Band Array configuration allows for 4T4R (4x4 MIMO) on Low Band and Dual 4T4R (4x4 MIMO) High Band Arrays, using full length arrays (non stacked), all in under a 20.7" (525 mm) width enclosure, an Industry First
- Full Spectrum Compliance for WCS and AWS-3 frequencies and Band 14 Operations
- Array configuration allows for 4T4R (4X4 MIMO) on Low Band, essential for Band 14 Operations
- LTE Optimized FBR and SPR performance, providing for an efficient use of valuable radio capacity
- LTE Optimized Boresight and Sector XPD and USL performance, essential for LTE Performance
- Exceeds minimum PIM performance requirements
- Equipped with new 4.3-10 connector, which is 40% smaller than traditional 7/16 DIN connector
- Equipped with 3 field replaceable, integrated AISG 2.0 compliant Remote Electrical Tilt (RET) Controllers (Type 1 External)
- Ordering options for External RET Controllers (Type 1) or Internally Integraged RET Controllers (Type 17)

## Overview

The CCI 12-Port multiband array is a twelve port antenna, with eight wide band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz. The antenna provides the capability to deploy Dual 4×4 Multiple-input Multiple-output (MIMO) in the high band and 4X4 Multiple-input Multiple-output (MIMO) across low band ports. The CCI 12-Port allows independent tilt control between the low band ports and high band ports and independent tilt control between left and right antenna arrays.

In this three RET configuration, the 1st RET is dedicated for the four Low Band ports. The 2nd RET is dedicated for the four Left High Band ports and the 3th RET is dedicated for the four Right High Band ports. This RET arrangement allows for complete flexibility in coverage control between left and right antenna arrays.

CCI antennas are designed and produced to ISO 9001 certification standards for reliability and quality in our state-of-the-art manufacturing facilities.

## Applications

- Dual 4×4 MIMO for the High Band and 4X4 MIMO Low Band ports
- Ready for Network Standardization on 4.3-10 DIN connectors
- With CCI's multiband antennas, wireless providers can connect multiple platforms to a single antenna, reducing tower load, lease expense, deployment time and installation costs

SPECIFICATIONS

# Multi-Band Twelve-Port Antenna

## TPA65R-BU8D

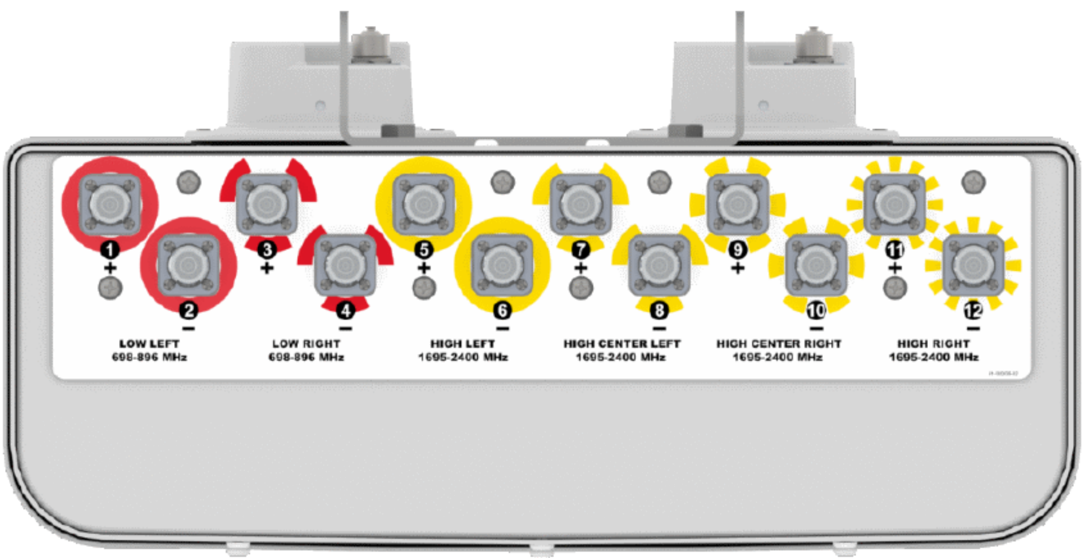
### Mechanical

| | |
|---|---|
| Dimensions (LxWxD) | 96.0x20.7x7.7 in (2438x525x197 mm) |
| Survival Wind Speed | > 150 mph (> 241 kph) |
| Front Wind Load | 457 lbs (2033 N) @ 100 mph (161 kph) |
| Side Wind Load | 209 lbs (929 N) @ 100 mph (161 kph) |
| Equivalent Flat Plate Area | 17.9 $ft^2$ (1.7 $m^2$) |
| Weight * | 87.1 lbs (39.5 kg) |
| Connector | 12 x 4.3-10 female |
| Mounting Pole | 2 to 5 in (5 to 12 cm) |
| Package Dimensions (LxWxD) | 104.3x28.7x16.9 in (2650x730x430 mm) |
| Package Weight | 145 lbs (65.8 kg) |

** Weight excludes mounting kit*

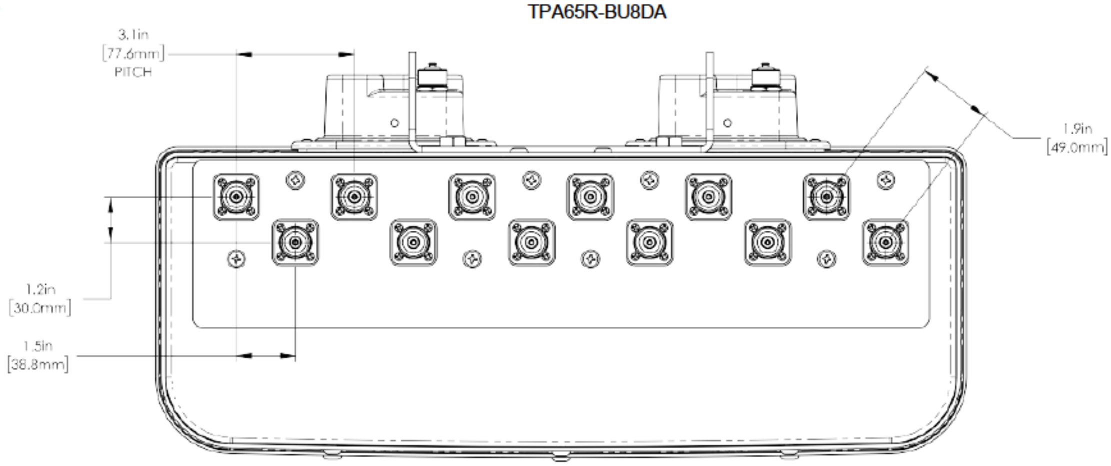
*Bottom View*

TPA65R-BU8DA



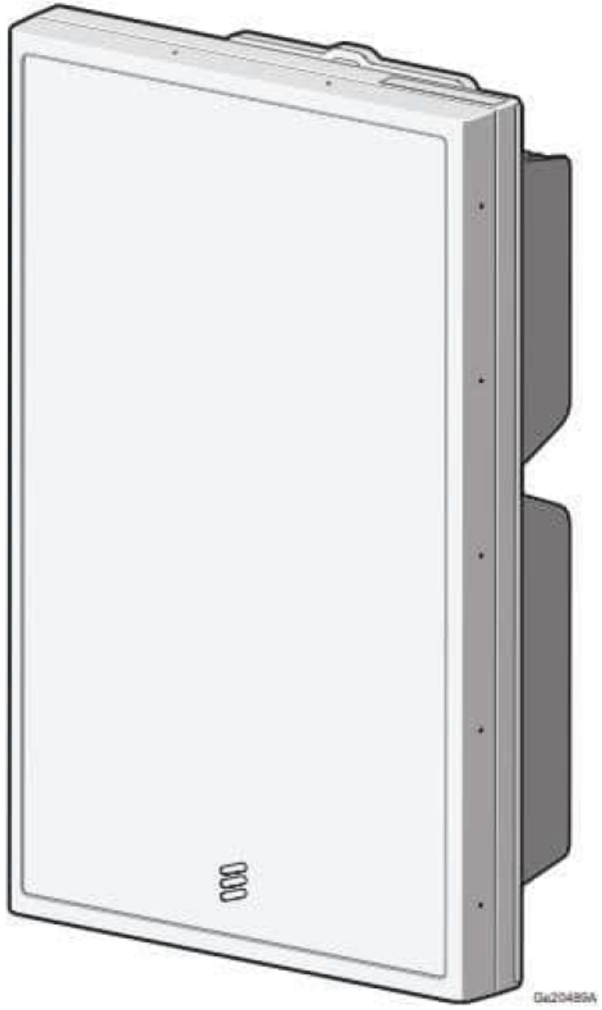

*Connector Spacing*

TPA65R-BU8DA



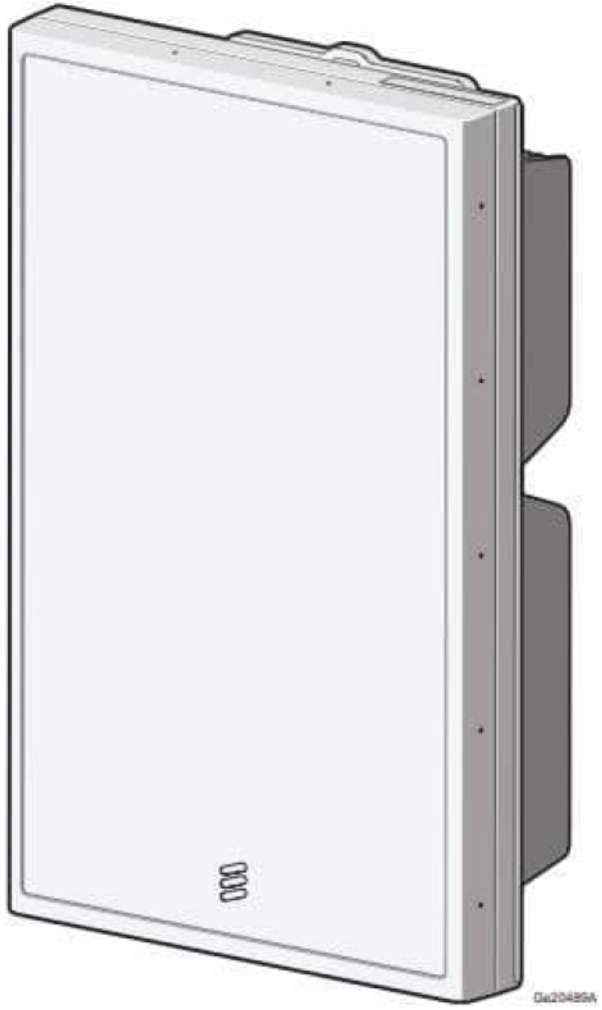
# ERICSSON AIR 6419 B77G

- ERICSSON AIR 6419 has a total of 2 ECPRI connections @ 25.8 Gbps, 1 DC Power cable connection
- Operates over B77G DOD band (3.4-3.6 GHz)
- Breaker size = 45A DC, DC Power Consumption = 1280W (for dimensioning)
- Dimensions
  - Height: 31.1” (790 mm)
  - Width: 16.1” (408 mm)
  - Depth: 7.3” (186 mm)
- Weight, excl. mounting hardware = 44 lbs (20 kg)
- Weight with Mounting Hardware = 55.4 lbs (25.2 kg)
- Max Frontal Wind Load @ 42m/s = 454 N
- Horizontal Separation Required between AIR 6419 = 100mm
- Minimum Vertical Space Required below/above AIR 6419 = 300mm
- Minimum Height Above Users = 5m
- Outdoor Installation locations to avoid:
  - Hot microclimates caused by, for example, heat radiated or reflected from dark or metallic walls or floors
  - Chimney mouths or ventilation system outlets
  - In front of Large glass surfaces or concrete surfaces
- Avoid radio interference by keeping the area directly in front of the antenna clear of metal surfaces such as railing, ladders or chains or equipment generating electromagnetic fields, for example, electric motors in air conditioners or diesel generators in front of antenna
- Do not use metallic paint to cover the AIR 6419 If painting is required. Do not paint underside of AIR 6419.



# ERICSSON AIR 6449 B77

- ERICSSON AIR 6449 has a total of 4 ECPRI connections @ 25 Gbps
- Operates over B77 band (3.3-4.2 GHz)
- Breaker size = 50A DC, DC Power Consumption = 1280W (for dimensioning)
- Dimensions
  - Height: 30.6” (778 mm)
  - Width: 15.9” (403 mm)
  - Depth: 10.6” (268 mm)
- Weight, excl. mounting hardware = 82.5 lbs (37.5 kg)
- Weight with Mounting Hardware = 95.5 lbs (43.4 kg)
- Max Frontal Wind Load @ 42m/s = 478 N
- Horizontal Separation Required between AIR 6449 = 100mm
- Minimum Vertical Space Required below AIR 6449 = 300mm
- Minimum Height Above Users = 5m
- Outdoor Installation locations to avoid:
  - Hot microclimates caused by, for example, heat radiated or reflected from dark or metallic walls or floors
  - Chimney mouths or ventilation system outlets
  - In front of Large glass surfaces or concrete surfaces
- Avoid radio interference by keeping the area directly in front of the antenna clear of metal surfaces such as railing, ladders or chains or equipment generating electromagnetic fields, for example, electric motors in air conditioners or diesel generators in front of antenna
- Do not use metallic paint to cover the AIR 6449 If painting is required. Do not paint underside of AIR 6449.

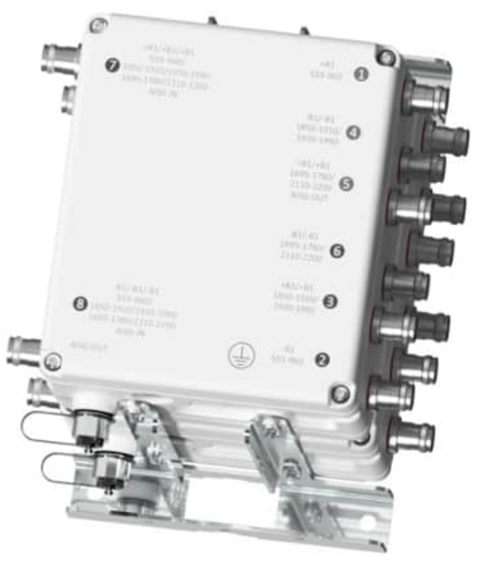


# TMA2124F03V5-2D

## DUAL TWIN TMA 1900/AWS/LOWPASS 555-960MHZ 6 ANT

NON-DIPLEXED 1900/AWS ANTENNA PORTS

Designed to be deployed in co-located AWS & 1900 networks, the Kaelus TMA2124 provides gain in 1900 and AWS uplink, using independent LNAs per band and per channel. Low loss bypass 555-960MHz signal to low band antennas is also provided.



### FEATURES

- Improved base station sensitivity through excellent noise figure performance and linearity
- AISG 2.0 compatible, full software upgradable using AISG "personality" upload
- DC/AISG passthrough to AWS antenna (port 5)
- AISG OUT connector disabled when AISG device (SBT equipped antenna) present on Port 3 +R1/+R1
- One AISG subunit per LNA, 4 in total. All fixed gain
- 555-960 bypass to low band antenna

### TECHNICAL SPECIFICATIONS

| BAND NAME | 1900 | AWS |
|---|---|---|
| **DOWNLINK** | | |
| **Passband** | 1930 - 1990MHz | 2110 - 2200MHz |
| **Insertion loss** | 0.4dB typical | 0.3dB typical |
| **Return loss** | 22dB typical | |
| **Maximum input power** | 160W (average) / 2kW (PEP) | 160W (average) / 2kW (PEP) |
| **Intermodulation products** | -155dBc maximum, at antenna port in RX band with 2 x 20W carriers | -163dBc maximum, at antenna port in RX band with 2 x 20W carriers |
| **UPLINK** | | |
| **Passband** | 1850 - 1910MHz | 1695 - 1780MHz |
| **Gain** | 13dB | |
| **Gain variation** | ±1dB maximum | |
| **Return loss** | 22dB typical | |
| **Bypass return loss** | 14dB typical | |
| **Bypass loss** | 3dB typical | |
| **Noise figure** | 1.2dB typical @ 13dB gain | 1.0dB typical @ 13dB gain |
| **Output IP3** | +28dBm typical | |
| **Maximum input power with no damage** | +12dBm | |
| **555-960 LOWPASS FILTER** | | |
| **Passband** | 555 - 960MHz | |
| **Insertion loss** | 0.2dB typical | |
| **Return loss** | 21dB typical | |
| **Maximum input power** | 250W (average) / 2.5kW (PEP) | |
| **Intermodulation products** | -155dBc maximum, at antenna port with 2 x 20W carriers | |
| **ELECTRICAL** | | |
| **Impedance** | 50Ohms | |

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| POWER SUPPLY AND ALARM (CURRENT WINDOW ALARM MODE, DEFAULT) | |
|---|---|
| Current window alarm mode (CWA) is the default operating mode and can be configured to specific customer requirements. The TMA2124F03V4 is configured so that both channels are independently powered and monitored via their respective BTS port, 7 or 8. The BTS port sinks additional current to indicate an alarm state in its uplink path. Normal operating and alarm current values are configured independently via a field-loadable personality file. Please contact Kaelus for more information. | |
| **DC supply voltage** | +8.5 to +18V DC, case is DC ground |
| **DC supply** | Each BTS port powered individually |
| **DC supply current, normal mode** | 200mA per port typical (both ports are powered) |
| **DC supply current, alarm mode** | 300mA per port typical (both ports are powered) |

| AISG MODE OF OPERATION (AUTO SELECTED ON VALID AISG 2.0 FRAMES) | |
|---|---|
| AISG signals can be applied to port 7 or port 8. The TMA unit switches to AISG mode when valid frames are detected on either port 7 or 8. All LNAs take DC power from the port with the AISG frames or, if DC is present on both ports, power will be supplied equally between the ports. Each LNA is controlled uniquely by its sub-unit number. | |
| **DC supply voltage** | +7.5V to +30V DC |
| **AISG version** | 2.0 (1.1 optional) |
| **Supply current, AISG mode** | 500mA @ 7.5V, 135mA @ 30V typical |
| **AISG connector, current rating** | IEC60130-9, 8-pin female, < 4A peak, 2A continuous, pin 6 |
| **Field firmware upgradable** | Yes (R951022ATA2.0 Rev 2.9.12) |
| **AISG pass through to antenna port** | Yes |

| ANTENNA AISG OOK + DC | | | | |
|---|---|---|---|---|
| When DC is applied it is quickly switched through to port 5. If an over-current condition is detected, DC & AISG are disconnected from port 5. If DC remains connected to the load at port 5, DC and AISG are disconnected from the AISG OUT 8 pin connector. If DC is disconnected from port 5, DC and AISG are enabled at the AISG OUT 8 pin connector. If a short circuit is detected at the AISG OUT 8 pin connector, DC and AISG are disabled. | | | | |
| **Mode of Operation** | Voltage at Port 5 | Assumption | "Autosense + Protection" Switch Status | Comment |
| **AISG or CWA** | High | Device present or open circuit | Close | DC & AISG OOK will be supplied to port 5. DC & AISG is removed from the AISG OUT 8 pin port |
| **AISG or CWA** | Low | DC short circuit or low DC resistance | Open | DC & AISG OOK will not be supplied to port 5. DC & AISG are supplied to the AISG OUT 8 pin port |

| ENVIRONMENTAL | |
|---|---|
| For further details of environmental compliance, please contact Kaelus. | |
| **Temperature range** | -40°C to +65°C \| -40°F to +149°F |
| **Ingress protection** | IP67 |
| **Altitude** | 3,000m \| 10,000ft |
| **Lightning protection** | IEC61312-1, RF: ±5kA maximum (8/20us), AISG: ±2kA maximum (8/20us) |
| **MTBF** | >1,000,000 hours |
| **Compliance** | FCC Part 15 subpart B |

| MECHANICAL | |
|---|---|
| **Dimensions H x D x W (single unit)** | 245 x 263 x 210mm \| 9.7 x 10.4 x 8.3in excluding brackets and connectors |
| **Weight** | 16.2kg \| 35.71lbs |
| **Finish** | Painted, light grey (RAL 7035) |
| **Connectors** | 4.3-10 (F) x 16 long neck, AISG (F) x 2 |
| **Wind Load** | Front 390N, Side 147N (Single)<br>Front 251N, Side 409N (Twin)<br>At 74m/s (AS/NZS 1170-2-2011 Structural design - Wind actions - Cyclone areas) |
| **Mounting** | Pole/wall bracket supplied with two metal clamps 45-178mm diameter poles |

## ORDERING INFORMATION

| PART NUMBER | CONFIGURATION | OPTIONAL FEATURES | CONNECTORS |
|---|---|---|---|
| **TMA2124F03V5-1D** | TWIN 2 in / 6 out | STANDARD | 4.3-10 (F) |
| **TMA2124F03V5-2D** | QUAD 4 in / 12 out | STANDARD | 4.3-10 (F) |
| **TMA2124F03V5-1S** | TWIN 2 in / 6 out | STANDARD | 4.3-10 (F) |
| **TMA2124F03V5-2S** | QUAD 4 in / 12 out | STANDARD | 4.3-10 (F) |




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# TMA2104F00V1-1

## TWIN TMA 2300, LOWPASS

Designed to be deployed in 2300MHz WCS Band, the Kaelus TMA2104 provides gain at the 2300MHz uplink band while allowing 700/850 services to pass through to a low-band antenna. This saves OPEX, CAPEX and gives excellent system performance as well as full AISG capabilities.

### FEATURES

- Improved base station sensitivity through gain in 2300MHz bands
- High linearity and low noise performance
- Bypass provided for 700/850 MHz services
- Hardware and software configuration using AISG "Personality" upload
- Fail safe bypass mode with lightning protection

### TECHNICAL SPECIFICATIONS

| 2300MHZ DOWNLINK (TX) PATH | |
|---|---|
| **Passband** | 2350 - 2360MHz |
| **Return loss** | 18dB minimum |
| **Insertion loss** | 0.5dB typical |
| **Maximum input power with no damage** | 120W (average) / 1.2kW (PEP) |
| **Intermodulation @ antenna ports** | -153dBc maximum in RX band with 2 x 20W carriers |

| 2300MHZ UPLINK AWS (TX) PATH | |
|---|---|
| **Passband** | 2305 - 2315MHz |
| **Nominal gain** | 12dB |
| **Gain variation over frequency, temperature** | ± 1dB maximum |
| **Noise figure** | 1.7dB typical |
| **Return loss** | 18dB minimum operating, 15dB minimum in bypass mode |
| **Bypass loss** | 3.3dB typical |
| **Output IP3** | +30dBm typical |
| **Maximum input power with no damage** | 12dBm maximum |
| **Rejection Rx in 2324.54 - 2341.285MHz** | 27.5dB minimum |
| **Rejection Rx in 698 - 2170MHz** | 75dB minimum |

| LOW BAND PATH | |
|---|---|
| **Passband** | 698 - 894MHz |
| **Return loss** | 18dB minimum |
| **Insertion loss** | 0.35dB typical |
| **Maximum input power with no damage** | 200W (average) / 2kW (PEP) |
| **Intermodulation @ antenna ports** | -153dBc maximum in RX band with 2 x 20W carriers |

| ELECTRICAL | |
|---|---|
| **Impedance** | 50ohms |







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| POWER SUPPLY AND ALARM (CURRENT WINDOW ALARM MODE, DEFAULT) | |
|---|---|
| Current window alarm mode (CWA) is the default TMA operating mode and can be configured to specific customer requirements. The generic personality (F00V1) is configured so that both channels are independently powered and monitored via the respective BTS port. The BTS port sinks additional current to indicate an alarm state in its uplink path. Normal operating and alarm current values are configured independently via a field-loadable personality file, Please contact Kaelus for more information. | |
| **DC supply voltage** | 8.5V to 30V DC, case is DC ground |
| **DC supply** | Each BTS powered individually (programmable) |
| **DC supply current, normal mode** | 100 ± 20mA per port (programmable) |
| **DC supply current, alarm mode programmable range** | 180 ± 30mA per port |

| AISG MODE OF OPERATION (AUTO SELECTED ON VALID AISG 2.0 FRAMES) | |
|---|---|
| AISG signals can be applied to either BTS1 or BTS2 ports. The TMA2104FxxVx-1 unit switches to AISG mode when valid frames are detected on one of the BTS ports. Both LNAs take DC power from the port with AISG frames or, if DC is present on both ports, both channels supply equal power to the TMA2104FxxVx-1. | |
| **DC supply voltage** | +8V to +30V DC |
| **AISG version** | 2.0 (1.1 optional) |
| **Supply current, AISG mode** | 215mA @ 8.5V, 70mA @ 30V typical |
| **AISG connector, current rating** | IEC60130-9, 8-pin female, < 4A peak, 2A continuous, pin 6 |
| **Field firmware upgradable** | Yes |
| **AISG pass through to antenna port** | Yes (optional) |

| ENVIRONMENTAL | |
|---|---|
| For further details of environmental compliance, please contact Kaelus. | |
| **Temperature range** | -40º to +65ºC \| -40º to +149ºF |
| **Ingress protection** | IP67 |
| **Altitude** | 2,000m \| 6,561ft |
| **Lightning protection** | IEC61312-1, RF: ±5kA maximum (8/20us), AISG: ±2kA maximum (8/20us) |
| **MTBF** | >1,000,000 (hours) |
| **Compliance** | FCC part 15, ETSI EN 300 019 class 4.1, RoHS |

| MECHANICAL | |
|---|---|
| **Dimensions H x D x W** | 220 x 200 x 104mm \| 8.7 x 7.9 x 4.1in (excluding brackets and connectors) |
| **Weight** | 7.7kg \| 17lbs |
| **Finish** | Painted, light grey (RAL7035) |
| **Connectors** | DIN 7-16 (F) x 6 long shank, AISG (F) x 1 |
| **Mounting** | Pole/wall bracket supplied with two metal clamps 45-178mm diameter poles |

## ORDERING INFORMATION

| PART NUMBER | CONFIGURATION | OPTIONAL FEATURES | CONNECTORS |
|---|---|---|---|
| **TMA2104F00V1-1** | TWIN 2 in / 4 out | Generic CWA configuration | DIN 7-16 (F) |
| **TMA2104F00V1-2** | Quad 4 in / 8 out | Generic CWA configuration | DIN 7-16 (F) |

DATA SHEET

# DC Surge Protection Solutions

## DC6-48-60-18-8C-EV

**Overvoltage Protection and Fiber Distribution/Cable Management Solution**

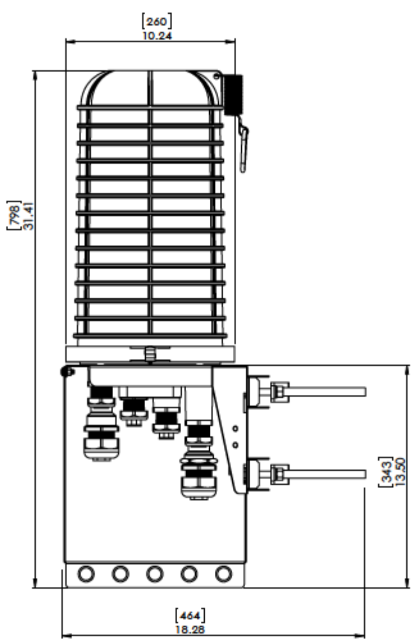
Rooftop / Towertop

The DC6-48-60-18-8C-EV is designed to provide the ultimate coordination between the SPD and the RRH/RRU by offering industry-leading low-clamping voltage of 160V and extremely robust protection for use in a high DC voltage environment. Capable of providing 12.5kA (10/350 µs) max per circuit surge capacity for up to 6 -48V DC circuits.

powered by **Strikesorb®**

### Features

- Provides discrete protection for six individual -48V DC circuits
- Surge protection of 90kA 8/20 µs
- Maximum impulse current 12.5kA 10/350 µs
- Fiber connections for up to 18 fiber pair
- Simplifies inter-connectivity and cable management for DC conductors
- UL 1449 4th Edition Type 2 protective device
- IEC 61643-11 Class I protection for DC applications
- Form C relay contacts included, allowing remote monitoring of suppressor status
- Copper-coated lid to reduce power line interference
- Patented design
- Patented Strikesorb technology ensures lowest let-through voltage available in the industry, providing enhanced coordination with the RRH/RRU
- Raycap recommends that DC protection system be installed within 5 meters of the radio




### Benefits

- Strikesorb modules are fully recognized to UL 1449 4th Edition, and IEC 61643-11 Safety Standards, meeting all intermediate and high current fault requirements to facilitate use in original equipment manufacturers (OEM) applications
- Strikesorb offers unique maintenance-free protection against direct lightning currents
- Design provides maximum flexibility for installation
- NEMA 4X enclosure allows for indoor or outdoor installation



G02-01-203 180122

SPECIFICATIONS

powered by
**Strikesorb®**

# DC Surge Protection Solutions

## DC6-48-60-18-8C-EV

**Overvoltage Protection and Fiber Distribution/Cable Management Solution**

| | | |
|---|---|---|
| **Electrical** | | |
| Model Number | | DC6-48-60-18-8C-EV |
| CEQ / ANT Number | | CEQ.18537 |
| Number of Circuits Protected | | 6 |
| Surge Protective Device (SPD) Type per UL 1449 4th Edition | | Type 2 |
| Surge Protection Class as per IEC 61643-11 | | Class I |
| Nominal Operating DC Voltage [$U_n$] | | 48 V |
| Nominal Discharge Current [$I_n$] per UL 1449 4th Edition | | 20 kA 8/20 µs |
| Maximum Surge Current [$I_{max}$] per IEC 61643-11 | | 90 kA 8/20 µs |
| Maximum Impulse (Lightning) Current [$I_{imp}$] per IEC 61643-11 | | 12.5 kA 10/350 µs |
| Maximum Continuous Operating DC Voltage [$U_c$] (MCOV) | | 60 VDC |
| Voltage Protection Level [$U_p$] per IEC 61643-11 | | 160 V |
| Voltage Protection Rating (VPR) per UL 1449 4th Edition | | 330 V |
| Suppression Technology | | MOV |
| Strikesorb Module Type 2CA (UL 1449 4th edition) | | 30-V1-EV |
| Protection Modes: | Normal Mode | -48V to Return |
| | Common Mode | Return to Ground |
| **Mechanical** | | |
| Connection Terminal (Alarm) Method | | Form C Hardwired, #22 to #12 AWG [0.34 to 4 mm²] |
| Connection Terminal (Suppression) Method (for all power cables) | | Compression lug 2 hole, #10, 5/8 pitch, #12 – #4 AWG [3.3 – 21.15 mm²] |
| Connection Terminal (Terminal Block) Method | Copper | #12 to #4 AWG [3.3 – 21.15 mm²] |
| Fiber Connection Method | | LC-LC Single Mode |
| Environmental Ingress Protection (IP) Rating | | IP 68 |
| Operating Temperature (°C) | | -40º C to +100º C |
| Storage Temperature (°C) | | -70º C to +80º C |
| Cold Temperature Cycling IEC 61300-2-22 | | -30º C to +60º C 200 hrs @5 PSI |
| Resistance to Aggressive Materials CEI IEC 61073-2 | | Including Acids and Bases |
| UV Protection ISO 4892-2 Method A | | Xenon-Arc 2160 hrs |
| Enclosure Type | | Outdoor NEMA 4X |
| Enclosure Dimensions (L x W x H) | | 18.28" x 10.24" x 31.4" [464 x 260 x 797 mm] |
| Weight* | | System: 16.0 lbs [7.25 kg] Mount: 10.2 lbs [4.62 kg] Total: 26.2 lbs [11.87 kg] |
| Combined Wind Loading | Sustained | 150 mph Sustained: 105.7 lbs [470 N] |
| | Gust | 195 mph Gust: 213.6 lbs [950 N] |

**Standards Compliance & Certifications**

NEBS certified to: GR-63-CORE Issue 4, GR-1089-CORE Issue 6, GR-3108-CORE Issue 3, GR-487-CORE Issue 4, ATT-TP-76200 Issue 18

Strikesorb modules are compliant to the following Surge Protection Device Standards:

Standards: UL 1449 4th Edition: 2011, IEC 61643-11: 2011, EN 61643-11: 2012, IEEE C62.11: 2005, IEEE C62.41: 2002, IEEE C62.45: 2002, NEMA-LS-1

Certifications: UL, VDE, CE

AWG=American Wire Gauge

January 21, 2022
**February 16, 2024 (Rev.1)**

SAI AT&T

SAI Communications
12 Industrial Way
Salem NH, 03079

| | | |
|---|---|---|
| RE: | AT&T Site Number: | CT2267 (C-BAND) |
| | FA Number: | 10141359 |
| | PACE Number: | MRCTB051476 |
| | PT Number: | 2051A0Z7QX |
| | TEP Project Number: | 316500.928356 |
| | AT&T Site Name: | ORANGE CT RIDGE ROAD |
| | Site Address: | 298 Ridge Road<br>Orange, CT 06477 |

To Whom It May Concern:

TEP Northeast (TEP NE) has been authorized by SAI Communications to perform a mount analysis on the existing AT&T antenna mount to determine their capability of supporting the following loading:

- **(3) TPA65R-BU8DA-K Antennas (96.0"x20.7"x7.7" – Wt. = 87 lbs. /each)**
- **(3) AIR6449 Antennas (30.6"x15.9"x10.6" – Wt. 84 lbs. /each)**
- **(3) AIR6419 Antennas (31.2"x16.1"x9.1" – Wt. = 66 lbs. /each)**
- **(3) DMP65R-BU8DA Antennas (96.0"x20.7"x7.7" – Wt. = 119 lbs. /each)**
- **(3) TMA2124F03V5-2D TMA's (10.4"x9.7"x8.3" – Wt. = 36 lbs. /each) (Pos.2)**
- **(6) TMA2104F00V1-1 TMA's (8.7"x7.9"x4.1" – Wt. = 8 lbs. /each) (Pos.4)**
- **(1) DC6-48-60-18 Surge Arrestor (31.4"x10.2"Ø – Wt. = 29 lbs. /each) (Standoff)**

**Proposed equipment shown in bold.*

Fabrication drawings prepared Sitepro1, P/N RMV12-496, dated July 2, 2015, were available for the existing mount. TEP NE conducted a ground audit of the existing antenna mounts on March 29, 2022.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2021 with 2022 Connecticut State Building Code, and AT&T Mount Technical Directive – R22.
- TEP NE considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix P of the Connecticut State Building Code, the max basic wind speed for this site is equal to 130 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.30 in was used for this analysis.
- TEP NE considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- TEP NE considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- TEP NE considers this site to have a spectral response acceleration parameter at short periods, $S_S$, of 0.201 and a spectral response acceleration parameter at a period of 1 second, $S_1$, of 0.054.
- AT&T policy forbids walking on or suspending below T-arm mounts. This analysis does not include live load conditions for this mount.
- The existing mount is secured to the existing pole extension with ring mounts and threaded rods. TEP NE considers the threaded rods to be the governing connection member.

Based on our evaluation, we have determined that the existing mount **IS NOT CAPABLE** of supporting the proposed installation. TEP NE recommends the following modifications:

- **Remove existing antenna pipe mast and install proposed 2-1/2" std. (2.88" O.D.) pipe mast secured to the existing mount and handrail (typ. of 3 per sector, total of 9).**
- **Install proposed 2" std. (2.38" O.D.) pipe brace secured to the mount face and adjacent standoff (typ. of 1 per sector, total of 3).**

| | Component | Controlling Load Case | Stress Ratio | Pass/Fail |
|---|---|---|---|---|
| **Existing Mount Rating** | 8 | LC1 | 156% | **FAIL** |
| **Modified Mount Rating** | 54 | LC1 | 84% | **PASS** |

**Reference Documents:**

- Fabrication drawings prepared Sitepro1, P/N RMV12-496, dated July 2, 2015.

This determination was based on the following limitations and assumptions:

1. TEP NE is not responsible for any modifications completed prior to and hereafter which TEP NE was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mount has been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mount must be tightened and re-plumbed prior to the installation of new appurtenances.
6. TEP NE performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
TEP Northeast

Michael Cabral
Director

STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

Daniel P. Hamm, PE
Vice President

**FIELD PHOTOS:**











# Wind & Ice
# Calculations

**Date:** 2/15/2024
**Project Name:** ORANGE CT RIDGE ROAD
**Project No.:** CT2267
**Designed By:** KM **Checked By:** MSC

TEP NORTHEAST

**2.6.5.2 Velocity Pressure Coeff:**

$K_z = 2.01\,(z/z_g)^{2/\alpha}$

| | | | |
|---|---|---|---|
| **$K_z$=** | **1.294** | z= | 111 (ft) |
| | | $z_g$= | 900 (ft) |
| | | α= | 9.5 |

Kzmin ≤ Kz ≤ 2.01

**Table 2-4**

| Exposure | $Z_g$ | α | $K_{zmin}$ | $K_c$ |
|---|---|---|---|---|
| B | 1200 ft | 7.0 | 0.70 | 0.9 |
| C | 900 ft | 9.5 | 0.85 | 1.0 |
| D | 700 ft | 11.5 | 1.03 | 1.1 |

**2.6.6.2 Topographic Factor:**

**Table 2-5**

| Topo. Category | $K_t$ | f |
|---|---|---|
| 2 | 0.43 | 1.25 |
| 3 | 0.53 | 2.0 |
| 4 | 0.72 | 1.5 |

$K_{zt} = [1+(K_c\,K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

**$K_{zt}$= 1**

*(If Category 1 then $K_{zt}$=1.0)*

Category= **1**

| | | |
|---|---|---|
| $K_h$= | 1 | |
| $K_c$= | 1.0 | (from Table 2-4) |
| $K_t$= | 0 | (from Table 2-5) |
| f= | 0 | (from Table 2-5) |
| z= | 111 | |
| $z_s$= | 145 | (Mean elevation of base of structure above sea level) |
| H= | 0 | (Ht. of the crest above surrounding terrain) |
| $K_{zt}$= | 1.00 | (from 2.6.6.2.1) |
| $K_e$= | 0.99 | (from 2.6.8) |

**2.6.10 Design Ice Thickness**

| | | | |
|---|---|---|---|
| Max Ice Thickness = | $t_i$ = | 1.00 | in |
| Importance Factor = | I= | 1.15 | (from Table 2-3) |
| | $K_{iz}$ = | 1.13 | (from Sec. 2.6.10) |

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$

$t_{iz}$ = 1.30 in

Date: 2/15/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

**2.6.9 Gust Effect Factor**

*2.6.9.1 Self Supporting Lattice Structures*

$G_h = 1.0$ Latticed Structures > 600 ft

$G_h = 0.85$ Latticed Structures 450 ft or less

$G_h = 0.85 + 0.15 [h/150 - 3.0]$ h= ht. of structure

h= 114 $G_h$= 0.85

*2.6.9.2 Guyed Masts* $G_h$= 0.85

*2.6.9.3 Pole Structures* $G_h$= 1.1

*2.6.9 Appurtenances* $G_h$= 1.0

*2.6.9.4 Structures Supported on Other Structures*
*(Cantilevered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)*

$G_h$= 1.35 **Gh= 1.00**

**2.6.11.2 Design Wind Force on Appurtenances**

**$F = q_z * G_h * (EPA)_A$**

$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$

| | | |
|---|---|---|
| $K_z$= | 1.294 | (from 2.6.5.2) |
| $K_{zt}$= | 1.0 | (from 2.6.6.2.1) |
| $K_s$= | 1.0 | (from 2.6.7) |
| $K_e$= | 0.99 | (from 2.6.8) |
| $K_d$= | 0.95 | (from Table 2-2) |
| $V_{max}$= | 130 | mph (Ultimate Wind Speed) |
| $V_{max\ (ice)}$= | 50 | mph |
| $V_{30}$= | 30 | mph |

| | |
|---|---|
| **$q_z$=** | **52.90** |
| **$q_{z\ (ice)}$=** | **7.82** |
| **$q_{z\ (30)}$=** | **2.82** |

**Table 2-2**

| Structure Type | Wind Direction Probability Factor, Kd |
|---|---|
| Latticed structures with triangular, square or rectangular cross sections | 0.85 |
| Tubular pole structures, latticed structures with other cross sections, appurtenances | 0.95 |
| Tubular pole structures supporting antennas enclosed within a cylindrical shroud | 1.00 |

Date: 2/16/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

**Determine Ca:**

**Table 2-9**

| Force Coefficients (Ca) for Appurtenances | | | | |
|---|---|---|---|---|
| Member Type | | Aspect Ratio ≤ 2.5 | Aspect Ratio = 7 | Aspect Ratio ≥ 25 |
| | | Ca | Ca | Ca |
| Flat | | 1.2 | 1.4 | 2.0 |
| Square/Rectangular HSS | | $1.2 - 2.8(r_s) \geq 0.85$ | $1.4 - 4.0(r_s) \geq 0.90$ | $2.0 - 6.0(r_s) \geq 1.25$ |
| Round | C < 39 (Subcritical) | 0.7 | 0.8 | 1.2 |
| | 39 ≤ C ≤ 78 (Transitional) | $4.14/(C^{0.485})$ | $3.66/(C^{0.415})$ | $46.8/(C^{1.0})$ |
| | C > 78 (Supercritical) | 0.5 | 0.6 | 0.6 |

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

**Ice Thickness =** 1.30 in **Angle =** 0 (deg) **Equivalent Angle =** 180 (deg)

| Appurtenances | Height | Width | Depth | Flat Area | Aspect Ratio | Ca | Force (lbs) | Force (lbs) (w/ Ice) |
|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 4.64 | 1.30 | 945 | 162 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 1.92 | 1.20 | 214 | 40 |
| AIR6419 Antenna | 31.2 | 16.1 | 9.1 | 3.49 | 1.94 | 1.20 | 221 | 41 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 4.64 | 1.30 | 945 | 162 |
| TMA2124F03V5-2D TMA | 10.4 | 9.7 | 8.3 | 0.70 | 1.07 | 1.20 | 44 | 10 |
| TMA2124F03V5-2D TMA (Shielded) | 10.4 | 0.0 | 8.3 | 0.00 | 0.00 | 1.20 | 0 | 2 |
| TMA2104F00V1-1 TMA | 8.7 | 4.1 | 7.9 | 0.25 | 2.12 | 1.20 | 16 | 5 |
| TMA2104F00V1-1 TMA (Shielded) | 8.7 | 0.0 | 7.9 | 0.00 | 0.00 | 1.20 | 0 | 2 |
| DC6 Surge Arrestor | 31.4 | 10.2 | 10.2 | 2.22 | 3.08 | 0.70 | 82 | 17 |
| HSS 4x4 | 4.0 | 12.0 | - | 0.33 | 0.33 | 1.25 | 22 | |
| 4" Pipe | 4.5 | 12.0 | - | 0.38 | 0.38 | 1.20 | 24 | |
| 3" Pipe | 3.5 | 12.0 | - | 0.29 | 0.29 | 1.20 | 19 | |
| 2-1/2" Pipe | 2.9 | 12.0 | - | 0.24 | 0.24 | 1.20 | 15 | |
| 2" Pipe | 2.4 | 12.0 | - | 0.20 | 0.20 | 1.20 | 13 | |

Date: 2/15/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

## WIND LOADS

Angle = 30 (deg) | Ice Thickness = 1.30 in. | Equivalent Angle = 210 (deg)

### WIND LOADS WITH NO ICE:

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Aspect Ratio | Aspect Ratio | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 816 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 214 | 145 | 197 |
| AIR6419 Antenna | 31.2 | 16.1 | 9.1 | 3.49 | 1.97 | 1.94 | 3.43 | 1.20 | 1.24 | 221 | 129 | 198 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 816 |
| TMA2124F03V5-2D TMA | 10.4 | 9.7 | 8.3 | 0.70 | 0.60 | 1.07 | 1.25 | 1.20 | 1.20 | 44 | 38 | 43 |
| TMA2124F03V5-2D TMA (Shielded) | 10.4 | 4.9 | 8.3 | 0.35 | 0.60 | 2.14 | 1.25 | 1.20 | 1.20 | 22 | 38 | 26 |
| TMA2104F00V1-1 TMA | 8.7 | 4.1 | 7.9 | 0.25 | 0.48 | 2.12 | 1.10 | 1.20 | 1.20 | 16 | 30 | 19 |
| TMA2104F00V1-1 TMA (Shielded) | 8.7 | 2.1 | 7.9 | 0.12 | 0.48 | 4.24 | 1.10 | 1.28 | 1.20 | 8 | 30 | 14 |

### WIND LOADS WITH ICE:

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Aspect Ratio | Aspect Ratio | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 140 |
| AIR6449 Antenna | 33.2 | 18.5 | 13.2 | 4.26 | 3.04 | 1.79 | 2.52 | 1.20 | 1.20 | 40 | 29 | 37 |
| AIR6419 Antenna | 33.8 | 18.7 | 11.7 | 4.39 | 2.75 | 1.81 | 2.89 | 1.20 | 1.22 | 41 | 26 | 37 |
| DMP65R-BU8DA Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 140 |
| TMA2124F03V5-2D TMA | 13.0 | 12.3 | 10.9 | 1.11 | 0.98 | 1.06 | 1.19 | 1.20 | 1.20 | 10 | 9 | 10 |
| TMA2124F03V5-2D TMA (Shielded) | 13.0 | 6.1 | 10.9 | 0.55 | 0.98 | 2.11 | 1.19 | 1.20 | 1.20 | 5 | 9 | 6 |
| TMA2104F00V1-1 TMA | 11.3 | 6.7 | 10.5 | 0.53 | 0.82 | 1.69 | 1.08 | 1.20 | 1.20 | 5 | 8 | 6 |
| TMA2104F00V1-1 TMA (Shielded) | 11.3 | 3.3 | 10.5 | 0.26 | 0.82 | 3.37 | 1.08 | 1.24 | 1.20 | 3 | 8 | 4 |

Date: 2/15/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

## WIND LOADS

| Angle = | 60 | (deg) | Ice Thickness = | 1.30 | in. | Equivalent Angle = | 240 | (deg) |
|---|---|---|---|---|---|---|---|---|

**WIND LOADS WITH NO ICE:**

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 559 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 214 | 145 | 162 |
| AIR6419 Antenna | 31.2 | 16.1 | 9.1 | 3.49 | 1.97 | 1.94 | 3.43 | 1.20 | 1.24 | 221 | 129 | 152 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 559 |
| TMA2124F03V5-2D TMA | 10.4 | 9.7 | 8.3 | 0.70 | 0.60 | 1.07 | 1.25 | 1.20 | 1.20 | 44 | 38 | 40 |
| TMA2124F03V5-2D TMA (Shielded) | 10.4 | 7.3 | 8.3 | 0.53 | 0.60 | 1.43 | 1.25 | 1.20 | 1.20 | 33 | 38 | 37 |
| TMA2104F00V1-1 TMA | 8.7 | 4.1 | 7.9 | 0.25 | 0.48 | 2.12 | 1.10 | 1.20 | 1.20 | 16 | 30 | 27 |
| TMA2104F00V1-1 TMA (Shielded) | 8.7 | 3.1 | 7.9 | 0.19 | 0.48 | 2.83 | 1.10 | 1.21 | 1.20 | 12 | 30 | 26 |

**WIND LOADS WITH ICE:**

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 101 |
| AIR6449 Antenna | 33.2 | 18.5 | 13.2 | 4.26 | 3.04 | 1.79 | 2.52 | 1.20 | 1.20 | 40 | 29 | 31 |
| AIR6419 Antenna | 33.8 | 18.7 | 11.7 | 4.39 | 2.75 | 1.81 | 2.89 | 1.20 | 1.22 | 41 | 26 | 30 |
| DMP65R-BU8DA Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 101 |
| TMA2124F03V5-2D TMA | 13.0 | 12.3 | 10.9 | 1.11 | 0.98 | 1.06 | 1.19 | 1.20 | 1.20 | 10 | 9 | 10 |
| TMA2124F03V5-2D TMA (Shielded) | 13.0 | 9.2 | 10.9 | 0.83 | 0.98 | 1.41 | 1.19 | 1.20 | 1.20 | 8 | 9 | 9 |
| TMA2104F00V1-1 TMA | 11.3 | 6.7 | 10.5 | 0.53 | 0.82 | 1.69 | 1.08 | 1.20 | 1.20 | 5 | 8 | 7 |
| TMA2104F00V1-1 TMA (Shielded) | 11.3 | 5.0 | 10.5 | 0.39 | 0.82 | 2.25 | 1.08 | 1.20 | 1.20 | 4 | 8 | 7 |

Date: 2/15/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

## WIND LOADS

Angle = 90 (deg) | Ice Thickness = 1.30 in. | Equivalent Angle = 270 (deg)

**WIND LOADS WITH NO ICE:**

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 430 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 214 | 145 | 145 |
| AIR6419 Antenna | 31.2 | 16.1 | 9.1 | 3.49 | 1.97 | 1.94 | 3.43 | 1.20 | 1.24 | 221 | 129 | 129 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 430 |
| TMA2124F03V5-2D TMA | 10.4 | 9.7 | 8.3 | 0.70 | 0.60 | 1.07 | 1.25 | 1.20 | 1.20 | 44 | 38 | 38 |
| TMA2124F03V5-2D TMA (Shielded) | 10.4 | 0.0 | 8.3 | 0.00 | 0.60 | 0.00 | 1.25 | 1.20 | 1.20 | 0 | 38 | 38 |
| TMA2104F00V1-1 TMA | 8.7 | 4.1 | 7.9 | 0.25 | 0.48 | 2.12 | 1.10 | 1.20 | 1.20 | 16 | 30 | 30 |
| TMA2104F00V1-1 TMA (Shielded) | 8.7 | 0.0 | 7.9 | 0.00 | 0.48 | 0.00 | 1.10 | 1.20 | 1.20 | 0 | 30 | 30 |

**WIND LOADS WITH ICE:**

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 82 |
| AIR6449 Antenna | 33.2 | 18.5 | 13.2 | 4.26 | 3.04 | 1.79 | 2.52 | 1.20 | 1.20 | 40 | 29 | 29 |
| AIR6419 Antenna | 33.8 | 18.7 | 11.7 | 4.39 | 2.75 | 1.81 | 2.89 | 1.20 | 1.22 | 41 | 26 | 26 |
| DMP65R-BU8DA Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 82 |
| TMA2124F03V5-2D TMA | 13.0 | 12.3 | 10.9 | 1.11 | 0.98 | 1.06 | 1.19 | 1.20 | 1.20 | 10 | 9 | 9 |
| TMA2124F03V5-2D TMA (Shielded) | 13.0 | 2.6 | 10.9 | 0.23 | 0.98 | 5.01 | 1.19 | 1.31 | 1.20 | 2 | 9 | 9 |
| TMA2104F00V1-1 TMA | 11.3 | 6.7 | 10.5 | 0.53 | 0.82 | 1.69 | 1.08 | 1.20 | 1.20 | 5 | 8 | 8 |
| TMA2104F00V1-1 TMA (Shielded) | 11.3 | 2.6 | 10.5 | 0.20 | 0.82 | 4.35 | 1.08 | 1.28 | 1.20 | 2 | 8 | 8 |

Date: 2/15/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

## WIND LOADS

Angle = 120 (deg) | Ice Thickness = 1.30 in. | Equivalent Angle = 300 (deg)

### WIND LOADS WITH NO ICE:

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 559 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 214 | 145 | 162 |
| AIR6419 Antenna | 31.2 | 16.1 | 9.1 | 3.49 | 1.97 | 1.94 | 3.43 | 1.20 | 1.24 | 221 | 129 | 152 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 559 |
| TMA2124F03V5-2D TMA | 10.4 | 9.7 | 8.3 | 0.70 | 0.60 | 1.07 | 1.25 | 1.20 | 1.20 | 44 | 38 | 40 |
| TMA2124F03V5-2D TMA (Shielded) | 10.4 | 7.3 | 8.3 | 0.53 | 0.60 | 1.43 | 1.25 | 1.20 | 1.20 | 33 | 38 | 37 |
| TMA2104F00V1-1 TMA | 8.7 | 4.1 | 7.9 | 0.25 | 0.48 | 2.12 | 1.10 | 1.20 | 1.20 | 16 | 30 | 27 |
| TMA2104F00V1-1 TMA (Shielded) | 8.7 | 3.1 | 7.9 | 0.19 | 0.48 | 2.83 | 1.10 | 1.21 | 1.20 | 12 | 30 | 26 |

### WIND LOADS WITH ICE:

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 101 |
| AIR6449 Antenna | 33.2 | 18.5 | 13.2 | 4.26 | 3.04 | 1.79 | 2.52 | 1.20 | 1.20 | 40 | 29 | 31 |
| AIR6419 Antenna | 33.8 | 18.7 | 11.7 | 4.39 | 2.75 | 1.81 | 2.89 | 1.20 | 1.22 | 41 | 26 | 30 |
| DMP65R-BU8DA Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 101 |
| TMA2124F03V5-2D TMA | 13.0 | 12.3 | 10.9 | 1.11 | 0.98 | 1.06 | 1.19 | 1.20 | 1.20 | 10 | 9 | 10 |
| TMA2124F03V5-2D TMA (Shielded) | 13.0 | 9.2 | 10.9 | 0.83 | 0.98 | 1.41 | 1.19 | 1.20 | 1.20 | 8 | 9 | 9 |
| TMA2104F00V1-1 TMA | 11.3 | 6.7 | 10.5 | 0.53 | 0.82 | 1.69 | 1.08 | 1.20 | 1.20 | 5 | 8 | 7 |
| TMA2104F00V1-1 TMA (Shielded) | 11.3 | 5.0 | 10.5 | 0.39 | 0.82 | 2.25 | 1.08 | 1.20 | 1.20 | 4 | 8 | 7 |

Date: 2/15/2024
Project Name: ORANGE CT RIDGE ROAD
Project No.: CT2267
Designed By: KM Checked By: MSC

TEP NORTHEAST

## WIND LOADS

Angle = 150 (deg) | Ice Thickness = 1.30 in. | Equivalent Angle = 330 (deg)

### WIND LOADS WITH NO ICE:

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 816 |
| AIR6449 Antenna | 30.6 | 15.9 | 10.6 | 3.38 | 2.25 | 1.92 | 2.89 | 1.20 | 1.22 | 214 | 145 | 197 |
| AIR6419 Antenna | 31.2 | 16.1 | 9.1 | 3.49 | 1.97 | 1.94 | 3.43 | 1.20 | 1.24 | 221 | 129 | 198 |
| DMP65R-BU8DA Antenna | 96.0 | 20.7 | 7.7 | 13.80 | 5.13 | 4.64 | 12.47 | 1.30 | 1.58 | 945 | 430 | 816 |
| TMA2124F03V5-2D TMA | 10.4 | 9.7 | 8.3 | 0.70 | 0.60 | 1.07 | 1.25 | 1.20 | 1.20 | 44 | 38 | 43 |
| TMA2124F03V5-2D TMA (Shielded) | 10.4 | 4.9 | 8.3 | 0.35 | 0.60 | 2.14 | 1.25 | 1.20 | 1.20 | 22 | 38 | 26 |
| TMA2104F00V1-1 TMA | 8.7 | 4.1 | 7.9 | 0.25 | 0.48 | 2.12 | 1.10 | 1.20 | 1.20 | 16 | 30 | 19 |
| TMA2104F00V1-1 TMA (Shielded) | 8.7 | 2.1 | 7.9 | 0.12 | 0.48 | 4.24 | 1.10 | 1.28 | 1.20 | 8 | 30 | 14 |

### WIND LOADS WITH ICE:

| Appurtenances | Height | Width | Depth | Flat Area (normal) | Flat Area (side) | Ratio (normal) | Ratio (side) | Ca (normal) | Ca (side) | Force (lbs) (normal) | Force (lbs) (side) | Force (lbs) (angle) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TPA65R-BU8DA-K Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 140 |
| AIR6449 Antenna | 33.2 | 18.5 | 13.2 | 4.26 | 3.04 | 1.79 | 2.52 | 1.20 | 1.20 | 40 | 29 | 37 |
| AIR6419 Antenna | 33.8 | 18.7 | 11.7 | 4.39 | 2.75 | 1.81 | 2.89 | 1.20 | 1.22 | 41 | 26 | 37 |
| DMP65R-BU8DA Antenna | 98.6 | 23.3 | 10.3 | 15.95 | 7.05 | 4.23 | 9.58 | 1.28 | 1.49 | 159 | 82 | 140 |
| TMA2124F03V5-2D TMA | 13.0 | 12.3 | 10.9 | 1.11 | 0.98 | 1.06 | 1.19 | 1.20 | 1.20 | 10 | 9 | 10 |
| TMA2124F03V5-2D TMA (Shielded) | 13.0 | 6.1 | 10.9 | 0.55 | 0.98 | 2.11 | 1.19 | 1.20 | 1.20 | 5 | 9 | 6 |
| TMA2104F00V1-1 TMA | 11.3 | 6.7 | 10.5 | 0.53 | 0.82 | 1.69 | 1.08 | 1.20 | 1.20 | 5 | 8 | 6 |
| TMA2104F00V1-1 TMA (Shielded) | 11.3 | 3.3 | 10.5 | 0.26 | 0.82 | 3.37 | 1.08 | 1.24 | 1.20 | 3 | 8 | 4 |

**Date:** 2/16/2024
**Project Name:** ORANGE CT RIDGE ROAD
**Project No.:** CT2267
**Designed By:** KM **Checked By:** MSC

# ICE WEIGHT CALCULATIONS

| | | |
|---|---|---|
| Thickness of ice: | 1.30 | in. |
| Density of ice: | 56 | pcf |

**TPA65R-BU8DA-K Antenna**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 96.0 | |
| Width (in): | 20.7 | |
| Depth (in): | 7.7 | |
| Total weight of ice on object: | 297 | lbs |
| Weight of object: | 87.0 | lbs |
| Combined weight of ice and object: | 384 | lbs |

**AIR6449 Antenna**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 30.6 | |
| Width (in): | 15.9 | |
| Depth (in): | 10.6 | |
| Total weight of ice on object: | 83 | lbs |
| Weight of object: | 84.0 | lbs |
| Combined weight of ice and object: | 167 | lbs |

**AIR6419 Antenna**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 31.2 | |
| Width (in): | 16.1 | |
| Depth (in): | 9.1 | |
| Total weight of ice on object: | 82 | lbs |
| Weight of object: | 66.0 | lbs |
| Combined weight of ice and object: | 148 | lbs |

**DMP65R-BU8DA Antenna**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 96.0 | |
| Width (in): | 20.7 | |
| Depth (in): | 7.7 | |
| Total weight of ice on object: | 297 | lbs |
| Weight of object: | 119.0 | lbs |
| Combined weight of ice and object: | 416 | lbs |

**TMA2124F03V5-2D TMA**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 10.4 | |
| Width (in): | 9.7 | |
| Depth (in): | 8.3 | |
| Total weight of ice on object: | 19 | lbs |
| Weight of object: | 36.0 | lbs |
| Combined weight of ice and object: | 55 | lbs |

**TMA2104F00V1-1 TMA**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 8.7 | |
| Width (in): | 4.1 | |
| Depth (in): | 7.9 | |
| Total weight of ice on object: | 12 | lbs |
| Weight of object: | 8.0 | lbs |
| Combined weight of ice and object: | 20 | lbs |

**DC6 Surge Arrestor**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Depth (in): | 31.4 | |
| Diameter(in): | 10.2 | |
| Total weight of ice on object: | 48 | lbs |
| Weight of object: | 29 | lbs |
| Combined weight of ice and object: | 77 | lbs |

**HSS 4x4**

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 4 | |
| Width (in): | 4 | |
| Per foot weight of ice on object: | 11 | plf |

**4" Pipe**

Per foot weight of ice:

| | | |
|---|---|---|
| diameter (in): | 4.5 | |
| Per foot weight of ice on object: | 9 | plf |

**3" Pipe**

Per foot weight of ice:

| | | |
|---|---|---|
| diameter (in): | 3.5 | |
| Per foot weight of ice on object: | 8 | plf |

**2-1/2" Pipe**

Per foot weight of ice:

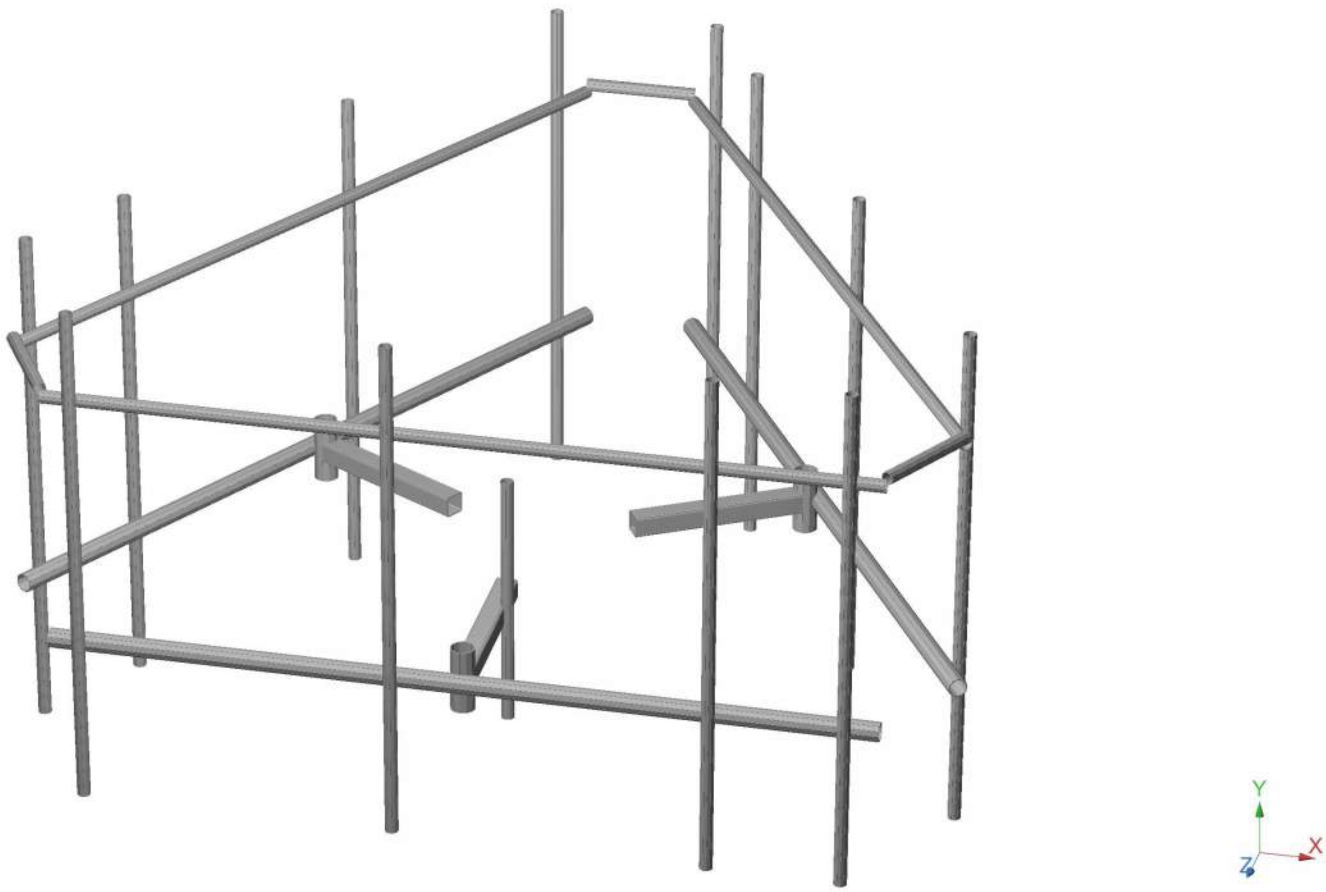
| | | |
|---|---|---|
| diameter (in): | 2.88 | |
| Per foot weight of ice on object: | 7 | plf |

**2" Pipe**

Per foot weight of ice:

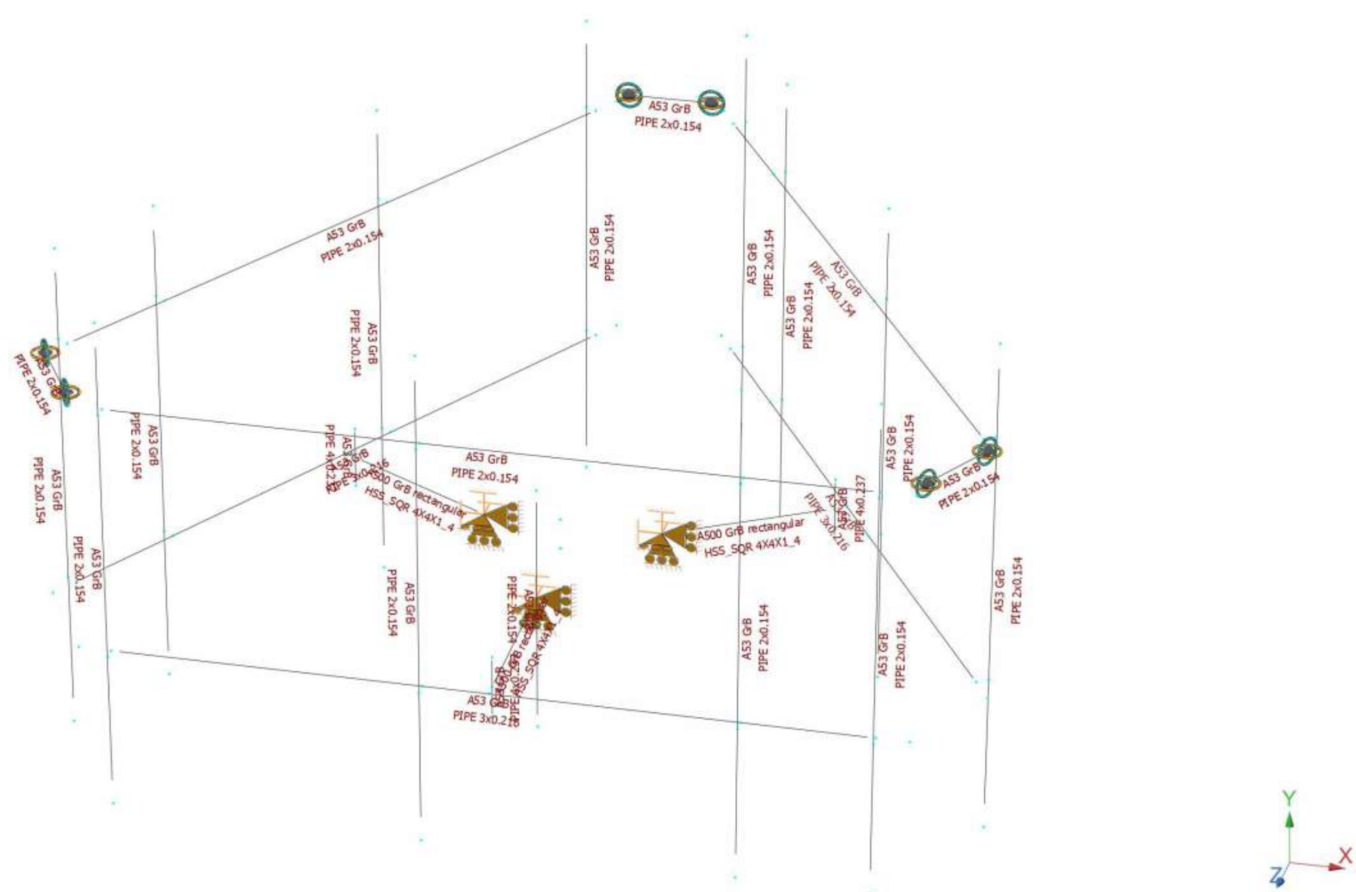
| | | |
|---|---|---|
| diameter (in): | 2.38 | |
| Per foot weight of ice on object: | 6 | plf |

**Mount Calculations**
**(Existing Conditions)**



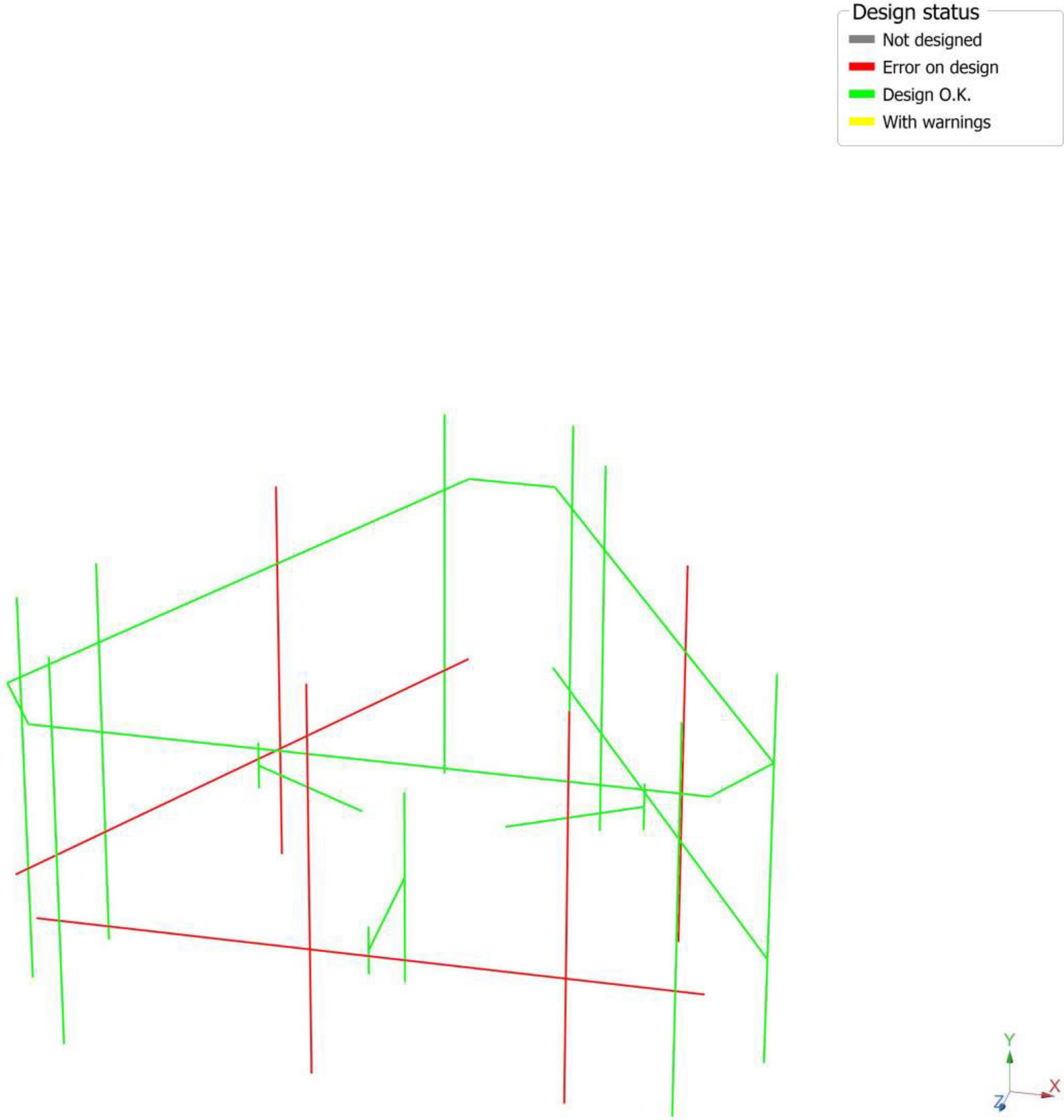
![RAM Elements CONNECT Edition]

**Current Date:** 2/16/2024 10:59 AM
**Units system:** English

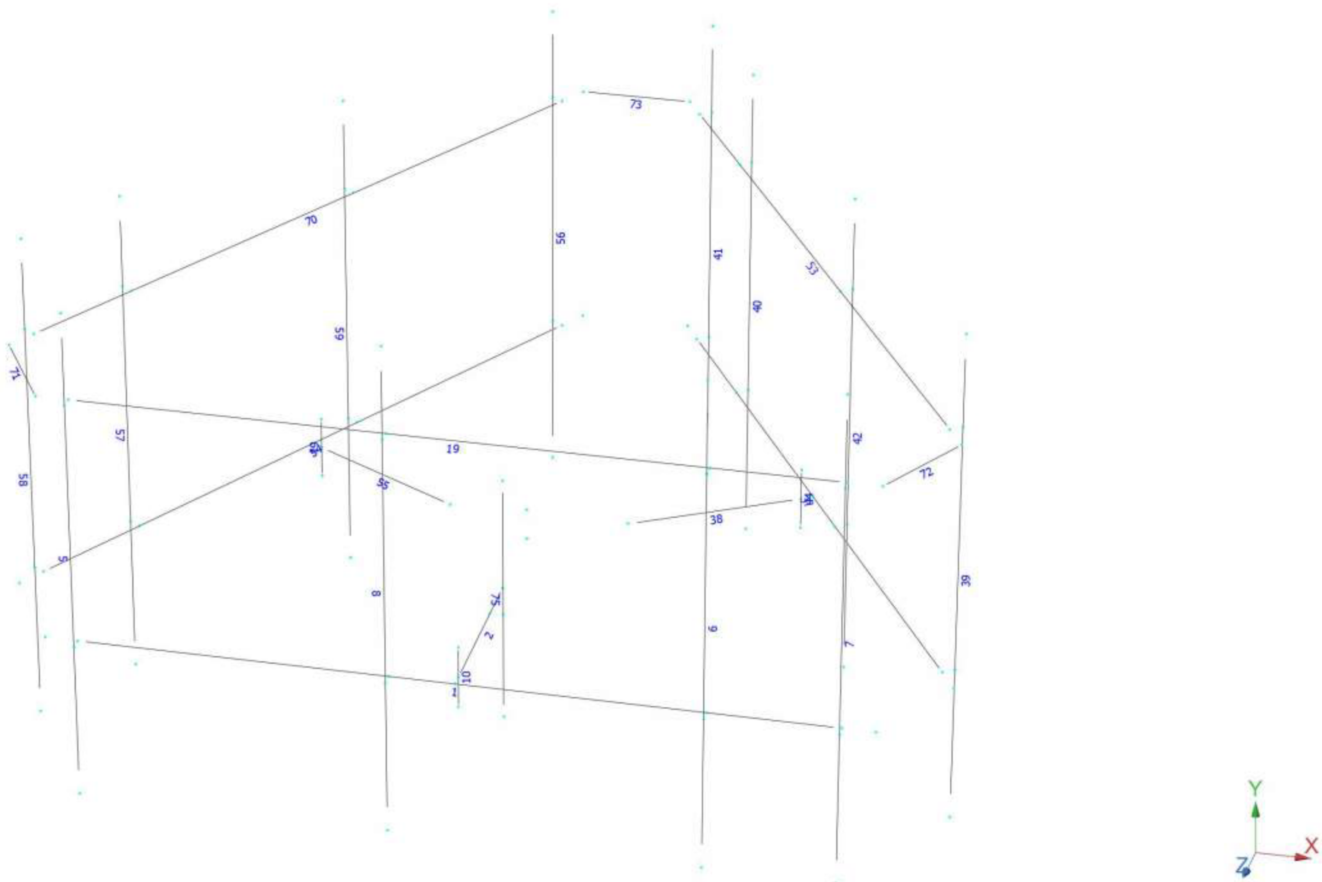


RAM® Elements
CONNECT Edition

**Current Date:** 2/16/2024 11:00 AM
**Units system:** English



**Current Date:** 2/16/2024 11:00 AM
**Units system:** English



**Current Date:** 2/16/2024 11:00 AM
**Units system:** English

# Load data

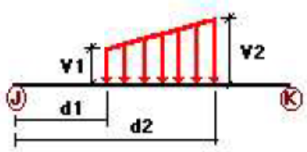
GLOSSARY

Comb : Indicates if load condition is a load combination

## Load Conditions

| Condition | Description | Comb. | Category |
|---|---|---|---|
| DL | Dead Load | No | DL |
| W0 | Wind Load 0/60/120 deg | No | WIND |
| W30 | Wind Load 30/90/150 deg | No | WIND |
| Di | Ice Load | No | LL |
| Wi0 | Ice Wind Load 0/60/120 deg | No | WIND |
| Wi30 | Ice Wind Load 30/90/150 deg | No | WIND |

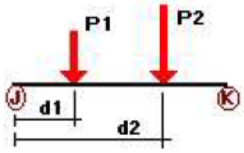
## Distributed force on members




| Condition | Member | Dir1 | Val1 [Kip/ft] | Val2 [Kip/ft] | Dist1 [ft] | % | Dist2 [ft] | % |
|---|---|---|---|---|---|---|---|---|
| W0 | 1 | z | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 7 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 10 | z | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 19 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 37 | z | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 38 | z | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 39 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 40 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 41 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 42 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 44 | z | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 53 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 54 | z | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 55 | z | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 56 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 57 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 58 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 59 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 61 | z | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 70 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 71 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 72 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 73 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 75 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| W30 | 2 | x | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 5 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 6 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 7 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 8 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 10 | x | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 19 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 37 | x | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 38 | x | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 41 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 44 | x | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 53 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 54 | x | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 55 | x | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 56 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 57 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 58 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 59 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 61 | x | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 70 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 71 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 72 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 73 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 75 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| Di | 1 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 2 | y | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 5 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 6 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 7 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 8 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 10 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 19 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 37 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 38 | y | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 39 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 40 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 41 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 42 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 44 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 53 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 54 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 55 | y | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 56 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 57 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 58 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 59 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 61 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 70 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 71 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 72 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 73 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 75 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |

## Concentrated forces on members




| Condition | Member | Dir1 | Value1 [Kip] | Dist1 [ft] | % |
|---|---|---|---|---|---|
| DL | 5 | y | -0.06 | 0.50 | No |
| | | y | -0.06 | 7.50 | No |
| | | y | -0.008 | 4.00 | No |
| | | y | -0.008 | 4.00 | No |
| | 6 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | | y | -0.036 | 4.00 | No |
| | 8 | y | -0.033 | 1.00 | No |
| | | y | -0.033 | 3.00 | No |
| | | y | -0.041 | 5.00 | No |
| | | y | -0.041 | 7.00 | No |
| | 39 | y | -0.06 | 0.50 | No |
| | | y | -0.06 | 7.50 | No |
| | | y | -0.008 | 4.00 | No |
| | | y | -0.008 | 4.00 | No |
| | 40 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | | y | -0.036 | 4.00 | No |
| | 42 | y | -0.033 | 1.00 | No |
| | | y | -0.033 | 3.00 | No |
| | | y | -0.041 | 5.00 | No |
| | | y | -0.041 | 7.00 | No |
| | 56 | y | -0.06 | 0.50 | No |
| | | y | -0.06 | 7.50 | No |
| | | y | -0.008 | 4.00 | No |
| | | y | -0.008 | 4.00 | No |
| | 57 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | | y | -0.036 | 4.00 | No |
| | 59 | y | -0.033 | 1.00 | No |
| | | y | -0.033 | 3.00 | No |
| | | y | -0.041 | 5.00 | No |
| | | y | -0.041 | 7.00 | No |
| | 75 | y | -0.029 | 1.00 | No |
| W0 | 5 | z | -0.473 | 0.50 | No |
| | | z | -0.473 | 7.50 | No |
| | 6 | z | -0.473 | 0.50 | No |
| | | z | -0.473 | 7.50 | No |
| | 8 | z | -0.111 | 1.00 | No |
| | | z | -0.111 | 3.00 | No |
| | | z | -0.107 | 5.00 | No |
| | | z | -0.107 | 7.00 | No |
| | 39 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |
| | | z | -0.026 | 4.00 | No |
| | 40 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |
| | | z | -0.037 | 4.00 | No |
| | 42 | z | -0.076 | 1.00 | No |
| | | z | -0.076 | 3.00 | No |
| | | z | -0.081 | 5.00 | No |
| | | z | -0.081 | 7.00 | No |
| | 56 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |

| | | | | | |
|---|---|---|---|---|---|
| | | z | -0.026 | 4.00 | No |
| | 57 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |
| | | z | -0.037 | 4.00 | No |
| | 59 | z | -0.076 | 1.00 | No |
| | | z | -0.076 | 3.00 | No |
| | | z | -0.081 | 5.00 | No |
| | | z | -0.081 | 7.00 | No |
| | 75 | z | -0.082 | 1.00 | No |
| W30 | 5 | x | -0.215 | 0.50 | No |
| | | x | -0.215 | 7.50 | No |
| | | x | -0.03 | 4.00 | No |
| | 6 | x | -0.215 | 0.50 | No |
| | | x | -0.215 | 7.50 | No |
| | | x | -0.038 | 4.00 | No |
| | 8 | x | -0.065 | 1.00 | No |
| | | x | -0.065 | 3.00 | No |
| | | x | -0.073 | 5.00 | No |
| | | x | -0.073 | 7.00 | No |
| | 39 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.014 | 4.00 | No |
| | 40 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.026 | 4.00 | No |
| | 42 | x | -0.099 | 1.00 | No |
| | | x | -0.099 | 3.00 | No |
| | | x | -0.099 | 5.00 | No |
| | | x | -0.099 | 7.00 | No |
| | 56 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.014 | 4.00 | No |
| | 57 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.026 | 4.00 | No |
| | 59 | x | -0.099 | 1.00 | No |
| | | x | -0.099 | 3.00 | No |
| | | x | -0.099 | 5.00 | No |
| | | x | -0.099 | 7.00 | No |
| | 75 | x | -0.082 | 1.00 | No |
| Di | 5 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.012 | 4.00 | No |
| | | y | -0.012 | 4.00 | No |
| | 6 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.019 | 4.00 | No |
| | 8 | y | -0.041 | 1.00 | No |
| | | y | -0.041 | 3.00 | No |
| | | y | -0.042 | 5.00 | No |
| | | y | -0.042 | 7.00 | No |
| | 39 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.012 | 4.00 | No |
| | | y | -0.012 | 4.00 | No |
| | 40 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.019 | 4.00 | No |
| | 42 | y | -0.041 | 1.00 | No |
| | | y | -0.041 | 3.00 | No |

| | | | | | |
|---|---|---|---|---|---|
| | | y | -0.042 | 5.00 | No |
| | | y | -0.042 | 7.00 | No |
| | 56 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.012 | 4.00 | No |
| | | y | -0.012 | 4.00 | No |
| | 57 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.019 | 4.00 | No |
| | 59 | y | -0.041 | 1.00 | No |
| | | y | -0.041 | 3.00 | No |
| | | y | -0.042 | 5.00 | No |
| | | y | -0.042 | 7.00 | No |
| | 75 | y | -0.048 | 1.00 | No |
| Wi0 | 5 | z | -0.081 | 0.50 | No |
| | | z | -0.081 | 7.50 | No |
| | | z | -0.002 | 4.00 | No |
| | 6 | z | -0.081 | 0.50 | No |
| | | z | -0.081 | 7.50 | No |
| | | z | -0.002 | 4.00 | No |
| | 8 | z | -0.021 | 1.00 | No |
| | | z | -0.021 | 3.00 | No |
| | | z | -0.02 | 5.00 | No |
| | | z | -0.02 | 7.00 | No |
| | 39 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.007 | 4.00 | No |
| | 40 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.009 | 4.00 | No |
| | 42 | z | -0.015 | 1.00 | No |
| | | z | -0.015 | 3.00 | No |
| | | z | -0.016 | 5.00 | No |
| | | z | -0.016 | 7.00 | No |
| | 56 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.007 | 4.00 | No |
| | 57 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.009 | 4.00 | No |
| | 59 | z | -0.015 | 1.00 | No |
| | | z | -0.015 | 3.00 | No |
| | | z | -0.016 | 5.00 | No |
| | | z | -0.016 | 7.00 | No |
| | 75 | z | -0.017 | 1.00 | No |
| Wi30 | 5 | x | -0.041 | 0.50 | No |
| | | x | -0.041 | 7.50 | No |
| | | x | -0.008 | 4.00 | No |
| | 6 | x | -0.041 | 0.50 | No |
| | | x | -0.041 | 7.50 | No |
| | | x | -0.009 | 4.00 | No |
| | 8 | x | -0.013 | 1.00 | No |
| | | x | -0.013 | 3.00 | No |
| | | x | -0.015 | 5.00 | No |
| | | x | -0.015 | 7.00 | No |
| | 39 | x | -0.07 | 0.50 | No |
| | | x | -0.07 | 7.50 | No |
| | | x | -0.004 | 4.00 | No |
| | 40 | x | -0.07 | 0.50 | No |
| | | x | -0.07 | 7.50 | No |

| | | | | |
|---|---|---|---|---|
| | x | -0.006 | 4.00 | No |
| 42 | x | -0.019 | 1.00 | No |
| | x | -0.019 | 3.00 | No |
| | x | -0.019 | 5.00 | No |
| | x | -0.019 | 7.00 | No |
| 56 | x | -0.07 | 0.50 | No |
| | x | -0.07 | 7.50 | No |
| | x | -0.004 | 4.00 | No |
| 57 | x | -0.07 | 0.50 | No |
| | x | -0.07 | 7.50 | No |
| | x | -0.006 | 4.00 | No |
| 59 | x | -0.019 | 1.00 | No |
| | x | -0.019 | 3.00 | No |
| | x | -0.019 | 5.00 | No |
| | x | -0.019 | 7.00 | No |
| 75 | x | -0.017 | 1.00 | No |

## Self weight multipliers for load conditions

| | | Self weight multiplier | | | |
|---|---|---|---|---|---|
| **Condition** | **Description** | **Comb.** | **MultX** | **MultY** | **MultZ** |
| DL | Dead Load | No | 0.00 | -1.00 | 0.00 |
| W0 | Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| W30 | Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| Di | Ice Load | No | 0.00 | 0.00 | 0.00 |
| Wi0 | Ice Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| Wi30 | Ice Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |

**Current Date:** 2/16/2024 11:00 AM
**Units system:** English

# Steel Code Check

**Report: Summary - Group by member**

**Load conditions to be included in design :**

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.4DL
LC16=1.2DL

| Description | Section | Member | Ctrl Eq. | Ratio | Status | Reference |
|---|---|---|---|---|---|---|
| | ***HSS_SQR 4X4X1_4*** | **2** | LC2 at 0.00% | 0.53 | OK | |
| | | **38** | LC1 at 0.00% | 0.64 | OK | |
| | | **55** | LC1 at 0.00% | **0.68** | **OK** | |
| | ***PIPE 2x0.154*** | **5** | LC1 at 66.67% | 0.98 | OK | |
| | | **6** | LC1 at 66.67% | 1.02 | N.G. | |
| | | **7** | LC1 at 66.67% | 0.63 | OK | |
| | | **8** | LC1 at 66.67% | **1.56** | **N.G.** | |
| | | **19** | LC1 at 41.25% | 0.49 | OK | |
| | | **39** | LC2 at 66.67% | 0.82 | OK | |
| | | **40** | LC2 at 66.67% | 0.90 | OK | |
| | | **41** | LC2 at 66.67% | 0.63 | OK | |
| | | **42** | LC2 at 66.67% | 1.32 | N.G. | |
| | | **53** | LC4 at 42.50% | 0.62 | OK | |
| | | **56** | LC4 at 66.67% | 0.85 | OK | |
| | | **57** | LC4 at 66.67% | 0.87 | OK | |
| | | **58** | LC4 at 66.67% | 0.52 | OK | |
| | | **59** | LC4 at 66.67% | 1.37 | N.G. | |
| | | **70** | LC4 at 42.50% | 0.56 | OK | |
| | | **71** | LC3 at 100.00% | 0.01 | OK | |
| | | **72** | LC4 at 50.00% | 0.00 | OK | |
| | | **73** | LC2 at 0.00% | 0.01 | OK | |
| | | **75** | LC2 at 53.13% | 0.07 | OK | |
| | ***PIPE 3x0.216*** | **1** | LC1 at 48.96% | 1.01 | N.G. | |
| | | **37** | LC2 at 50.00% | 1.00 | OK | |
| | | **54** | LC4 at 48.96% | **1.12** | **N.G.** | |
| | ***PIPE 4x0.237*** | **10** | LC2 at 50.00% | **0.00** | **OK** | |
| | | **44** | LC4 at 50.00% | 0.00 | OK | |
| | | **61** | LC1 at 50.00% | 0.00 | OK | |

**Current Date:** 2/16/2024 11:00 AM
**Units system:** English

# Geometry data

GLOSSARY

| | |
|---|---|
| Cb22, Cb33 | : Moment gradient coefficients |
| Cm22, Cm33 | : Coefficients applied to bending term in interaction formula |
| d0 | : Tapered member section depth at J end of member |
| DJX | : Rigid end offset distance measured from J node in axis X |
| DJY | : Rigid end offset distance measured from J node in axis Y |
| DJZ | : Rigid end offset distance measured from J node in axis Z |
| DKX | : Rigid end offset distance measured from K node in axis X |
| DKY | : Rigid end offset distance measured from K node in axis Y |
| DKZ | : Rigid end offset distance measured from K node in axis Z |
| dL | : Tapered member section depth at K end of member |
| Ig factor | : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members |
| K22 | : Effective length factor about axis 2 |
| K33 | : Effective length factor about axis 3 |
| L22 | : Member length for calculation of axial capacity |
| L33 | : Member length for calculation of axial capacity |
| LB pos | : Lateral unbraced length of the compression flange in the positive side of local axis 2 |
| LB neg | : Lateral unbraced length of the compression flange in the negative side of local axis 2 |
| RX | : Rotation about X |
| RY | : Rotation about Y |
| RZ | : Rotation about Z |
| TO | : 1 = Tension only member 0 = Normal member |
| TX | : Translation in X |
| TY | : Translation in Y |
| TZ | : Translation in Z |

## Nodes

| Node | X [ft] | Y [ft] | Z [ft] | Rigid Floor |
|---|---|---|---|---|
| 1 | -6.25 | 0.00 | 0.00 | 0 |
| 2 | 6.25 | 0.00 | 0.00 | 0 |
| 3 | 0.00 | 0.00 | -0.20 | 0 |
| 4 | 0.00 | 0.00 | -3.00 | 0 |
| 8 | -5.75 | 5.50 | 0.20 | 0 |
| 9 | 3.75 | 5.50 | 0.20 | 0 |
| 10 | 5.75 | 5.50 | 0.20 | 0 |
| 11 | -1.00 | 5.50 | 0.20 | 0 |
| 12 | -5.75 | -2.50 | 0.20 | 0 |
| 13 | 3.75 | -2.50 | 0.20 | 0 |
| 14 | 5.75 | -2.50 | 0.20 | 0 |
| 15 | -1.00 | -2.50 | 0.20 | 0 |
| 16 | 0.00 | 0.00 | 0.00 | 0 |
| 17 | 0.00 | 0.50 | -0.20 | 0 |
| 18 | 0.00 | -0.50 | -0.20 | 0 |
| 19 | -5.75 | 0.00 | 0.00 | 0 |
| 20 | -1.00 | 0.00 | 0.00 | 0 |
| 21 | 3.75 | 0.00 | 0.00 | 0 |
| 22 | 5.75 | 0.00 | 0.00 | 0 |
| 23 | 5.75 | 0.00 | 0.20 | 0 |
| 24 | 3.75 | 0.00 | 0.20 | 0 |
| 25 | -1.00 | 0.00 | 0.20 | 0 |
| 26 | -5.75 | 0.00 | 0.20 | 0 |

| | | | | |
|---|---|---|---|---|
| 27 | -6.25 | 4.00 | 0.00 | 0 |
| 28 | -5.75 | 4.00 | 0.00 | 0 |
| 29 | -5.75 | 4.00 | 0.20 | 0 |
| 30 | -1.00 | 4.00 | 0.00 | 0 |
| 31 | -1.00 | 4.00 | 0.20 | 0 |
| 32 | 6.25 | 4.00 | 0.00 | 0 |
| 33 | 3.75 | 4.00 | 0.00 | 0 |
| 34 | 5.75 | 4.00 | 0.00 | 0 |
| 35 | 5.75 | 4.00 | 0.20 | 0 |
| 36 | 3.75 | 4.00 | 0.20 | 0 |
| 37 | 0.00 | 0.00 | -4.62 | 0 |
| 38 | 0.00 | 0.50 | -4.62 | 0 |
| 72 | 7.126 | 0.00 | -1.5173 | 0 |
| 73 | 0.876 | 0.00 | -12.3427 | 0 |
| 74 | 3.8278 | 0.00 | -6.83 | 0 |
| 75 | 1.403 | 0.00 | -5.43 | 0 |
| 76 | 7.0492 | 5.50 | -2.0504 | 0 |
| 77 | 2.2992 | 5.50 | -10.2776 | 0 |
| 78 | 1.2992 | 5.50 | -12.0096 | 0 |
| 79 | 4.6742 | 5.50 | -6.164 | 0 |
| 80 | 7.0492 | -2.50 | -2.0504 | 0 |
| 81 | 2.2992 | -2.50 | -10.2776 | 0 |
| 82 | 1.2992 | -2.50 | -12.0096 | 0 |
| 83 | 4.6742 | -2.50 | -6.164 | 0 |
| 84 | 4.001 | 0.00 | -6.93 | 0 |
| 85 | 3.8278 | 0.50 | -6.83 | 0 |
| 86 | 3.8278 | -0.50 | -6.83 | 0 |
| 87 | 6.876 | 0.00 | -1.9504 | 0 |
| 88 | 4.501 | 0.00 | -6.064 | 0 |
| 89 | 2.126 | 0.00 | -10.1776 | 0 |
| 90 | 1.126 | 0.00 | -11.9096 | 0 |
| 91 | 1.2992 | 0.00 | -12.0096 | 0 |
| 92 | 2.2992 | 0.00 | -10.2776 | 0 |
| 93 | 4.6742 | 0.00 | -6.164 | 0 |
| 94 | 7.0492 | 0.00 | -2.0504 | 0 |
| 95 | 7.126 | 4.00 | -1.5173 | 0 |
| 96 | 6.876 | 4.00 | -1.9504 | 0 |
| 97 | 7.0492 | 4.00 | -2.0504 | 0 |
| 98 | 4.501 | 4.00 | -6.064 | 0 |
| 99 | 4.6742 | 4.00 | -6.164 | 0 |
| 100 | 0.876 | 4.00 | -12.3427 | 0 |
| 101 | 2.126 | 4.00 | -10.1776 | 0 |
| 102 | 1.126 | 4.00 | -11.9096 | 0 |
| 103 | 1.2992 | 4.00 | -12.0096 | 0 |
| 104 | 2.2992 | 4.00 | -10.2776 | 0 |
| 105 | -0.876 | 0.00 | -12.3427 | 0 |
| 106 | -7.126 | 0.00 | -1.5173 | 0 |
| 107 | -3.8278 | 0.00 | -6.83 | 0 |
| 108 | -1.403 | 0.00 | -5.43 | 0 |
| 109 | -1.2992 | 5.50 | -12.0096 | 0 |
| 110 | -6.0492 | 5.50 | -3.7824 | 0 |
| 111 | -7.0492 | 5.50 | -2.0504 | 0 |
| 112 | -3.6742 | 5.50 | -7.896 | 0 |
| 113 | -1.2992 | -2.50 | -12.0096 | 0 |
| 114 | -6.0492 | -2.50 | -3.7824 | 0 |
| 115 | -7.0492 | -2.50 | -2.0504 | 0 |
| 116 | -3.6742 | -2.50 | -7.896 | 0 |
| 117 | -4.001 | 0.00 | -6.93 | 0 |
| 118 | -3.8278 | 0.50 | -6.83 | 0 |
| 119 | -3.8278 | -0.50 | -6.83 | 0 |

| | | | | |
|---|---|---|---|---|
| 120 | -1.126 | 0.00 | -11.9096 | 0 |
| 121 | -3.501 | 0.00 | -7.796 | 0 |
| 122 | -5.876 | 0.00 | -3.6824 | 0 |
| 123 | -6.876 | 0.00 | -1.9504 | 0 |
| 124 | -7.0492 | 0.00 | -2.0504 | 0 |
| 125 | -6.0492 | 0.00 | -3.7824 | 0 |
| 126 | -3.6742 | 0.00 | -7.896 | 0 |
| 127 | -1.2992 | 0.00 | -12.0096 | 0 |
| 128 | -0.876 | 4.00 | -12.3427 | 0 |
| 129 | -1.126 | 4.00 | -11.9096 | 0 |
| 130 | -1.2992 | 4.00 | -12.0096 | 0 |
| 131 | -3.501 | 4.00 | -7.796 | 0 |
| 132 | -3.6742 | 4.00 | -7.896 | 0 |
| 133 | -7.126 | 4.00 | -1.5173 | 0 |
| 134 | -5.876 | 4.00 | -3.6824 | 0 |
| 135 | -6.876 | 4.00 | -1.9504 | 0 |
| 136 | -7.0492 | 4.00 | -2.0504 | 0 |
| 137 | -6.0492 | 4.00 | -3.7824 | 0 |
| 138 | 0.00 | 0.00 | -2.20 | 0 |
| 139 | 0.20 | 0.00 | -2.20 | 0 |
| 140 | 0.20 | 2.25 | -2.20 | 0 |
| 141 | 0.20 | -1.75 | -2.20 | 0 |

## Restraints

| Node | TX | TY | TZ | RX | RY | RZ |
|---|---|---|---|---|---|---|
| 4 | 1 | 1 | 1 | 1 | 1 | 1 |
| 75 | 1 | 1 | 1 | 1 | 1 | 1 |
| 108 | 1 | 1 | 1 | 1 | 1 | 1 |

## Members

| Member | NJ | NK | Description | Section | Material | d0 [in] | dL [in] | Ig factor |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 3 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 5 | 8 | 12 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 6 | 9 | 13 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 7 | 10 | 14 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 8 | 11 | 15 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 10 | 18 | 17 | | PIPE 4x0.237 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 19 | 27 | 32 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 37 | 72 | 73 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 38 | 75 | 74 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 39 | 76 | 80 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 40 | 77 | 81 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 41 | 78 | 82 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 42 | 79 | 83 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 44 | 86 | 85 | | PIPE 4x0.237 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 53 | 95 | 100 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 54 | 105 | 106 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 55 | 108 | 107 | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 56 | 109 | 113 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 57 | 110 | 114 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 58 | 111 | 115 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 59 | 112 | 116 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 61 | 119 | 118 | PIPE 4x0.237 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 70 | 128 | 133 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 71 | 27 | 133 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 72 | 32 | 95 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 73 | 100 | 128 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 75 | 140 | 141 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |

## Orientation of local axes

| Member | Rotation [Deg] | Axes23 | NX | NY | NZ |
|---|---|---|---|---|---|
| 5 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 6 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 7 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 8 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 39 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 40 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 41 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 42 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 44 | 0.00 | 2 | 0.50 | 0.00 | 0.866 |
| 56 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 57 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 58 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 59 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 61 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |

## Rigid end offsets

| Member | DJX [in] | DJY [in] | DJZ [in] | DKX [in] | DKY [in] | DKZ [in] |
|---|---|---|---|---|---|---|
| 71 | 0.00 | 1.50 | 0.00 | 0.00 | 1.50 | 0.00 |
| 72 | 0.00 | 1.50 | 0.00 | 0.00 | 1.50 | 0.00 |
| 73 | 0.00 | 1.50 | 0.00 | 0.00 | 1.50 | 0.00 |

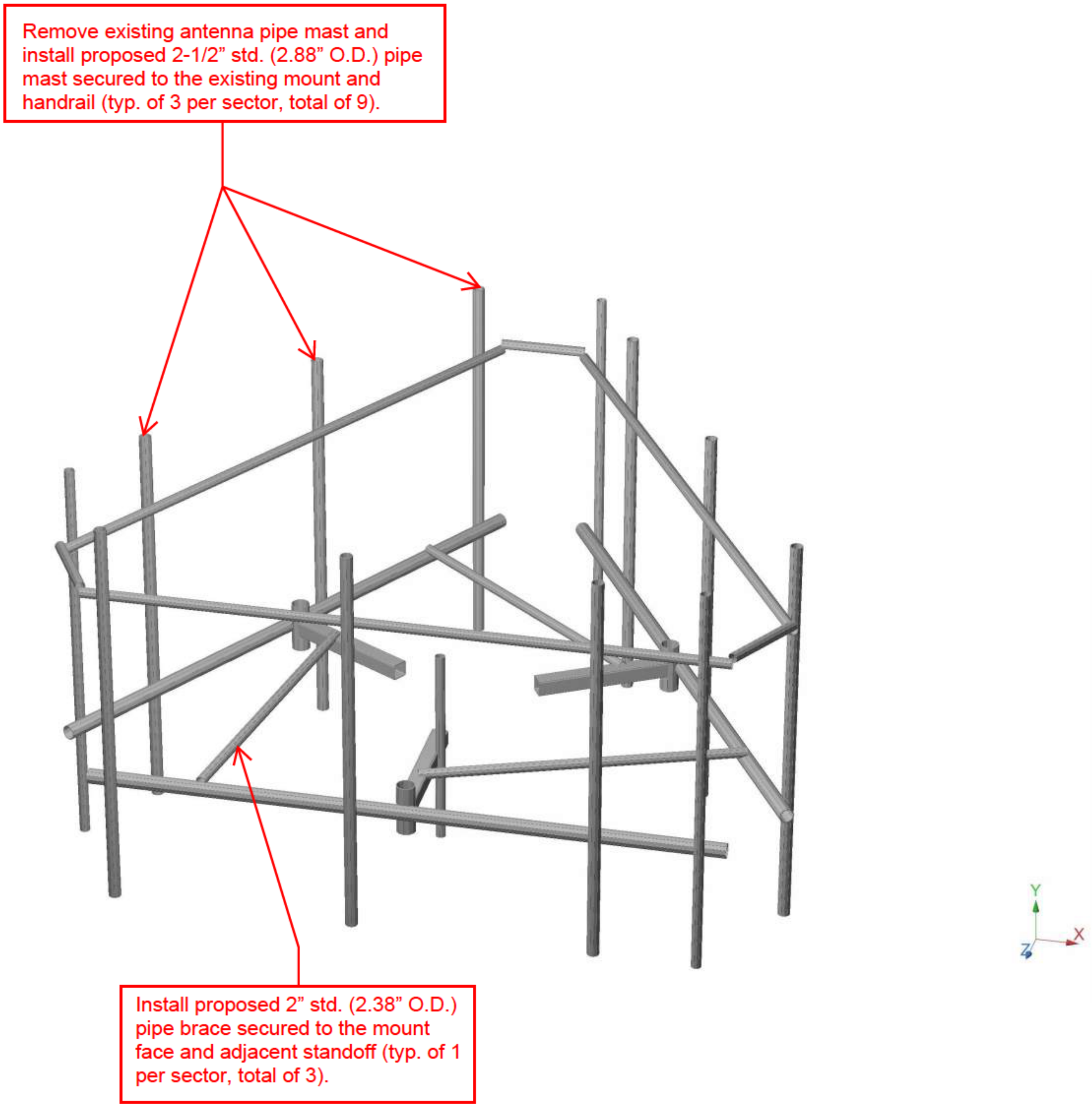
## Hinges

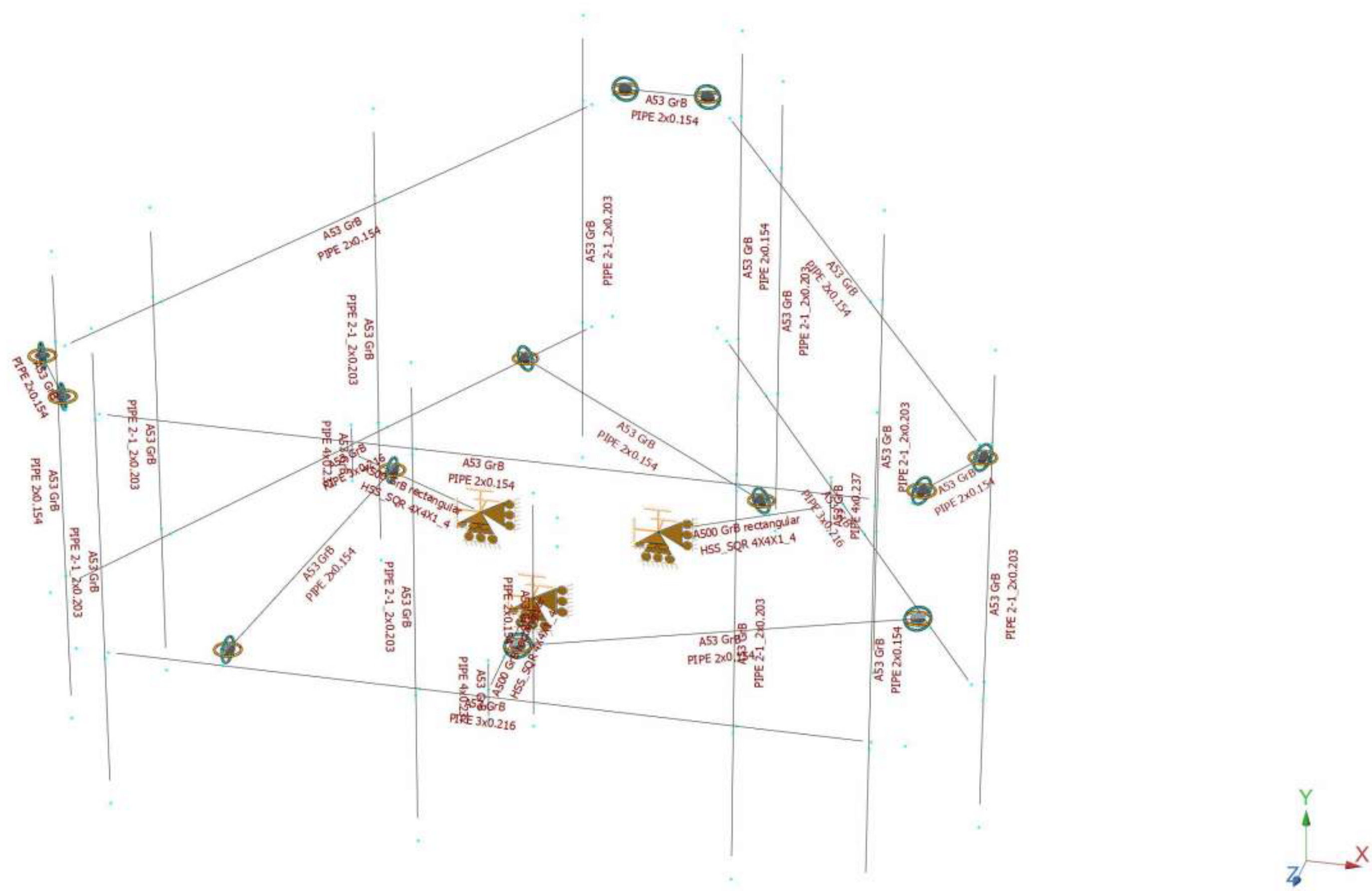
| | Node-J | | | | Node-K | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Member | M33 | M22 | V3 | V2 | M33 | M22 | V3 | V2 | TOR | AXL | Axial rigidity |
| 71 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 72 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 73 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |

**Mount Calculations**
**(Modified Conditions)**

RAM® Elements
CONNECT Edition

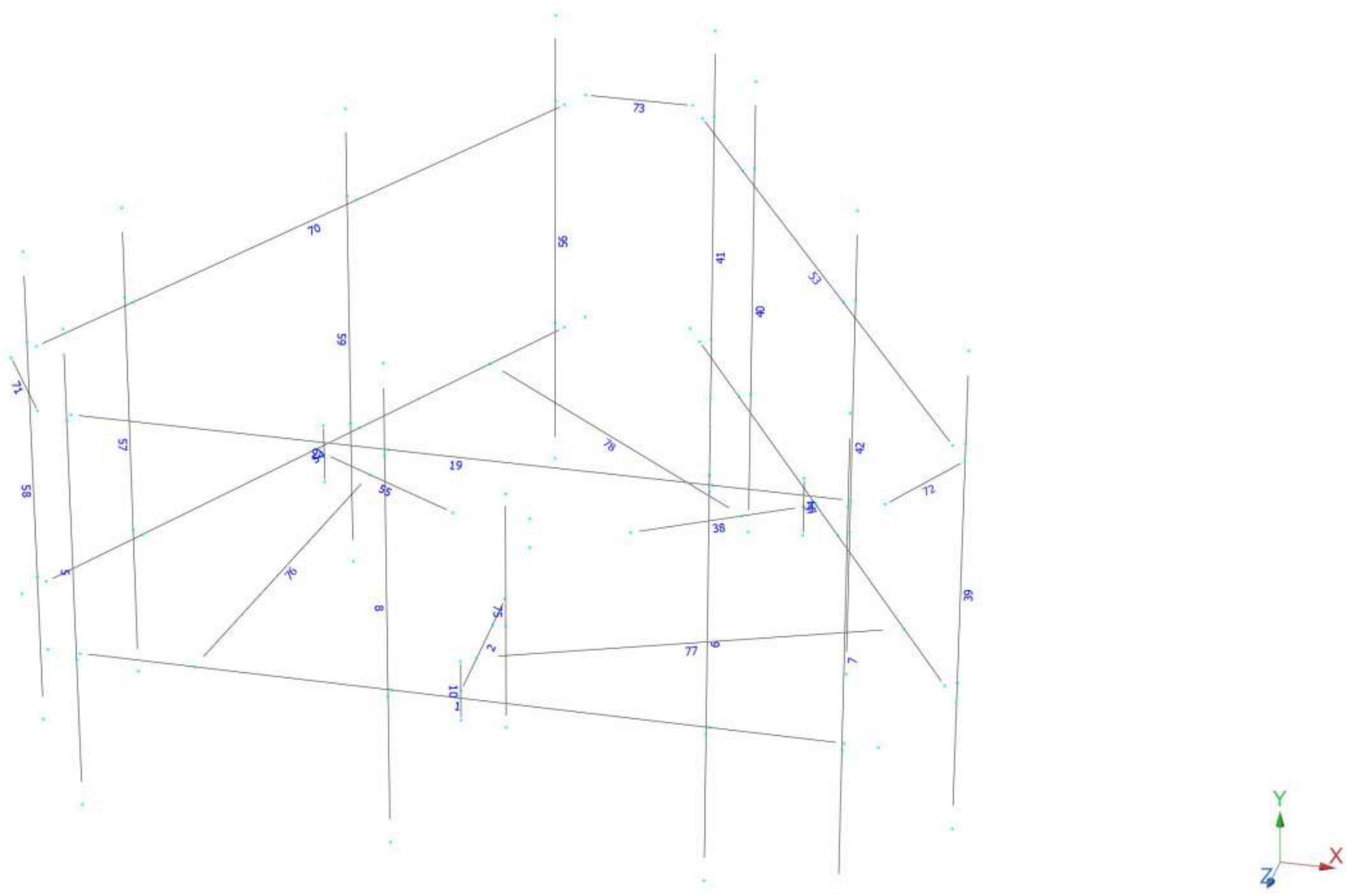
**Current Date:** 2/16/2024 10:58 AM
**Units system:** English




A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2-1_2x0.203
A500 GrB rectangular
HSS_SQR 4X4X1_4
PIPE 3x0.216
Y
X
Z

RAM® Elements
CONNECT Edition

**Current Date:** 2/16/2024 10:58 AM
**Units system:** English


70
73
56
41
40
53
65
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58
71
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42
72
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76
8
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77
6
7
2
10
Y
X
Z

**Current Date:** 2/16/2024 10:58 AM
**Units system:** English

# Load data

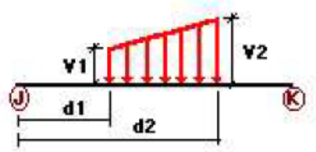
GLOSSARY

Comb : Indicates if load condition is a load combination

## Load Conditions

| Condition | Description | Comb. | Category |
|---|---|---|---|
| DL | Dead Load | No | DL |
| W0 | Wind Load 0/60/120 deg | No | WIND |
| W30 | Wind Load 30/90/150 deg | No | WIND |
| Di | Ice Load | No | LL |
| Wi0 | Ice Wind Load 0/60/120 deg | No | WIND |
| Wi30 | Ice Wind Load 30/90/150 deg | No | WIND |

## Distributed force on members

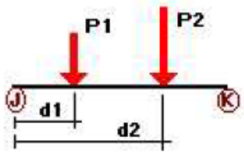



| Condition | Member | Dir1 | Val1 [Kip/ft] | Val2 [Kip/ft] | Dist1 [ft] | % | Dist2 [ft] | % |
|---|---|---|---|---|---|---|---|---|
| W0 | 1 | z | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 7 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 10 | z | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 19 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 37 | z | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 38 | z | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 39 | z | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 40 | z | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 41 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 42 | z | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 44 | z | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 53 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 54 | z | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 55 | z | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 56 | z | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 57 | z | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 58 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 59 | z | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 61 | z | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 70 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 71 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 72 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 73 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 75 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 76 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 77 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 78 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| W30 | 2 | x | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 5 | x | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 6 | x | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 7 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 8 | x | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 10 | x | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 19 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 37 | x | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 38 | x | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 41 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 44 | x | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 53 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 54 | x | -0.019 | -0.019 | 0.00 | No | 100.00 | Yes |
| | 55 | x | -0.022 | -0.022 | 0.00 | No | 100.00 | Yes |
| | 56 | x | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 57 | x | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 58 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 59 | x | -0.015 | -0.015 | 0.00 | No | 100.00 | Yes |
| | 61 | x | -0.024 | -0.024 | 0.00 | No | 100.00 | Yes |
| | 70 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 71 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 72 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 73 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 75 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 76 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 77 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 78 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| Di | 1 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 2 | y | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 5 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 6 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 7 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 8 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 10 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 19 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 37 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 38 | y | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 39 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 40 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 41 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 42 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 44 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 53 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 54 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 55 | y | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 56 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 57 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 58 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 59 | y | -0.007 | -0.007 | 0.00 | No | 100.00 | Yes |
| | 61 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 70 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 71 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 72 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 73 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 75 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 76 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |
| | 77 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 78 | y | -0.006 | -0.006 | 0.00 | No | 100.00 | Yes |

## Concentrated forces on members




| Condition | Member | Dir1 | Value1 [Kip] | Dist1 [ft] | % |
|---|---|---|---|---|---|
| DL | 5 | y | -0.06 | 0.50 | No |
| | | y | -0.06 | 7.50 | No |
| | | y | -0.008 | 4.00 | No |
| | | y | -0.008 | 4.00 | No |
| | 6 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | | y | -0.036 | 4.00 | No |
| | 8 | y | -0.033 | 1.00 | No |
| | | y | -0.033 | 3.00 | No |
| | | y | -0.041 | 5.00 | No |
| | | y | -0.041 | 7.00 | No |
| | 39 | y | -0.06 | 0.50 | No |
| | | y | -0.06 | 7.50 | No |
| | | y | -0.008 | 4.00 | No |
| | | y | -0.008 | 4.00 | No |
| | 40 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | | y | -0.036 | 4.00 | No |
| | 42 | y | -0.033 | 1.00 | No |
| | | y | -0.033 | 3.00 | No |
| | | y | -0.041 | 5.00 | No |
| | | y | -0.041 | 7.00 | No |
| | 56 | y | -0.06 | 0.50 | No |
| | | y | -0.06 | 7.50 | No |
| | | y | -0.008 | 4.00 | No |
| | | y | -0.008 | 4.00 | No |
| | 57 | y | -0.044 | 0.50 | No |
| | | y | -0.044 | 7.50 | No |
| | | y | -0.036 | 4.00 | No |
| | 59 | y | -0.033 | 1.00 | No |
| | | y | -0.033 | 3.00 | No |
| | | y | -0.041 | 5.00 | No |
| | | y | -0.041 | 7.00 | No |
| | 75 | y | -0.029 | 1.00 | No |
| W0 | 5 | z | -0.473 | 0.50 | No |
| | | z | -0.473 | 7.50 | No |
| | 6 | z | -0.473 | 0.50 | No |
| | | z | -0.473 | 7.50 | No |
| | 8 | z | -0.111 | 1.00 | No |
| | | z | -0.111 | 3.00 | No |
| | | z | -0.107 | 5.00 | No |
| | | z | -0.107 | 7.00 | No |
| | 39 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |

| | | | | | |
|---|---|---|---|---|---|
| | | z | -0.026 | 4.00 | No |
| | 40 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |
| | | z | -0.037 | 4.00 | No |
| | 42 | z | -0.076 | 1.00 | No |
| | | z | -0.076 | 3.00 | No |
| | | z | -0.081 | 5.00 | No |
| | | z | -0.081 | 7.00 | No |
| | 56 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |
| | | z | -0.026 | 4.00 | No |
| | 57 | z | -0.28 | 0.50 | No |
| | | z | -0.28 | 7.50 | No |
| | | z | -0.037 | 4.00 | No |
| | 59 | z | -0.076 | 1.00 | No |
| | | z | -0.076 | 3.00 | No |
| | | z | -0.081 | 5.00 | No |
| | | z | -0.081 | 7.00 | No |
| | 75 | z | -0.082 | 1.00 | No |
| W30 | 5 | x | -0.215 | 0.50 | No |
| | | x | -0.215 | 7.50 | No |
| | | x | -0.03 | 4.00 | No |
| | 6 | x | -0.215 | 0.50 | No |
| | | x | -0.215 | 7.50 | No |
| | | x | -0.038 | 4.00 | No |
| | 8 | x | -0.065 | 1.00 | No |
| | | x | -0.065 | 3.00 | No |
| | | x | -0.073 | 5.00 | No |
| | | x | -0.073 | 7.00 | No |
| | 39 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.014 | 4.00 | No |
| | 40 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.026 | 4.00 | No |
| | 42 | x | -0.099 | 1.00 | No |
| | | x | -0.099 | 3.00 | No |
| | | x | -0.099 | 5.00 | No |
| | | x | -0.099 | 7.00 | No |
| | 56 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.014 | 4.00 | No |
| | 57 | x | -0.408 | 0.50 | No |
| | | x | -0.408 | 7.50 | No |
| | | x | -0.026 | 4.00 | No |
| | 59 | x | -0.099 | 1.00 | No |
| | | x | -0.099 | 3.00 | No |
| | | x | -0.099 | 5.00 | No |
| | | x | -0.099 | 7.00 | No |
| | 75 | x | -0.082 | 1.00 | No |
| Di | 5 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.012 | 4.00 | No |
| | | y | -0.012 | 4.00 | No |
| | 6 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.019 | 4.00 | No |
| | 8 | y | -0.041 | 1.00 | No |
| | | y | -0.041 | 3.00 | No |
| | | y | -0.042 | 5.00 | No |

| | | | | | |
|---|---|---|---|---|---|
| | | y | -0.042 | 7.00 | No |
| | 39 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.012 | 4.00 | No |
| | | y | -0.012 | 4.00 | No |
| | 40 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.019 | 4.00 | No |
| | 42 | y | -0.041 | 1.00 | No |
| | | y | -0.041 | 3.00 | No |
| | | y | -0.042 | 5.00 | No |
| | | y | -0.042 | 7.00 | No |
| | 56 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.012 | 4.00 | No |
| | | y | -0.012 | 4.00 | No |
| | 57 | y | -0.149 | 0.50 | No |
| | | y | -0.149 | 7.50 | No |
| | | y | -0.019 | 4.00 | No |
| | 59 | y | -0.041 | 1.00 | No |
| | | y | -0.041 | 3.00 | No |
| | | y | -0.042 | 5.00 | No |
| | | y | -0.042 | 7.00 | No |
| | 75 | y | -0.048 | 1.00 | No |
| Wi0 | 5 | z | -0.081 | 0.50 | No |
| | | z | -0.081 | 7.50 | No |
| | | z | -0.002 | 4.00 | No |
| | 6 | z | -0.081 | 0.50 | No |
| | | z | -0.081 | 7.50 | No |
| | | z | -0.002 | 4.00 | No |
| | 8 | z | -0.021 | 1.00 | No |
| | | z | -0.021 | 3.00 | No |
| | | z | -0.02 | 5.00 | No |
| | | z | -0.02 | 7.00 | No |
| | 39 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.007 | 4.00 | No |
| | 40 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.009 | 4.00 | No |
| | 42 | z | -0.015 | 1.00 | No |
| | | z | -0.015 | 3.00 | No |
| | | z | -0.016 | 5.00 | No |
| | | z | -0.016 | 7.00 | No |
| | 56 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.007 | 4.00 | No |
| | 57 | z | -0.051 | 0.50 | No |
| | | z | -0.051 | 7.50 | No |
| | | z | -0.009 | 4.00 | No |
| | 59 | z | -0.015 | 1.00 | No |
| | | z | -0.015 | 3.00 | No |
| | | z | -0.016 | 5.00 | No |
| | | z | -0.016 | 7.00 | No |
| | 75 | z | -0.017 | 1.00 | No |
| Wi30 | 5 | x | -0.041 | 0.50 | No |
| | | x | -0.041 | 7.50 | No |
| | | x | -0.008 | 4.00 | No |
| | 6 | x | -0.041 | 0.50 | No |
| | | x | -0.041 | 7.50 | No |

| | | | | |
|---|---|---|---|---|
| | x | -0.009 | 4.00 | No |
| 8 | x | -0.013 | 1.00 | No |
| | x | -0.013 | 3.00 | No |
| | x | -0.015 | 5.00 | No |
| | x | -0.015 | 7.00 | No |
| 39 | x | -0.07 | 0.50 | No |
| | x | -0.07 | 7.50 | No |
| | x | -0.004 | 4.00 | No |
| 40 | x | -0.07 | 0.50 | No |
| | x | -0.07 | 7.50 | No |
| | x | -0.006 | 4.00 | No |
| 42 | x | -0.019 | 1.00 | No |
| | x | -0.019 | 3.00 | No |
| | x | -0.019 | 5.00 | No |
| | x | -0.019 | 7.00 | No |
| 56 | x | -0.07 | 0.50 | No |
| | x | -0.07 | 7.50 | No |
| | x | -0.004 | 4.00 | No |
| 57 | x | -0.07 | 0.50 | No |
| | x | -0.07 | 7.50 | No |
| | x | -0.006 | 4.00 | No |
| 59 | x | -0.019 | 1.00 | No |
| | x | -0.019 | 3.00 | No |
| | x | -0.019 | 5.00 | No |
| | x | -0.019 | 7.00 | No |
| 75 | x | -0.017 | 1.00 | No |

## Self weight multipliers for load conditions

| | | Self weight multiplier | | | |
|---|---|---|---|---|---|
| **Condition** | **Description** | **Comb.** | **MultX** | **MultY** | **MultZ** |
| DL | Dead Load | No | 0.00 | -1.00 | 0.00 |
| W0 | Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| W30 | Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| Di | Ice Load | No | 0.00 | 0.00 | 0.00 |
| Wi0 | Ice Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| Wi30 | Ice Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |

**Current Date:** 2/16/2024 10:58 AM
**Units system:** English

# Steel Code Check

**Report: Summary - Group by member**

**Load conditions to be included in design :**

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.4DL
LC16=1.2DL

| Description | Section | Member | Ctrl Eq. | Ratio | Status | Reference |
|---|---|---|---|---|---|---|
| | ***HSS_SQR 4X4X1_4*** | **2** | LC4 at 0.00% | 0.54 | OK | |
| | | **38** | LC4 at 0.00% | **0.74** | **OK** | |
| | | **55** | LC1 at 0.00% | 0.71 | OK | |
| | ***PIPE 2-1_2x0.203*** | **5** | LC1 at 66.67% | 0.69 | OK | |
| | | **6** | LC1 at 66.67% | 0.55 | OK | |
| | | **8** | LC1 at 66.67% | **0.84** | **OK** | |
| | | **39** | LC2 at 66.67% | 0.49 | OK | |
| | | **40** | LC2 at 66.67% | 0.46 | OK | |
| | | **42** | LC2 at 66.67% | 0.69 | OK | |
| | | **56** | LC4 at 66.67% | 0.68 | OK | |
| | | **57** | LC4 at 66.67% | 0.48 | OK | |
| | | **59** | LC4 at 66.67% | 0.77 | OK | |
| | ***PIPE 2x0.154*** | **7** | LC1 at 66.67% | 0.23 | OK | |
| | | **19** | LC1 at 41.25% | 0.46 | OK | |
| | | **41** | LC2 at 66.67% | 0.24 | OK | |
| | | **53** | LC2 at 41.25% | 0.51 | OK | |
| | | **58** | LC4 at 18.75% | 0.23 | OK | |
| | | **70** | LC2 at 41.25% | **0.52** | **OK** | |
| | | **71** | LC2 at 0.00% | 0.01 | OK | |
| | | **72** | LC3 at 100.00% | 0.01 | OK | |
| | | **73** | LC1 at 50.00% | 0.01 | OK | |
| | | **75** | LC3 at 53.13% | 0.07 | OK | |
| | | **76** | LC2 at 50.00% | 0.06 | OK | |
| | | **77** | LC3 at 50.00% | 0.07 | OK | |
| | | **78** | LC4 at 0.00% | 0.07 | OK | |
| | ***PIPE 3x0.216*** | **1** | LC2 at 49.11% | 0.69 | OK | |
| | | **37** | LC2 at 50.00% | 0.76 | OK | |
| | | **54** | LC1 at 49.11% | **0.84** | **OK** | |
| | ***PIPE 4x0.237*** | **10** | LC6 at 50.00% | **0.00** | **OK** | |
| | | **44** | LC1 at 50.00% | 0.00 | OK | |
| | | **61** | LC1 at 50.00% | 0.00 | OK | |

RAM Elements CONNECT Edition

**Current Date:** 2/16/2024 10:59 AM
**Units system:** English

# Geometry data

GLOSSARY

| | |
|---|---|
| Cb22, Cb33 | : Moment gradient coefficients |
| Cm22, Cm33 | : Coefficients applied to bending term in interaction formula |
| d0 | : Tapered member section depth at J end of member |
| DJX | : Rigid end offset distance measured from J node in axis X |
| DJY | : Rigid end offset distance measured from J node in axis Y |
| DJZ | : Rigid end offset distance measured from J node in axis Z |
| DKX | : Rigid end offset distance measured from K node in axis X |
| DKY | : Rigid end offset distance measured from K node in axis Y |
| DKZ | : Rigid end offset distance measured from K node in axis Z |
| dL | : Tapered member section depth at K end of member |
| Ig factor | : Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members |
| K22 | : Effective length factor about axis 2 |
| K33 | : Effective length factor about axis 3 |
| L22 | : Member length for calculation of axial capacity |
| L33 | : Member length for calculation of axial capacity |
| LB pos | : Lateral unbraced length of the compression flange in the positive side of local axis 2 |
| LB neg | : Lateral unbraced length of the compression flange in the negative side of local axis 2 |
| RX | : Rotation about X |
| RY | : Rotation about Y |
| RZ | : Rotation about Z |
| TO | : 1 = Tension only member 0 = Normal member |
| TX | : Translation in X |
| TY | : Translation in Y |
| TZ | : Translation in Z |

## Nodes

| Node | X [ft] | Y [ft] | Z [ft] | Rigid Floor |
|---|---|---|---|---|
| 1 | -6.25 | 0.00 | 0.00 | 0 |
| 2 | 6.25 | 0.00 | 0.00 | 0 |
| 3 | 0.00 | 0.00 | -0.20 | 0 |
| 4 | 0.00 | 0.00 | -3.00 | 0 |
| 8 | -5.75 | 5.50 | 0.20 | 0 |
| 9 | 3.75 | 5.50 | 0.20 | 0 |
| 10 | 5.75 | 5.50 | 0.20 | 0 |
| 11 | -1.00 | 5.50 | 0.20 | 0 |
| 12 | -5.75 | -2.50 | 0.20 | 0 |
| 13 | 3.75 | -2.50 | 0.20 | 0 |
| 14 | 5.75 | -2.50 | 0.20 | 0 |
| 15 | -1.00 | -2.50 | 0.20 | 0 |
| 16 | 0.00 | 0.00 | 0.00 | 0 |
| 17 | 0.00 | 0.50 | -0.20 | 0 |
| 18 | 0.00 | -0.50 | -0.20 | 0 |
| 19 | -5.75 | 0.00 | 0.00 | 0 |
| 20 | -1.00 | 0.00 | 0.00 | 0 |
| 21 | 3.75 | 0.00 | 0.00 | 0 |
| 22 | 5.75 | 0.00 | 0.00 | 0 |
| 23 | 5.75 | 0.00 | 0.20 | 0 |
| 24 | 3.75 | 0.00 | 0.20 | 0 |
| 25 | -1.00 | 0.00 | 0.20 | 0 |
| 26 | -5.75 | 0.00 | 0.20 | 0 |

| | | | | |
|---|---|---|---|---|
| 27 | -6.25 | 4.00 | 0.00 | 0 |
| 28 | -5.75 | 4.00 | 0.00 | 0 |
| 29 | -5.75 | 4.00 | 0.20 | 0 |
| 30 | -1.00 | 4.00 | 0.00 | 0 |
| 31 | -1.00 | 4.00 | 0.20 | 0 |
| 32 | 6.25 | 4.00 | 0.00 | 0 |
| 33 | 3.75 | 4.00 | 0.00 | 0 |
| 34 | 5.75 | 4.00 | 0.00 | 0 |
| 35 | 5.75 | 4.00 | 0.20 | 0 |
| 36 | 3.75 | 4.00 | 0.20 | 0 |
| 37 | 0.00 | 0.00 | -4.62 | 0 |
| 38 | 0.00 | 0.50 | -4.62 | 0 |
| 72 | 7.126 | 0.00 | -1.5173 | 0 |
| 73 | 0.876 | 0.00 | -12.3427 | 0 |
| 74 | 3.8278 | 0.00 | -6.83 | 0 |
| 75 | 1.403 | 0.00 | -5.43 | 0 |
| 76 | 7.0492 | 5.50 | -2.0504 | 0 |
| 77 | 2.2992 | 5.50 | -10.2776 | 0 |
| 78 | 1.2992 | 5.50 | -12.0096 | 0 |
| 79 | 4.6742 | 5.50 | -6.164 | 0 |
| 80 | 7.0492 | -2.50 | -2.0504 | 0 |
| 81 | 2.2992 | -2.50 | -10.2776 | 0 |
| 82 | 1.2992 | -2.50 | -12.0096 | 0 |
| 83 | 4.6742 | -2.50 | -6.164 | 0 |
| 84 | 4.001 | 0.00 | -6.93 | 0 |
| 85 | 3.8278 | 0.50 | -6.83 | 0 |
| 86 | 3.8278 | -0.50 | -6.83 | 0 |
| 87 | 6.876 | 0.00 | -1.9504 | 0 |
| 88 | 4.501 | 0.00 | -6.064 | 0 |
| 89 | 2.126 | 0.00 | -10.1776 | 0 |
| 90 | 1.126 | 0.00 | -11.9096 | 0 |
| 91 | 1.2992 | 0.00 | -12.0096 | 0 |
| 92 | 2.2992 | 0.00 | -10.2776 | 0 |
| 93 | 4.6742 | 0.00 | -6.164 | 0 |
| 94 | 7.0492 | 0.00 | -2.0504 | 0 |
| 95 | 7.126 | 4.00 | -1.5173 | 0 |
| 96 | 6.876 | 4.00 | -1.9504 | 0 |
| 97 | 7.0492 | 4.00 | -2.0504 | 0 |
| 98 | 4.501 | 4.00 | -6.064 | 0 |
| 99 | 4.6742 | 4.00 | -6.164 | 0 |
| 100 | 0.876 | 4.00 | -12.3427 | 0 |
| 101 | 2.126 | 4.00 | -10.1776 | 0 |
| 102 | 1.126 | 4.00 | -11.9096 | 0 |
| 103 | 1.2992 | 4.00 | -12.0096 | 0 |
| 104 | 2.2992 | 4.00 | -10.2776 | 0 |
| 105 | -0.876 | 0.00 | -12.3427 | 0 |
| 106 | -7.126 | 0.00 | -1.5173 | 0 |
| 107 | -3.8278 | 0.00 | -6.83 | 0 |
| 108 | -1.403 | 0.00 | -5.43 | 0 |
| 109 | -1.2992 | 5.50 | -12.0096 | 0 |
| 110 | -6.0492 | 5.50 | -3.7824 | 0 |
| 111 | -7.0492 | 5.50 | -2.0504 | 0 |
| 112 | -3.6742 | 5.50 | -7.896 | 0 |
| 113 | -1.2992 | -2.50 | -12.0096 | 0 |
| 114 | -6.0492 | -2.50 | -3.7824 | 0 |
| 115 | -7.0492 | -2.50 | -2.0504 | 0 |
| 116 | -3.6742 | -2.50 | -7.896 | 0 |
| 117 | -4.001 | 0.00 | -6.93 | 0 |
| 118 | -3.8278 | 0.50 | -6.83 | 0 |
| 119 | -3.8278 | -0.50 | -6.83 | 0 |

| | | | | |
|---|---|---|---|---|
| 120 | -1.126 | 0.00 | -11.9096 | 0 |
| 121 | -3.501 | 0.00 | -7.796 | 0 |
| 122 | -5.876 | 0.00 | -3.6824 | 0 |
| 123 | -6.876 | 0.00 | -1.9504 | 0 |
| 124 | -7.0492 | 0.00 | -2.0504 | 0 |
| 125 | -6.0492 | 0.00 | -3.7824 | 0 |
| 126 | -3.6742 | 0.00 | -7.896 | 0 |
| 127 | -1.2992 | 0.00 | -12.0096 | 0 |
| 128 | -0.876 | 4.00 | -12.3427 | 0 |
| 129 | -1.126 | 4.00 | -11.9096 | 0 |
| 130 | -1.2992 | 4.00 | -12.0096 | 0 |
| 131 | -3.501 | 4.00 | -7.796 | 0 |
| 132 | -3.6742 | 4.00 | -7.896 | 0 |
| 133 | -7.126 | 4.00 | -1.5173 | 0 |
| 134 | -5.876 | 4.00 | -3.6824 | 0 |
| 135 | -6.876 | 4.00 | -1.9504 | 0 |
| 136 | -7.0492 | 4.00 | -2.0504 | 0 |
| 137 | -6.0492 | 4.00 | -3.7824 | 0 |
| 138 | 0.00 | 0.00 | -2.20 | 0 |
| 139 | 0.20 | 0.00 | -2.20 | 0 |
| 140 | 0.20 | 2.25 | -2.20 | 0 |
| 141 | 0.20 | -1.75 | -2.20 | 0 |
| 142 | 0.00 | 0.00 | -1.20 | 0 |
| 143 | 2.9618 | 0.00 | -6.33 | 0 |
| 144 | -2.9618 | 0.00 | -6.33 | 0 |
| 145 | -4.00 | 0.00 | 0.00 | 0 |
| 146 | 6.001 | 0.00 | -3.4659 | 0 |
| 147 | -2.001 | 0.00 | -10.3941 | 0 |

## Restraints

| Node | TX | TY | TZ | RX | RY | RZ |
|---|---|---|---|---|---|---|
| 4 | 1 | 1 | 1 | 1 | 1 | 1 |
| 75 | 1 | 1 | 1 | 1 | 1 | 1 |
| 108 | 1 | 1 | 1 | 1 | 1 | 1 |

## Members

| Member | NJ | NK | Description | Section | Material | d0 [in] | dL [in] | Ig factor |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 2 | 4 | 3 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 5 | 8 | 12 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 6 | 9 | 13 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 7 | 10 | 14 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 8 | 11 | 15 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 10 | 18 | 17 | | PIPE 4x0.237 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 19 | 27 | 32 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 37 | 72 | 73 | | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 38 | 75 | 74 | | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 39 | 76 | 80 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 40 | 77 | 81 | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 41 | 78 | 82 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 42 | 79 | 83 | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 44 | 86 | 85 | PIPE 4x0.237 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 53 | 95 | 100 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 54 | 105 | 106 | PIPE 3x0.216 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 55 | 108 | 107 | HSS_SQR 4X4X1_4 | A500 GrB rectangular | 0.00 | 0.00 | 0.00 |
| 56 | 109 | 113 | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 57 | 110 | 114 | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 58 | 111 | 115 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 59 | 112 | 116 | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 61 | 119 | 118 | PIPE 4x0.237 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 70 | 128 | 133 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 71 | 27 | 133 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 72 | 32 | 95 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 73 | 100 | 128 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 75 | 140 | 141 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 76 | 145 | 144 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 77 | 142 | 146 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 78 | 143 | 147 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |

## Orientation of local axes

| Member | Rotation [Deg] | Axes23 | NX | NY | NZ |
|---|---|---|---|---|---|
| 5 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 6 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 7 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 8 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 39 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 40 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 41 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 42 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 44 | 0.00 | 2 | 0.50 | 0.00 | 0.866 |
| 56 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 57 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 58 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 59 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 61 | 0.00 | 2 | 0.50 | 0.00 | -0.866 |

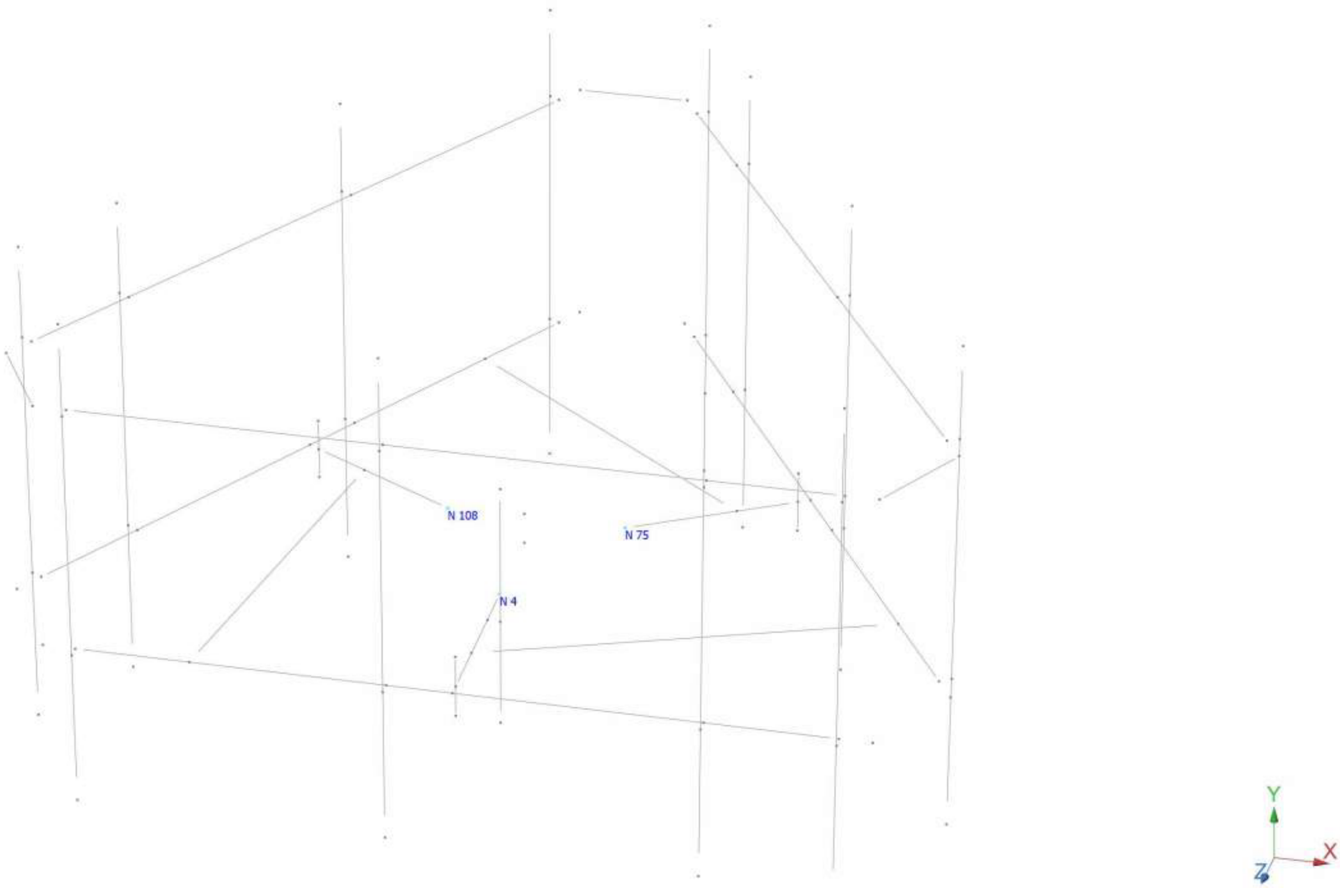
## Rigid end offsets

| Member | DJX [in] | DJY [in] | DJZ [in] | DKX [in] | DKY [in] | DKZ [in] |
|---|---|---|---|---|---|---|
| 71 | 0.00 | 1.50 | 0.00 | 0.00 | 1.50 | 0.00 |
| 72 | 0.00 | 1.50 | 0.00 | 0.00 | 1.50 | 0.00 |
| 73 | 0.00 | 1.50 | 0.00 | 0.00 | 1.50 | 0.00 |
| 76 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| 77 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| 78 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |

## Hinges

| Member | Node-J | | | | Node-K | | | | TOR | AXL | Axial rigidity |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | M33 | M22 | V3 | V2 | M33 | M22 | V3 | V2 | | | |
| 71 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 72 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 73 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 76 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 77 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |
| 78 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | Full |

# Connection Check

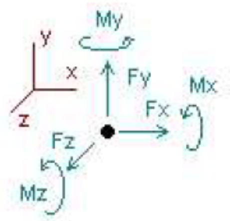

N 108
N 75
N 4
Y
X
Z

**Current Date:** 2/16/2024 10:59 AM
**Units system:** English

# Analysis result

## Envelope for nodal reactions

Note.- **lc** is the controlling load condition




*Direction of positive forces and moments*

Envelope of nodal reactions for :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.4DL
LC16=1.2DL

| | | Forces | | | | | | Moments | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Node** | | **Fx** [Kip] | **lc** | **Fy** [Kip] | **lc** | **Fz** [Kip] | **lc** | **Mx** [Kip*ft] | **lc** | **My** [Kip*ft] | **lc** | **Mz** [Kip*ft] | **lc** |
| 4 | Max | 2.633 | LC2 | 2.102 | LC12 | 2.249 | LC1 | 1.64140 | LC5 | 5.72379 | LC6 | 3.05742 | LC8 |
| | Min | -2.583 | LC8 | 0.744 | LC5 | -2.144 | LC7 | -6.24962 | LC3 | -5.75099 | LC4 | -3.68527 | LC2 |
| 75 | Max | 3.184 | LC2 | 2.001 | LC9 | 1.984 | LC5 | 5.01998 | LC1 | 6.28569 | LC8 | 5.93051 | LC4 |
| | Min | -3.127 | LC8 | 0.701 | LC7 | -2.077 | LC3 | -3.24223 | LC7 | -6.37136 | LC2 | -1.70921 | LC6 |
| 108 | Max | 1.793 | LC6 | 2.001 | LC11 | 3.448 | LC5 | 5.19062 | LC1 | 7.17530 | LC5 | 2.59886 | LC8 |
| | Min | -1.901 | LC4 | 0.701 | LC8 | -3.460 | LC3 | -2.32653 | LC7 | -7.24682 | LC3 | -6.23440 | LC2 |

| | |
|---|---|
| Site Number: | CT2267 |
| TEP No. | 316500.928356 |
| Analysis By: | KM 2/16/2024 |
| Checked By: | MSC 2/16/2024 |

# Moment Bolt Group - Plate Connection to Collar

| | |
|---|---|
| Code Revisions: | ANSI/TIA-222-H |
| Bolt Type: | Headed Bolts |

**Connection Inputs:**

| | | |
|---|---|---|
| Bolt Size: | 0.750 | in |
| # Bolts: | 4 | |
| Plate Width: | 8.00 | in |
| Plate Height: | 8.00 | in |
| Bolt H Gap: | 6.00 | in |
| Bolt V Gap: | 6.00 | in |
| Plate T: | 0.625 | in |
| Slip Member Ø: | N/A | in |
| Bolt Grade: | A325N | |

**Capacities:**

| | | |
|---|---|---|
| Bolt Capacity= | 53.3% | PASS* |
| Plate Capacity= | 99.0% | PASS* |

*Value Adjusted per TIA-H Section 15.5

**Bolt Properties:**

| | | |
|---|---|---|
| $Fy_{bolt}$: | 92.0 | ksi |
| $Fu_{bolt}$: | 120.0 | ksi |
| r: | 4.2 | in |
| J: | 72.0 | $in^4/in^2$ |
| $A_{bolt}$: | 0.4 | $in^2$ |
| $A_{bolt, Net Tensile}$: | 0.3 | $in^2$ |
| Pretension: | 28.1 | kips |

**Member Properties:**

| | | |
|---|---|---|
| Member Shape: | Flat | |
| Plate Fy: | 36.0 | ksi |
| Plate Fu: | 60.0 | ksi |
| Member Height: | 4.0 | in |
| Member Width: | 4.0 | in |

**Member Forces:**

| | | |
|---|---|---|
| Reaction in X Direction: | 2.633 | kips |
| Reaction in Y Direction: | 2.102 | kips |
| Reaction in Z Direction: | 2.249 | kips |
| Moment in X Axis: | 6.25 | kip-ft |
| Moment in Y Axis: | 5.751 | kip-ft |
| Moment in Z Axis: | 3.685 | kip-ft |

## PROJECT INFORMATION

SCOPE OF WORK:

- NEW AT&T ANTENNAS: AIR6419 B77G (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T ANTENNAS: AIR6449 B77D (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T ANTENNAS: TPA65R–BU8DA–K (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T ANTENNAS: DMP65R–BU8DA (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T SURGE ARRESTOR: DC6–48–60–18–8C (TOTAL OF 1) W/ (1) FIBER & (2) AWG6 DC TRUNK.
- NEW AT&T TMA'S: TMA2124F03V5–2D (TYP OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T TMA'S: TMA2104F00V1–1 (TYP OF 2 PER SECTOR, TOTAL OF 6).

ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:

- ADD (1) 6648 + XCEDE CABLE
- NEW AT&T RRUS: 4478 B14 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T RRUS: 8843 B2/B66A (AWS/PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T RRUS: 4449 B5/B12 (700/850) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T DIPLEXERS: DBC0115F1V91–2 (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- NEW AT&T TRIPLEXERS: CBC61923T–DS–43 (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- NEW AT&T (12) SMART BIAS TEE.
- ADD (5) RECTIFIERS.
- ADD (2) DC12.

ITEMS TO BE REMOVED:

- EXISTING AT&T LTE ANTENNA: SBNH–1D6565C (TYP. OF 3 PER SECTOR, TOTAL OF 9).
- EXISTING AT&T LTE ANTENNA: OPA–65R–LCUU–H8 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T TMA: DTMABP7819VG12A (TYP. OF 4 PER SECTOR, TOTAL OF 12).
- EXISTING AT&T DIPLEXERS: CM1007–DBPXBC–003 (TYP. OF 6 PER SECTOR, TOTAL OF 24).
- EXISTING AT&T RRUS: RRUS–11 B12 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T RRUS: RRUS–12 B2+A2 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- DECOMM UMTS & LINE COMPONENTS.

ITEMS TO REMAIN:

- (24) COAX CABLES

| | |
|---|---|
| SITE ADDRESS: | 298 RIDGE ROAD<br>ORANGE, CT 06477 |
| LATITUDE: | 41.2584600° N, 41° 15' 30.456" N |
| LONGITUDE: | 73.0442600° W, 73° 2' 39.336" W |
| TYPE OF SITE: | UTILITY POLE / INDOOR EQUIPMENT |
| STRUCTURE HEIGHT: | 96'–0"± |
| RAD CENTER: | 111'–0"± (LTE), 113'–8"± (DOD), 110'–0"± (C–BAND) |
| CURRENT USE: | TELECOMMUNICATIONS FACILITY |
| PROPOSED USE: | TELECOMMUNICATIONS FACILITY |

## DRAWING INDEX



NOTE TO GENERAL CONTRACTOR: (PRIOR/DURING CONSTRUCTION)

CONTRACTOR TO CONTACT E.O.R. (TEP NORTHEAST, TEP OPCO,LLC) PRIOR TO ROOF/WALL OPENINGS TO COORDINATE/SCHEDULE THE FOLLOWING:

- INSPECTION OF EXISTING CONDITIONS AND LOCATIONS WHERE CONNECTIONS ARE BEING PROPOSED, INCLUDING INSPECTIONS OF STUB-UP ANCHORS AND/OR WALL ANCHORS PRIOR TO CONCEALING.

AT&T

# SITE NUMBER: CTL02267

# SITE NAME: ORANGE CT RIDGE ROAD

# FA CODE: 10141359

# EVERSOURCE STRUCTURE: 3848

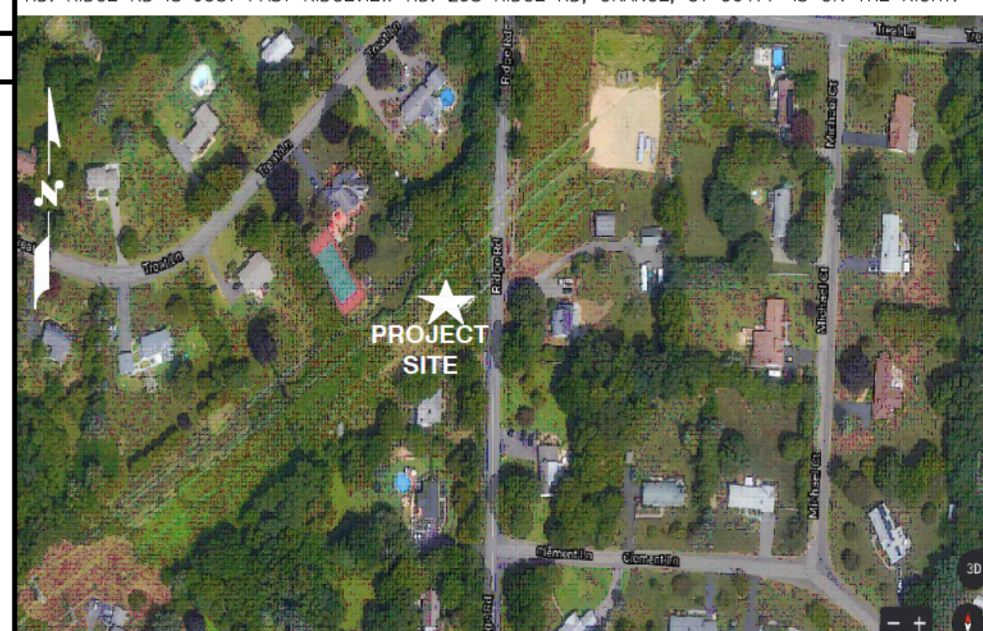
# PACE ID: MRCTB052645,MRCTB051144,MRCTB050790,MRCTB051256, MRCTB050915,MRCTB051353,MRCTB051426, MRCTB051476

# PROJECT: 5G NR 1SR CBAND ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

## VICINITY MAP

**DIRECTIONS TO SITE:**

START OUT GOING EAST ON ENTERPRISE DR TOWARD CAPITAL BLVD. TURN LEFT ONTO CAPITAL BLVD. TURN LEFT ONTO WEST ST. MERGE ONTO I–91 S VIA THE RAMP ON THE LEFT TOWARD NEW HAVEN. MERGE ONTO CT–15 S VIA EXIT 17 TOWARD E MAIN ST. TAKE THE CT–121 EXIT, EXIT 56, TOWARD ORANGE. STAY STRAIGHT TO GO ONTO TURKEY HILL RD. TURN RIGHT ONTO GRASSY HILL RD/CT–121. TURN LEFT ONTO CLARK LN. CLARK LN IS 0.4 MILES PAST SPORTSMAN RD. TURN RIGHT ONTO RIDGE RD. RIDGE RD IS JUST PAST RIDGEVIEW RD. 298 RIDGE RD, ORANGE, CT 06477–IS ON THE RIGHT.




## GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

**72 HOURS**

CALL
BEFORE YOU DIG

CALL TOLL FREE 1–800–922–4455

OR CALL 811

**UNDERGROUND SERVICE ALERT**


TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079


SITE NUMBER: CTL02267
SITE NAME: ORANGE CT RIDGE ROAD

298 RIDGE ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY


AT&T
84 DEERFIELD LANE
MERIDEN, CT 06450


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
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| A | 02/24/22 | ISSUED FOR REVIEW | MR | HC | DPH |

SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | T–1 | 3 |

## GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE–SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

## GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SAI
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR–ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. **APPLICABLE BUILDING CODES:**
   SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

   **BUILDING CODE: IBC 2021 WITH 2022 CT STATE BUILDING CODE AMENDMENTS**
   **ELECTRICAL CODE: 2020 NATIONAL ELECTRICAL CODE (NFPA 70–2020)**

   SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

   **AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;**

   **AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;**

   **TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222–H, STRUCTURAL STANDARDS FOR STEEL**

   FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

## ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AGL | ABOVE GRADE LEVEL | EQ | EQUAL | REQ | REQUIRED |
| AWG | AMERICAN WIRE GAUGE | GC | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
| BBU | BATTERY BACKUP UNIT | GRC | GALVANIZED RIGID CONDUIT | TBD | TO BE DETERMINED |
| BTCW | BARE TINNED SOLID COPPER WIRE | MGB | MASTER GROUND BAR | TBR | TO BE REMOVED |
| BGR | BURIED GROUND RING | MIN | MINIMUM | TBRR | TO BE REMOVED AND REPLACED |
| BTS | BASE TRANSCEIVER STATION | P | PROPOSED | TYP | TYPICAL |
| E | EXISTING | NTS | NOT TO SCALE | UG | UNDER GROUND |
| EGB | EQUIPMENT GROUND BAR | RAD | RADIATION CENTER LINE (ANTENNA) | VIF | VERIFY IN FIELD |
| EGR | EQUIPMENT GROUND RING | REF | REFERENCE | | |

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CTL02267
SITE NAME: ORANGE CT RIDGE ROAD

298 RIDGE ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

AT&T
84 DEERFIELD LANE
MERIDEN, CT 06450

| NO. | DATE | REVISIONS | BY | CHK | APP'D |
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| 0 | 09/19/22 | ISSUED FOR REVIEW | MR | HC | DPH |
| A | 02/24/22 | ISSUED FOR REVIEW | MR | HC | DPH |

SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

STATE OF CONNECTICUT – No. 24178 – LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | GN–1 | 3 |

NOTE:

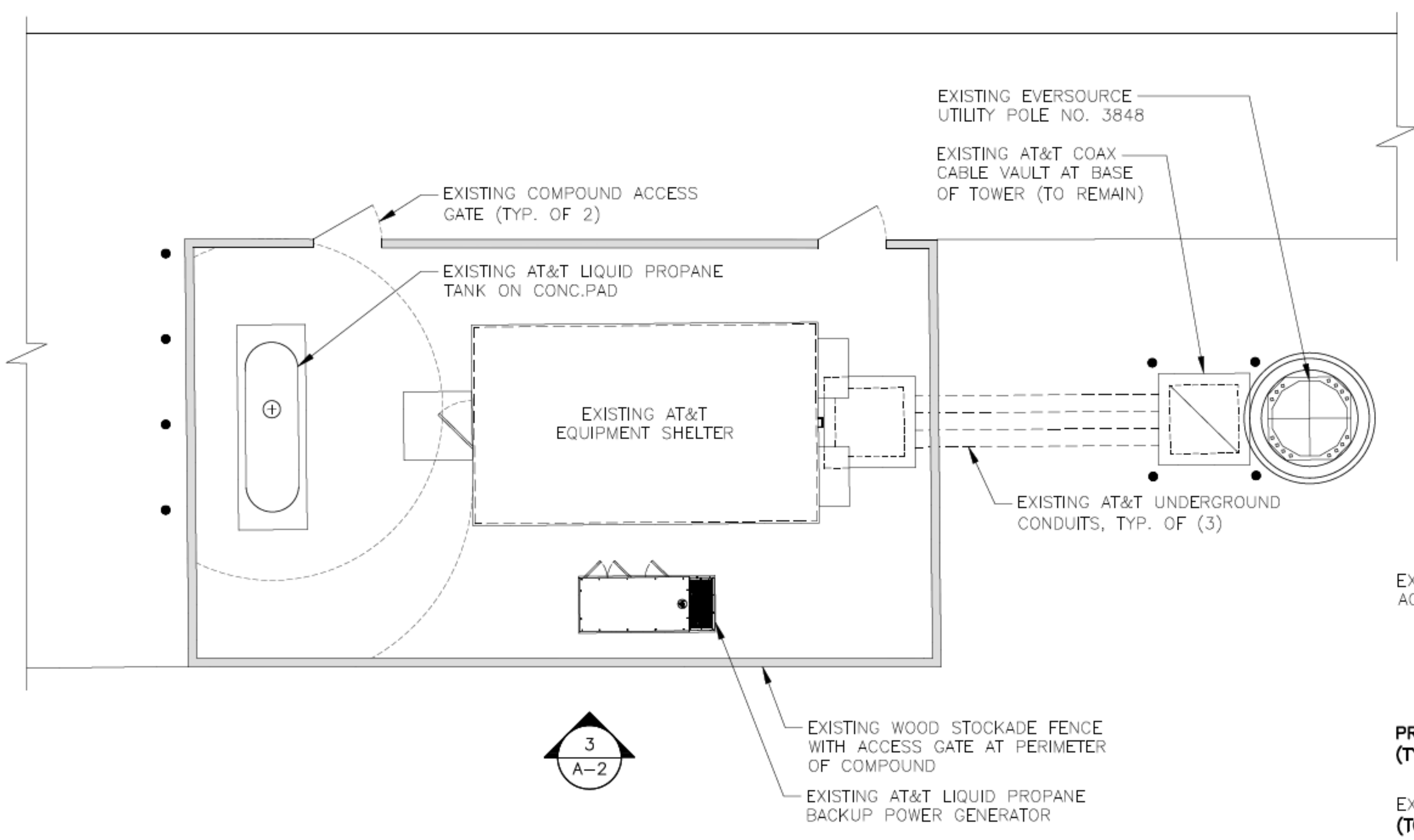
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

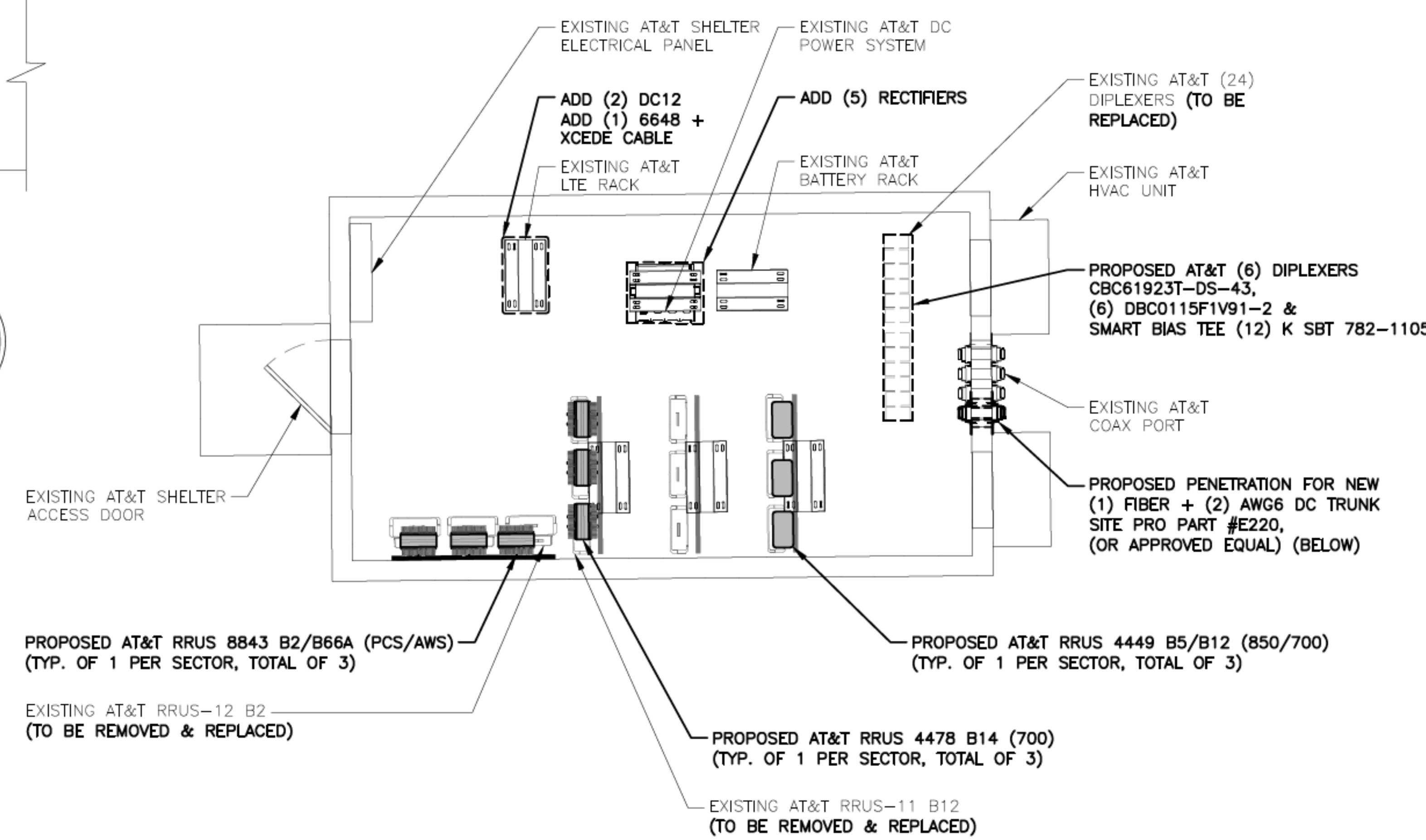
NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
TEP NORTHEAST (TEP OPCO, LLC.)
DATED: FEBRUARY 16, 2024 (REV.1)

NOTE:

REFER TO STRUCTURAL ANALYSIS
BY: CENTEK ENGINEERING
DATED: APRIL 15 2024, (REV.3)
FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.




MAGNETIC NORTH 13°23' TRUE NORTH

**COMPOUND PLAN** (1 / A-1)
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"

MAGNETIC NORTH 13°23' TRUE NORTH

**EQUIPMENT PLAN** (2 / A-1)
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

0 1'-4" 2'-8" 5'-4" 8'-0"

TEP NORTHEAST
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| A | 02/24/22 | ISSUED FOR REVIEW | MR | HC | DPH |

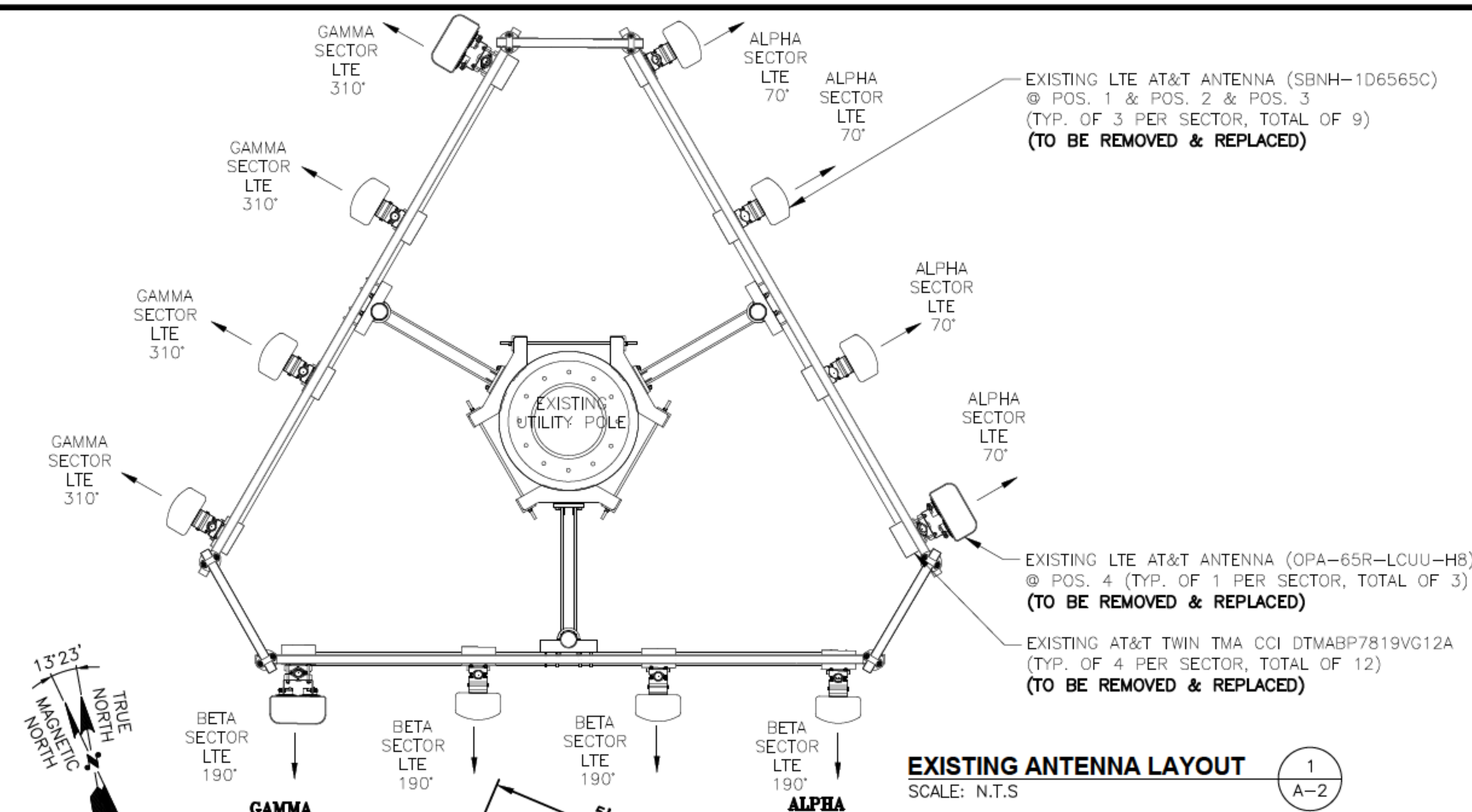
SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

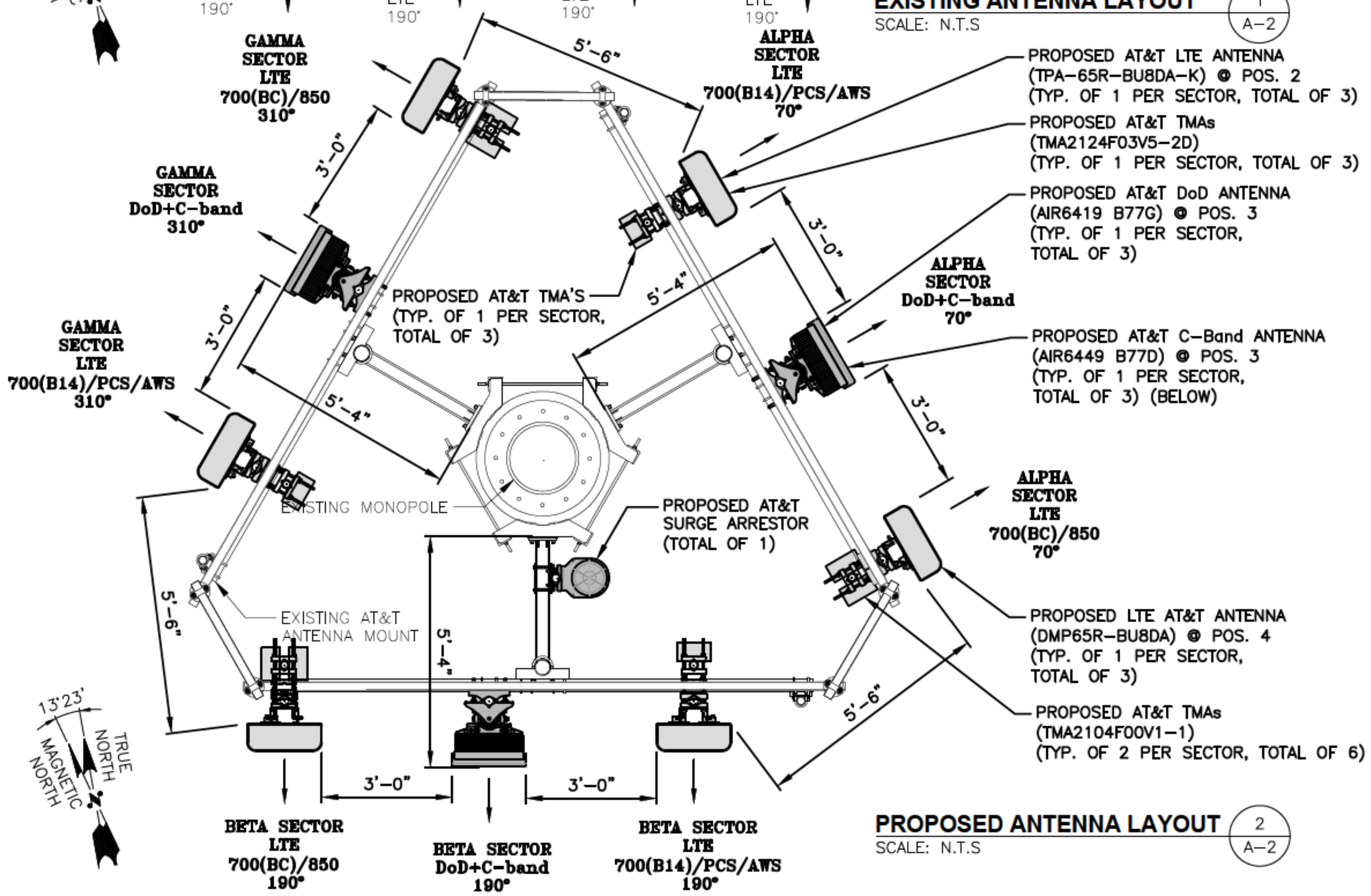
AT&T

COMPOUND & EQUIPMENT PLANS
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

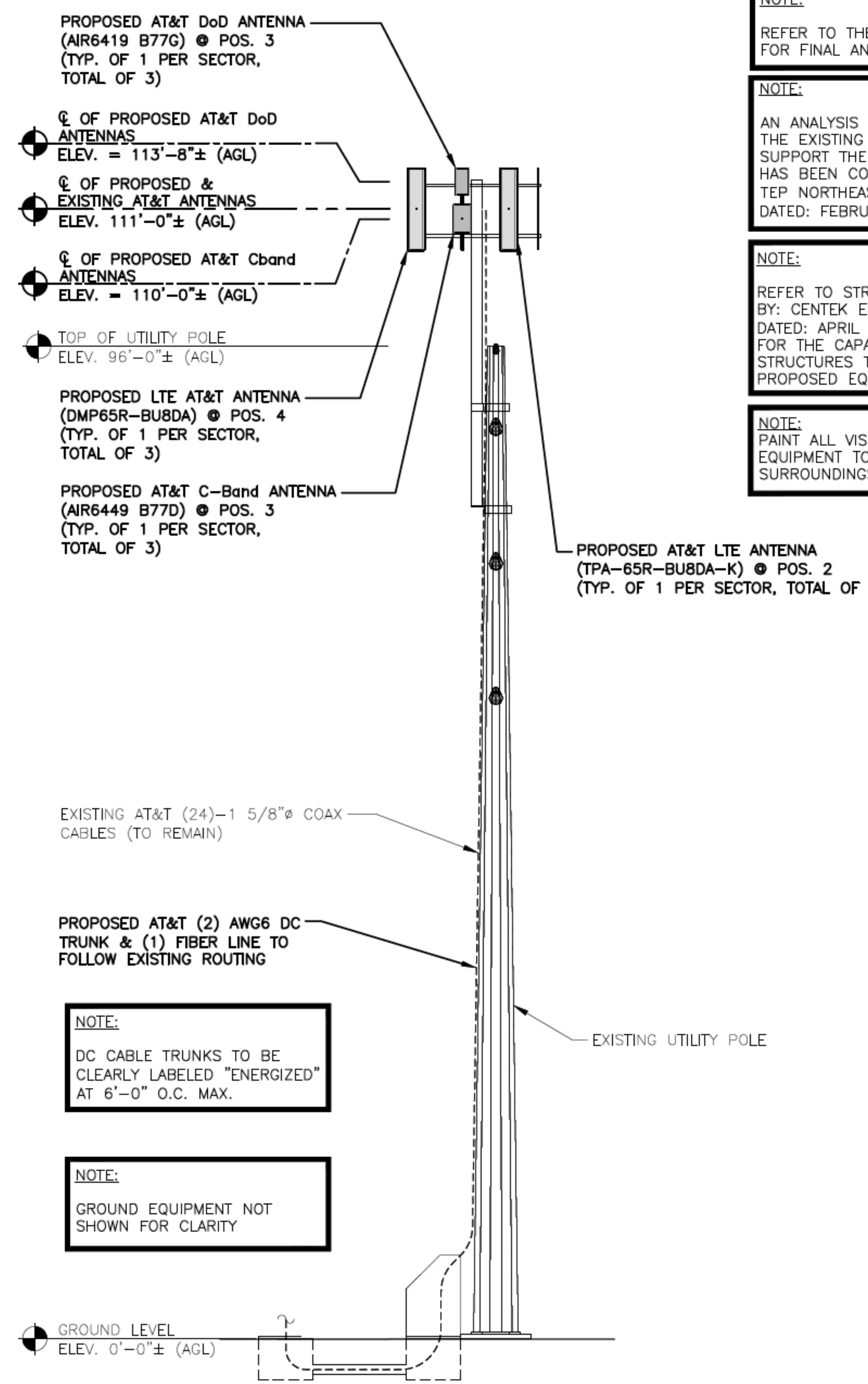
| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | A-1 | 3 |




**EXISTING ANTENNA LAYOUT** (1 / A-2)
SCALE: N.T.S




**PROPOSED ANTENNA LAYOUT** (2 / A-2)
SCALE: N.T.S




NOTE:
DC CABLE TRUNKS TO BE CLEARLY LABELED "ENERGIZED" AT 6'-0" O.C. MAX.

NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

**ELEVATION** (3 / A-2)
22x34 SCALE: 1/8"=1'-0"
11x17 SCALE: 1/16"=1'-0"
0 4'-0" 8'-0" 16'-0" 24'-0"

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: TEP NORTHEAST (TEP OPCO, LLC.) DATED: FEBRUARY 16, 2024 (REV.1)

NOTE:
REFER TO STRUCTURAL ANALYSIS BY: CENTEK ENGINEERING DATED: APRIL 15 2024, (REV.3) FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

NOTE:
PAINT ALL VISIBLE PROPOSED EQUIPMENT TO MATCH EXISTING SURROUNDINGS

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CTL02267
SITE NAME: ORANGE CT RIDGE ROAD

298 RIDGE ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

AT&T
84 DEERFIELD LANE
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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

STATE OF CONNECTICUT DANIEL P. HAMM No. 24178 LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA LAYOUTS & ELEVATION
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | A-2 | 3 |

## ANTENNA SCHEDULE

| SECTOR | EXISTING/ PROPOSED | BAND | ANTENNA | SIZE (INCHES) (L x W x D) | ANTENNA ℄ HEIGHT | AZIMUTH | TMA/ DIPLEXER | RRU | SIZE (INCHES) (L x W x D) | FEEDER | RAYCAP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | - | - | - | - | - | - | - | - | - | (8)1-5/8 COAX | (P) (1) RAYCAP DC6-48-60-18-8C |
| A2 | PROPOSED | LTE 700(B14)/ PCS/AWS | TPA65R-BU8DA-K | 96X20.7X7.7 | 111'-0"± | 70° | (P)(1) TMA2124F03V5-2D | (P)(G)(1) 4478 B14 (700)<br>(P)(G)(1) 8843 B2/B66A (AWS/PCS) | 18.1"x13.4"x8.3"<br>14.9"x13.2"x10.9" | (P)(2) DC POWER & (1) FIBER | |
| A3 | PROPOSED | DOD + CBAND | AIR6419 B77G + AIR6449 B77D (STACKED) | 31.1X16.1X7.3<br>30.4X15.9X8.1 | 113'-0"±<br>110'-0"± | 70° | - | - | - | - | |
| A4 | PROPOSED | LTE 700(BC)/850 | DMP65R-BU8DA | 96.0X20.7X7.7 | 111'-0"± | 70° | (P)(2) TMA2104F00V1-1 | (P)(G)(1) 4449 B5/B12 (850/700) | 17.9"x13.2"x10.4" | - | |
| B1 | - | - | - | - | - | - | - | - | - | (8)1-5/8 COAX | - |
| B2 | PROPOSED | LTE 700(B14)/ PCS/AWS | TPA65R-BU8DA-K | 96X20.7X7.7 | 111'-0"± | 190° | (P)(1) TMA2124F03V5-2D | (P)(G)(1) 4478 B14 (700)<br>(P)(G)(1) 8843 B2/B66A (AWS/PCS) | 18.1"x13.4"x8.3"<br>14.9"x13.2"x10.9" | - | |
| B3 | PROPOSED | DOD + CBAND | AIR6419 B77G + AIR6449 B77D (STACKED) | 31.1X16.1X7.3<br>30.4X15.9X8.1 | 113'-0"±<br>110'-0"± | 190° | - | - | - | - | |
| B4 | PROPOSED | LTE 700(BC)/850 | DMP65R-BU8DA | 96.0X20.7X7.7 | 111'-0"± | 190° | (P)(2) TMA2104F00V1-1 | (P)(G)(1) 4449 B5/B12 (850/700) | 17.9"x13.2"x10.4" | - | |
| C1 | - | - | - | - | - | - | - | - | - | (8)1-5/8 COAX | - |
| C2 | PROPOSED | LTE 700(B14)/ PCS/AWS | TPA65R-BU8DA-K | 96X20.7X7.7 | 111'-0"± | 310° | (P)(1) TMA2124F03V5-2D | (P)(G)(1) 4478 B14 (700)<br>(P)(G)(1) 8843 B2/B66A (AWS/PCS) | 18.1"x13.4"x8.3"<br>14.9"x13.2"x10.9" | - | |
| C3 | PROPOSED | DOD + CBAND | AIR6419 B77G + AIR6449 B77D (STACKED) | 31.1X16.1X7.3<br>30.4X15.9X8.1 | 113'-0"±<br>110'-0"± | 310° | - | - | - | - | |
| C4 | PROPOSED | LTE 700(BC)/850 | DMP65R-BU8DA | 96.0X20.7X7.7 | 111'-0"± | 310° | (P)(2) TMA2104F00V1-1 | (P)(G)(1) 4449 B5/B12 (850/700) | 17.9"x13.2"x10.4" | - | |

**FINAL ANTENNA SCHEDULE** (1 / A-3)
SCALE: N.T.S

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
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TEP NORTHEAST (TEP OPCO, LLC.)
DATED: FEBRUARY 16, 2024 (REV.1)

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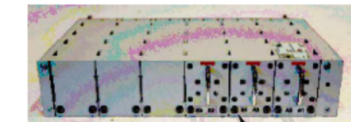


PROPOSED DC12 RAYCAP
P/N DC12-48-60-RM
WEIGHT: 15.0 LBS.

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

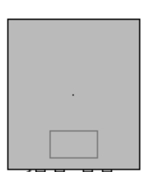
**DC12 DETAIL** (6 / A-3)
SCALE: N.T.S

## RRU CHART

| QUANTITY | MODEL | SIZE (L x W x D) |
|---|---|---|
| P(3) | 4449 B5/B12 (700/850) | 17.9"x13.2"x10.4" |
| P(3) | 8843 B2/B66A (AWS/PCS) | 14.9"x13.2"x10.9" |
| P(3) | 4478 B14 (700) | 18.1"x13.4"x8.3" |

**NOTE:**
MOUNT PER MANUFACTURER'S SPECIFICATIONS

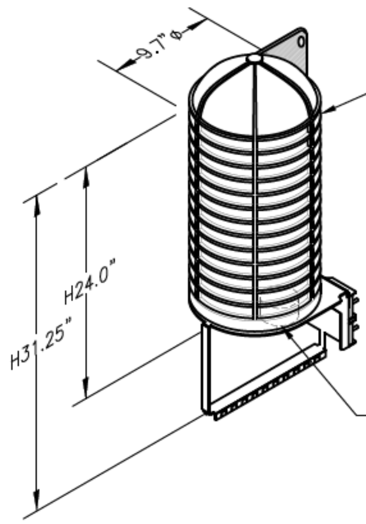
NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

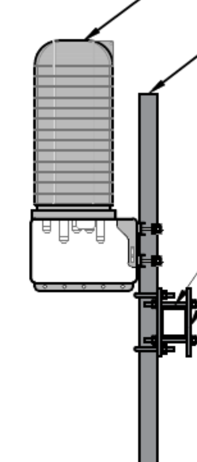
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

**PROPOSED RRUS DETAIL** (2 / A-3)
SCALE: N.T.S

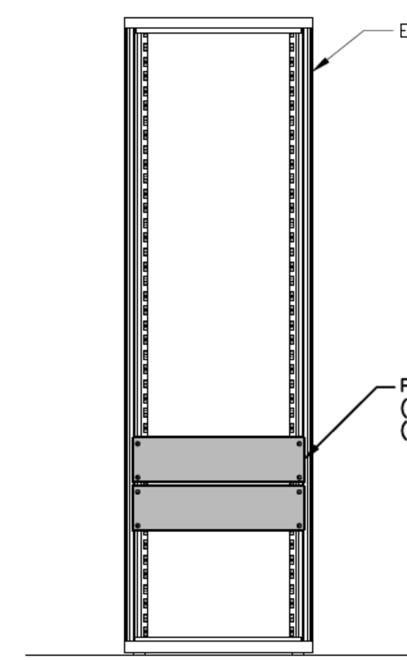



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

**DC SURGE SUPPRESSOR DETAIL** (3 / A-3)
SCALE: N.T.S




**PROPOSED SURGE ARRESTOR MOUNTING DETAIL** (4 / A-5)
SCALE: N.T.S




**PROPOSED DC12 MOUNTING DETAIL** (5 / A-5)
SCALE: N.T.S

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STATE OF CONNECTICUT
DANIEL P. HAMM
No.24178
LICENSED PROFESSIONAL ENGINEER

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DETAILS
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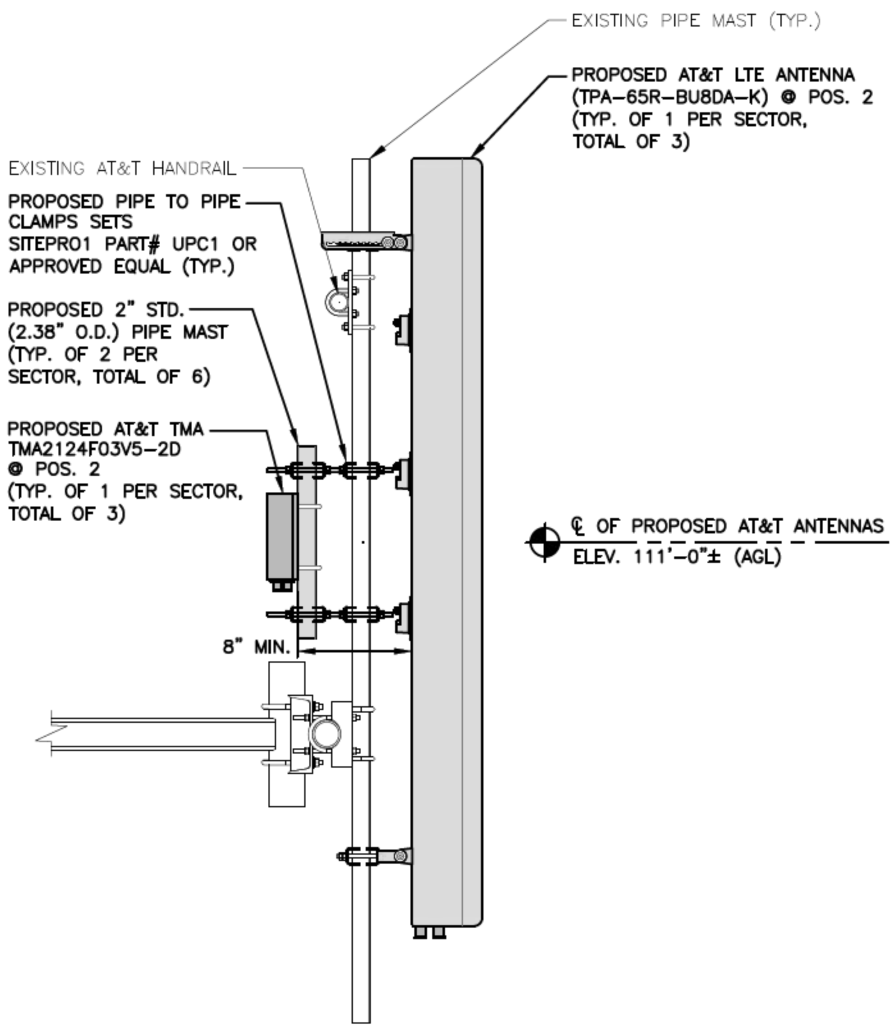
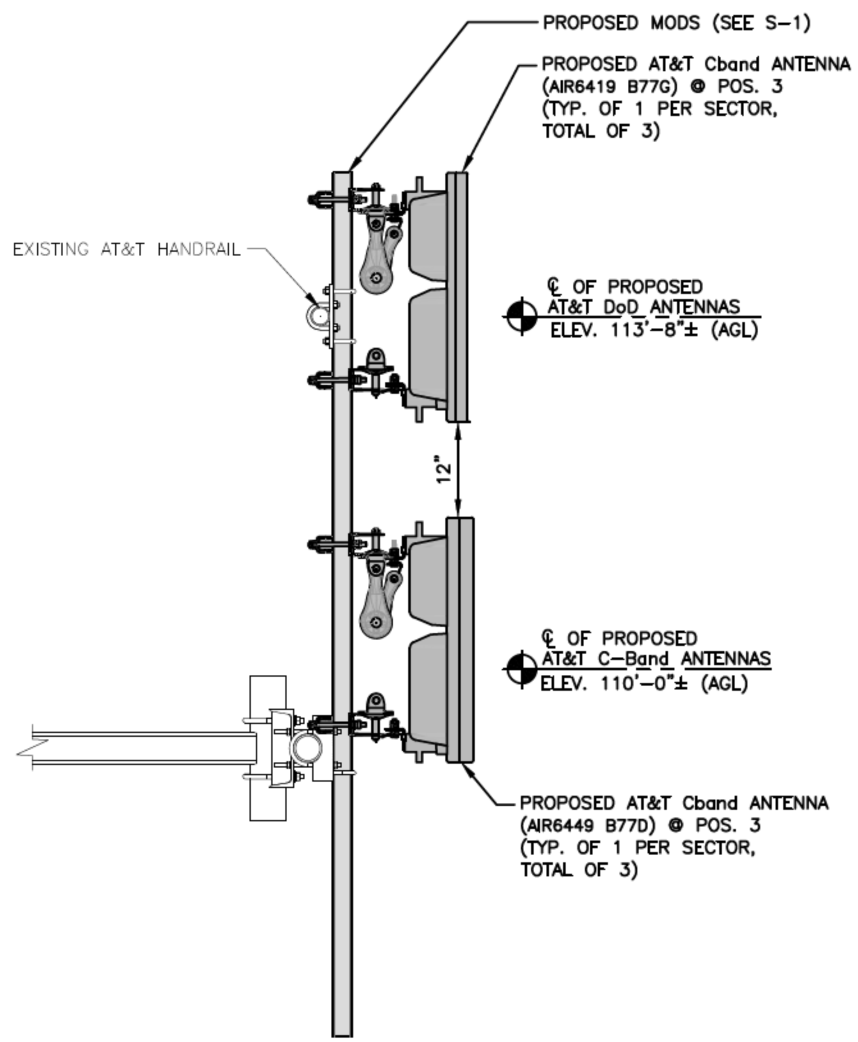
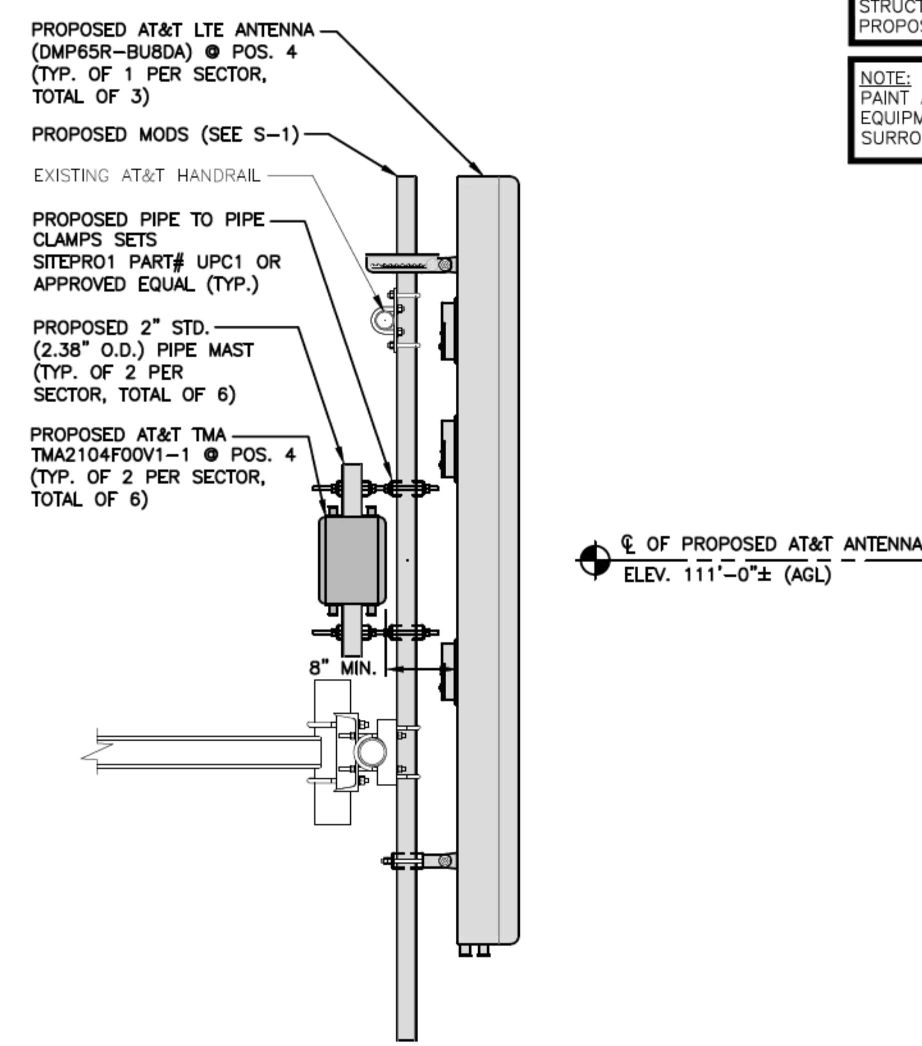



**PROPOSED LTE ANTENNA MOUNTING DETAIL** (1 / A-4)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"




**PROPOSED DoD + C-BAND ANTENNA MOUNTING DETAIL** (2 / A-4)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"




**PROPOSED LTE ANTENNA MOUNTING DETAIL** (3 / A-4)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"

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## STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA–222–H STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD–FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT–DIPPED ZINC–COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE–X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT–DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC–COATING (HOT–DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON–CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI–HIT HY–270 AND OR HY–200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF–S–325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE–EXISTING CONDITIONS.

## SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

**GENERAL:** WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

### SPECIAL INSPECTION CHECKLIST

| | |
|---|---|
| **BEFORE CONSTRUCTION** | |
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM |
| N/A | ENGINEER OF RECORD APPROVED SHOP DRAWINGS [1] |
| N/A | MATERIAL SPECIFICATIONS REPORT [2] |
| N/A | FABRICATOR NDE INSPECTION |
| **REQUIRED** | PACKING SLIPS [3] |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| **DURING CONSTRUCTION** | |
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM |
| **REQUIRED** | STEEL INSPECTIONS |
| N/A | HIGH STRENGTH BOLT INSPECTIONS |
| N/A | HIGH WIND ZONE INSPECTIONS [4] |
| N/A | FOUNDATION INSPECTIONS |
| N/A | CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT |
| N/A | POST INSTALLED ANCHOR VERIFICATION [5] |
| N/A | GROUT VERIFICATION |
| N/A | CERTIFIED WELD INSPECTION |
| N/A | EARTHWORK: LIFT AND DENSITY |
| N/A | ON SITE COLD GALVANIZING VERIFICATION |
| N/A | GUY WIRE TENSION REPORT |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| **AFTER CONSTRUCTION** | |
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD) | REPORT ITEM |
| **REQUIRED** | MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS [6] |
| N/A | POST INSTALLED ANCHOR PULL–OUT TESTING |
| **REQUIRED** | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |


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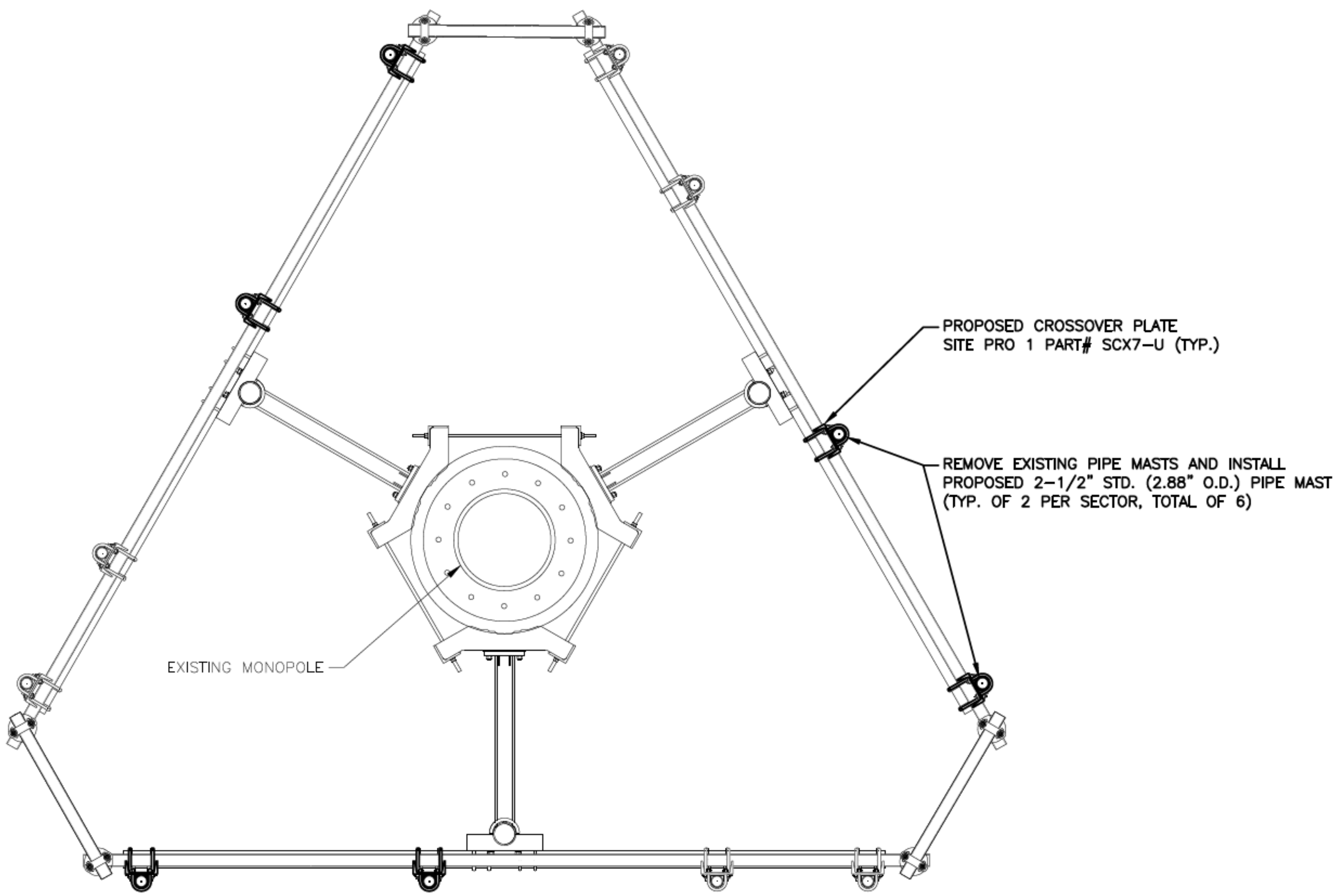
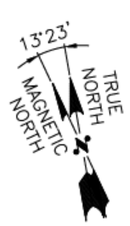
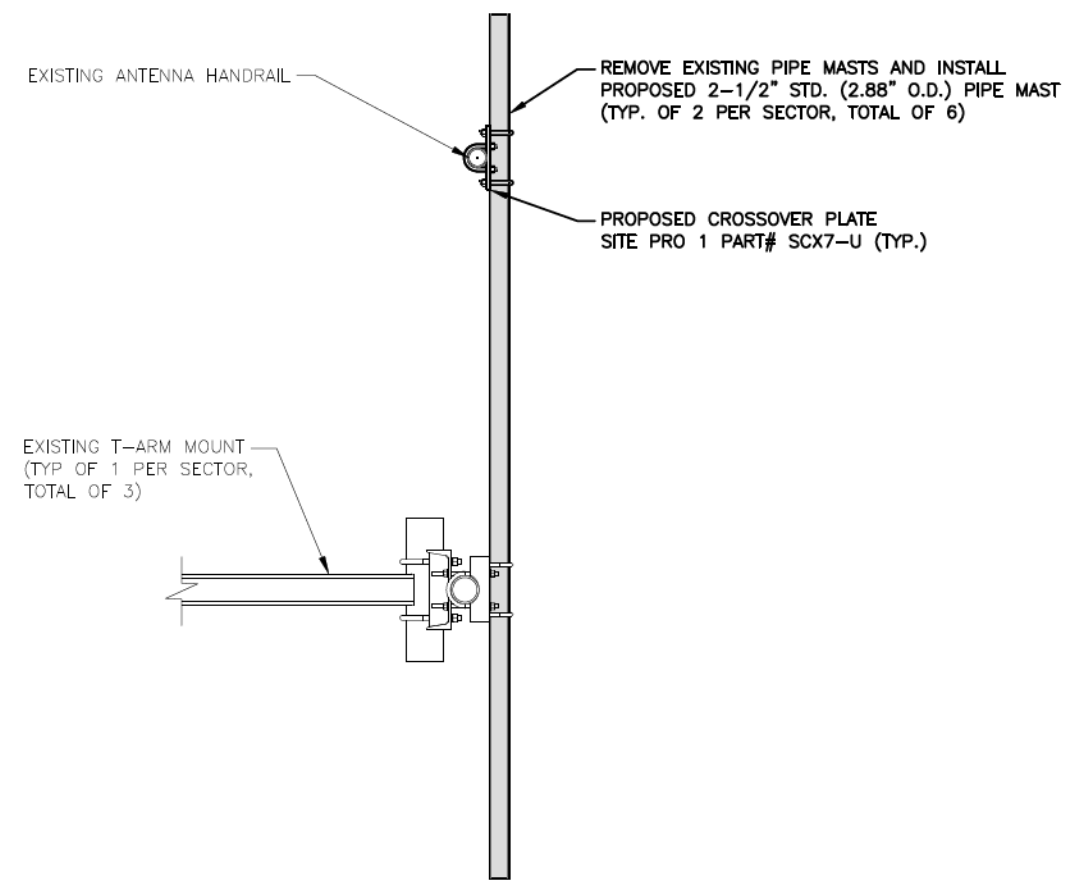
FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.




**PROPOSED MOUNT MODIFICATIONS PLAN** (1 / S-1)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"

0 8" 1'-4" 2'-8" 4'-0"




**PROPOSED MOUNT MODIFICATIONS DETAIL** (2 / S-1)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CTL02267
SITE NAME: ORANGE CT RIDGE ROAD

298 RIDGE ROAD
ORANGE, CT 06477
NEW HAVEN COUNTY

AT&T
84 DEERFIELD LANE
MERIDEN, CT 06450

| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 3 | 05/01/24 | ISSUED FOR CONSTRUCTION | AM | AT | DPH |
| 2 | 10/11/22 | ISSUED FOR CONSTRUCTION | GA | HC | DPH |
| 1 | 09/26/22 | ISSUED FOR REVIEW | BB | HC | DPH |
| 0 | 09/19/22 | ISSUED FOR REVIEW | MR | HC | DPH |
| A | 02/24/22 | ISSUED FOR REVIEW | MR | HC | DPH |

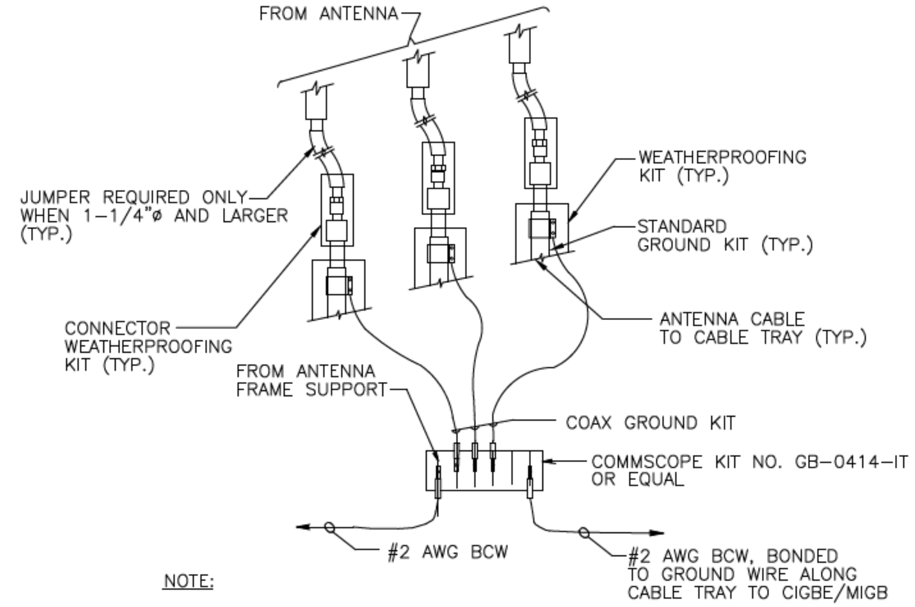
SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

MOUNT MODIFICATION DESIGN
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | S-1 | 3 |

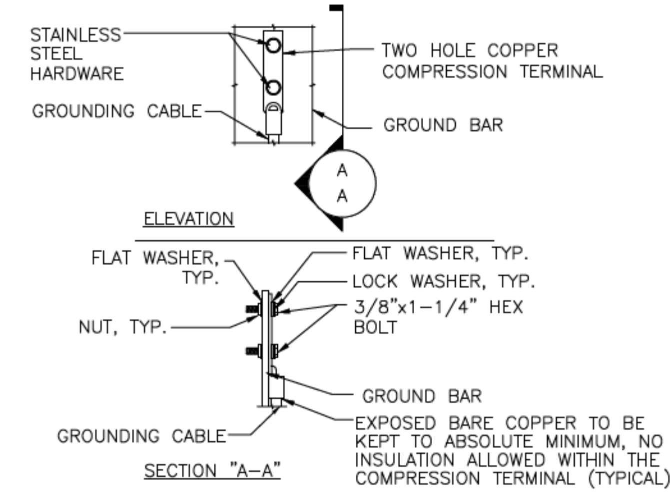



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

**GROUND WIRE TO GROUND BAR CONNECTION DETAIL** (1 / G-1)

SCALE: N.T.S

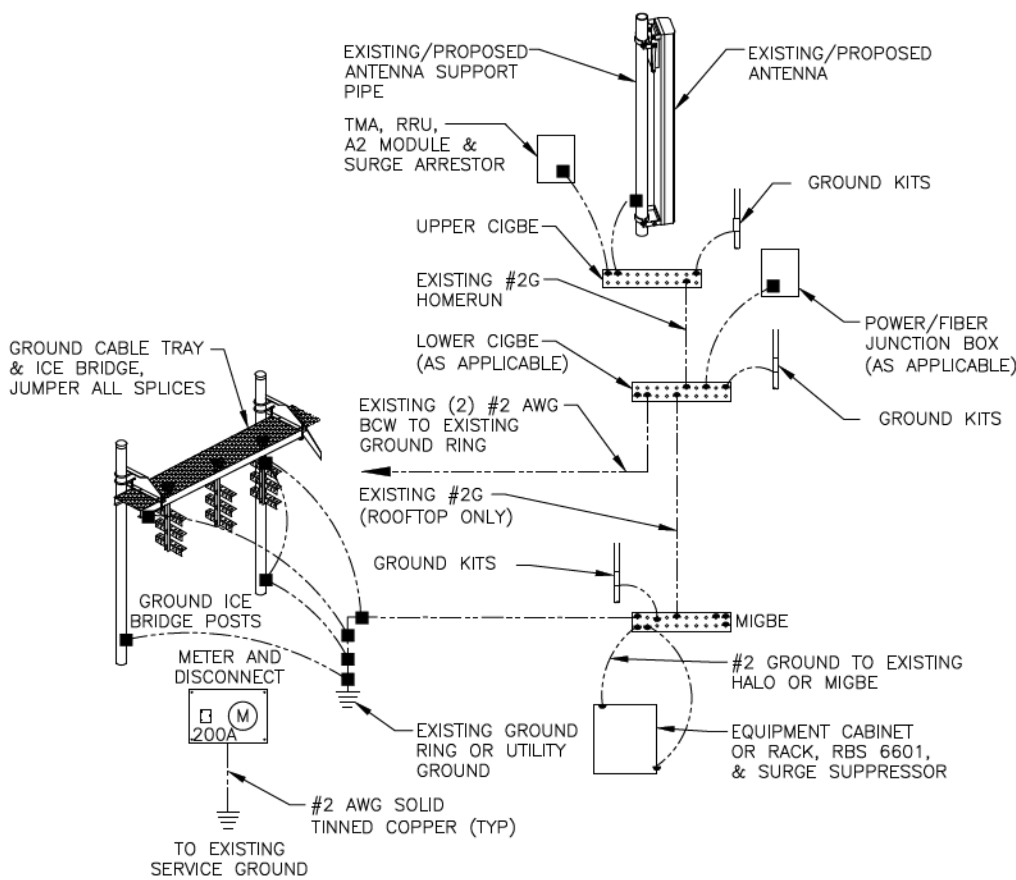



NOTES:

1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

**TYPICAL GROUND BAR CONNECTION DETAIL** (3 / G-1)

SCALE: N.T.S




**GROUNDING RISER DIAGRAM** (2 / G-1)

SCALE: N.T.S

AT&T GROUNDING STANDARDS TO BE FOLLOWED:

ATT-TP-76416
ATT-TP-76300
ATT-CEM-18002
ATT-002-290-531
ATT-002-290-701
ATT-CEM-23001

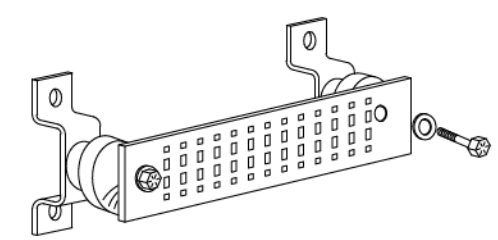
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
+24V POWER SUPPLY RETURN BAR (#2 AWG)
-48V POWER SUPPLY RETURN BAR (#2 AWG)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2 AWG)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
BUILDING STEEL (IF AVAILABLE) (#2 AWG)



**GROUND BAR - DETAIL (AS REQUIRED)** (4 / G-1)

SCALE: N.T.S

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

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12 INDUSTRIAL WAY
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ORANGE, CT 06477
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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

STATE OF CONNECTICUT – DANIEL P. HAMM – No. 24178 – LICENSED PROFESSIONAL ENGINEER

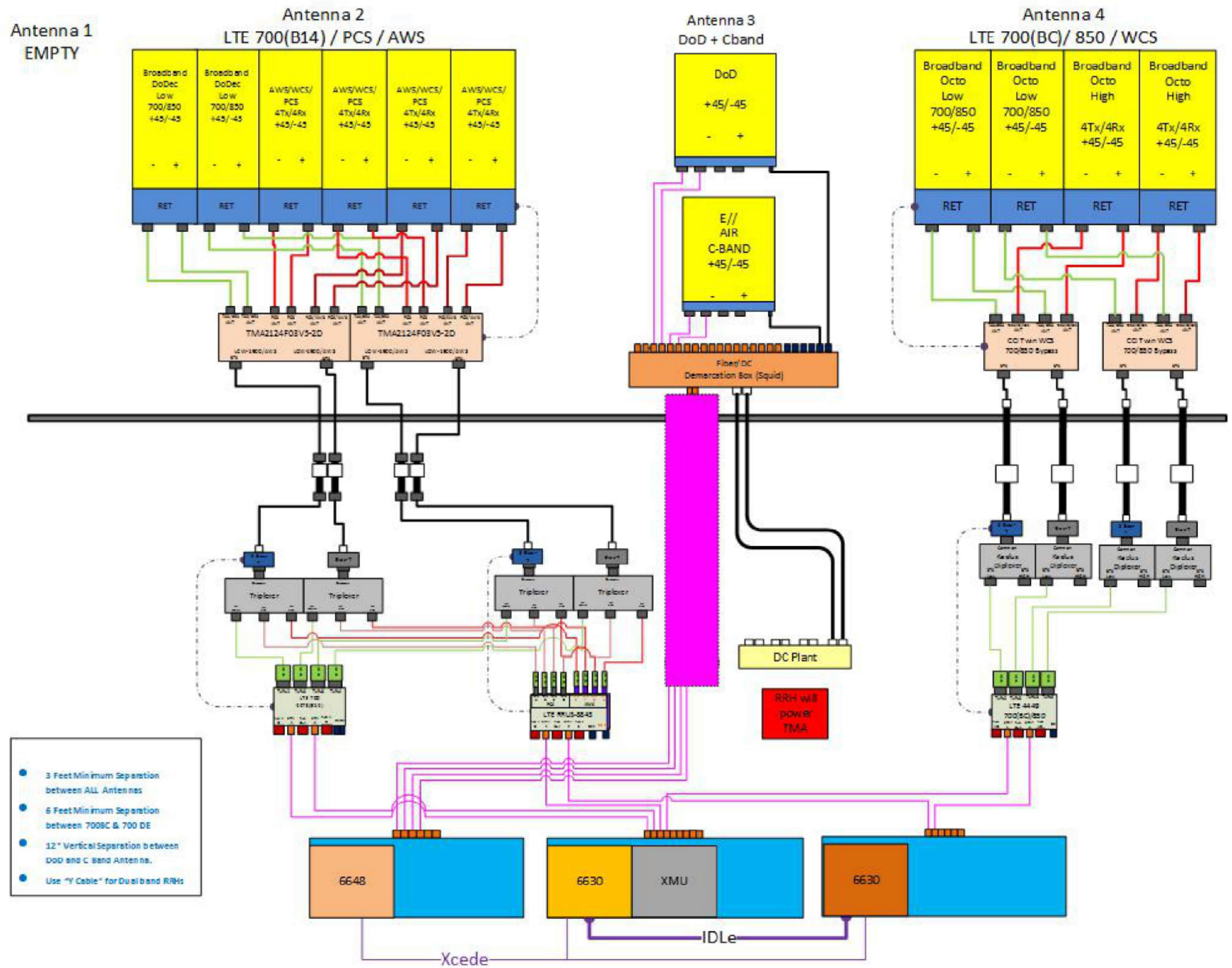
AT&T

GROUNDING DETAILS
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | G-1 | 3 |

**NOTE:**

REV: 5
DATED: 05/13/22
RFDS ID: 4732036




**RF PLUMBING DIAGRAM** 1 / RF-1
SCALE: N.T.S

**NOTE:**
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

**NOTE:**
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: MR

AT&T

RF PLUMBING DIAGRAM
5G NR 1SR CBAND_ANTENNA MODIFICATION II 4TX4RX SOFTWARE RETROIT UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CTL02267 | RF-1 | 3 |

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
Web Site: portal.ct.gov/csc

**VIA ELECTRONIC MAIL**

November 28, 2022

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
hredding@saigrp.com

RE: **EM-AT&T-107-221031 –** AT&T notice of intent to modify an existing telecommunications facility located at 298 Ridge Road, Orange, Connecticut.

Dear Hollis Redding:

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:

1. Prior to the commencement of construction, AT&T shall provide a copy of the Structural Analysis referencing the Connecticut State Building Code effective October 1, 2022;

2. Prior to AT&T's antenna installation, antenna mount modifications shall be installed in accordance with the Mount Analysis prepared by Hudson Design Group dated January 21, 2022, stamped and signed by Daniel Hamm;

3. Within 45 days following completion of equipment installation, AT&T shall provide documentation certified by a Professional Engineer that its installation complied with the recommendations of the Mount Analysis;

4. RF access restriction and caution signage shall be installed at the site in compliance with FCC guidance;

5. Any deviation from the proposed modification as specified in this notice and supporting materials submitted to the Council shall render this acknowledgement invalid;

6. Any material changes to this modification as proposed shall require the filing of a new notice with the Council;

7. The Council shall be notified in writing at least two weeks prior to the commencement of site construction activities;

8. Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;

9. Deployment of any 5G services must comply with FCC and FAA guidance relative to air navigation, as applicable;

10. Any nonfunctioning antenna and associated antenna mounting equipment, or other equipment at this facility owned and operated by AT&T shall be removed within 60 days of the date the antenna or equipment ceased to function;

11. The validity of this action shall expire one year from the date of this letter; and

12. AT&T 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 October 28, 2022. 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 by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and Environmental Protection pursuant to Connecticut 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.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/RDM/emr

c: The Honorable James M. Zeoli, First Selectperson, Town of Orange (jzeoli@orange-ct.gov)



emr

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
Web Site: portal.ct.gov/csc

**VIA ELECTRONIC MAIL**

November 8, 2023

Hollis M. Redding
SAI Communications, LLC
12 Industrial Way
Salem, NH 03079
hredding@saigrp.com

RE: **Requests for Extensions of Construction:**

**EM-AT&T-103-221026** – AT&T notice of intent to modify an existing telecommunications facility located 284 New Canaan Avenue, Norwalk, Connecticut.

**EM-AT&T-107-221031** – AT&T notice of intent to modify an existing telecommunications facility located at 298 Ridge Road, Orange, Connecticut.

Dear Hollis Redding:

The Connecticut Siting Council (Council) is in receipt of your correspondence dated November 6, 2023, submitted on behalf of AT&T requesting extensions of time to submit notices of completion of construction for the above-referenced exempt modifications.

The Council hereby grants an extension of time until November 28, 2024, to submit notices of completion of construction.

The extensions are granted with the understanding that the Council will be notified should AT&T need additional time to submit notices of completion or decides not to proceed with construction on any of the above-referenced exempt modifications.

Thank you for your attention to this matter.
Sincerely,

Melanie A. Bachman
Executive Director

MAB/ANM/laf

STATE OF CONNECTICUT
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Executive Director

MAB/ANM/laf