NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Victoria Masse
420 Main Street #2, Sturbridge, MA 01566
860-306-2326
victoria@northeastsitesolutions.com

October 13, 2020

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

RE: Notice of Exempt Modification
Off of Rood Road, Pole # 20073, Line 1779, Windsor CT 06095
Latitude: 41.8256844800
Longitude: -72.6675063100
T-Mobile Site#: CT11446A_Anchor

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antenna at the 154-foot level and three (3) antenna at the 161-foot level of the existing 164-foot utility pole located Off of Rood Road, Pole # 20073, Line 1779, Windsor CT. The 164-foot utility pole and property are owned by CT Light and Power d/b/a Eversource. T-Mobile now intends to replace three (3) of the existing antenna with three (3) new 600/700/1900/2100 MHz antenna. The new antennas would be installed at the 154-foot level of the tower.

Planned Modifications:

Remove:
(6) TMA

Remove and Replace:
(3) LNX6515DS (**Remove) –** (3) APXVAARR24-43-U-NA20 Antenna 600/700/1900/2100 MHz (154-ft RAD) **(Replace)**

Install New:
(12) 1-5/8" Coax

Existing to Remain:
(18) 1-5/8" Coax
(3) APX16DWV-16DWV Antenna 1900/2100 MHz (161-ft RAD)

Ground:
(3) RRH **(Remove) –** (3) RRU 4449 B71 +B12 **(Replace)** on Exiting H-Frame

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

This facility was approved by the CT Siting Council Petition No.1125. Please see attached.

This facility was approved by the Connecticut Siting Council. Docket No.179 – 1. The height of the proposed tower shall not exceed a height of 327 feet above ground level (AGL). Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor Donald Trinks, as Elected Official for the Town of Windsor and Eric Barz, Town Planner as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site. ·

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Victoria Masse
Mobile: 860-306-2326
Fax: 413-521-0558
Office: 420 Main Street #2, Sturbridge, MA 01566
Email: victoria@northeastsitesolutions.com

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Attachments
cc:
Mayor Donald Trinks - as elected official
Eric Barz- Town Planner

Eversource - Tower and property owner
Northeast Utilities
107 Selden Street
Berlin CT 06037
Attn: Chris Gelinas

Exhibit A

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

RE: PETITION BY T-MOBILE NORTHEAST LLC FOR A DECLARATORY RULING THAT NO CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED IS REQUIRED TO MODIFY THE TELECOMMUNICATIONS FACILITY OFF OF ROOD ROAD, STRUCTURE NO. 20073 IN THE TOWN OF WINDSOR, CONNECTICUT

PETITION NO. _____

Date: December 10, 2014

PETITION FOR DECLARATORY RULING

Pursuant to General Statutes § 16-50g *et seq.* and § 16-50j-1 *et seq.* of the Regulations of Connecticut State Agencies, T-Mobile Northeast LLC ("T-Mobile") submits this Petition for a Declaratory Ruling ("Petition") for a determination that T-Mobile does not require a Certificate of Environmental Compatibility and Public Need ("Certificate") for the modification of the wireless telecommunications facility Off of Rood Road, Structure #20073, Line #1779, in the Town of Windsor ("Windsor Facility" or "Facility"). T-Mobile respectfully requests that the Connecticut Siting Council ("Council") issue a declaratory ruling that the modified Windsor Facility would not have a substantial adverse impact on the environment and, accordingly, T-Mobile does not need to obtain a Certificate for the modifications to the Windsor Facility.

II. BACKGROUND INFORMATION

A. The Applicant

T-Mobile is a limited liability company, organized under the laws of Delaware, with a Connecticut office at 35 Griffin Road South, Bloomfield, Connecticut 06002. The company and its affiliated entities are licensed by the Federal Communications Commission ("FCC") to construct and operate a personal wireless services system in Connecticut, which has been interpreted as a "cellular system" within the meaning of General Statutes § 16-50i (a) (6). T-Mobile does not conduct any other business in the State of Connecticut other than the provision of cellular services under FCC rules and regulations.

Correspondence and/or communications regarding this Petition should be addressed to the attorney for the Applicant:

Cohen and Wolf, P.C.
1115 Broad Street
Bridgeport, CT 06604
Telephone: (203) 368-0211
Attention: Julie D. Kohler, Esq.

B. The Windsor Facility

Structure No. 20073 is a Northeast Utilities transmission line structure that is a component of transmission Line No. 1779. In Petition No. 590, the Council approved T-Mobile's request for location of its antennas on a 16 foot pipe extension on this 148 foot Facility, bringing the height of the Facility to 164 feet.[1] Further, T-Mobile's equipment

[1] The Petition No. 590 staff report indicates that "Two sets of three-panel antennas would be mounted at centerline heights of 155 and 161 feet above ground level (agl). The total height of the structure would be 164 feet agl."

cabinets were approved to be installed on a 12-foot by 14-foot concrete pad enclosed within a fenced 18-foot by 20-foot compound.

T-Mobile subsequently modified the Facility in a notice to intent captioned EM-T-MOBILE-164-100819.

A copy of the Petition No. 590 approval and the EM-T-MOBILE-164-100819 acknowledgement are attached hereto as Exhibit A.

II. PROPOSED MODIFICATIONS TO THE WINDSOR FACILITY

T-Mobile seeks to modify the existing Windsor Facility by:

- Replacing three (3) antennas at a centerline of 155 feet;
- Relocating three (3) existing TMAs (tower mounted amplifiers) from a centerline of 155 feet to a centerline of 161 feet;
- Adding three (3) RRUS (remote radio units) on a proposed H-frame; and
- Expanding the chain link fenced area by a dimension of 12 feet x 20 feet 3 inches to enclose the transmission structure and existing ice bridge, as required by Northeast Utilities. Portions of the existing fence would be removed to accommodate this enlarged perimeter.

Plans (revised to November 10, 2014) detailing these proposed modifications are attached hereto as Exhibit B.

The majority of proposed modifications to this Facility qualify for acknowledgement as an exempt modification. However, fencing in the transmission structure will technically expand the boundaries of the existing site. Although this is not a substantial change, it is a deviation from the Petition No. 590 approval and T-Mobile seeks a Petition to allow for these modifications.[2]

III. STATEMENT OF NEED

The Facility is an integral component of T-Mobile's wireless network in this area of Windsor. It is imperative that T-Mobile upgrade its antennas and equipment so that it may provide improved wireless services to people living in and traveling through this area of the State.

T-Mobile has acquired 700 MHz wireless spectrum in Connecticut to improve the service provided to customers. As T-Mobile's current spectrum deployment is in the PCS (1900 MHz) and AWS (2100 MHz) bands, this new spectrum provides an opportunity to significantly improve coverage for wireless subscribers throughout the area. The 700 MHz spectrum is primarily intended to improve in-building coverage for voice and E911 services. The 700 MHz spectrum has a better ability to penetrate building structures so it will provide superior coverage and will now become the priority use of spectrum for customers that attempt to utilize their phones in poorly covered areas.

As part of this new deployment, T-Mobile has chosen to use the best antennas available so that the best possible service can be provided to customers. The proposed antennas have a gain of 16.7 dBi, which is 1 dB more than a shorter model. This additional gain allows each existing antenna installation to provide the absolute maximum possible coverage from that location. The incremental coverage from each site will provide additional in-building coverage to residents in the area and will ensure

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[2] T-Mobile also seeks approval of the other proposed facility modifications identified in Section II.

fewer areas are out of coverage. Ensuring maximum possible coverage will provide voice service to more customers and provides the ability for E911 services to more area. It will also minimize the need to build additional facilities in the Town.

To summarize, these antennas do provide a significant amount of additional coverage that is necessary to provide the full utilization of this T-Mobile installation, in order to best provide voice coverage and E911 services to residents.

IV. THE PROPOSED MODIFICATIONS WILL NOT HAVE A SUBSTANTIAL ADVERSE ENVIRONMENTAL EFFECT

As indicated above, the reason this proposed modification is being filed as a Petition is only due to the minimal expansion of the site boundaries. Northeast Utilities has required that T-Mobile enclose the transmission tower and existing ice bridge with a fence as part of this equipment upgrade. A Letter of Approval from Northeast Utilities is attached hereto as Exhibit C.

This de minimus site expansion will not result in any adverse environmental effect. The remainder of the proposed site modifications fall within the exempt modifications criteria, so by regulation have been established to not have a substantial adverse environmental effect.

A. Limited Site Impacts

T-Mobile is already collocated on this Facility and it seeks to install a necessary equipment upgrade. The proposed modifications would be situated on the existing structure and include an expansion of the fenced area simply to enclose two existing structures – the transmission tower and ice bridge. No clearing or grading is required and this area is already disturbed by the presence of the existing transmission line. Further, T-Mobile does not propose any generators or HVAC units. The proposed modifications to the Facility would not have a significant adverse impact on the environment.

B. Compliance with MPE Limits

The operation of the proposed antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI Consulting dated November 4, 2014 T-Mobile's operations would add 5.50% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 5.50% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit D.

C. Structural Analysis

The Windsor Facility is structurally capable of supporting T-Mobile's proposed antennas. The Structural Analysis Report dated September 24, 2014 and attached hereto as Exhibit E concluded that "the subject tower is adequate to support the proposed modified antenna configuration."

D. Other Environmental Factors

T-Mobile's continued collocation on the Windsor Facility is consistent with the Council's Decision and Staff Report in Petition No. 590 approval as it relates to other environmental factors. As such, the modified Windsor Facility will not have a significant adverse effect on any of the following: the natural environment; ecological balance; public health and safety; scenic, historic, and recreational values; forests and parks; air; water purity; and fish, aquaculture, and wildlife.

V. NOTICE REQUIRED

In accordance with R.C.S.A. § 16-50j-40(a), T-Mobile sent notice of its intent to file this Petition to each person appearing of record as an owner of property that abuts the site, as well as the appropriate municipal officials. A copy of the notice, list of the property owners and municipal officials to whom the notice was sent and a certification of such notice are included in Exhibit F.

VI. CONCLUSION

The information and exhibits referenced above demonstrate that a Petition should issue for the modifications T-Mobile proposes at this Facility.

This Petition and the accompanying materials and documentation demonstrate that the only aspect of the proposal that would not receive acknowledgement as an exempt activity is the expansion of the fenced area. In order for T-Mobile to upgrade its facility at this location it is required to fence in the transmission structure and ice bridge area. The expansion of the fenced area is not a significant change to the site and given the disturbed nature of the site, would not result in an adverse environmental impact.

The other modifications will all be located within the existing compound or on the tower. T-Mobile therefore respectfully requests that the Council issue a declaratory ruling approving the Windsor Facility modifications as proposed in this filing.

Respectfully Submitted,

T-MOBILE NORTHEAST LLC

By: ______________________

Julie D. Kohler, Esq.
Cohen and Wolf, P.C.
1115 Broad Street
Bridgeport, CT 06604
Tel. (203) 368-0211
Fax (203) 394-9901
jkohler@cohenandwolf.com

EXHIBIT A

Petition No. 590
Omnipoint Communications, Inc. d/b/a T-Mobile USA, Inc.
Windsor, Connecticut
Staff Report
November 7, 2002

On October 30, 2002, Connecticut Siting Council (Council) member Gerald Heffernan and Robert Mercier of the Council staff met with Omnipoint Communications, Inc (Omnipoint) representatives at a Connecticut Light and Power (CL&P) right-of-way south of Rood Avenue in Windsor, Connecticut for inspection of an electric transmission structure owned by CL&P. Omnipoint, with the agreement of CL&P, proposes to modify the structure by installing antennas on a pipe mount and an equipment compound for telecommunications use and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

Omnipoint proposes to install a 16-foot pipe mast on the existing 148-foot electric transmission line structure (no. 20073). Two sets of three-panel antennas would be mounted at centerline heights of 155 and 161 feet above ground level (agl). The total height of the structure would be 164 feet agl.

Three equipment cabinets would be installed on a 12-foot by 14-foot concrete pad enclosed within an 18-foot by 20-foot compound. A six-foot high chain link fence would enclose the gravel compound area. Access to the proposed site would be via a graded grassy track that would require minimal clearing. Utility service would be provided from an underground conduit that would extend from an existing utility pole on Pine Line Extension, through a residential property to the right-of-way.

The tower location abuts a residential area to the south and west, Interstate 91 to the east and a continuation of the right-of-way to the north. The right-of way contains two separate transmission lines and associated tower structures. The proposed compound site is in a cleared area that would be visible from the backyards of several homes that directly abut the right-of-way. In the petition, Omnipoint proposes to locate the compound access gate on the west side of the compound, in view of the residences. Omnipoint would be willing to relocate the gate to the north side of the compound and establish vegetative screening on the west side to minimize potential visual impacts.

Omnipoint investigated the possible shared use of existing telecommunications facilities on Cottage Grove Road and Emerson Road in Windsor and determined coverage objectives could not be met.

The worst-case power density for the telecommunications operations at the site has been calculated to be 1.9% of the applicable standard for uncontrolled environments.

The proposed project is designed to provide coverage to coverage gaps on Interstate 91 in the vicinity of Exit 36. Omnipoint contends that the proposed modification of the structure would not cause a substantial adverse environmental impact, and would prevent the construction of a new tower in the area.

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
Internet: ct.gov/csc

Daniel F. Caruso
Chairman

September 8, 2010

Thomas J. Regan, Esq.
Brown Rudnick LLP
CityPlace I, 185 Asylum Street
Hartford, CT 06103

RE: **EM-T-MOBILE-164-100819** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located off of Rood Avenue, Windsor, Connecticut.

Dear Attorney Regan:

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:

- Prior to the antenna/dish installation, the foundation shall be reinforced in accordance with the structural analysis prepared by CENTEK Engineering, Inc. April 29, 2010 and stamped by Carlo F. Centore, P.E.; and

- The foundation shall not exceed 100 percent of its post-construction structural rating; and

- Prior to the antenna/dish installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the reinforcements have been properly completed and the foundation does not exceed 100 percent of its post-construction structural rating.

The proposed modifications are to be implemented as specified here and in your notice dated August 19, 2010, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Thank you for your attention and cooperation.

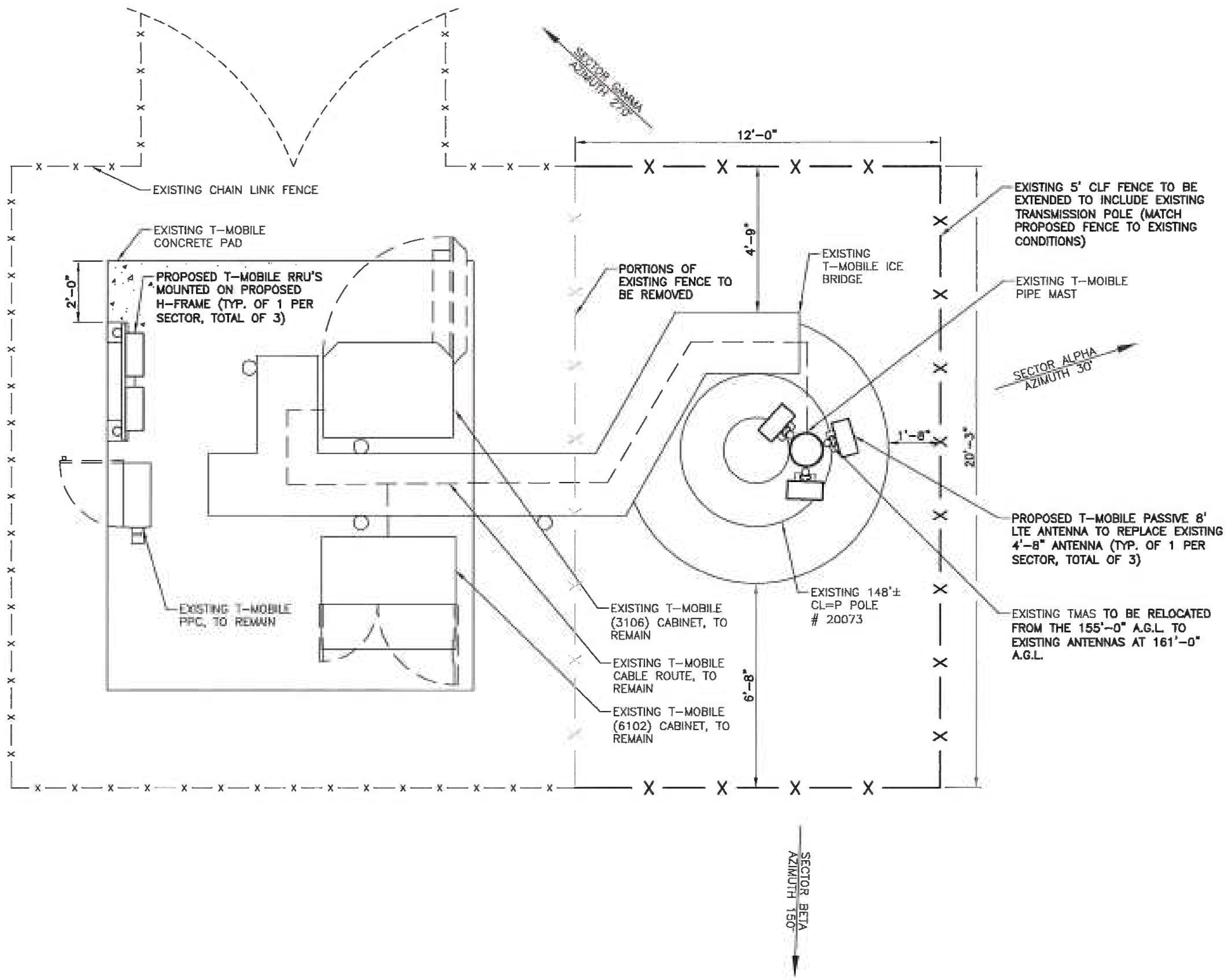
Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Donald Trinks, Mayor, Town of Windsor
Peter Souza, Town Manager, Town of Windsor
Eric Barz, Town Planner, Town of Windsor
Daniel J. Garstka, Senior Engineer, Transmission Projects, Northeast Utilities Service Company

EXHIBIT B



CONFIGURATION

704BU

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

SITE PLAN

SCALE: 3/16" = 1'-0"

PREPARED BY:

EBI Consulting
environmental | engineering | due diligence
21 B Street | Burlington, MA 01803
Tel: (781) 273-2500 | Fax: (781) 273-3311
www.ebiconsulting.com

EBI JOB NO.: 81140815

CLIENT:

T-Mobile Northeast, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860.692.7100

SITE INFO:

CT11446
CL&P MONOPOLE, WINDSOR
OFF OF ROOD ROAD POLE #20073, LINE 1779
WINDSOR, CT. 06095

SUBMITTALS

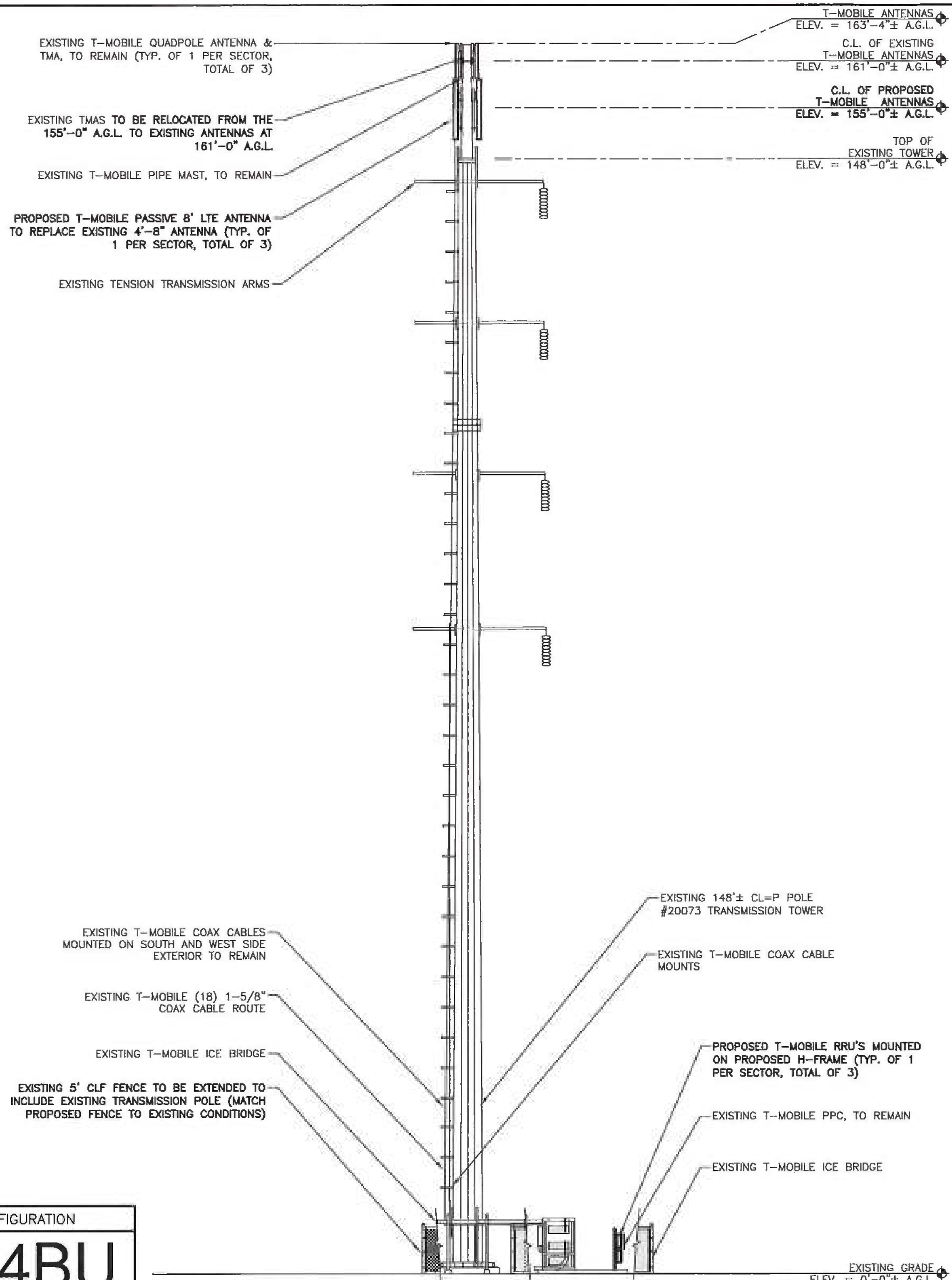
NO.	DATE	DESCRIPTION	BY
A	08/06/00	FOR REVIEW	SH
B	10/27/14	PER COMMENTS	SS
C	11/10/14	ANTENNAS COMMENTS	MK

DRAWN BY: SH

CHECKED BY: PM

DATE: 08/01/14

SHEET NO: LE-1



CONFIGURATION

704BU

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

ELEVATION

SCALE: 1:20

PREPARED BY:
EBI Consulting
environmental | engineering | due diligence
21 B Street | Burlington, MA 01803
Tel: (781) 273-2500 | Fax: (781) 273-3311
www.ebiconsulting.com

EBI JOB NO.: 81140815

CLIENT:
T-Mobile Northeast, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860.692.7100

SITE INFO:
CT11446
CL&P MONOPOLE, WINDSOR
OFF OF ROOD ROAD POLE #20073, LINE 1779
WINDSOR, CT. 06095

SUBMITTALS

NO.	DATE	DESCRIPTION	BY
A	08/06/00	FOR REVIEW	SH
B	10/27/14	PER COMMENTS	SS
C	11/10/14	ANTENNAS COMMENTS	MK

DRAWN BY: SH
CHECKED BY: PM
DATE: 08/01/14

SHEET NO: LE-2

EXHIBIT C

Northeast
Utilities System

56 Prospect Street, Hartford, CT 06103

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

October 31, 2014

Mr. Mark Richard
T-Mobile
35 Griffin Rd.
Bloomfield, CT 06002

RE: T-Mobile Antenna Site, CT-11 446A, Rood Rd., Windsor CT, structure 20073.

Dear Mr. Richard:

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

Since there are no outstanding structural or site related issues to resolve at this time, construction at these locations may begin as soon as scheduling allows. You may contact Mr. O'Brien (860-665-6987); once the lease issues are secured you may then contact Mr. John Landry directly (860-665-5425) to begin the construction arrangements

Sincerely,

Robert Gray
Transmission Line Engineering

Ref: CT11446A_L700_CD_REV.C_704BU_10.21.14.pdf

Ref: 14025.010 - CT11446A Structural Analysis Rev0 14-09-24.pdf

EXHIBIT D

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11446A

CL&P Monopole, Windsor
Off of Rood Road Pole #20073, Line 1779
Windsor, CT 06095

November 4, 2014

EBI Project Number: 62145548

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general public allowable limit:	**5.50 %**

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

November 4, 2014

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11446A – CL&P Monopole, Windsor**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **Off of Rood Road Pole #20073, Line 1779, Windsor, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **Off of Rood Road Pole #20073, Line 1779, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

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

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerlines of the proposed antennas are **161 feet and 155 feet** above ground level (AGL).

9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

EBI Consulting

environmental | engineering | due diligence

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	161 feet	Height (AGL):	161 feet	Height (AGL):	161 feet
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	3,833.82	ERP (W):	3,833.82	ERP (W):	3,833.82
Antenna A1 MPE%	1.53	Antenna B1 MPE%	1.53	Antenna C1 MPE%	1.53
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	155 feet	Height (AGL):	155 feet	Height (AGL):	155 feet
Frequency Bands	700 Mhz	Frequency Bands	700 Mhz	Frequency Bands	700 Mhz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	445.37	ERP (W):	445.37	ERP (W):	445.37
Antenna A2 MPE%	0.30	Antenna B2 MPE%	0.30	Antenna C2 MPE%	0.30

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**5.50**
No Additional Carriers	
Site Total MPE %:	**5.50 %**

T-Mobile Sector 1 Total:	1.83 %
T-Mobile Sector 2 Total:	1.83 %
T-Mobile Sector 3 Total:	1.83 %
Site Total:	5.50 %

21 B Street Burlington, MA 01803 Tel: (781) 273.2500 Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.83 %
Sector 2:	1.83 %
Sector 3 :	1.83 %
T-Mobile Total:	5.50 %
Site Total:	5.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.50%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803`

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EXHIBIT E

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and CL&P Pole

T-Mobile: CT11446A

CL&P Structure No. 20073

148' Electric Transmission Pole

Rood Ave,
Windsor, CT

CENTEK Project No. 14025.010

Date: September 24, 2014

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 20330
LICENSED
PROFESSIONAL ENGINEER

Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

Introduction

The purpose of this report is to analyze the existing 51' long antenna mast and 148' CL&P pole located off Rood Ave in Windsor, CT for the proposed antenna and equipment upgrade by T-Mobile.

The proposed loads consist of the following:

- T-MOBILE (Existing to Remain):

  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas and three (3) RFS ATMAA1412D-1A20 TMA's flush mounted on the existing pipe mast with a RAD center elevation of 161-ft above tower base plate.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables mounted to the exterior of the existing CL&P pole and antenna mast.

- T-MOBILE (Existing to Relocate):

  Antennas: Three (3) RFS ATMAA1412D-1A20 TMA's flush mounted on the existing pipe mast with a RAD center elevation of 155-ft above tower base plate to be relocated to 161-ft above tower base plate.

- T-MOBILE (Existing to Remove):

  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas flush mounted on the existing pipe mast with a RAD center elevation of 155-ft above tower base plate.

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

  Antennas: Three (3) Andrew LNX-6515DS panel antennas flush mounted on the existing pipe mast with a RAD center elevation of 155-ft above tower base plate.

Primary assumptions used in the analysis

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

Analysis

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

The existing mast consisting of a 10-in SCH. 40 x 12.5-ft long pipe flange connected to a 12-in SCH. 40 x 38.5-ft long pipe connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast structure in order to obtain reactions needed for analyzing the CL&P pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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

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

Design Basis

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

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

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 72.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.................................... 4.0 psf
  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 C2-2007, 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 pole were analyzed and designed in accordance with the NU Design Criteria Table, TIA/EIA-222-F, and AISC-ASD standards.

Load cases considered:

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

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

Note 2: Per NU Mast Design Criteria Exception 1.

Results

- MAST ASSEMBLY

The existing pipe mast was determined to be structurally adequate.

Component	Size	Stress Ratio (percentage of capacity)	Result
10" Sch. 40 Pipe	12.5'	57.7%	**PASS**
12" Sch. 40 Pipe	38.5'	32.4%	**PASS**

- UTILITY POLE

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

A maximum usage of **98.02%** 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 2	88.00' -108.00' (AGL)	98.02%	**PASS**

BASE PLATE:

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	55.98%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 10-ft ∅ x 23.0-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (28) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01139-60000. The existing foundation was reinforced with a 26-ft square by 4-ft thick reinforced concrete mat installed at the periphery of the existing caisson per the structural analysis report prepared by Centek Engineering job no. 09045.CO2 dated June 15, 2010.

<u>BASE REACTIONS:</u>

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	62.26 kips	105.89 kips	6582.43 ft-kips
NESC Extreme Wind	77.02 kips	58.71 kips	7480.85 ft-kips

Note 1 – 10% increase applied to tower base reactions 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	77.6%	**PASS**

<u>FOUNDATION:</u>

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Pad and Pier	Overturning	1.0 FS (1)	1.61 FS (1)	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

<u>Conclusion</u>

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

EXHIBIT F

CERTIFICATION OF SERVICE

I hereby certify that on the 9th day of December, 2014, a copy of the foregoing letter and notice was mailed by certified mail, return receipt requested to each of the abutting properties owners on the accompanying list.

Julie D. Kohler, Esq.
Cohen and Wolf, P.C.
1115 Broad Street
Bridgeport, CT 06604

Attorney for:
T-Mobile Northeast, LLC
("T-Mobile")

COHEN *and* WOLF
P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

December 9, 2014

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Re: T-Mobile Northeast LLC
Proposed Modifications to an Existing Telecommunications Facility Off of Rood Road, Northeast Utilities Transmission Structure #20073, Windsor Connecticut
Petition to the Connecticut Siting Council

To Whom It May Concern:

We are writing you on behalf of our client T-Mobile Northeast LLC ("T-Mobile") with respect to the above referenced matter. T-Mobile is currently collocated on the telecommunications facility located Off of Rood Road on Northeast Utilities Transmission Structure #20073 in Windsor, Connecticut and seeks to modify its existing installation to improve its coverage and service from this location.

The attached notice is being sent to you pursuant to the Regulations of Connecticut State Agencies, which require that owners of property that abut a parcel on which the facility is located be sent notice of an applicant's intent to file a Petition with the Connecticut Siting Council.

If you have any question regarding this notice or the Petition, please don't hesitate to contact the Connecticut Siting Council or the undersigned.

Sincerely,

Julie D. Kohler

Enclosure

1115 Broad Street
P.O. Box 1821
Bridgeport, CT 06601-1821
Tel: (203) 368-0211
Fax: (203) 394-9901

158 Deer Hill Avenue
Danbury, CT 06810
Tel: (203) 792-2771
Fax: (203) 791-8149

320 Post Road West
Westport, CT 06880
Tel: (203) 222-1034
Fax: (203) 227-1373

657 Orange Center Road
Orange, CT 06477
Tel: (203) 298-4066
Fax: (203) 298-4068

NOTICE

Pursuant to Section 16-50j-40(a) of the Regulations of Connecticut State Agencies, notice is hereby given that T-Mobile Northeast LLC ("T-Mobile") will file a Petition for Declaratory Ruling ("Petition") with the Connecticut Siting Council ("Council") on or after December 9, 2014. T-Mobile will seek a ruling that no Certificate of Environmental Compatibility and Public Need is required to modify its antenna site at the existing telecommunication facility Off of Rood Avenue, Northeast Utilities Transmission Structure #20073, Line #1779 Windsor Connecticut ("Facility").

T-Mobile has an existing wireless telecommunications site at this Facility and antenna arrays at the 155 and 161 foot centerlines. It seeks to upgrade its equipment and replace three (3) antennas at a centerline of 155 feet; relocate three (3) existing TMAs (tower mounted amplifiers) from a centerline of 155 feet to a centerline of 161 feet; add three (3) RRUS (remote radio units) on a proposed H-frame; and expand the chain link fenced area by a dimension of 12 feet x 20 feet, 3 inches to enclose the existing transmission structure and ice bridge.

The modifications to this Facility are being proposed to allow T-Mobile to provide improved wireless service to the Town of Windsor.

The Petition will set forth the need, purpose and benefits of the modifications to the Facility. The Petition provides plans, details of the proposed modifications and explains why T-Mobile submits that these modifications present no significant adverse environmental effect.

Copies of the Petition will be available for review during normal business hours on or after December 9, 2014 at the Connecticut Siting Council:

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

or at the offices of T-Mobile's legal counsel:

Julie D. Kohler, Esq.
Cohen and Wolf, P.C.
1115 Broad Street
Bridgeport, CT 06604
Tel. (203) 368-0211
Fax (203) 394-9901

All inquiries should be addressed to the Council or to T-Mobile's legal counsel as listed above.

ADJACENT PROPERTY OWNERS
301T Rood Avenue, Windsor

Rita Baylor
263 Rood Avenue
Windsor, CT 06095

Theresa A. Macbeth and Robert B. Macbeth
273 Rood Avenue
Windsor, CT 06095

State of Connecticut
165 Capital Avenue
Hartford, CT 06106

Thomas H. Bowley and Brenda JW Bowley
255 Rood Avenue,
Windsor, CT 06095

Stacy Bentil
303 Rood Avenue
Windsor, CT 06095

Mary Armstrong
69 Pine Lane Extension
Windsor, CT 06095

Sylvia Buckley
77 Pine Lane Extension
Windsor, CT 06095

Nancy E. Hellmann
81 Pine Lane Extension
Windsor, CT 06095

Dennis J. Harris
89 Pine Lane Extension,
Windsor, CT 06095

Household Realty Corp.
961 Weigel Drive
Elmburst IL 60126

ADJACENT PROPERTY OWNERS
301T Rood Avenue, Windsor

Keith R. Sales
105 Pine Lane Extension
Windsor, CT 06095

Maxine Mighty
113 Pine Lane Extension
Windsor, CT 06095

Teresa R. Flakes
70 Grande Avenue
Windsor, CT 06095

Yvonne Dobbs-Wallace
74 Grande Avenue
Windsor, CT 06095

Joao C. Esteves and Sonia V. Esteves
76 Grande Avenue
Windsor, CT 06095

Juana M. Smith
80 Grande Avenue
Windsor, CT 06095

Terry A. Mulder and Cheryl J. Mulder
82 Grande Avenue
Windsor, CT 06095

Connecticut Light and Power Company
P.O. Box 270
Hartford, CT 06141

Luis Thuillard and Peggy Thuillard
86 Grande Avenue
Windsor, CT 06095

Norma Sullivan Hughes
Timothy P. Hughes
288 Rood Avenue
Windsor, CT 06095

NOTICE

Pursuant to Section 16-50j-40(a) of the Regulations of Connecticut State Agencies, notice is hereby given that T-Mobile Northeast LLC ("T-Mobile") will file a Petition for Declaratory Ruling ("Petition") with the Connecticut Siting Council ("Council") on or after December 9, 2014. T-Mobile will seek a ruling that no Certificate of Environmental Compatibility and Public Need is required to modify its antenna site at the existing telecommunication facility Off of Rood Avenue, Northeast Utilities Transmission Structure #20073, Line #1779 Windsor Connecticut ("Facility").

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Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

or at the offices of T-Mobile's legal counsel:

Julie D. Kohler, Esq.
Cohen and Wolf, P.C.
1115 Broad Street
Bridgeport, CT 06604
Tel. (203) 368-0211
Fax (203) 394-9901

All inquiries should be addressed to the Council or to T-Mobile's legal counsel as listed above.

CERTIFICATION OF SERVICE

I hereby certify that on the 9th day of December, 2014, copies of the attached notice of filing a Petition with the Connecticut Siting Council for a declaratory ruling was sent by certified mail, return receipt requested to the following:

Mayor Donald Trinks
Town of Windsor
275 Broad Street
Windsor, CT 06095

Julie D. Kohler, Esq.

Exhibit B

Details

Property

Address	301T ROOD AVE, WINDSOR
ID	1412

Ownership

Owner	CONNECTICUT LIGHT & POWER COMPANY THE
Address	PO BOX 270 HARTFORD CT 06141-0270

Valuation

Total Assessment	$53,410
Land Value	$53,410
Building Value	$0
Last Sale	$0 on 1982-07-02
Book/Page	426/0231

Land

Area	2.20 Acres
Zone	AA

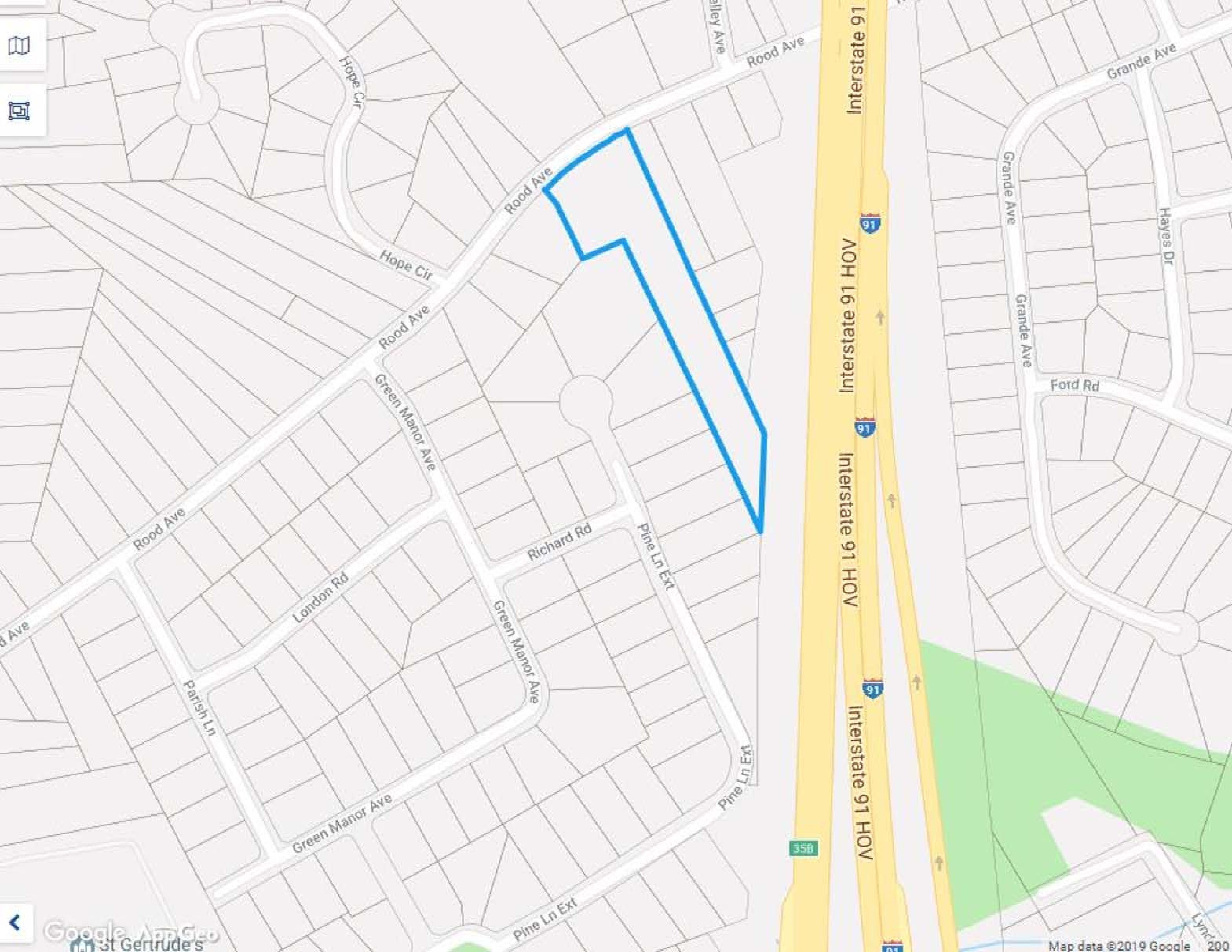

Rood Ave
Hope Cir
Grande Ave
Interstate 91
91
Interstate 91 HOV
Hayes Dr
Ford Rd
Green Manor Ave
Richard Rd
Pine Ln Ext
London Rd
Parish Ln
358
St Gertrude's
Map data ©2019 Google

Exhibit C

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

CL&P MONOPOLE, WINDSOR
SITE ID: CT11446A
EVERSOURCE STRUCTURE 20073
OFF OF ROOD AVE
WINDSOR, CT 06095

T-MOBILE RF CONFIGURATION

67D94DB_1xAIR+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2018 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 2 DAYS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

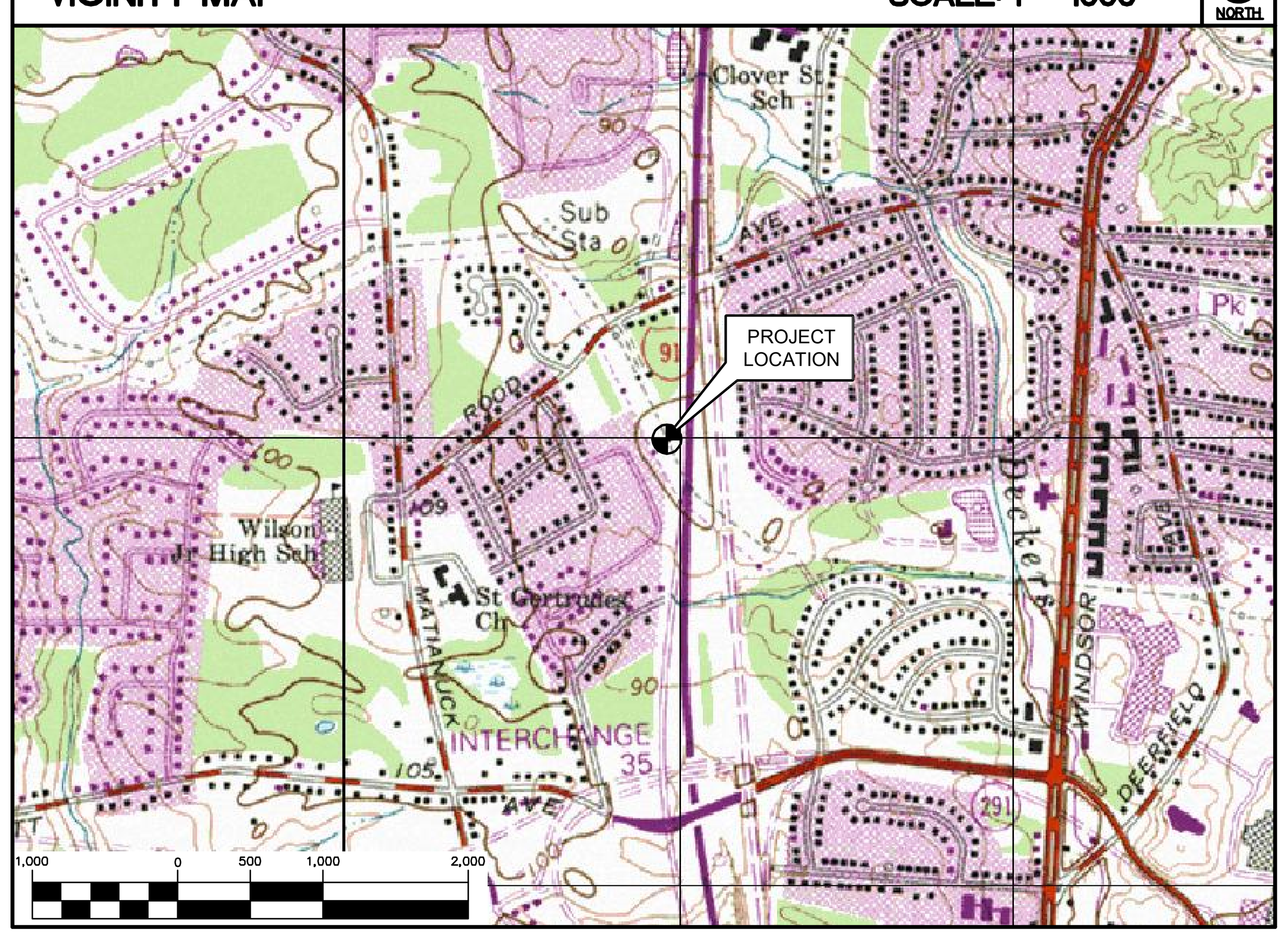
TO: ROOD AVE
WINDSOR, CT 06095

1.	HEAD NORTHWEST ON W NEWBERRY RD TOWARD GRIFFIN RD S.	0.90 MI.
2.	TURN LEFT ONTO WOODLAND AVE.	0.20 MI.
3.	TURN RIGHT ONTO CT-187 S.	2.90 MI.
4.	TURN LEFT ONTO CT-178 E..	1.70 MI.
5.	TURN RIGHT ONTO SUNNYFIELD DR.	0.50 MI.
6.	TURN LEFT ONTO SHELLEY AVE.	0.20 MI.
7.	TURN RIGHT ONTO ROOD AVE.	0.10 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE AND REPLACE (3) PANEL ANTENNAS ON TOWER.
   B. REMOVE (6) TMAs ON TOWER.
   C. INSTALL (12) 1-5/8" COAX CABLES.
   D. REMOVE AND REPLACE (3) REMOTE RADIO UNITS AT GRADE.
   E. INSTALL (3) DIPLEXERS AT GRADE.

PROJECT INFORMATION

SITE NAME:	CL&P MONOPOLE, WINDSOR
SITE ID:	CT11446A
SITE ADDRESS:	OFF OF ROOD ROAD POLE #20073 WINDSOR, CT 06095
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	SHELDON FREINCLE (PROJECT MANAGER) NORTHEAST SITE SOLUTIONS (201) 776-8521
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-49'-31.12" N LONGITUDE: 72°-39'-59.40" W GROUND ELEVATION: 101'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	5/29/19	TJL	CAG	ISSUED FOR CONSTRUCTION – TOP OF ANTENNA MAST HEIGHT ADDED
0	4/8/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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

T-Mobile

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CL+P MONOPOLE, WINDSOR
SITE ID: CT11446A
OFF OF ROOD AVE POLE #20073
WINDSOR, CT 06095

DATE:	3/11/19
SCALE:	AS NOTED
JOB NO.	18098.01

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

ANTENNA MAST

- WIND LOAD: PER ANSI/TIA 222 G (ANTENNA MOUNTS): 97 MPH

TRANSMISSION TOWER – WIRE LOADS

- WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250B – 4PSF
- WIND LOAD: PER HISTORIC 1977 NESC 250C – 20PSF

TRANSMISSION TOWER – TOWER AND TELECOMMUNICATIONS EQUIPMENT

- WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250B – 4PSF
- WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250C – 110MPH
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORWICH PUBLIC UTILITIES.
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON NORWICH PUBLIC UTILITIES OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	5/29/19	TJL	CAG	ISSUED FOR CONSTRUCTION – TOP OF ANTENNA MAST HEIGHT ADDED
0	4/8/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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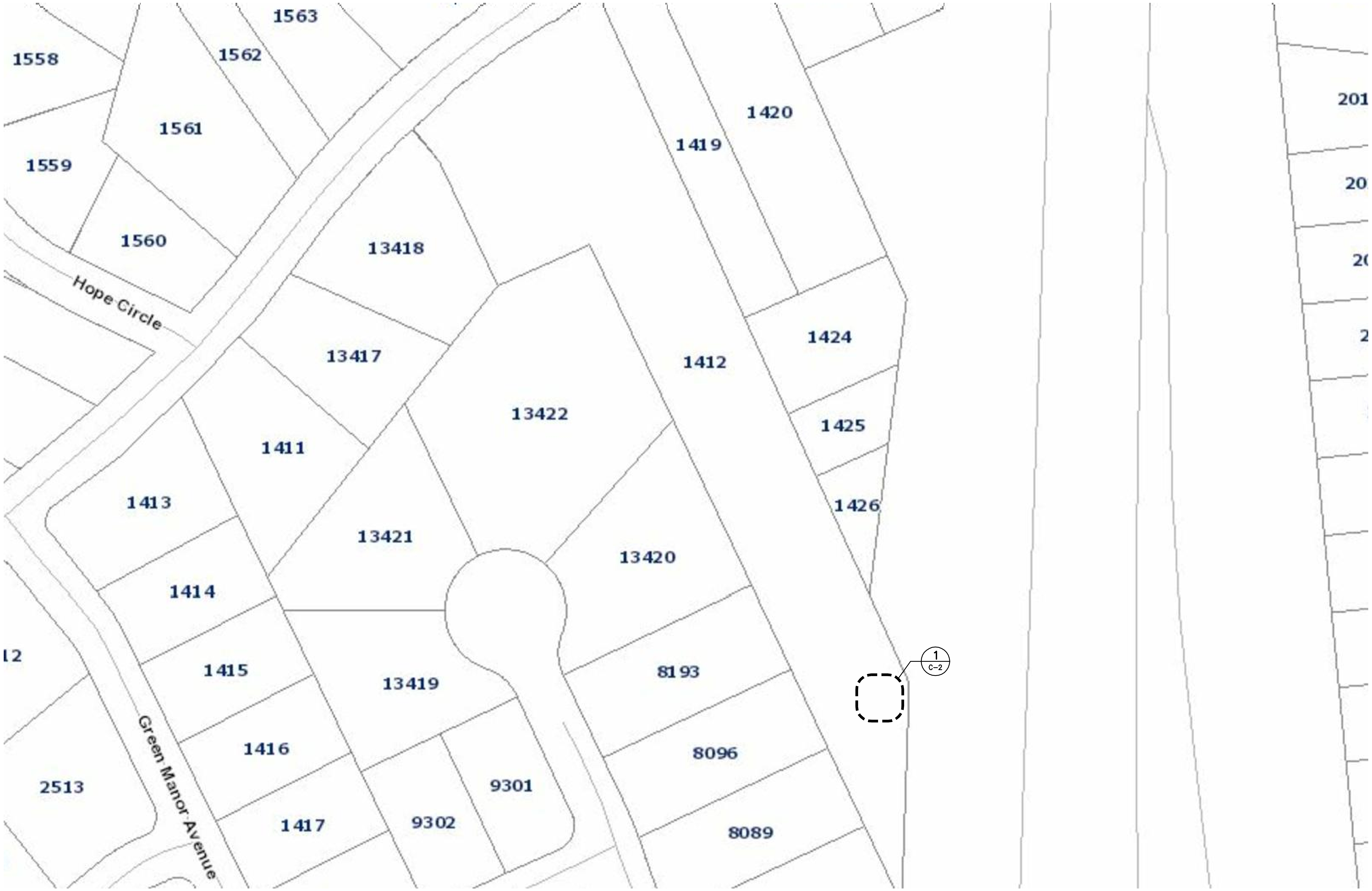
CL+P MONOPOLE, WINDSOR
SITE ID: CT11446A
OFF OF ROOD AVE POLE #20073
WINDSOR, CT 06095

DATE: 3/11/19
SCALE: AS NOTED
JOB NO. 18098.01

DESIGN BASIS AND SITE NOTES

N–1

Sheet No. 2 of 5



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 50'

APPROX. NORTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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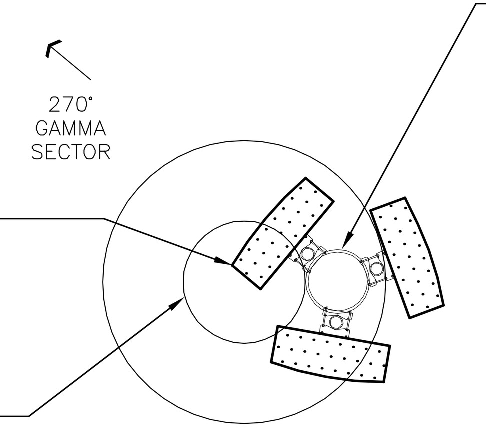
WINDSOR, CT 06095

DATE: 3/11/19
SCALE: AS NOTED
JOB NO. 18098.01

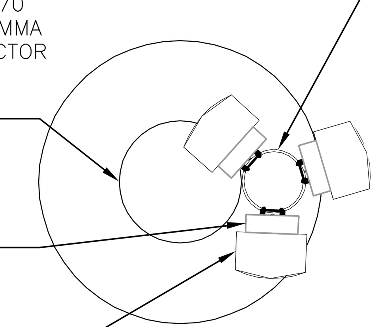
SITE LOCATION PLAN

C-1

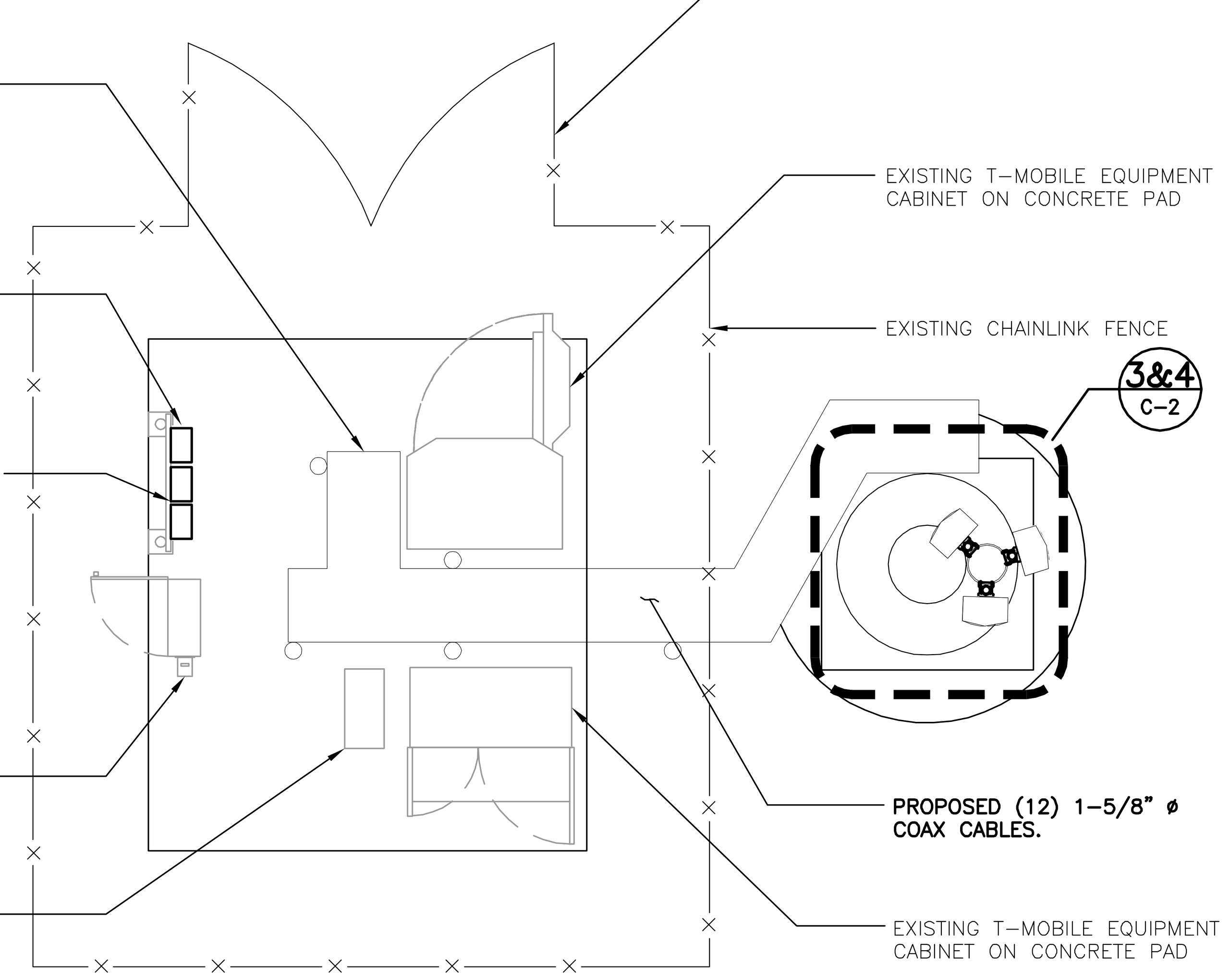
Sheet No. 3 of 5



4 / C-2 PROPOSED ANTENNA MOUNTING CONFIGURATION
SCALE: 3/8" = 1' (161'-0" AGL)
TRUE NORTH

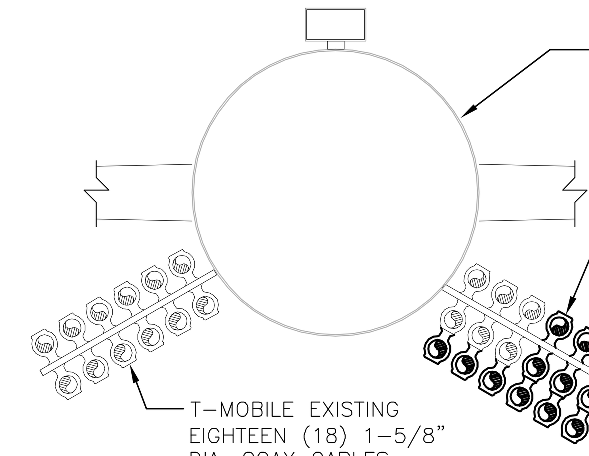


3 / C-2 PROPOSED ANTENNA MOUNTING CONFIGURATION
SCALE: 3/8" = 1' (154'-0" AGL)
TRUE NORTH

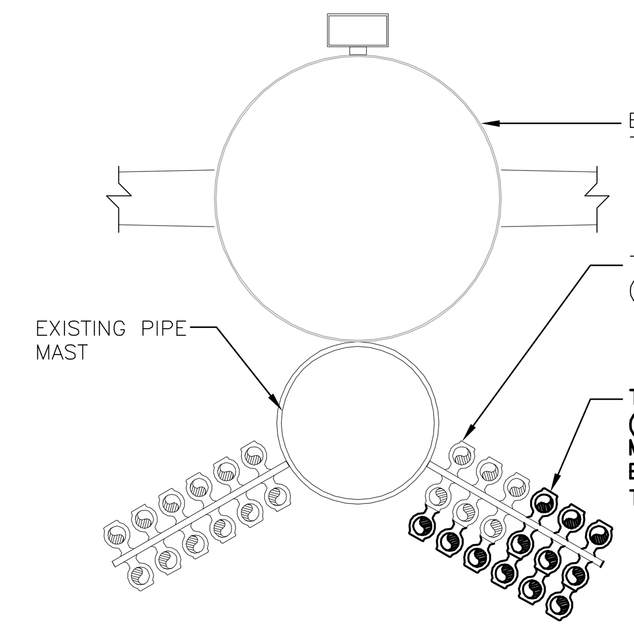


1 / C-2 COMPOUND PLAN
SCALE: 1/4" = 1'
TRUE NORTH

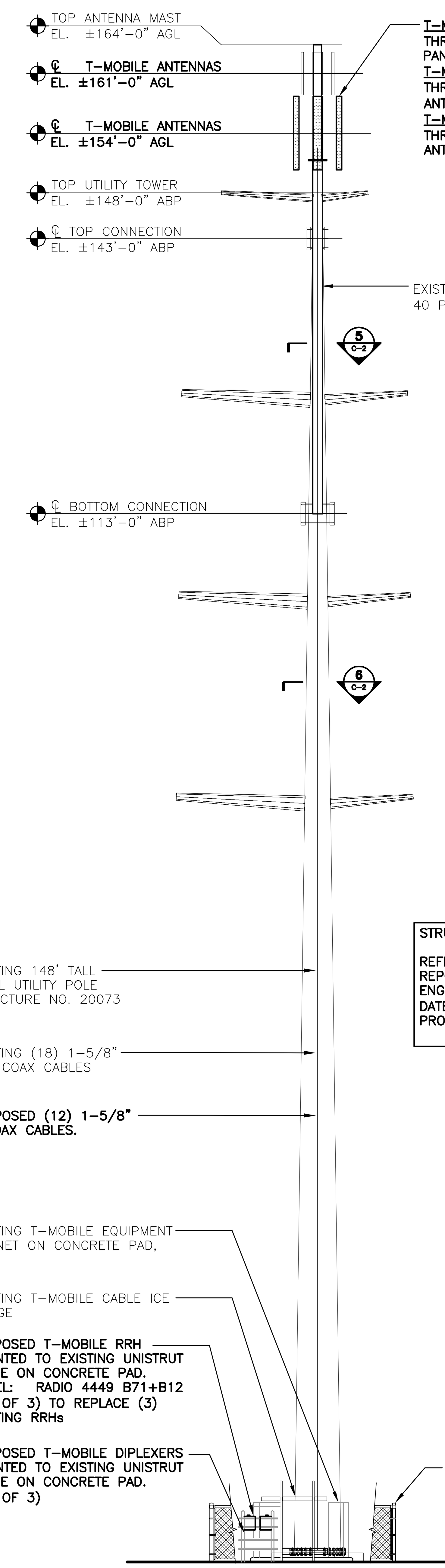
GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.



5 / C-2 COAX PLAN
SCALE: NOT TO SCALE



6 / C-2 COAX PLAN
SCALE: NOT TO SCALE



STRUCTURAL NOTE:

REFER TO STRUCTURAL ANALYSIS REPORT AS PREPARED BY CENTEK ENGINEERING INC.,
DATED: 02/12/19
PROJECT NUMBER: 18098.01

2 / C-2 TOWER ELEVATION
SCALE: 1" = 10'

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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0	4/8/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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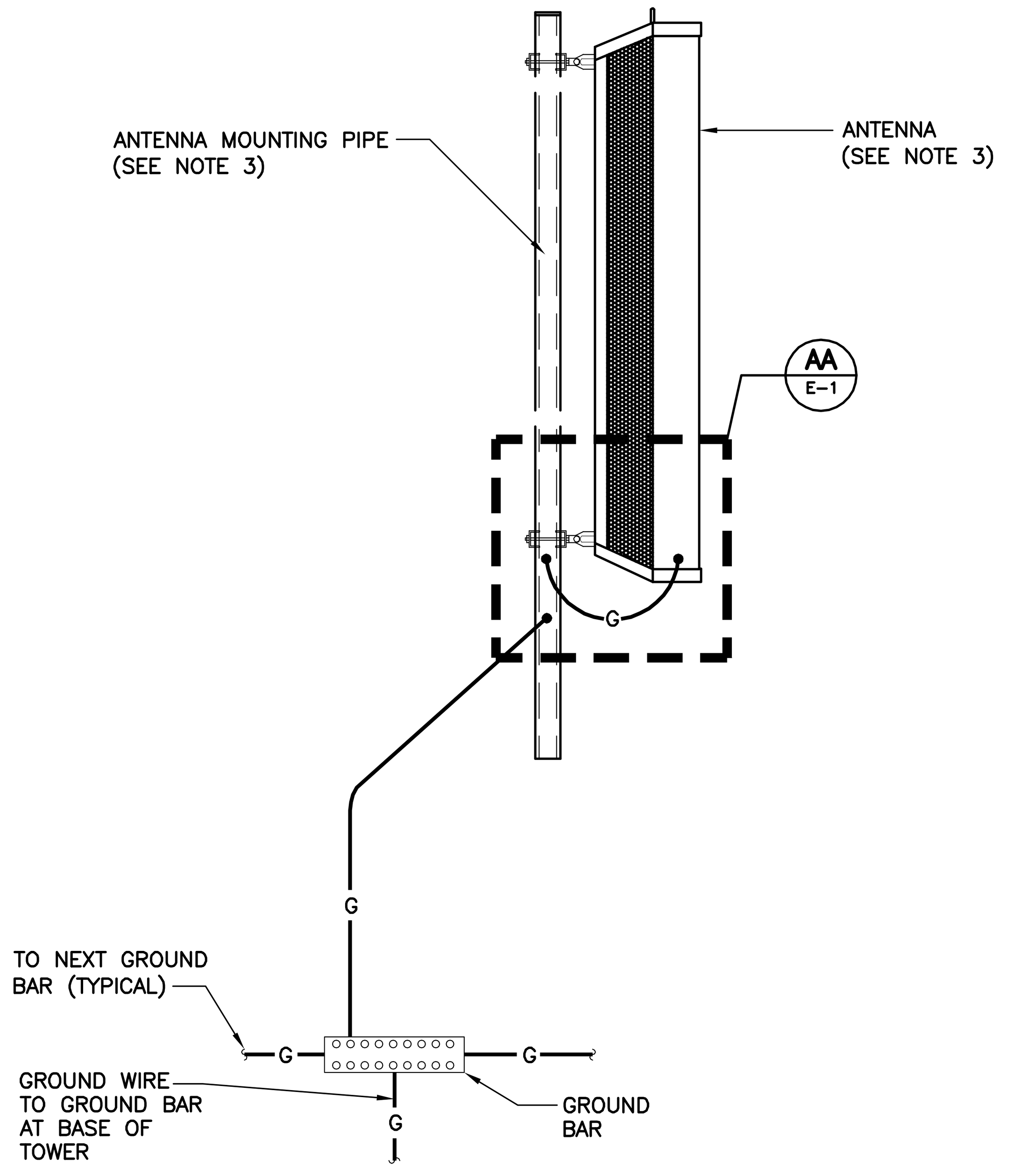
SCALE: AS NOTED
JOB NO. 18098.01

COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

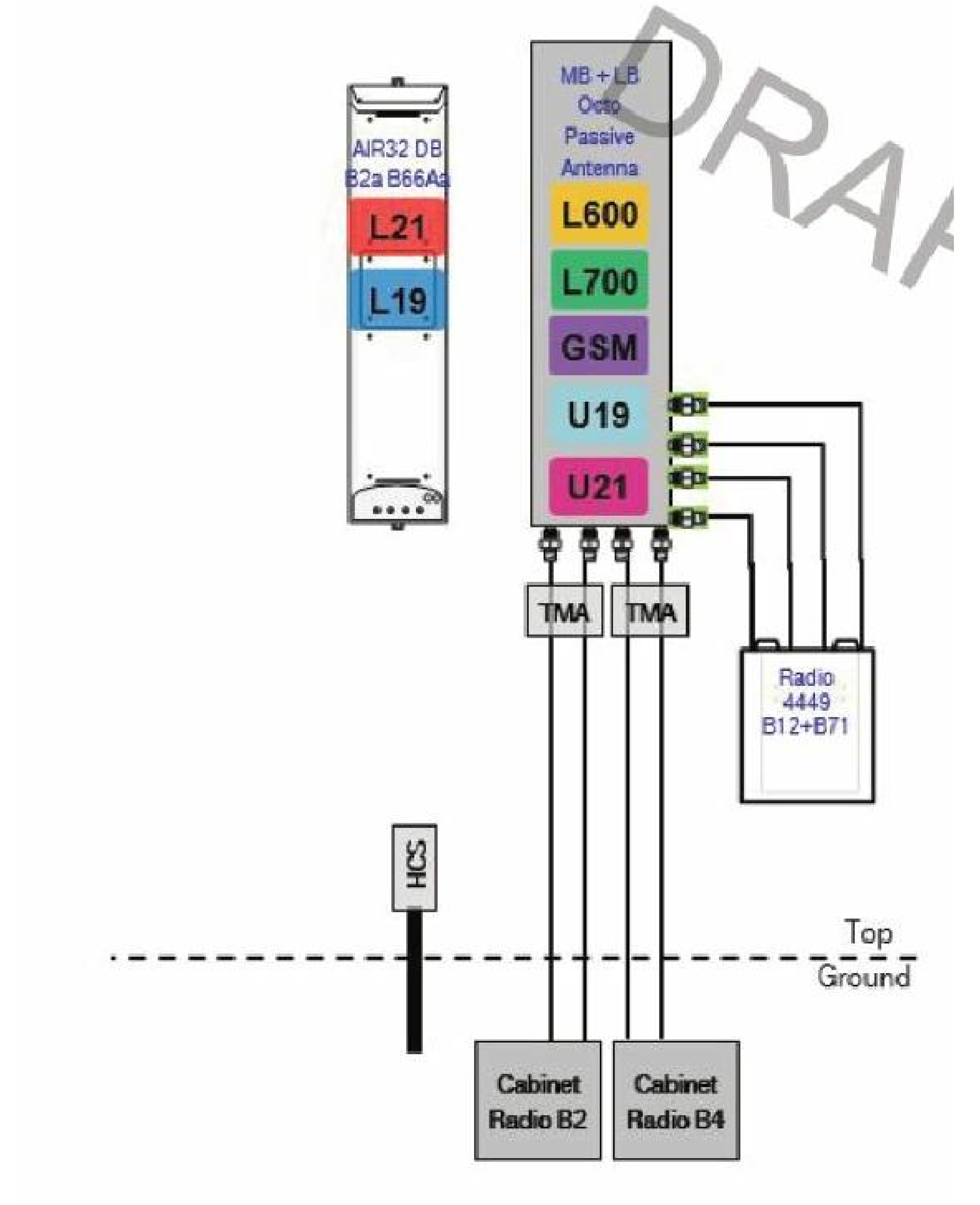
Sheet No. 4 of 5



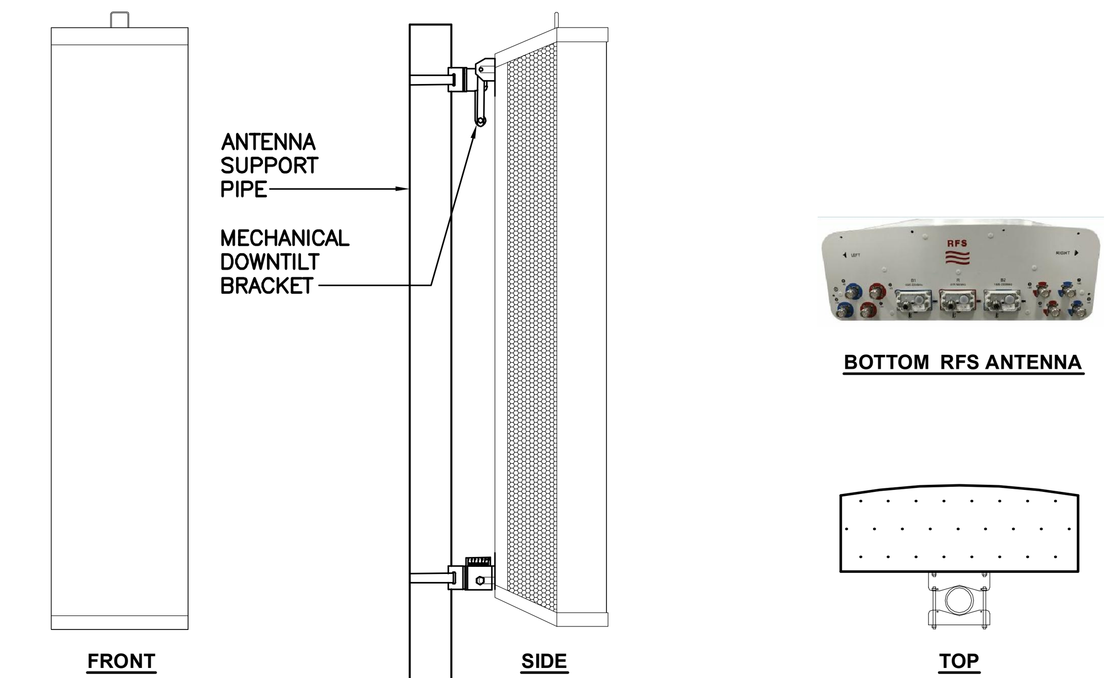
NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 C-3 TYPICAL ANTENNA GROUNDING DETAIL
SCALE: NONE

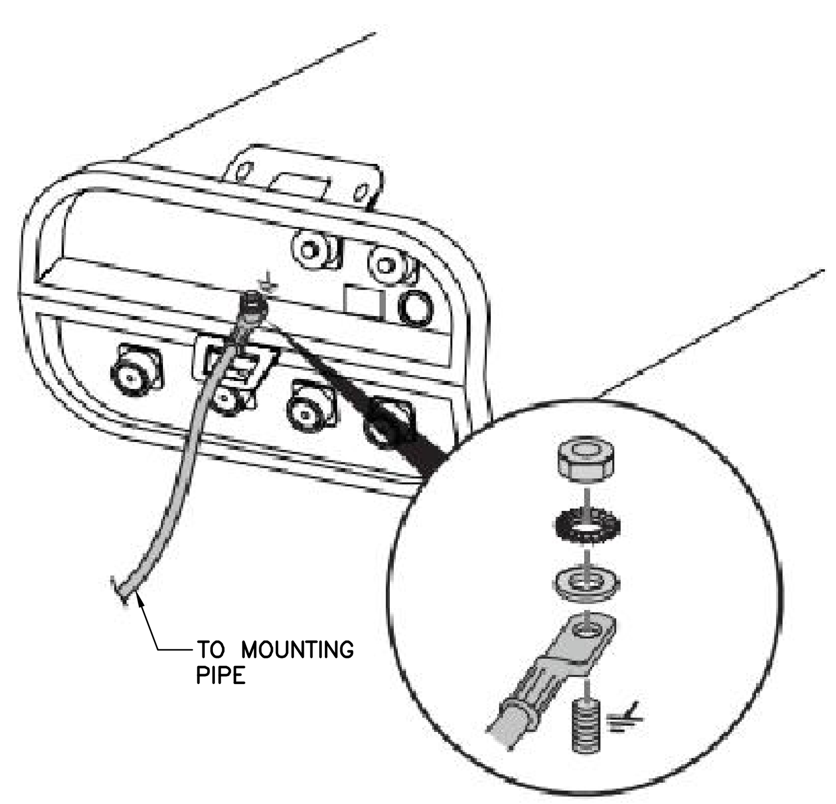


2 C-3 PROPOSED PLUMBING DIAGRAM
SCALE: NONE

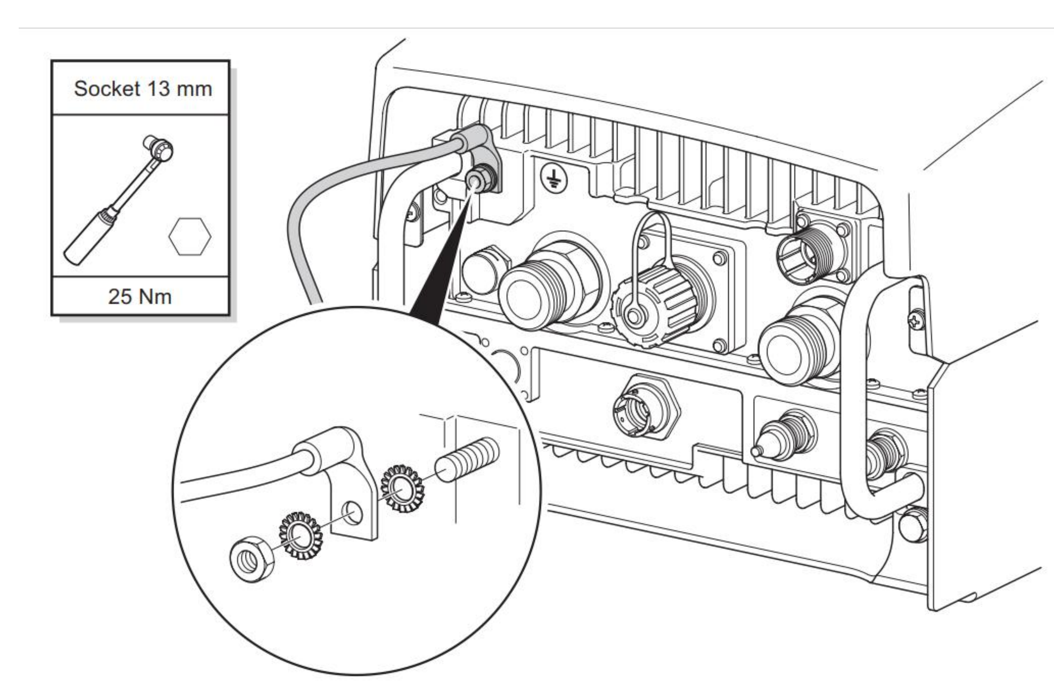


ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	95.9"L x 24.0"W x 8.7"D	153 LBS.

3 C-3 PROPOSED ANTENNA DETAIL
SCALE: NONE



AA C-3 TYPICAL ANTENNA GROUNDING DETAIL
SCALE: NONE



4 C-3 TYPICAL RRU GROUNDING DETAIL
NOT TO SCALE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

5 C-3 PROPOSED RRU DETAIL
SCALE: NONE

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JOB NO. 18098.01

TYPICAL DETAILS

C-3

Exhibit D

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Utility Pole

T-Mobile: CT11446A

Structure No. 20073

148' Electric Transmission Pole

Rood Avenue
Windsor, CT

CENTEK Project No. 18098.01

~~Date: September 18, 2018~~

Rev 3: February 12, 2019

Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to analyze the existing 51' long antenna mast and 148' utility pole located off Rood Ave in Windsor, CT for the proposed antenna and equipment upgrade by T-Mobile.

The proposed loads consist of the following:

- T-MOBILE (Existing to Remain):

  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas flush mounted on the existing pipe mast with a RAD center elevation of 161-ft above tower base plate.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables mounted to the exterior of the existing pole and antenna mast.

- **T-MOBILE (Existing to Remove):**

  Antennas: Six (6) TMAs flush mounted on the existing pipe mast with a RAD center elevation of 161-ft above tower base plate. Three (3) Andrew LNX-6515DS panel antennas flush mounted on the existing pipe mast with a RAD center elevation of 155-ft above tower base plate.

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

  Antennas: Three (3) RFS APXVAARR24_43 panel antennas flush mounted on the existing pipe mast with a RAD center elevation of 154-ft above tower base plate.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables mounted to the exterior of the existing pole and antenna mast.

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

A n a l y s i s

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

The existing mast consisting of a 10-in SCH. 40 x 12.5-ft long pipe flange connected to a 12-in SCH. 40 x 38.5-ft long pipe connected at two points to the existing pole was analyzed for its ability to resist loads prescribed by the TIA 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/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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

D e s i g n   B a s i s

Our analysis was performed in accordance with TIA-222-G, ASCE 48-11, "Design of Steel Transmission Pole Structures", NESC C2-2012 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 C2-2012 ~ Construction Grade B, and ASCE 48-11.

  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 C2-2012, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the Eversource Design Criteria Table, TIA-222-G and AISC standards.

Load cases considered:

Load Case 1:
Wind Speed……………………………….... 97 mph (2016 CSBC Appendix-N)
Radial Ice Thickness………………………. 0"

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

Results

- MAST ASSEMBLY

The existing pipe mast was determined to be structurally adequate.

Component	Size	Stress Ratio (percentage of capacity)	Result
10" Sch. 40 Pipe	12.5'	34.5%	**PASS**
12" Sch. 40 Pipe	38.5'	75.4%	**PASS**
Connection	-	48.3%	**PASS**

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 48-11, "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 **90.03%** 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
Section 6	0.00' -16.17' (AGL)	90.03%	**PASS**

BASE PLATE:

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	86.84%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 10-ft ∅ x 23.0-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (28) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01139-60000. The existing foundation was reinforced with a 26-ft square by 4-ft thick reinforced concrete mat installed at the periphery of the existing caisson per the structural analysis report prepared by Centek Engineering job no. 09045.CO2 dated June 15, 2010.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	69.71 kips	125.37 kips	7179.48 ft-kips
NESC Extreme Wind	82.10 kips	70.24 kips	7950.98 ft-kips

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

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	72.3%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Pad and Pier	Overturning	1.0 FS (1)	1.53 FS (1)	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

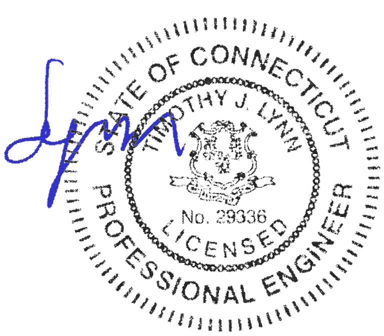
Conclusion

This analysis shows that the subject utility pole **is adequate** to support the proposed equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource and T-Mobile. 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

S T A N D A R D   C O N D I T I O N S   F O R   F U R N I S H I N G   O F   P R O F E S S I O N A L   E N G I N E E R I N G   S E R V I C E S   O N   E X I S T I N G   S T R U C T U R E S

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

PCS Mast

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

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

ELECTRIC TRANSMISSION TOWER

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

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

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

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

Attachment A
Eversource Design Criteria

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

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

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

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

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

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

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

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

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

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

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

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

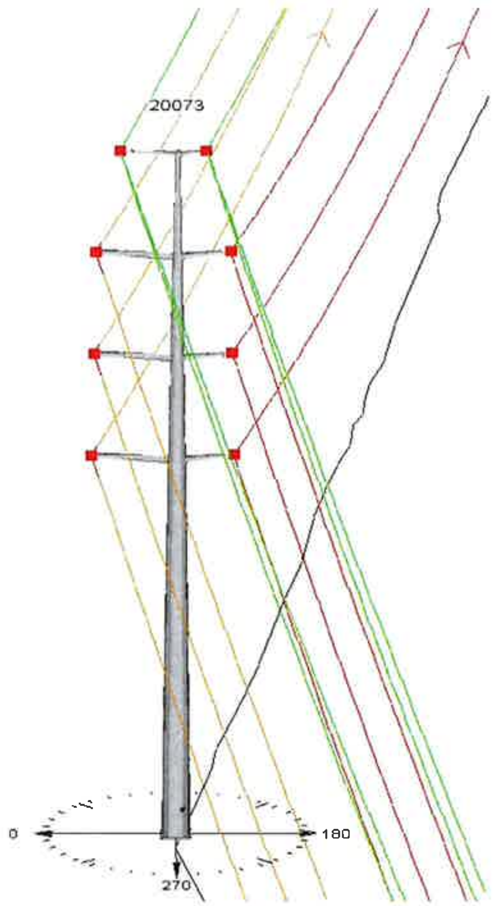
Project: 3642/1873 Lines, Structure 20073
Date: 9/12/18
Engineer: JS
Purpose: Recalculate wire loads for T-Mobile site.

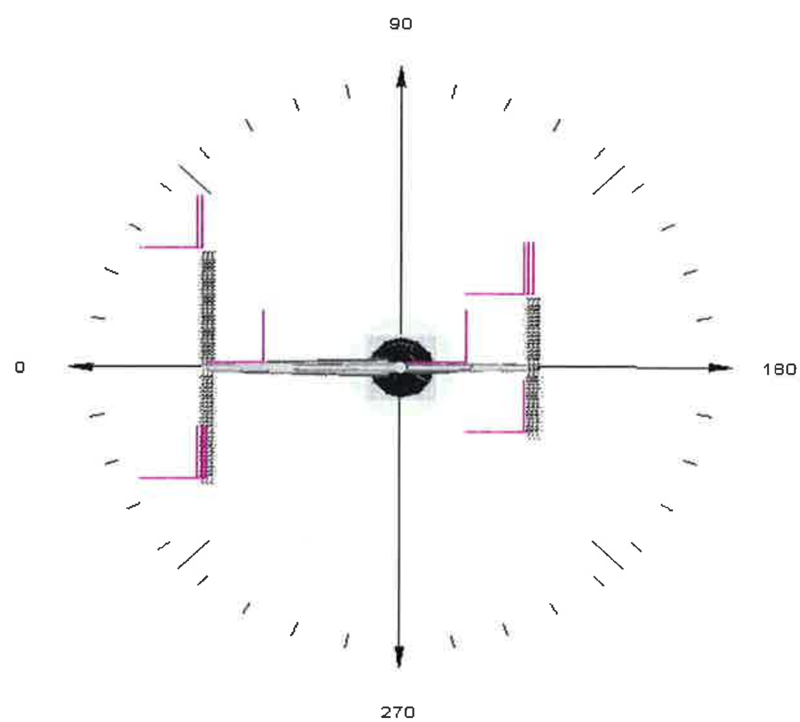
Shield Wires:
3642: 7#8 Alumoweld, sagged in PLS-CADD
1872: 7#8 Alumoweld, sagged in PLS-CADD

Conductors:
3642: Bundled 954 "Rail" ACSR, sagged in PLS-CADD
1873: 1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250B

3642 Line			1873 Line	
Shield Wire				
	V:	1308	V:	1308
	T:	-2686	T:	-2686
	L:	-1027	L:	-544
Conductors				
	V:	7929	V:	4821
	T:	-10515	T:	-5601
	L:	-1239	L:	25
	V:	7929	V:	4821
	T:	-10378	T:	-5873
	L:	1632	L:	-1958
	V:	7929	V:	4821
	T:	-10690	T:	-6537
	L:	847	L:	-1847


20073
0
180
270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180
270

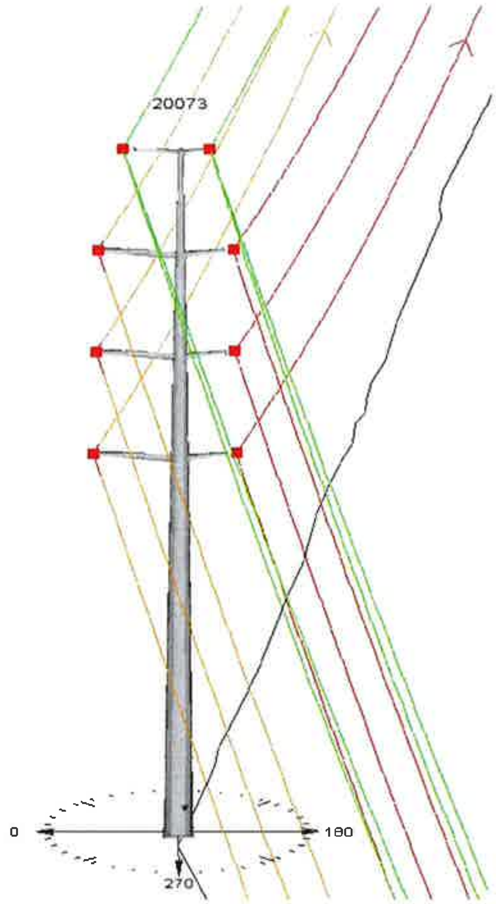
Project: 3642/1873 Lines, Structure 20073
Date: 9/12/18
Engineer: JS
Purpose: Recalculate wire loads for T-Mobile site.

Shield Wires:
3642: 7#8 Alumoweld, sagged in PLS-CADD
1872: 7#8 Alumoweld, sagged in PLS-CADD

Conductors:
3642: Bundled 954 "Rail" ACSR, sagged in PLS-CADD
1873: 1272 "Bittern" ACSR, sagged in PLS-CADD

Historic NESC 250C (20 psf wind, 1.15 wind factor)

	3642 Line		1873 Line
Shield Wire			
V:	446	V:	449
T:	-1342	T:	-1330
L:	-405	L:	-140
Conductors			
V:	3848	V:	2358
T:	-8161	T:	-4551
L:	-1112	L:	-268
V:	3861	V:	2374
T:	-8088	T:	-4688
L:	316	L:	-1250
V:	3907	V:	2470
T:	-8244	T:	-5009
L:	-104	L:	-1258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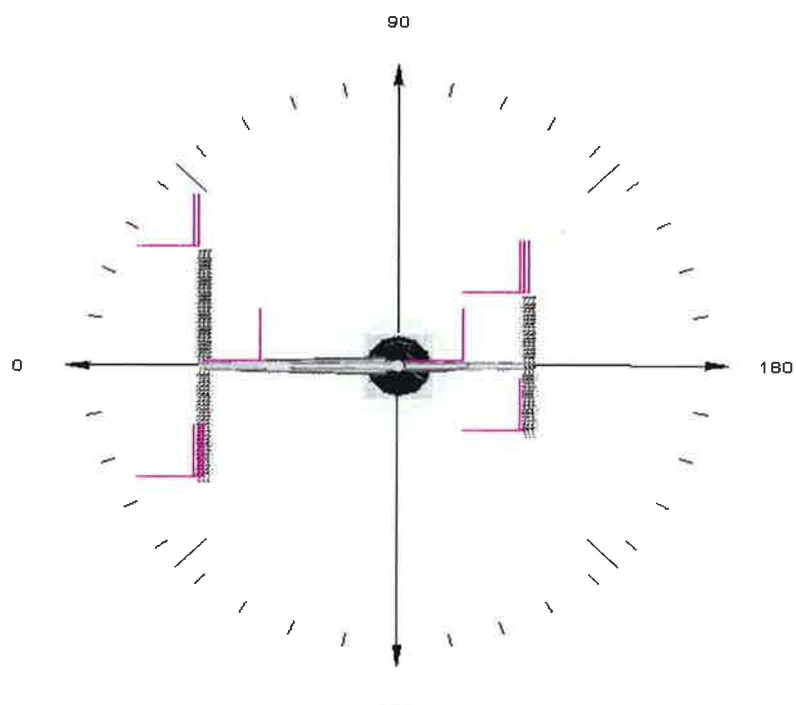
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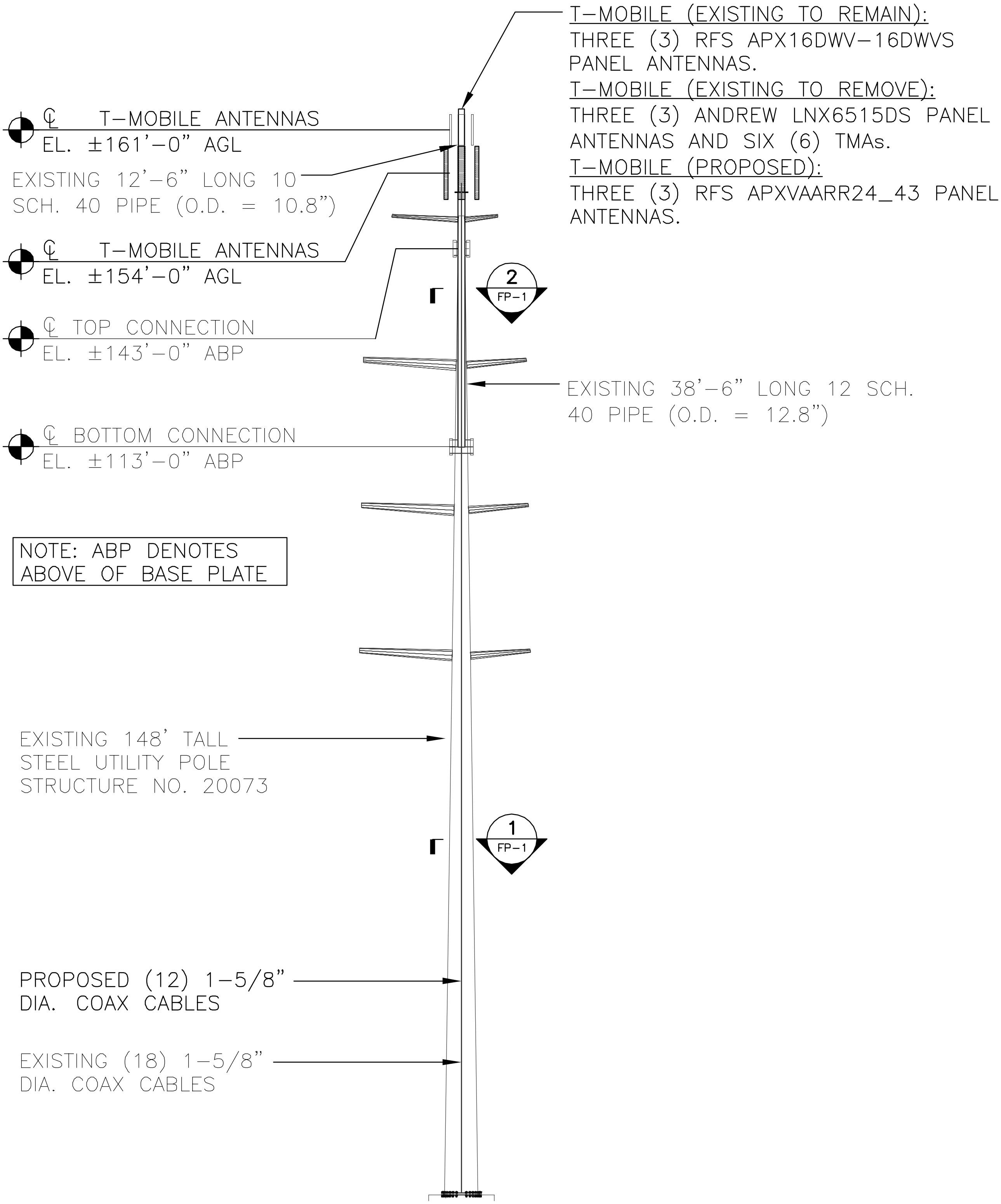

1
EL-1

TOWER + MAST ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	9/18/18	ISSUED FOR REVIEW

CENTEK engineering
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(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

CT11446A

OFF ROOD AVE
WINDSOR, CT 06095

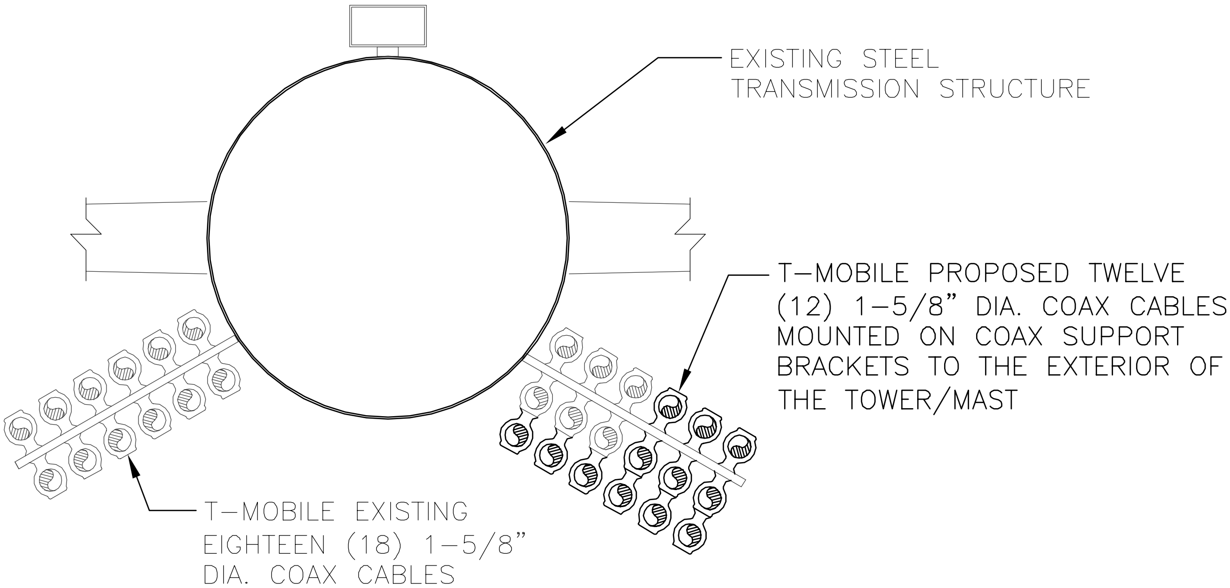
PROJECT NO:	18098.01
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	9/18/18

T-Mobile

TOWER AND MAST ELEVATION

EL-1

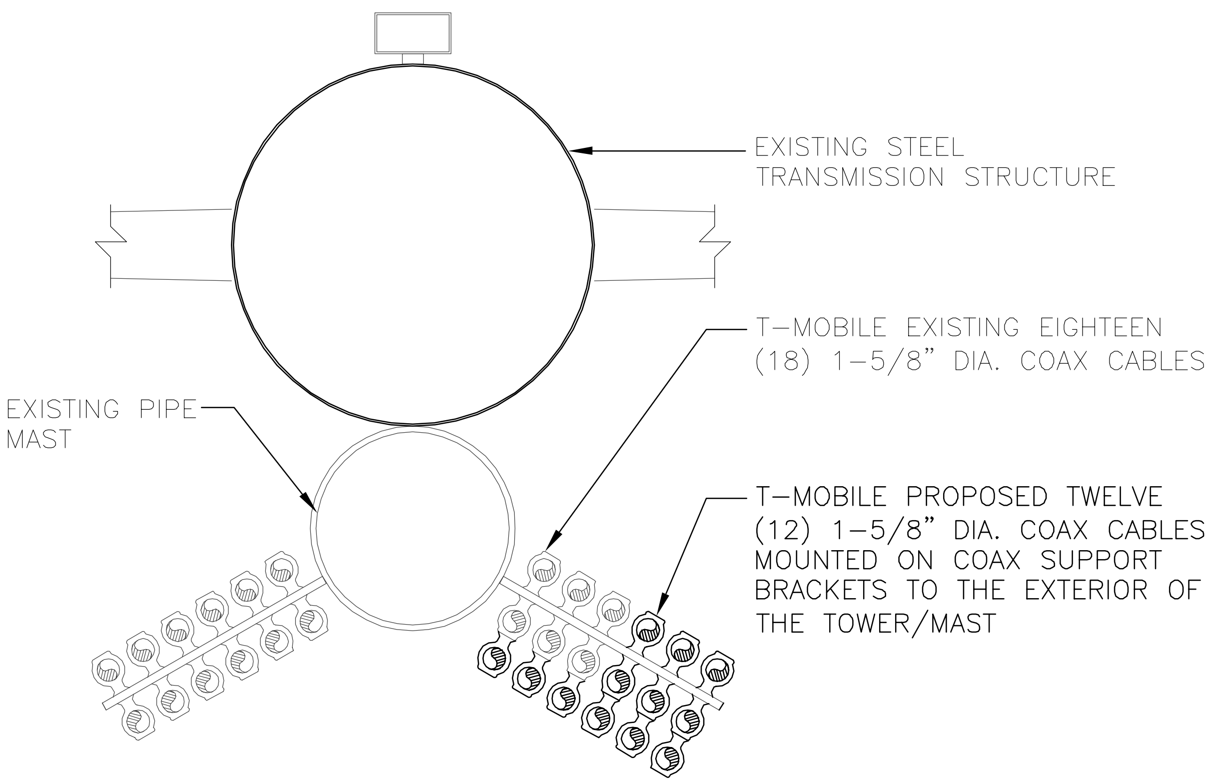
DWG. 1 OF 2



1 / FP–1

COAX PLAN

SCALE: NOT TO SCALE



2 / FP–1

COAX PLAN

SCALE: NOT TO SCALE

REVISIONS		
00	9/18/18	ISSUED FOR REVIEW

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CT11446A

OFF ROOD AVE
WINDSOR, CT 06095

PROJECT NO:	18098.01
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	9/18/18

T - Mobile

FEEDLINE PLAN

FP-1

DWG. 2 OF 2

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

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = SC := III (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 163$ ft (User Input)

Height to Center of Antennas = $z_{ATT2} := 161$ ft (User Input)

Height to Center of Antennas = $z_{ATT1} := 154$ ft (User Input)

Height to Center of Mast = $z_{Mast2} := 158$ ft (User Input)

Height to Center of Mast = $z_{Mast1} := 132$ ft (User Input)

Radial Ice Thickness = $t_i := 1.00$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H := 1.35$ (User Input)

Output

Wind Direction Probability Factor = $K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$ (Per Table 2-2 of TIA-222-G)

Importance Factors = $I_{Wind} := \begin{cases} 0.87 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.15 & \text{if SC = 3} \end{cases} = 1.15$ (Per Table 2-3 of TIA-222-G)

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

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

$K_{iz} := \left(\frac{z_{ATT2}}{33}\right)^{0.1} = 1.172$ $t_{iz.ATT2} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.929$

Velocity Pressure Coefficient Antennas = $Kz_{ATT2} := 2.01 \left(\left(\frac{z_{ATT2}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.399$

Velocity Pressure w/o Ice Antennas = $qz_{ATT2} := 0.00256 \cdot K_d \cdot Kz_{ATT2} \cdot V^2 \cdot I_{Wind} = 36.817$

Velocity Pressure with Ice Antennas = $qz_{ice.ATT2} := 0.00256 \cdot K_d \cdot Kz_{ATT2} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.506$

$K_{iz} := \left(\frac{z_{ATT1}}{33}\right)^{0.1} = 1.167$ $t_{iz.ATT1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.916$

Velocity Pressure Coefficient Antennas = $Kz_{ATT1} := 2.01 \left(\left(\frac{z_{ATT1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.386$

Velocity Pressure w/o Ice Antennas = $qz_{ATT1} := 0.00256 \cdot K_d \cdot Kz_{ATT1} \cdot V^2 \cdot I_{Wind} = 36.474$

Velocity Pressure with Ice Antennas = $qz_{ice.ATT1} := 0.00256 \cdot K_d \cdot Kz_{ATT1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.427$

$K_{izMast2} := \left(\frac{z_{Mast2}}{33}\right)^{0.1} = 1.17$ $t_{izMast2} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast2} \cdot K_{zt}^{0.35} = 2.924$

Velocity Pressure Coefficient Mast = $Kz_{Mast2} := 2.01 \left(\left(\frac{z_{Mast2}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.394$

Velocity Pressure w/o Ice Mast = $qz_{Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V^2 \cdot I_{Wind} = 36.672$

Velocity Pressure with Ice Mast = $qz_{ice.Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.473$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.149$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.872$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01 \left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.342$

Velocity Pressure w/o Ice Mast = $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 35.31$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.158$

Development of Wind & Ice Load on Mast

Mast Data: (10" Sch. 40 Pipe) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 10.75$ in (User Input)

Mast Length = $L_{mast} := 12.5$ ft (User Input)

Mast Thickness = $t_{mast} := 0.365$ in (User Input)

Velocity Coefficient = $C := \sqrt{I \cdot Kz_{Mast1}} \cdot V \cdot \frac{D_{mast}}{12} = 101$

Mast Force Coefficient = $CF_{mast} = 0.6$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.896$ sf/ft

Total Mast Wind Force = $qz_{Mast2} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 27$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast2}\right)}{12} = 1.383$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast2} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 9$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast2} \cdot 2\right)^2 - D_{mast}^{\,2}\right] = 125.6$ sq in

Weight of Ice on Mast = $W_{ICEmast2} := Id \cdot \frac{Ai_{mast}}{144} = 49$ plf **BLC 3**

Development of Wind & Ice Load on Mast

Mast Data: (12" Sch. 40 Pipe) (User Input)

Mast Shape = Round (User Input)

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

Mast Length = $L_{mast} := 38.5$ ft (User Input)

Mast Thickness = $t_{mast} := 0.375$ in (User Input)

Velocity Coefficient = $C := \sqrt{I \cdot Kz_{Mast1}} \cdot V \cdot \frac{D_{mast}}{12} = 119$

Mast Force Coefficient = $CF_{mast} = 0.6$

Wind Load (without ice)

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

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 30$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.541$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 10$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 140.9$ sq in

Weight of Ice on Mast = $W_{ICEmast1} := Id \cdot \frac{Ai_{mast}}{144} = 55$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFSAPX16DWV-16DWVS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 55.9$ in (User Input)

Antenna Width = $W_{ant} := 13$ in (User Input)

Antenna Thickness = $T_{ant} := 3.15$ in (User Input)

Antenna Weight = $WT_{ant} := 45$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$

Antenna Force Coefficient = $Ca_{ant} = 1.28$

Wind Load (without ice)

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

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

Total Antenna Wind Force = $F_{ant} := qz_{ATT2} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 963$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.ATT2}) \cdot (W_{ant} + 2 \cdot t_{iz.ATT2})}{144} = 8.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 24.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ATT2} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 357$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 135$ lbs **BLC 2**

Gravity Loads (ice only)

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

Volume of Ice on Each Antenna =

$$V_{ice} := (L_{ant} + 2 \cdot t_{iz.ATT2})(W_{ant} + 2 \cdot t_{iz.ATT2}) \cdot (T_{ant} + 2 \cdot t_{iz.ATT2}) - V_{ant} = 8203$$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 266$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 798$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24_43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 154$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 48$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ATT1} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2990$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.ATT1}) \cdot (W_{ant} + 2 \cdot t_{iz.ATT1})}{144} = 21.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 63.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ATT1} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 911$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 462$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$ cu in

Volume of Ice on Each Antenna =

$$V_{ice} := (L_{ant} + 2 \cdot t_{iz.ATT1})(W_{ant} + 2 \cdot t_{iz.ATT1}) \cdot (T_{ant} + 2 \cdot t_{iz.ATT1}) - V_{ant} = 2 \times 10^4$$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 780$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 2341$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	Universal Tri-Bracket		
Mount Shape =	Flat		(User Input)
Pipe Mount Length =	$L_{mnt} := 66$	in	(User Input)
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	(User Input)
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	(User Input)
Number of Mounting Pipes =	$N_{mnt} := 3$		(User Input)
Tri Bracket Weight =	$W_{tb.mnt} := 225$	lbs	(User Input)
Mount Aspect Ratio =	$Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 28$		
Mount Force Coefficient =	$Ca_{mnt} := 2$		

Wind Load (without ice)

Assumes Mount is Shielded by Antenna

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

Wind Load (with ice)

Assumes Mount is Shielded by Antenna

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

Gravity Loads (without ice)

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 20$	lbs	
Weight of All Mounts =	$WT_{mnt} \cdot N_{mnt} + W_{tb.mnt} = 285$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 292$	cu in	
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 307$	cu in	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 10$	lbs	
Weight of Ice on All Mounts =	$W_{ICEmnt} \cdot N_{mnt} + 5 = 35$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	Universal Tri-Bracket		
Mount Shape =	Flat		(User Input)
Pipe Mount Length =	$L_{mnt} := 96$	in	(User Input)
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	(User Input)
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	(User Input)
Number of Mounting Pipes =	$N_{mnt} := 3$		(User Input)
Tri Bracket Weight =	$W_{tb.mnt} := 225$	lbs	(User Input)
Mount Aspect Ratio =	$Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 40$		
Mount Force Coefficient =	$Ca_{mnt} := 2$		

Wind Load (without ice)

Assumes Mount is Shielded by Antenna

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

Wind Load (with ice)

Assumes Mount is Shielded by Antenna

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

Gravity Loads (without ice)

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 29$	lbs	
Weight of All Mounts =	$WT_{mnt} \cdot N_{mnt} + W_{tb.mnt} = 313$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 425$	cu in	
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1 \right)^{2} \right] \cdot \left(L_{mnt} + 1 \right) \right] - V_{mnt} = 442$	cu in	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 14$	lbs	
Weight of Ice on All Mounts =	$W_{ICEmnt} \cdot N_{mnt} + 5 = 48$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: 113' - 154'

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

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

Coax Cable Length = $L_{coax} := 41$ ft (User Input)

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

Total Number of Coax = $N_{coax} := 30$ (User Input)

Total Number of Exterior Coax = $Ne_{coax} := 30$ (User Input)

No. of Coax Projecting Outside Face of Mast = $NP_{coax} := 12$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 248.5$

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

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 113$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{iz.ATT1})}{12} = 2.5$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 33$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 31$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{iz.ATT1})^2 - D_{coax}^{\ 2}\right] = 44.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 523$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: 154' - 161'

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

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

Coax Cable Length = $L_{coax} := 7$ ft (User Input)

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

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

Total Number of Exterior Coax = $Ne_{coax} := 12$ (User Input)

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

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 42.4$

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

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 57$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{iz.ATT1})}{12} = 1.5$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 20$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{iz.ATT1}\right)^2 - D_{coax}^{\ 2}\right] = 44.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 209$ plf **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast 1	PIPE_12.0	Column	Pipe	A53 Gr. B	Typical	13.7	262	262	523
2	Mast 2	PIPE_10.0	Column	Pipe	A53 Gr. B	Typical	11.5	151	151	302

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast 1	38.5			Lbyy						Lateral
2	M2	Mast 2	12.5			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTCO...	FLANGE...			Mast 1	Column	Pipe	A53 Gr. B	Typical
2	M2	FLANGE...	TOPMA...			Mast 2	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTCONNECTION	0	0	0	0	
2	TOPCONNECTION	0	30	0	0	
3	FLANGECONNECTION	0	38.5	0	0	
4	TOPMAST	0	51	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	TOPCONNECTION	Reaction		Reaction		Reaction	
2	BOTCONNECTION	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.135	9.5
2	M2	Y	-.462	2.5
3	M2	Y	-.285	9.5
4	M2	Y	-.302	2.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.798	9.5
2	M2	Y	-2.341	2.5
3	M2	Y	-.035	9.5
4	M2	Y	-.043	2.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.357	9.5
2	M2	X	.911	2.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.963	9.5
2	M2	X	2.99	2.5

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.031	-.031	0	0
2	M2	Y	-.012	-.012	0	8

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.523	-.523	0	0
2	M2	Y	-.209	-.209	0	8
3	M1	Y	-.055	-.055	0	0
4	M2	Y	-.049	-.049	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.033	.033	0	0
2	M2	X	.02	.02	0	8
3	M1	X	.01	.01	0	0
4	M2	X	.009	.009	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.113	.113	0	0
2	M2	X	.057	.057	0	8
3	M1	X	.03	.03	0	0
4	M2	X	.027	.027	0	0

Basic Load Cases

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

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-direction)	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0Wi (X-...	Yes	Y		1	1.2	2	1.2	3	1	4	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	TOPCONNEC...	max	-3.301	3	0	3	0	3	0	3	0	3	0	3
2		min	-16.52	1	0	1	0	1	0	1	0	1	0	1
3	BOTCONNEC...	max	.116	1	30.723	3	0	3	0	3	0	3	0	3
4		min	.105	3	2.226	2	0	1	0	1	0	1	0	1
5	Totals:	max	-3.196	3	30.723	3	0	3						
6		min	-16.403	1	2.226	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	BOTCONNE...	max	0	3	0	3	0	3	0	3	0	3	6.468e-03	1
2		min	0	1	0	1	0	1	0	1	0	1	1.509e-03	3
3	TOPCONNE...	max	0	3	-.002	2	0	3	0	3	0	3	-4.193e-03	3
4		min	0	1	-.024	3	0	1	0	1	0	1	-1.917e-02	1
5	FLANGECO...	max	2.794	1	-.002	2	0	3	0	3	0	3	-7.147e-03	3
6		min	.606	3	-.027	3	0	1	0	1	0	1	-3.295e-02	1
7	TOPMAST	max	8.263	1	-.003	2	0	3	0	3	0	3	-8.206e-03	3
8		min	1.802	3	-.029	3	0	1	0	1	0	1	-3.741e-02	1

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	M1	PIPE_12.0	.754	30....	1	.074	30....		1	243....	431.55	140....	140....	...	H1-...
2	M2	PIPE_10.0	.345	0	1	.070	0		1	331....	362.25	96.862	96.862	...	H1-...

Joint Reactions (By Combination)

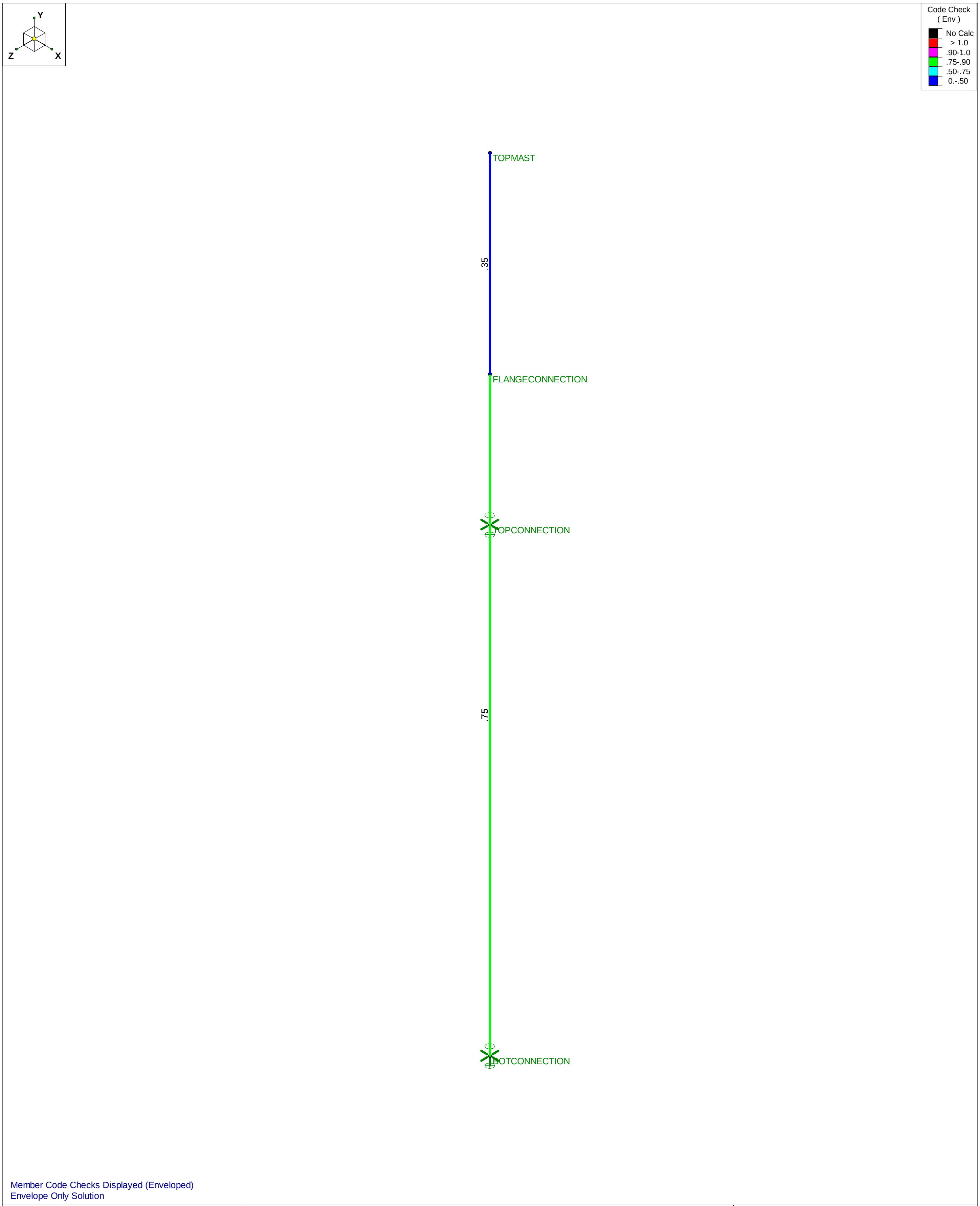
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-16.52	0	0	0	0	0
2	1	BOTCONNECTION	.116	2.968	0	0	0	0
3	1	Totals:	-16.403	2.968	0			
4	1	COG (ft):	X: 0	Y: 31.752	Z: 0			

Joint Reactions (By Combination)

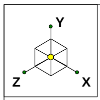
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-16.513	0	0	0	0	0
2	2	BOTCONNECTION	.11	2.226	0	0	0	0
3	2	Totals:	-16.403	2.226	0			
4	2	COG (ft):	X: 0	Y: 31.752	Z: 0			

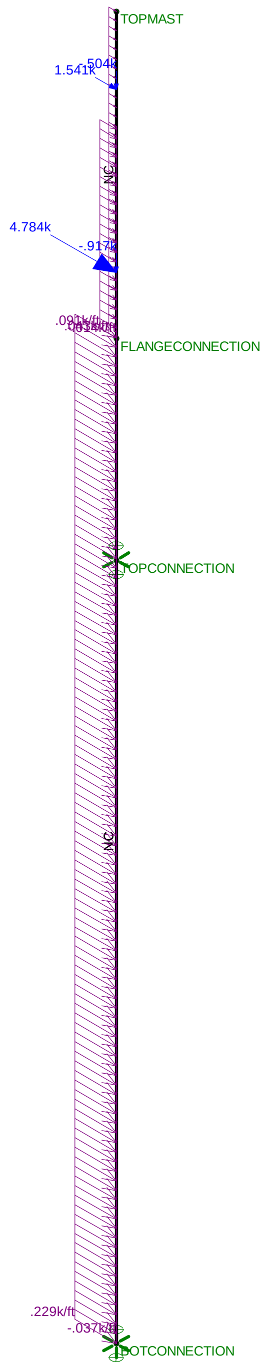
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	TOPCONNECTION	-3.301	0	0	0	0	0
2	3	BOTCONNECTION	.105	30.723	0	0	0	0
3	3	Totals:	-3.196	30.723	0			
4	3	COG (ft):	X: 0	Y: 24.699	Z: 0			



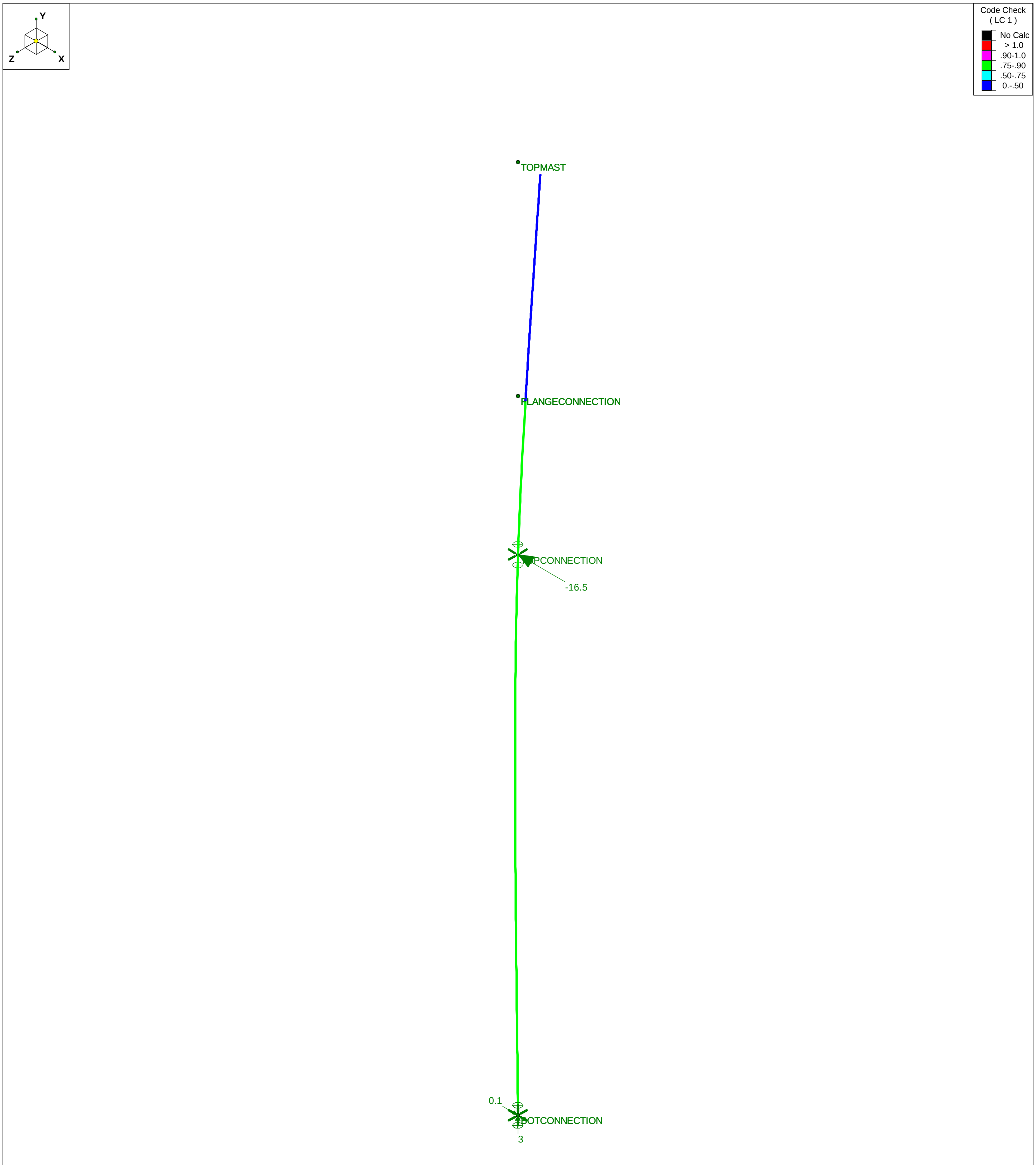
CENTEK engineering, INC.		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:48 AM
18098.01 - CT11446A	Unity Check	TIA.r3d





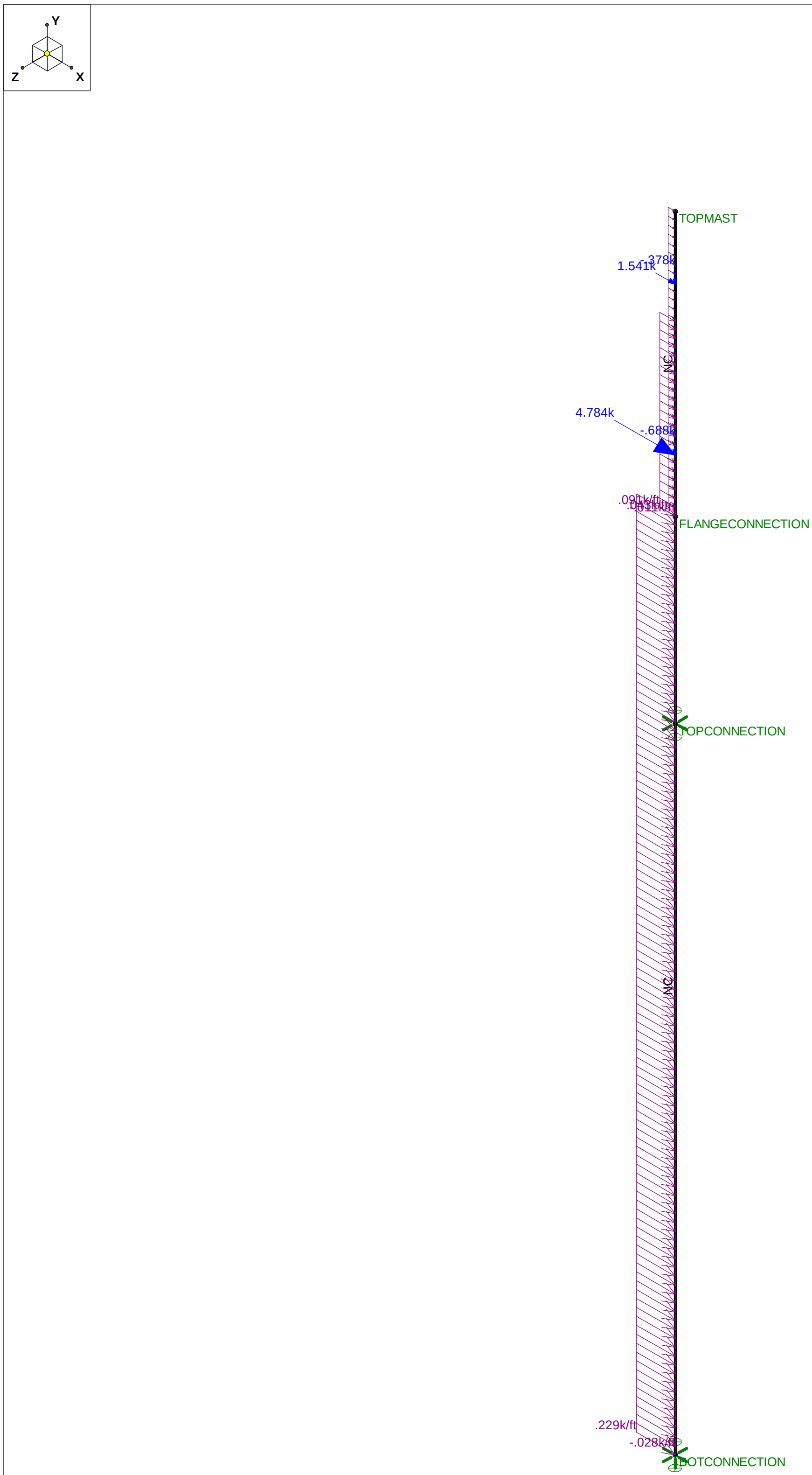
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W (X-direction)

CENTEK engineering, INC.		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:49 AM
18098.01 - CT11446A	LC #1 Loads	TIA.r3d



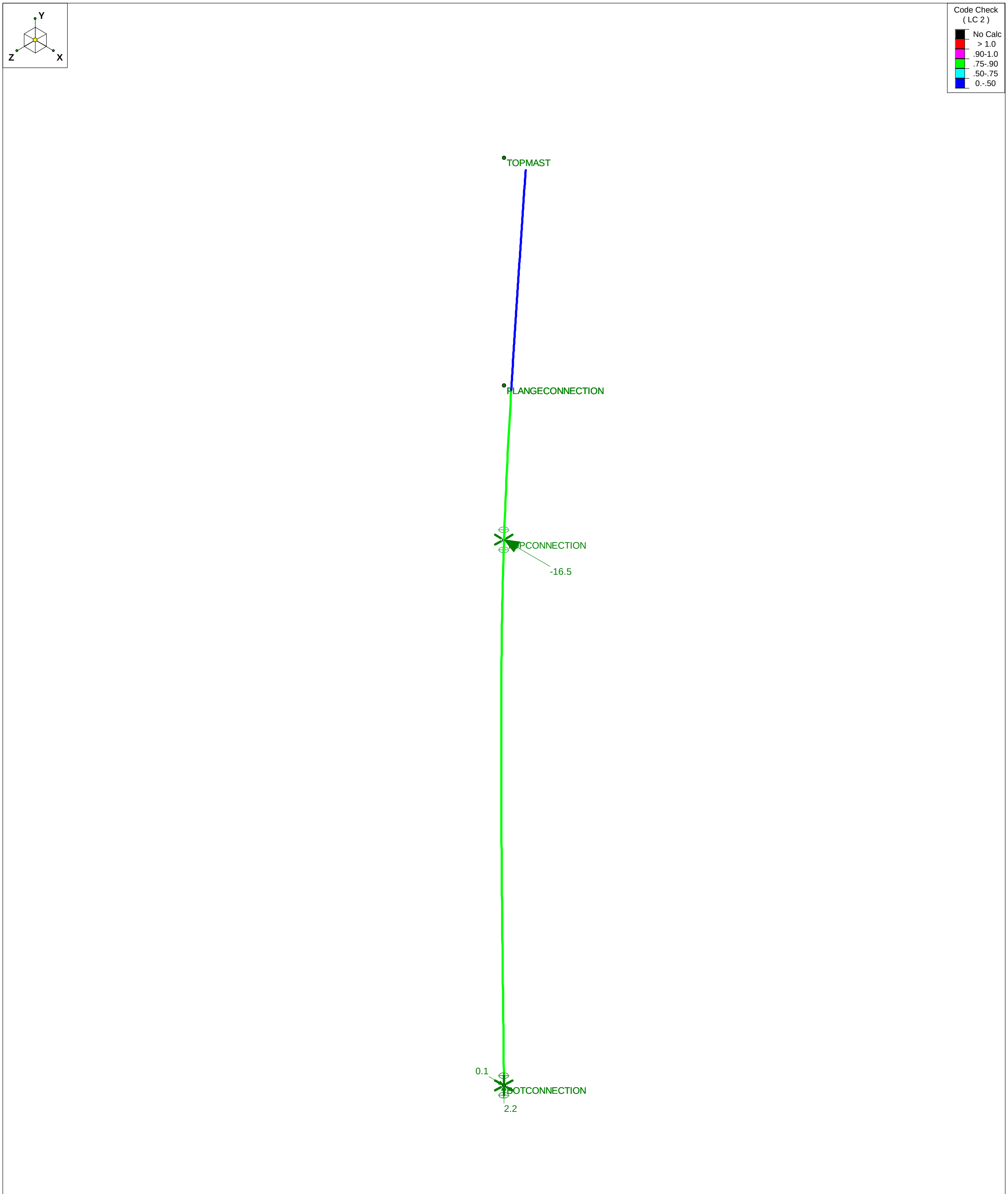
Member Code Checks Displayed
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK engineering, INC.		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:50 AM
18098.01 - CT11446A	LC #1 Reactions and Deflected Shape	TIA.r3d



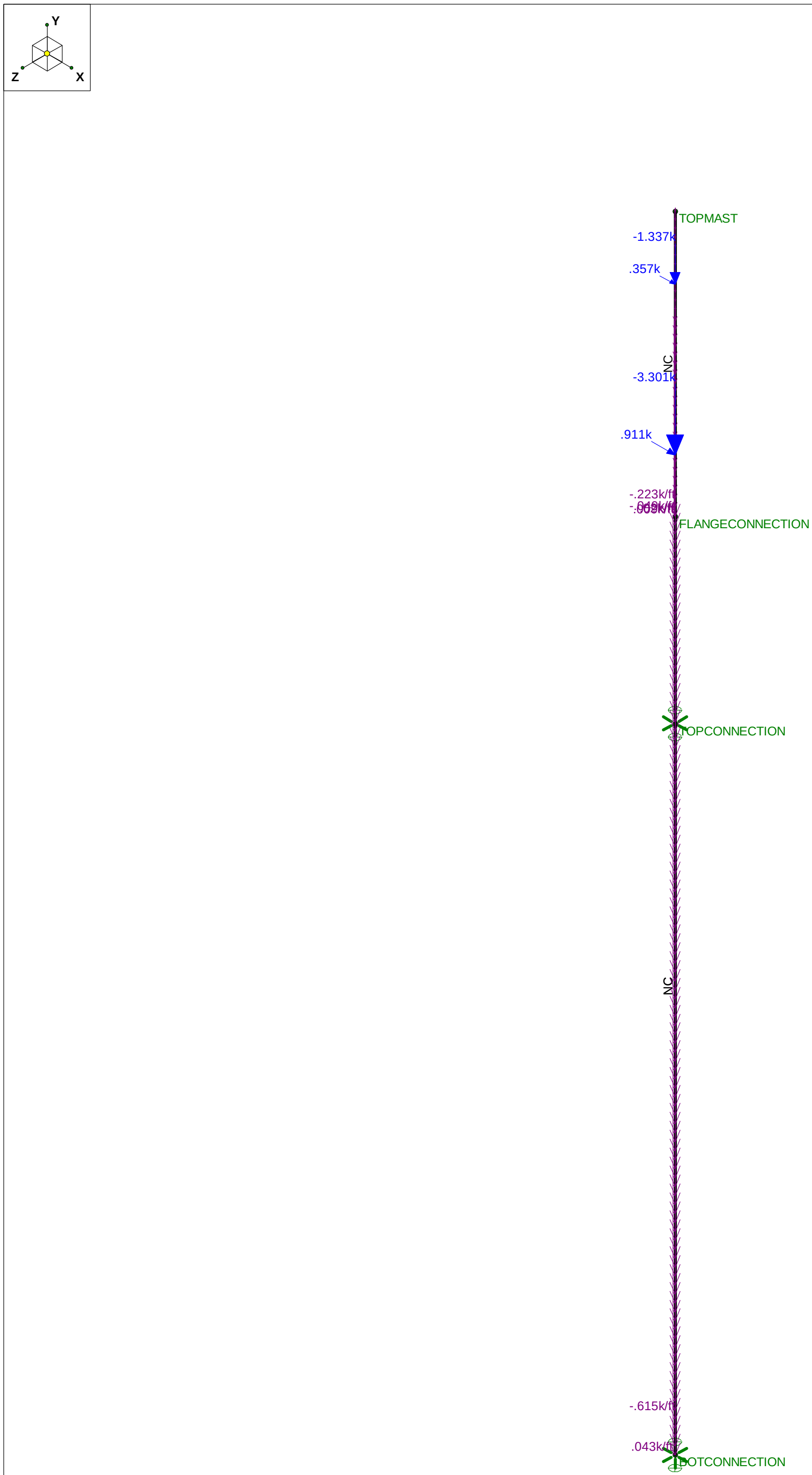
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W (X-direction)

CENTEK engineering, INC.	Pole # 20073	
tjl, cfc		Feb 12, 2019 at 10:49 AM
18098.01 - CT11446A	LC #2 Loads	TIA.r3d



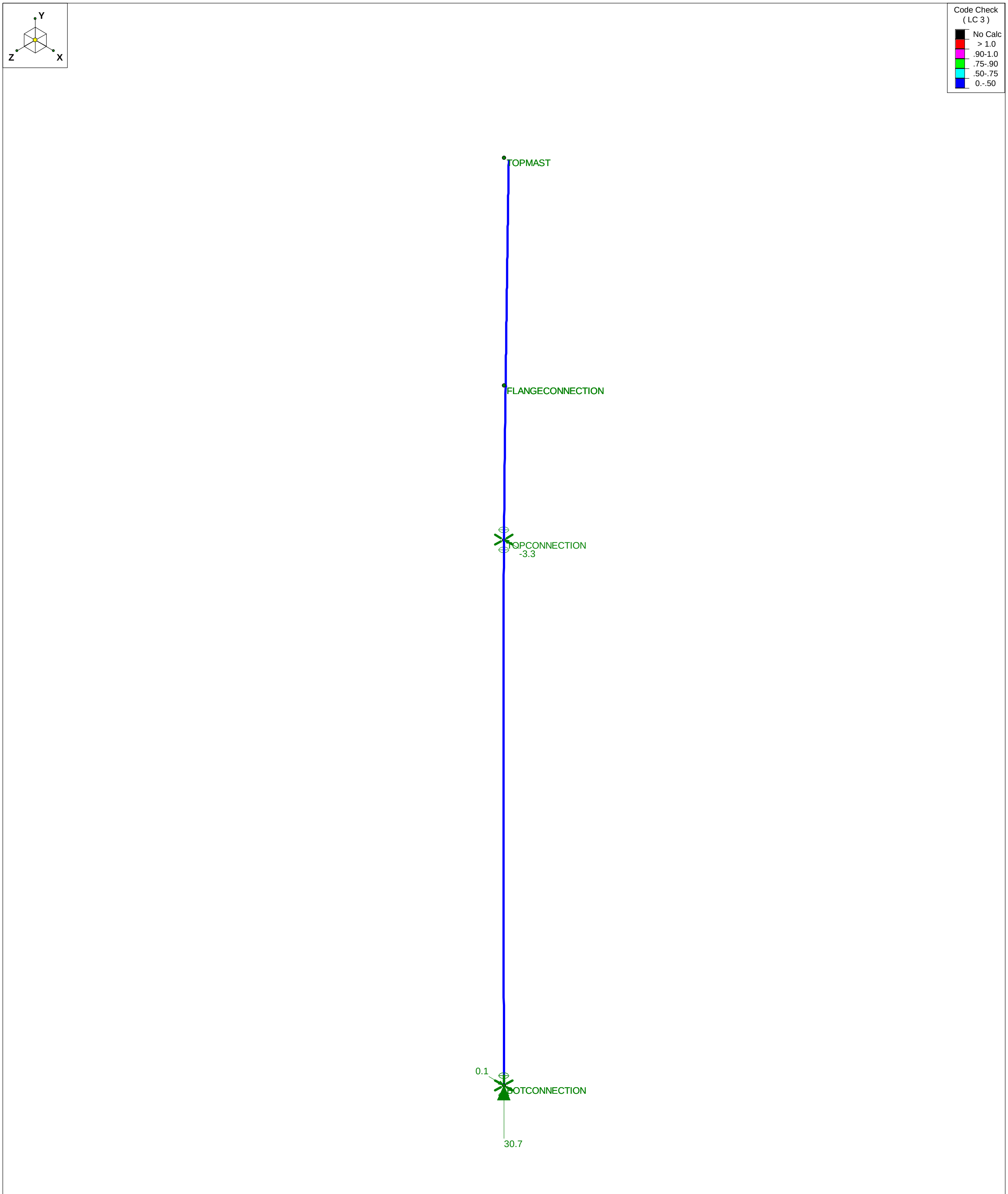
Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK engineering, INC.		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:51 AM
18098.01 - CT11446A	LC #2 Reactions and Deflected Shape	TIA.r3d



Member Code Checks Displayed
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

CENTEK engineering, INC.		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:49 AM
18098.01 - CT11446A	LC #3 Loads	TIA.r3d

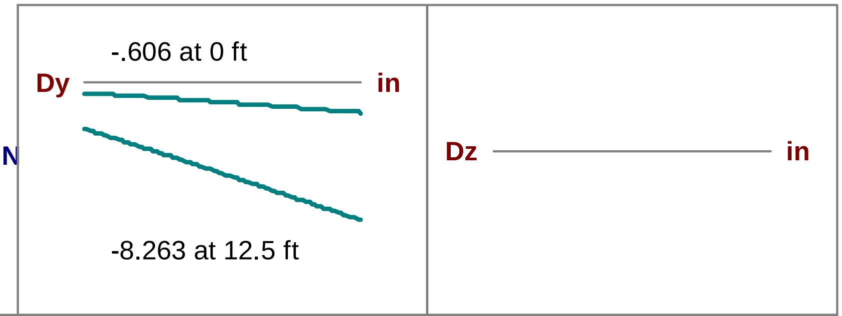


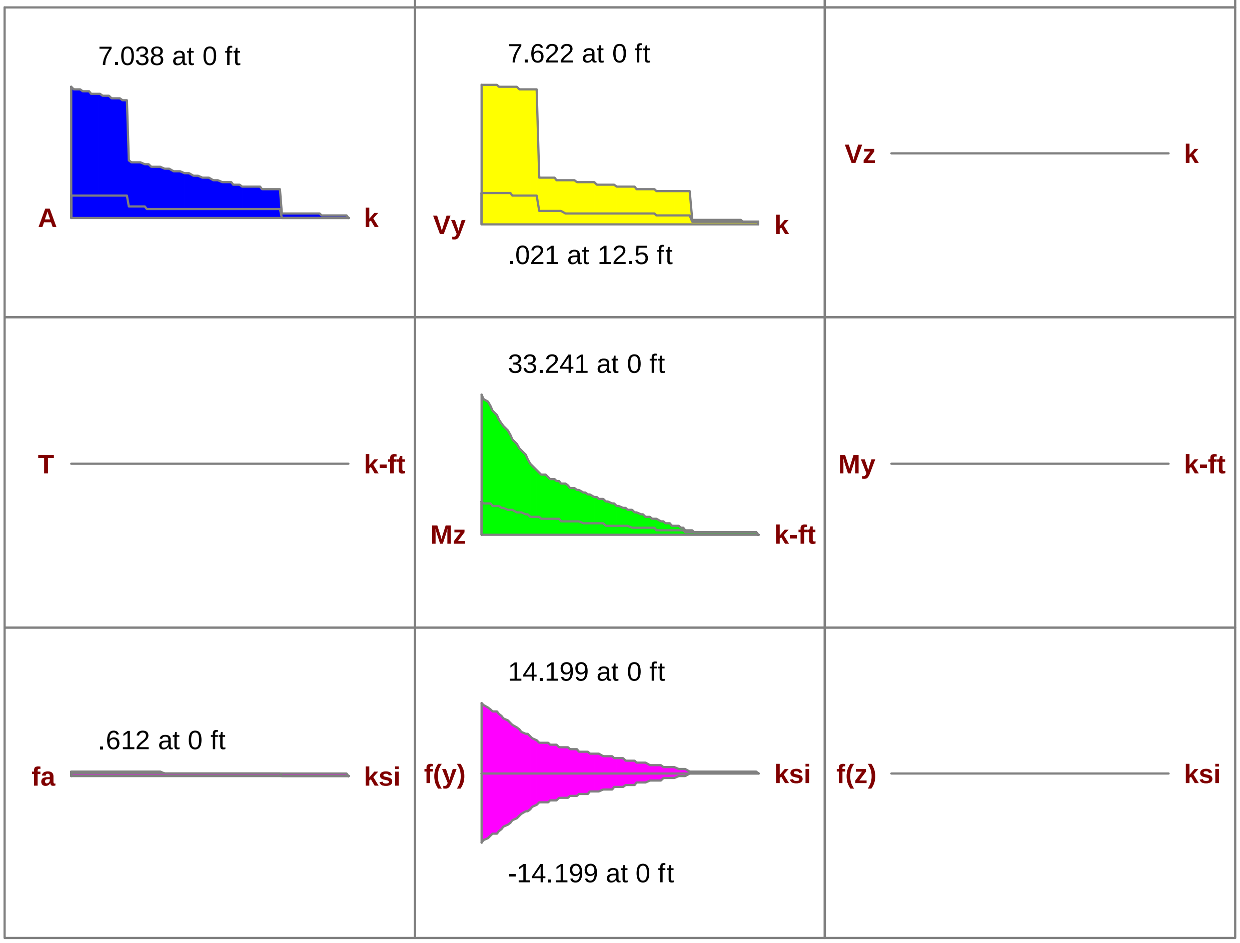
Member Code Checks Displayed
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK engineering, INC.		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:51 AM
18098.01 - CT11446A	LC #3 Reactions and Deflected Shape	TIA.r3d

Column: ***M2***

Shape: **PIPE_10.0**
Material: **A53 Gr. B**
Length: **12.5 ft**
I Joint: **FLANGECONNECTION**
J Joint: **TOPMAST**
Envelope
Code Check: **0.345 (LC 1)**
Report Based On 97 Sections





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

Direct Analysis Method

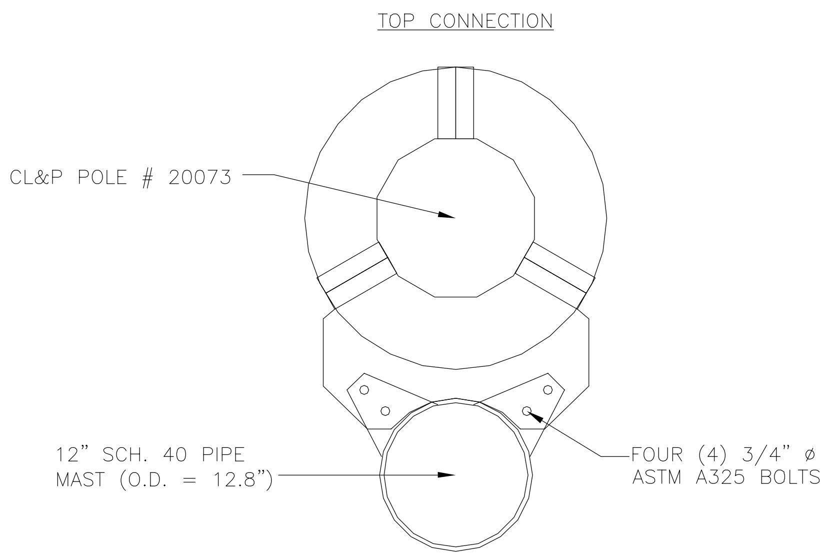
Max Bending Check	**0.345 (LC 1)**	Max Shear Check	**0.070 (s) (LC 1)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/27**
Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**12.5 ft**	**12.5 ft**
phi*Pnc	**331.832 k**	KL/r	**41.395**	**41.395**
phi*Pnt	**362.25 k**			
phi*Mny	**96.862 k-ft**	L Comp Flange	**12.5 ft**	
phi*Mnz	**96.862 k-ft**	L-torque	**12.5 ft**	
phi*Vny	**108.675 k**	Tau_b	**1**	
phi*Vnz	**108.675 k**			
phi*Tn	**91.155 k-ft**			
Cb	**2.799**			

Mast Top Connection:

Design Basis:

The mast connection to the CL&P structure is based on the design prepared by Paul J. Ford and Company job no. A02-T092 sheet S-1 - S-4 - dated 7-1-2002.
The (4) A325 3/4" diameter bolts will be checked for both tension and shear
The mast is assumed to be pinned at the top connection.



Reactions at Connection:

Horizontal =	Horizontal := 16.5·kips	(User Input from Risa 3D)
Vertical =	Vertical := 0·kips	(User Input from Risa 3D)
Moment =	Moment := 0·kips·ft	(User Input from Risa 3D)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts, nb =	$n_b := 4$	(User Input)
Bolt Diameter, db =	$d_b := 0.75in$	(User Input)
Bolt Area, ab =	$a_b := \frac{1}{4}\cdot\pi\cdot d_b^2 = 0.442\cdot in^2$	(User Input)
Design Tensile Strength =	$F_{nt} := 29.8\cdot kips$	(User Input)
Design Shear Strength =	$F_{nv} := 17.9\cdot kips$	(User Input)
Edge Distance =	$Edge := 1.375\cdot in$	(User Input)
Plate Thickness =	$t := 0.5\cdot in$	(User Input)
Hole Diameter =	$Hole_d := 0.8125\cdot in$	(User Input)
Plate Tensile Strength =	$F_u := 58\cdot ksi$	(User Input)

Check Bolt Stresses:

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Vertical}{n_b} = 0 \cdot kips$

$Condition1 := if(F_{tension.bolt} < F_{nt}, "OK", "Overstressed")$

$Condition1 = "OK"$ $\frac{F_{tension.bolt}}{F_{nt}} = 0 \cdot \%$

Shear Force Each Bolt = $F_{shear.bolt} := \frac{Horizontal}{n_b} = 4.125 \cdot kips$

$Condition2 := if(F_{shear.bolt} < F_{nv}, "OK", "Overstressed") = "OK"$

$Condition2 = "OK"$ $\frac{F_{shear.bolt}}{F_{nv}} = 23 \cdot \%$

Check Bearing:

Clear Distance = $l_c := Edge - \frac{Hole_d}{2} = 0.969 \cdot in$

$\phi := 0.75$

$R_n := min[(1.2 \cdot l_c \cdot t \cdot F_u), 2.4 \cdot d_b \cdot t \cdot F_u] = 33.712 \cdot kips$

$\phi R_n := R_n \cdot \phi = 25.284 \cdot kips$

$Condition3 := if(F_{shear.bolt} < \phi R_n, "OK", "Overstressed") = "OK"$

$Condition3 = "OK"$ $\frac{F_{shear.bolt}}{\phi R_n} = 16.3 \cdot \%$

Mast to Plate Tab Weld Check:

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

Weld Size = $D_w := 0.375 \cdot in$ (User Input)

Weld Length = $lw := 7 \cdot in$ (User Input)

Number of Plate Tabs = $npl := 2$ (User Input)

Number of Welds per Plate = $nw := 2$ (User Input)

Force Each Plate Tab = $F_{plate} := \frac{Horizontal}{npl} = 8.25 \cdot kips$

$\phi R_n := \phi \cdot 0.6 \cdot F_{yw} \cdot \left(\frac{\sqrt{2}}{2}\right) \cdot (D_w) \cdot lw \cdot nw = 116.938 \cdot kips$

$Condition3 := if(F_{shear.bolt} < \phi R_n, "OK", "Overstressed") = "OK"$

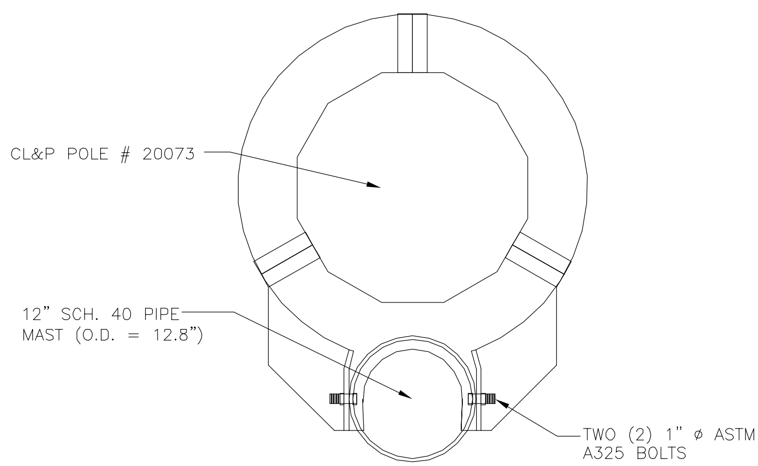
$Condition3 = "OK"$ $\frac{F_{shear.bolt}}{\phi R_n} = 3.5 \cdot \%$

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject: Location: Rev. 3: 2/12/19	Mast Bottom Connection Windsor, CT Prepared by: T.J.L. Checked by: C.F.C. Job No. 18098.01

Mast Bottom Connection:

Design Basis:

The mast connection to the CL&P structure is based on the design done prepared Paul J. Ford and Company job no. A02-T092 sheet S-1 - S-4 - dated 7-1-2002.
The (2) A325 1" diameter bolts will be checked for tension and shear
The mast is assumed to be pinned at the bottom connection.
When wind is applied parallel to the bolts one bolt will resist the tension force.
When wind is applied perpendicular to the bolts two bolts will resist the combined shear force developed from the wind and the weight of the structure.



Reactions at Connection:

Horizontal =	$Horizontal := 0.1 \cdot kips$	(User Input from Risa 3D)
Vertical =	$Vertical := 30.7 \cdot kips$	(User Input from Risa 3D)
Moment =	$Moment := 0 \cdot kips \cdot ft$	(User Input from Risa 3D)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts, nb =	$n_b := 2$	(User Input)
Bolt Diameter, db =	$d_b := 1in$	(User Input)
Bolt Area, ab =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^{2} = 0.785 \cdot in^{2}$	(User Input)
Design Tensile Strength =	$F_{nt} := 53 \cdot kips$	(User Input)
Design Shear Strength =	$F_{nv} := 31.8 \cdot kips$	(User Input)
Edge Distance =	$Edge := 3 \cdot in$	(User Input)
Plate Thickness =	$t := 0.5 \cdot in$	(User Input)
Hole Diameter =	$Hole_d := 1.0625 \cdot in$	(User Input)
Plate Tensile Strength =	$F_u := 58 \cdot ksi$	(User Input)

Check Bolt Stresses:

Tension Force Each Bolt =

$F_{tension.bolt} := Horizontal = 0.1 \cdot kips$

$Condition1 := if(F_{tension.bolt} < F_{nt}, \text{"OK"}, \text{"Overstressed"})$

$Condition1 = \text{"OK"}$ $\quad \frac{F_{tension.bolt}}{F_{nt}} = 0.2 \cdot \%$

Shear Force Each Bolt =

$F_{shear.bolt} := \frac{\sqrt{Horizontal^2 + Vertical^2}}{n_b} = 15.35 \cdot kips$

$Condition2 := if(F_{shear.bolt} < F_{nv}, \text{"OK"}, \text{"Overstressed"}) = \text{"OK"}$

$Condition2 = \text{"OK"}$ $\quad \frac{F_{shear.bolt}}{F_{nv}} = 48.3 \cdot \%$

Check Bearing:

Clear Distance =

$l_c := Edge - \frac{Hole_d}{2} = 2.469 \cdot in$

$\phi := 0.75$

$R_n := min[(1.2 \cdot l_c \cdot t \cdot F_u), 2.4 \cdot d_b \cdot t \cdot F_u] = 69.6 \cdot kips$

$\phi R_n := R_n \cdot \phi = 52.2 \cdot kips$

$Condition3 := if(F_{shear.bolt} < \phi R_n, \text{"OK"}, \text{"Overstressed"}) = \text{"OK"}$

$Condition3 = \text{"OK"}$ $\quad \frac{F_{shear.bolt}}{\phi R_n} = 29.4 \cdot \%$

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 34 \cdot ft \cdot kips$	(Input From RisaTower)
Shear Force =	$Shear := 8 \cdot kips$	(Input From RisaTower)
Axial Force =	$Axial := 7 \cdot kips$	(Input From RisaTower)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 10$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 21 \cdot in$	(User Input)
Bolt Minimum Tensile Strength =	$F_{ub} := 120 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 0.75 \cdot in$	(User Input)
Threads per Inch =	$n := 10$	(User Input)

Flange Plate Data:

Use ASTM A36

Plate Yield Strength =	$Fy_{bp} := 36 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 0.75 \cdot in$	(User Input)
Flange Plate Diameter =	$D_{bp} := 24 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 10.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 10.5 \cdot in$

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

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

$d_1 = 6.17 \cdot in$	$d_7 = -9.99 \cdot in$
$d_2 = 9.99 \cdot in$	$d_8 = -9.99 \cdot in$
$d_3 = 9.99 \cdot in$	$d_9 = -6.17 \cdot in$
$d_4 = 6.17 \cdot in$	$d_{10} = -0.00 \cdot in$
$d_5 = 0.00 \cdot in$	$d_{11} = ▪ \cdot in$
$d_6 = -6.17 \cdot in$	$d_{12} = ▪ \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 5.375 \cdot in$

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

$MA_1 = 0.80 \cdot in$	$MA_7 = 0.00 \cdot in$
$MA_2 = 4.61 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_3 = 4.61 \cdot in$	$MA_9 = 0.00 \cdot in$
$MA_4 = 0.80 \cdot in$	$MA_{10} = 0.00 \cdot in$
$MA_5 = 0.00 \cdot in$	$MA_{11} = ▪ \cdot in$
$MA_6 = 0.00 \cdot in$	$MA_{12} = ▪ \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 17.2 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 551.25 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.442 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.334 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.653 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.163 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.027 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 7.1 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 0.8 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := (0.75 \cdot F_{ub} \cdot 0.75 \cdot A_g) = 29.8 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 23.71 \cdot \%$

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

$Condition1 = \text{"OK"}$

Design Shear Strength = $\Phi R_{nv} := (0.75 \cdot 0.45 \cdot F_{ub} \cdot A_g) = 17.9 \cdot kips$

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

$Condition2 = \text{"OK"}$

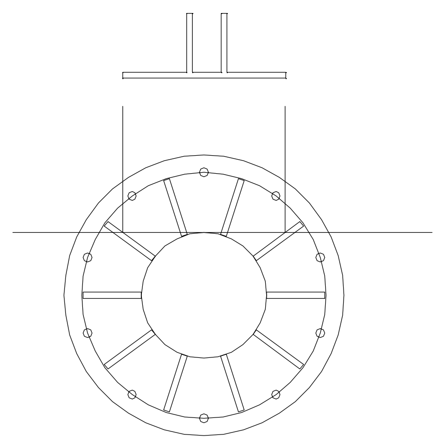
Flange Plate Analysis:

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

$C_1 = 5.3 \cdot kips$	$C_7 = -6.7 \cdot kips$
$C_2 = 8.1 \cdot kips$	$C_8 = -6.7 \cdot kips$
$C_3 = 8.1 \cdot kips$	$C_9 = -3.9 \cdot kips$
$C_4 = 5.3 \cdot kips$	$C_{10} = 0.7 \cdot kips$
$C_5 = 0.7 \cdot kips$	$C_{11} = \blacksquare \cdot kips$
$C_6 = -3.9 \cdot kips$	$C_{12} = \blacksquare \cdot kips$

Maximum Bending in Plate = $M_{bp} := \sum_i \left(C_i \cdot MA_i\right) = 83 \cdot in \cdot kips$

Section Modulus of Plate / Gussets = $S_{bp} := 7.97 \cdot in^3$



Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 32.4 \cdot ksi$

Bending Stress in Plate = $f_{bp} := \frac{M_{bp}}{S_{bp}} = 10.4 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 32.1 \cdot \%$

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

Condition3 = "Ok"

Basic Components

Heavy Wind Pressure = $p := 4.00$ psf (User Input NESC 2012 Figure 250-1 & Table 250-1)

Basic Windspeed = $V := 110$ mph (User Input NESC 2012 Figure 250-2(e))

Radial Ice Thickness = $Ir := 0.50$ in (User Input)

Radial Ice Density = $Id := 56.0$ pcf (User Input)

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade = $TME := 164$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2012 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.405$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.291$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.782$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.829$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36.1$ psf (NESC 2012 Section 250.C.2)

Shape Factors

Eversource OTRM 059 dated 6/7/18

Shape Factor for Round Members = $Cd_R := 1.3$ (User Input)

Shape Factor for Flat Members = $Cd_F := 1.6$ (User Input)

Shape Factor for Coax Cables Attached to Outside of Pole = $Cd_{coax} := 1.6$ (User Input)

Overload Factors

Eversource Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Wind Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Wind 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 Wind Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Wind 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 Antenna Mast

Antenna Mast Data: (12" Sch. 40)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 12.8$ in (User Input)

Mast Length = $L_{mast} := 38.5$ ft (User Input)

Mast Thickness = $t_{mast} := 0.375$ in (User Input)

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}{}^2\right] = 20.9$ sq in

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

Wind Load (NESC Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 1.15$ sf/ft

Total Mast Wind Force w/ Ice = $Fi_{mast} := p \cdot Cd_{coax} \cdot AICE_{mast} = 7$ plf **BLC 4**

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.067$ sf/ft

Total Mast Wind Force (Above NU Structure) = $F_{mast} := qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 77$ plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $F_{mast} := qz \cdot Cd_{coax} \cdot A_{mast} = 62$ plf **BLC 5**

Development of Wind & Ice Load on Antenna Mast

Antenna Mast Data: (10" Sch. 40)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 10.8$	in	(User Input)
Mast Length =	$L_{mast} := 12.5$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.365$	in	(User Input)

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^{\,2}\right] = 17.7$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 7$ plf **BLC 3**

Wind Load (NESC Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 0.983$ sf/ft

Total Mast Wind Force w/ Ice = $Fi_{mast} := p \cdot Cd_{coax} \cdot AICE_{mast} = 6$ plf **BLC 4**

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.9$ sf/ft

Total Mast Wind Force (Above NU Structure) = $F_{mast} := qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 65$ plf **BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 135$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1017$ cu in

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

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

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 5.5$ sf

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

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

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1092$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24_43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 154$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 462$	lbs	BLC 2

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 3474$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 113$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 338$	lbs	BLC 3

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 16.8$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 50.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 323$	lbs	BLC 4

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 48$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 3459$	lbs	BLC 5

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type: Microflect Tri-Sector Bracket & Adapter Mount w/ 3 Pipes

Mount Shape = Round (User Input)

Pipe Mount Length = $L_{mnt} := 66$ in (User Input)

2 inch Pipe Mount Linear Weight = $W_{mnt} := 3.66$ plf (User Input)

Pipe Mount Outside Diameter = $D_{mnt} := 2.375$ in (User Input)

Number of Mounting Pipes = $N_{mnt} := 3$ (User Input)

Tri Sector Adapter and Bracket Mount Weight = $W_{tsa.mnt} := 225$ lbs (User Input)

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

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

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

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

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

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

Gravity Loads (without ice)

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 20$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{tsa.mnt} = 285$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^2 \cdot L_{mnt} = 292$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 307$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 35$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	Microflect Tri-Sector Bracket & Adapter Mount w/ 3 Pipes		
Mount Shape =	Round		(User Input)
Pipe Mount Length =	$L_{mnt} := 96$	in	(User Input)
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	(User Input)
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	(User Input)
Number of Mounting Pipes =	$N_{mnt} := 3$		(User Input)
Tri Sector Adapter and Bracket Mount Weight =	$W_{tsa.mnt} := 225$	lbs	(User Input)

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

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

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

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

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

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

Gravity Loads (without ice)

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 29$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{tsa.mnt} = 313$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 425$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 442$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 14$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 48$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (113-ft - 154-ft AGL)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

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

Coax Cable Length = $L_{coax} := 41$ ft (User Input)

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

Total Number of Coax = $N_{coax} := 30$ (User Input)

No. of Coax Projecting Outside Face of Antenna Mast = $NP_{coax} := 12$ (User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 31$ plf **BLC 2**

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 45$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot D_{coax} + 2 \cdot Ir}{12} = 2.1$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 13$ plf **BLC 4**

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax}\right)}{12} = 2$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 143$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 114$ plf **BLC 5**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (154-ft - 161-ft AGL)

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 7$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of Antenna Mast =	$NP_{coax} := 6$		(User Input)

Gravity Loads (without ice)

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

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 18$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot D_{coax} + 2 \cdot Ir}{12} = 1.1$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 7$ plf **BLC 4**

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 71$ plf **BLC 5**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast 1	PIPE_12.0	Column	Pipe	A53 Gr. B	Typical	13.7	262	262	523
2	Mast 2	PIPE_10.0	Column	Pipe	A53 Gr. B	Typical	11.5	151	151	302

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Mast 1	38.5			Lbyy									Lateral
2	M2	Mast 2	12.5			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTCO...	FLANGE...			Mast 1	Column	Pipe	A53 Gr. B	Typical
2	M2	FLANGE...	TOPMA...			Mast 2	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTCONNECTION	0	0	0	0	
2	TOPCONNECTION	0	30	0	0	
3	FLANGECONNECTION	0	38.5	0	0	
4	TOPMAST	0	51	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	TOPCONNECTION	Reaction		Reaction		Reaction	
2	BOTCONNECTION	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.135	9.5
2	M2	Y	-.285	9.5
3	M2	Y	-.462	2.5
4	M2	Y	-.285	2.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.099	9.5
2	M2	Y	-.035	9.5
3	M2	Y	-.338	2.5
4	M2	Y	-.035	2.5

Member Point Loads (BLC 4 : NESC Heavy Wind on Antenna Struc)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.106	9.5
2	M2	X	.323	2.5

Member Point Loads (BLC 5 : NESC Extreme Wind on Antenna Str)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	1.092	9.5
2	M2	X	3.459	2.5

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.031	-.031	0	0
2	M2	Y	-.012	-.012	0	8

Member Distributed Loads (BLC 3 : Weight of Ice Only on Antenna St)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M2	Y	-.007	-.007	0	0
3	M1	Y	-.045	-.045	0	0
4	M2	Y	-.018	-.018	0	8

Member Distributed Loads (BLC 4 : NESC Heavy Wind on Antenna Struc)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	0
2	M2	X	.006	.006	0	0
3	M1	X	.013	.013	0	0
4	M2	X	.007	.007	0	8

Member Distributed Loads (BLC 5 : NESC Extreme Wind on Antenna Str)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.062	.062	0	35
2	M1	X	.077	.077	35	0
3	M2	X	.065	.065	0	0
4	M1	X	.114	.114	0	35
5	M1	X	.143	.143	35	0
6	M2	X	.071	.071	0	8

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight (Antenna Mast)	None		-1						
2	Weight of Appurtenances	None					4	2		
3	Weight of Ice Only on Antenna St	None					4	4		
4	NESC Heavy Wind on Antenna Struc	None					2	4		
5	NESC Extreme Wind on Antenna Str	None					2	6		

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind on An...	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind on ...	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Joint Reactions

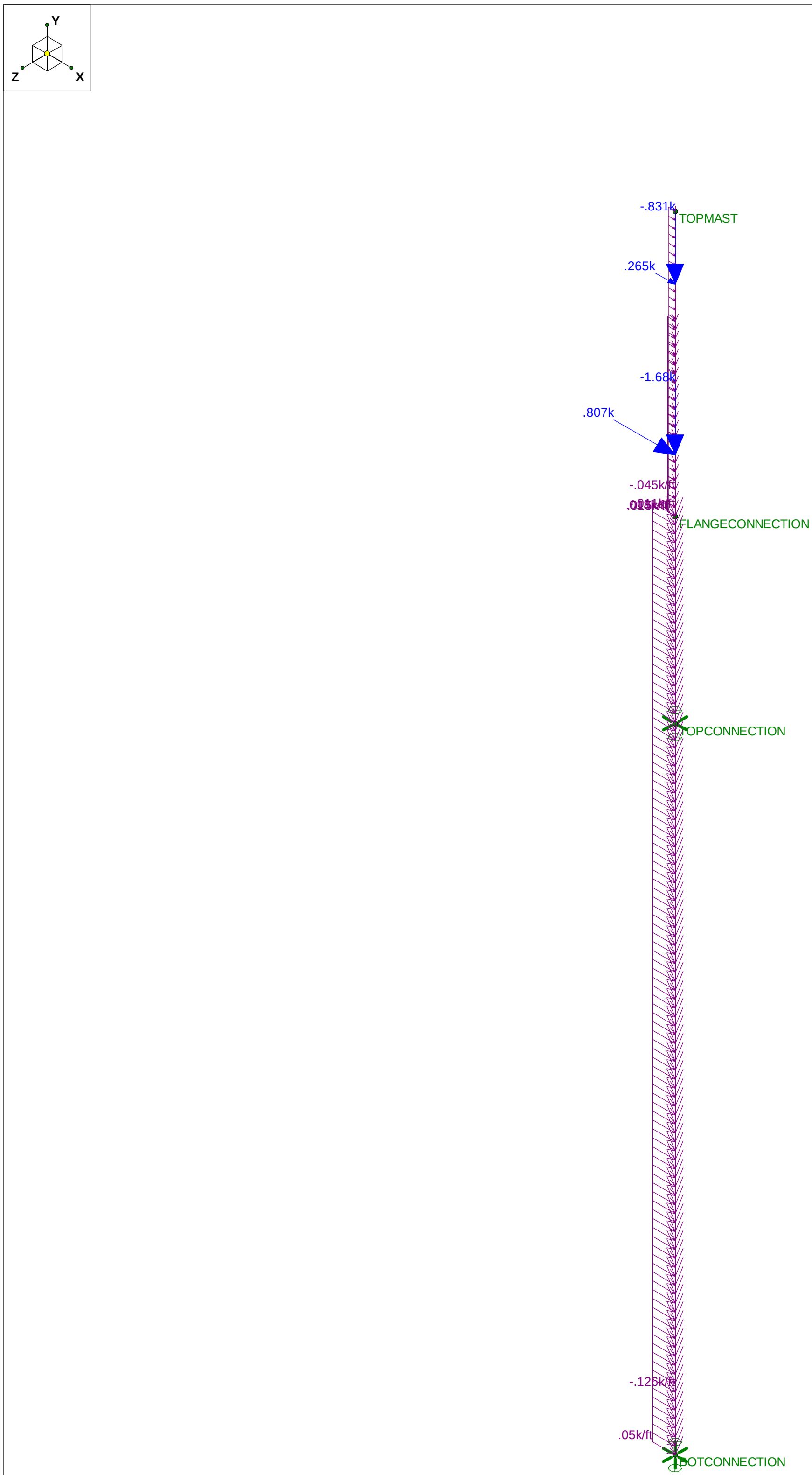
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	TOPCONNEC...	max	-3.241	1	0	2	0	2	0	2	0	2	0	2
2		min	-13.028	2	0	1	0	1	0	1	0	1	0	1
3	BOTCONNEC...	max	.166	2	11.279	1	0	2	0	2	0	2	0	2
4		min	-.084	1	4.74	2	0	1	0	1	0	1	0	1
5	Totals:	max	-3.325	1	11.279	1	0	2						
6		min	-12.862	2	4.74	2	0	1						

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-3.241	0	0	0	0	0
2	1	BOTCONNECTION	-.084	11.279	0	0	0	0
3	1	Totals:	-3.325	11.279	0			
4	1	COG (ft):	X: 0	Y: 27.305	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-13.028	0	0	0	0	0
2	2	BOTCONNECTION	.166	4.74	0	0	0	0
3	2	Totals:	-12.862	4.74	0			
4	2	COG (ft):	X: 0	Y: 28.327	Z: 0			

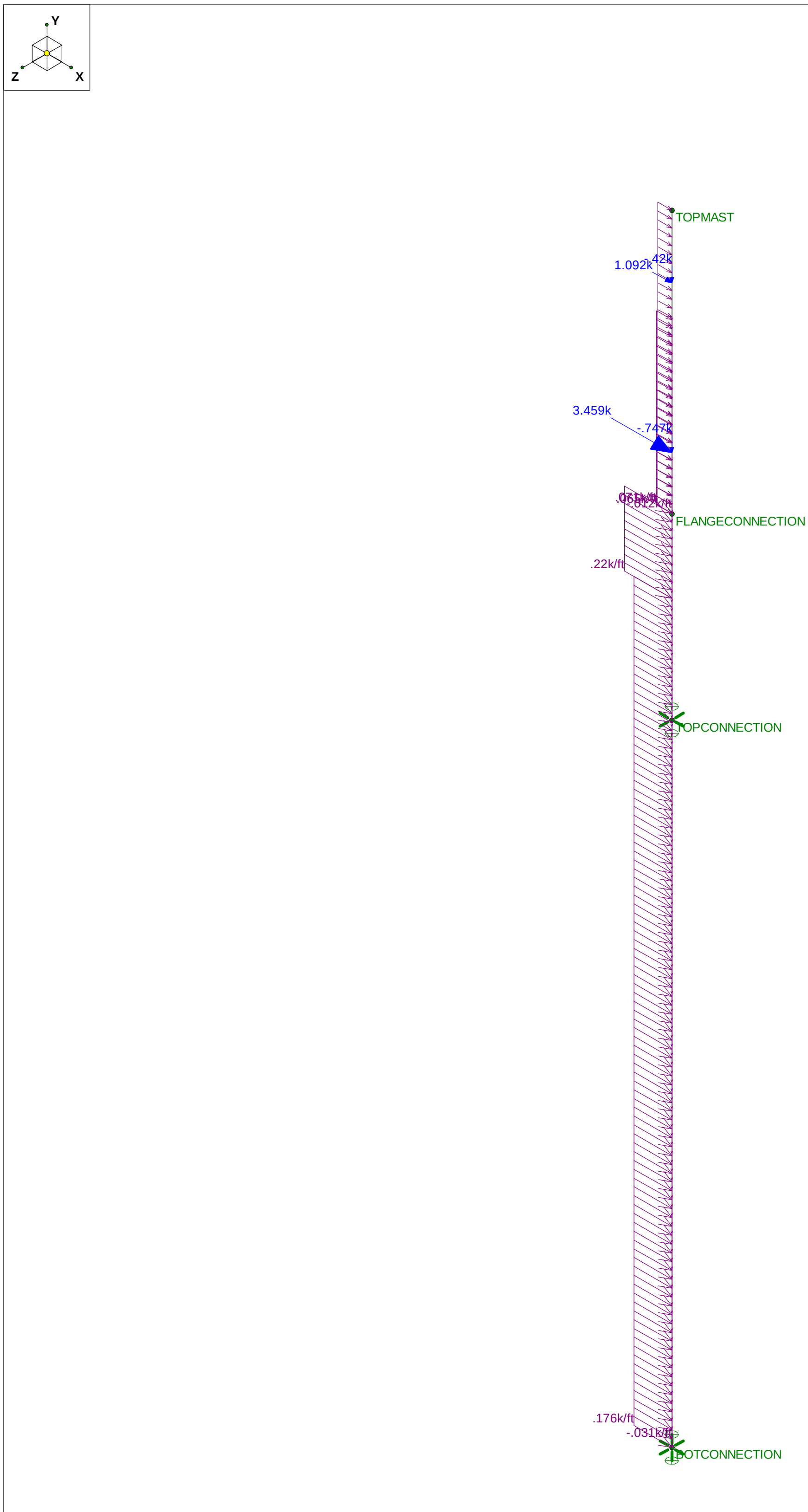


Loads: LC 1, NESC Heavy Wind on Antenna Structure

CENTEK Engineering		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:45 AM
18098.01 - CT11446A	LC #1 Loads	NESC.r3d

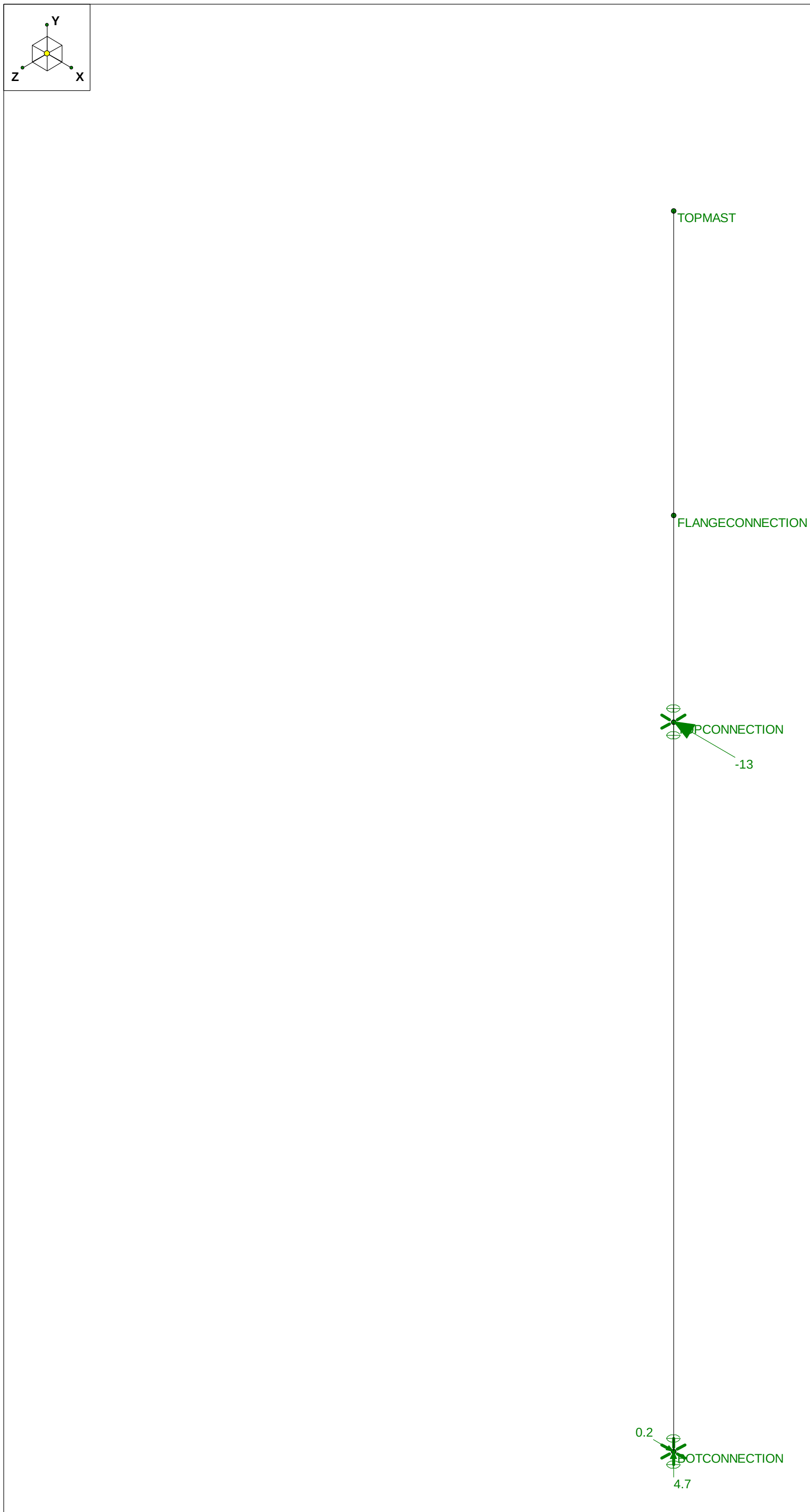
Results for LC 1, NESC Heavy Wind on Antenna Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:46 AM
18098.01 - CT11446A	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on Antenna Structure

CENTEK Engineering		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:45 AM
18098.01 - CT11446A	LC #2 Loads	NESC.r3d



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

CENTEK Engineering		
tjl, cfc	Pole # 20073	Feb 12, 2019 at 10:47 AM
18098.01 - CT11446A	LC #2 Reactions	NESC.r3d

Coax Cable on CL&P Pole

Coaxial Cable Span $\quad Coax_{Span} := \begin{pmatrix} 13 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

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

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

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

Basic Windspeed = $V := 110$ mph (User Input NESC 2007 Figure 250-2(e))

Height to Top of Coax Above Grade = $TC := 164$ ft (User Input)

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

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

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.291$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.291$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.782$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.829$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 33.2$ psf (NESC 2007 Section 250.C.2)

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 = $N_{coax} := 30$ *(User Input)*

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

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

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

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

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

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

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 23.76 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 24.76 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 45.448 \cdot plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 1495 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 429 \\ 330 \\ 330 \\ 330 \\ 330 \\ 330 \\ 330 \\ 330 \\ 330 \\ 330 \\ 330 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

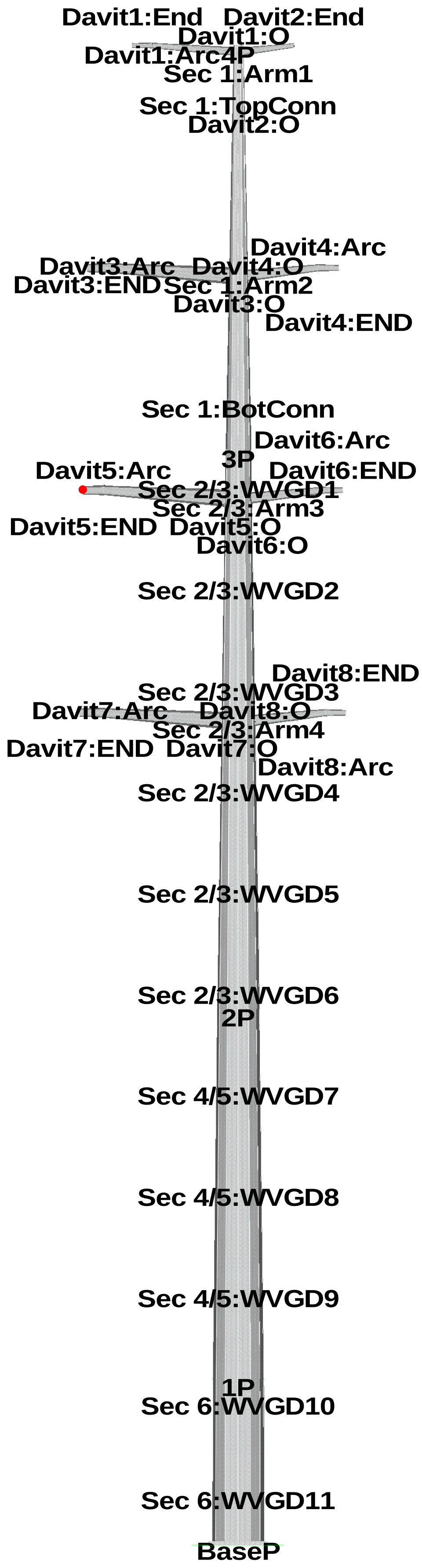
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot CoaxSpan \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

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

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 406 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 1365 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \\ 1050 \end{pmatrix} ft^2$$

Centek Engineering Inc, Project: "cl&p structure # 20073"
PLS-POLE Version 12.50, 2:15:11 PM Monday, February 04, 2019
Undeformed geometry displayed



Project Name : 18098.01 - Windsor, CT
Project Notes: Struct # 20073/ T-Mobile - CT11446A
Project File : J:\Jobs\1809800.WI\01_CT11446A\Structural\Backup Documentation\Rev (3)\Calcs\PLS-Pole\cl&p structure # 20073.pol
Date run : 10:39:57 AM Tuesday, February 12, 2019
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1809800.wi\01_ct11446a\structural\backup documentation\rev (3)\calcs\pls-pole\cl&p #20073.lca

*** Analysis Results:

Maximum element usage is 90.03% for Steel Pole "Sec 6" in load case "NESC Extreme"
Maximum insulator usage is 16.67% for Clamp "Clamp7" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	BaseP	3.90	-69.60	-125.37	69.71	7161.04	514.17	7179.48	-49.85	0.00
NESC Extreme	BaseP	4.16	-82.00	-70.24	82.10	7937.04	470.73	7950.98	-11.47	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	4P	-9.44	100.51	-4.04	101.03	-0.83	-6.61	-0.16
NESC Heavy	3P	-4.34	51.34	-1.46	51.54	-0.46	-4.83	0.08
NESC Heavy	2P	-0.87	11.53	-0.16	11.56	-0.16	-2.09	0.03
NESC Heavy	1P	-0.08	1.08	-0.01	1.09	-0.05	-0.62	0.01
NESC Extreme	4P	-6.89	117.13	-5.60	117.47	-0.49	-8.20	-0.13
NESC Extreme	3P	-3.55	57.34	-1.79	57.48	-0.35	-5.58	0.01
NESC Extreme	2P	-0.77	12.69	-0.18	12.71	-0.14	-2.30	0.01
NESC Extreme	1P	-0.07	1.20	-0.01	1.20	-0.04	-0.68	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
Sec 1	1	2466	NESC Extreme	81.82	821.31
Sec 2/3	1	2449	NESC Extreme	84.44	1454.81
Sec 2/3	2	8369	NESC Extreme	86.05	3927.24
Sec 4/5	1	6248	NESC Extreme	76.76	4867.63
Sec 4/5	2	7798	NESC Extreme	85.09	6651.32
Sec 6	1	6360	NESC Extreme	90.03	7950.99

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Sec 1	81.82	NESC Extreme	10	2465.6
Sec 2/3	86.05	NESC Extreme	15	10818.2
Sec 4/5	85.09	NESC Extreme	10	14046.7
Sec 6	90.03	NESC Extreme	4	11139.8

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	14.67	NESC Heavy	1	221.5
Davit2	11.72	NESC Heavy	1	72.5
Davit3	22.04	NESC Heavy	1	664.0
Davit4	25.18	NESC Heavy	1	257.1
Davit5	22.91	NESC Heavy	1	664.0
Davit6	25.73	NESC Heavy	1	257.1
Davit7	23.49	NESC Heavy	1	664.0
Davit8	26.46	NESC Heavy	1	257.1

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	82.03	Sec 6	Steel Pole
NESC Extreme	90.03	Sec 6	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	82.03	Sec 6	4
NESC Extreme	90.03	Sec 6	4

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	Sec 6	11	15.658	120.588	7161.038	514.257	48.306	138.044	3	162.090	3.253	80.51
NESC Extreme	Sec 6	11	15.658	65.465	7937.035	470.756	52.104	148.899	3	175.780	3.378	86.84

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number

NESC Heavy	26.46	Davit8	1
NESC Extreme	14.57	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.95	NESC Heavy	0.0
Clamp2	Clamp	3.80	NESC Heavy	0.0
Clamp3	Clamp	16.53	NESC Heavy	0.0
Clamp4	Clamp	9.24	NESC Heavy	0.0
Clamp5	Clamp	16.45	NESC Heavy	0.0
Clamp6	Clamp	9.81	NESC Heavy	0.0
Clamp7	Clamp	16.67	NESC Heavy	0.0
Clamp8	Clamp	10.41	NESC Heavy	0.0
Clamp9	Clamp	16.28	NESC Extreme	0.0
Clamp10	Clamp	14.10	NESC Heavy	0.0
Clamp13	Clamp	1.94	NESC Heavy	0.0
Clamp14	Clamp	1.50	NESC Heavy	0.0
Clamp15	Clamp	1.50	NESC Heavy	0.0
Clamp16	Clamp	1.50	NESC Heavy	0.0
Clamp17	Clamp	1.50	NESC Heavy	0.0
Clamp18	Clamp	1.50	NESC Heavy	0.0
Clamp19	Clamp	1.50	NESC Heavy	0.0
Clamp20	Clamp	1.50	NESC Heavy	0.0
Clamp21	Clamp	1.50	NESC Heavy	0.0
Clamp22	Clamp	1.50	NESC Heavy	0.0
Clamp23	Clamp	1.50	NESC Heavy	0.0

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 3057.4
Weight of Steel Poles: 38470.4
Total: 41527.7

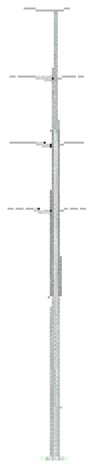
*** End of Report

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

Project Name : 18098.01 - Windsor, CT
Project Notes: Struct # 20073/ T-Mobile - CT11446A
Project File : J:\Jobs\1809800.WI\01_CT11446A\Structural\Backup Documentation\Rev (3)\Calcs\PLS-Pole\cl&p structure # 20073.pol
Date run : 10:39:56 AM Tuesday, February 12, 2019
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.



Modeling options:
Offset Arms from Pole/Mast: Yes
Offset Braces from Pole/Mast: Yes
Offset Guys from Pole/Mast: Yes
Offset Posts from Pole/Mast: Yes
Offset Strains from Pole/Mast: Yes
Use Alternate Convergence Process: No
Steel poles checked with ASCE/SEI 48-11

Joints Geometry:

Joint Label	Symmetry Code	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
BaseP	None	0	0	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
1P	None	0	0	16.17	Free	Free	Free	Free	Free	Free
2P	None	0	0	52.75	Free	Free	Free	Free	Free	Free
3P	None	0	0	108	Free	Free	Free	Free	Free	Free

4P	None	0	0	148	Free	Free	Free	Free	Free	Free

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

Steel Pole Properties:

Steel Pole Property Label	Stock Number	Length (ft)	Default Embedded Length (ft)	Base Plate	Shape	Tip Diameter (in)	Base Diameter (in)	Taper (in/ft)	Default Drag Coef.	Tubes	Modulus of Elasticity Override (ksi)	Weight Density Override (lbs/ft^3)	Shape At Base	Strength Check Type	Distance From Tip (ft)	Ultimate Trans. Load (kips)	Ultimate Long. Load (kips)
Section 1	S1	40.00	0	No	12T	11.31	29.31	0	1.6	1 tube	0	0		Calculated	0.000	0.0000	0.0000
Section 2/3	S2/3	55.25	0	No	12T	29.31	48.44	0	1.6	2 tubes	0	0		Calculated	0.000	0.0000	0.0000
Section 4/5	S4/5	36.58	0	No	12T	48.44	57.88	0	1.6	2 tubes	0	0		Calculated	0.000	0.0000	0.0000
Section 6	S6	16.17	0	Yes	12T	57.88	58.44	0	1.6	1 tube	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
Section 1	1	40	0.28125	0.000	0.000	0.000	65.000	0.000	2466	23.00	0.45000	11.31	29.31	0.000	0.000

Steel Tubes Properties:

Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
Section 2/3	1	20	0.34375	4.750	0.000	0.000	65.000	0.000	2449	10.37	0.35860	29.31	36.48	4.475	4.750
Section 2/3	2	40	0.46875	0.000	0.000	0.000	65.000	0.000	8369	21.17	0.35860	34.09	48.44	0.000	0.000

Steel Tubes Properties:

Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
Section 4/5	1	20	0.5625	6.917	0.000	0.000	65.000	0.000	6248	10.19	0.28873	48.44	54.21	6.636	6.917
Section 4/5	2	23.5	0.5625	0.000	0.000	0.000	65.000	0.000	7798	12.00	0.28873	51.09	57.87	0.000	0.000

Steel Tubes Properties:

Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)

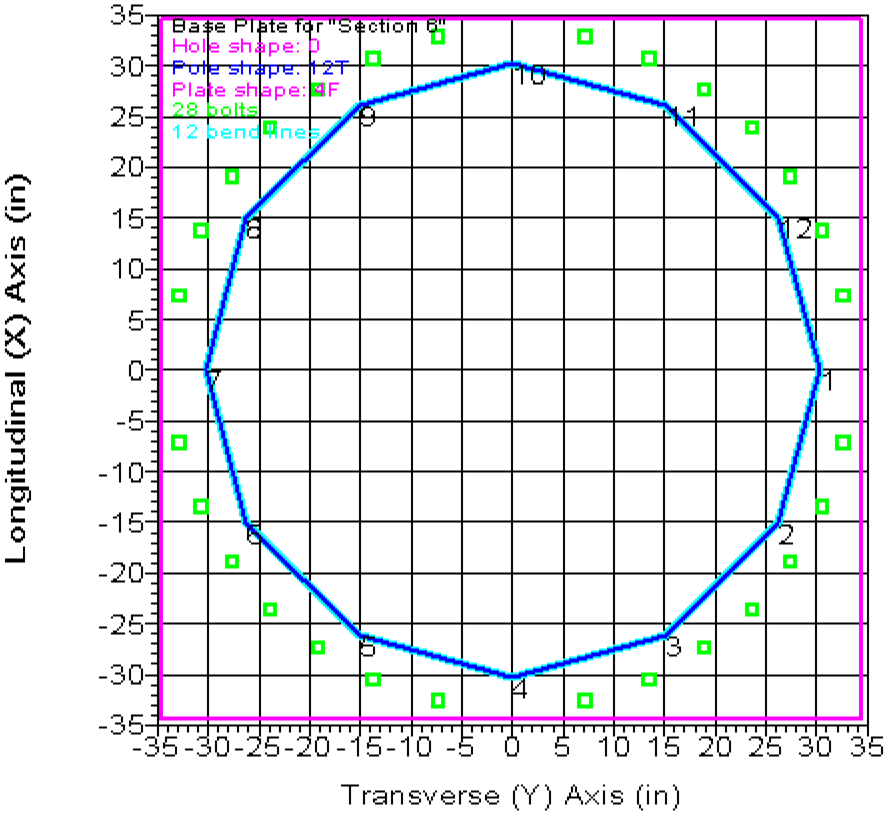
Section 6	1	16.167	0.625	0.000	0.000	0.000	65.000	0.000	6360	8.10	0.03479	57.88	58.44	0.000	0.000

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)
Section 6	69.000	4F	3.625	4780	0.000	0.000	0	490.00	60.000	2.250	67.000	28	62505.33	62505.33

Base Plate Bolt Coordinates for Property "Section 6":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.2164	0.9776	0
0.4067	0.9142	0
0.5672	0.8209	0
0.709	0.709	0
0.8209	0.5672	0
0.9142	0.4067	0
0.9776	0.2164	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)
Sec 1	4P	3P	0	0	0	0	0	Section 1	4 labels		0.00	0
Sec 2/3	3P	2P	0	0	0	0	0	Section 2/3	8 labels		0.00	0
Sec 4/5	2P	1P	0	0	0	0	0	Section 4/5	3 labels		0.00	0
Sec 6	1P	BaseP	0	0	0	0	0	Section 6	2 labels		0.00	0

Relative Attachment Labels for Steel Pole "Sec 1":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
Sec 1:Arm1	0.00	147.42
Sec 1:Arm2	0.00	125.25

Sec 1:TopConn	0.00	143.00
Sec 1:BotConn	0.00	113.00

Relative Attachment Labels for Steel Pole "Sec 2/3":

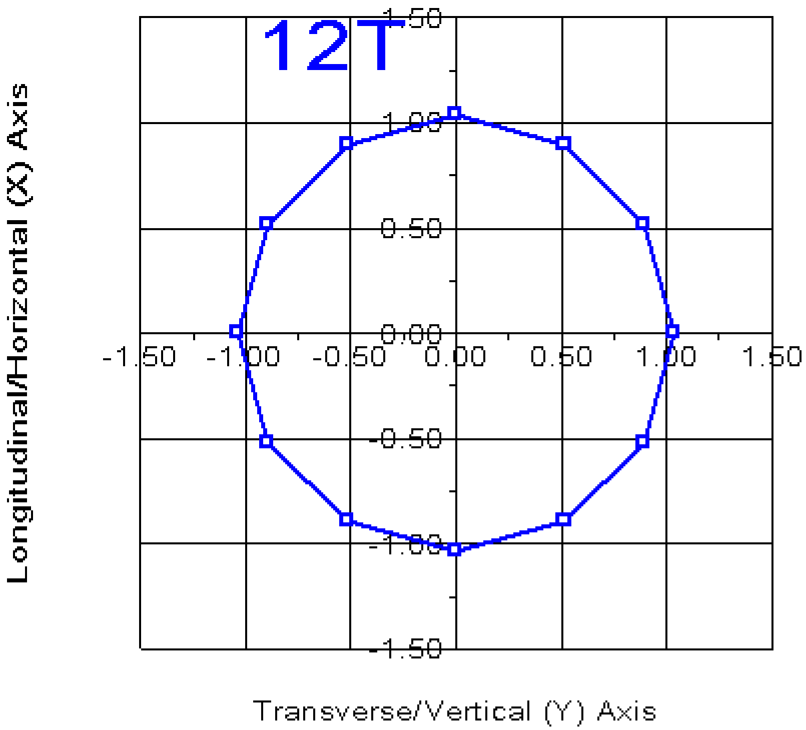
Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
Sec 2/3:Arm3	0.00	103.25
Sec 2/3:Arm4	0.00	81.25
Sec 2/3:WVGD1	0.00	105.00
Sec 2/3:WVGD2	0.00	95.00
Sec 2/3:WVGD3	0.00	85.00
Sec 2/3:WVGD4	0.00	75.00
Sec 2/3:WVGD5	0.00	65.00
Sec 2/3:WVGD6	0.00	55.00

Relative Attachment Labels for Steel Pole "Sec 4/5":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
Sec 4/5:WVGD7	0.00	45.00
Sec 4/5:WVGD8	0.00	35.00
Sec 4/5:WVGD9	0.00	25.00

Relative Attachment Labels for Steel Pole "Sec 6":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
Sec 6:WVGD10	0.00	15.00
Sec 6:WVGD11	0.00	5.00



Pole Steel Properties:

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
Sec 1	4P	4P Ori	0.00	11.31	9.98	155.46	155.46	0.00	8.1	65.00	65.00	143.80	143.80
Sec 1	Sec 1:Arm1	Sec 1:Arm1 End	0.58	11.57	10.21	166.76	166.76	0.00	8.3	65.00	65.00	150.77	150.77
Sec 1	Sec 1:Arm1	Sec 1:Arm1 Ori	0.58	11.57	10.21	166.76	166.76	0.00	8.3	65.00	65.00	150.77	150.77
Sec 1	Sec 1:TopConn	Sec 1:TopConn End	5.00	13.56	12.01	271.27	271.27	0.00	10.2	65.00	65.00	209.30	209.30
Sec 1	Sec 1:TopConn	Sec 1:TopConn Ori	5.00	13.56	12.01	271.27	271.27	0.00	10.2	65.00	65.00	209.30	209.30
Sec 1	#Sec 1:0	Tube 1 End	10.00	15.81	14.05	433.76	433.76	0.00	12.4	65.00	65.00	287.05	287.05
Sec 1	#Sec 1:0	Tube 1 Ori	10.00	15.81	14.05	433.76	433.76	0.00	12.4	65.00	65.00	287.05	287.05
Sec 1	#Sec 1:1	Tube 1 End	15.00	18.06	16.08	650.87	650.87	0.00	14.5	65.00	65.00	377.07	377.07
Sec 1	#Sec 1:1	Tube 1 Ori	15.00	18.06	16.08	650.87	650.87	0.00	14.5	65.00	65.00	377.07	377.07
Sec 1	#Sec 1:2	Tube 1 End	18.88	19.81	17.66	861.71	861.71	0.00	16.2	65.00	65.00	455.26	455.26
Sec 1	#Sec 1:2	Tube 1 Ori	18.88	19.81	17.66	861.71	861.71	0.00	16.2	65.00	65.00	455.26	455.26
Sec 1	Sec 1:Arm2	Sec 1:Arm2 End	22.75	21.55	19.23	1113.79	1113.79	0.00	17.9	65.00	65.00	540.83	540.83
Sec 1	Sec 1:Arm2	Sec 1:Arm2 Ori	22.75	21.55	19.23	1113.79	1113.79	0.00	17.9	65.00	65.00	540.83	540.83
Sec 1	#Sec 1:3	Tube 1 End	27.75	23.80	21.27	1505.94	1505.94	0.00	20.0	65.00	65.00	662.11	662.11
Sec 1	#Sec 1:3	Tube 1 Ori	27.75	23.80	21.27	1505.94	1505.94	0.00	20.0	65.00	65.00	662.11	662.11

Sec 1	#Sec 1:4	Tube 1	End	31.37	25.43	22.74	1841.50	1841.50	0.00	21.5	65.00	65.00	757.72	757.72
Sec 1	#Sec 1:4	Tube 1	Ori	31.37	25.43	22.74	1841.50	1841.50	0.00	21.5	65.00	65.00	757.72	757.72
Sec 1	Sec 1:BotConn	Sec 1:BotConn	End	35.00	27.06	24.22	2223.53	2223.53	0.00	23.1	65.00	65.00	859.76	859.76
Sec 1	Sec 1:BotConn	Sec 1:BotConn	Ori	35.00	27.06	24.22	2223.53	2223.53	0.00	23.1	65.00	65.00	859.76	859.76
Sec 1	3P	3P	End	40.00	29.31	26.25	2832.32	2832.32	0.00	25.2	65.00	65.00	1011.10	1011.10
Sec 2/3	3P	3P	Ori	0.00	29.31	32.02	3439.56	3439.56	0.00	20.2	65.00	65.00	1227.87	1227.87
Sec 2/3	Sec 2/3:WVGD1	Sec 2/3:WVGD1	End	3.00	30.39	33.21	3837.13	3837.13	0.00	21.0	65.00	65.00	1321.31	1321.31
Sec 2/3	Sec 2/3:WVGD1	Sec 2/3:WVGD1	Ori	3.00	30.39	33.21	3837.13	3837.13	0.00	21.0	65.00	65.00	1321.31	1321.31
Sec 2/3	Sec 2/3:Arm3	Sec 2/3:Arm3	End	4.75	31.02	33.90	4082.60	4082.60	0.00	21.5	65.00	65.00	1377.39	1377.39
Sec 2/3	Sec 2/3:Arm3	Sec 2/3:Arm3	Ori	4.75	31.02	33.90	4082.61	4082.61	0.00	21.5	65.00	65.00	1377.39	1377.39
Sec 2/3	#Sec 2/3:5	Tube 1	End	8.87	32.50	35.54	4702.17	4702.17	0.00	22.7	65.00	65.00	1514.21	1514.21
Sec 2/3	#Sec 2/3:5	Tube 1	Ori	8.87	32.50	35.54	4702.17	4702.17	0.00	22.7	65.00	65.00	1514.21	1514.21
Sec 2/3	Sec 2/3:WVGD2	Sec 2/3:WVGD2	End	13.00	33.97	37.17	5381.45	5381.45	0.00	23.8	65.00	65.00	1657.50	1657.50
Sec 2/3	Sec 2/3:WVGD2	Sec 2/3:WVGD2	Ori	13.00	33.97	37.17	5381.45	5381.45	0.00	23.8	65.00	65.00	1657.50	1657.50
Sec 2/3	#Sec 2/3:6	SpliceT	End	15.25	34.78	38.06	5778.12	5778.12	0.00	24.4	65.00	65.00	1738.39	1738.39
Sec 2/3	#Sec 2/3:6	SpliceT	Ori	15.25	34.78	38.06	5778.12	5778.12	0.00	24.4	65.00	65.00	1738.39	1738.39
Sec 2/3	#Sec 2/3:7	SpliceB	End	20.00	35.80	53.25	8507.27	8507.27	0.00	17.8	65.00	65.00	2486.84	2486.84
Sec 2/3	#Sec 2/3:7	SpliceB	Ori	20.00	35.80	53.25	8507.27	8507.27	0.00	17.8	65.00	65.00	2486.84	2486.84
Sec 2/3	Sec 2/3:WVGD3	Sec 2/3:WVGD3	End	23.00	36.87	54.87	9308.26	9308.26	0.00	18.4	65.00	65.00	2641.60	2641.60
Sec 2/3	Sec 2/3:WVGD3	Sec 2/3:WVGD3	Ori	23.00	36.87	54.87	9308.26	9308.26	0.00	18.4	65.00	65.00	2641.60	2641.60
Sec 2/3	Sec 2/3:Arm4	Sec 2/3:Arm4	End	26.75	38.22	56.90	10378.25	10378.25	0.00	19.2	65.00	65.00	2841.62	2841.62
Sec 2/3	Sec 2/3:Arm4	Sec 2/3:Arm4	Ori	26.75	38.22	56.90	10378.25	10378.25	0.00	19.2	65.00	65.00	2841.62	2841.62
Sec 2/3	#Sec 2/3:8	Tube 2	End	29.87	39.34	58.58	11330.14	11330.14	0.00	19.8	65.00	65.00	3013.88	3013.88
Sec 2/3	#Sec 2/3:8	Tube 2	Ori	29.87	39.34	58.58	11330.14	11330.14	0.00	19.8	65.00	65.00	3013.88	3013.88
Sec 2/3	Sec 2/3:WVGD4	Sec 2/3:WVGD4	End	33.00	40.46	60.27	12338.53	12338.53	0.00	20.4	65.00	65.00	3191.21	3191.21
Sec 2/3	Sec 2/3:WVGD4	Sec 2/3:WVGD4	Ori	33.00	40.46	60.27	12338.53	12338.53	0.00	20.4	65.00	65.00	3191.21	3191.21
Sec 2/3	#Sec 2/3:9	Tube 2	End	38.00	42.25	62.98	14073.53	14073.53	0.00	21.5	65.00	65.00	3485.48	3485.48
Sec 2/3	#Sec 2/3:9	Tube 2	Ori	38.00	42.25	62.98	14073.54	14073.54	0.00	21.5	65.00	65.00	3485.48	3485.48
Sec 2/3	Sec 2/3:WVGD5	Sec 2/3:WVGD5	End	43.00	44.04	65.68	15964.01	15964.01	0.00	22.5	65.00	65.00	3792.73	3792.73
Sec 2/3	Sec 2/3:WVGD5	Sec 2/3:WVGD5	Ori	43.00	44.04	65.68	15964.01	15964.01	0.00	22.5	65.00	65.00	3792.73	3792.73
Sec 2/3	#Sec 2/3:10	Tube 2	End	48.00	45.84	68.38	18016.64	18016.64	0.00	23.5	65.00	65.00	4112.96	4112.96
Sec 2/3	#Sec 2/3:10	Tube 2	Ori	48.00	45.84	68.38	18016.64	18016.64	0.00	23.5	65.00	65.00	4112.96	4112.96
Sec 2/3	Sec 2/3:WVGD6	Sec 2/3:WVGD6	End	53.00	47.63	71.08	20238.08	20238.08	0.00	24.5	65.00	65.00	4446.17	4446.17
Sec 2/3	Sec 2/3:WVGD6	Sec 2/3:WVGD6	Ori	53.00	47.63	71.08	20238.08	20238.08	0.00	24.5	65.00	65.00	4446.17	4446.17
Sec 2/3	2P	2P	End	55.25	48.44	72.30	21294.58	21294.58	0.00	25.0	65.00	65.00	4600.35	4600.35
Sec 4/5	2P	2P	Ori	0.00	48.44	86.59	25404.96	25404.96	0.00	20.4	65.00	65.00	5488.33	5488.33
Sec 4/5	#Sec 4/5:11	Tube 1	End	3.88	49.56	88.61	27227.85	27227.85	0.00	20.9	65.00	65.00	5749.34	5749.34
Sec 4/5	#Sec 4/5:11	Tube 1	Ori	3.88	49.56	88.61	27227.86	27227.86	0.00	20.9	65.00	65.00	5749.34	5749.34
Sec 4/5	Sec 4/5:WVGD7	Sec 4/5:WVGD7	End	7.75	50.68	90.64	29135.94	29135.94	0.00	21.5	65.00	65.00	6016.41	6016.41
Sec 4/5	Sec 4/5:WVGD7	Sec 4/5:WVGD7	Ori	7.75	50.68	90.64	29135.94	29135.94	0.00	21.5	65.00	65.00	6016.41	6016.41
Sec 4/5	#Sec 4/5:12	Tube 1	End	10.42	51.45	92.03	30499.43	30499.43	0.00	21.8	65.00	65.00	6203.72	6203.72
Sec 4/5	#Sec 4/5:12	Tube 1	Ori	10.42	51.45	92.03	30499.43	30499.43	0.00	21.8	65.00	65.00	6203.72	6203.72
Sec 4/5	#Sec 4/5:13	SpliceT	End	13.08	52.21	93.42	31904.82	31904.82	0.00	22.2	65.00	65.00	6393.89	6393.89
Sec 4/5	#Sec 4/5:13	SpliceT	Ori	13.08	52.21	93.42	31904.82	31904.82	0.00	22.2	65.00	65.00	6393.89	6393.89
Sec 4/5	Sec 4/5:WVGD8	Sec 4/5:WVGD8	End	17.75	52.44	93.82	32318.85	32318.85	0.00	22.3	65.00	65.00	6449.39	6449.39
Sec 4/5	Sec 4/5:WVGD8	Sec 4/5:WVGD8	Ori	17.75	52.44	93.82	32318.85	32318.85	0.00	22.3	65.00	65.00	6449.39	6449.39
Sec 4/5	#Sec 4/5:14	SpliceB	End	20.00	53.09	95.00	33548.23	33548.23	0.00	22.6	65.00	65.00	6612.79	6612.79
Sec 4/5	#Sec 4/5:14	SpliceB	Ori	20.00	53.09	95.00	33548.23	33548.23	0.00	22.6	65.00	65.00	6612.79	6612.79
Sec 4/5	#Sec 4/5:15	Tube 2	End	23.87	54.21	97.02	35737.88	35737.88	0.00	23.1	65.00	65.00	6899.00	6899.00
Sec 4/5	#Sec 4/5:15	Tube 2	Ori	23.87	54.21	97.02	35737.88	35737.88	0.00	23.1	65.00	65.00	6899.00	6899.00
Sec 4/5	Sec 4/5:WVGD9	Sec 4/5:WVGD9	End	27.75	55.32	99.05	38020.80	38020.80	0.00	23.7	65.00	65.00	7191.28	7191.28
Sec 4/5	Sec 4/5:WVGD9	Sec 4/5:WVGD9	Ori	27.75	55.32	99.05	38020.80	38020.80	0.00	23.7	65.00	65.00	7191.28	7191.28
Sec 4/5	#Sec 4/5:16	Tube 2	End	32.17	56.60	101.35	40738.94	40738.94	0.00	24.3	65.00	65.00	7531.79	7531.79
Sec 4/5	#Sec 4/5:16	Tube 2	Ori	32.17	56.60	101.35	40738.94	40738.94	0.00	24.3	65.00	65.00	7531.79	7531.79
Sec 4/5	1P	1P	End	36.58	57.87	103.66	43583.65	43583.65	0.00	24.9	65.00	65.00	7880.18	7880.18
Sec 6	1P	1P	Ori	0.00	57.88	115.05	48269.03	48269.03	0.00	22.1	65.00	65.00	8727.33	8727.33

Sec 6	Sec 6:WVGD10	Sec 6:WVGD10	End	1.17	57.92	115.13	48371.80	48371.80	0.00	22.2	65.00	65.00	8739.77	8739.77
Sec 6	Sec 6:WVGD10	Sec 6:WVGD10	Ori	1.17	57.92	115.13	48371.80	48371.80	0.00	22.2	65.00	65.00	8739.77	8739.77
Sec 6	#Sec 6:17	Tube 1	End	6.17	58.09	115.48	48813.75	48813.75	0.00	22.2	65.00	65.00	8793.21	8793.21
Sec 6	#Sec 6:17	Tube 1	Ori	6.17	58.09	115.48	48813.75	48813.75	0.00	22.2	65.00	65.00	8793.21	8793.21
Sec 6	Sec 6:WVGD11	Sec 6:WVGD11	End	11.17	58.26	115.83	49258.39	49258.39	0.00	22.3	65.00	65.00	8846.82	8846.82
Sec 6	Sec 6:WVGD11	Sec 6:WVGD11	Ori	11.17	58.26	115.83	49258.40	49258.40	0.00	22.3	65.00	65.00	8846.82	8846.82
Sec 6	BaseP	BaseP	End	16.17	58.44	116.18	49705.73	49705.73	0.00	22.4	65.00	65.00	8900.58	8900.58

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density Override (lbs/ft^3)	Steel Shape At End
ARM A		8T	0.2813	9.5	5	0	1.3	29000	2 points	Calculated	0	0	0	0	65	0	
ARM B		8T	0.1875	9	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
ARM C		8T	0.3125	18.5	9	0	1.3	29000	2 points	Calculated	0	0	0	0	65	0	
ARM D		8T	0.2813	12.5	6	0	1.3	29000	2 points	Calculated	0	0	0	0	65	0	

Intermediate Joints for Davit Property "ARM A":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
Arc	8	-0.5833
End	10	-0.5833

Intermediate Joints for Davit Property "ARM B":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	5	-0.5833

Intermediate Joints for Davit Property "ARM C":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
Arc	12	-0.75
END	14	-0.75

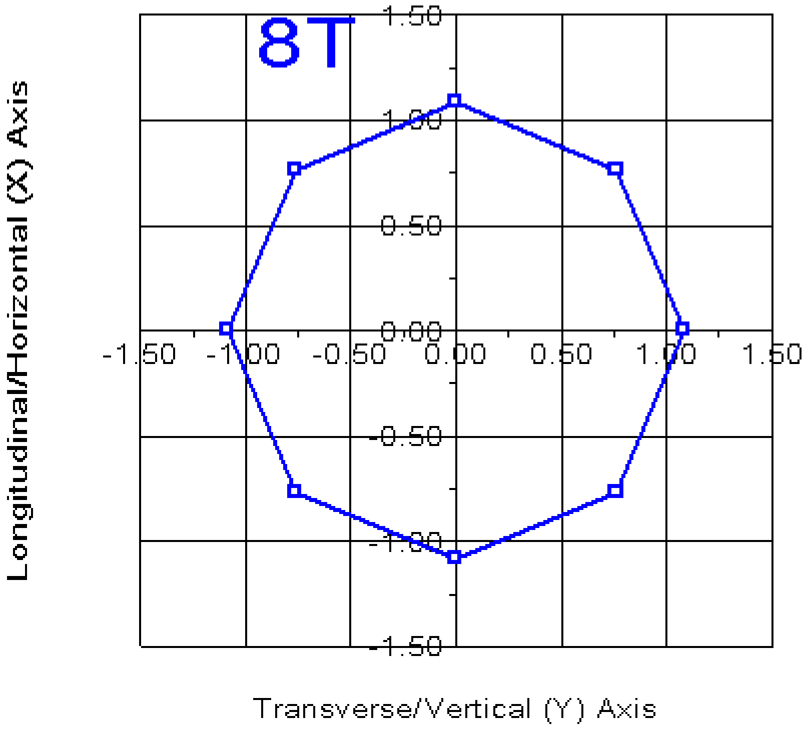
Intermediate Joints for Davit Property "ARM D":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
Arc	7	-0.75

END	9	-0.75

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	Sec 1:Arm1	ARM A	180
Davit2	Sec 1:Arm1	ARM B	0
Davit3	Sec 1:Arm2	ARM C	180
Davit4	Sec 1:Arm2	ARM D	0
Davit5	Sec 2/3:Arm3	ARM C	180
Davit6	Sec 2/3:Arm3	ARM D	0
Davit7	Sec 2/3:Arm4	ARM C	180
Davit8	Sec 2/3:Arm4	ARM D	0



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	9.50	8.59	96.58	96.58	0.00	9.8	65.00	65.00	101.75	101.75

Davit1	#Davit1:0	End	4.01	7.70	6.91	50.34	50.34	0.00	7.2	65.00	65.00	65.44	65.44
Davit1	#Davit1:0	Origin	4.01	7.70	6.91	50.34	50.34	0.00	7.2	65.00	65.00	65.44	65.44
Davit1	Davit1:Arc	End	8.02	5.90	5.23	21.88	21.88	0.00	4.5	65.00	65.00	37.12	37.12
Davit1	Davit1:Arc	Origin	8.02	5.90	5.23	21.88	21.88	0.00	4.5	65.00	65.00	37.12	37.12
Davit1	Davit1:End	End	10.02	5.00	4.40	12.98	12.98	0.00	3.2	65.00	65.00	25.99	25.99
Davit2	Davit2:O	Origin	0.00	9.00	5.48	56.22	56.22	0.00	15.7	65.00	65.00	62.52	62.52
Davit2	#Davit2:0	End	2.52	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit2	#Davit2:0	Origin	2.52	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit2	Davit2:End	End	5.03	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	18.50	18.83	823.52	823.52	0.00	20.4	65.00	65.00	445.53	445.53
Davit3	#Davit3:0	End	5.00	15.11	15.33	443.85	443.85	0.00	15.9	65.00	65.00	293.94	293.94
Davit3	#Davit3:0	Origin	5.00	15.11	15.33	443.85	443.85	0.00	15.9	65.00	65.00	293.94	293.94
Davit3	#Davit3:1	End	8.51	12.73	12.86	262.42	262.42	0.00	12.7	65.00	65.00	206.26	206.26
Davit3	#Davit3:1	Origin	8.51	12.73	12.86	262.42	262.42	0.00	12.7	65.00	65.00	206.26	206.26
Davit3	Davit3:Arc	End	12.02	10.35	10.40	138.72	138.72	0.00	9.6	65.00	65.00	134.09	134.09
Davit3	Davit3:Arc	Origin	12.02	10.35	10.40	138.72	138.72	0.00	9.6	65.00	65.00	134.09	134.09
Davit3	Davit3:END	End	14.02	9.00	9.00	89.84	89.84	0.00	7.8	65.00	65.00	99.91	99.91
Davit4	Davit4:O	Origin	0.00	12.50	11.39	224.79	224.79	0.00	14.3	65.00	65.00	179.99	179.99
Davit4	#Davit4:0	End	3.52	9.97	9.03	112.07	112.07	0.00	10.5	65.00	65.00	112.52	112.52
Davit4	#Davit4:0	Origin	3.52	9.97	9.03	112.07	112.07	0.00	10.5	65.00	65.00	112.52	112.52
Davit4	Davit4:Arc	End	7.04	7.44	6.67	45.21	45.21	0.00	6.8	65.00	65.00	60.84	60.84
Davit4	Davit4:Arc	Origin	7.04	7.44	6.67	45.21	45.21	0.00	6.8	65.00	65.00	60.84	60.84
Davit4	Davit4:END	End	9.04	6.00	5.33	23.09	23.09	0.00	4.7	65.00	65.00	38.51	38.51
Davit5	Davit5:O	Origin	0.00	18.50	18.83	823.52	823.52	0.00	20.4	65.00	65.00	445.53	445.53
Davit5	#Davit5:0	End	5.00	15.11	15.33	443.85	443.85	0.00	15.9	65.00	65.00	293.94	293.94
Davit5	#Davit5:0	Origin	5.00	15.11	15.33	443.85	443.85	0.00	15.9	65.00	65.00	293.94	293.94
Davit5	#Davit5:1	End	8.51	12.73	12.86	262.42	262.42	0.00	12.7	65.00	65.00	206.26	206.26
Davit5	#Davit5:1	Origin	8.51	12.73	12.86	262.42	262.42	0.00	12.7	65.00	65.00	206.26	206.26
Davit5	Davit5:Arc	End	12.02	10.35	10.40	138.72	138.72	0.00	9.6	65.00	65.00	134.09	134.09
Davit5	Davit5:Arc	Origin	12.02	10.35	10.40	138.72	138.72	0.00	9.6	65.00	65.00	134.09	134.09
Davit5	Davit5:END	End	14.02	9.00	9.00	89.84	89.84	0.00	7.8	65.00	65.00	99.91	99.91
Davit6	Davit6:O	Origin	0.00	12.50	11.39	224.79	224.79	0.00	14.3	65.00	65.00	179.99	179.99
Davit6	#Davit6:0	End	3.52	9.97	9.03	112.07	112.07	0.00	10.5	65.00	65.00	112.52	112.52
Davit6	#Davit6:0	Origin	3.52	9.97	9.03	112.07	112.07	0.00	10.5	65.00	65.00	112.52	112.52
Davit6	Davit6:Arc	End	7.04	7.44	6.67	45.21	45.21	0.00	6.8	65.00	65.00	60.84	60.84
Davit6	Davit6:Arc	Origin	7.04	7.44	6.67	45.21	45.21	0.00	6.8	65.00	65.00	60.84	60.84
Davit6	Davit6:END	End	9.04	6.00	5.33	23.09	23.09	0.00	4.7	65.00	65.00	38.51	38.51
Davit7	Davit7:O	Origin	0.00	18.50	18.83	823.52	823.52	0.00	20.4	65.00	65.00	445.53	445.53
Davit7	#Davit7:0	End	5.00	15.11	15.33	443.85	443.85	0.00	15.9	65.00	65.00	293.94	293.94
Davit7	#Davit7:0	Origin	5.00	15.11	15.33	443.85	443.85	0.00	15.9	65.00	65.00	293.94	293.94
Davit7	#Davit7:1	End	8.51	12.73	12.86	262.42	262.42	0.00	12.7	65.00	65.00	206.26	206.26
Davit7	#Davit7:1	Origin	8.51	12.73	12.86	262.42	262.42	0.00	12.7	65.00	65.00	206.26	206.26
Davit7	Davit7:Arc	End	12.02	10.35	10.40	138.72	138.72	0.00	9.6	65.00	65.00	134.09	134.09
Davit7	Davit7:Arc	Origin	12.02	10.35	10.40	138.72	138.72	0.00	9.6	65.00	65.00	134.09	134.09
Davit7	Davit7:END	End	14.02	9.00	9.00	89.84	89.84	0.00	7.8	65.00	65.00	99.91	99.91
Davit8	Davit8:O	Origin	0.00	12.50	11.39	224.79	224.79	0.00	14.3	65.00	65.00	179.99	179.99
Davit8	#Davit8:0	End	3.52	9.97	9.03	112.07	112.07	0.00	10.5	65.00	65.00	112.52	112.52
Davit8	#Davit8:0	Origin	3.52	9.97	9.03	112.07	112.07	0.00	10.5	65.00	65.00	112.52	112.52
Davit8	Davit8:Arc	End	7.04	7.44	6.67	45.21	45.21	0.00	6.8	65.00	65.00	60.84	60.84
Davit8	Davit8:Arc	Origin	7.04	7.44	6.67	45.21	45.21	0.00	6.8	65.00	65.00	60.84	60.84
Davit8	Davit8:END	End	9.04	6.00	5.33	23.09	23.09	0.00	4.7	65.00	65.00	38.51	38.51

*** Insulator Data

Clamp Properties:

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

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp1	Davit1:End	clamp	No Limit
Clamp2	Davit2:End	clamp	No Limit
Clamp3	Davit3:END	clamp	No Limit
Clamp4	Davit4:END	clamp	No Limit
Clamp5	Davit5:END	clamp	No Limit
Clamp6	Davit6:END	clamp	No Limit
Clamp7	Davit7:END	clamp	No Limit
Clamp8	Davit8:END	clamp	No Limit
Clamp9	Sec 1:TopConn	clamp	No Limit
Clamp10	Sec 1:BotConn	clamp	No Limit
Clamp13	Sec 2/3:WVGD1	clamp	No Limit
Clamp14	Sec 2/3:WVGD2	clamp	No Limit
Clamp15	Sec 2/3:WVGD3	clamp	No Limit
Clamp16	Sec 2/3:WVGD4	clamp	No Limit
Clamp17	Sec 2/3:WVGD5	clamp	No Limit
Clamp18	Sec 2/3:WVGD6	clamp	No Limit
Clamp19	Sec 4/5:WVGD7	clamp	No Limit
Clamp20	Sec 4/5:WVGD8	clamp	No Limit
Clamp21	Sec 4/5:WVGD9	clamp	No Limit
Clamp22	Sec 6:WVGD10	clamp	No Limit
Clamp23	Sec 6:WVGD11	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1809800.wi\01_ct11446a\structural\backup documentation\rev (3)\calcs\pls-pole\cl&p #20073.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)	148.00 (ft)	
Structure height	148.00 (ft)	
Structure height above ground	148.00 (ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	4	0	0.000	0.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	NESC 2012	31	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	1308	2686	-1027	
Davit2:End	1308	2686	-544	
Davit3:END	7929	10515	-1239	
Davit4:END	4821	5601	25	
Davit5:END	7929	10378	1632	
Davit6:END	4821	5873	-1958	
Davit7:END	7929	10690	847	
Davit8:END	4821	6537	-1847	
Sec 1:TopConn	0	3241	0	
Sec 1:BotConn	11279	-84	0	
Sec 2/3:WVGD1	1495	429	0	
Sec 2/3:WVGD2	1150	330	0	
Sec 2/3:WVGD3	1150	330	0	
Sec 2/3:WVGD4	1150	330	0	
Sec 2/3:WVGD5	1150	330	0	
Sec 2/3:WVGD6	1150	330	0	

Sec 4/5:WVGD7	1150	330	0	
Sec 4/5:WVGD8	1150	330	0	
Sec 4/5:WVGD9	1150	330	0	
Sec 6:WVGD10	1150	330	0	
Sec 6:WVGD11	1150	330	0	

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	446	1342	-405	
Davit2:End	449	1330	-140	
Davit3:END	3848	8161	-1112	
Davit4:END	2358	4551	-268	
Davit5:END	3861	8088	316	
Davit6:END	2374	4688	-1250	
Davit7:END	3907	8244	-104	
Davit8:END	2470	5009	-1258	
Sec 1:TopConn	0	13028	0	
Sec 1:BotConn	4740	-166	0	
Sec 2/3:WVGD1	406	1365	0	
Sec 2/3:WVGD2	312	1050	0	
Sec 2/3:WVGD3	312	1050	0	
Sec 2/3:WVGD4	312	1050	0	
Sec 2/3:WVGD5	312	1050	0	
Sec 2/3:WVGD6	312	1050	0	
Sec 4/5:WVGD7	312	1050	0	
Sec 4/5:WVGD8	312	1050	0	
Sec 4/5:WVGD9	312	1050	0	
Sec 6:WVGD10	312	1050	0	
Sec 6:WVGD11	312	1050	0	

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

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

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
Sec 1	4P	Sec 1:Arm1	148.00	147.42	147.71	11.443	9.81e+005	1.000	32.79	0.00	19.92	18.13	0.00	0.00	18.13	0.00
Sec 1	Sec 1:Arm1	Sec 1:TopConn	147.42	143.00	145.21	12.568	1.08e+006	1.000	32.79	0.00	167.12	151.77	0.00	0.00	151.77	0.00
Sec 1	Sec 1:TopConn		143.00	138.00	140.50	14.687	1.26e+006	1.000	32.79	0.00	221.66	200.64	0.00	0.00	200.64	0.00
Sec 1			138.00	133.00	135.50	16.938	1.45e+006	1.000	32.79	0.00	256.28	231.38	0.00	0.00	231.38	0.00
Sec 1			133.00	129.13	131.06	18.934	1.62e+006	1.000	32.79	0.00	222.42	200.46	0.00	0.00	200.46	0.00

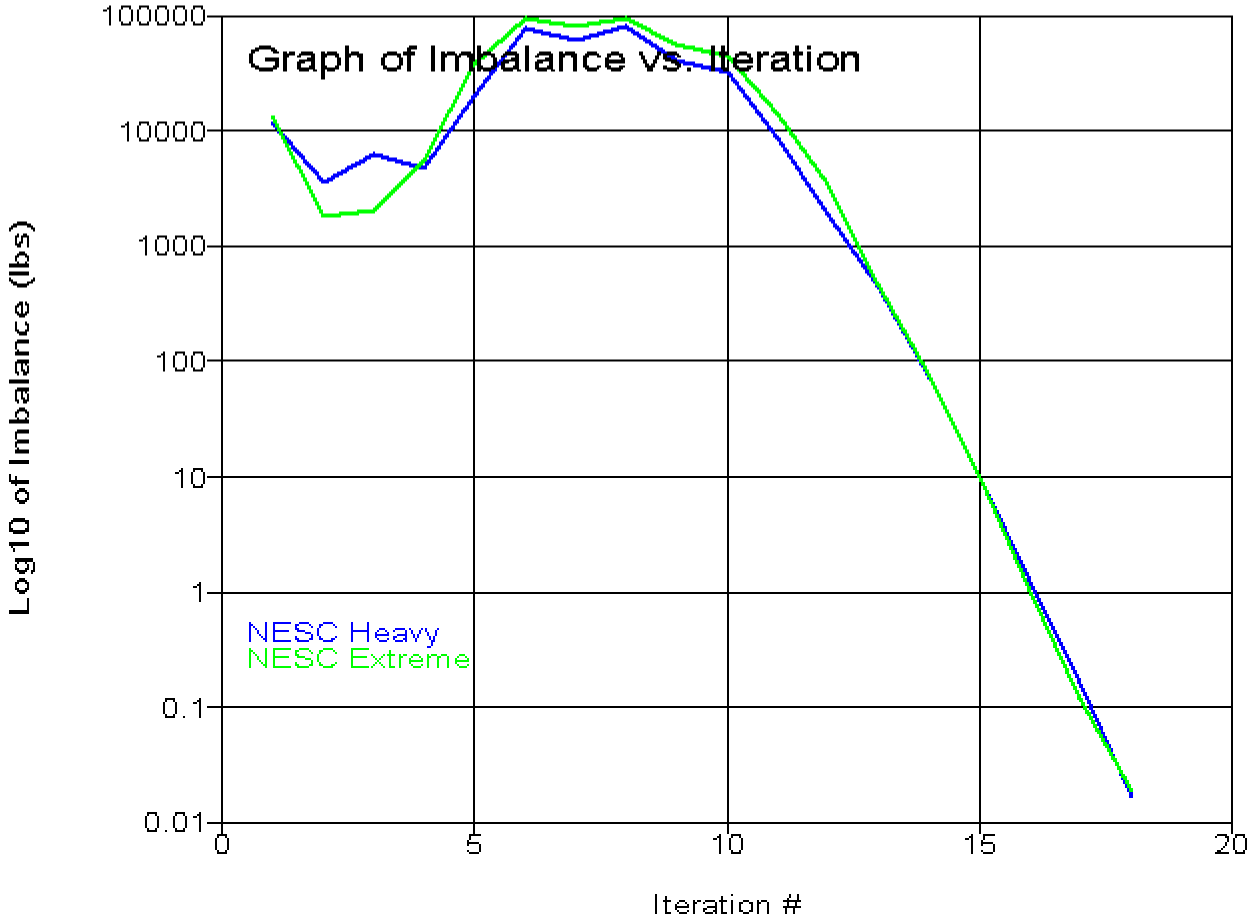
Sec 1		Sec 1:Arm2	129.13	125.25	127.19	20.678	1.77e+006	1.000	32.79	0.00	243.22	218.92	0.00	0.00	218.92	0.00
Sec 1	Sec 1:Arm2		125.25	120.25	122.75	22.675	1.94e+006	1.000	32.79	0.00	344.55	309.76	0.00	0.00	309.76	0.00
Sec 1			120.25	116.63	118.44	24.616	2.11e+006	1.000	32.79	0.00	271.45	243.80	0.00	0.00	243.80	0.00
Sec 1		Sec 1:BotConn	116.63	113.00	114.81	26.247	2.25e+006	1.000	32.79	0.00	289.65	259.95	0.00	0.00	259.95	0.00
Sec 1	Sec 1:BotConn	3P	113.00	108.00	110.50	28.187	2.42e+006	1.000	32.79	0.00	429.37	385.07	0.00	0.00	385.07	0.00
Sec 2/3	3P	Sec 2/3:WVGD1	108.00	105.00	106.50	29.850	2.56e+006	1.000	32.79	0.00	332.93	244.67	0.00	0.00	244.67	0.00
Sec 2/3	Sec 2/3:WVGD1	Sec 2/3:Arm3	105.00	103.25	104.13	30.702	2.63e+006	1.000	32.79	0.00	199.81	146.80	0.00	0.00	146.80	0.00
Sec 2/3	Sec 2/3:Arm3		103.25	99.13	101.19	31.755	2.72e+006	1.000	32.79	0.00	487.33	357.89	0.00	0.00	357.89	0.00
Sec 2/3		Sec 2/3:WVGD2	99.13	95.00	97.06	33.235	2.85e+006	1.000	32.79	0.00	510.28	374.56	0.00	0.00	374.56	0.00
Sec 2/3	Sec 2/3:WVGD2		95.00	92.75	93.88	34.378	2.95e+006	1.000	32.79	0.00	288.01	211.33	0.00	0.00	211.33	0.00
Sec 2/3			92.75	88.00	90.38	35.289	3.03e+006	1.000	32.79	0.00	1470.33	457.98	0.00	0.00	457.98	0.00
Sec 2/3		Sec 2/3:WVGD3	88.00	85.00	86.50	36.335	3.11e+006	1.000	32.79	0.00	551.96	297.82	0.00	0.00	297.82	0.00
Sec 2/3	Sec 2/3:WVGD3	Sec 2/3:Arm4	85.00	81.25	83.13	37.545	3.22e+006	1.000	32.79	0.00	713.08	384.68	0.00	0.00	384.68	0.00
Sec 2/3	Sec 2/3:Arm4		81.25	78.13	79.69	38.778	3.32e+006	1.000	32.79	0.00	613.99	331.09	0.00	0.00	331.09	0.00
Sec 2/3		Sec 2/3:WVGD4	78.13	75.00	76.56	39.898	3.42e+006	1.000	32.79	0.00	631.95	340.66	0.00	0.00	340.66	0.00
Sec 2/3	Sec 2/3:WVGD4		75.00	70.00	72.50	41.355	3.55e+006	1.000	32.79	0.00	1048.47	564.95	0.00	0.00	564.95	0.00
Sec 2/3		Sec 2/3:WVGD5	70.00	65.00	67.50	43.148	3.7e+006	1.000	32.79	0.00	1094.45	589.44	0.00	0.00	589.44	0.00
Sec 2/3	Sec 2/3:WVGD5		65.00	60.00	62.50	44.941	3.85e+006	1.000	32.79	0.00	1140.43	613.94	0.00	0.00	613.94	0.00
Sec 2/3		Sec 2/3:WVGD6	60.00	55.00	57.50	46.734	4.01e+006	1.000	32.79	0.00	1186.41	638.43	0.00	0.00	638.43	0.00
Sec 2/3	Sec 2/3:WVGD6	2P	55.00	52.75	53.88	48.034	4.12e+006	1.000	32.79	0.00	548.88	295.29	0.00	0.00	295.29	0.00
Sec 4/5	2P		52.75	48.87	50.81	48.997	4.2e+006	1.000	32.79	0.00	1155.09	518.74	0.00	0.00	518.74	0.00
Sec 4/5		Sec 4/5:WVGD7	48.87	45.00	46.94	50.116	4.3e+006	1.000	32.79	0.00	1181.77	530.59	0.00	0.00	530.59	0.00
Sec 4/5	Sec 4/5:WVGD7		45.00	42.33	43.67	51.060	4.38e+006	1.000	32.79	0.00	828.71	371.99	0.00	0.00	371.99	0.00
Sec 4/5			42.33	39.67	41.00	51.830	4.44e+006	1.000	32.79	0.00	841.34	377.60	0.00	0.00	377.60	0.00
Sec 4/5		Sec 4/5:WVGD8	39.67	35.00	37.33	52.326	4.49e+006	1.000	32.79	0.00	2973.60	667.22	0.00	0.00	667.22	0.00
Sec 4/5	Sec 4/5:WVGD8		35.00	32.75	33.88	52.762	4.52e+006	1.000	32.79	0.00	1461.25	324.35	0.00	0.00	324.35	0.00
Sec 4/5			32.75	28.88	30.81	53.646	4.6e+006	1.000	32.79	0.00	1266.20	567.97	0.00	0.00	567.97	0.00
Sec 4/5		Sec 4/5:WVGD9	28.88	25.00	26.94	54.765	4.69e+006	1.000	32.79	0.00	1292.65	579.81	0.00	0.00	579.81	0.00
Sec 4/5	Sec 4/5:WVGD9		25.00	20.58	22.79	55.962	4.8e+006	1.000	32.79	0.00	1505.83	675.28	0.00	0.00	675.28	0.00
Sec 4/5		1P	20.58	16.17	18.38	57.237	4.91e+006	1.000	32.79	0.00	1540.49	690.67	0.00	0.00	690.67	

0.00

Sec 6	1P	Sec 6:WVGD10	16.17	15.00	15.58	57.895	4.96e+006	1.000	32.79	0.00	457.03	184.60	0.00	0.00	184.60	0.00
Sec 6	Sec 6:WVGD10		15.00	10.00	12.50	58.003	4.97e+006	1.000	32.79	0.00	1961.82	792.37	0.00	0.00	792.37	0.00
Sec 6		Sec 6:WVGD11	10.00	5.00	7.50	58.177	4.99e+006	1.000	32.79	0.00	1967.77	794.74	0.00	0.00	794.74	0.00
Sec 6	Sec 6:WVGD11	BaseP	5.00	0.00	2.50	58.351	5e+006	1.000	32.79	0.00	1973.72	797.12	0.00	0.00	797.12	0.00

*** Analysis Results:

Maximum element usage is 90.03% for Steel Pole "Sec 6" in load case "NESC Extreme"
Maximum insulator usage is 16.67% for Clamp "Clamp7" in load case "NESC Heavy"



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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
BaseP	0	0	0	0.0000	0.0000	0.0000	0	0	0
1P	-0.006562	0.09035	-0.0008782	-0.6195	-0.0453	0.0061	-0.006562	0.09035	16.17
2P	-0.07264	0.9609	-0.01357	-2.0949	-0.1618	0.0267	-0.07264	0.9609	52.74

3P	-0.3613	4.278	-0.1214	-4.8283	-0.4599	0.0771	-0.3613	4.278	107.9
4P	-0.7869	8.376	-0.3366	-6.6147	-0.8290	-0.1602	-0.7869	8.376	147.7
Sec 1:Arm1	-0.7787	8.309	-0.3327	-6.6147	-0.8290	-0.1602	-0.7787	8.309	147.1
Sec 1:TopConn	-0.7251	7.8	-0.3029	-6.5588	-0.8033	-0.1021	-0.7251	7.8	142.7
Sec 1:Arm2	-0.5167	5.884	-0.1977	-5.7576	-0.6250	-0.0158	-0.5167	5.884	125.1
Sec 1:BotConn	-0.4024	4.714	-0.1408	-5.1307	-0.5058	0.0584	-0.4024	4.714	112.9
Sec 2/3:WVGD1	-0.338	4.03	-0.1109	-4.6756	-0.4380	0.0849	-0.338	4.03	104.9
Sec 2/3:Arm3	-0.3249	3.888	-0.1051	-4.5852	-0.4253	0.0890	-0.3249	3.888	103.1
Sec 2/3:WVGD2	-0.2661	3.258	-0.08035	-4.1496	-0.3667	0.0761	-0.2661	3.258	94.92
Sec 2/3:WVGD3	-0.2061	2.579	-0.05672	-3.6368	-0.3080	0.0660	-0.2061	2.579	84.94
Sec 2/3:Arm4	-0.1862	2.347	-0.04933	-3.4603	-0.2894	0.0633	-0.1862	2.347	81.2
Sec 2/3:WVGD4	-0.1555	1.985	-0.0385	-3.1684	-0.2593	0.0527	-0.1555	1.985	74.96
Sec 2/3:WVGD5	-0.1133	1.473	-0.02487	-2.6848	-0.2135	0.0392	-0.1133	1.473	64.98
Sec 2/3:WVGD6	-0.07926	1.045	-0.01526	-2.2020	-0.1709	0.0287	-0.07926	1.045	54.98
Sec 4/5:WVGD7	-0.05226	0.6978	-0.008819	-1.7867	-0.1362	0.0213	-0.05226	0.6978	44.99
Sec 4/5:WVGD8	-0.03111	0.4201	-0.004586	-1.3855	-0.1040	0.0154	-0.03111	0.4201	35
Sec 4/5:WVGD9	-0.01566	0.2137	-0.002071	-0.9731	-0.0720	0.0101	-0.01566	0.2137	25
Sec 6:WVGD10	-0.005666	0.0781	-0.0007756	-0.5777	-0.0422	0.0056	-0.005666	0.0781	15
Sec 6:WVGD11	-0.0006524	0.009106	-0.0001852	-0.2009	-0.0145	0.0019	-0.0006524	0.009106	5
Davit1:O	-0.7809	8.312	-0.2752	-6.6147	-0.8290	-0.1602	-0.7809	7.813	147.1
Davit1:Arc	-0.8441	8.43	0.6239	-6.3725	-0.8702	-0.4200	-0.8441	-0.06969	148.6
Davit1:End	-0.863	8.442	0.8448	-6.3389	-0.8743	-0.4542	-0.863	-2.057	148.8
Davit2:O	-0.7765	8.306	-0.3902	-6.6147	-0.8290	-0.1602	-0.7765	8.805	147
Davit2:End	-0.7657	8.34	-0.9781	-6.7713	-0.8286	-0.0959	-0.7657	13.84	147
Davit3:O	-0.5179	5.888	-0.1044	-5.7576	-0.6250	-0.0158	-0.5179	4.959	125.1
Davit3:Arc	-0.551	6.017	1.049	-5.3240	-0.6371	-0.0975	-0.551	-6.912	127
Davit3:END	-0.5566	6.026	1.233	-5.2892	-0.6378	-0.1038	-0.5566	-8.904	127.2
Davit4:O	-0.5154	5.879	-0.291	-5.7576	-0.6250	-0.0158	-0.5154	6.809	125
Davit4:Arc	-0.5135	5.919	-1.025	-6.1836	-0.6247	-0.0176	-0.5135	13.85	125
Davit4:END	-0.5105	5.908	-1.242	-6.2538	-0.6246	-0.0179	-0.5105	15.84	124.8
Davit5:O	-0.3236	3.892	0.001903	-4.5852	-0.4253	0.0890	-0.3236	2.555	103.3
Davit5:Arc	-0.3057	3.984	0.9106	-4.1351	-0.4124	0.1959	-0.3057	-9.354	104.9
Davit5:END	-0.2997	3.99	1.054	-4.0992	-0.4117	0.2042	-0.2997	-11.35	105.1
Davit6:O	-0.3261	3.884	-0.212	-4.5852	-0.4253	0.0890	-0.3261	5.222	103
Davit6:Arc	-0.3498	3.922	-0.8026	-5.0213	-0.4206	0.2659	-0.3498	12.26	103.2
Davit6:END	-0.3586	3.914	-0.9796	-5.0931	-0.4181	0.2980	-0.3586	14.25	103
Davit7:O	-0.1849	2.35	0.05017	-3.4603	-0.2894	0.0633	-0.1849	0.7015	81.3
Davit7:Arc	-0.1728	2.412	0.7234	-2.9976	-0.2837	0.1191	-0.1728	-11.24	82.72
Davit7:END	-0.169	2.414	0.827	-2.9607	-0.2834	0.1234	-0.169	-13.23	82.83
Davit8:O	-0.1875	2.344	-0.1488	-3.4603	-0.2894	0.0633	-0.1875	3.993	81.1
Davit8:Arc	-0.2076	2.378	-0.602	-3.9066	-0.2882	0.2300	-0.2076	11.03	81.4
Davit8:END	-0.2157	2.373	-0.7401	-3.9797	-0.2864	0.2602	-0.2157	13.02	81.26

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
BaseP	3.90	0.0	-69.60	0.0	0.0	-125.37	0.0	0.0	143.45	0.0	7161.04	0.0	514.2	0.0	0.0	-49.85	0.0	0.0

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.

Sec 1	4P	Origin	0.00	100.51	-9.44	-4.04	0.00	-0.00	0.0	-0.01	0.01	0.00	-0.00	0.00	0.00	0.00	0.00	0.04
Sec 1	Sec 1:Arm1	End	0.58	99.71	-9.34	-3.99	0.00	0.00	0.0	-0.01	0.01	0.00	-0.00	0.00	0.00	0.00	0.00	0.02
Sec 1	Sec 1:Arm1	Origin	0.58	99.71	-9.34	-3.99	-3.00	0.95	-8.0	-2.55	5.74	1.63	-0.25	0.41	1.15	1.73	5.03	7.74
Sec 1	Sec 1:TopConn	End	5.00	93.60	-8.70	-3.64	22.40	8.12	-8.0	-2.55	5.74	1.63	-0.21	7.29	0.55	1.25	8.12	12.52
Sec 1	Sec 1:TopConn	Origin	5.00	93.60	-8.70	-3.64	22.40	8.13	-8.0	-2.49	9.08	1.63	-0.21	7.29	0.82	1.24	8.30	12.82
Sec 1	Tube 1	End	10.00	86.81	-7.96	-3.25	67.81	16.22	-8.0	-2.49	9.08	1.63	-0.18	15.36	0.24	0.91	15.66	24.11
Sec 1	Tube 1	Origin	10.00	86.81	-7.96	-3.25	67.81	16.25	-8.0	-2.88	9.21	1.62	-0.20	15.35	0.24	0.90	15.68	24.11
Sec 1	Tube 1	End	15.00	80.26	-7.24	-2.88	113.89	24.31	-8.0	-2.88	9.21	1.62	-0.18	19.63	0.21	0.69	19.87	30.61
Sec 1	Tube 1	Origin	15.00	80.26	-7.24	-2.88	113.89	24.33	-7.9	-3.27	9.35	1.62	-0.20	19.63	0.20	0.68	19.90	30.61
Sec 1	Tube 1	End	18.88	75.35	-6.71	-2.62	150.11	30.56	-7.9	-3.27	9.35	1.62	-0.19	21.43	0.19	0.57	21.66	33.31
Sec 1	Tube 1	Origin	18.88	75.35	-6.71	-2.62	150.10	30.58	-7.9	-3.65	9.47	1.61	-0.21	21.43	0.19	0.57	21.68	33.31
Sec 1	Sec 1:Arm2	End	22.75	70.61	-6.20	-2.37	186.81	36.80	-7.9	-3.65	9.47	1.61	-0.19	22.45	0.17	0.48	22.67	34.91
Sec 1	Sec 1:Arm2	Origin	22.75	70.61	-6.20	-2.37	133.89	37.87	-27.7	-16.57	27.06	2.97	-0.86	16.21	1.47	1.66	17.91	27.62
Sec 1	Tube 1	End	27.75	64.68	-5.61	-2.07	269.24	52.52	-27.7	-16.57	27.06	2.97	-0.78	26.43	0.28	1.36	27.36	42.11
Sec 1	Tube 1	Origin	27.75	64.68	-5.61	-2.07	269.23	52.61	-27.6	-17.14	27.18	2.94	-0.81	26.43	0.28	1.36	27.38	42.11
Sec 1	Tube 1	End	31.37	60.54	-5.21	-1.87	367.78	63.12	-27.6	-17.14	27.18	2.94	-0.75	31.55	0.26	1.18	32.40	49.81
Sec 1	Tube 1	Origin	31.37	60.54	-5.21	-1.87	367.77	63.21	-27.6	-17.66	27.28	2.92	-0.78	31.55	0.26	1.18	32.42	49.91
Sec 1	Sec 1:BotConn	End	35.00	56.56	-4.83	-1.69	466.68	73.65	-27.6	-17.66	27.28	2.92	-0.73	35.28	0.24	1.04	36.08	55.51
Sec 1	Sec 1:BotConn	Origin	35.00	56.56	-4.83	-1.69	466.67	73.75	-27.5	-29.56	28.30	2.99	-1.22	35.28	0.25	1.04	36.57	56.31
Sec 1	3P	End	40.00	51.34	-4.34	-1.46	608.21	88.50	-27.5	-29.56	28.30	2.99	-1.13	39.10	0.23	0.88	40.27	62.01
Sec 2/3	3P	Origin	0.00	51.34	-4.34	-1.46	608.20	88.60	-27.4	-30.25	28.38	2.97	-0.94	32.20	0.19	0.73	33.18	51.01
Sec 2/3	Sec 2/3:WVGD1	End	3.00	48.36	-4.06	-1.33	693.37	97.40	-27.4	-30.25	28.38	2.97	-0.91	34.11	0.18	0.67	35.05	53.91
Sec 2/3	Sec 2/3:WVGD1	Origin	3.00	48.36	-4.06	-1.33	693.36	97.45	-27.4	-32.16	28.99	2.97	-0.97	34.11	0.18	0.67	35.11	54.01
Sec 2/3	Sec 2/3:Arm3	End	4.75	46.66	-3.90	-1.26	744.11	102.58	-27.4	-32.16	28.99	2.97	-0.95	35.11	0.18	0.65	36.09	55.51
Sec 2/3	Sec 2/3:Arm3	Origin	4.75	46.66	-3.90	-1.26	686.61	102.84	17.7	-45.56	46.38	3.36	-1.34	32.40	0.20	0.42	33.76	51.91
Sec 2/3	Tube 1	End	8.87	42.78	-3.53	-1.11	877.93	116.81	17.7	-45.56	46.38	3.36	-1.28	37.69	0.19	0.38	38.98	60.01
Sec 2/3	Tube 1	Origin	8.87	42.78	-3.53	-1.11	877.94	116.72	17.7	-46.48	46.44	3.34	-1.31	37.69	0.19	0.38	39.01	60.01
Sec 2/3	Sec 2/3:WVGD2	End	13.00	39.10	-3.19	-0.96	1069.50	130.61	17.7	-46.48	46.44	3.34	-1.25	41.94	0.18	0.35	43.20	66.51

Sec 2/3	Sec 2/3:WVGD2	Origin	13.00	39.10	-3.19	-0.96	1069.51	130.53	17.7	-48.35	46.89	3.33	-1.30	41.94	0.18	0.35	43.25	66.5	1
Sec 2/3	SpliceT	End	15.25	37.17	-3.02	-0.89	1175.01	138.09	17.7	-48.35	46.89	3.33	-1.27	43.93	0.18	0.33	45.21	69.6	1
Sec 2/3	SpliceT	Origin	15.25	37.17	-3.02	-0.89	1175.02	138.01	17.6	-49.82	46.99	3.32	-1.31	43.93	0.18	0.33	45.25	69.6	1
Sec 2/3	SpliceB	End	20.00	33.28	-2.68	-0.76	1398.19	153.88	17.6	-49.82	46.99	3.32	-0.94	36.55	0.13	0.23	37.49	57.7	1
Sec 2/3	SpliceB	Origin	20.00	33.28	-2.68	-0.76	1398.20	153.79	17.6	-51.50	47.10	3.31	-0.97	36.55	0.13	0.23	37.52	57.7	1
Sec 2/3	Sec 2/3:WVGD3	End	23.00	30.95	-2.47	-0.68	1539.50	163.76	17.6	-51.50	47.10	3.31	-0.94	37.88	0.12	0.22	38.82	59.7	1
Sec 2/3	Sec 2/3:WVGD3	Origin	23.00	30.95	-2.47	-0.68	1539.50	163.69	17.6	-53.70	47.58	3.30	-0.98	37.88	0.12	0.22	38.86	59.8	1
Sec 2/3	Sec 2/3:Arm4	End	26.75	28.16	-2.23	-0.59	1717.93	176.13	17.6	-53.70	47.58	3.30	-0.94	39.30	0.12	0.20	40.24	61.9	1
Sec 2/3	Sec 2/3:Arm4	Origin	26.75	28.16	-2.23	-0.59	1657.85	176.79	50.2	-67.91	65.70	4.34	-1.19	37.92	0.15	0.57	39.14	60.2	1
Sec 2/3	Tube 2	End	29.87	25.94	-2.04	-0.52	1863.14	190.51	50.2	-67.91	65.70	4.34	-1.16	40.18	0.15	0.54	41.36	63.6	1
Sec 2/3	Tube 2	Origin	29.87	25.94	-2.04	-0.52	1863.16	190.36	50.2	-69.01	65.74	4.32	-1.18	40.18	0.15	0.54	41.38	63.7	1
Sec 2/3	Sec 2/3:WVGD4	End	33.00	23.82	-1.87	-0.46	2068.59	204.04	50.2	-69.01	65.74	4.32	-1.14	42.13	0.15	0.51	43.29	66.6	1
Sec 2/3	Sec 2/3:WVGD4	Origin	33.00	23.82	-1.87	-0.46	2068.61	203.84	50.2	-71.62	66.19	4.31	-1.19	42.13	0.15	0.51	43.34	66.7	1
Sec 2/3	Tube 2	End	38.00	20.62	-1.60	-0.37	2399.52	225.66	50.2	-71.62	66.19	4.31	-1.14	44.75	0.14	0.47	45.90	70.6	1
Sec 2/3	Tube 2	Origin	38.00	20.62	-1.60	-0.37	2399.54	225.41	50.1	-73.51	66.25	4.28	-1.17	44.75	0.14	0.47	45.93	70.7	1
Sec 2/3	Sec 2/3:WVGD5	End	43.00	17.67	-1.36	-0.30	2730.73	247.11	50.1	-73.51	66.25	4.28	-1.12	46.80	0.13	0.43	47.93	73.7	1
Sec 2/3	Sec 2/3:WVGD5	Origin	43.00	17.67	-1.36	-0.30	2730.75	246.86	50.1	-76.60	66.68	4.26	-1.17	46.80	0.13	0.43	47.98	73.8	1
Sec 2/3	Tube 2	End	48.00	14.98	-1.14	-0.24	3064.13	268.45	50.1	-76.60	66.68	4.26	-1.12	48.42	0.13	0.40	49.55	76.2	1
Sec 2/3	Tube 2	Origin	48.00	14.98	-1.14	-0.24	3064.15	268.19	50.0	-78.62	66.73	4.23	-1.15	48.42	0.13	0.40	49.58	76.3	1
Sec 2/3	Sec 2/3:WVGD6	End	53.00	12.55	-0.95	-0.18	3397.78	289.65	50.0	-78.62	66.73	4.23	-1.11	49.67	0.12	0.37	50.79	78.1	1
Sec 2/3	Sec 2/3:WVGD6	Origin	53.00	12.55	-0.95	-0.18	3397.80	289.46	50.0	-81.27	67.14	4.22	-1.14	49.67	0.12	0.37	50.82	78.2	1
Sec 2/3	2P	End	55.25	11.53	-0.87	-0.16	3548.85	299.08	50.0	-81.27	67.14	4.22	-1.12	50.14	0.12	0.35	51.27	78.9	1
Sec 4/5	2P	Origin	0.00	11.53	-0.87	-0.16	3548.86	298.94	50.0	-82.70	67.20	4.20	-0.96	42.03	0.10	0.30	42.99	66.1	1
Sec 4/5	Tube 1	End	3.88	9.89	-0.74	-0.13	3809.24	315.41	50.0	-82.70	67.20	4.20	-0.93	43.07	0.10	0.28	44.00	67.7	1
Sec 4/5	Tube 1	Origin	3.88	9.89	-0.74	-0.13	3809.25	315.25	50.0	-84.63	67.29	4.18	-0.96	43.07	0.10	0.28	44.03	67.7	1
Sec 4/5	Sec 4/5:WVGD7	End	7.75	8.37	-0.63	-0.11	4069.97	331.64	50.0	-84.63	67.29	4.18	-0.93	43.97	0.09	0.27	44.91	69.1	1
Sec 4/5	Sec 4/5:WVGD7	Origin	7.75	8.37	-0.63	-0.11	4069.99	331.50	49.9	-87.43	67.73	4.17	-0.96	43.97	0.09	0.27	44.94	69.1	1
Sec 4/5	Tube 1	End	10.42	7.40	-0.55	-0.09	4250.56	342.74	49.9	-87.43	67.73	4.17	-0.95	44.54	0.09	0.26	45.49	70.0	1
Sec 4/5	Tube 1	Origin	10.42	7.40	-0.55	-0.09	4250.57	342.63	49.9	-88.81	67.78	4.16	-0.97	44.54	0.09	0.26	45.50	70.0	1

Sec 4/5	SpliceT	End	13.08	6.49	-0.48	-0.08	4431.30	353.84	49.9	-88.81	67.78	4.16	-0.95	45.05	0.09	0.25	46.00	70.8	1
Sec 4/5	SpliceT	Origin	13.08	6.49	-0.48	-0.08	4431.31	353.69	49.9	-91.85	67.88	4.14	-0.98	45.05	0.09	0.25	46.04	70.8	1
Sec 4/5	Sec 4/5:WVGD8	End	17.75	5.04	-0.37	-0.06	4748.10	373.23	49.9	-91.85	67.88	4.14	-0.98	47.85	0.09	0.25	48.84	75.1	1
Sec 4/5	Sec 4/5:WVGD8	Origin	17.75	5.04	-0.37	-0.06	4748.11	373.08	49.9	-96.48	68.33	4.12	-1.03	47.85	0.09	0.25	48.89	75.2	1
Sec 4/5	SpliceB	End	20.00	4.41	-0.33	-0.05	4901.85	382.47	49.9	-96.48	68.33	4.12	-1.02	48.18	0.09	0.25	49.20	75.7	1
Sec 4/5	SpliceB	Origin	20.00	4.41	-0.33	-0.05	4901.86	382.34	49.9	-98.68	68.38	4.11	-1.04	48.18	0.09	0.25	49.22	75.7	1
Sec 4/5	Tube 2	End	23.87	3.42	-0.25	-0.03	5166.80	398.44	49.9	-98.68	68.38	4.11	-1.02	48.68	0.09	0.24	49.70	76.5	1
Sec 4/5	Tube 2	Origin	23.87	3.42	-0.25	-0.03	5166.82	398.28	49.9	-100.79	68.42	4.08	-1.04	48.68	0.09	0.23	49.72	76.5	1
Sec 4/5	Sec 4/5:WVGD9	End	27.75	2.56	-0.19	-0.02	5431.92	414.28	49.9	-100.79	68.42	4.08	-1.02	49.10	0.08	0.23	50.12	77.1	1
Sec 4/5	Sec 4/5:WVGD9	Origin	27.75	2.56	-0.19	-0.02	5431.93	414.12	49.9	-104.24	68.81	4.06	-1.05	49.10	0.08	0.23	50.15	77.2	1
Sec 4/5	Tube 2	End	32.17	1.74	-0.13	-0.02	5735.81	432.24	49.9	-104.24	68.81	4.06	-1.03	49.50	0.08	0.22	50.53	77.7	1
Sec 4/5	Tube 2	Origin	32.17	1.74	-0.13	-0.02	5735.82	432.07	49.9	-106.73	68.85	4.03	-1.05	49.50	0.08	0.22	50.56	77.8	1
Sec 4/5	1P	End	36.58	1.08	-0.08	-0.01	6039.87	450.07	49.9	-106.73	68.85	4.03	-1.03	49.82	0.08	0.21	50.85	78.2	1
Sec 6	1P	Origin	0.00	1.08	-0.08	-0.01	6039.87	449.96	49.9	-108.36	68.87	4.01	-0.94	44.98	0.07	0.19	45.93	70.7	1
Sec 6	Sec 6:WVGD10	End	1.17	0.94	-0.07	-0.01	6120.24	454.69	49.9	-108.36	68.87	4.01	-0.94	45.52	0.07	0.19	46.46	71.5	1
Sec 6	Sec 6:WVGD10	Origin	1.17	0.94	-0.07	-0.01	6120.25	454.59	49.9	-111.46	69.26	3.99	-0.97	45.52	0.07	0.19	46.49	71.5	1
Sec 6	Tube 1	End	6.17	0.42	-0.03	-0.01	6466.50	474.76	49.9	-111.46	69.26	3.99	-0.97	47.80	0.07	0.18	48.77	75.0	1
Sec 6	Tube 1	Origin	6.17	0.42	-0.03	-0.01	6466.51	474.58	49.9	-114.64	69.29	3.96	-0.99	47.80	0.07	0.18	48.80	75.1	1
Sec 6	Sec 6:WVGD11	End	11.17	0.11	-0.01	-0.00	6812.94	494.59	49.9	-114.64	69.29	3.96	-0.99	50.06	0.07	0.18	51.05	78.5	1
Sec 6	Sec 6:WVGD11	Origin	11.17	0.11	-0.01	-0.00	6812.95	494.42	49.8	-118.98	69.62	3.92	-1.03	50.06	0.07	0.18	51.09	78.6	1
Sec 6	BaseP	End	16.17	0.00	0.00	0.00	7161.04	514.26	49.8	-118.98	69.62	3.92	-1.02	52.30	0.07	0.18	53.32	82.0	1

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	99.75	-9.37	-3.30	-9.67	-10.65	-0.2	-2.92	1.02	1.06	-0.34	9.18	0.25	0.05	9.53	14.7	2
Davit1	#Davit1:0	End	4.01	100.46	-9.69	2.14	-5.59	-6.40	-0.2	-2.92	1.02	1.06	-0.42	8.42	0.32	0.08	8.87	13.6	2
Davit1	#Davit1:0	Origin	4.01	100.46	-9.69	2.14	-5.59	-6.40	-0.2	-2.89	0.89	1.06	-0.42	8.42	0.30	0.08	8.86	13.6	2
Davit1	Davit1:Arc	End	8.02	101.15	-10.13	7.49	-2.03	-2.13	-0.2	-2.89	0.89	1.06	-0.55	5.15	0.40	0.14	5.77	8.9	2
Davit1	Davit1:Arc	Origin	8.02	101.15	-10.13	7.49	-2.03	-2.14	-0.0	-2.81	1.01	1.07	-0.54	5.15	0.42	0.00	5.74	8.8	2
Davit1	Davit1:End	End	10.02	101.30	-10.36	10.14	-0.00	-0.00	-0.0	-2.81	1.01	1.07	-0.64	0.00	0.51	0.00	1.09	1.7	2
Davit2	Davit2:O	Origin	0.00	99.67	-9.32	-4.68	-6.78	2.87	0.0	2.68	1.38	-0.57	0.49	7.10	0.40	0.00	7.62	11.7	2

Davit2	#Davit2:0	End	2.52	99.87	-9.24	-8.19	-3.32	1.43	0.0	2.68	1.38	-0.57	0.63	5.88	0.52	0.00	6.57	10.1	2
Davit2	#Davit2:0	Origin	2.52	99.87	-9.24	-8.19	-3.32	1.43	-0.0	2.69	1.32	-0.57	0.63	5.88	0.50	0.00	6.57	10.1	2
Davit2	Davit2:End	End	5.03	100.07	-9.19	-11.74	0.00	-0.00	-0.0	2.69	1.32	-0.57	0.90	0.00	0.92	0.00	1.83	2.8	3
Davit3	Davit3:O	Origin	0.00	70.66	-6.22	-1.25	-93.89	-18.80	-0.2	-11.77	6.89	1.34	-0.63	13.70	0.15	0.01	14.33	22.0	1
Davit3	#Davit3:0	End	5.00	71.32	-6.36	4.64	-59.45	-12.11	-0.2	-11.77	6.89	1.34	-0.77	13.15	0.18	0.02	13.92	21.4	1
Davit3	#Davit3:0	Origin	5.00	71.32	-6.36	4.64	-59.45	-12.10	-0.2	-11.70	6.58	1.34	-0.76	13.15	0.18	0.02	13.91	21.4	1
Davit3	#Davit3:1	End	8.51	71.77	-6.48	8.66	-36.34	-7.40	-0.2	-11.70	6.58	1.34	-0.91	11.45	0.22	0.03	12.37	19.0	1
Davit3	#Davit3:1	Origin	8.51	71.77	-6.48	8.66	-36.34	-7.40	-0.2	-11.65	6.38	1.34	-0.91	11.45	0.22	0.03	12.36	19.0	1
Davit3	Davit3:Arc	End	12.02	72.21	-6.61	12.59	-13.92	-2.68	-0.2	-11.65	6.38	1.34	-1.12	6.75	0.27	0.04	7.89	12.1	1
Davit3	Davit3:Arc	Origin	12.02	72.21	-6.61	12.59	-13.92	-2.69	-0.0	-11.20	6.96	1.35	-1.08	6.75	0.27	0.00	7.84	12.1	1
Davit3	Davit3:END	End	14.02	72.31	-6.68	14.80	-0.00	-0.00	-0.0	-11.20	6.96	1.35	-1.25	0.00	1.61	0.00	3.05	4.7	3
Davit4	Davit4:O	Origin	0.00	70.55	-6.18	-3.49	-43.96	0.28	0.0	5.58	5.14	-0.03	0.49	15.87	0.01	0.00	16.36	25.2	1
Davit4	#Davit4:0	End	3.52	70.79	-6.17	-7.81	-25.87	0.17	0.0	5.58	5.14	-0.03	0.62	14.94	0.01	0.00	15.56	23.9	1
Davit4	#Davit4:0	Origin	3.52	70.79	-6.17	-7.81	-25.87	0.17	0.0	5.60	4.95	-0.03	0.62	14.94	0.01	0.00	15.56	23.9	1
Davit4	Davit4:Arc	End	7.04	71.03	-6.16	-12.30	-8.43	0.06	0.0	5.60	4.95	-0.03	0.84	9.01	0.01	0.00	9.85	15.1	1
Davit4	Davit4:Arc	Origin	7.04	71.03	-6.16	-12.30	-8.43	0.06	-0.0	6.09	4.21	-0.03	0.91	9.01	0.01	0.00	9.92	15.3	1
Davit4	Davit4:END	End	9.04	70.89	-6.13	-14.90	0.00	-0.00	-0.0	6.09	4.21	-0.03	1.14	0.00	1.65	0.00	3.08	4.7	3
Davit5	Davit5:O	Origin	0.00	46.71	-3.88	0.02	-97.85	22.40	0.2	-11.50	7.17	-1.59	-0.61	14.28	0.17	0.01	14.89	22.9	1
Davit5	#Davit5:0	End	5.00	47.19	-3.83	4.70	-61.98	14.46	0.2	-11.50	7.17	-1.59	-0.75	13.71	0.21	0.02	14.46	22.2	1
Davit5	#Davit5:0	Origin	5.00	47.19	-3.83	4.70	-61.98	14.46	0.2	-11.43	6.87	-1.60	-0.75	13.71	0.22	0.02	14.46	22.2	1
Davit5	#Davit5:1	End	8.51	47.51	-3.76	7.86	-37.87	8.85	0.2	-11.43	6.87	-1.60	-0.89	11.93	0.26	0.03	12.83	19.7	1
Davit5	#Davit5:1	Origin	8.51	47.51	-3.76	7.86	-37.87	8.85	0.2	-11.38	6.67	-1.60	-0.88	11.93	0.26	0.03	12.83	19.7	1
Davit5	Davit5:Arc	End	12.02	47.81	-3.67	10.93	-14.45	3.21	0.2	-11.38	6.67	-1.60	-1.09	7.01	0.32	0.05	8.13	12.5	1
Davit5	Davit5:Arc	Origin	12.02	47.81	-3.67	10.93	-14.45	3.22	0.0	-10.92	7.23	-1.61	-1.05	7.01	0.32	0.00	8.08	12.4	1
Davit5	Davit5:END	End	14.02	47.88	-3.60	12.65	-0.00	-0.00	0.0	-10.92	7.23	-1.61	-1.21	0.00	1.67	0.00	3.14	4.8	3
Davit6	Davit6:O	Origin	0.00	46.61	-3.91	-2.54	-44.86	17.82	0.4	5.75	5.24	-1.98	0.50	16.20	0.36	0.08	16.72	25.7	1
Davit6	#Davit6:0	End	3.52	46.83	-4.02	-6.00	-26.40	10.84	0.4	5.75	5.24	-1.98	0.64	15.21	0.92	0.12	15.95	24.5	2
Davit6	#Davit6:0	Origin	3.52	46.83	-4.02	-6.00	-26.40	10.84	0.4	5.78	5.06	-1.97	0.64	15.21	0.89	0.12	15.95	24.5	2
Davit6	Davit6:Arc	End	7.04	47.07	-4.20	-9.63	-8.60	3.90	0.4	5.78	5.06	-1.97	0.87	9.44	1.22	0.22	10.61	16.3	2
Davit6	Davit6:Arc	Origin	7.04	47.07	-4.20	-9.63	-8.60	3.93	-0.0	6.29	4.30	-1.96	0.94	9.46	1.06	0.00	10.56	16.3	2
Davit6	Davit6:END	End	9.04	46.97	-4.30	-11.75	0.00	-0.00	-0.0	6.29	4.30	-1.96	1.18	0.00	1.68	0.00	3.15	4.8	3
Davit7	Davit7:O	Origin	0.00	28.20	-2.22	0.60	-100.40	11.54	0.1	-11.66	7.35	-0.82	-0.62	14.65	0.09	0.01	15.27	23.5	1
Davit7	#Davit7:0	End	5.00	28.52	-2.18	4.10	-63.63	7.45	0.1	-11.66	7.35	-0.82	-0.76	14.07	0.11	0.01	14.83	22.8	1
Davit7	#Davit7:0	Origin	5.00	28.52	-2.18	4.10	-63.63	7.45	0.1	-11.60	7.05	-0.82	-0.76	14.07	0.11	0.01	14.83	22.8	1
Davit7	#Davit7:1	End	8.51	28.74	-2.13	6.44	-38.88	4.56	0.1	-11.60	7.05	-0.82	-0.90	12.25	0.13	0.02	13.16	20.2	1
Davit7	#Davit7:1	Origin	8.51	28.74	-2.13	6.44	-38.88	4.56	0.1	-11.56	6.85	-0.83	-0.90	12.25	0.13	0.02	13.15	20.2	1
Davit7	Davit7:Arc	End	12.02	28.94	-2.07	8.68	-14.84	1.65	0.1	-11.56	6.85	-0.83	-1.11	7.19	0.16	0.03	8.31	12.8	1
Davit7	Davit7:Arc	Origin	12.02	28.94	-2.07	8.68	-14.84	1.66	0.0	-11.09	7.42	-0.83	-1.07	7.19	0.17	0.00	8.26	12.7	1
Davit7	Davit7:END	End	14.02	28.97	-2.03	9.92	-0.00	-0.00	0.0	-11.09	7.42	-0.83	-1.23	0.00	1.71	0.00	3.21	4.9	3
Davit8	Davit8:O	Origin	0.00	28.13	-2.25	-1.79	-46.04	16.73	0.4	6.31	5.39	-1.86	0.55	16.63	0.34	0.07	17.20	26.5	1
Davit8	#Davit8:0	End	3.52	28.33	-2.34	-4.42	-27.07	10.17	0.4	6.31	5.39	-1.86	0.70	15.64	0.43	0.11	16.36	25.2	1
Davit8	#Davit8:0	Origin	3.52	28.33	-2.34	-4.42	-27.07	10.18	0.4	6.34	5.20	-1.85	0.70	15.64	0.42	0.11	16.37	25.2	1
Davit8	Davit8:Arc	End	7.04	28.54	-2.49	-7.22	-8.76	3.66	0.4	6.34	5.20	-1.85	0.95	9.38	1.24	0.21	10.64	16.4	2
Davit8	Davit8:Arc	Origin	7.04	28.54	-2.49	-7.22	-8.76	3.69	-0.0	6.86	4.38	-1.84	1.03	9.40	1.07	0.00	10.59	16.3	2
Davit8	Davit8:END	End	9.04	28.48	-2.59	-8.88	0.00	-0.00	-0.0	6.86	4.38	-1.84	1.29	0.00	1.72	0.00	3.24	5.0	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %

Clamp1	3.159	80.00	80.00	3.95
Clamp2	3.037	80.00	80.00	3.80
Clamp3	13.228	80.00	80.00	16.53
Clamp4	7.390	80.00	80.00	9.24
Clamp5	13.162	80.00	80.00	16.45
Clamp6	7.847	80.00	80.00	9.81
Clamp7	13.337	80.00	80.00	16.67
Clamp8	8.330	80.00	80.00	10.41
Clamp9	3.241	80.00	80.00	4.05
Clamp10	11.279	80.00	80.00	14.10
Clamp13	1.555	80.00	80.00	1.94
Clamp14	1.196	80.00	80.00	1.50
Clamp15	1.196	80.00	80.00	1.50
Clamp16	1.196	80.00	80.00	1.50
Clamp17	1.196	80.00	80.00	1.50
Clamp18	1.196	80.00	80.00	1.50
Clamp19	1.196	80.00	80.00	1.50
Clamp20	1.196	80.00	80.00	1.50
Clamp21	1.196	80.00	80.00	1.50
Clamp22	1.196	80.00	80.00	1.50
Clamp23	1.196	80.00	80.00	1.50

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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
BaseP	0	0	0	0.0000	0.0000	0.0000	0	0	0
1P	-0.005966	0.09989	-0.000694	-0.6837	-0.0410	0.0014	-0.005966	0.09989	16.17
2P	-0.0644	1.057	-0.01514	-2.3030	-0.1415	0.0062	-0.0644	1.057	52.73
3P	-0.2957	4.778	-0.1495	-5.5845	-0.3456	0.0061	-0.2957	4.778	107.9
4P	-0.5743	9.761	-0.4664	-8.2025	-0.4948	-0.1278	-0.5743	9.761	147.5
Sec 1:Arm1	-0.5695	9.678	-0.4604	-8.2025	-0.4948	-0.1278	-0.5695	9.678	147
Sec 1:TopConn	-0.5372	9.048	-0.4151	-8.1678	-0.4860	-0.1021	-0.5372	9.048	142.6
Sec 1:Arm2	-0.4051	6.677	-0.2553	-7.0045	-0.4246	-0.0591	-0.4051	6.677	125
Sec 1:BotConn	-0.3259	5.284	-0.1753	-6.0012	-0.3700	-0.0070	-0.3259	5.284	112.8
Sec 2/3:WVGD1	-0.2783	4.491	-0.1356	-5.3809	-0.3336	0.0115	-0.2783	4.491	104.9
Sec 2/3:Arm3	-0.2684	4.329	-0.128	-5.2621	-0.3265	0.0144	-0.2684	4.329	103.1
Sec 2/3:WVGD2	-0.2236	3.611	-0.09642	-4.6920	-0.2913	0.0144	-0.2236	3.611	94.9
Sec 2/3:WVGD3	-0.1761	2.849	-0.06699	-4.0664	-0.2527	0.0145	-0.1761	2.849	84.93
Sec 2/3:Arm4	-0.1599	2.589	-0.0579	-3.8574	-0.2398	0.0145	-0.1599	2.589	81.19
Sec 2/3:WVGD4	-0.1346	2.187	-0.04476	-3.5121	-0.2182	0.0121	-0.1346	2.187	74.96
Sec 2/3:WVGD5	-0.09931	1.621	-0.02845	-2.9599	-0.1832	0.0090	-0.09931	1.621	64.97
Sec 2/3:WVGD6	-0.07013	1.15	-0.01711	-2.4214	-0.1490	0.0066	-0.07013	1.15	54.98
Sec 4/5:WVGD7	-0.04661	0.7683	-0.009592	-1.9636	-0.1202	0.0049	-0.04661	0.7683	44.99
Sec 4/5:WVGD8	-0.02794	0.463	-0.004721	-1.5237	-0.0927	0.0036	-0.02794	0.463	35
Sec 4/5:WVGD9	-0.01416	0.2358	-0.001924	-1.0718	-0.0647	0.0023	-0.01416	0.2358	25
Sec 6:WVGD10	-0.005154	0.08636	-0.0005951	-0.6377	-0.0382	0.0013	-0.005154	0.08636	15
Sec 6:WVGD11	-0.000598	0.0101	-0.0001058	-0.2223	-0.0132	0.0004	-0.000598	0.0101	5
Davit1:O	-0.5712	9.683	-0.3892	-8.2025	-0.4948	-0.1278	-0.5712	9.184	147
Davit1:Arc	-0.6114	9.847	0.7413	-8.1402	-0.5135	-0.2291	-0.6114	1.348	148.7
Davit1:End	-0.6223	9.867	1.024	-8.1315	-0.5155	-0.2424	-0.6223	-0.6318	149
Davit2:O	-0.5678	9.673	-0.5316	-8.2025	-0.4948	-0.1278	-0.5678	10.17	146.9
Davit2:End	-0.5561	9.705	-1.254	-8.2533	-0.4943	-0.1111	-0.5561	15.2	146.7
Davit3:O	-0.4069	6.684	-0.1419	-7.0045	-0.4246	-0.0591	-0.4069	5.754	125.1
Davit3:Arc	-0.4435	6.862	1.297	-6.8330	-0.4368	-0.1322	-0.4435	-6.068	127.3
Davit3:END	-0.4501	6.876	1.535	-6.8187	-0.4375	-0.1378	-0.4501	-8.053	127.5
Davit4:O	-0.4033	6.67	-0.3687	-7.0045	-0.4246	-0.0591	-0.4033	7.6	124.9
Davit4:Arc	-0.3967	6.709	-1.241	-7.1995	-0.4225	-0.0341	-0.3967	14.64	124.8
Davit4:END	-0.3938	6.694	-1.492	-7.2293	-0.4219	-0.0296	-0.3938	16.62	124.5
Davit5:O	-0.2688	4.334	-0.005299	-5.2621	-0.3265	0.0144	-0.2688	2.996	103.2
Davit5:Arc	-0.274	4.451	1.072	-5.0718	-0.3240	0.0347	-0.274	-8.887	105.1
Davit5:END	-0.2738	4.459	1.248	-5.0561	-0.3238	0.0363	-0.2738	-10.88	105.2
Davit6:O	-0.2681	4.323	-0.2507	-5.2621	-0.3265	0.0144	-0.2681	5.661	103
Davit6:Arc	-0.2778	4.363	-0.9097	-5.4711	-0.3218	0.1280	-0.2778	12.7	103.1
Davit6:END	-0.2817	4.354	-1.101	-5.5033	-0.3199	0.1486	-0.2817	14.69	102.9
Davit7:O	-0.1599	2.593	0.053	-3.8574	-0.2398	0.0145	-0.1599	0.9443	81.3
Davit7:Arc	-0.1641	2.668	0.8364	-3.6514	-0.2406	0.0076	-0.1641	-10.98	82.84
Davit7:END	-0.1643	2.672	0.9633	-3.6344	-0.2406	0.0071	-0.1643	-12.98	82.96
Davit8:O	-0.1598	2.585	-0.1688	-3.8574	-0.2398	0.0145	-0.1598	4.234	81.08
Davit8:Arc	-0.1701	2.621	-0.6565	-4.0853	-0.2379	0.1286	-0.1701	11.27	81.34
Davit8:END	-0.1745	2.616	-0.7999	-4.1207	-0.2365	0.1494	-0.1745	13.26	81.2

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force	X Usage	Y Force	Y Usage	H-Shear Usage	Z Force	Comp. Usage	Uplift Usage	Result. Force	Result. Usage	X Moment	X-M. Usage	Y Moment	Y-M. Usage	H-Bend-M Usage	Z Moment	Z-M. Usage	Max. Usage

	(kips)	%	(kips)	%	%	(kips)	%	%	(kips)	%	(ft-k)	%	(ft-k)	%	%	(ft-k)	%	%
BaseP	4.16	0.0	-82.00	0.0	0.0	-70.24	0.0	0.0	108.05	0.0	7937.04	0.0	470.7	0.0	0.0	-11.47	0.0	0.0

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Sec 1	4P	Origin	0.00	117.13	-6.89	-5.60	0.00	-0.00	0.0	-0.01	0.01	0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
Sec 1	Sec 1:Arm1	End	0.58	116.14	-6.83	-5.53	0.01	0.00	0.0	-0.01	0.01	0.00	-0.00	0.00	0.00	0.00	0.00	0.0	3
Sec 1	Sec 1:Arm1	Origin	0.58	116.14	-6.83	-5.53	-0.43	0.33	-3.5	-0.88	2.92	0.56	-0.09	0.14	0.58	0.76	2.35	3.6	4
Sec 1	Sec 1:TopConn	End	5.00	108.57	-6.45	-4.98	12.48	2.80	-3.5	-0.88	2.92	0.56	-0.07	3.79	0.26	0.55	4.11	6.3	2
Sec 1	Sec 1:TopConn	Origin	5.00	108.57	-6.45	-4.98	12.48	2.81	-3.5	0.75	16.02	0.59	0.06	2.69	2.37	0.55	5.76	8.9	3
Sec 1	Tube 1	End	10.00	100.12	-5.99	-4.38	92.57	5.71	-3.5	0.75	16.02	0.59	0.05	20.96	0.08	0.40	21.03	32.4	1
Sec 1	Tube 1	Origin	10.00	100.12	-5.99	-4.38	92.57	5.72	-3.5	0.44	16.26	0.58	0.03	20.96	0.08	0.40	21.01	32.3	1
Sec 1	Tube 1	End	15.00	91.97	-5.54	-3.82	173.89	8.59	-3.5	0.44	16.26	0.58	0.03	29.98	0.07	0.30	30.01	46.2	1
Sec 1	Tube 1	Origin	15.00	91.97	-5.54	-3.82	173.89	8.60	-3.5	0.10	16.51	0.58	0.01	29.98	0.07	0.30	29.99	46.1	1
Sec 1	Tube 1	End	18.88	85.93	-5.20	-3.43	237.87	10.82	-3.5	0.10	16.51	0.58	0.01	33.96	0.07	0.25	33.97	52.3	1
Sec 1	Tube 1	Origin	18.88	85.93	-5.20	-3.43	237.87	10.83	-3.5	-0.22	16.75	0.58	-0.01	33.96	0.07	0.25	33.98	52.3	1
Sec 1	Sec 1:Arm2	End	22.75	80.13	-4.86	-3.06	302.76	13.04	-3.5	-0.22	16.75	0.58	-0.01	36.39	0.06	0.21	36.40	56.0	1
Sec 1	Sec 1:Arm2	Origin	22.75	80.13	-4.86	-3.06	284.86	14.17	-18.0	-6.14	30.51	2.02	-0.32	34.24	0.21	1.08	34.63	53.3	1
Sec 1	Tube 1	End	27.75	72.99	-4.47	-2.64	437.41	24.07	-18.0	-6.14	30.51	2.02	-0.29	42.94	0.19	0.88	43.27	66.6	1
Sec 1	Tube 1	Origin	27.75	72.99	-4.47	-2.64	437.41	24.16	-17.9	-6.64	30.78	2.00	-0.31	42.94	0.19	0.88	43.29	66.6	1
Sec 1	Tube 1	End	31.37	68.08	-4.18	-2.36	548.99	31.29	-17.9	-6.64	30.78	2.00	-0.29	47.09	0.18	0.77	47.41	72.9	1
Sec 1	Tube 1	Origin	31.37	68.08	-4.18	-2.36	548.98	31.36	-17.8	-7.08	31.02	1.99	-0.31	47.09	0.18	0.76	47.43	73.0	1
Sec 1	Sec 1:BotConn	End	35.00	63.41	-3.91	-2.10	661.44	38.46	-17.8	-7.08	31.02	1.99	-0.29	50.01	0.17	0.67	50.32	77.4	1
Sec 1	Sec 1:BotConn	Origin	35.00	63.41	-3.91	-2.10	661.44	38.54	-17.8	-12.37	31.65	2.02	-0.51	50.01	0.17	0.67	50.54	77.8	1
Sec 1	3P	End	40.00	57.34	-3.55	-1.79	819.69	48.43	-17.8	-12.37	31.65	2.02	-0.47	52.69	0.16	0.57	53.18	81.8	1
Sec 2/3	3P	Origin	0.00	57.34	-3.55	-1.79	819.68	48.50	-17.7	-12.92	31.93	2.01	-0.40	43.39	0.13	0.47	43.81	67.4	1
Sec 2/3	Sec 2/3:WVGD1	End	3.00	53.89	-3.34	-1.63	915.47	54.43	-17.7	-12.92	31.93	2.01	-0.39	45.04	0.12	0.43	45.43	69.9	1
Sec 2/3	Sec 2/3:WVGD1	Origin	3.00	53.89	-3.34	-1.63	915.47	54.47	-17.6	-13.56	33.51	2.00	-0.41	45.04	0.12	0.43	45.45	69.9	1
Sec 2/3	Sec 2/3:Arm3	End	4.75	51.94	-3.22	-1.54	974.10	57.92	-17.6	-13.56	33.51	2.00	-0.40	45.97	0.12	0.42	46.38	71.4	1
Sec 2/3	Sec 2/3:Arm3	Origin	4.75	51.94	-3.22	-1.54	952.53	58.65	0.0	-19.98	47.11	2.97	-0.59	44.95	0.18	0.00	45.54	70.1	1
Sec 2/3	Tube 1	End	8.87	47.52	-2.94	-1.34	1146.84	70.90	0.0	-19.98	47.11	2.97	-0.56	49.23	0.17	0.00	49.79	76.6	1
Sec 2/3	Tube 1	Origin	8.87	47.52	-2.94	-1.34	1146.84	70.87	0.0	-20.71	47.41	2.96	-0.58	49.23	0.17	0.00	49.81	76.6	1
Sec 2/3	Sec 2/3:WVGD2	End	13.00	43.33	-2.68	-1.16	1342.41	83.09	0.0	-20.71	47.41	2.96	-0.56	52.64	0.16	0.00	53.20	81.8	1
Sec 2/3	Sec 2/3:WVGD2	Origin	13.00	43.33	-2.68	-1.16	1342.41	83.07	0.0	-21.53	48.72	2.96	-0.58	52.64	0.16	0.00	53.22	81.9	1
Sec 2/3	SpliceT	End	15.25	41.16	-2.55	-1.07	1452.04	89.73	0.0	-21.53	48.72	2.96	-0.57	54.29	0.16	0.00	54.86	84.4	1
Sec 2/3	SpliceT	Origin	15.25	41.16	-2.55	-1.07	1452.04	89.70	0.0	-22.60	49.04	2.96	-0.59	54.29	0.16	0.00	54.89	84.4	1
Sec 2/3	SpliceB	End	20.00	36.79	-2.28	-0.90	1684.97	103.75	0.0	-22.60	49.04	2.96	-0.42	44.04	0.11	0.00	44.47	68.4	1
Sec 2/3	SpliceB	Origin	20.00	36.79	-2.28	-0.90	1684.97	103.71	0.0	-23.81	49.39	2.95	-0.45	44.04	0.11	0.00	44.49	68.4	1
Sec 2/3	Sec 2/3:WVGD3	End	23.00	34.18	-2.11	-0.80	1833.15	112.57	0.0	-23.81	49.39	2.95	-0.43	45.11	0.11	0.00	45.54	70.1	1
Sec 2/3	Sec 2/3:WVGD3	Origin	23.00	34.18	-2.11	-0.80	1833.15	112.55	0.0	-24.84	50.77	2.95	-0.45	45.11	0.11	0.00	45.56	70.1	1
Sec 2/3	Sec 2/3:Arm4	End	26.75	31.07	-1.92	-0.69	2023.53	123.61	0.0	-24.84	50.77	2.95	-0.44	46.29	0.11	0.00	46.72	71.9	1
Sec 2/3	Sec 2/3:Arm4	Origin	26.75	31.07	-1.92	-0.69	2000.01	124.60	11.6	-32.07	64.79	4.33	-0.56	45.75	0.15	0.13	46.31	71.3	1
Sec 2/3	Tube 2	End	29.87	28.60	-1.76	-0.61	2202.47	138.20	11.6	-32.07	64.79	4.33	-0.55	47.50	0.15	0.13	48.05	73.9	1
Sec 2/3	Tube 2	Origin	29.87	28.60	-1.76	-0.61	2202.47	138.13	11.6	-32.88	65.07	4.33	-0.56	47.50	0.15	0.12	48.06	73.9	1
Sec 2/3	Sec 2/3:WVGD4	End	33.00	26.24	-1.62	-0.54	2405.80	151.71	11.6	-32.88	65.07	4.33	-0.55	49.00	0.15	0.12	49.55	76.2	1
Sec 2/3	Sec 2/3:WVGD4	Origin	33.00	26.24	-1.62	-0.54	2405.81	151.63	11.6	-34.23	66.51	4.32	-0.57	49.00	0.15	0.12	49.57	76.3	1
Sec 2/3	Tube 2	End	38.00	22.70	-1.39	-0.43	2738.33	173.34	11.6	-34.23	66.51	4.32	-0.54	51.07	0.14	0.11	51.61	79.4	1
Sec 2/3	Tube 2	Origin	38.00	22.70	-1.39	-0.43	2738.33	173.23	11.6	-35.62	66.97	4.32	-0.57	51.07	0.14	0.11	51.63	79.4	1
Sec 2/3	Sec 2/3:WVGD5	End	43.00	19.45	-1.19	-0.34	3073.19	194.89	11.6	-35.62	66.97	4.32	-0.54	52.67	0.13	0.10	53.21	81.9	1
Sec 2/3	Sec 2/3:WVGD5	Origin	43.00	19.45	-1.19	-0.34	3073.20	194.79	11.5	-37.32	68.52	4.31	-0.57	52.67	0.13	0.10	53.24	81.9	1
Sec 2/3	Tube 2	End	48.00	16.49	-1.01	-0.27	3415.79	216.40	11.5	-37.32	68.52	4.31	-0.55	53.98	0.13	0.09	54.53	83.9	1
Sec 2/3	Tube 2	Origin	48.00	16.49	-1.01	-0.27	3415.80	216.30	11.5	-38.81	69.02	4.30	-0.57	53.98	0.13	0.09	54.55	83.9	1

Sec 2/3	Sec 2/3:WVGD6	End	53.00	13.80	-0.84	-0.21	3760.90	237.87	11.5	-38.81	69.02	4.30	-0.55	54.98	0.12	0.08	55.53	85.4	1
Sec 2/3	Sec 2/3:WVGD6	Origin	53.00	13.80	-0.84	-0.21	3760.90	237.80	11.5	-40.18	70.45	4.29	-0.57	54.98	0.12	0.08	55.55	85.5	1
Sec 2/3	2P	End	55.25	12.69	-0.77	-0.18	3919.42	247.48	11.5	-40.18	70.45	4.29	-0.56	55.38	0.12	0.08	55.94	86.1	1
Sec 4/5	2P	Origin	0.00	12.69	-0.77	-0.18	3919.42	247.43	11.5	-41.21	70.79	4.29	-0.48	46.42	0.10	0.07	46.90	72.1	1
Sec 4/5	Tube 1	End	3.88	10.89	-0.66	-0.15	4193.73	264.09	11.5	-41.21	70.79	4.29	-0.47	47.41	0.10	0.07	47.88	73.7	1
Sec 4/5	Tube 1	Origin	3.88	10.89	-0.66	-0.15	4193.74	264.02	11.5	-42.59	71.23	4.28	-0.48	47.41	0.10	0.07	47.89	73.7	1
Sec 4/5	Sec 4/5:WVGD7	End	7.75	9.22	-0.56	-0.12	4469.77	280.65	11.5	-42.59	71.23	4.28	-0.47	48.29	0.10	0.06	48.76	75.0	1
Sec 4/5	Sec 4/5:WVGD7	Origin	7.75	9.22	-0.56	-0.12	4469.77	280.60	11.5	-44.05	72.67	4.27	-0.49	48.29	0.10	0.06	48.78	75.0	1
Sec 4/5	Tube 1	End	10.42	8.15	-0.49	-0.10	4663.54	292.03	11.5	-44.05	72.67	4.27	-0.48	48.86	0.09	0.06	49.34	75.9	1
Sec 4/5	Tube 1	Origin	10.42	8.15	-0.49	-0.10	4663.55	291.99	11.5	-45.03	72.98	4.27	-0.49	48.86	0.09	0.06	49.35	75.9	1
Sec 4/5	SpliceT	End	13.08	7.15	-0.43	-0.08	4858.15	303.40	11.5	-45.03	72.98	4.27	-0.48	49.39	0.09	0.06	49.87	76.7	1
Sec 4/5	SpliceT	Origin	13.08	7.15	-0.43	-0.08	4858.16	303.34	11.5	-47.14	73.43	4.26	-0.50	49.39	0.09	0.06	49.89	76.8	1
Sec 4/5	Sec 4/5:WVGD8	End	17.75	5.56	-0.34	-0.06	5200.86	323.29	11.5	-47.14	73.43	4.26	-0.50	52.42	0.09	0.06	52.92	81.4	1
Sec 4/5	Sec 4/5:WVGD8	Origin	17.75	5.56	-0.34	-0.06	5200.86	323.24	11.5	-49.85	74.91	4.26	-0.53	52.42	0.09	0.06	52.95	81.5	1
Sec 4/5	SpliceB	End	20.00	4.86	-0.29	-0.05	5369.41	332.84	11.5	-49.85	74.91	4.26	-0.52	52.78	0.09	0.06	53.30	82.0	1
Sec 4/5	SpliceB	Origin	20.00	4.86	-0.29	-0.05	5369.42	332.80	11.5	-51.39	75.27	4.25	-0.54	52.78	0.09	0.06	53.32	82.0	1
Sec 4/5	Tube 2	End	23.87	3.77	-0.23	-0.03	5661.08	349.31	11.5	-51.39	75.27	4.25	-0.53	53.34	0.09	0.05	53.87	82.9	1
Sec 4/5	Tube 2	Origin	23.87	3.77	-0.23	-0.03	5661.09	349.26	11.5	-52.90	75.71	4.24	-0.55	53.34	0.09	0.05	53.88	82.9	1
Sec 4/5	Sec 4/5:WVGD9	End	27.75	2.83	-0.17	-0.02	5954.47	365.73	11.5	-52.90	75.71	4.24	-0.53	53.82	0.09	0.05	54.36	83.6	1
Sec 4/5	Sec 4/5:WVGD9	Origin	27.75	2.83	-0.17	-0.02	5954.47	365.68	11.5	-54.84	77.25	4.23	-0.55	53.82	0.09	0.05	54.38	83.7	1
Sec 4/5	Tube 2	End	32.17	1.92	-0.12	-0.01	6295.63	384.41	11.5	-54.84	77.25	4.23	-0.54	54.33	0.08	0.05	54.87	84.4	1
Sec 4/5	Tube 2	Origin	32.17	1.92	-0.12	-0.01	6295.64	384.35	11.5	-56.63	77.77	4.22	-0.56	54.33	0.08	0.05	54.89	84.4	1
Sec 4/5	1P	End	36.58	1.20	-0.07	-0.01	6639.09	403.03	11.5	-56.63	77.77	4.22	-0.55	54.76	0.08	0.05	55.31	85.1	1
Sec 6	1P	Origin	0.00	1.20	-0.07	-0.01	6639.09	402.99	11.5	-57.79	78.10	4.21	-0.50	49.45	0.07	0.04	49.95	76.8	1
Sec 6	Sec 6:WVGD10	End	1.17	1.04	-0.06	-0.01	6730.22	407.92	11.5	-57.79	78.10	4.21	-0.50	50.05	0.07	0.04	50.56	77.8	1
Sec 6	Sec 6:WVGD10	Origin	1.17	1.04	-0.06	-0.01	6730.23	407.89	11.5	-59.47	79.52	4.20	-0.52	50.05	0.07	0.04	50.57	77.8	1
Sec 6	Tube 1	End	6.17	0.47	-0.03	-0.00	7127.84	428.95	11.5	-59.47	79.52	4.20	-0.51	52.69	0.07	0.04	53.20	81.9	1
Sec 6	Tube 1	Origin	6.17	0.47	-0.03	-0.00	7127.84	428.90	11.5	-61.73	80.11	4.19	-0.53	52.69	0.07	0.04	53.22	81.9	1
Sec 6	Sec 6:WVGD11	End	11.17	0.12	-0.01	-0.00	7528.40	449.89	11.5	-61.73	80.11	4.19	-0.53	55.31	0.07	0.04	55.85	85.9	1
Sec 6	Sec 6:WVGD11	Origin	11.17	0.12	-0.01	-0.00	7528.40	449.84	11.5	-64.31	81.73	4.17	-0.56	55.31	0.07	0.04	55.87	86.0	1
Sec 6	BaseP	End	16.17	0.00	0.00	0.00	7937.04	470.76	11.5	-64.31	81.73	4.17	-0.55	57.96	0.07	0.04	58.52	90.0	1

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	116.20	-6.85	-4.67	-2.61	-4.15	-0.1	-1.44	0.30	0.41	-0.17	3.05	0.09	0.02	3.22	5.0	2
Davit1	#Davit1:0	End	4.01	117.19	-7.07	2.13	-1.39	-2.49	-0.1	-1.44	0.30	0.41	-0.21	2.73	0.11	0.03	2.95	4.5	2
Davit1	#Davit1:0	Origin	4.01	117.19	-7.07	2.13	-1.39	-2.49	-0.1	-1.42	0.22	0.41	-0.21	2.73	0.10	0.03	2.94	4.5	2
Davit1	Davit1:Arc	End	8.02	118.17	-7.34	8.90	-0.53	-0.83	-0.1	-1.42	0.22	0.41	-0.27	1.68	0.13	0.05	1.98	3.0	2
Davit1	Davit1:Arc	Origin	8.02	118.17	-7.34	8.90	-0.53	-0.83	-0.0	-1.39	0.26	0.41	-0.27	1.68	0.14	0.00	1.96	3.0	2
Davit1	Davit1:End	End	10.02	118.41	-7.47	12.29	-0.00	-0.00	-0.0	-1.39	0.26	0.41	-0.32	0.00	0.20	0.00	0.47	0.7	1
Davit2	Davit2:O	Origin	0.00	116.07	-6.81	-6.38	-2.24	0.74	0.0	1.34	0.46	-0.15	0.25	2.33	0.06	0.00	2.57	4.0	1
Davit2	#Davit2:0	End	2.52	116.27	-6.74	-10.70	-1.07	0.37	0.0	1.34	0.46	-0.15	0.32	1.88	0.07	0.00	2.20	3.4	1
Davit2	#Davit2:0	Origin	2.52	116.27	-6.74	-10.70	-1.07	0.37	-0.0	1.34	0.43	-0.15	0.32	1.88	0.07	0.00	2.20	3.4	1
Davit2	Davit2:End	End	5.03	116.46	-6.67	-15.04	0.00	-0.00	-0.0	1.34	0.43	-0.15	0.45	0.00	0.30	0.00	0.68	1.0	3
Davit3	Davit3:O	Origin	0.00	80.21	-4.88	-1.70	-37.18	-16.22	-0.1	-8.82	2.78	1.15	-0.47	5.51	0.23	0.01	5.99	9.2	2
Davit3	#Davit3:0	End	5.00	81.11	-5.04	5.53	-23.30	-10.45	-0.1	-8.82	2.78	1.15	-0.58	5.28	0.29	0.02	5.88	9.0	2
Davit3	#Davit3:0	Origin	5.00	81.11	-5.04	5.53	-23.30	-10.45	-0.1	-8.77	2.57	1.16	-0.57	5.28	0.27	0.02	5.87	9.0	2
Davit3	#Davit3:1	End	8.51	81.73	-5.17	10.57	-14.28	-6.39	-0.1	-8.77	2.57	1.16	-0.68	4.61	0.32	0.02	5.32	8.2	2
Davit3	#Davit3:1	Origin	8.51	81.73	-5.17	10.57	-14.28	-6.38	-0.1	-8.74	2.43	1.16	-0.68	4.61	0.31	0.02	5.32	8.2	2
Davit3	Davit3:Arc	End	12.02	82.34	-5.32	15.57	-5.75	-2.32	-0.1	-8.74	2.43	1.16	-0.84	2.77	0.39	0.04	3.68	5.7	2

Davit3	Davit3:Arc	Origin	12.02	82.34	-5.32	15.57	-5.75	-2.32	-0.0	-8.56	2.88	1.16	-0.82	2.77	0.44	0.00	3.67	5.6	2
Davit3	Davit3:END	End	14.02	82.51	-5.40	18.42	-0.00	-0.00	-0.0	-8.56	2.88	1.16	-0.95	0.00	0.66	0.00	1.49	2.3	3
Davit4	Davit4:O	Origin	0.00	80.04	-4.84	-4.42	-20.59	2.62	0.1	4.59	2.48	-0.29	0.40	7.44	0.05	0.01	7.84	12.1	1
Davit4	#Davit4:0	End	3.52	80.28	-4.80	-9.62	-11.88	1.59	0.1	4.59	2.48	-0.29	0.51	6.86	0.07	0.02	7.37	11.3	1
Davit4	#Davit4:0	Origin	3.52	80.28	-4.80	-9.62	-11.88	1.59	0.1	4.59	2.36	-0.29	0.51	6.86	0.07	0.02	7.37	11.3	1
Davit4	Davit4:Arc	End	7.04	80.51	-4.76	-14.89	-3.57	0.57	0.1	4.59	2.36	-0.29	0.69	3.81	0.09	0.03	4.51	6.9	1
Davit4	Davit4:Arc	Origin	7.04	80.51	-4.76	-14.89	-3.57	0.58	-0.0	4.81	1.79	-0.29	0.72	3.81	0.09	0.00	4.54	7.0	1
Davit4	Davit4:END	End	9.04	80.32	-4.73	-17.91	0.00	-0.00	-0.0	4.81	1.79	-0.29	0.90	0.00	0.70	0.00	1.51	2.3	3
Davit5	Davit5:O	Origin	0.00	52.01	-3.23	-0.06	-41.41	4.16	0.0	-8.66	3.08	-0.29	-0.46	6.04	0.03	0.00	6.50	10.0	1
Davit5	#Davit5:0	End	5.00	52.60	-3.26	5.37	-26.00	2.69	0.0	-8.66	3.08	-0.29	-0.57	5.75	0.04	0.00	6.32	9.7	1
Davit5	#Davit5:0	Origin	5.00	52.60	-3.26	5.37	-26.00	2.69	0.0	-8.62	2.87	-0.30	-0.56	5.75	0.04	0.00	6.31	9.7	1
Davit5	#Davit5:1	End	8.51	53.01	-3.28	9.14	-15.92	1.64	0.0	-8.62	2.87	-0.30	-0.67	5.02	0.05	0.01	5.69	8.8	1
Davit5	#Davit5:1	Origin	8.51	53.01	-3.28	9.14	-15.92	1.64	0.0	-8.60	2.73	-0.30	-0.67	5.02	0.05	0.01	5.69	8.7	1
Davit5	Davit5:Arc	End	12.02	53.41	-3.29	12.86	-6.33	0.60	0.0	-8.60	2.73	-0.30	-0.83	3.07	0.06	0.01	3.90	6.0	1
Davit5	Davit5:Arc	Origin	12.02	53.41	-3.29	12.86	-6.33	0.60	-0.0	-8.40	3.17	-0.30	-0.81	3.07	0.06	0.00	3.88	6.0	1
Davit5	Davit5:END	End	14.02	53.50	-3.29	14.98	-0.00	-0.00	-0.0	-8.40	3.17	-0.30	-0.93	0.00	0.73	0.00	1.57	2.4	3
Davit6	Davit6:O	Origin	0.00	51.88	-3.22	-3.01	-21.94	11.35	0.3	4.65	2.63	-1.26	0.41	8.50	0.38	0.05	8.94	13.8	2
Davit6	#Davit6:0	End	3.52	52.11	-3.25	-6.92	-12.69	6.91	0.3	4.65	2.63	-1.26	0.52	8.01	0.48	0.08	8.58	13.2	2
Davit6	#Davit6:0	Origin	3.52	52.11	-3.25	-6.92	-12.69	6.91	0.3	4.66	2.51	-1.26	0.52	8.01	0.46	0.08	8.57	13.2	2
Davit6	Davit6:Arc	End	7.04	52.35	-3.33	-10.92	-3.85	2.49	0.3	4.66	2.51	-1.26	0.70	4.79	0.63	0.14	5.65	8.7	2
Davit6	Davit6:Arc	Origin	7.04	52.35	-3.33	-10.92	-3.85	2.50	-0.0	4.90	1.93	-1.25	0.73	4.80	0.52	0.00	5.61	8.6	2
Davit6	Davit6:END	End	9.04	52.24	-3.38	-13.21	0.00	-0.00	-0.0	4.90	1.93	-1.25	0.92	0.00	0.75	0.00	1.60	2.5	3
Davit7	Davit7:O	Origin	0.00	31.11	-1.92	0.64	-44.75	-1.68	-0.0	-8.74	3.32	0.12	-0.46	6.53	0.01	0.00	6.99	10.8	1
Davit7	#Davit7:0	End	5.00	31.50	-1.94	4.61	-28.15	-1.08	-0.0	-8.74	3.32	0.12	-0.57	6.23	0.02	0.00	6.80	10.5	1
Davit7	#Davit7:0	Origin	5.00	31.50	-1.94	4.61	-28.15	-1.08	-0.0	-8.71	3.11	0.12	-0.57	6.23	0.02	0.00	6.79	10.5	1
Davit7	#Davit7:1	End	8.51	31.76	-1.95	7.35	-17.24	-0.66	-0.0	-8.71	3.11	0.12	-0.68	5.43	0.02	0.00	6.11	9.4	1
Davit7	#Davit7:1	Origin	8.51	31.76	-1.95	7.35	-17.24	-0.66	-0.0	-8.69	2.97	0.12	-0.68	5.43	0.02	0.00	6.11	9.4	1
Davit7	Davit7:Arc	End	12.02	32.02	-1.97	10.04	-6.82	-0.24	-0.0	-8.69	2.97	0.12	-0.84	3.30	0.02	0.00	4.14	6.4	1
Davit7	Davit7:Arc	Origin	12.02	32.02	-1.97	10.04	-6.82	-0.24	-0.0	-8.48	3.41	0.12	-0.82	3.30	0.02	0.00	4.12	6.3	1
Davit7	Davit7:END	End	14.02	32.06	-1.97	11.56	-0.00	-0.00	-0.0	-8.48	3.41	0.12	-0.94	0.00	0.79	0.00	1.66	2.6	3
Davit8	Davit8:O	Origin	0.00	31.03	-1.92	-2.03	-23.89	11.38	0.3	4.90	2.85	-1.27	0.43	9.01	0.40	0.05	9.47	14.6	2
Davit8	#Davit8:0	End	3.52	31.24	-1.96	-4.91	-13.86	6.93	0.3	4.90	2.85	-1.27	0.54	8.49	0.51	0.08	9.09	14.0	2
Davit8	#Davit8:0	Origin	3.52	31.24	-1.96	-4.91	-13.86	6.93	0.3	4.92	2.73	-1.26	0.54	8.49	0.49	0.08	9.09	14.0	2
Davit8	Davit8:Arc	End	7.04	31.45	-2.04	-7.88	-4.24	2.50	0.3	4.92	2.73	-1.26	0.74	5.09	0.68	0.14	6.00	9.2	2
Davit8	Davit8:Arc	Origin	7.04	31.45	-2.04	-7.88	-4.24	2.51	-0.0	5.18	2.12	-1.26	0.78	5.10	0.55	0.00	5.95	9.2	2
Davit8	Davit8:END	End	9.04	31.39	-2.09	-9.60	0.00	-0.00	-0.0	5.18	2.12	-1.26	0.97	0.00	0.83	0.00	1.74	2.7	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	1.471	80.00	80.00	1.84
Clamp2	1.411	80.00	80.00	1.76
Clamp3	9.091	80.00	80.00	11.36
Clamp4	5.133	80.00	80.00	6.42
Clamp5	8.968	80.00	80.00	11.21
Clamp6	5.401	80.00	80.00	6.75
Clamp7	9.124	80.00	80.00	11.40
Clamp8	5.725	80.00	80.00	7.16
Clamp9	13.028	80.00	80.00	16.28

Clamp10	4.743	80.00	80.00	5.93
Clamp13	1.424	80.00	80.00	1.78
Clamp14	1.095	80.00	80.00	1.37
Clamp15	1.095	80.00	80.00	1.37
Clamp16	1.095	80.00	80.00	1.37
Clamp17	1.095	80.00	80.00	1.37
Clamp18	1.095	80.00	80.00	1.37
Clamp19	1.095	80.00	80.00	1.37
Clamp20	1.095	80.00	80.00	1.37
Clamp21	1.095	80.00	80.00	1.37
Clamp22	1.095	80.00	80.00	1.37
Clamp23	1.095	80.00	80.00	1.37

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Sec 1	81.82	NESC Extreme	10	2465.6
Sec 2/3	86.05	NESC Extreme	15	10818.2
Sec 4/5	85.09	NESC Extreme	10	14046.7
Sec 6	90.03	NESC Extreme	4	11139.8

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 %
Sec 6	NESC Heavy	1	-0.000	2.521	-1.260	2.183	15.658	41.454	118.468	2	180.481	3.013	3.625	69.09
Sec 6	NESC Heavy	2	-1.260	2.183	-2.183	1.260	15.658	42.030	120.108	3	147.172	3.034	3.625	70.05
Sec 6	NESC Heavy	3	-2.183	1.260	-2.521	-0.000	15.658	11.461	32.754	2	66.760	1.584	3.625	19.10
Sec 6	NESC Heavy	4	-2.521	-0.000	-2.183	-1.260	15.658	15.351	43.870	2	-82.191	1.834	3.625	25.59
Sec 6	NESC Heavy	5	-2.183	-1.260	-1.260	-2.183	15.658	45.368	129.649	3	-153.477	3.152	3.625	75.61
Sec 6	NESC Heavy	6	-1.260	-2.183	0.000	-2.521	15.658	41.325	118.098	2	-177.559	3.008	3.625	68.88
Sec 6	NESC Heavy	7	0.000	-2.521	1.260	-2.183	15.658	39.400	112.596	2	-171.867	2.938	3.625	65.67
Sec 6	NESC Heavy	8	1.260	-2.183	2.183	-1.260	15.658	39.092	111.713	3	-138.559	2.926	3.625	65.15
Sec 6	NESC Heavy	9	2.183	-1.260	2.521	0.000	15.658	9.406	26.882	2	-58.147	1.435	3.625	15.68
Sec 6	NESC Heavy	10	2.521	0.000	2.183	1.260	15.658	17.406	49.742	2	90.805	1.952	3.625	29.01
Sec 6	NESC Heavy	11	2.183	1.260	1.260	2.183	15.658	48.306	138.044	3	162.090	3.253	3.625	80.51
Sec 6	NESC Heavy	12	1.260	2.183	0.000	2.521	15.658	43.380	123.971	2	186.172	3.082	3.625	72.30
Sec 6	NESC Extreme	1	-0.000	2.521	-1.260	2.183	15.658	45.551	130.176	2	198.152	3.159	3.625	75.92
Sec 6	NESC Extreme	2	-1.260	2.183	-2.183	1.260	15.658	46.359	132.480	3	162.124	3.186	3.625	77.26
Sec 6	NESC Extreme	3	-2.183	1.260	-2.521	-0.000	15.658	12.696	36.282	2	73.879	1.667	3.625	21.16
Sec 6	NESC Extreme	4	-2.521	-0.000	-2.183	-1.260	15.658	17.022	48.645	2	-91.213	1.931	3.625	28.37
Sec 6	NESC Extreme	5	-2.183	-1.260	-1.260	-2.183	15.658	50.509	144.341	3	-171.104	3.326	3.625	84.18
Sec 6	NESC Extreme	6	-1.260	-2.183	0.000	-2.521	15.658	46.198	132.025	2	-198.686	3.181	3.625	77.00
Sec 6	NESC Extreme	7	0.000	-2.521	1.260	-2.183	15.658	44.436	126.988	2	-193.476	3.120	3.625	74.06
Sec 6	NESC Extreme	8	1.260	-2.183	2.183	-1.260	15.658	44.764	127.922	3	-157.448	3.131	3.625	74.61
Sec 6	NESC Extreme	9	2.183	-1.260	2.521	0.000	15.658	11.580	33.094	2	-69.203	1.593	3.625	19.30
Sec 6	NESC Extreme	10	2.521	0.000	2.183	1.260	15.658	18.138	51.833	2	95.889	1.993	3.625	30.23
Sec 6	NESC Extreme	11	2.183	1.260	1.260	2.183	15.658	52.104	148.899	3	175.780	3.378	3.625	86.84
Sec 6	NESC Extreme	12	1.260	2.183	0.000	2.521	15.658	47.314	135.213	2	203.362	3.219	3.625	78.86

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	14.67	NESC Heavy	1	221.5
Davit2	11.72	NESC Heavy	1	72.5
Davit3	22.04	NESC Heavy	1	664.0
Davit4	25.18	NESC Heavy	1	257.1
Davit5	22.91	NESC Heavy	1	664.0
Davit6	25.73	NESC Heavy	1	257.1
Davit7	23.49	NESC Heavy	1	664.0
Davit8	26.46	NESC Heavy	1	257.1

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	82.03	Sec 6	Steel Pole
NESC Extreme	90.03	Sec 6	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	82.03	Sec 6	4
NESC Extreme	90.03	Sec 6	4

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	Sec 6	11	15.658	120.588	7161.038	514.257	48.306	138.044	3	162.090	3.253	80.51
NESC Extreme	Sec 6	11	15.658	65.465	7937.035	470.756	52.104	148.899	3	175.780	3.378	86.84

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	26.46	Davit8	1
NESC Extreme	14.57	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.95	NESC Heavy	0.0
Clamp2	Clamp	3.80	NESC Heavy	0.0
Clamp3	Clamp	16.53	NESC Heavy	0.0
Clamp4	Clamp	9.24	NESC Heavy	0.0
Clamp5	Clamp	16.45	NESC Heavy	0.0
Clamp6	Clamp	9.81	NESC Heavy	0.0
Clamp7	Clamp	16.67	NESC Heavy	0.0
Clamp8	Clamp	10.41	NESC Heavy	0.0
Clamp9	Clamp	16.28	NESC Extreme	0.0
Clamp10	Clamp	14.10	NESC Heavy	0.0
Clamp13	Clamp	1.94	NESC Heavy	0.0
Clamp14	Clamp	1.50	NESC Heavy	0.0
Clamp15	Clamp	1.50	NESC Heavy	0.0
Clamp16	Clamp	1.50	NESC Heavy	0.0

Clamp17	Clamp	1.50	NESC Heavy	0.0
Clamp18	Clamp	1.50	NESC Heavy	0.0
Clamp19	Clamp	1.50	NESC Heavy	0.0
Clamp20	Clamp	1.50	NESC Heavy	0.0
Clamp21	Clamp	1.50	NESC Heavy	0.0
Clamp22	Clamp	1.50	NESC Heavy	0.0
Clamp23	Clamp	1.50	NESC Heavy	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	Clamp1	Clamp	Davit1:End	-1.027	2.686	1.308	3.159
NESC Heavy	Clamp2	Clamp	Davit2:End	-0.544	2.686	1.308	3.037
NESC Heavy	Clamp3	Clamp	Davit3:END	-1.239	10.515	7.929	13.228
NESC Heavy	Clamp4	Clamp	Davit4:END	0.025	5.601	4.821	7.390
NESC Heavy	Clamp5	Clamp	Davit5:END	1.632	10.378	7.929	13.162
NESC Heavy	Clamp6	Clamp	Davit6:END	-1.958	5.873	4.821	7.847
NESC Heavy	Clamp7	Clamp	Davit7:END	0.847	10.690	7.929	13.337
NESC Heavy	Clamp8	Clamp	Davit8:END	-1.847	6.537	4.821	8.330
NESC Heavy	Clamp9	Clamp	Sec 1:TopConn	0.000	3.241	0.000	3.241
NESC Heavy	Clamp10	Clamp	Sec 1:BotConn	0.000	-0.084	11.279	11.279
NESC Heavy	Clamp13	Clamp	Sec 2/3:WVGD1	0.000	0.429	1.495	1.555
NESC Heavy	Clamp14	Clamp	Sec 2/3:WVGD2	0.000	0.330	1.150	1.196
NESC Heavy	Clamp15	Clamp	Sec 2/3:WVGD3	0.000	0.330	1.150	1.196
NESC Heavy	Clamp16	Clamp	Sec 2/3:WVGD4	0.000	0.330	1.150	1.196
NESC Heavy	Clamp17	Clamp	Sec 2/3:WVGD5	0.000	0.330	1.150	1.196
NESC Heavy	Clamp18	Clamp	Sec 2/3:WVGD6	0.000	0.330	1.150	1.196
NESC Heavy	Clamp19	Clamp	Sec 4/5:WVGD7	0.000	0.330	1.150	1.196
NESC Heavy	Clamp20	Clamp	Sec 4/5:WVGD8	0.000	0.330	1.150	1.196
NESC Heavy	Clamp21	Clamp	Sec 4/5:WVGD9	0.000	0.330	1.150	1.196
NESC Heavy	Clamp22	Clamp	Sec 6:WVGD10	0.000	0.330	1.150	1.196
NESC Heavy	Clamp23	Clamp	Sec 6:WVGD11	0.000	0.330	1.150	1.196
NESC Extreme	Clamp1	Clamp	Davit1:End	-0.405	1.342	0.446	1.471
NESC Extreme	Clamp2	Clamp	Davit2:End	-0.140	1.330	0.449	1.411
NESC Extreme	Clamp3	Clamp	Davit3:END	-1.112	8.161	3.848	9.091
NESC Extreme	Clamp4	Clamp	Davit4:END	-0.268	4.551	2.358	5.133
NESC Extreme	Clamp5	Clamp	Davit5:END	0.316	8.088	3.861	8.968
NESC Extreme	Clamp6	Clamp	Davit6:END	-1.250	4.688	2.374	5.401
NESC Extreme	Clamp7	Clamp	Davit7:END	-0.104	8.244	3.907	9.124
NESC Extreme	Clamp8	Clamp	Davit8:END	-1.258	5.009	2.470	5.725
NESC Extreme	Clamp9	Clamp	Sec 1:TopConn	0.000	13.028	0.000	13.028
NESC Extreme	Clamp10	Clamp	Sec 1:BotConn	0.000	-0.166	4.740	4.743
NESC Extreme	Clamp13	Clamp	Sec 2/3:WVGD1	0.000	1.365	0.406	1.424
NESC Extreme	Clamp14	Clamp	Sec 2/3:WVGD2	0.000	1.050	0.312	1.095
NESC Extreme	Clamp15	Clamp	Sec 2/3:WVGD3	0.000	1.050	0.312	1.095
NESC Extreme	Clamp16	Clamp	Sec 2/3:WVGD4	0.000	1.050	0.312	1.095
NESC Extreme	Clamp17	Clamp	Sec 2/3:WVGD5	0.000	1.050	0.312	1.095
NESC Extreme	Clamp18	Clamp	Sec 2/3:WVGD6	0.000	1.050	0.312	1.095
NESC Extreme	Clamp19	Clamp	Sec 4/5:WVGD7	0.000	1.050	0.312	1.095
NESC Extreme	Clamp20	Clamp	Sec 4/5:WVGD8	0.000	1.050	0.312	1.095
NESC Extreme	Clamp21	Clamp	Sec 4/5:WVGD9	0.000	1.050	0.312	1.095
NESC Extreme	Clamp22	Clamp	Sec 6:WVGD10	0.000	1.050	0.312	1.095
NESC Extreme	Clamp23	Clamp	Sec 6:WVGD11	0.000	1.050	0.312	1.095

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	61.852	-4.111	65.140	6370.862	-501.381	51.658
NESC Extreme	66.140	-4.221	27.979	6819.435	-463.362	12.115

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	3057.4
Weight of Steel Poles:	38470.4
Total:	41527.7

*** End of Report

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 176 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 82.1 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 28$ (User Input)

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

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

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

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

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

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

Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.9 \times 10^3 \, lbf$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 902.8 \, psi$

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

Shear Stress Permitted = $F_v := 0.35 F_y = 26.25 \cdot ksi$

Permitted Axial Tensile Stress in Conjuction with Shear = $F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 74.96 \cdot ksi$

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 72.3 \cdot \%$

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

Condition1 = "OK"

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 7951 \cdot ft \cdot kips \cdot 1.1 = 8746 \cdot ft \cdot kips$	(User Input)	
Shear Force =	$Shear := 82.1 \cdot kip \cdot 1.1 = 90 \cdot ft \cdot kips$	(User Input)	
Axial Force =	$Axial := 70.3 \cdot kip \cdot 1.1 = 77 \cdot ft \cdot kips$	(User Input)	
Tower Height =	$H_t := 148 \cdot ft$	(User Input)	

Footing Data:

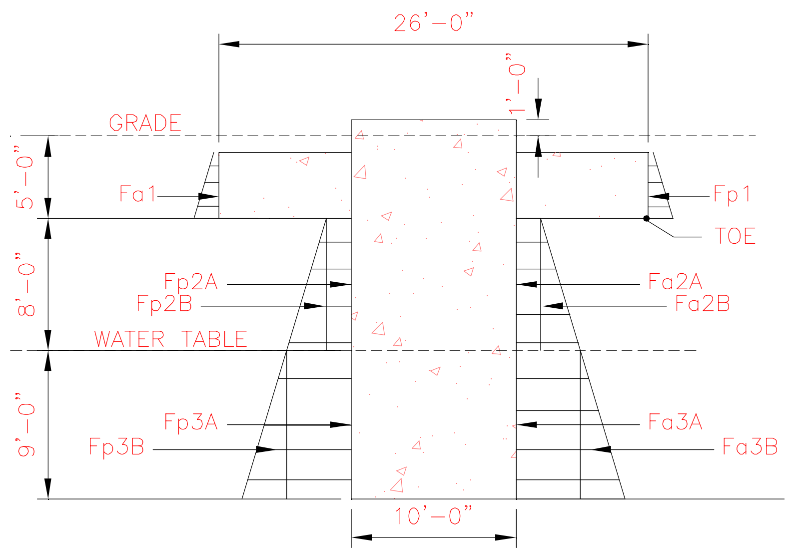
Overall Depth of Footing =	$D_f := 22 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 23 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 1 \cdot ft$	(User Input)	
Diameter of Cassion =	$d_p := 10 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 26 \cdot ft$	(User Input)	
Water Depth =	$D_{water} := 13 \cdot ft$	(User Input)	
Distance From Grade to Bottom of Pad =	$d_f := 5 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 9000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Submerged Soil Unit Weight =	$\gamma_{soil.sub} := 60 \cdot pcf$		
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 1$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 1.0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)

Pad Reinforcement:

Bar Size =	$BS_{top} := 8$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.00 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 21$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 8$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.00 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 21$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)



Calculated Factors:

Pad Top Reinforcement Bar Area = $A_{btop} := \dfrac{\pi \cdot d_{btop}^{2}}{4} = 0.785 \cdot in^{2}$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \dfrac{\pi \cdot d_{bbot}^{2}}{4} = 0.785 \cdot in^{2}$

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

$Ka := \dfrac{(1 - \sin(\Phi_s))}{(1 + \sin(\Phi_s))} = 0.333$

Stability of Footing:

Passive Pressure 1 = $P_{p1.top} := K_p \cdot \gamma_{soil} \cdot n = 0.3 \cdot ksf$

$P_{p1.bot} := K_p \cdot \gamma_{soil} \cdot (T_f + n) = 1.5 \cdot ksf$

$P_{p1.ave} := \frac{P_{p1.top} + P_{p1.bot}}{2} = 0.9 \cdot ksf$

Active Pressure 1 = $P_{a1.top} := Ka \cdot \gamma_{soil} \cdot n = 0.033 \cdot ksf$

$P_{a1.bot} := Ka \cdot \gamma_{soil} \cdot (T_f + n) = 0.167 \cdot ksf$

$P_{a1.ave} := \frac{P_{a1.top} + P_{a1.bot}}{2} = 0.1 \cdot ksf$

Area of Pressure 1 = $A_{p1} := T_f \cdot W_f = 104$

Forces 1 = $F_{p1} := P_{p1.ave} \cdot A_{p1} = 93.6 \cdot kip$

$F_{a1} := P_{a1.ave} \cdot A_{p1} = 10.4 \cdot kip$

Ultimate Shear 1 = $S_{u1} := (F_{p1} - F_{a1}) = 83.2 \cdot kip$

Passive Pressure 2 = $P_{p2.top} := K_p \cdot \gamma_{soil} \cdot (T_f + n) = 1.5 \cdot ksf$

$P_{p2.bot} := K_p \cdot \gamma_{soil} \cdot D_{water} = 3.9 \cdot ksf$

Active Pressure 2 = $P_{a2.top} := Ka \cdot \gamma_{soil} \cdot (T_f + n) = 0.167 \cdot ksf$

$P_{a2.bot} := Ka \cdot \gamma_{soil} \cdot D_{water} = 0.433 \cdot ksf$

Area of Pressure 2 = $A_{p2} := (D_{water} - d_f) \cdot d_p = 80$

Forces 2 = $F_{p2A} := P_{p2.top} \cdot A_{p2} = 120 \cdot kips$

$F_{a2A} := P_{a2.top} \cdot A_{p2} = 13.3 \cdot kips$

$F_{p2B} := \frac{1}{2} \cdot (P_{p2.bot} - P_{p2.top}) \cdot A_{p2} = 96 \cdot kips$

$F_{a2B} := \frac{1}{2} \cdot (P_{a2.bot} - P_{a2.top}) \cdot A_{p2} = 10.7 \cdot kips$

Ultimate Shear 2 = $S_{u2A} := (F_{p2A} - F_{a2A}) = 106.7 \cdot kip$

$S_{u2B} := F_{p2B} - F_{a2B} = 85.3 \cdot kip$

Passive Pressure 3 = $P_{p3.top} := K_p \cdot \gamma_{soil.sub} \cdot D_{water} = 2.34 \cdot ksf$

$P_{p3.bot} := K_p \cdot \gamma_{soil.sub} \cdot D_f = 3.96 \cdot ksf$

Active Pressure 3 = $P_{a3.top} := Ka \cdot \gamma_{soil.sub} \cdot D_{water} = 0.26 \cdot ksf$

$P_{a3.bot} := Ka \cdot \gamma_{soil.sub} \cdot D_f = 0.44 \cdot ksf$

Area of Pressure 3 = $A_{p3} := (D_f - D_{water}) \cdot d_p = 90$

Forces 3 = $F_{p3A} := P_{p3.top} \cdot A_{p3} = 210.6 \cdot kips$

$F_{a3A} := P_{a3.top} \cdot A_{p3} = 23.4 \cdot kips$

$F_{p3B} := \frac{1}{2} \cdot (P_{p3.bot} - P_{p3.top}) \cdot A_{p3} = 72.9 \cdot kips$

$F_{a3B} := \frac{1}{2} \cdot (P_{a3.bot} - P_{a3.top}) \cdot A_{p3} = 8.1 \cdot kips$

Ultimate Shear 3 = $S_{u3A} := (F_{p3A} - F_{a3A}) = 187.2 \cdot kip$

$S_{u3B} := F_{p3B} - F_{a3B} = 64.8 \cdot kip$

Weight of Concrete = $WT_c := \left[\frac{d_p^{\,2} \cdot \pi}{4} L_p + \left(W_f^{\,2} - \frac{d_p^{\,2} \cdot \pi}{4}\right) \cdot T_f\right] \cdot \gamma_{conc} = 629.44 \cdot kip$

Weight of Soil Above Pad = $WT_s := \left[\left(W_f^{\,2} - \frac{d_p^{\,2} \cdot \pi}{4}\right) \cdot n\right] \cdot \gamma_{soil} = 59.75 \cdot kip$

Total Weight = $W_{tot} := WT_c + WT_s + Axial = 766.514 \cdot kips$

Overturning Moment = $M_{ot} := OM + Shear \cdot (d_f + L_{pag}) = 9288 \cdot kip \cdot ft$

Resisting Moment =

$$M_r := (W_{tot}) \cdot \frac{W_f}{2} + S_{u1} \cdot T_f \cdot \frac{1}{3} + S_{u2A} \cdot \frac{(D_{water} - d_f)}{2} + S_{u2B} \cdot \frac{2 \cdot (D_{water} - d_f)}{3} + S_{u3A} \cdot \left[\frac{(D_f + D_{water})}{2} - d_f\right] + S_{u3B} \cdot \left(\frac{2 \cdot D_f}{3} + \frac{D_{water}}{3} - d_f\right) = 14205 \cdot kip \cdot ft$$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.53$

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

Overturning_Check := if(FS ≥ FS_{req}, "Okay", "No Good")

Overturning_Check = "Okay"

Bearing Pressure Check:

Area of Mat = $A_{mat} := W_f^2 = 676$

Section Modulus of Mat = $S_{mat} := \frac{W_f^3}{6} = 2929$

Required Moment Resistance of Slab = $M := OM + S_{u1} \cdot \left(T_f - \frac{T_f}{3}\right) - S_{u2A} \cdot \left(\frac{D_f - d_f}{2} + T_f\right) - S_{u2B} \cdot \left[\frac{2 \cdot (D_f - d_f)}{3} + T_f\right] = 6326 \cdot k \cdot ft$

Note: Bending Moment in slab due to to calculated soil resistance

Maximum Pressure in Mat = $P_{max} := \frac{W_{tot}}{A_{mat}} + \frac{M}{S_{mat}} = 3.293 \cdot ksf$

Max_Pressure_Check := if($P_{max} < q_s$, "Okay" , "No Good")

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{W_{tot}}{A_{mat}} - \frac{M}{S_{mat}} = -1.026 \cdot ksf$

Min_Pressure_Check := if[$(P_{min} \geq 0) \cdot (P_{min} < q_s)$, "Okay" , "No Good"]

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 6.609$

Distance to Kern = $X_k := \frac{W_f}{6} = 4.333$

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

Eccentricity = $e := \frac{M}{W_{tot}} = 8.253$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot W_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 4.141 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 4.141 \cdot ksf$

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

Pressure_Check = "Okay"

Pad Reinforcement:

$$d := T_f - Cvr_{pad} - d_{bbot}$$

$$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$$

$$L := \left(\frac{W_f}{2} - e\right) \cdot 3$$

$$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$$

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$$q_b := q_{adj} - d_1 \cdot Slope = 1.814 \cdot ksf$$

Maximum Bending at Face of Pier = $M_n := \frac{1}{\phi_m} \cdot \left[\left(q_{adj} - q_b\right) \cdot \frac{d_1^{\,2}}{3} + q_b \cdot \frac{d_1^{\,2}}{2}\right] \cdot W_f = 3110.9 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[\left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right] \cdot 0.5\right]\right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-2008 10.2.7.3)

$$R_u := \frac{M_n}{\phi_m \cdot W_f \cdot d^2} = 68.7 \cdot psi$$

$$\rho := \frac{0.85 \cdot f_c}{f_y}\left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f_c}}\right) = 0.0012$$

$$\rho_{min} := 1.333 \cdot \rho = 0.00154$$

Required Reinforcement for Temperature and Shrinkage:

$h := 48 \cdot in$

(Temperature and Shrinkage steel shall be evenly distributed between top and bottom of pad)

$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$ (ACI -2008 7.12.2.1)

$As := \rho_{sh} \cdot \frac{W_f}{2} \cdot h = 13.5 \cdot in^2$

$As_{prov} := A_{bbot} \cdot NB_{bot} = 16.5 \cdot in^2$

$Temp\_Reinforcement := if(As_{prov} > As, \text{"Okay"}, \text{"No Good"})$

$Temp\_Reinforcement = \text{"Okay"}$

Development Length Pad Reinforcement:

Bar Spacing = $B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 14.25 \cdot in$

Spacing or Cover Dimension = $c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$

Transverse Reinforcement Index = $k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 25.4 \cdot in$

Minimum Development Length = $L_{dbmin} := 12 \cdot in$ (ACI-2008 12.2.1)

$L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"})$

Available Length in Pad = $L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 93 \cdot in$

$Lpad\_Check := if(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$

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

RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Section 1 - Site Information

Site ID: CT11446A
Status: Draft
Version: 2.5
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 5/14/2018 11:37:39 AM
Last Modified By: GSM1900\VJaini

Site Name: CL&P Monopole, Windsor
Site Class: Monopole
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: CL&P

Latitude: 41.8256844800
Longitude: -72.6675063100
Address: Off of Rood Road Pole #20073, Line 1779
City, State: Windsor, CT
Region: NORTHEAST

RAN Template: 67D94DB Indoor (evolved from 4B)
AL Template: 67D94DB_1xAIR+1OP

Sector Count: 3 | **Antenna Count:** 6 | **Coax Line Count:** 30 | **TMA Count:** 0 | **RRU Count:** 0

Section 2 - Existing Template Images

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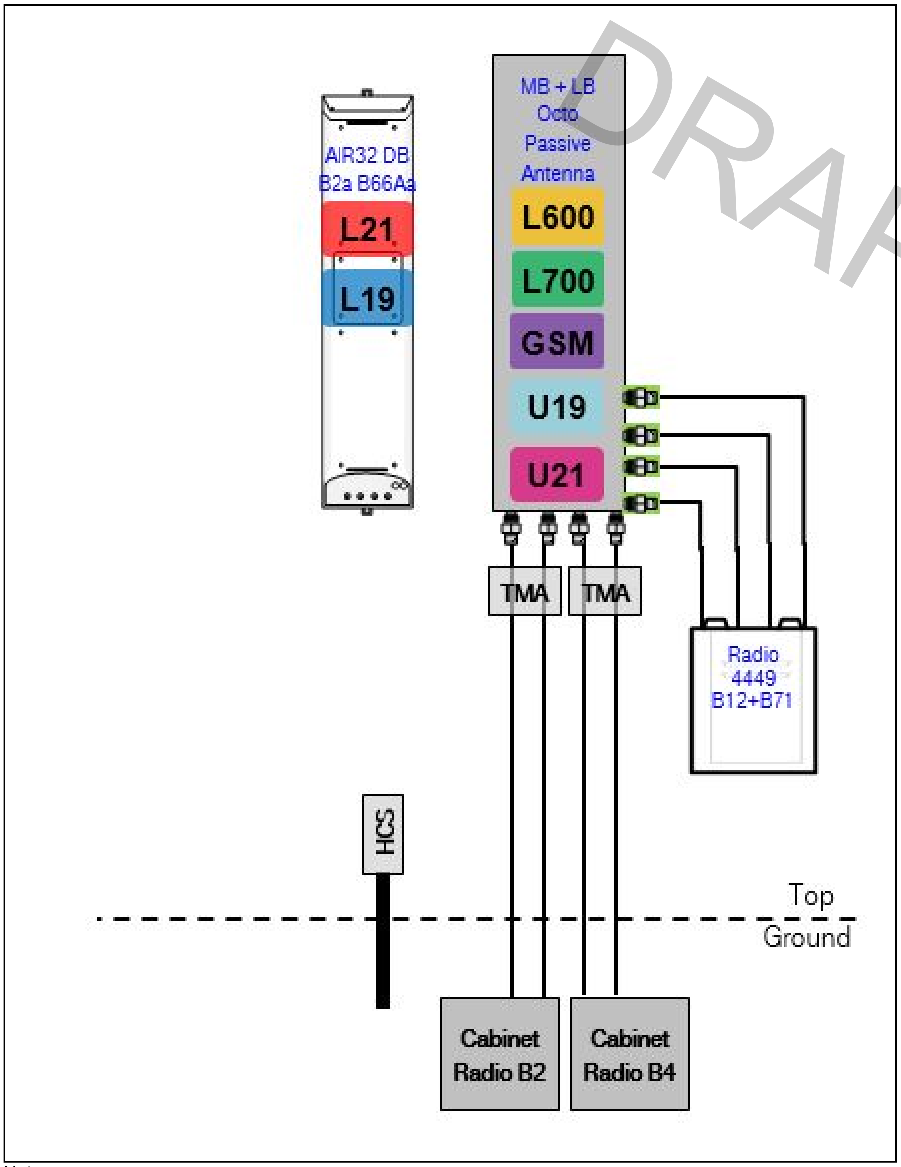
Section 3 - Proposed Template Images

67D94DB_1xAIR+1OP.JPG



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704Bu

Enclosure	1	2
Enclosure Type	RBS 6102	RBS 3106
Baseband	DUG20, DUL20, DUW30 **(x2)**, DUS41	
Radio	RUS01 B2 **(x6)**, RUS01 B4 **(x6)**	

Proposed RAN Equipment

Template: 67D94DB Indoor (evolved from 4B)

Enclosure	1	2
Enclosure Type	RBS 6201	Ancillary Equipment
Baseband	BB 5216 (L2100, L1900, L700, L600), DUW30 (U2100), DUW30 (U1900 (DECOMMISSIONED)), DUG20 (G1900)	
Multiplexer	XMU	
Radio	RUS01 B2 **(x3)** (G1900), RUS01 B2 **(x3)** (U1900 (DECOMMISSIONED)), RUS01 B4 **(x6)** (U2100)	

RAN Scope of Work:

RAN Template: 67D94DB Indoor (evolved from 4B)	A&L Template: 67D94DB_1xAIR+1OP	Power System Template: Custom

CT11446A_L600_2.5_draft

Section 6 - A&L Equipment

Existing Template: 704Bu
Proposed Template: 67D94DB_1xAIR+1OP

Sector 1 (Existing) view from behind			
Coverage Type	A - Outdoor Macro		
Antenna	1		2
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Andrew - LNX-6515DS-A1M (Dual)
Azimuth	30		30
M. Tilt	0		0
Height	161		155
Ports	P2	P1	P3
Active Tech.	U2100 L2100	G1900	L700
Dark Tech.			
Restricted Tech.			
Decomm. Tech.		U1900	
E. Tilt	5	2	2
Cables	1-5/8" Coax - 180 ft. **(x4)**	1-5/8" Coax - 180 ft. **(x4)**	1-5/8" Coax - 180 ft. **(x4)**
TMAs	Generic Twin Style 1B - AWS (AtAntenna)	Generic Twin Style 1A - PCS (AtAntenna)	
Diplexers / Combiners			
Radio			RRUS11 B12 (At Antenna)
Sector Equipment			

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Sector 1 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	30		30			
M. Tilt	0		0			
Height	161		155			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2100	L1900		U2100 G1900	L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**		1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**
TMAs						
Diplexers / Combiners				Generic AWS/PCS Diplexer (AtCabinet)		
Radio					Radio 4449 B71+B12 (At Cabinet)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro		
Antenna	1		2
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Andrew - LNX-6515DS-A1M (Dual)
Azimuth	150		150
M. Tilt	0		0
Height	161		155
Ports	P1	P2	P3
Active Tech.	G1900	U2100 L2100	L700
Dark Tech.			
Restricted Tech.			
Decomm. Tech.	U1900		
E. Tilt	2	5	2
Cables	1-5/8" Coax - 180 ft. **(x4)**	1-5/8" Coax - 180 ft. **(x4)**	1-5/8" Coax - 180 ft. **(x4)**
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)	
Diplexers / Combiners			
Radio			RRUS11 B12 (At Antenna)
Sector Equipment			

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	150		150			
M. Tilt	0		0			
Height	161		155			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2100	L1900		U2100 G1900	L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**		1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**
TMAs						
Diplexers / Combiners				Generic AWS/PCS Diplexer (AtCabinet)		
Radio					Radio 4449 B71+B12 (At Cabinet)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Sector 3 (Existing) view from behind			
Coverage Type	A - Outdoor Macro		
Antenna	1		2
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Andrew - LNX-6515DS-A1M (Dual)
Azimuth	270		270
M. Tilt	0		0
Height	161		155
Ports	P1	P2	P3
Active Tech.	G1900	U2100 L2100	L700
Dark Tech.			
Restricted Tech.			
Decomm. Tech.	U1900		
E. Tilt	2	5	2
Cables	1-5/8" Coax - 180 ft. **(x4)**	1-5/8" Coax - 180 ft. **(x4)**	1-5/8" Coax - 180 ft. **(x4)**
TMAs	Generic Twin Style 1A - PCS (AtAntenna)	Generic Twin Style 1B - AWS (AtAntenna)	
Diplexers / Combiners			
Radio			RRUS11 B12 (At Antenna)
Sector Equipment			

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94DB Indoor (evolved from 4B)	67D94DB_1xAIR+1OP	Custom

CT11446A_L600_2.5_draft

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	270		270			
M. Tilt	0		0			
Height	161		155			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	L2100	L1900		U2100 G1900	L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**		1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**	1-5/8" Coax - 180 ft. **(x2)**
TMAs						
Diplexers / Combiners				Generic AWS/PCS Diplexer (AtCabinet)		
Radio					Radio 4449 B71+B12 (At Cabinet)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

RAN Template: 67D94DB Indoor (evolved from 4B)	A&L Template: 67D94DB_1xAIR+1OP	Power System Template: Custom

CT11446A_L600_2.5_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

Proposed Power Systems Equipment

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- 24 Inch Width For Easier Zoning
- Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality
- Superior elevation pattern performance across the entire electrical down tilt range
- Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.
- Low band arrays driven by a single RET motor

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

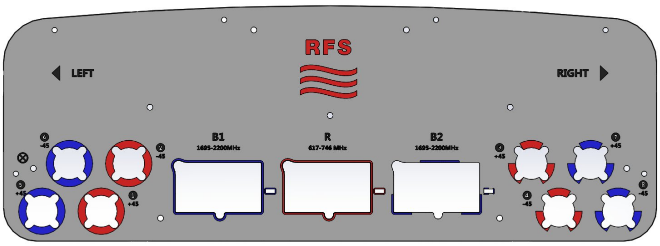
Impedance	Ohm	50.0
Polarization	Deg	±45°

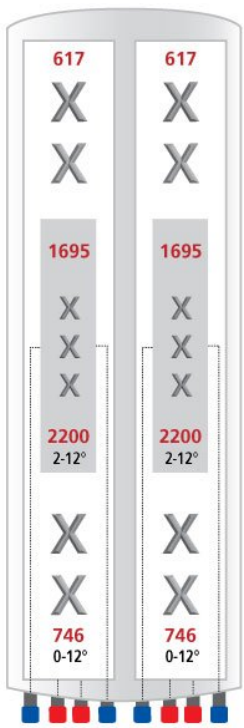
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

Exhibit E

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11446A

CL&P Monopole Windsor
Off of Rood Road Pole #20073, Line 1779
Windsor, CT 06095

March 16, 2019

EBI Project Number: 6219000750

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**1.83 %**

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

March 16, 2019

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11446A – CL&P Monopole Windsor**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **Off of Rood Road Pole #20073, Line 1779, Windsor, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm^2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **Off of Rood Road Pole #20073, Line 1779, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

7) Cable losses were factored in the calculations for this site. Since all of the proposed radios are ground mounted the following cable loss values were used. For each ground mounted 600 MHz radio there was 0.93 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 700 MHz radio there was 1.01 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 1900 MHz (PCS) radio there was 1.85 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 2100 MHz (AWS) radio there was 1.91 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 180 feet of 1-5/8" coax

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

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

10) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** & the **RFS APXVAARR24_43-U-NA20** for 600 MHz, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerlines of the proposed antennas are **161 feet** and **154 feet** above ground level (AGL).

12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

13) All calculations were done with respect to uncontrolled / general population threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	161 feet	Height (AGL):	161 feet	Height (AGL):	161 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	5,526.37	ERP (W):	5,526.37	ERP (W):	5,526.37
Antenna A1 MPE%	**0.83**	Antenna B1 MPE%	**0.83**	Antenna C1 MPE%	**0.83**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 / 15.65 / 16.35 dBd	Gain:	12.95 / 13.35 / 15.65 / 16.35 dBd	Gain:	12.95 / 13.35 / 15.65 / 16.35 dBd
Height (AGL):	154 feet	Height (AGL):	154 feet	Height (AGL):	154 feet
Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	175	Total TX Power(W):	175	Total TX Power(W):	175
ERP (W):	3,431.06	ERP (W):	3,431.06	ERP (W):	3,431.06
Antenna A2 MPE%	**1.00**	Antenna B2 MPE%	**1.00**	Antenna C2 MPE%	**1.00**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.83 %**
No Additional Carriers	**NA**
Site Total MPE %:	**1.83 %**

T-Mobile Sector A Total:	1.83 %
T-Mobile Sector B Total:	1.83 %
T-Mobile Sector C Total:	1.83 %
Site Total:	1.83 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,114.45	161	3.35	PCS - 1900 MHz	1000.00	0.34%
T-Mobile AWS - 2100 MHz LTE	2	1,648.74	161	4.93	AWS - 2100 MHz	1000.00	0.49%
T-Mobile 600 MHz LTE	2	636.88	154	2.09	600 MHz	400.00	0.52%
T-Mobile 700 MHz LTE	2	342.79	154	1.13	700 MHz	467.00	0.24%
T-Mobile PCS - 1900 MHz GSM	1	359.82	154	0.59	PCS - 1900 MHz	1000.00	0.06%
T-Mobile AWS - 2100 MHz UMTS	1	1,111.89	154	1.82	AWS - 2100 MHz	1000.00	0.18%
						Total:	**1.83%**

Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	1.83 %
Sector B:	1.83 %
Sector C:	1.83 %
T-Mobile Maximum MPE % (Per Sector):	1.83 %
Site Total:	1.83 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **1.83%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Exhibit F

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

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

July 17, 2019

Mr. Mark Richard
T-Mobile
35 Griffin Rd. South
Bloomfield, CT 06002

RE: T-Mobile Antenna Site CT-11446A, Rood Avenue, Windsor, CT, Eversource Structure 20073

Dear Mr. Richard:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at 860-728-4503.

Sincerely,

Joel Szarkowicz
Transmission Line Engineering

Ref: 18098.01 - CT11446A Structural Analysis Rev 3 19.02.12
18098.01 CT11446A CD Rev.1 19.05.29 (S&S)

Exhibit G

Click-N-Ship®

UNITED STATES POSTAL SERVICE®

P

usps.com
$7.75
US POSTAGE
Flat Rate Env

9405 5036 9930 0081 8517 36 0077 5000 0010 6037

10/14/2020 Mailed from 01566 062S0000001301

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 10/17/20
Ref#: 446-ANC
0006

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Carrier -- Leave if No Response

C015

SHIP TO: CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

USPS TRACKING #

9405 5036 9930 0081 8517 36

Electronic Rate Approved #038555749

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Instructions

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2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0081 8517 36

Trans. #:	510172235	Priority Mail® Postage:	$7.75
Print Date:	10/13/2020	Total:	$7.75
Ship Date:	10/14/2020		
Expected Delivery Date:	10/17/2020		

From: DEBORAH CHASE Ref#: 446-ANC
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

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P

usps.com
$7.75
US POSTAGE
Flat Rate Env

9405 5036 9930 0081 8518 11 0077 5000 0010 6051

10/14/2020 Mailed from 01566 062S0000000312

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 10/17/20
Ref#: 446-ANCH

0006

Carrier -- Leave if No Response

C006

SHIP TO:
LISA A MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

USPS TRACKING #

9405 5036 9930 0081 8518 11

Electronic Rate Approved #038555749

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4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :

9405 5036 9930 0081 8518 11

Trans. #:	510172235
Print Date:	10/13/2020
Ship Date:	10/14/2020
Expected Delivery Date:	10/17/2020

Priority Mail® Postage:	$7.75
Total:	$7.75

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Ref#: 446-ANCH

To: LISA A MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

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Check the status of your shipment on the USPS Tracking® page at usps.com

Click-N-Ship®

UNITED STATES POSTAL SERVICE®

9405 5036 9930 0081 8518 66 0077 5000 0010 6095

usps.com
$7.75
US POSTAGE
Flat Rate Env

P

10/14/2020 Mailed from 01566 062S0000001310

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 10/17/20

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Ref#: 446-ANCH

0006

Carrier -- Leave if No Response

C036

SHIP TO:
ERIC BARZ
WINDSOR-TOWN PLANNER
275 BROAD ST
WINDSOR CT 06095-2940

USPS TRACKING #

9405 5036 9930 0081 8518 66

Electronic Rate Approved #038555749

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Instructions

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2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :

9405 5036 9930 0081 8518 66

Trans. #:	510172235	Priority Mail® Postage:	**$7.75**
Print Date:	10/13/2020	Total:	**$7.75**
Ship Date:	10/14/2020		
Expected Delivery Date:	10/17/2020		

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Ref#: 446-ANCH

To: ERIC BARZ
WINDSOR-TOWN PLANNER
275 BROAD ST
WINDSOR CT 06095-2940

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

UNITED STATES POSTAL SERVICE ®

Click-N-Ship®

P

usps.com
$7.75
US POSTAGE
Flat Rate Env

9405 5036 9930 0081 8519 10 0077 5000 0010 6095

10/14/2020

Mailed from 01566 062S0000000309

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 10/17/20
Ref#: 446-ANCH

0006

Carrier -- Leave if No Response

C036

SHIP TO: DONALD TRINKS
MAYOR- TOWN OF WINDSOR
275 BROAD ST
WINDSOR CT 06095-2940

USPS TRACKING #

9405 5036 9930 0081 8519 10

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # :

9405 5036 9930 0081 8519 10

Trans. #:	510172235	Priority Mail® Postage:	$7.75
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STURBRIDGE MA 01566-1359

Ref#: 446-ANCH

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MAYOR- TOWN OF WINDSOR
275 BROAD ST
WINDSOR CT 06095-2940

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UNITED STATES POSTAL SERVICE ®

Thank you for shipping with the United States Postal Service!

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Exhibit H

Deborah Chase

From: Deborah Chase
Sent: Tuesday, October 13, 2020 3:53 PM
To: 'barz@townofwindsorct.com'
Cc: 'TownCouncil@townofwindsorct.com'; 'Gelinas, Christopher'
Subject: OFF OF ROOD ROAD,POLE # 20073,LINE #1779 WINDSOR CT 06095 T-MOBILE EM APPLICATION (CT11446A-ANCHOR)
Attachments: OFF OF ROOD ROAD,POLE #20073,LINE 1779 WINDSOR, CT 06095 T-MOBILE EM APPLICATION (CT114446A-ANCHOR).pdf

Good afternoon,

On behalf of our client, (T-Mobile), I am forwarding copies of T-Mobile's Exempt Modification Request to collocate on a wireless telecommunications facility located At Off of Rood Road in Windsor, CT.
Hard copies will be sent as well for your records.

Please do not hesitate to contact me with any questions regarding T-Mobile's Exempt Modification Request.
Thank you very much

Deborah Chase
Senior Project Coordinator & Analyst
Mobile: 860-490-8839

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
www.northeastsitesolutions.com

Save a tree. Refuse.Reduce. Reuse. Recycle.