NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

January 11, 2021

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

RE: Notice of Exempt Modification
8 Chimney Drive, Bethel CT 06801
Latitude: 41.41080000
Longitude: -73.40020000
T-Mobile Site#: CT11110C_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antenna at the 154-foot and 162-foot level of the existing 145-foot transmission pole (#10256) located at 8 Chimney Drive, Bethel CT. The electric transmission pole (#10256) is owned by CL&P d/b/a Eversource. The property which holds the utility easement is owned by CL&P d/b/a Eversource. T-Mobile now intends to install three (3) new 600/700/1900/2100 MHz 5G antenna. The new antenna would be installed at the 162-foot level of the tower. T-Mobile also intends to make the following modifications.

Planned Modifications:
Remove: NONE

Remove and Replace:
(3) LNX 6512DS-A1M Antenna (Remove) - (3) RFS APXVAARR24_42-U-NA20- 600/700/1900 MHz **5G** Antenna (Replace)

Install New:
(6) 1-5/8” Coax

Existing to Remain:
(3) APX18-20914- 2100 MHz Antenna
(3) Smart Bias-T
(12) 1-5/8” Coax

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Turnkey Wireless Development

This facility was approved by the CT Siting Council. Per the attached Petition No. 457 – Dated May 10, 2000. T-Mobile (formally Voicestream) received approval to install on the existing transmission tower, with a total height of 175’-4”. 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 First Selectman Matthew Knickerbocker, Elected Official and Beth Cavagna, Planning Director for the Town of Bethel, 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, Unit 2, Sturbridge MA 01566
Email: victoria@northeastsitesolutions.com

Attachments
cc: First Selectman, Matthew Knickerbocker– as elected official
Beth Cavagna- Planning Director/Town Planner
CL&P d/b/a Eversource - as tower owner & property owner

54 Main Street Unit 3 | Sturbridge Ma 01566 | f: 413-521-0558 | www.northeastsitesolutions.com

Exhibit A

Petition No. 457
Voicestream Wireless
Bethel, Connecticut
Staff Report
May 10, 2000

On May 4, 2000, Connecticut Siting Council (Council) member Gerald J. Heffernan, and Fred Cunliffe of Council staff met Voicestream Wireless (Voicestream) representatives J. Brendan Sharkey, Esq., Chetan Dharduk, and Brian Raggazine for inspection of a Connecticut Light & Power Company (CL&P) electric transmission line structure (no. 10256) located off Chimney Drive, Bethel. Voicestream, with the agreement of CL&P, proposes to modify the transmission structure 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.

Voicestream proposes to attach a 4.5-inch diameter pipe extending the existing monopole height of 150 feet by 25 feet 4 inches for a total height of 175 feet 4 inches. A structural analysis concludes no additional reinforcement is necessary. No microwave antenna is proposed as depicted in the antenna drawing. Voicestream proposes to install two low profile antenna cluster mounts with centers of radiation at 173 feet and 163 feet 4 inches on the pipe, and place associated equipment cabinets on a concrete foundation within a 10-foot by 20-foot compound secured by a six-foot chain link fence. Utilities would be placed underground 150 feet from an existing electric transformer and telephone junction box to the site. No trees would be cleared to install the utilities.

The proposed site is within a CL&P easement within a residential area. The nearest home is across Chimney Drive approximately 200 feet west of the site with other homes nearby. The same trees not to be cleared for installation of utilities would provide a buffer to these homes.

The worst case power density for the telecommunications operations at the site has been calculated to be less than 3.6% of the applicable standard for uncontrolled environments.

Voicestream contends that the proposed installation will not cause a substantial adverse environmental effect, and for this reason would not require a Certificate.

Exhibit B

Bethel, CT : Residential Property Record Card

[Back to Search Results] [Start a New Search][Help with Printing]

Search For Properties

Account	Map Block Lot	Street #	Street Name

Search
Reset Search

Account	Card	Map-Block-Lot	Location	Zoning	State Class	Acres
R01101	1	59 091 49	8 CHIMNEY DRIVE	R-30	130 - Developable Land	3.060

Living Units
0

Owner Information

Conn Light & Power Co % Tax Department
Po Box 270
Hartford CT 061410270

Property Picture

Deed Information

Book/Page:	1006/996
Deed Date:	2011/09/07

Dwelling Information

Style:	
Story Height:	0
Attic:	
Basement:	
Year Built:	0
Ground Flr Area:	0
Tot Living Area:	0
Rooms:	0
Bedrooms:	0
Full Baths:	0
Half Baths:	0
Ext Walls:	
Finished Basement Size:	0
Rec Room Size:	0 x 0
WB FP Stacks/Openings	0 / 0
MT FP Stacks/Openings	0 / 0
Heating Type:	Undefined
Fuel Type:	
System Type:	None

Valuation

Land:	$159,810
Building:	$0
Total:	$159,810
Net Assessment:	$111,870

Sales History

Book/Page	Date	Price	Type	Validity
1006/996	2011/09/07	$0	Land Only	04

Permit History

Date	Purpose	Price

Out Building Information

Type	Qty	Year	Size1	Size2	Grade	Cond

Building Sketch

	Descriptor/Area

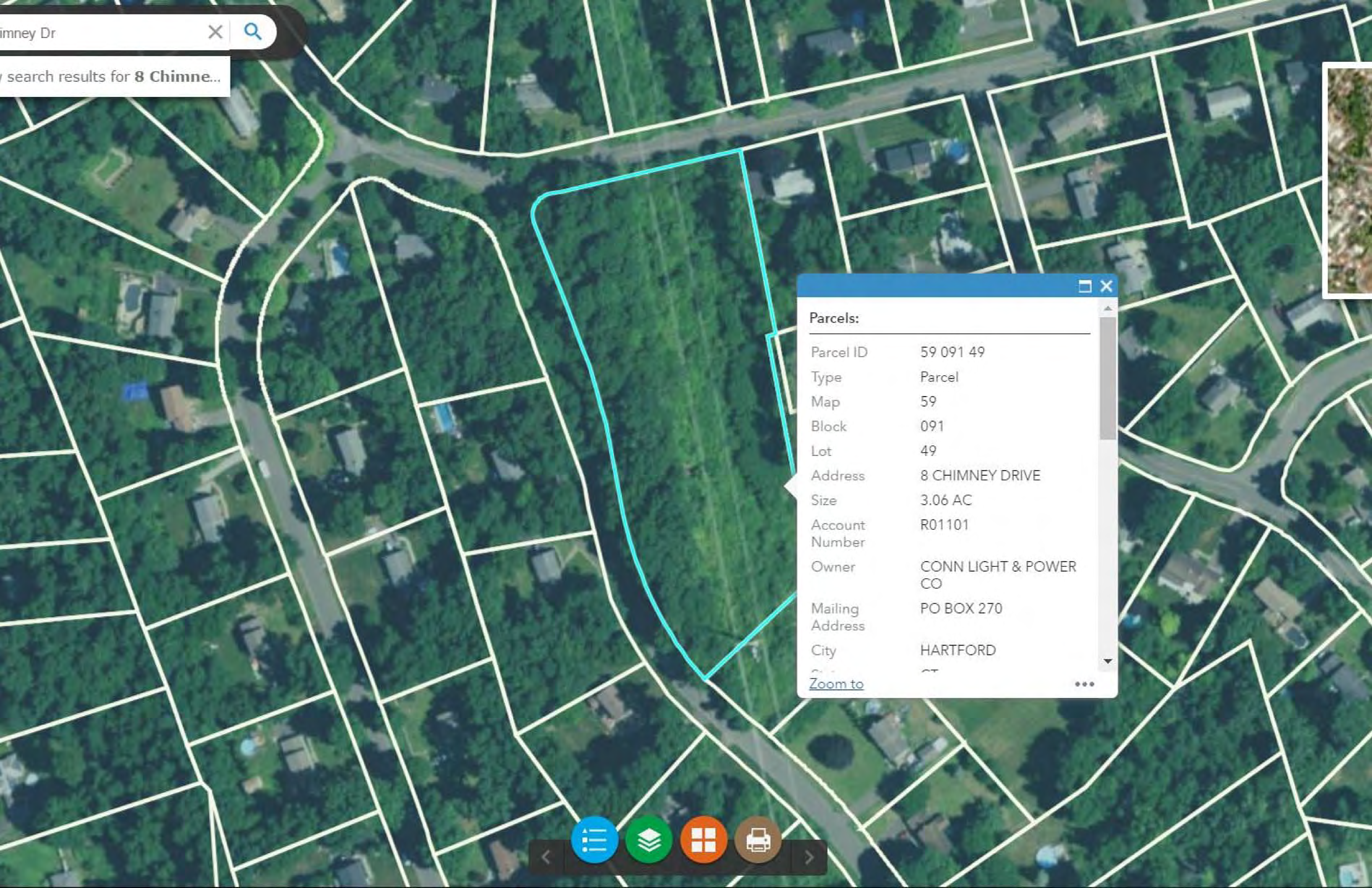
Notice

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Bethel, CT.

The providers of this database: CLT, Big Room Studios, and Bethel, CT assume no liability for any error or omission in the information provided here.

Currently All Values Have Not Been Finalized and Are Subject To Change.

Comments regarding this service should be directed to: Assessor@betheltownhall.org



imney Dr
search results for 8 Chimne...
Parcels:
Parcel ID 59 091 49
Type Parcel
Map 59
Block 091
Lot 49
Address 8 CHIMNEY DRIVE
Size 3.06 AC
Account Number R01101
Owner CONN LIGHT & POWER CO
Mailing Address PO BOX 270
City HARTFORD
Zoom to

Exhibit C

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

DANBURY/I-84/X8
SITE ID: CT11110C
8 CHIMNEY DRIVE
EVERSOURCE STRUCTURE: #10256
BETHEL, CT 06801

T-MOBILE RF CONFIGURATION

67D04B_1QP+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, 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 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

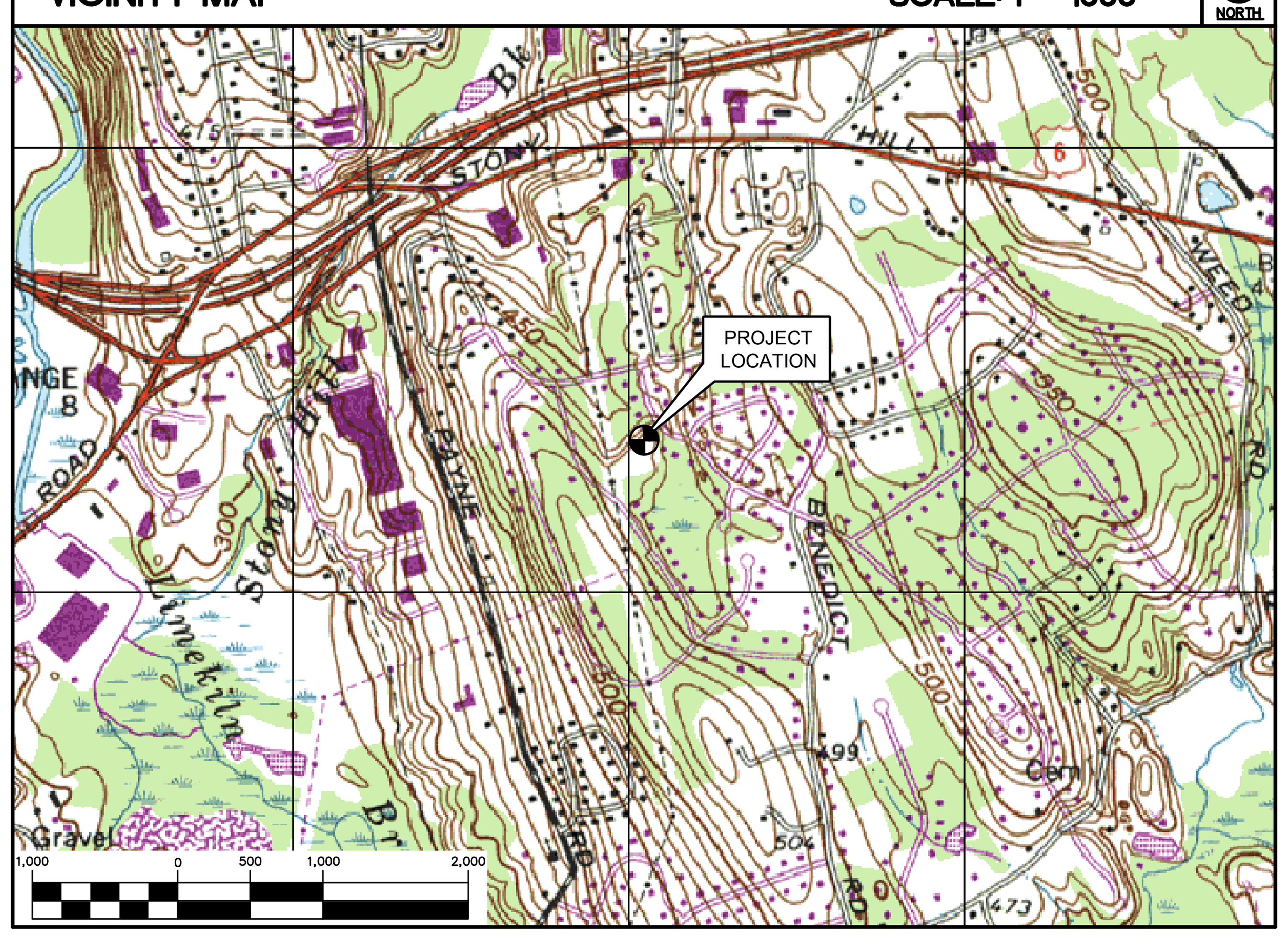
TO: 8 CHIMNEY DRIVE (POLE #10256)
BETHEL, CT 06801

1.	START OUT GOING NORTH ON GRIFFIN RD TOWARD HARTMAN RD.	0.30 MI.
2.	TAKE THE SECOND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE FIRST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187. CONTINUE TO FOLLOW CT-187	0.64 MI.
4.	STAY STRAIGHT TO GO ONTO BLUE ILLS AVE/CT-187.	1.24 MI.
5.	TURN LEFT ONTO OLD WINDSOR RD/CT-305. CONTINUE TO FOLLOW CT-305.	2.33 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD.	5.66 MI.
7.	MERGE ONTO I-84 W VIA EXIT 32A TOWARD WATERBURY.	53.97 MI.
8.	MERGE ONTO NEWTOWN RD VIA EXIT 8 TOWARD BETHEL.	0.48 MI.
9.	TURN SLIGHT LEFT TOWARD I-84 E.	0.07 MI.
10.	TURN SLIGHT LEFT ONTO ROUTE 6/US-6 E. CONTINUE TO FOLLOW US-6 E.	0.38 MI.
11.	TURN RIGHT ONTO SKY EDGE DR.	0.20 MI.
12.	SKY EDGE DR BECOMES SKY EDGE LN.	0.08 MI.
13.	TURN RIGHT ONTO CHIMNEY DR.	0.12 MI.
14.	8 CHIMNEY DR, BETHEL, CT 06801-1225, 8 CHIMNEY DR IS ON THE LEFT.	

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. REPLACE (1) DUS31 WITH (1) BB6630 FOR LTE
   - B. INSTALL (1) BB6630 FOR FUTURE 5G N600
   - C. REMOVE (1) XMU
   - D. ADD (6) COAXIAL LINES
   - E. REMOVE AND REPLACE (3) EXISTING RRU'S WITH (3) NEW RRU'S (P/N: RADIO 4449 B71+B12)
   - F. REMOVE AND REPLACE (3) EXISTING ANTENNAS FOR (3) NEW OCTO-PORT ANTENNAS, (1) PER SECTOR
   - G. INSTALL (1) 2.0 STD (x 9'-0" LONG) VERTICAL PIPE MAST PER SECTOR. TOTAL (3)

PROJECT INFORMATION

SITE NAME:	DANBURY/I-84/X8
SITE ID:	CT11110C
SITE ADDRESS:	8 CHIMNEY DR EVERSOURCE STRUCTURE: #10256 BETHEL, CT 06801
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	SHELDON FREINCLE (PROJECT MANAGER) NORTHEAST SITE SOLUTIONS (203) 776-8521
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-24'-38.90" N LONGITUDE: 73°-24'-00.71" W GROUND ELEVATION: 495'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	1/08/21	TJL	TJR	CONSTRUCTION DRAWINGS – REVISE PER EVERSOURCE COMMENTS
1	1/05/21	TJL	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
0	12/21/20	ASC	TJL	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST SITE SOLUTIONS

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

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
DANBURY/I-84/X8
SITE ID: CT11110C
8 CHIMNEY DR, EVERSOURCE: 10256
BETHEL, CT 06801

DATE:	06/03/19
SCALE:	AS NOTED
JOB NO.	19066.12

TITLE SHEET

T-1

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

GENERAL NOTES

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18\. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

19\. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.

20\. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	1/08/21	TJL	TJR	CONSTRUCTION DRAWINGS – REVISE PER EVERSOURCE COMMENTS
1	1/05/21	TJL	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
0	12/21/20	ASC	TJL	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST

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

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
DANBURY/I-84/X8
SITE ID: CT11110C
8 CHIMNEY DR, EVERSOURCE: 10256
BETHEL, CT 06801

DATE: 06/03/19
SCALE: AS NOTED
JOB NO. 19066.12

DESIGN BASIS AND SITE NOTES

N-1

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	RFS (APXV18-209014-C-A20)	53.0 x 6.65 x 3.15	154'	60°		(E) GENERIC TWIN STYLE PCS+AWS (1)	(2) 7/8" COAX (±185')
A2	PROPOSED	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	162'	60°	(P) RADIO 4449 B71+B12 (1)	(E) ANDREW SMART BIAS T (1)	
B1	EXISTING	RFS (APXV18-209014-C-A20)	53.0 x 6.65 x 3.15	154'	180°		(E) GENERIC TWIN STYLE PCS+AWS (1)	(2) 7/8" COAX (±185')
B2	PROPOSED	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	162'	180°	(P) RADIO 4449 B71+B12 (1)	(E) ANDREW SMART BIAS T (1)	
C1	EXISTING	RFS (APXV18-209014-C-A20)	53.0 x 6.65 x 3.15	154'	300°		(E) GENERIC TWIN STYLE PCS+AWS (1)	(2) 7/8" COAX (±185')
C2	PROPOSED	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	162'	300°	(P) RADIO 4449 B71+B12 (1)	(E) ANDREW SMART BIAS T (1)	

1 C-1 SITE LOCATION PLAN
SCALE: 1" = 100'

APPROX. NORTH

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	1/08/21	TJL	TJR	CONSTRUCTION DRAWINGS - REVISE PER EVERSOURCE COMMENTS
1	1/05/21	TJL	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
0	12/21/20	ASC	TJL	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

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DANBURY/I-84/X8
SITE ID: CT11110C
8 CHIMNEY DR, EVERSOURCE: 10256
BETHEL, CT 06801

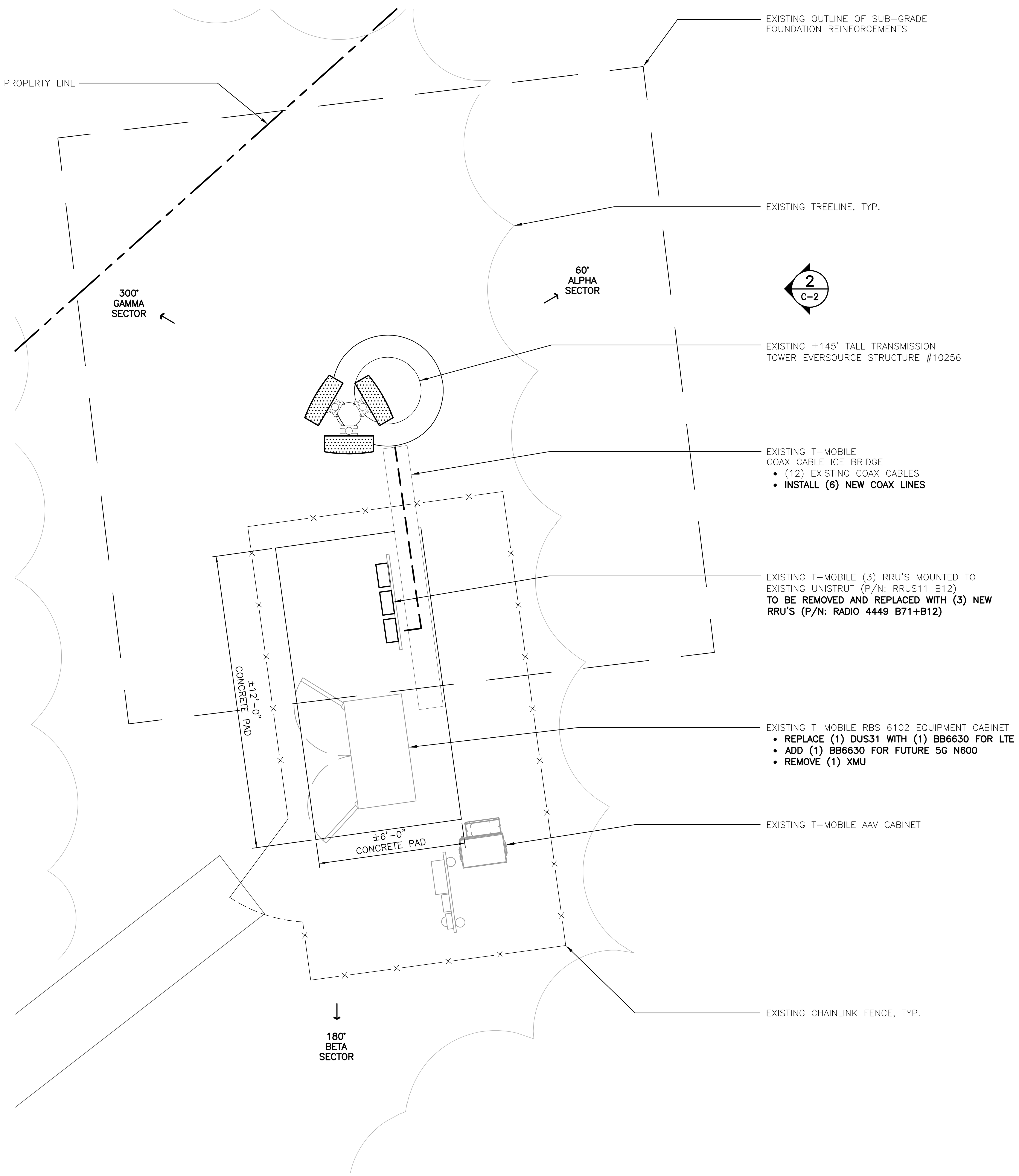
DATE: 06/03/19
SCALE: AS NOTED
JOB NO. 19066.12

SITE LOCATION PLAN

C-1

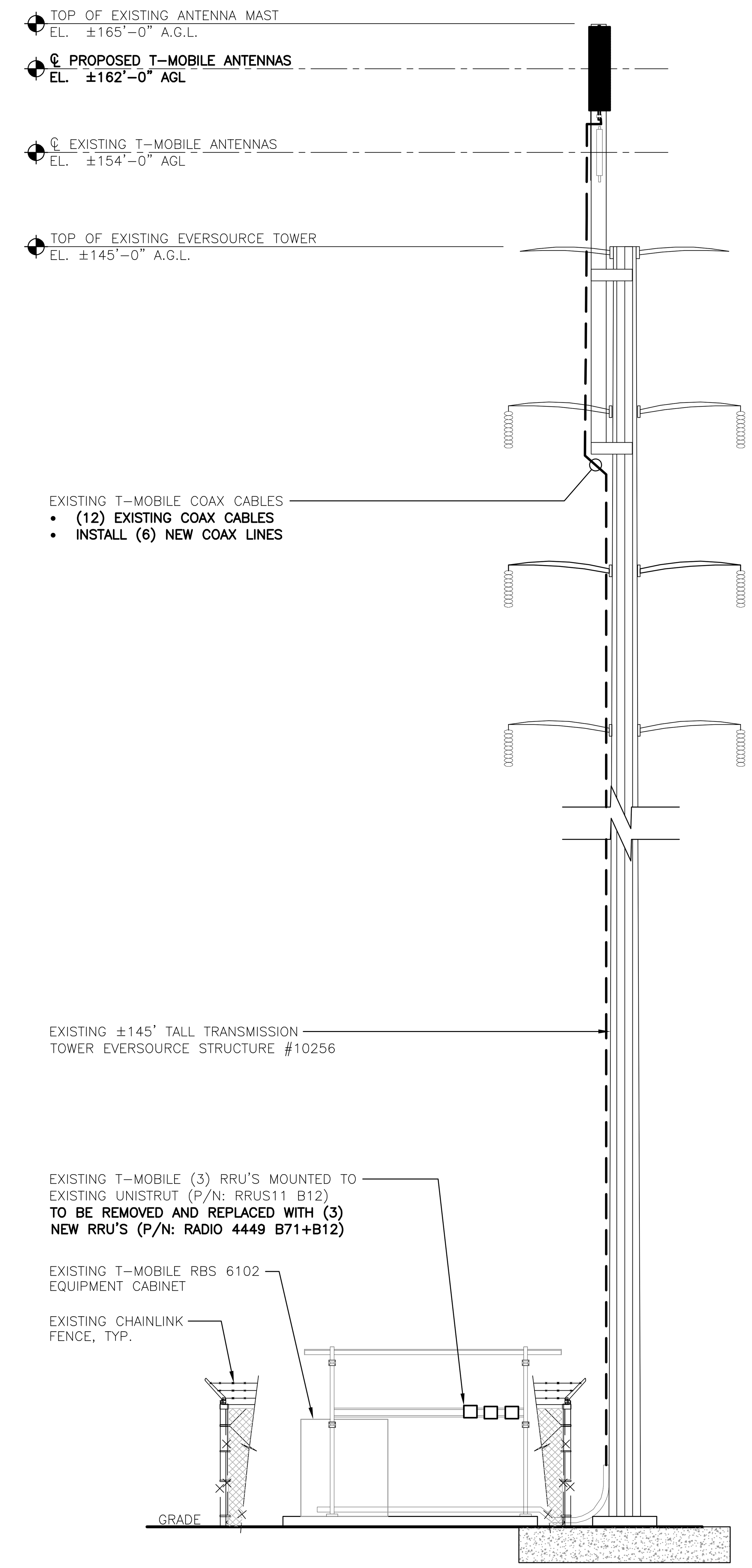
Sheet No. 3 of 7

STRUCTURAL COMPLIANCE
ANTENNA MOUNTS A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING. REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 19066.12) DATED 01/7/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.



1 C-2 COMPOUND AND EQUIPMENT PLAN - PROPOSED
SCALE: 3/8" = 1'

TRUE NORTH



2 C-2 TOWER ELEVATION - PROPOSED
SCALE: NONE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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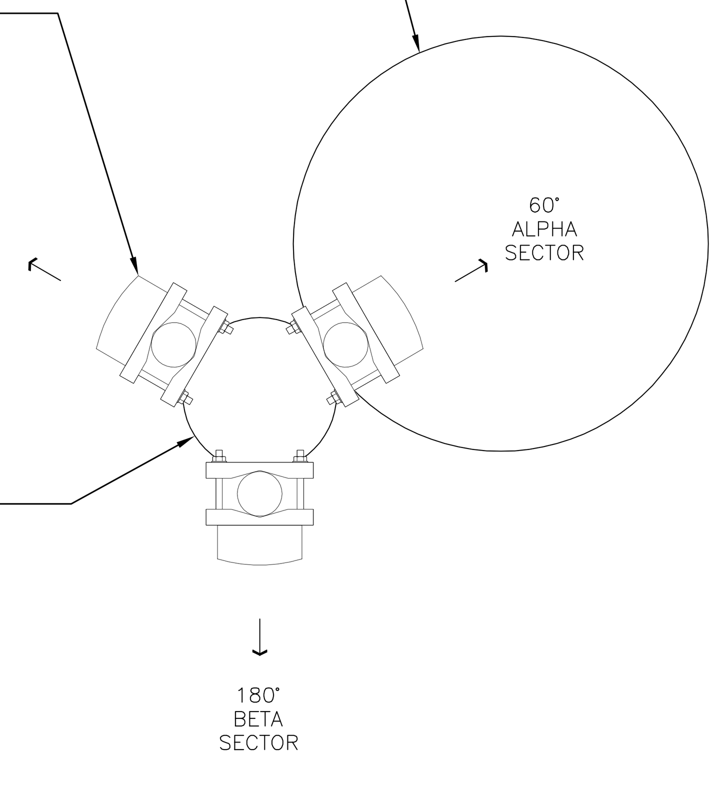
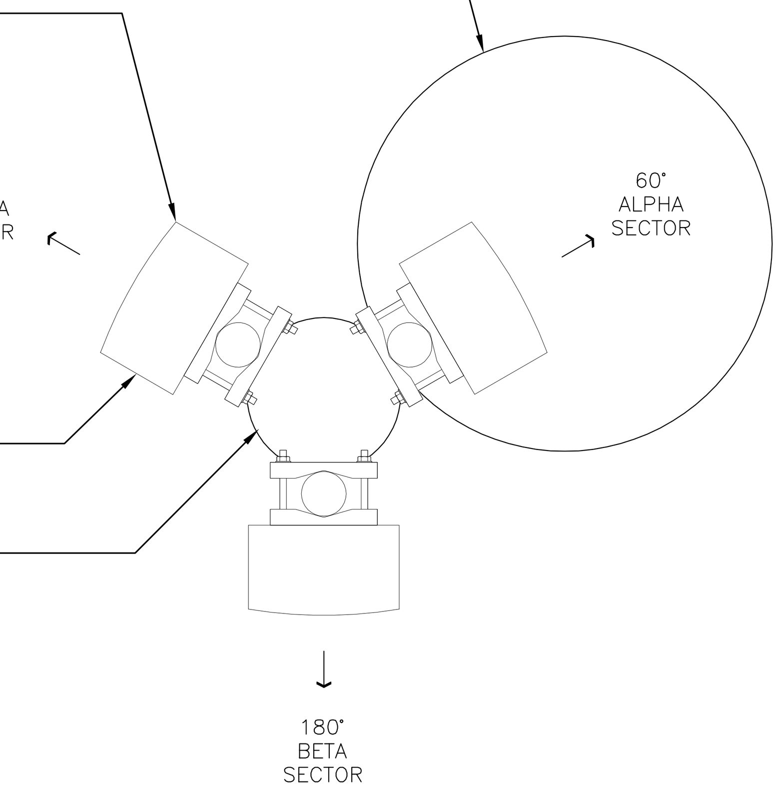
JOB NO. 19066.12

EQUIPMENT PLAN AND ELEVATION

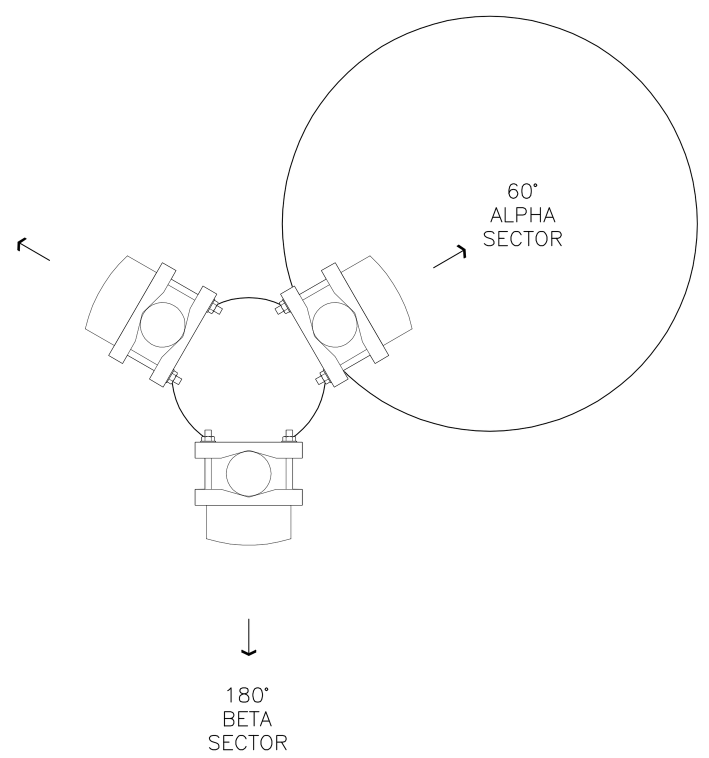
C-2



1 / C-3 ANTENNA MOUNTING CONFIGURATION TYP. - EXISTING
SCALE: 1" = 1'-0" — **154' ELEVATION** — TRUE NORTH

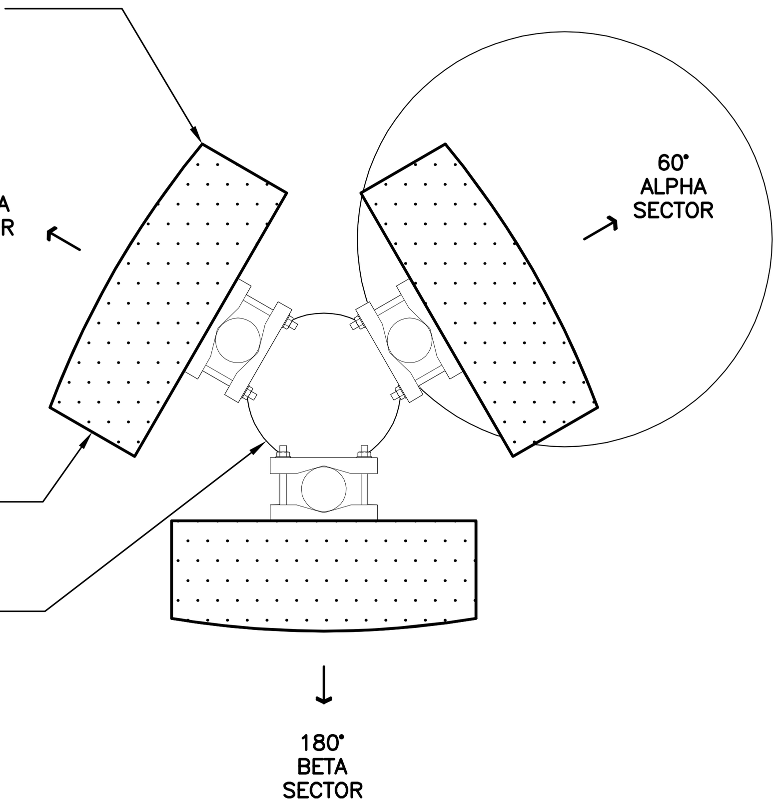


2 / C-3 ANTENNA MOUNTING CONFIGURATION TYP. - EXISTING
SCALE: 1" = 1'-0" — **162' ELEVATION** — TRUE NORTH

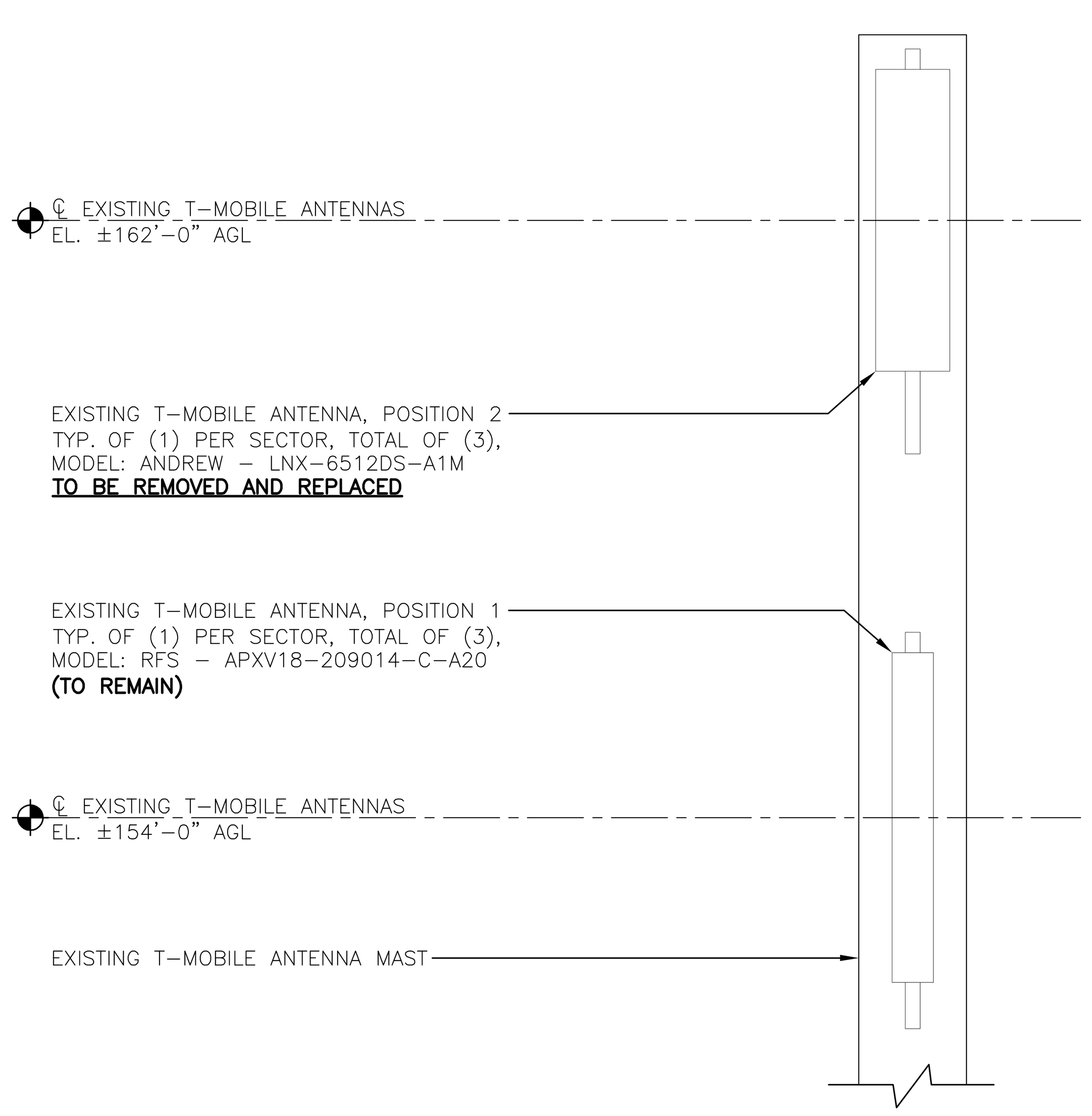


3 / C-3 ANTENNA MOUNTING CONFIGURATION TYP. - PROPOSED
SCALE: 1" = 1'-0" — **154' ELEVATION** — TRUE NORTH

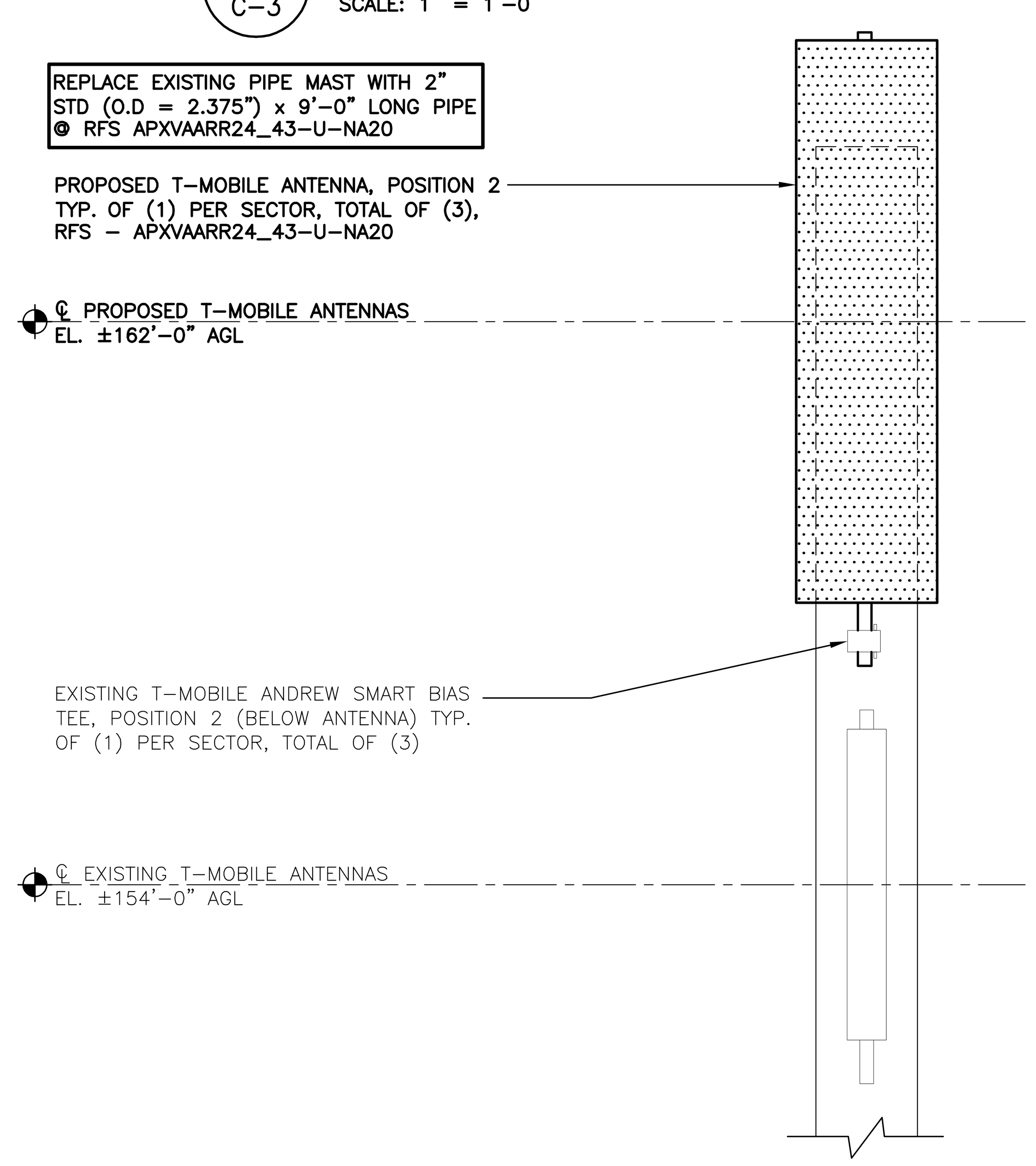
ADDITIONAL ANTENNA MAST NOTE:
REPLACE EXISTING PIPE MAST WITH 2" STD (O.D = 2.375") x 9'-0" LONG PIPE @ RFS APXVAARR24_43-U-NA20



4 / C-3 ANTENNA MOUNTING CONFIGURATION TYP. - PROPOSED
SCALE: 1" = 1'-0" — **162' ELEVATION** — TRUE NORTH



5 / C-3 ANTENNA ELEVATION - EXISTING
SCALE: 1/2" = 1' — **154'/162' ELEVATION**



6 / C-3 ANTENNA ELEVATION - PROPOSED
SCALE: 1/2" = 1' — **154'/162' ELEVATION**

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DATE: 06/03/19
SCALE: AS NOTED
JOB NO. 19066.12

ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 7

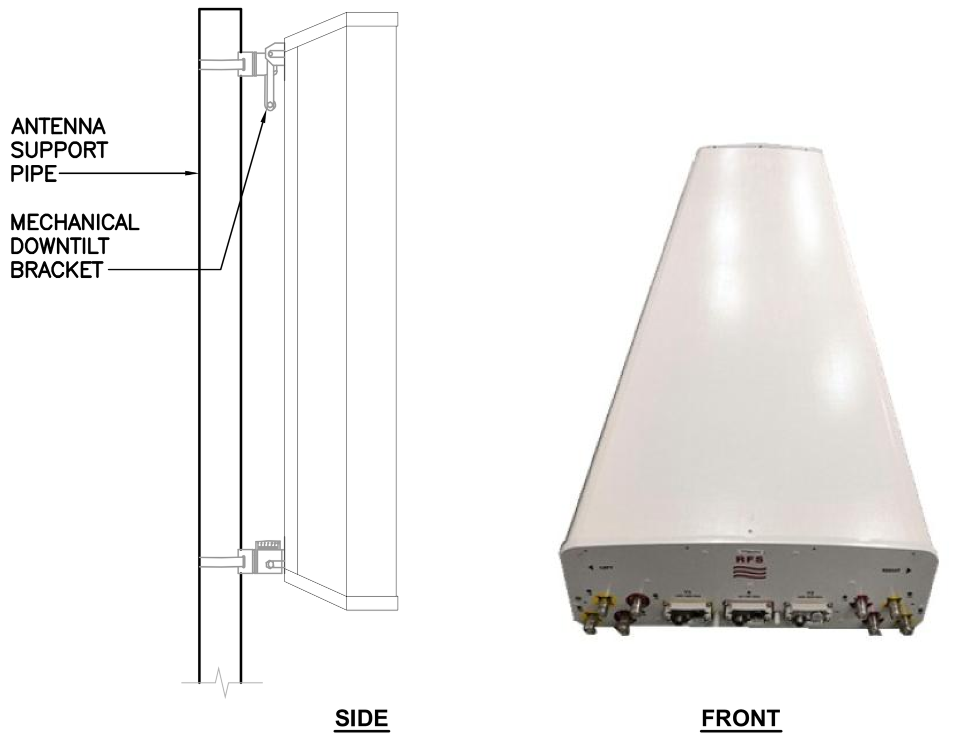
3 C-4 **BIAS-T DETAIL**
SCALE: NOT TO SCALE

RADIO 4449 B71+B85

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B12,B71	14.9"L x 13.4"W x 9.4"D	±74 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.

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

1 C-4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.

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

2 C-4 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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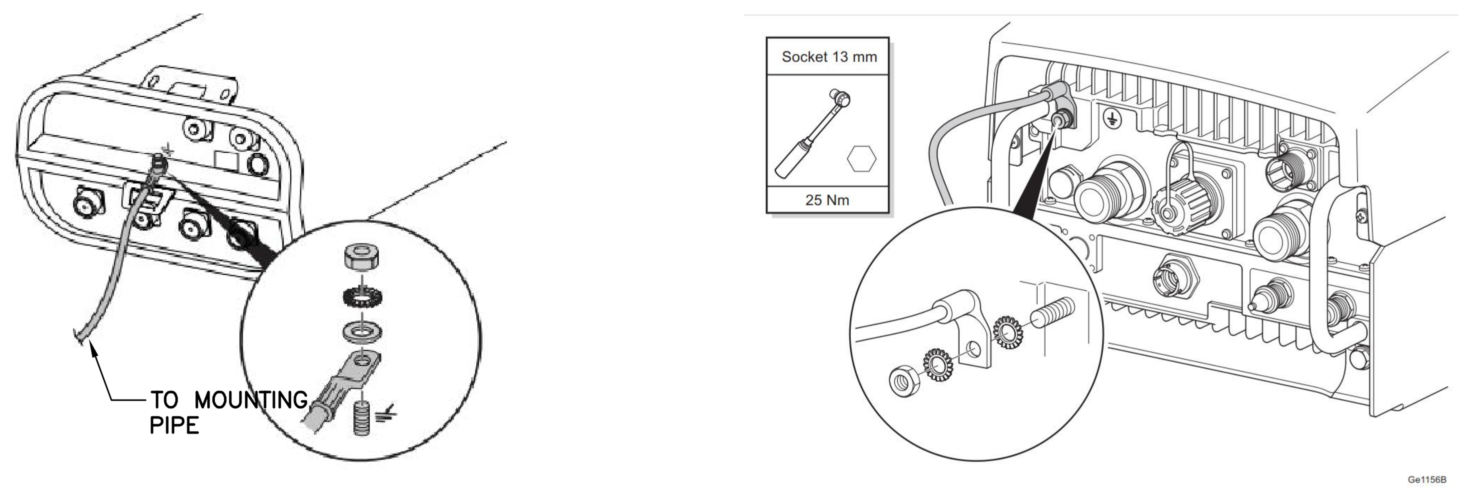
SCALE: AS NOTED
JOB NO. 19066.12

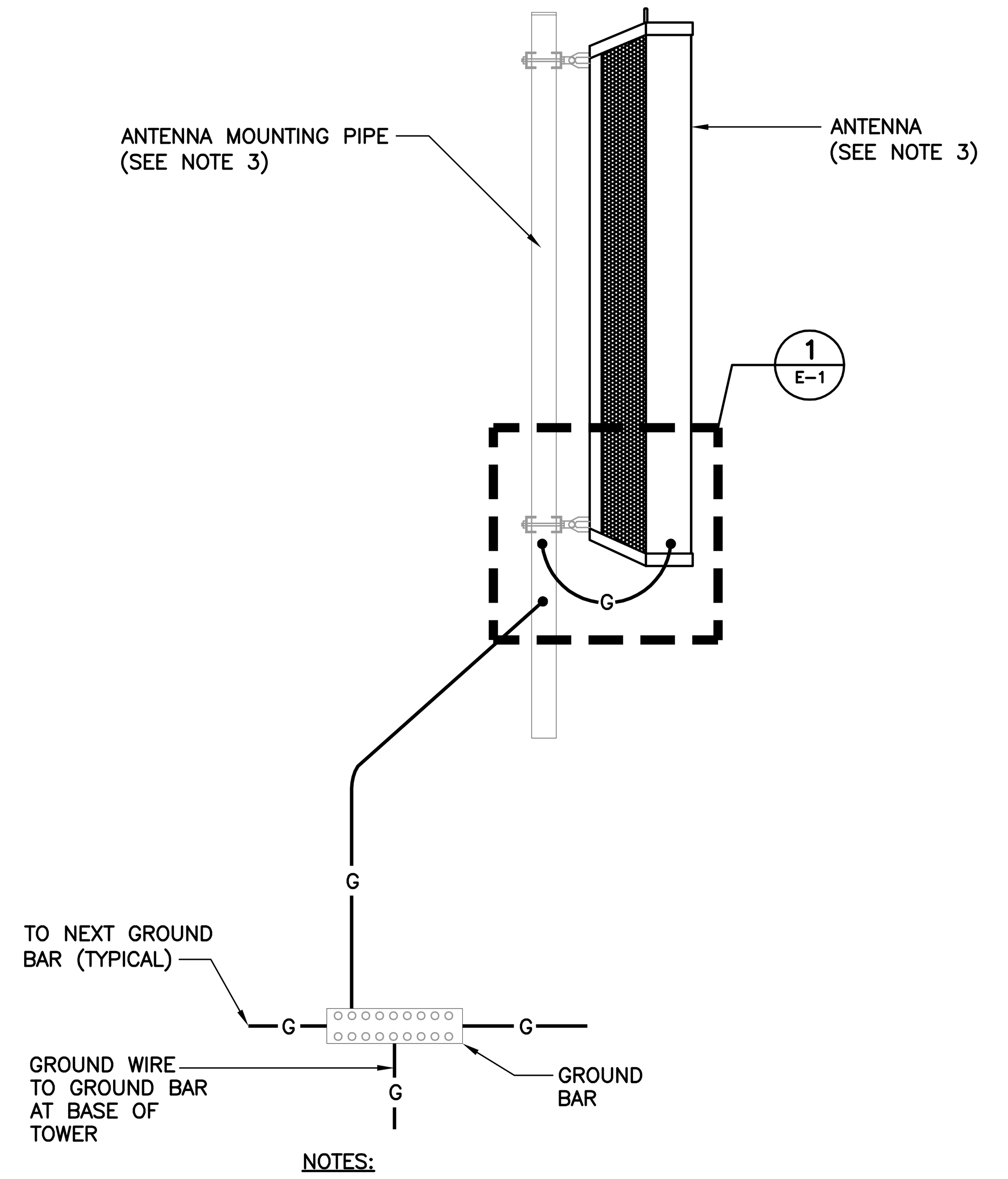
TYPICAL DETAILS

C-4

Sheet No. 6 of 7



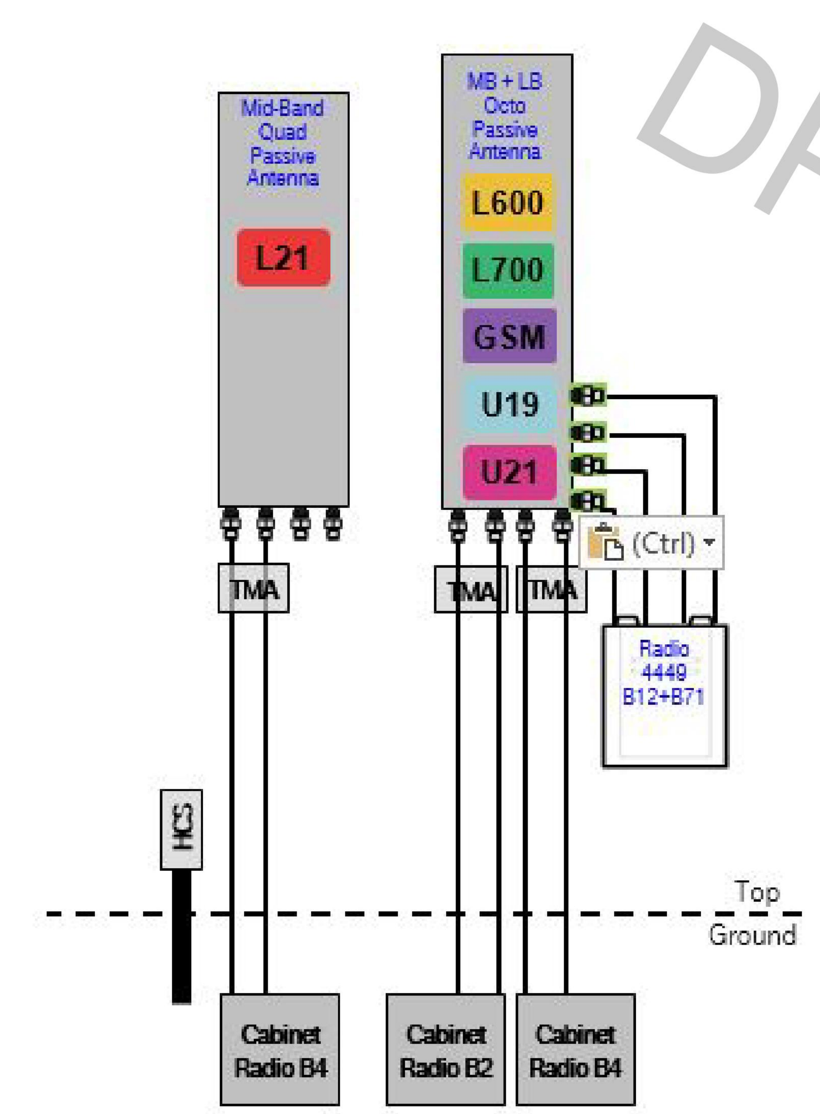
1 TYPICAL ANTENNA/RRU GROUNDING DETAILS
E-1
SCALE: NOT TO SCALE



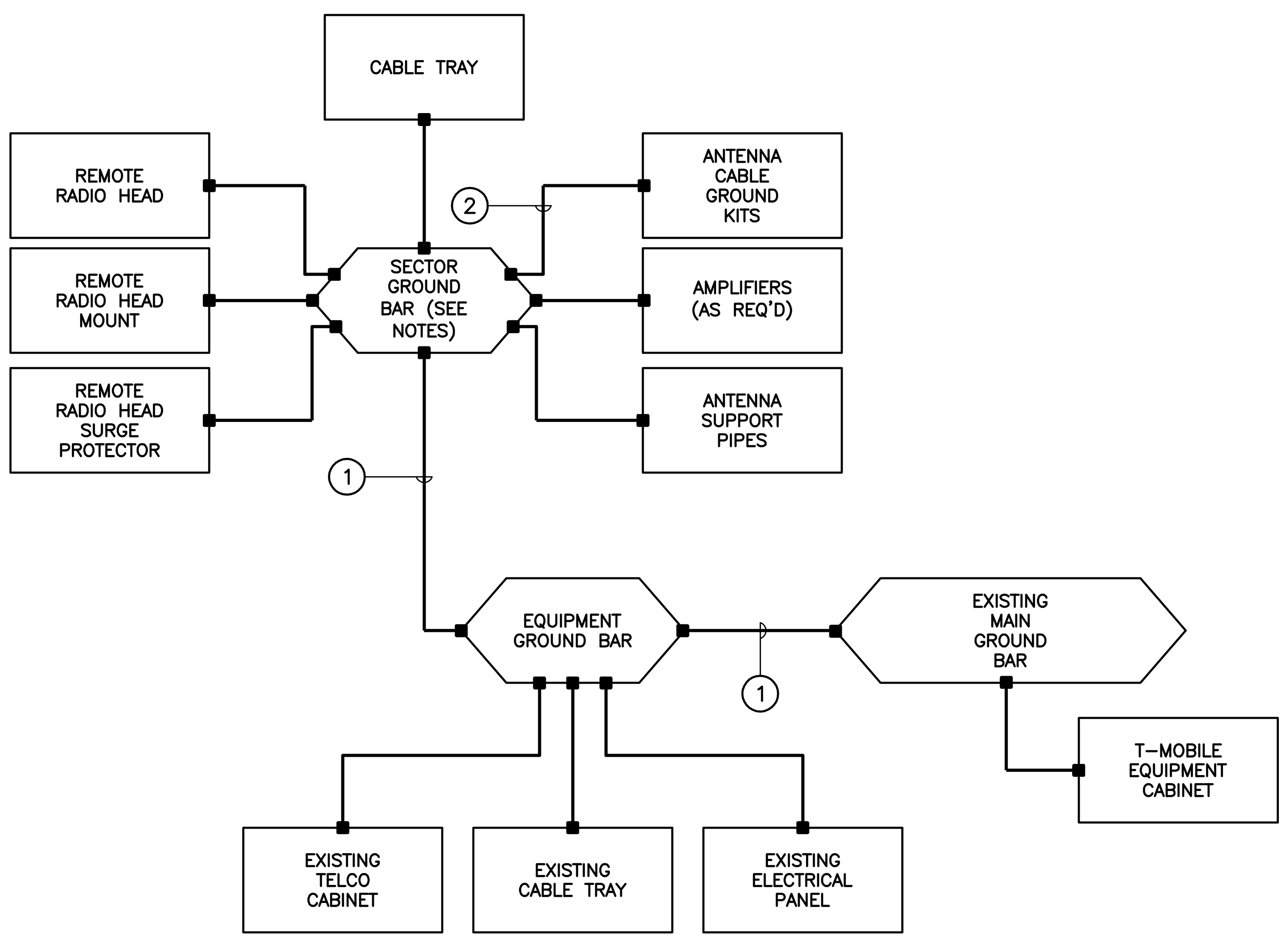
NOTES:

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.

2 TYPICAL ANTENNA GROUNDING DETAIL
E-1
SCALE: NOT TO SCALE



3 PROPOSED PLUMBING DIAGRAM
E-1
SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
6. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 TYPICAL GROUNDING SCHEMATIC DETAIL
E-1
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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SCALE: AS NOTED
JOB NO. 19066.12

ELECTRICAL DETAILS

E-1

Sheet No. 6 of 7

Exhibit D

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Tower

T-Mobile Site Ref: CT11110C

Eversource Structure No. 10256
145' Electric Transmission Pole

8 Chimney Drive
Bethel, CT

CENTEK Project No. 19066.12

~~Date: October 14, 2019~~
Rev 3: January 7, 2021

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

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 mast and 145' utility pole located at 8 Chimney Drive in Bethel, CT for the proposed antenna and equipment upgrade by T-Mobile.

The existing/proposed loads consist of the following:

- T-MOBILE (Existing to Remain):
  Antennas: Three (3) RFS APXV18-209014-C-A20 panel antennas and three (3) Andrew ATSBT-TOP-FM-4G Smart Bias Tees mounted in two (2) clusters on a mast with RAD center elevations of 154-ft and 162-ft above grade respectively.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables mounted to the exterior of the pole.
- T-MOBILE (Existing to be Removed):
  Antennas: Three (3) Andrew LNX-6512DS-A1M panel antennas mounted on a mast with RAD center elevation of 162-ft above grade.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APXVAARR24_43-U-NA20 panel antennas mounted on the existing pipe mast with a RAD center elevation of 162-ft above grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables mounted to the exterior of the pole.

Primary assumptions used in the analysis

- ASCE Manual No. 48-05, "Design of Steel Transmission Pole Structures", defines steel stresses for evaluation of the utility pole.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed within the antenna mast unless specified otherwise.
- Antenna mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Antenna mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

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 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 existing antenna mast consisting of a of a 12-in x 30-ft long SCH. 40 pipe (O.D. = 12.8") connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA-222-G standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA-222-G loading and for NESC/Eversource loading are listed in report Sections 6 and 8, respectively.

Structural analysis of the existing utility pole structure was completed using the current version of PLS-Pole computer program licensed to CENTEK Engineering, Inc. The NESC program contains a library of all AISC angle shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized.

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 existing 145-ft tall utility pole was analyzed for its ability to resist loads prescribed by the NESC standard. Maximum usage for the tower was calculated considering the additional forces from the antenna mast and associated appurtenances. Section 7 of this report details these gravity and lateral wind loads.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE 48-05, "Design of Steel Transmission Pole Structures", NESC C2-2017 and Northeast Utilities Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2017 ~ Construction Grade B, and ASCE Manual No. 48-05, "Design of Steel Transmission Pole Structures".

  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.. 100 mph (1)
  Radial Ice Thickness............................ 0"

  Note 1: NESC C2-2017, 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 Design Criteria Table, TIA/EIA-222-G and AISC standards.

  Load cases considered:

  Load Case 1:
  Wind Speed………………………………... 93 mph (2018 CSBC Appendix-N)
  Radial Ice Thickness………………………. 0"

  Load Case 2:
  Wind Pressure.……………………………. 50 mph wind pressure
  Radial Ice Thickness……………………….. 0.75"

R e s u l t s

- MAST ASSEMBLY

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

Component	Stress Ratio (percentage of capacity)	Result
12" Sch. 40 Pipe	74.3%	**PASS**
Connection to Tower	31.5%	**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 48-05, "Design of Steel Transmission Pole Structures" for the applied NESC Heavy and Extreme 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 **88.67%** occurs in the utility pole base plate under the **NESC Extreme** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 3	0.00' -46.17' (AGL)	86.78%	**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	88.67%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft ∅ x 18.0-ft long reinforced concrete caisson, reinforced with a 24-ft square by 4-ft thick reinforced concrete mat installed at the periphery of the existing caisson. The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01143-60001.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	34.03 kips	115.18 kips	3897.83 ft-kips
NESC Extreme Wind	48.90 kips	59.62 kips	5222.89 ft-kips

Note 1 – 10% increase will be 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	50.5%	**PASS**

FOUNDATION:

The existing caisson foundation was found to be structurally **adequate**.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Caisson with Mat	Overturning	1.0 FS (1)	1.51 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 tower **is adequate** to support the proposed T-Mobile 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

Prepared by:

Fernando J. Palacios
Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

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

Modeling Features

- Comprehensive CAD-like drawing/editing environment: draw, generate, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, trim, extend, etc.
- Versatile drawing grids (orthogonal, radial, skewed, DXF underlay)
- Universal snaps and object snaps allow drawing without grids
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet based, save/recall selections with locking
- True spreadsheet editing with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and graphics
- Open multiple spreadsheets simultaneously
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability, automatic timed backup
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, geodesic domes, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection custom shape libraries
- Steel Shapes: AISC, Historic, Australian, British, Canadian, Chilean, Chinese, European, Indian, Mexican
- Light Gage Shapes: AISI, SSMA, Dale/Incor, Dietrich, Marino\WARE
- Import DXF, RISA-2D, STAAD and CIS/2 files
- Export DXF, SDNF and CIS/2 files
- Robust two-way link with Revit Structure 2019
- Link with Tekla Structures 2018

Analysis Features

- Analysis of 1D members (beams, columns, braces, etc.) using Finite Element Method
- Analysis of 2D elements (plates, walls) using Finite Element Method
- Analysis of 3D elements (solids) using Finite Element Method
- Partial fixity member end releases using rotational spring constants
- Time History Analysis
- Accelerated true sparse solver for static analysis
- Flexible modeling of P-Delta effects
- Accelerated Sparse Lanczos dynamics solver, very fast and robust
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS with automatic calc of scaling factors
- Automatic inclusion of mass offset (5% or user defined) for dynamics when integrated with RISAFloor
- Ritz vector dynamic solver
- True physical member modeling (members are aware of interior joints)
- Plate/shell elements with plane stress only option
- 8 node solid elements
- High end mesh generation — draw a polygon with any number of sides to create a mesh of well formed quadrilateral (NO triangular) elements
- Automatic rigid diaphragm modeling with detachable joints

- Area loads with one-way or two-way distributions with optional “blow through” distribution for loading open structures
- Plate thermal loads
- Simultaneous moving loads, AASHTO/custom for bridges, cranes…
- Torsional warping calculations for stiffness, stress and design of hot rolled steel
- Member end releases, rigid end offsets, analysis offsets
- Enforced joint displacements
- One Way members, for tension only bracing, slipping, etc.
- One Way springs, for modeling soils and other effects
- Euler members: Compression up to buckling load, then disable
- Stress calculations on any arbitrary shape
- Inactivate members, plates, solids and diaphragms without deleting them
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members, plates and solids

Graphics Features

- Unlimited simultaneous model view windows
- “True to scale” rendering with translucency, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamically zoom, pan, rotate, scroll, snap views
- Font and color control
- Saved views to quickly restore frequent or desired views
- Rendered or wire-frame animations of deflected model and mode shapes
- Animation of moving loads with speed control
- Distance tool for measuring between points
- Force/moment summation about any arbitrary cut line
- High quality customizable graphics printing

Design Codes

- Steel Design Codes: AISC 360-16/10/05: ASD & LRFD, AISC 2nd & 3rd: LRFD, AISC 9th: ASD, CSA S16-14/09/05/01/CSA-S16.1-94, BS 5950-1: 2000, EN 1993-1-1:2014/2005, ENV 1993-1-1:1992, IS 800: 2007/1998, AS 4100-1998, NZS 3404: 1997
- Seismic design per AISC 341-10/05, including 358 prequalified connections
- Concrete Design Codes: ACI 318-14/11/08/05/02/99, CSA A23.3-14/04/94, NTC-DF 2004, BS 8110-1: 1997, BS EN 1992-1-1: 2004+A1: 2014/2004, EN 1992-1-1:1992, IS 456: 2000, AS 3600-2001, NZS 3101: 1995, SBC 304-2007
- Cold Formed Steel Design Codes: AISI S100-16/12/10/07: ASD & LRFD, AISI NAS-04/01: ASD & LRFD, AISI 1999: ASD & LRFD, CSA S136-16/12/10/07/04/01: LSD, CANACERO 16: ASD, CANACERO 12/10/07/04/01: ASD & LRFD
- Aluminum Design Codes: AA ADM1-15/10: ASD & LRFD, AA ADM1-05: ASD
- Wood Design Codes: AWC NDS-18/15/12: ASD, AF&PA NDS-08/05/01/97/91: ASD, CSA 086-14/09 Ultimate, Structural Composite Lumber, multi-ply, full sawn, Glulam, shear walls
- Masonry Design Codes: TMS 402-16: ASD & Strength, ACI 530-13/11/08/05/02: ASD & Strength, ACI 530-99: ASD, UBC 1997: ASD & Strength
- Stainless Steel Design Code: AISC 360-10: ASD & LRFD
- Wind loads are generated automatically (ASCE 7-16/10/05/02/98/95, NBC 15/10/05, NTC 2004, & IS 875: 1987) for building-type structures, including partial wind cases
- Seismic loads are generated automatically (ASCE 7-16/10/05/02, CBC 2001, IBC 2000, UBC 1997, NBC 15/10/05, NTC 2004, & IS 1893: 2002) for building-type structures, including accidental torsion

Design Features

- Designs/optimizes concrete, hot rolled & cold formed steel, masonry, wood and aluminum

- Program selected or user-defined rebar layouts for flexure and shear
- Concrete beam detailing (Rectangular, T and L).
- Concrete column interaction diagrams
- Concrete wall design including in-plane, out-of-plane & bearing loads
- Automatic spectra generation for ASCE 7, NBC, IS 1893, NTC
- Extensive user controlled generation of load combinations
- Intelligent unbraced length calculations for physical members
- Tapered wide flange design per AISC Design Guide 25
- Masonry wall design for in-plane and out-of-plane
- Wood Shapes: Complete NDS species/grade and Glulam database
- Complete wood wall design for bearing & shear walls: Segmented, Perforated & Force Transfer Around Openings design methods
- Strap and Hold Down design for Wood Shear Walls
- Seismic design of concrete walls using ACI 318-14 Chapter 18
- Concrete seismic coupling beams for multi-story walls with diaphragms

<u>Results Features</u>

- Graphic presentation of color-coded results and plotted designs
- Color contours on plates, solid stresses/forces with smoothing and animation
- Spreadsheet results with sorting and filtering of: deflections, forces, stresses, optimized sizes for strength or deflection, code designs, concrete reinforcing, material takeoffs, etc.
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams

<u>Integrated Building Design</u>

RISA-3D, RISAFloor, RISAFoundation and RISAConnection are so tightly integrated that they operate as one program on the same building model. Optimize the gravity system in RISAFloor, the lateral system in RISA-3D, the connection design in RISAConnection and the foundation system in RISAFoundation, with a complete flow of information both ways.

<u>General Features</u>

- Compatible with Windows 7/8.1/10 (64-bit Windows)
- Program technical support provided by Professional Engineers

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE

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

Modeling Features:

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

Analysis Features:

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

Results Features:

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

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

Introduction

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

ANSI Standard TIA-222-G covering the design of telecommunications structures specifies a limit state design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that the design strength exceeds the required strength.

ANSI Standard C2-2017 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

P C S   M a s t

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

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

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

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

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2017 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

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

Attachment A
Eversource Design Criteria

		Attachment A ES Design Criteria	Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	-----	4	1	1	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	-----	4	1	1	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor Loads Provided by ES					
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, 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
High Wind Condition	NESC Extreme Wind	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
High Wind Condition	NESC Extreme Wind	Conductors:	Conductor Loads Provided by ES					
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, 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
NESC Extreme Ice with Wind Condition*		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
NESC Extreme Ice with Wind Condition*		Conductors:	Conductor Loads Provided by ES					
NESC Extreme Ice with Wind Condition*		*Only for structures installed after 2007						

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

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

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

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

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

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

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

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

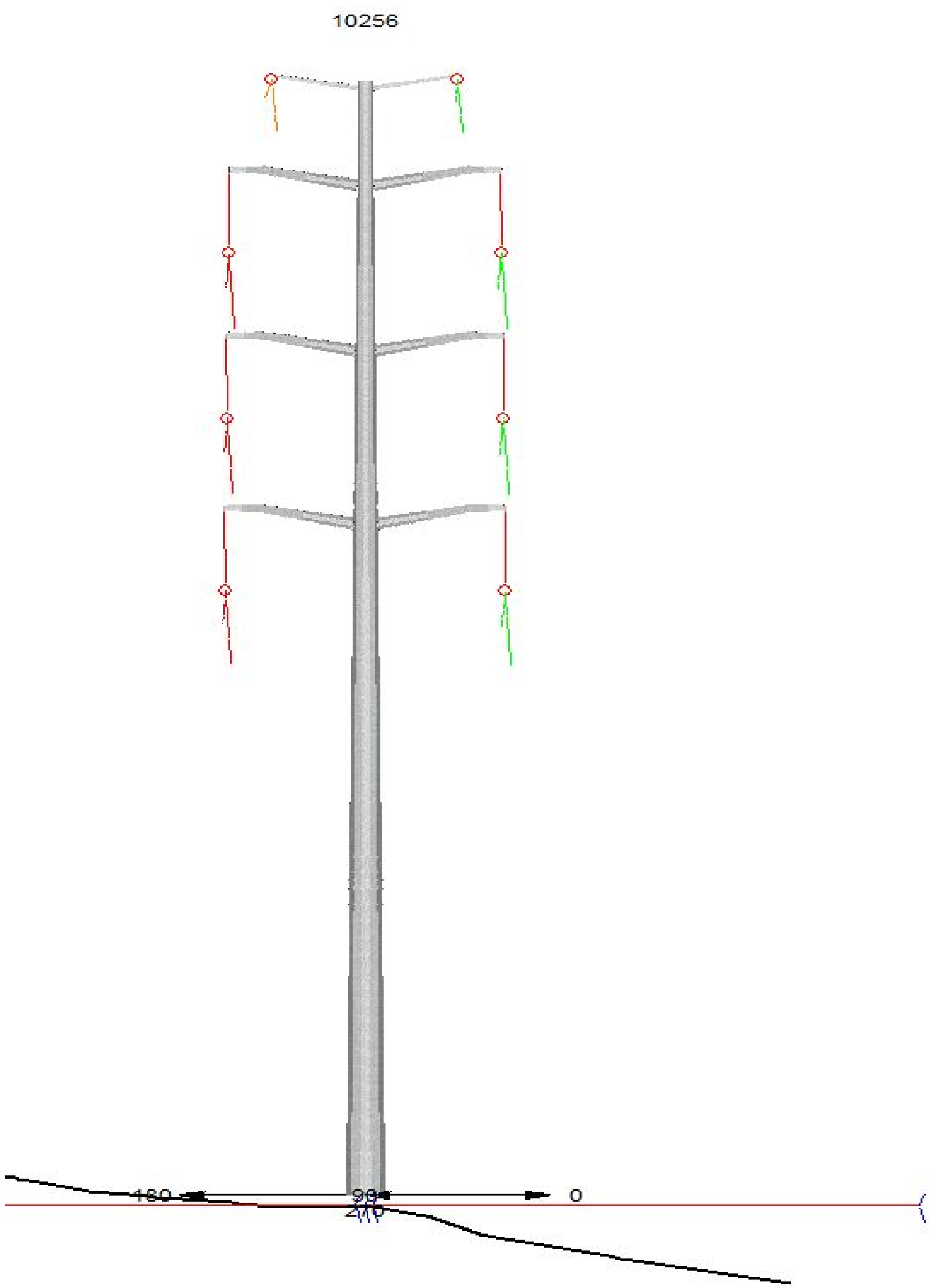
Project: 321/1268 Lines, Structure 10256
Date: 9/11/19
Engineer: JS
Purpose: Recalculate wire loads for Eversource structure 10256, T-Mobile site CT11110C

Shield Wires:
321: AFL DNO-4963 0.457" OPGW, sagged to 4200# NESC 250B Final
1268: 7#8 Alumoweld, sagged in PLS-CADD

Conductors:
Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250B

321 Line			**1268 Line**	
		OPGW	**Alumoweld**	
	V:	1265	V:	1205
	T:	1161	T:	991
	L:	25	L:	25
Conductors				
Top	V:	8015	V:	7875
	T:	3618	T:	3599
	L:	50	L:	50
Middle	V:	8039	V:	7898
	T:	3621	T:	3620
	L:	50	L:	50
Bottom	V:	8021	V:	7888
	T:	3625	T:	3647
	L:	50	L:	50



Looking north.
321 Line is on the right.
1268 Line is on the left.

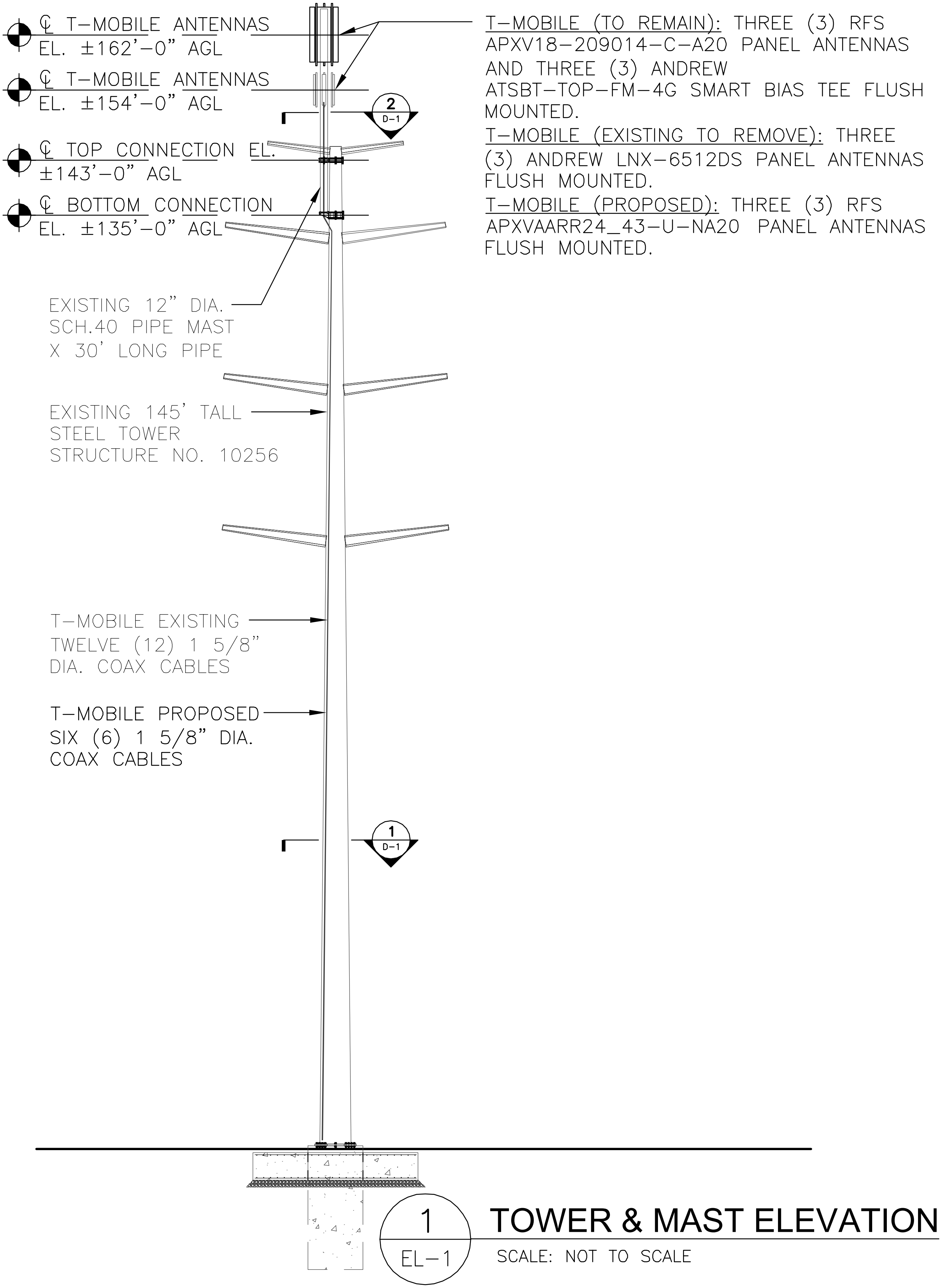
Project: 321/1268 Lines, Structure 10256
Date: 9/11/19
Engineer: JS
Purpose: Recalculate wire loads for T-Mobile site

Shield Wires:
321: AFL DNO-4963 0.457" OPGW, sagged to 4200# NESC 250B Final
1268: 7#8 Alumoweld, sagged in PLS-CADD

Conductors:
Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250C

321 Line		**OPGW**	**1268 Line Alumoweld**	
	V:	306	V:	305
	T:	838	T:	634
	L:	25	L:	25
Conductors Top	V:	3269	V:	3200
	T:	4707	T:	4469
	L:	50	L:	50
Middle	V:	3277	V:	3207
	T:	4555	T:	4275
	L:	50	L:	50
Bottom	V:	3255	V:	3189
	T:	4367	T:	4124
	L:	50	L:	50



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

SCALE: NOT TO SCALE

REVISIONS		
00	10/14/19	ISSUED FOR REVIEW
01	12/16/19	ISSUED FOR REVIEW
02	1/15/20	CONSTRUCTION

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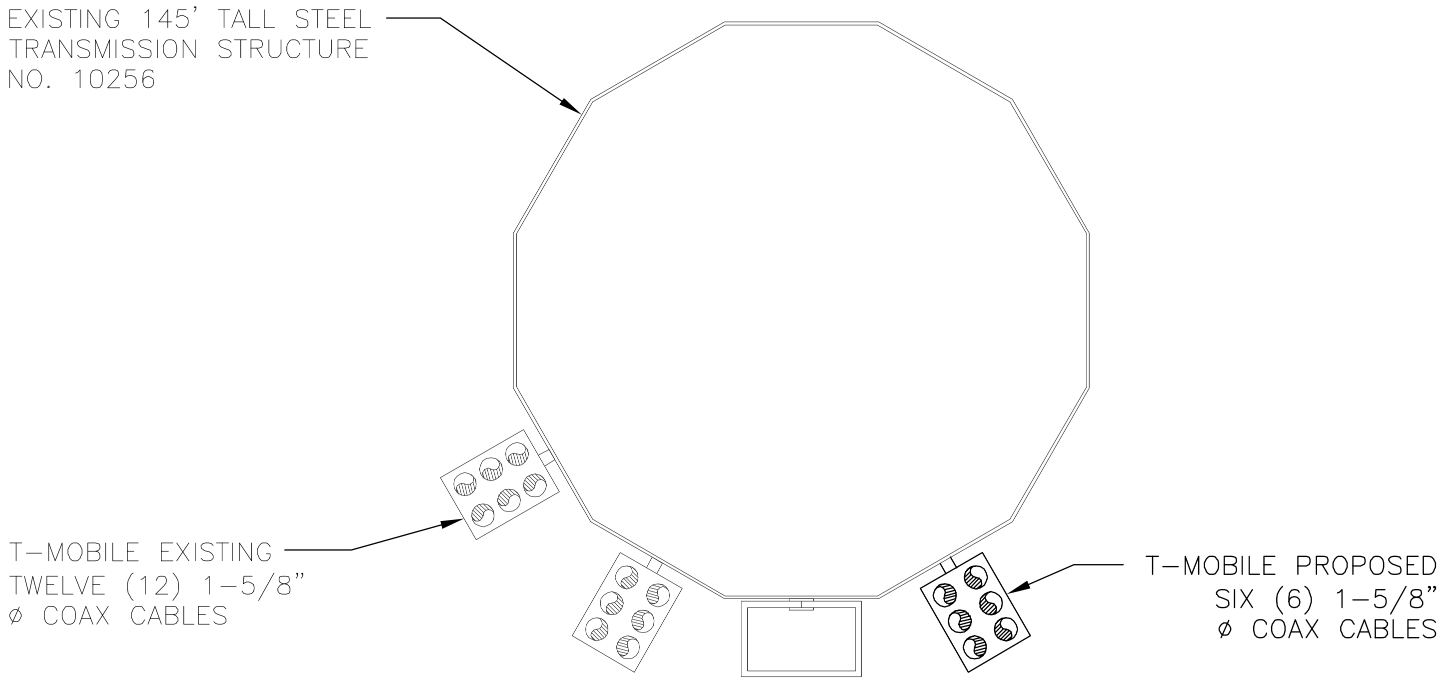
CT11110C
CEVERSOURCE 10256
8 CHIMNEY DRIVE
BETHEL, CT 06801

PROJECT NO:	19066.12
DRAWN BY:	FJP
CHECKED BY:	TJL
SCALE:	AS NOTED
DATE:	12/12/19

TOWER AND MAST ELEVATION

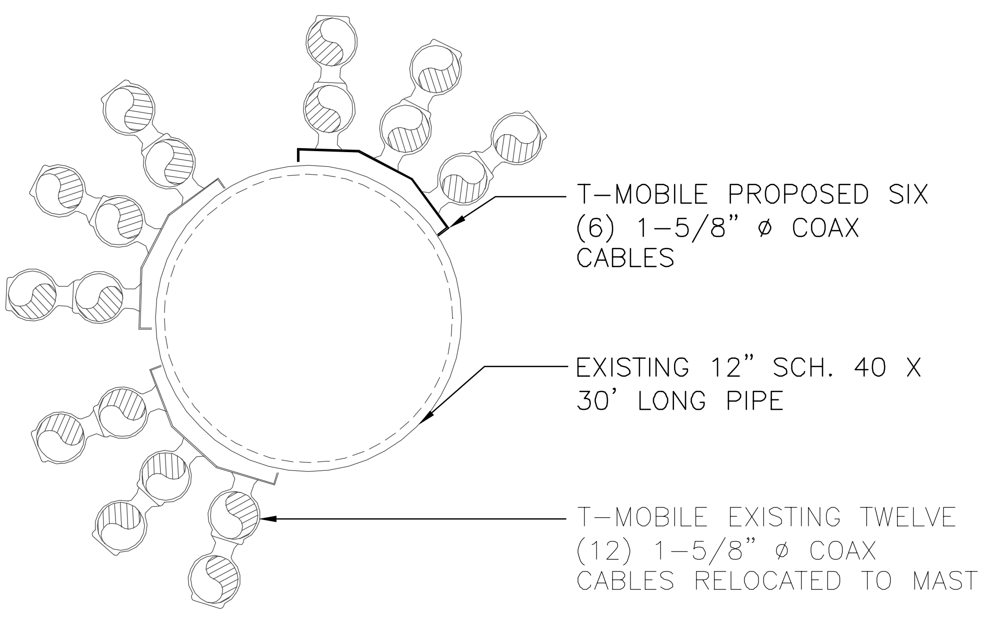
EL-1

DWG. 1 OF 2



1 / D-1 COAX CABLE PLAN TOWER

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



2 / D-1 COAX CABLE PLAN ANTENNA MAST

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

REVISIONS

00	10/14/19	ISSUED FOR REVIEW
01	12/16/19	ISSUED FOR REVIEW
02	1/15/20	CONSTRUCTION

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CT11110C
CEVERSOURCE 10256

8 CHIMNEY DRIVE
BETHEL, CT 06801

PROJECT NO:	19066.12
DRAWN BY:	FJP
CHECKED BY:	TJL
SCALE:	AS NOTED
DATE:	12/12/19

COAX CABLE DETAILS

D-1

DWG. 2 OF 2

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

Wind Speeds

Basic Wind Speed =	$V := 93$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice =	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)
Basic Wind Speed Service Loads =	$V_{Ser} := 60$	mph	(User Input - TIA-222-G Section 2.8.3)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := III		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 145$	ft	(User Input)
Height to Center of Antennas =	$z_{T-Mo} := 162$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 150.67$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	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 =

$K_d :=$ if Structure_Type = Pole → 0.95; if Structure_Type = Lattice → 0.85; $= 0.95$

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

Importance Factors =

$I_{Wind} :=$ if SC = 1 → 0.87; if SC = 2 → 1.00; if SC = 3 → 1.15; $= 1.15$

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

$I_{Wind\_w\_Ice} :=$ if SC = 1 → 0; if SC = 2 → 1.00; if SC = 3 → 1.00; $= 1$

$I_{ice} :=$ if SC = 1 → 0; if SC = 2 → 1.00; if SC = 3 → 1.25 $= 1.25$ (Per Section 2.8.3 of TIA-222-G)

Wind Direction Probability Factor (Service) = $K_{dSer} :=$ if Structure_Type = Pole → 0.95; if Structure_Type = Lattice → 0.85 $= 0.95$ (Per Section 2.8.3 of TIA-222-G)

Importance Factor (Service) = $I_{Ser} := 1$

$K_{iz} := \left(\frac{z_{T-Mo}}{33}\right)^{0.1} = 1.172$ $t_{izT-Mo} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.198$

Velocity Pressure Coefficient Antennas = $Kz_{T-Mo} := 2.01 \cdot \left(\left(\frac{z_{T-Mo}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.401$

Velocity Pressure w/o Ice Antennas = $qz_{T-Mo} := 0.00256 \cdot K_d \cdot Kz_{T-Mo} \cdot V^2 \cdot I_{Wind} = 33.887$

Velocity Pressure with Ice Antennas = $qz_{ice.T-Mo} := 0.00256 \cdot K_d \cdot Kz_{T-Mo} \cdot V_i^{\,2} \cdot I_{Wind\_w\_Ice} = 8.518$

Velocity Pressure Service = $qz_{T-Mo.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{T-Mo} \cdot V_{Ser}^{\,2} \cdot I_{Ser} = 12.265$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.164$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.182$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01 \cdot \left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.38$

Velocity Pressure w/o Ice Mast = $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 33.374$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^{\,2} \cdot I_{Wind\_w\_Ice} = 8.389$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^{\,2} \cdot I_{Ser} = 12.079$

Development of Wind & Ice Load on Mast

Mast Data:	(Pipe 12" SCH. 40)		(User Input)
Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)
Mast Length =	$L_{mast} := 30$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.349$	in	(User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12 \cdot L_{mast}}{D_{mast}} = 28.2$

Mast Force Coefficient = $Ca_{mast} = 1.2$

Wind Load (without ice)

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

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 57$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast1})}{12} = 1.426$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 19$ plf **BLC 4**

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 21$ plf **BLC 6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast1} \cdot 2)^2 - D_{mast}^2 \right) = 102.4$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 40$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFS APXVAARR24_43-U-NA20

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 = $WT_{ant} := 153.3$ 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 = $F_{ant} := qz_{T-Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2778$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izT-Mo}) \cdot (W_{ant} + 2 \cdot t_{izT-Mo})}{144} = 19.8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 59.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.T-Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 864$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{T-Mo.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1006$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 460$ lbs **BLC 2**

Gravity Loads (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izT-Mo}) \cdot (W_{ant} + 2 \cdot t_{izT-Mo}) \cdot (T_{ant} + 2 \cdot t_{izT-Mo}) - V_{ant} = 2 \cdot 10^4$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 560$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 1680$ lbs **BLC 3**

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Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFS APXV18-209014-C-A20

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 53$ in (User Input)

Antenna Width = $W_{ant} := 6.65$ in (User Input)

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

Antenna Weight = $WT_{ant} := 24.9$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 8.0$

Antenna Force Coefficient = $Ca_{ant} = 1.43$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 7.3$ sf

Total Antenna Wind Force = $F_{ant} := qz_{T-Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 481$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izT-Mo}) \cdot (W_{ant} + 2 \cdot t_{izT-Mo})}{144} = 4.4$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.T-Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 218$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{T-Mo.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 174$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 75$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1110$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izT-Mo}) \cdot (W_{ant} + 2 \cdot t_{izT-Mo}) \cdot (T_{ant} + 2 \cdot t_{izT-Mo}) - V_{ant} = 3675$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 119$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 357$ lbs **BLC 3**

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Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope ATSBT-TOP-FM-4G Bias Tee		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.5$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{T-Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 24$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izT-Mo}) \cdot (W_{ant} + 2 \cdot t_{izT-Mo})}{144} = 0.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.T-Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 23$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{T-Mo.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 9$	lbs	**BLC 6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 6$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izT-Mo}) \cdot (W_{ant} + 2 \cdot t_{izT-Mo}) \cdot (T_{ant} + 2 \cdot t_{izT-Mo}) - V_{ant} = 478$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 15$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 46$	lbs	**BLC 3**

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Development of Wind & Ice Load on Mounts

Mount Data:

Mounting Type = Site Pro Universal Ring Mount & Adapter Kit w/ 3 Pipes

MountShape = Round (User Input)

Pipe Mount Lenght= $L_{mnt} := 60$ 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 Antennas = $N_{mnt} := 3$ (User Input)

Tri Sector and Bracket Mount Weight = $WT_{sa.mnt} := 300$ lbs (User Input)

Wind Load (without ice)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0$ sf

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

Wind Load (with ice)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice = $AICE_{mnt} := 0$ sf

Total Mount Wind Force w/ Ice = $Fi_{mnt} := qz_{ice.T-Mo} \cdot G_H \cdot K_a \cdot Ca_{mnt} \cdot AICE_{mnt} = 0$ lbs **BLC 4**

Wind Load (Service)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0$

Total Mount Wind Force Service Loads = $F_{mnt.Ser} := qz_{T-Mo.Ser} \cdot G_H \cdot K_a \cdot Ca_{mnt} \cdot A_{mnt} = 0$ lbs **BLC 6**

Gravity Load (without ice)

Weight of Each Pipe Mount= $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 18$ lbs

Weight of all Mounts= $WT_{mnt} \cdot N_{mnt} + WT_{sa.mnt} = 355$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 266$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(\frac{\pi}{4} \cdot \left(\left(D_{mnt} + 2 \cdot t_{izT-Mo}\right)^2\right) \cdot \left(L_{mnt} + 2 \cdot t_{izT-Mo}\right)\right) - V_{mnt} = 2 \cdot 10^{3}$ cu in

Weight of Ice on Each Antenna = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 67$ lbs

Weight of Ice on All Antennas = $W_{ICEmnt} \cdot N_{mnt} + 5 = 205$ lbs **BLC 3**

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Development of Wind & Ice Load on Mounts

Mount Data:

Mounting Type = Site Pro Universal Ring Mount & Adapter Kit w/ 3 Pipes

MountShape = Round (User Input)

Pipe Mount Lenght= $L_{mnt} := 108$ 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 Antennas = $N_{mnt} := 3$ (User Input)

Tri Sector and Bracket Mount Weight = $WT_{sa.mnt} := 300$ lbs (User Input)

Wind Load (without ice)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0$ sf

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

Wind Load (with ice)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice = $AICE_{mnt} := 0$ sf

Total Mount Wind Force w/ Ice = $Fi_{mnt} := qz_{ice.T-Mo} \cdot G_H \cdot K_a \cdot Ca_{mnt} \cdot AICE_{mnt} = 0$ lbs **BLC 4**

Wind Load (Service)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0$

Total Mount Wind Force Service Loads = $F_{mnt.Ser} := qz_{T-Mo.Ser} \cdot G_H \cdot K_a \cdot Ca_{mnt} \cdot A_{mnt} = 0$ lbs **BLC 6**

Gravity Load (without ice)

Weight of Each Pipe Mount= $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 33$ lbs

Weight of all Mounts= $WT_{mnt} \cdot N_{mnt} + WT_{sa.mnt} = 399$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^2 \cdot L_{mnt} = 478$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(\frac{\pi}{4} \cdot \left(\left(D_{mnt} + 2 \cdot t_{izT-Mo}\right)^2\right) \cdot \left(L_{mnt} + 2 \cdot t_{izT-Mo}\right)\right) - V_{mnt} = 4 \cdot 10^3$ cu in

Weight of Ice on Each Antenna = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 116$ lbs

Weight of Ice on All Antennas = $W_{ICEmnt} \cdot N_{mnt} + 5 = 352$ lbs **BLC 3**

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Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

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

Coax Cable Length = $L_{coax} := 25$ ft (User Input)

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

Total Number of Coax = $N_{coax} := 18$ (User Input)

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

Coax aspect ratio = $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 151.5$

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

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 54$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1.4$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 18$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 19$ plf **BLC 6**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izT-Mo})^2 - D_{coax}^{\ 2} \right) = 28.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 202$ 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 530-05: ASD
Aluminum Code	AA ADM1-05: 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	Existing Mast	PIPE_12.0	Column	Pipe	A53 Gr. B	Typical	13.7	262	262	523

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Existing Mast	30			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...	TOPMA...			Existing Mast	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	8	0	0	
3	TOPMAST	0	30	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	BOTCONNECTION	Reaction	Reaction	Reaction		Reaction	
2	TOPCONNECTION	Reaction		Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.075	18.33
2	M1	Y	-.355	18.33
3	M1	Y	-.006	26.33
4	M1	Y	-.46	26.33
5	M1	Y	-.399	26.33

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.357	18.33
2	M1	Y	-.205	18.33
3	M1	Y	-.046	26.33
4	M1	Y	-1.68	26.33
5	M1	Y	-.352	26.33

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.218	18.33
2	M1	X	.023	26.33
3	M1	X	.864	26.33

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.481	18.33
2	M1	X	.024	26.33
3	M1	X	2.778	26.33

Member Point Loads (BLC 6 : Service Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.174	18.33
2	M1	X	.009	26.33
3	M1	X	1.006	26.33

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	0	22.33

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.04	-.04	0	0
2	M1	Y	-.202	-.202	0	22.33

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.019	.019	0	16.25
2	M1	X	.019	.019	20.67	22.33
3	M1	X	.018	.018	0	22.33

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.057	.057	0	16.25
2	M1	X	.057	.057	20.67	22.33
3	M1	X	.054	.054	0	22.33

Member Distributed Loads (BLC 6 : Service Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.021	.021	0	16.25
2	M1	X	.021	.021	20.67	22.33
3	M1	X	.019	.019	0	22.33

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfac...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					5	1		
3	Weight of Ice Only	None					5	2		
4	TIA Wind with Ice	None					3	3		
5	TIA Wind	None					3	3		
6	Service Wind	None					3	3		

Load Combinations

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.2D + 1.6...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D +1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.0D + 1.0...	Yes	Y		1	1	2	1	6	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	BOTCONNEC...	max	12.401	1	12.092	3	0	4	0	4	0	4	0	4
2		min	2.59	3	2.806	2	0	1	0	1	0	1	0	1
3	TOPCONNEC...	max	-4.438	3	0	4	0	4	0	4	0	4	0	4
4		min	-21.217	1	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-1.847	3	12.092	3	0	4						
6		min	-8.816	1	2.806	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	4	0	4	0	4	0	4	0	4	3.062e-03	1
2		min	0	1	0	1	0	1	0	1	0	1	6.396e-04	3
3	TOPCONNE...	max	0	4	0	2	0	4	0	4	0	4	-1.399e-03	3
4		min	0	1	-.003	3	0	1	0	1	0	1	-6.698e-03	1
5	TOPMAST	max	5.777	1	-.002	2	0	4	0	4	0	4	-5.648e-03	3
6		min	1.2	3	-.008	3	0	1	0	1	0	1	-2.724e-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	.743	8.1...	1	.107	7.8...		1	305....	431.55	140....	140....	...	H1-...

Joint Reactions (By Combination)

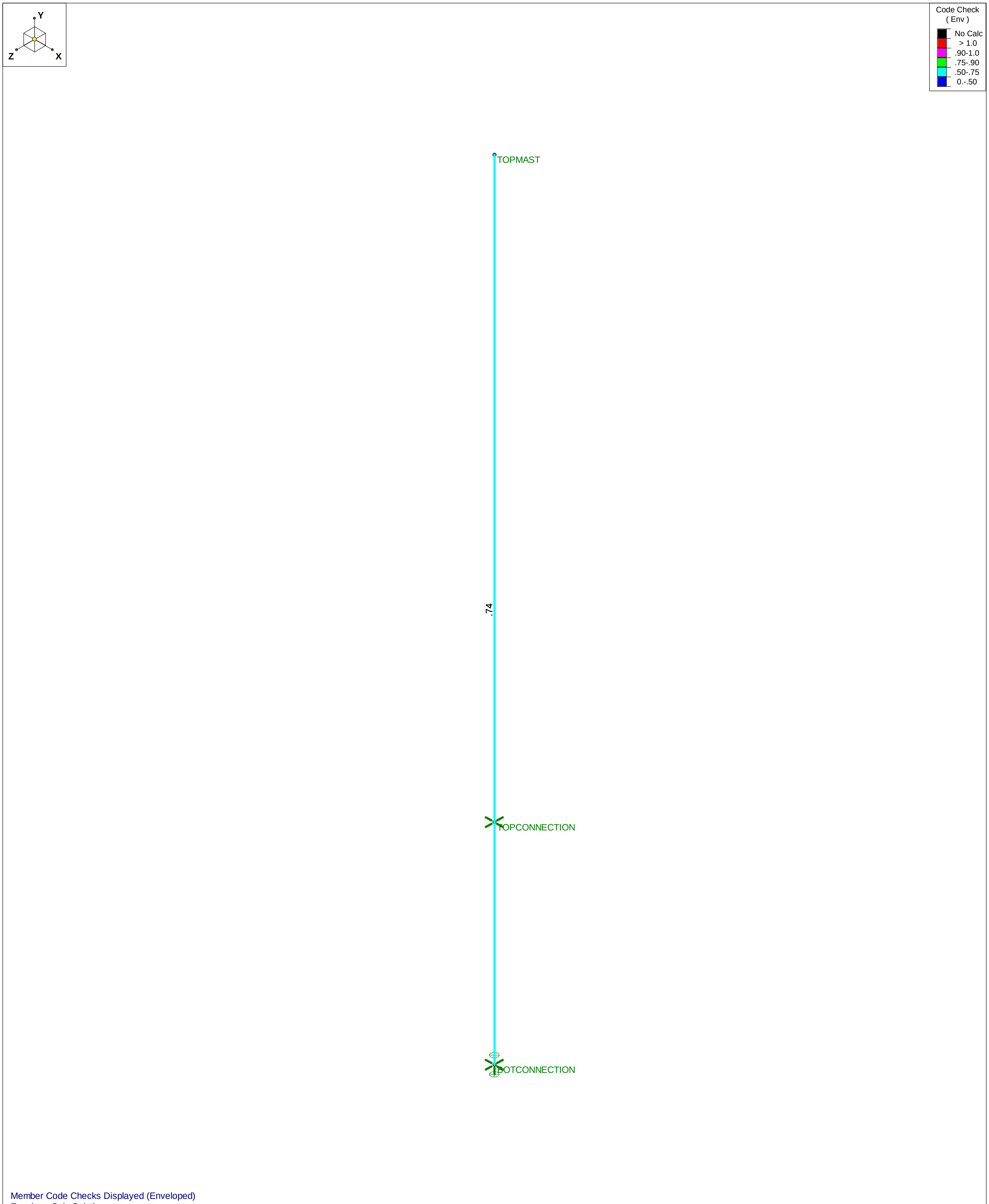
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	12.401	3.741	0	0	0	0
2	1	TOPCONNECTION	-21.217	0	0	0	0	0
3	1	Totals:	-8.816	3.741	0			
4	1	COG (ft):	X: 0	Y: 18.081	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	12.378	2.806	0	0	0	0
2	2	TOPCONNECTION	-21.193	0	0	0	0	0
3	2	Totals:	-8.816	2.806	0			
4	2	COG (ft):	X: 0	Y: 18.081	Z: 0			

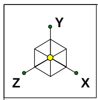
Joint Reactions (By Combination)

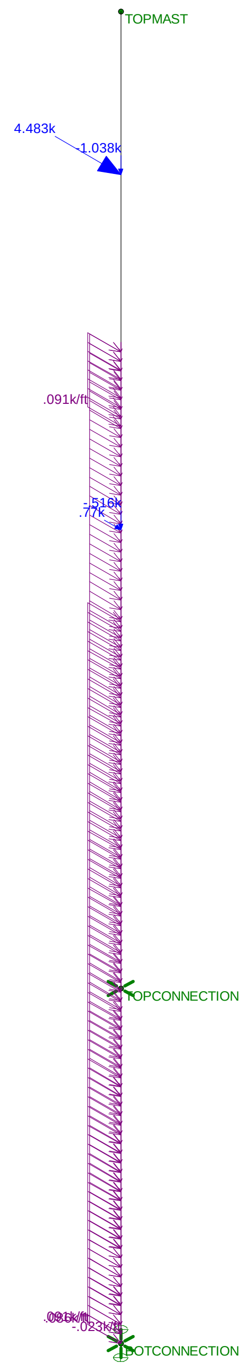
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTCONNECTION	2.59	12.092	0	0	0	0
2	3	TOPCONNECTION	-4.438	0	0	0	0	0
3	3	Totals:	-1.847	12.092	0			
4	3	COG (ft):	X: 0	Y: 16.624	Z: 0			



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

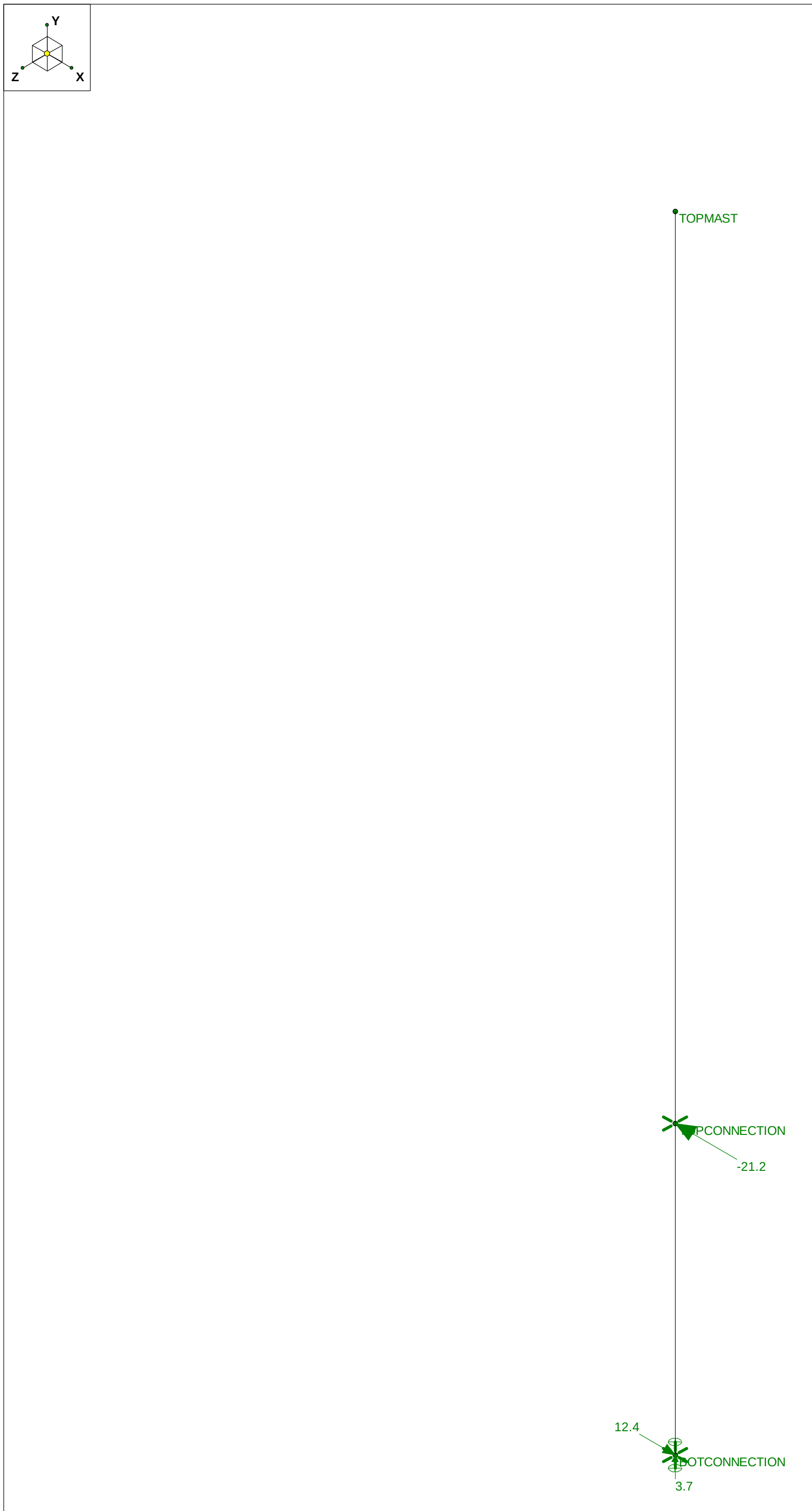
CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:01 PM
19066.12 /T-Mobile CT111...	Unity Check	TIA.r3d





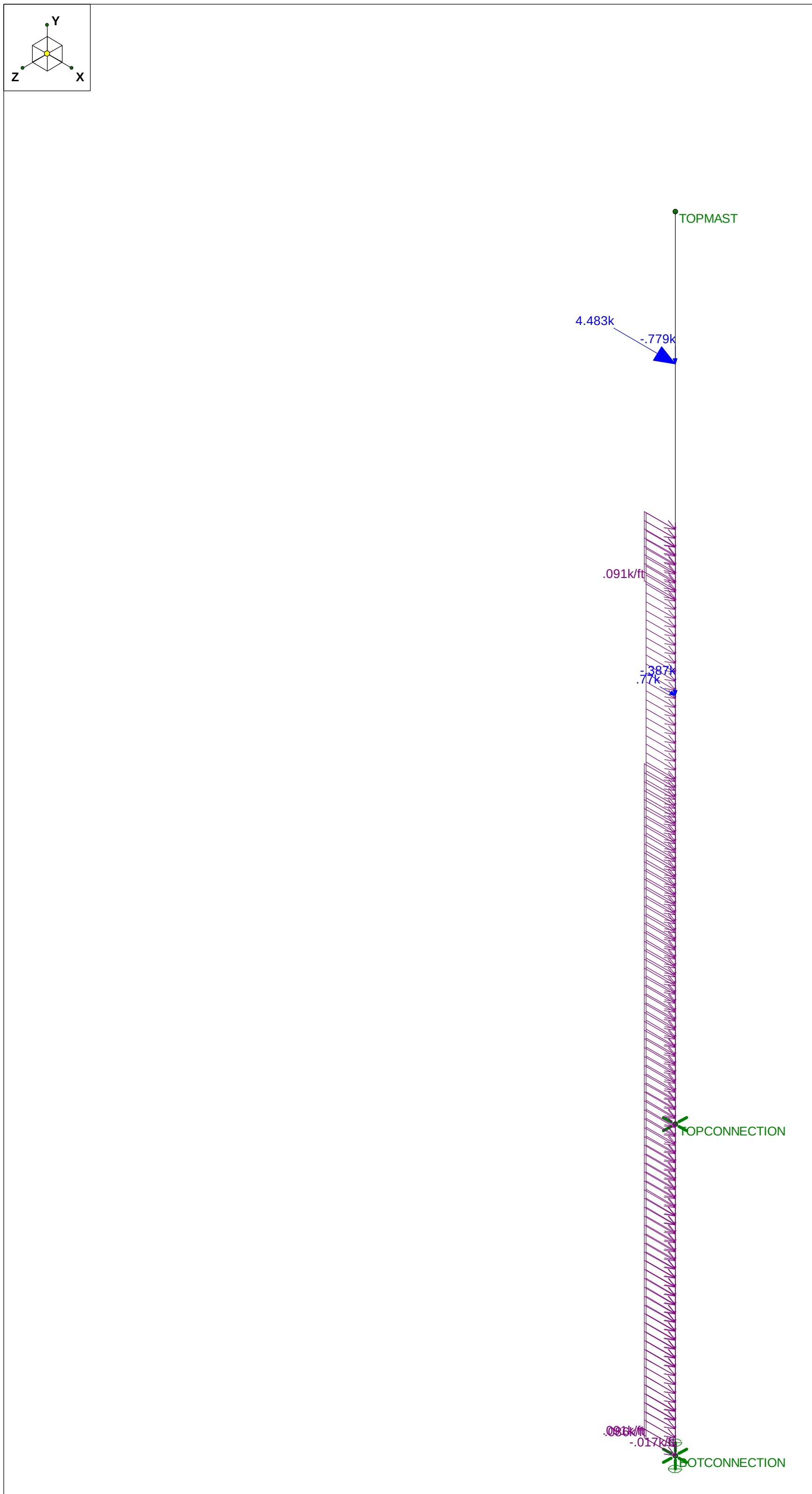
Loads: LC 1, 1.2D + 1.6W

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:37 PM
19066.12 /T-Mobile CT111...	LC#1 - Loads	TIA.r3d



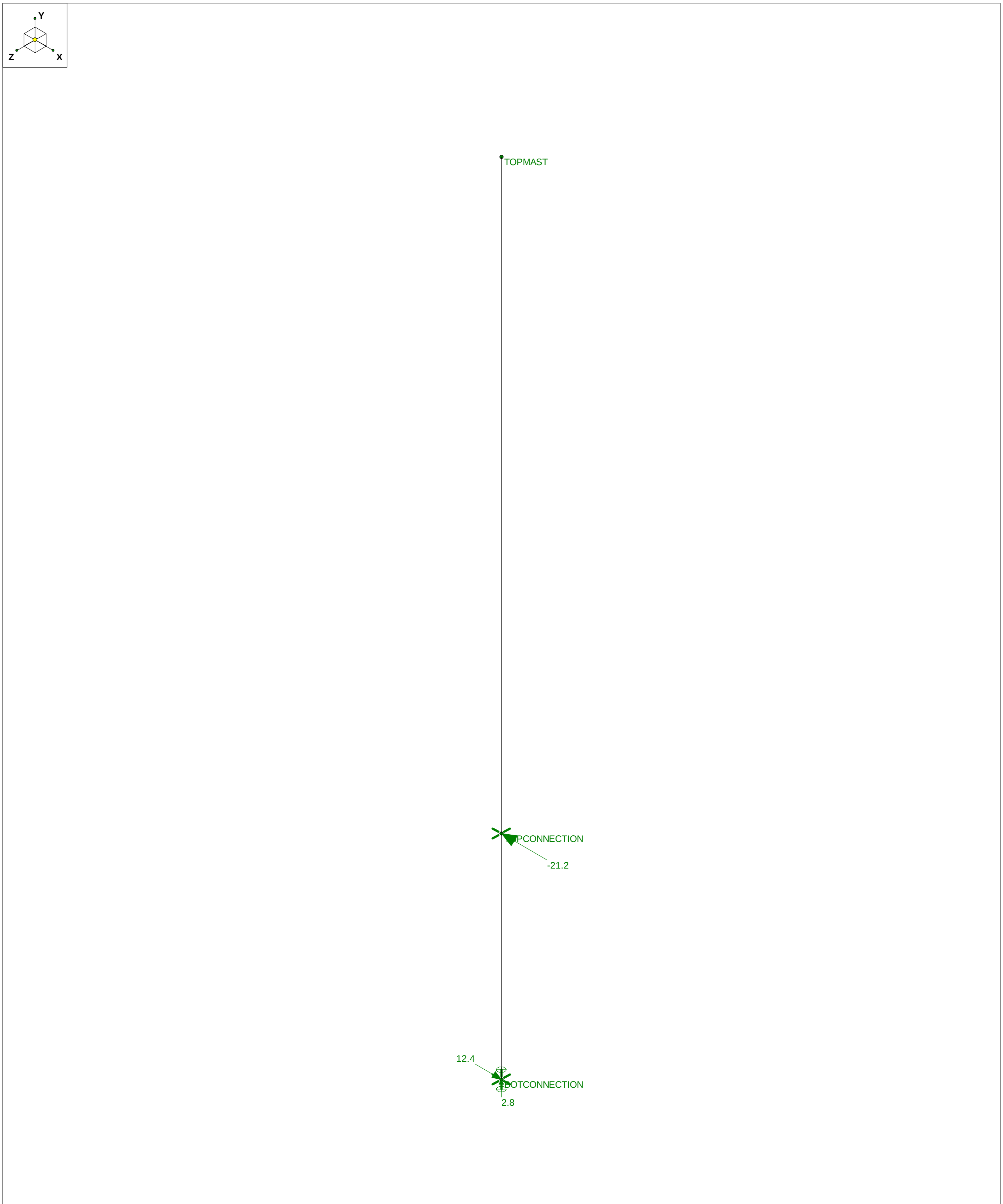
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:38 PM
19066.12 /T-Mobile CT111...	LC#1 - Reactions	TIA.r3d



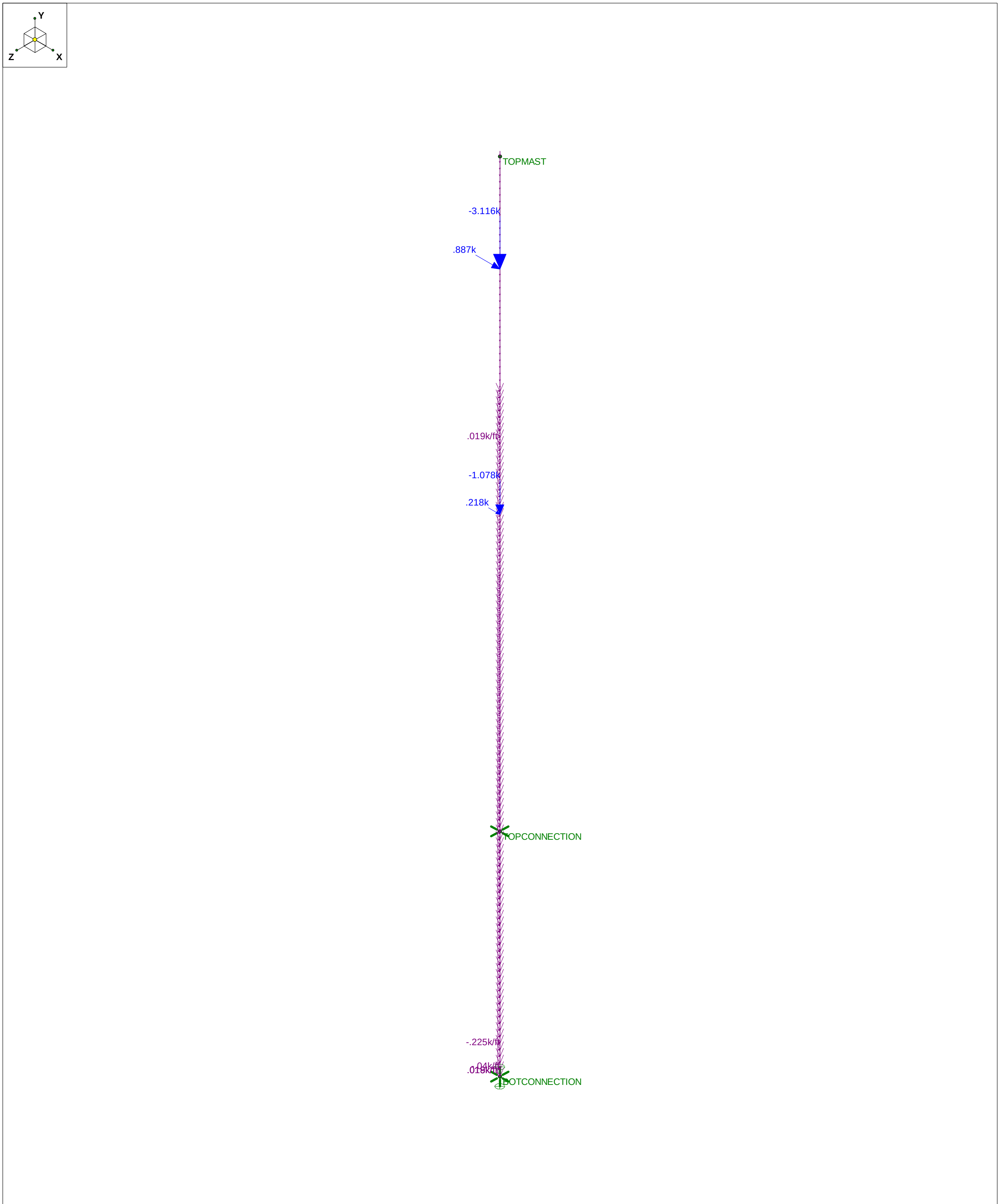
Loads: LC 2, 0.9D + 1.6W

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:37 PM
19066.12 /T-Mobile CT111...	LC#2 - Loads	TIA.r3d



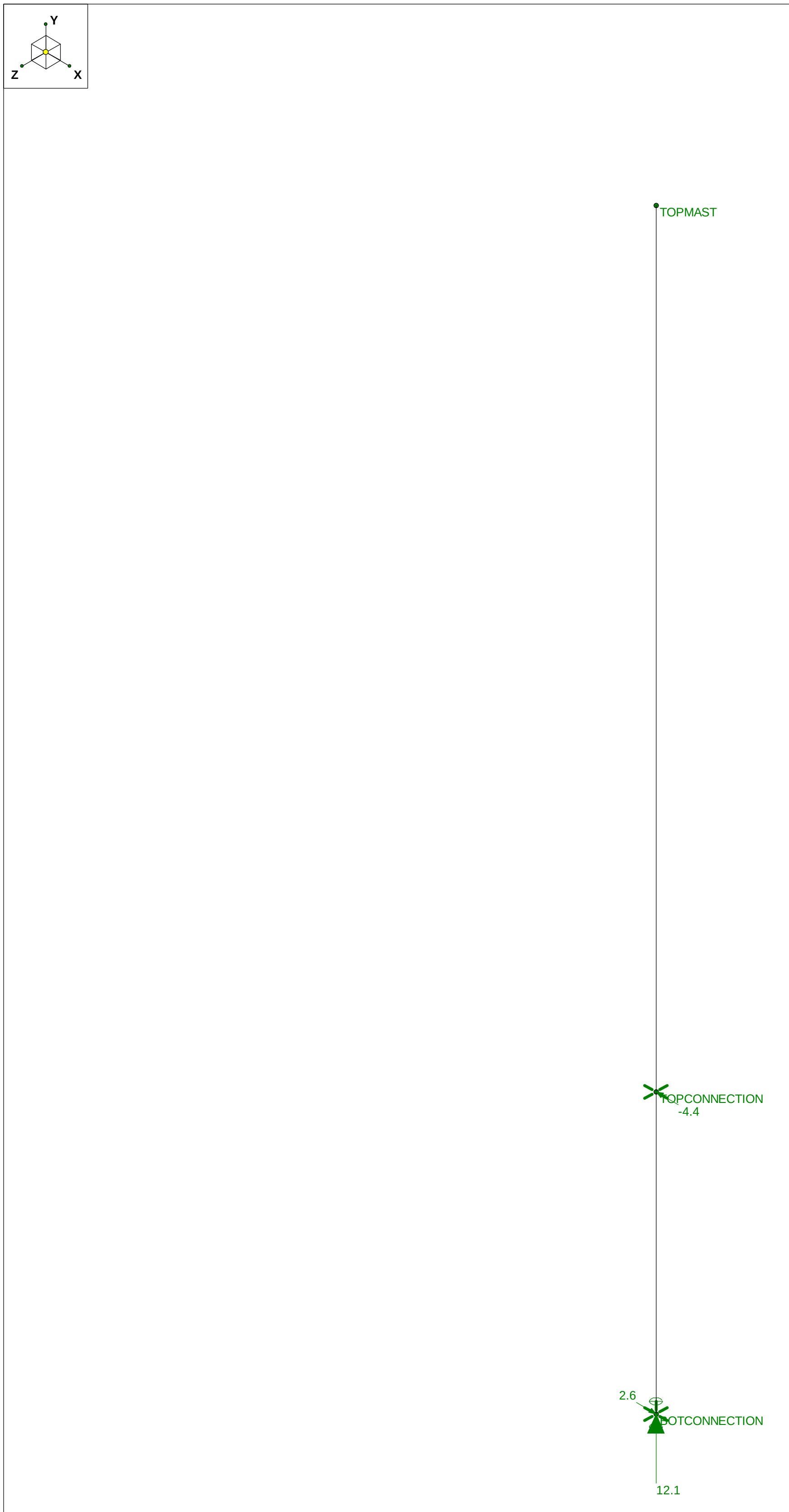
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:39 PM
19066.12 /T-Mobile CT111...	LC#2 - Reactions	TIA.r3d



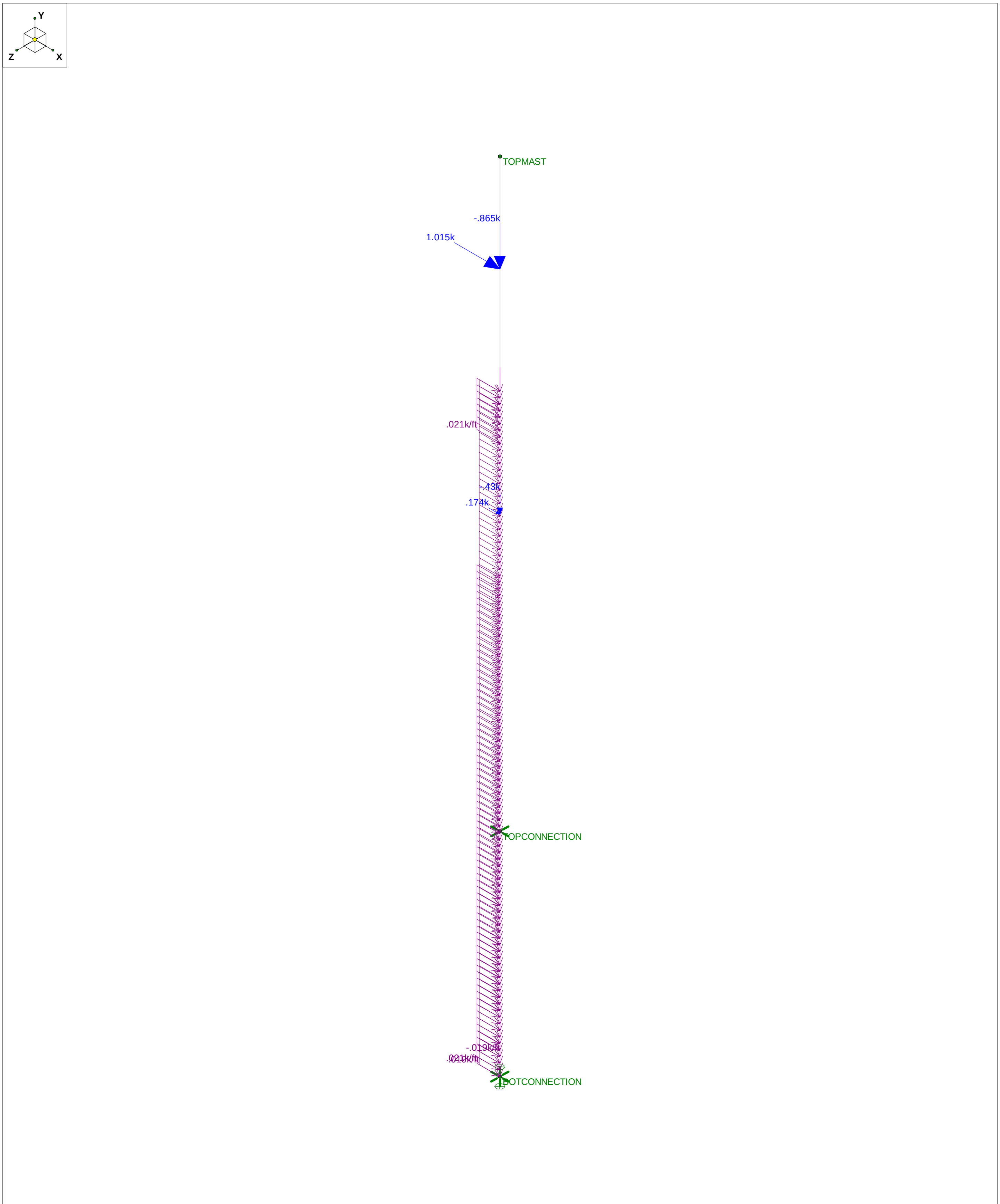
Loads: LC 3, 1.2D +1.0Di + 1.0Wi

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:37 PM
19066.12 /T-Mobile CT111...	LC#3 - Loads	TIA.r3d



Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:39 PM
19066.12 /T-Mobile CT111...	LC#3 - Reactions	TIA.r3d



Loads: LC 4, 1.0D + 1.0WService

CENTEK Engineering, INC.		
FJP	Strcuture #10256 - Mast	Jan 15, 2020 at 3:38 PM
19066.12 /T-Mobile CT111...	LC#4 - Loads	TIA.r3d

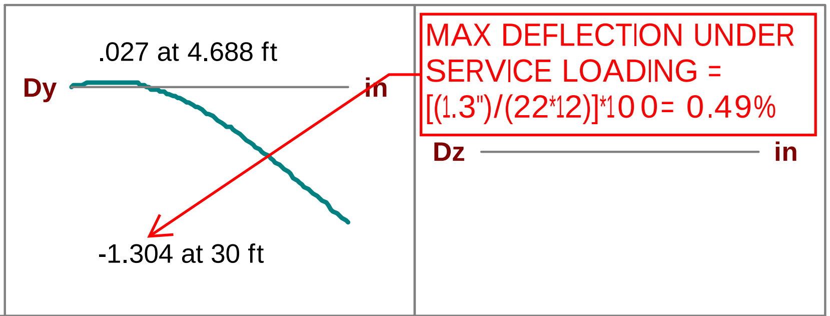
Column: ***M1***

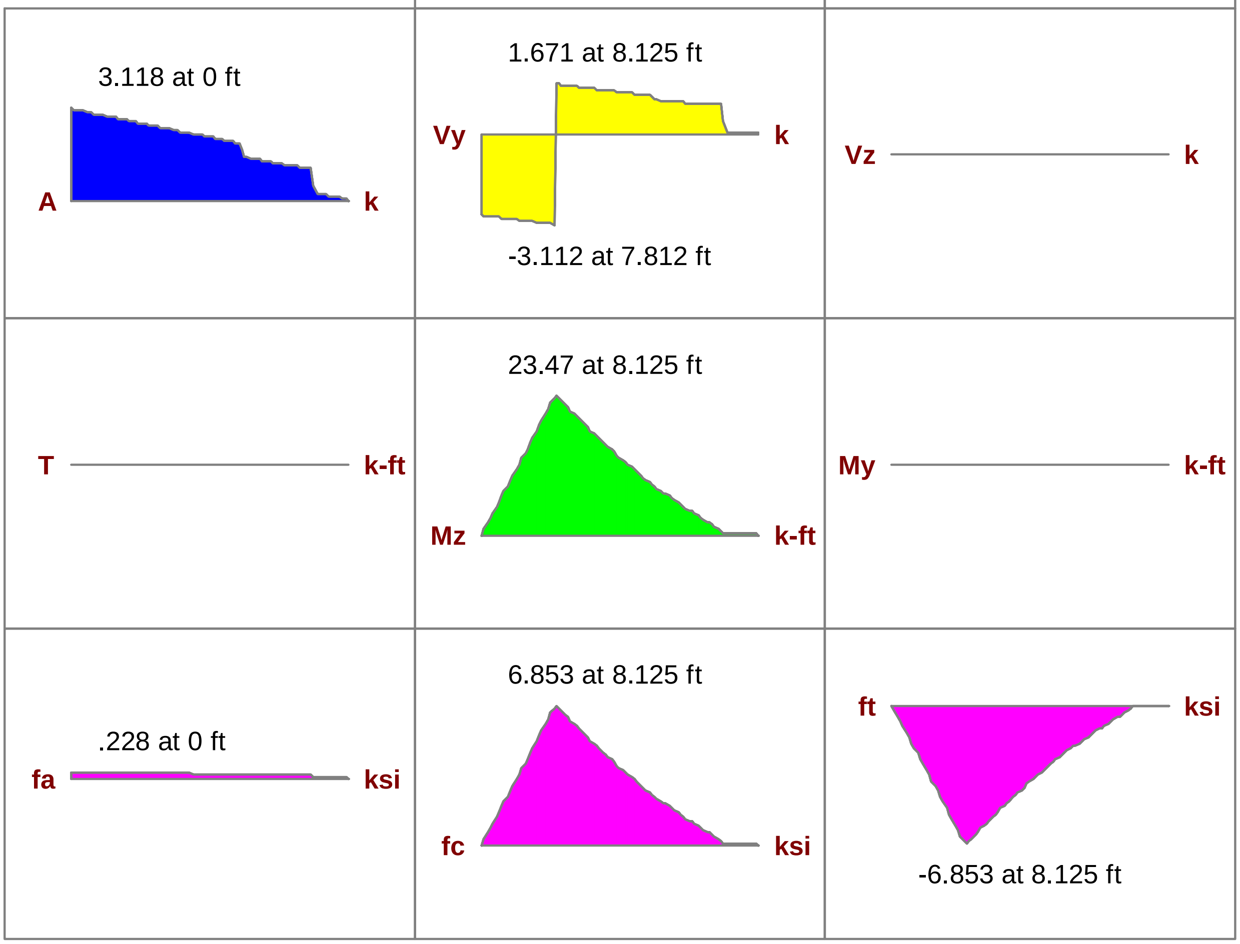
Shape:	**PIPE_12.0**
Material:	**A53 Gr. B**
Length:	**30 ft**
I Joint:	**BOTCONNECTION**
J Joint:	**TOPMAST**

LC 4: 1.0D + 1.0WService

Code Check: **0.171 (bending)**

Report Based On 97 Sections





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

Direct Analysis Method

Max Bending Check	**0.171**	Max Shear Check	**0.024 (s)**
Location	**8.125 ft**	Location	**7.813 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/276**
Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**30 ft**	**30 ft**
phi*Pnc	**305.067 k**	KL/r	**82.321**	**82.321**
phi*Pnt	**431.55 k**			
phi*Mny	**140.963 k-ft**	L Comp Flange	**30 ft**	
phi*Mnz	**140.963 k-ft**	L-torque	**30 ft**	
phi*Vny	**129.465 k**	Tau_b	**1**	
phi*Vnz	**129.465 k**			
phi*Tn	**132.782 k-ft**			
Cb	**1.556**			

Mast Top Connection:

Maximum Design Reactions at Brace:

Vertical =	Vert := 0·kips	(User Input)
Horizontal =	Horz := 21.2·kips	(User Input)
Moment =	Moment := 0	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 20.125 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 24.1875 \cdot in$	(User Input)

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

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

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

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

$Condition1 = "OK"$

$\frac{f_v}{(\phi \cdot F_{nv})} = 0 \cdot \%$

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

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 3.533 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 8 \cdot ksi$

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

$Condition2 = "OK"$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 11.8 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 7.998 \cdot ksi$

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

$Condition3 = "OK"$

$\frac{f_v}{(\phi \cdot F_{nv})} = 19.7 \cdot \%$

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

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 5.88 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 13.309 \cdot ksi$

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

$Condition4 = "OK"$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 19.7 \cdot \%$

Mast Connection to Bottom Bracket:

Design Reactions at Brace:

Axial (Max) =	$Axial_{max} := 12.1 \cdot kips$	(User Input)
Axial (Min) =	$Axial_{min} := 2.8 \cdot kips$	(User Input)
Shear =	$Shear := 12.5 \cdot kips$	(User Input)
Moment =	$Moment := 0 \cdot kips \cdot ft$	(User Input)

Anchor Bolt Data:

Bolt Grade =	A325	(User Input)
Design Shear Stress =	$F_v := 40.5 \cdot ksi$	(User Input)
Design Tension Stress =	$F_T := 67.5 \cdot ksi$	(User Input)
Total Number of Bolts =	$n_b := 4$	(User Input)
Number of Bolts Tension Side Parallel =	$n_{b.par} := 2$	(User Input)
Number of Bolts Tension Side Diagonal =	$n_{b.diag} := 1$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Bolt Spacing X Direction =	$S_x := 13 \cdot in$	(User Input)
Bolt Spacing Z Direction =	$S_z := 13 \cdot in$	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 16 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 1.25 \cdot in$	(User Input)
Bolt Edge Distance =	$B_E := 1.25 \cdot in$	(User Input)
Pole Diameter =	$D_p := 12.75 \cdot in$	(User Input)

Base Plate Data:

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

Anchor Bolt Check:

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

Shear per bolt = $V_{bolt} := \frac{Shear}{n_b} = 3.13 \cdot kips$

Actual Shear Stress = $f_v := \frac{V_{bolt}}{a_b} = 7.07 \cdot ksi$

Condition1 := if($f_v < F_v$, "OK", "Overstressed")

Condition1 = "OK"

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^2 + S_z^2} = 18.38 \cdot in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x \cdot n_{b.par}} - \frac{Axial_{min}}{n_b} = -0.7 \cdot kips$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} - \frac{Axial_{min}}{n_b} = -0.7 \cdot kips$

Tension per bolt = $T := if(T_{par} > T_{diag}, T_{par}, T_{diag}) = -0.7 \cdot kips$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = -1.58 \cdot ksi$

Condition2 := if($f_t < F_T$, "OK", "Overstressed")

Condition2 = "OK"

Base Plate Check:

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

Plate Bending Width = $Z := \left(Pl_w \cdot \sqrt{2} - D_p\right) = 9.88 \cdot in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 2.82 \cdot in$

Load per Bolt Diagonal = $P_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} + \frac{Axial_{max}}{n_b} = 3.03 \cdot kips$

Moment in Base Plate = $M := K \cdot P_{diag} = 8.52 \cdot kips \cdot in$

Plastic Section Modulus = $Z := \frac{1}{4} \cdot Z \cdot Pl_t^2 = 3.86 \cdot in^3$

Bending Stress = $f_b := \frac{M}{Z} = 2.21 \cdot ksi$

Condition3 := if($f_b < F_b$, "OK", "Overstressed")

Condition3 = "OK"

Base Plate to PCS Mast Weld Check:

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

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

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

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

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 28.71 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Shear}{A_w} = 1.39 \cdot ksi$

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

$Condition4 = \text{"OK"}$

Check Gusset Plates Below Base Plates:

Gusset Plate Data:

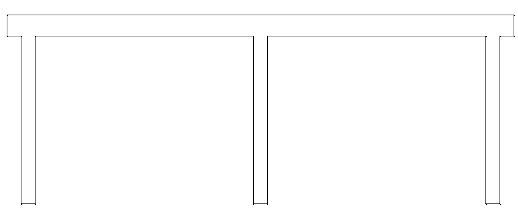
Allowable Yield Stress = $F_y := 36 \cdot ksi$ (User Input)

Plate Height = $Pl_h := 8.5 \cdot in$ (User Input)

Plate Thickness = $Pl_t := 0.5 \cdot in$ (User Input)

Distance from CL Pole to Face of Collar = $d := 13.25 \cdot in$ (User Input)

Section Modulus Gusset Assembly = $S_x := 29.361 \cdot in^3$ (User Input)



Max Moment = $Moment_{max} := Moment + Axial_{max} \cdot d = 160.325 \cdot in \cdot kips$

Bending Stress = $f_b := \frac{Moment_{max}}{S_x} = 5.46 \cdot ksi$

$Condition5 := if\left(f_b < F_b, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition5 = \text{"OK"}$

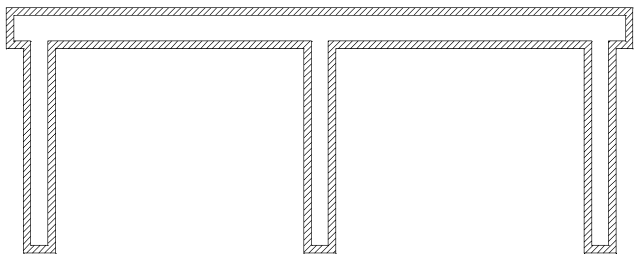
Weld Data:

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

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

Weld Area = $A_w := 23.1 \cdot in^2$ (User Input)

Section Modulus of Weld = $S_w := 28.9 \cdot in^3$ (User Input)



Weld Stress = $f_w := \frac{Moment_{max}}{S_w} + \frac{Axial_{max}}{A_w} = 6.07 \cdot ksi$

Condition6 := if$(f_w < F_w$, "OK" , "Overstressed"$)$

Condition6 = "OK"

Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 12.1 \cdot kips$	(User Input)
Horizontal =	$Horz := 2.6 \cdot kips$	(User Input)
Moment =	$Moment := 0 \cdot ft \cdot kips$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 8$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 20.125 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 26.1875 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 1 =	$S_{vert1} := 2.25 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 2 =	$S_{vert2} := 6 \cdot in$	(User Input)

Bolt Polar Moment of Inertia = $I_p := 2 \cdot S_{vert1}^2 + 2 \cdot S_{vert2}^2 = 82.125 \cdot in^2$

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

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 3.424 \cdot ksi$

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

Condition1 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 8.5 \cdot \%$

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

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment) \cdot S_{vert2}}{2 \cdot I_p} = 9.22 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 20.9 \cdot ksi$

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

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 30.9 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \sqrt{\left(\frac{Vert}{n_b \cdot a_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b \cdot a_b}\right)^2 + \left(\frac{Horz}{n_b \cdot a_b}\right)^2} = 3.502 \cdot ksi$

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

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 8.6 \cdot \%$

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

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e \cdot S_{vert2}}{2 \cdot I_p} = 9.395 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 21.266 \cdot ksi$

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

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 31.5 \cdot \%$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2017 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 100$	mph	(User Input NESC 2017 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 57.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	$TME := 165$	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 2017 Table 250-3 equation)
Importance Factor =	$I := 1.0$		(User Input from NESC 2017 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.406$ (NESC 2017 Table 250-2)

Exposure Factor = $Es := 0.346 \cdot \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.291$ (NESC 2017 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.78$ (NESC 2017 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 2017 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 29.8$ psf (NESC 2017 Section 250.C.2)

Shape Factors

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

Overload Factors

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)
NESC Extreme Loading =	**1.0**	(User Input)

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)
NESC Extreme Loading =	**1.0**	(User Input)

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Development of Wind & Ice Load on Mast

Mast Data: (Pipe 12.0" SCH. 40)

Mast Shape = Round (User Input)

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

Mast Length = $L_{mast} := 30$ ft (User Input)

Mast Thickness = $t_{mast} := 0.349$ 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 = $Ai_{mast} := \frac{\pi}{4} \cdot \left(\left(D_{mast} + Ir \cdot 2 \right)^2 - D_{mast}^{\ 2} \right) = 20.8$ sq in

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

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir \right)}{12} = 1.146$

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

Wind Load (NESC Extreme)

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

Total Mast Wind Force (Above Utility Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 63$ plf **BLC 5**

Total Mast Wind Force (Bellow Utility Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} = 51$ plf **BLC 5**

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Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXV18-209014-C-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 53$	in	(User Input)
Antenna Width =	$W_{ant} := 6.65$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 24.9$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 75$	lbs	BLC 2

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1110$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 604$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 20$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 60$	lbs	BLC 3

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 2.9$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 55$	lbs	BLC 4

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.4$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 7.3$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 438$	lbs	BLC 5

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24_43-U-NA20		
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 =	$WT_{ant} := 153.3$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 460$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 3474$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 115$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 344$ 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 = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2861$ lbs **BLC 5**

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Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Andrew ATSBT-TOP-FM-4G		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 6$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 52$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 2$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 5$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.6$ sf

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

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 26$ lbs **BLC 5**

Development of Wind & Ice Load on Mounts

Mount Data:

Mounting Type = Site Pro Universal Ring Mount & Adapter Kit w/ 3 Pipes

Mount Shape = Round (User Input)

Pipe Mount Length= $L_{mnt} := 60$ 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 Antennas = $N_{mnt} := 3$ (User Input)

Tri Sector and Bracket Mount Weight = $WT_{sa.mnt} := 300$ lbs (User Input)

Gravity Load (without ice)

Weight of Each Pipe Mount= $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 18$ lbs

Weight of all Mounts= $WT_{mnt} \cdot N_{mnt} + WT_{sa.mnt} = 355$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Pipe= $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 266$ cu in

Volume of Ice on Each Pipe= $V_{ice} := \left(\frac{\pi}{4} \cdot \left(\left(D_{mnt} + 2 \cdot Ir \right)^{2} \right) \cdot \left(L_{mnt} + 2 \cdot Ir \right) \right) - V_{mnt} = 280$ cu in

Weight of Ice on Each Pipe= $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 9$ lbs

Weight of Ice on All Pipes= $W_{ICEmnt} \cdot N_{mnt} + 5 = 33$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice = $AICE_{mnt} := 0 = 0$ sf

Total Antenna Wind Force w/ Ice = $Fi_{mnt} := p \cdot Cd_{R} \cdot AICE_{mnt} = 0$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0 = 0$ sf

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

Development of Wind & Ice Load on Mounts

Mount Data:

Mounting Type =	Site Pro Universal Ring Mount & Adapter Kit w/ 3 Pipes		
Mount Shape =	Round		(User Input)
Pipe Mount Length=	$L_{mnt} := 108$	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 Antennas =	$N_{mnt} := 3$		(User Input)
Tri Sector and Bracket Mount Weight =	$WT_{sa.mnt} := 300$	lbs	(User Input)

Gravity Load (without ice)

Weight of Each Pipe Mount= $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 33$ lbs

Weight of all Mounts= $WT_{mnt} \cdot N_{mnt} + WT_{sa.mnt} = 399$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Pipe= $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 478$ cu in

Volume of Ice on Each Pipe= $V_{ice} := \left(\frac{\pi}{4} \cdot \left(\left(D_{mnt} + 2 \cdot Ir\right)^{2}\right) \cdot \left(L_{mnt} + 2 \cdot Ir\right)\right) - V_{mnt} = 497$ cu in

Weight of Ice on Each Pipe= $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 16$ lbs

Weight of Ice on All Pipes= $W_{ICEmnt} \cdot N_{mnt} + 5 = 54$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice = $AICE_{mnt} := 0 = 0$ sf

Total Antenna Wind Force w/ Ice = $Fi_{mnt} := p \cdot Cd_{R} \cdot AICE_{mnt} = 0$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0 = 0$ sf

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

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Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 25$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 6$		(User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 28$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right)}{12} = 1.1$ 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 = $A_{coax} := \frac{\left(NP_{coax} \cdot D_{coax}\right)}{12} = 1$ ft

Total Coax Wind Force (Above Pole Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 59$ plf **BLC 5**

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 47$ 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 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 530-05: ASD
Aluminum Code	AA ADM1-05: 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 (\...	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 Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Mast	PIPE_12.0	Column	Pipe	A53 Gr. B	Typical	13.7	262	262	523

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Existing Mast	30			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...	TOPMA...			Existing Mast	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	8	0	0	
3	TOPMAST	0	30	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	BOTCONNECTION	Reaction	Reaction	Reaction		Reaction	
2	TOPCONNECTION	Reaction		Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.075	18.33
2	M1	Y	-.355	18.33
3	M1	Y	-.46	26.33
4	M1	Y	-.006	26.33
5	M1	Y	-.399	26.33

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.06	18.33
2	M1	Y	-.033	18.33
3	M1	Y	-.344	26.33
4	M1	Y	-.005	26.33
5	M1	Y	-.054	26.33

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.055	18.33
2	M1	X	.323	26.33
3	M1	X	.004	26.33

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.438	18.33
2	M1	X	2.861	26.33
3	M1	X	.026	26.33

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	0	22.33

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.028	-.028	0	22.33

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	16.25
2	M1	X	.007	.007	20.67	22.33
3	M1	X	.007	.007	0	22.33

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.051	.051	0	9.33
2	M1	X	.063	.063	9.33	16.25
3	M1	X	.063	.063	20.67	22.33
4	M1	X	.047	.047	0	9.33
5	M1	X	.059	.059	9.33	22.33

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					5	1		
3	Weight of Ice Only	None					5	2		
4	NESC Heavy Wind	None					3	3		
5	NESC Extreme Wind	None					3	5		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	NESC Heavy Wind	Yes	Y		1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind	Yes	Y		1	1	2	1	5	1														

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	BOTCONNEC...	max	8.038	2	6.719	1	0	2	0	2	0	2	0	2
2		min	2.289	1	3.118	2	0	1	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

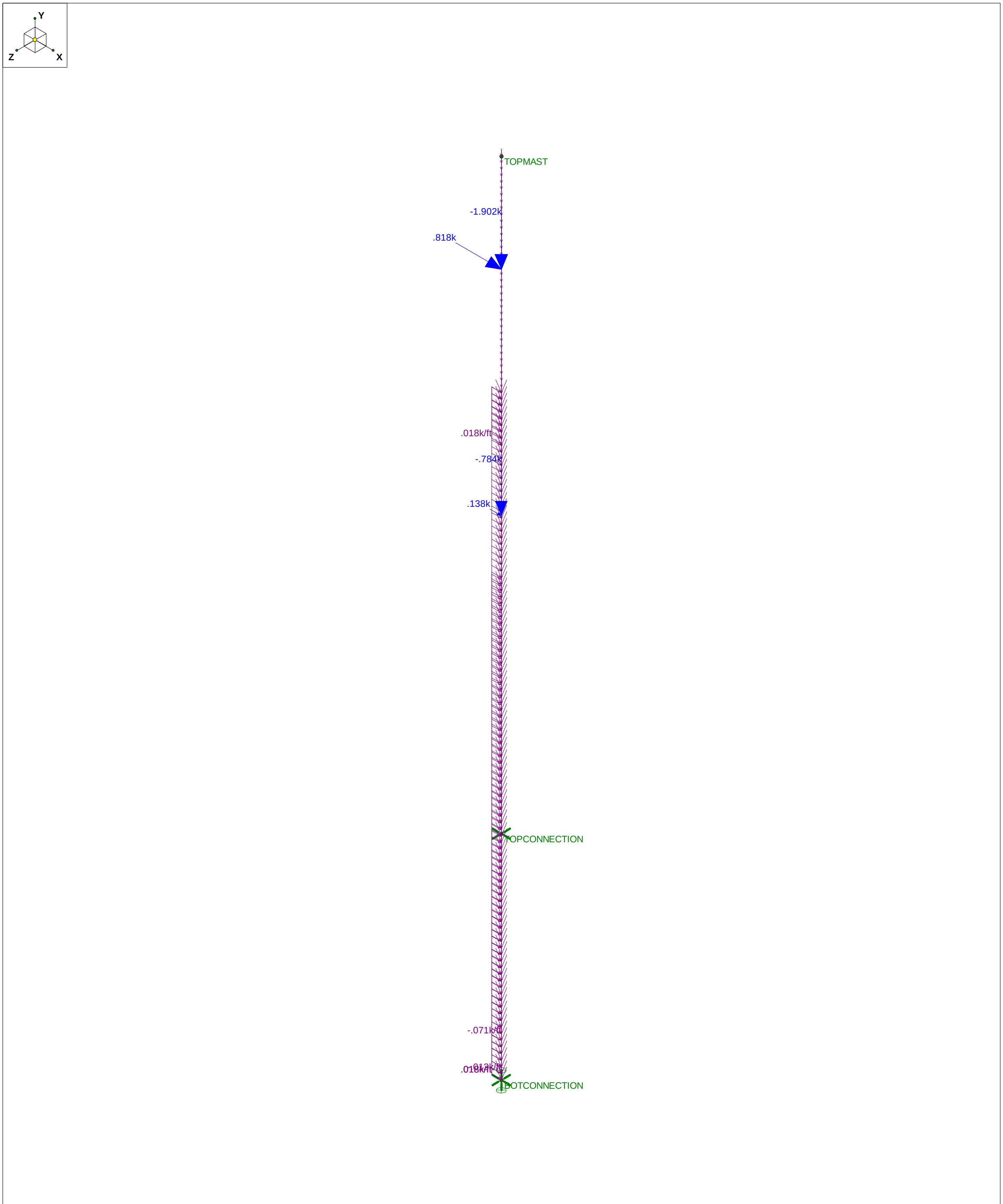
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
3	TOPCONNEC...	max	-3.948	1	0	2	0	2	0	2	0	2	0	2
4		min	-13.584	2	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-1.659	1	6.719	1	0	2						
6		min	-5.547	2	3.118	2	0	1						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	2.289	6.719	0	0	0	0
2	1	TOPCONNECTION	-3.948	0	0	0	0	0
3	1	Totals:	-1.659	6.719	0			
4	1	COG (ft):	X: 0	Y: 17.698	Z: 0			

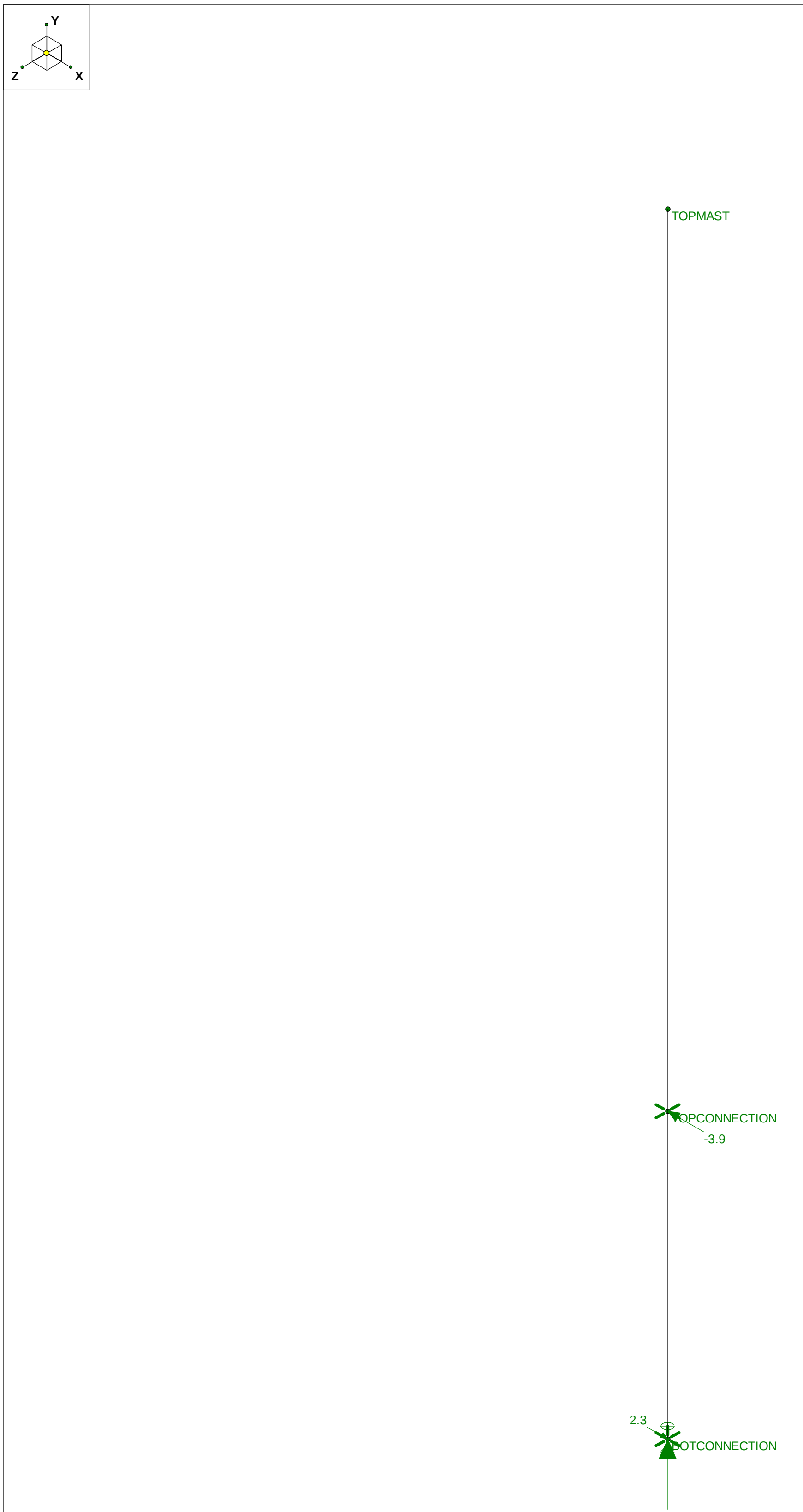
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	8.038	3.118	0	0	0	0
2	2	TOPCONNECTION	-13.584	0	0	0	0	0
3	2	Totals:	-5.547	3.118	0			
4	2	COG (ft):	X: 0	Y: 18.081	Z: 0			



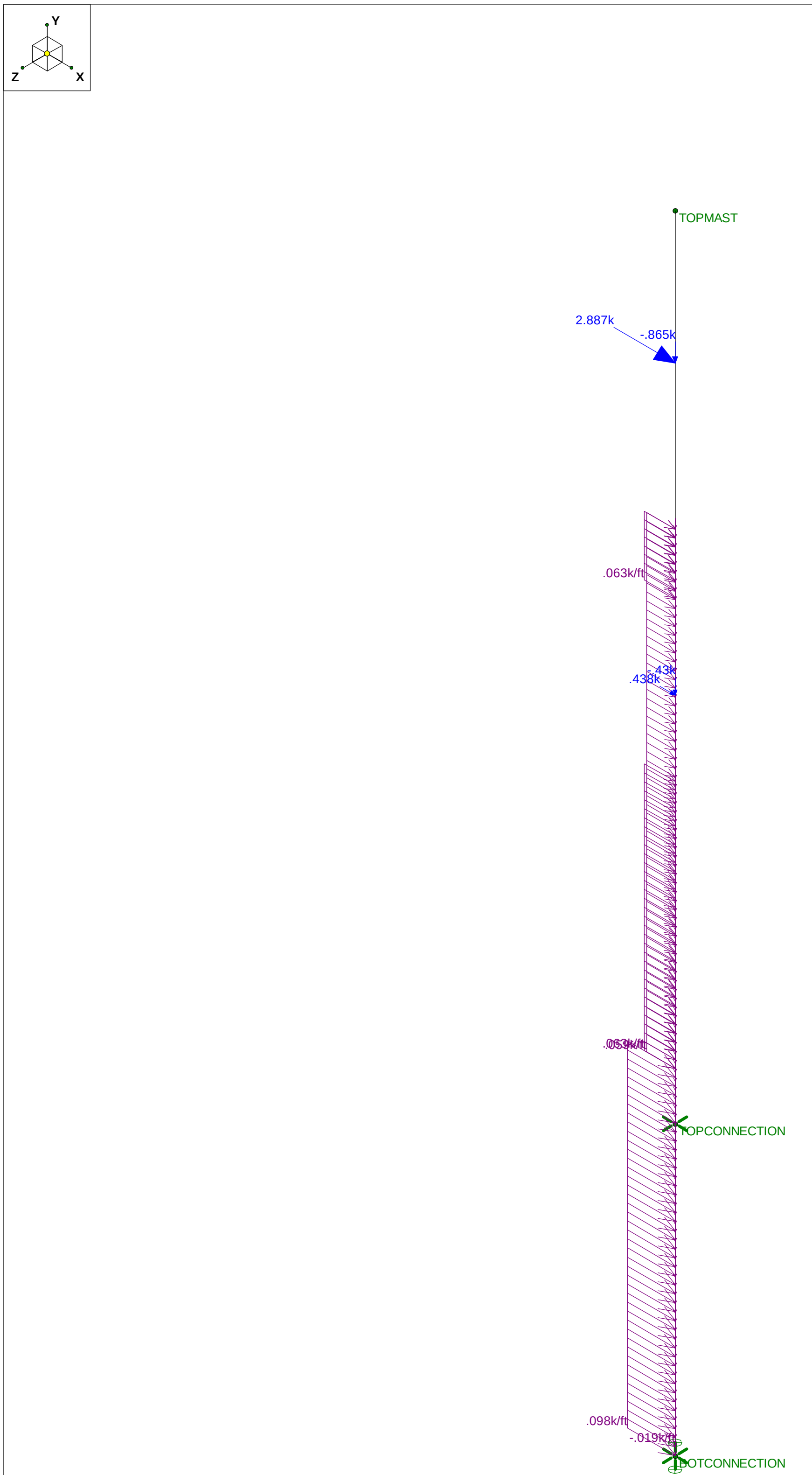
Loads: LC 1, NESC Heavy Wind

CENTEK Engineering, Inc.		
FJP	Structure # 10256 - Mast	Jan 7, 2021 at 9:04 AM
19066.12 /T-Mobile CT111...	LC #1 Loads	NESC.r3d



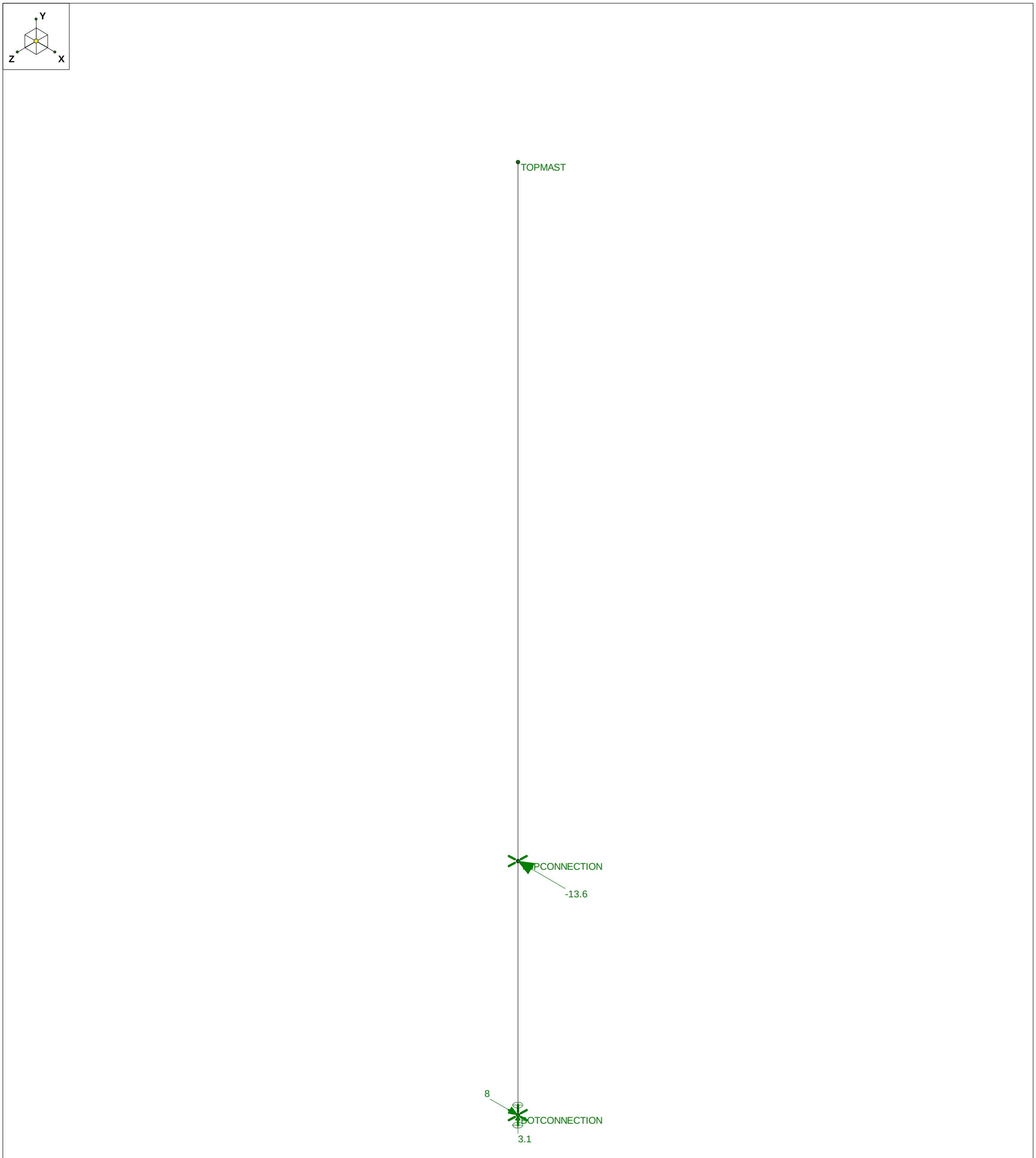
Results for LC 1, NESC Heavy Wind
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
FJP	Structure # 10256 - Mast	Jan 7, 2021 at 9:04 AM
19066.12 /T-Mobile CT111...	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind

CENTEK Engineering, Inc.		
FJP	Structure # 10256 - Mast	Jan 7, 2021 at 9:04 AM
19066.12 /T-Mobile CT111...	LC #2 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
FJP	Structure # 10256 - Mast	Jan 7, 2021 at 9:05 AM
19066.12 /T-Mobile CT111...	LC #2 Reactions	NESC.r3d

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

Coax Cable on CL&P Tower

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{bmatrix} 15 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{bmatrix} \cdot ft$ *(User Input)*

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 = $N_{coax} := 18$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 3$ *(User Input)*

Extreme Wind Pressure = $qz := 29.8 \cdot psf$ *(User Input)*

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

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

Radial Ice Density = $Id := 57 \cdot pcf$ *(User Input)*

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

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

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

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

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

Overload Factor for NESC Extreme Ice w/ Wind Load= $OF_{EIW} := 1.0$ *(User Input)*

Overload Factor for NESC Extreme Ice w/ Vertical Load= $OF_{EIV} := 1.0$ *(User Input)*

Wind Area without Ice = $A := (NP_{coax} \cdot D_{coax}) = 5.94\ in$

Wind Area with Ice = $A_{ice} := (NP_{coax} \cdot D_{coax} + 2 \cdot Ir) = 6.94\ in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 27.756\ plf$

Heavy Vertical Load =

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

Heavy Transverse Load =

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

$$Heavy_{Vert} = \begin{bmatrix} 1046 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \\ 697 \end{bmatrix} lb \qquad Heavy_{Trans} = \begin{bmatrix} 139 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \end{bmatrix} lb$$

Extreme Vertical Load =

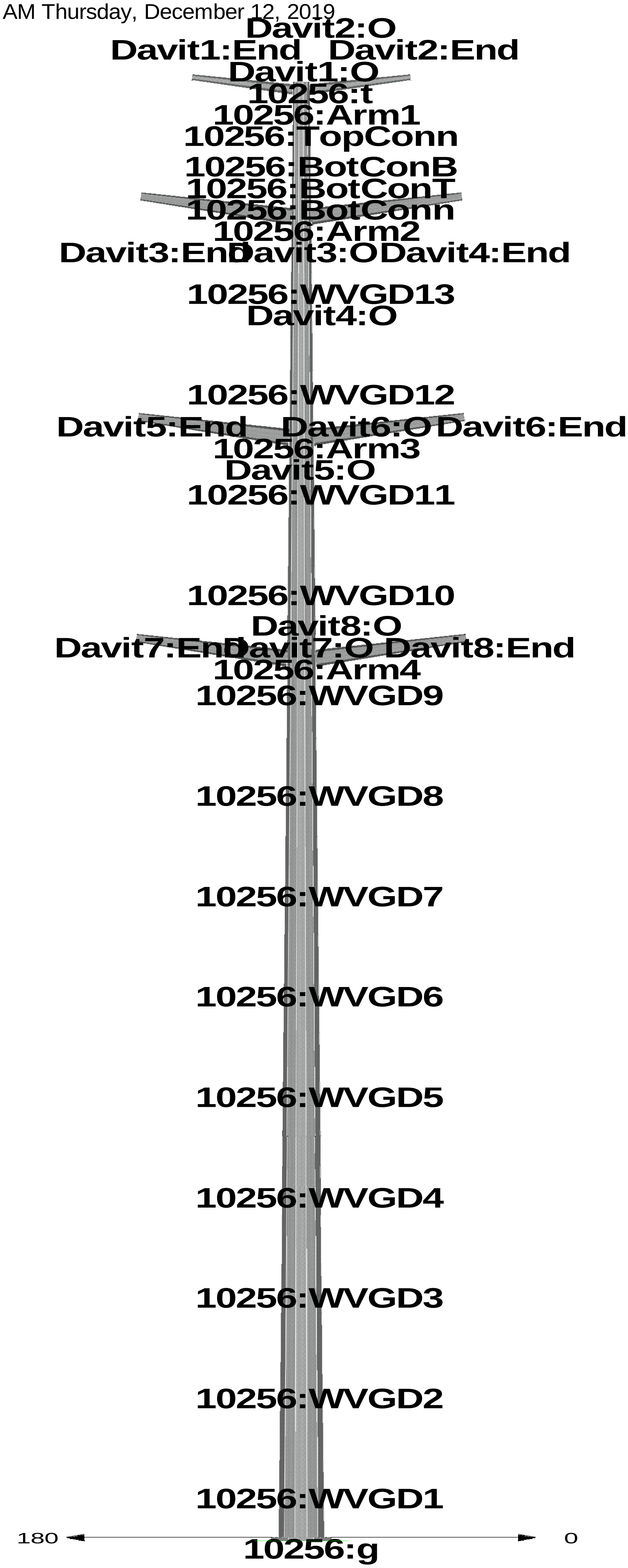
$$Extreme_{Vert} := \overrightarrow{\left(\left(N_{coax} \cdot W_{coax}\right) \cdot Coax_{Span} \cdot OF_{EV}\right)}$$

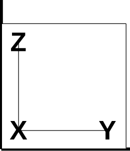
Extreme Transverse Load =

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

$$Extreme_{Vert} = \begin{bmatrix} 281 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \end{bmatrix} lb \qquad Extreme_{Trans} = \begin{bmatrix} 354 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \\ 236 \end{bmatrix} lb$$

Centek Engineering Inc, Project: "cl&p structure # 10256"
PLS-POLE Version 16.01, 9:17:34 AM Thursday, December 12, 2019
Undeformed geometry displayed





Project Name : 19066.12 - Bethel, CT
Project Notes: Str # 10256/ T-Mobile - CT11110C
Project File : J:\Jobs\1906600.WI\12_CT11110C\05_Structural\Backup Documentation\Calcs\Rev (3)\PLS-Pole\cl&p structure # 10256.pol
Date run : 4:11:15 PM Thursday, January 7, 2021
by : PLS-POLE Version 16.01
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: J:\Jobs\1906600.WI\12_CT11110C\05_Structural\Backup Documentation\Calcs\Rev (3)\PLS-Pole\cl&p #10256.lca

*** Analysis Results:

Maximum element usage is 88.67% for Base Plate "10256" in load case "NESC Extreme"
Maximum insulator usage is 16.98% for Clamp "Clamp9" in load case "NESC Extreme"

Foundation Design Forces For All Load Cases:

Note: loads are factored.

Load Case	Foundation Description	Axial Force (kips)	Shear Force (kips)	Bending Moment (ft-k)	Foundation Usage %
NESC Heavy	10256:g	115.18	34.04	3897.83	0.00
NESC Extreme	10256:g	59.62	48.90	5222.89	0.00

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	10256:g	-0.54	-34.03	-115.18	34.04	3897.39	-58.74	3897.83	-0.05	0.00
NESC Extreme	10256:g	-0.35	-48.90	-59.62	48.90	5222.72	-42.67	5222.89	-0.03	0.00

Summary of Tip Deflections For All Load Cases:

Note: positive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	10256:t	1.33	90.72	-3.25	90.79	0.08	-5.46	0.00
NESC Extreme	10256:t	1.01	121.37	-5.75	121.51	0.06	-7.50	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
10256	1	5024	NESC Extreme	75.10	1069.46
10256	2	10060	NESC Extreme	84.49	3071.93
10256	3	11494	NESC Extreme	86.78	5222.89

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
10256	86.78	NESC Extreme	2.5	36	29548.2

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
Davit1	12.41	NESC Heavy	144.6	1	182.3
Davit2	14.88	NESC Heavy	144.6	1	182.3
Davit3	31.83	NESC Heavy	132.0	1	575.0
Davit4	35.66	NESC Heavy	132.0	1	575.0
Davit5	32.18	NESC Heavy	110.0	1	575.0
Davit6	35.91	NESC Heavy	110.0	1	575.0
Davit7	32.48	NESC Heavy	88.0	1	575.0
Davit8	36.10	NESC Heavy	88.0	1	575.0

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type

NESC Heavy	68.31	10256 Base Plate
NESC Extreme	88.67	10256 Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Height AGL (ft)	Segment Number
NESC Heavy	66.43	10256	12.5	34
NESC Extreme	86.78	10256	2.5	36

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	10256	12	40.000	112.213	3897.387	-58.736	40.984	204.920	7	94.609	2.479	68.31
NESC Extreme	10256	12	40.000	56.648	5222.720	-42.670	53.204	266.022	7	122.265	2.825	88.67

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Height AGL (ft)	Segment Number
NESC Heavy	36.10	Davit8	88.0	1
NESC Extreme	15.70	Davit8	88.0	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	2.15	NESC Heavy	0.0
Clamp2	Clamp	1.95	NESC Heavy	0.0
Clamp3	Clamp	10.99	NESC Heavy	0.0
Clamp4	Clamp	10.82	NESC Heavy	0.0
Clamp5	Clamp	11.02	NESC Heavy	0.0
Clamp6	Clamp	10.86	NESC Heavy	0.0
Clamp7	Clamp	11.00	NESC Heavy	0.0
Clamp8	Clamp	10.86	NESC Heavy	0.0
Clamp9	Clamp	16.98	NESC Extreme	0.0
Clamp10	Clamp	10.78	NESC Extreme	0.0
Clamp13	Clamp	1.32	NESC Heavy	0.0
Clamp14	Clamp	0.88	NESC Heavy	0.0
Clamp15	Clamp	0.88	NESC Heavy	0.0
Clamp16	Clamp	0.88	NESC Heavy	0.0
Clamp17	Clamp	0.88	NESC Heavy	0.0
Clamp18	Clamp	0.88	NESC Heavy	0.0
Clamp19	Clamp	0.88	NESC Heavy	0.0
Clamp20	Clamp	0.88	NESC Heavy	0.0
Clamp21	Clamp	0.88	NESC Heavy	0.0
Clamp22	Clamp	0.88	NESC Heavy	0.0
Clamp23	Clamp	0.88	NESC Heavy	0.0
Clamp24	Clamp	0.88	NESC Heavy	0.0
Clamp25	Clamp	0.88	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	3814.7
Weight of Steel Poles:	29548.2
Total:	33362.9

*** End of Report

```
*************************************************************************
*                                                                       *
*                              PLS-POLE                                 *
*                  POLE AND FRAME ANALYSIS AND DESIGN                   *
*                Copyright Power Line Systems 1999-2019                 *
*                                                                       *
*************************************************************************
```

Project Name : 19066.12 - Bethel, CT
Project Notes: Str # 10256/ T-Mobile - CT11110C
Project File : J:\Jobs\1906600.WI\12_CT11110C\05_Structural\Backup Documentation\Calcs\Rev (3)\PLS-Pole\cl&p structure # 10256.pol
Date run   : 4:11:14 PM Thursday, January 7, 2021
by   : PLS-POLE Version 16.01
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

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

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

Steel Pole Properties:

Steel Pole Property Label	Stock Number	Length (ft)	Default Embedded Length (ft)	Base Plate	Shape	Tip Diameter (in)	Base Diameter (in)	Taper (in/ft)	Default Drag Coef.	Tubes	Modulus of Elasticity Override (ksi)	Weight Density Override (lbs/ft^3)	Shape At Base	Strength Check Type	Distance From Tip (ft)	Ultimate Trans. Load (kips)	Ultimate Long. Load (kips)	Texture
CL&P10256	10256	145.00	0	Yes	12F	20.19	54.75	0	1.6	3 tubes	0	0		Calculated	0.000	0.0000	0.0000	Galvanized Steel

Steel Tubes Properties:

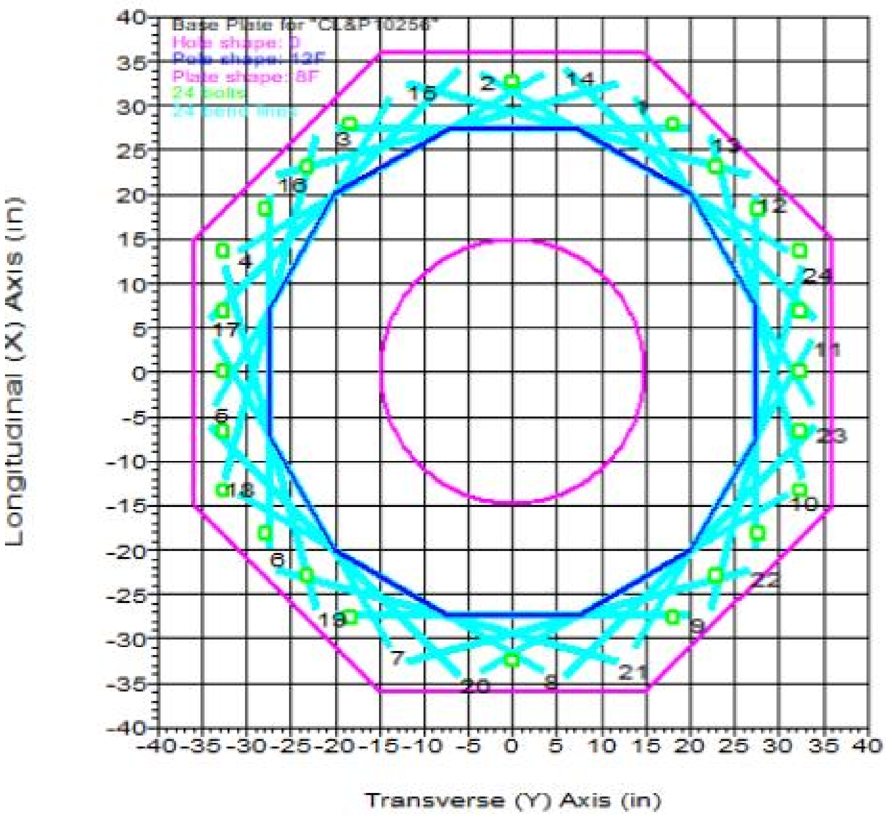
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap or Butt Offset (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CL&P10256	1	55	0.3125	4.670	0.000	0.000	65.000	0.000	5024	29.85	0.24871	20.19	33.87	4.155	4.670
CL&P10256	2	54.67	0.4375	6.170	0.000	0.000	65.000	0.000	10060	28.95	0.24871	32.08	45.68	5.600	6.170
CL&P10256	3	46.17	0.46875	0.000	0.000	0.000	65.000	0.000	11494	24.00	0.24871	43.27	54.75	0.000	0.000

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CL&P10256	72.000	8F	3.000	2971	40.000	30.000	0	490.00	60.000	2.250	65.000	24	67953.29	37978.89

Base Plate Bolt Coordinates for Property "CL&P10256":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0	1	0
0.8538	0.5615	0
0.7077	0.7077	0
0.5615	0.8538	0
0.4154	1	0
0.2077	1	0
1	0	0



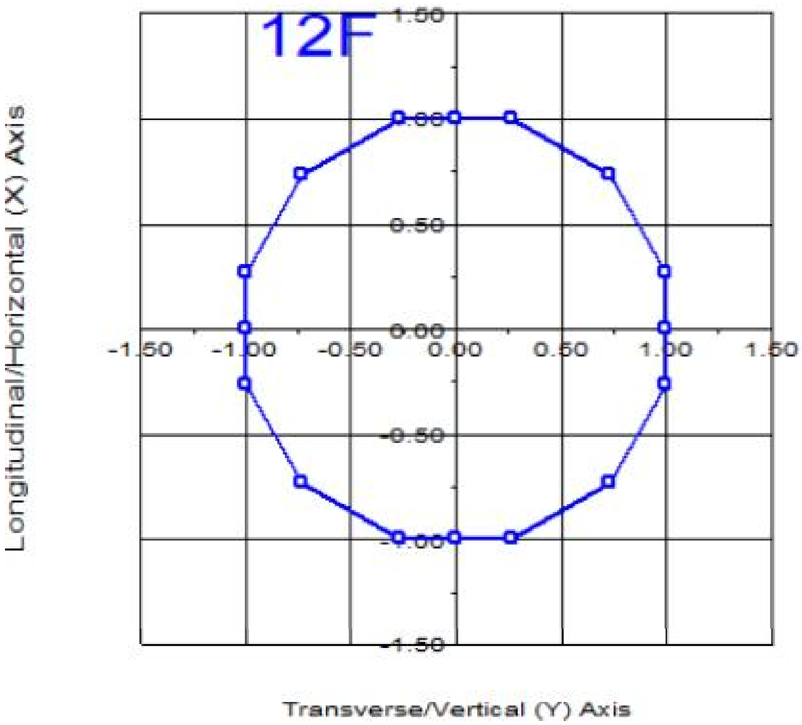
Steel Pole Connectivity:

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)
10256			0	0	0	0	0	CL&P10256	19 labels		0.00	0

Relative Attachment Labels for Steel Pole "10256":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
10256:Arm1	0.00	144.30
10256:Arm2	0.00	131.63
10256:Arm3	0.00	109.63
10256:Arm4	0.00	87.63
10256:TopConn	0.00	143.00
10256:BotConn	0.00	135.00
10256:WVGD1	0.00	5.00
10256:WVGD2	0.00	15.00

10256:WVGD3	0.00	25.00
10256:WVGD4	0.00	35.00
10256:WVGD5	0.00	45.00
10256:WVGD6	0.00	55.00
10256:WVGD7	0.00	65.00
10256:WVGD8	0.00	75.00
10256:WVGD9	0.00	85.00
10256:WVGD10	0.00	95.00
10256:WVGD11	0.00	105.00
10256:WVGD12	0.00	115.00
10256:WVGD13	0.00	125.00



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)
10256	10256:t	10256:t Ori	0.00	20.19	19.97	1009.93	1009.93	0.00	14.6	65.00	65.00	541.96	541.96
10256	10256:Arm1	10256:Arm1 End	0.70	20.36	20.15	1036.70	1036.70	0.00	14.8	65.00	65.00	551.57	551.57
10256	10256:Arm1	10256:Arm1 Ori	0.70	20.36	20.15	1036.70	1036.70	0.00	14.8	65.00	65.00	551.57	551.57
10256	10256:TopConn	10256:TopConn End	2.00	20.68	20.47	1087.66	1087.66	0.00	15.1	65.00	65.00	569.64	569.64
10256	10256:TopConn	10256:TopConn Ori	2.00	20.68	20.47	1087.66	1087.66	0.00	15.1	65.00	65.00	569.64	569.64
10256	#10256:0	Tube 1 End	6.00	21.68	21.47	1254.88	1254.88	0.00	15.9	65.00	65.00	627.06	627.06
10256	#10256:0	Tube 1 Ori	6.00	21.68	21.47	1254.88	1254.88	0.00	15.9	65.00	65.00	627.06	627.06
10256	10256:BotConn	10256:BotConn End	10.00	22.67	22.47	1438.41	1438.41	0.00	16.8	65.00	65.00	687.24	687.24
10256	10256:BotConn	10256:BotConn Ori	10.00	22.67	22.47	1438.41	1438.41	0.00	16.8	65.00	65.00	687.24	687.24
10256	10256:Arm2	10256:Arm2 End	13.38	23.51	23.31	1606.52	1606.52	0.00	17.5	65.00	65.00	740.16	740.16
10256	10256:Arm2	10256:Arm2 Ori	13.38	23.51	23.31	1606.52	1606.52	0.00	17.5	65.00	65.00	740.16	740.16
10256	#10256:1	Tube 1 End	16.69	24.34	24.14	1783.79	1783.79	0.00	18.2	65.00	65.00	794.00	794.00
10256	#10256:1	Tube 1 Ori	16.69	24.34	24.14	1783.79	1783.79	0.00	18.2	65.00	65.00	794.00	794.00
10256	10256:WVGD13	10256:WVGD13 End	20.00	25.16	24.97	1973.63	1973.63	0.00	18.9	65.00	65.00	849.74	849.74
10256	10256:WVGD13	10256:WVGD13 Ori	20.00	25.16	24.97	1973.63	1973.63	0.00	18.9	65.00	65.00	849.74	849.74
10256	#10256:2	Tube 1 End	25.00	26.41	26.22	2284.97	2284.97	0.00	20.0	65.00	65.00	937.46	937.46
10256	#10256:2	Tube 1 Ori	25.00	26.41	26.22	2284.98	2284.98	0.00	20.0	65.00	65.00	937.46	937.46
10256	10256:WVGD12	10256:WVGD12 End	30.00	27.65	27.47	2627.45	2627.45	0.00	21.0	65.00	65.00	1029.49	1029.49
10256	10256:WVGD12	10256:WVGD12 Ori	30.00	27.65	27.47	2627.45	2627.45	0.00	21.0	65.00	65.00	1029.49	1029.49
10256	#10256:3	Tube 1 End	32.69	28.32	28.14	2824.92	2824.92	0.00	21.6	65.00	65.00	1080.73	1080.73
10256	#10256:3	Tube 1 Ori	32.69	28.32	28.14	2824.92	2824.92	0.00	21.6	65.00	65.00	1080.73	1080.73
10256	10256:Arm3	10256:Arm3 End	35.38	28.99	28.81	3032.04	3032.04	0.00	22.2	65.00	65.00	1133.22	1133.22
10256	10256:Arm3	10256:Arm3 Ori	35.38	28.99	28.81	3032.04	3032.04	0.00	22.2	65.00	65.00	1133.22	1133.22
10256	10256:WVGD11	10256:WVGD11 End	40.00	30.14	29.97	3411.75	3411.75	0.00	23.2	65.00	65.00	1226.47	1226.47
10256	10256:WVGD11	10256:WVGD11 Ori	40.00	30.14	29.97	3411.75	3411.75	0.00	23.2	65.00	65.00	1226.47	1226.47
10256	#10256:4	Tube 1 End	45.00	31.38	31.22	3856.54	3856.54	0.00	24.2	65.00	65.00	1331.42	1331.42
10256	#10256:4	Tube 1 Ori	45.00	31.38	31.22	3856.54	3856.54	0.00	24.2	65.00	65.00	1331.42	1331.42
10256	10256:WVGD10	10256:WVGD10 End	50.00	32.62	32.47	4338.40	4338.40	0.00	25.3	65.00	65.00	1440.68	1440.68
10256	10256:WVGD10	10256:WVGD10 Ori	50.00	32.62	32.47	4338.40	4338.40	0.00	25.3	65.00	65.00	1440.69	1440.69
10256	#10256:5	SpliceT End	50.33	32.70	32.55	4371.54	4371.54	0.00	25.4	65.00	65.00	1448.05	1448.05

10256	#10256:5	SpliceT	Ori	50.33	32.70	32.55	4371.54	4371.54	0.00	25.4	65.00	65.00	1448.05	1448.05
10256	#10256:6	SpliceB	End	55.00	33.24	46.15	6356.88	6356.88	0.00	17.7	65.00	65.00	2071.70	2071.70
10256	#10256:6	SpliceB	Ori	55.00	33.24	46.15	6356.88	6356.88	0.00	17.7	65.00	65.00	2071.70	2071.70
10256	10256:Arm4	10256:Arm4	End	57.38	33.83	46.98	6706.45	6706.45	0.00	18.0	65.00	65.00	2147.46	2147.46
10256	10256:Arm4	10256:Arm4	Ori	57.38	33.83	46.98	6706.45	6706.45	0.00	18.0	65.00	65.00	2147.46	2147.46
10256	10256:WVGD9	10256:WVGD9	End	60.00	34.48	47.90	7107.47	7107.47	0.00	18.4	65.00	65.00	2232.79	2232.79
10256	10256:WVGD9	10256:WVGD9	Ori	60.00	34.48	47.90	7107.47	7107.47	0.00	18.4	65.00	65.00	2232.79	2232.79
10256	#10256:7	Tube 2	End	65.00	35.73	49.64	7914.95	7914.95	0.00	19.2	65.00	65.00	2399.91	2399.91
10256	#10256:7	Tube 2	Ori	65.00	35.73	49.64	7914.95	7914.95	0.00	19.2	65.00	65.00	2399.91	2399.91
10256	10256:WVGD8	10256:WVGD8	End	70.00	36.97	51.39	8781.38	8781.38	0.00	20.0	65.00	65.00	2573.07	2573.07
10256	10256:WVGD8	10256:WVGD8	Ori	70.00	36.97	51.39	8781.38	8781.38	0.00	20.0	65.00	65.00	2573.07	2573.07
10256	#10256:8	Tube 2	End	75.00	38.22	53.14	9708.84	9708.84	0.00	20.7	65.00	65.00	2752.26	2752.26
10256	#10256:8	Tube 2	Ori	75.00	38.22	53.14	9708.84	9708.84	0.00	20.7	65.00	65.00	2752.26	2752.26
10256	10256:WVGD7	10256:WVGD7	End	80.00	39.46	54.89	10699.41	10699.41	0.00	21.5	65.00	65.00	2937.48	2937.48
10256	10256:WVGD7	10256:WVGD7	Ori	80.00	39.46	54.89	10699.41	10699.41	0.00	21.5	65.00	65.00	2937.48	2937.48
10256	#10256:9	Tube 2	End	85.00	40.70	56.64	11755.17	11755.17	0.00	22.2	65.00	65.00	3128.73	3128.73
10256	#10256:9	Tube 2	Ori	85.00	40.70	56.64	11755.17	11755.17	0.00	22.2	65.00	65.00	3128.73	3128.73
10256	10256:WVGD6	10256:WVGD6	End	90.00	41.95	58.39	12878.19	12878.19	0.00	23.0	65.00	65.00	3326.02	3326.02
10256	10256:WVGD6	10256:WVGD6	Ori	90.00	41.95	58.39	12878.20	12878.20	0.00	23.0	65.00	65.00	3326.02	3326.02
10256	#10256:10	Tube 2	End	94.42	43.04	59.94	13927.41	13927.41	0.00	23.7	65.00	65.00	3505.24	3505.24
10256	#10256:10	Tube 2	Ori	94.42	43.04	59.94	13927.41	13927.41	0.00	23.7	65.00	65.00	3505.24	3505.24
10256	#10256:11	SpliceT	End	98.83	44.14	61.48	15032.11	15032.11	0.00	24.4	65.00	65.00	3689.16	3689.16
10256	#10256:11	SpliceT	Ori	98.83	44.14	61.48	15032.11	15032.11	0.00	24.4	65.00	65.00	3689.16	3689.16
10256	10256:WVGD5	10256:WVGD5	End	100.00	43.56	64.95	15435.44	15435.44	0.00	22.2	65.00	65.00	3838.93	3838.93
10256	10256:WVGD5	10256:WVGD5	Ori	100.00	43.56	64.95	15435.44	15435.44	0.00	22.2	65.00	65.00	3838.93	3838.93
10256	#10256:12	SpliceB	End	105.00	44.80	66.82	16810.64	16810.64	0.00	22.9	65.00	65.00	4064.91	4064.91
10256	#10256:12	SpliceB	Ori	105.00	44.80	66.82	16810.64	16810.64	0.00	22.9	65.00	65.00	4064.91	4064.91
10256	10256:WVGD4	10256:WVGD4	End	110.00	46.05	68.69	18265.19	18265.19	0.00	23.6	65.00	65.00	4297.35	4297.35
10256	10256:WVGD4	10256:WVGD4	Ori	110.00	46.05	68.69	18265.19	18265.19	0.00	23.6	65.00	65.00	4297.35	4297.35
10256	#10256:13	Tube 3	End	115.00	47.29	70.57	19801.32	19801.32	0.00	24.4	65.00	65.00	4536.25	4536.25
10256	#10256:13	Tube 3	Ori	115.00	47.29	70.57	19801.32	19801.32	0.00	24.4	65.00	65.00	4536.25	4536.25
10256	10256:WVGD3	10256:WVGD3	End	120.00	48.53	72.44	21421.25	21421.25	0.00	25.1	65.00	65.00	4781.62	4781.62
10256	10256:WVGD3	10256:WVGD3	Ori	120.00	48.53	72.44	21421.25	21421.25	0.00	25.1	65.00	65.00	4781.62	4781.62
10256	#10256:14	Tube 3	End	125.00	49.78	74.32	23127.21	23127.21	0.00	25.8	65.00	65.00	5033.45	5033.45
10256	#10256:14	Tube 3	Ori	125.00	49.78	74.32	23127.21	23127.21	0.00	25.8	65.00	65.00	5033.45	5033.45
10256	10256:WVGD2	10256:WVGD2	End	130.00	51.02	76.19	24921.42	24921.42	0.00	26.5	65.00	65.00	5291.75	5291.75
10256	10256:WVGD2	10256:WVGD2	Ori	130.00	51.02	76.19	24921.42	24921.42	0.00	26.5	65.00	65.00	5291.75	5291.75
10256	#10256:15	Tube 3	End	135.00	52.26	78.06	26806.11	26806.11	0.00	27.2	65.00	65.00	5556.50	5556.50
10256	#10256:15	Tube 3	Ori	135.00	52.26	78.06	26806.12	26806.12	0.00	27.2	65.00	65.00	5556.50	5556.50
10256	10256:WVGD1	10256:WVGD1	End	140.00	53.51	79.94	28783.51	28783.51	0.00	27.9	65.00	65.00	5827.72	5827.72
10256	10256:WVGD1	10256:WVGD1	Ori	140.00	53.51	79.94	28783.51	28783.51	0.00	27.9	65.00	65.00	5827.72	5827.72
10256	10256:g	10256:g	End	145.00	54.75	81.81	30855.84	30855.84	0.00	28.6	65.00	65.00	6105.41	6105.41

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 Override (ksi)	Weight Density (lbs/ft^3)	Steel Texture Shape At End
ARM1	601420	6T	0.1875	10.75	6	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
ARM2	601515	8T	0.25	18.46	9	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	

Intermediate Joints for Davit Property "ARM1":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	10	-1.2

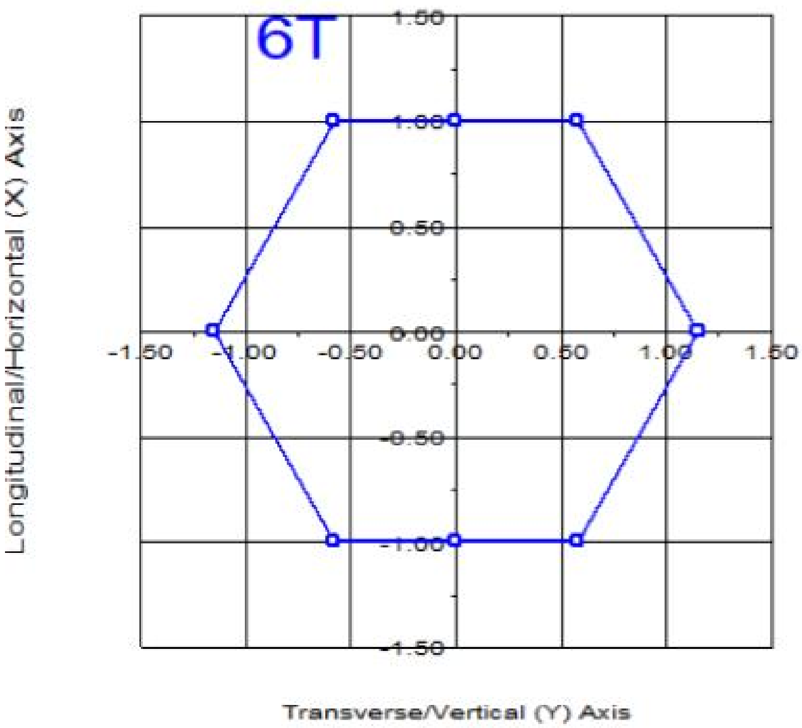
Intermediate Joints for Davit Property "ARM2":

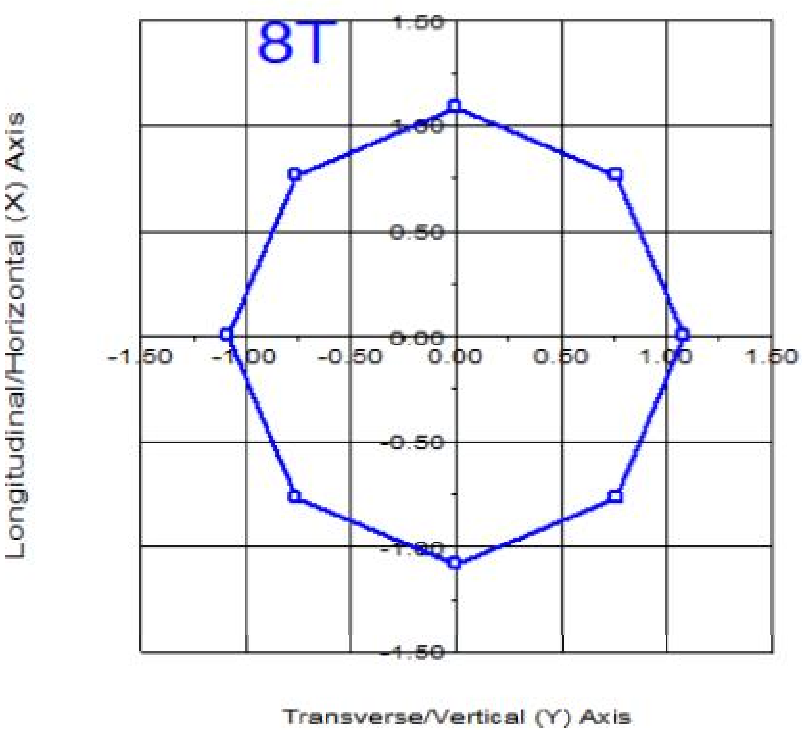
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	15	-2

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	10256:Arm1	ARM1	180
Davit2	10256:Arm1	ARM1	0
Davit3	10256:Arm2	ARM2	180
Davit4	10256:Arm2	ARM2	0
Davit5	10256:Arm3	ARM2	180
Davit6	10256:Arm3	ARM2	0

Davit7 10256:Arm4 ARM2 180
Davit8 10256:Arm4 ARM2 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	Davit1:0	Origin	0.00	10.75	6.86	106.34	106.34	0.00	27.3	65.00	65.00	92.80	107.16
Davit1	#Davit1:0	End	5.00	8.39	5.33	49.84	49.84	0.00	20.1	65.00	65.00	55.72	64.34

Davit1	#Davit1:0	Origin	5.00	8.39	5.33	49.84	49.84	0.00	20.1	65.00	65.00	55.72	64.34
Davit1	#Davit1:1	End	7.54	7.20	4.55	31.08	31.08	0.00	16.4	65.00	65.00	40.52	46.78
Davit1	#Davit1:1	Origin	7.54	7.20	4.55	31.08	31.08	0.00	16.4	65.00	65.00	40.52	46.78
Davit1	Davit1:End	End	10.07	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
Davit2	Davit2:O	Origin	0.00	10.75	6.86	106.34	106.34	0.00	27.3	65.00	65.00	92.80	107.16
Davit2	#Davit2:0	End	5.00	8.39	5.33	49.84	49.84	0.00	20.1	65.00	65.00	55.72	64.34
Davit2	#Davit2:0	Origin	5.00	8.39	5.33	49.84	49.84	0.00	20.1	65.00	65.00	55.72	64.34
Davit2	#Davit2:1	End	7.54	7.20	4.55	31.08	31.08	0.00	16.4	65.00	65.00	40.52	46.78
Davit2	#Davit2:1	Origin	7.54	7.20	4.55	31.08	31.08	0.00	16.4	65.00	65.00	40.52	46.78
Davit2	Davit2:End	End	10.07	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
Davit3	Davit3:O	Origin	0.00	18.46	15.09	661.20	661.20	0.00	26.4	65.00	65.00	358.49	358.49
Davit3	#Davit3:0	End	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit3	#Davit3:0	Origin	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit3	#Davit3:1	End	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit3	#Davit3:1	Origin	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit3	#Davit3:2	End	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit3	#Davit3:2	Origin	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit3	Davit3:End	End	15.13	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	81.63	81.63
Davit4	Davit4:O	Origin	0.00	18.46	15.09	661.20	661.20	0.00	26.4	65.00	65.00	358.49	358.49
Davit4	#Davit4:0	End	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit4	#Davit4:0	Origin	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit4	#Davit4:1	End	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit4	#Davit4:1	Origin	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit4	#Davit4:2	End	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit4	#Davit4:2	Origin	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit4	Davit4:End	End	15.13	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	81.63	81.63
Davit5	Davit5:O	Origin	0.00	18.46	15.09	661.20	661.20	0.00	26.4	65.00	65.00	358.49	358.49
Davit5	#Davit5:0	End	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit5	#Davit5:0	Origin	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit5	#Davit5:1	End	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit5	#Davit5:1	Origin	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit5	#Davit5:2	End	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit5	#Davit5:2	Origin	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit5	Davit5:End	End	15.13	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	81.63	81.63
Davit6	Davit6:O	Origin	0.00	18.46	15.09	661.20	661.20	0.00	26.4	65.00	65.00	358.49	358.49
Davit6	#Davit6:0	End	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit6	#Davit6:0	Origin	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit6	#Davit6:1	End	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit6	#Davit6:1	Origin	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit6	#Davit6:2	End	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit6	#Davit6:2	Origin	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit6	Davit6:End	End	15.13	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	81.63	81.63
Davit7	Davit7:O	Origin	0.00	18.46	15.09	661.20	661.20	0.00	26.4	65.00	65.00	358.49	358.49
Davit7	#Davit7:0	End	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit7	#Davit7:0	Origin	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit7	#Davit7:1	End	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit7	#Davit7:1	Origin	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit7	#Davit7:2	End	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit7	#Davit7:2	Origin	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit7	Davit7:End	End	15.13	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	81.63	81.63
Davit8	Davit8:O	Origin	0.00	18.46	15.09	661.20	661.20	0.00	26.4	65.00	65.00	358.49	358.49
Davit8	#Davit8:0	End	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit8	#Davit8:0	Origin	5.00	15.33	12.50	375.85	375.85	0.00	21.3	65.00	65.00	245.32	245.32
Davit8	#Davit8:1	End	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit8	#Davit8:1	Origin	10.00	12.21	9.91	187.31	187.31	0.00	16.1	65.00	65.00	153.55	153.55
Davit8	#Davit8:2	End	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit8	#Davit8:2	Origin	12.57	10.60	8.58	121.60	121.60	0.00	13.4	65.00	65.00	114.77	114.77
Davit8	Davit8:End	End	15.13	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	81.63	81.63

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)	Hardware Capacity (lbs)	Notes
clamp	clamp1	8e+04	0	

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	10256:TopConn	clamp	No Limit
Clamp10	10256:BotConn	clamp	No Limit
Clamp13	10256:WVGD1	clamp	No Limit
Clamp14	10256:WVGD2	clamp	No Limit
Clamp15	10256:WVGD3	clamp	No Limit
Clamp16	10256:WVGD4	clamp	No Limit
Clamp17	10256:WVGD5	clamp	No Limit
Clamp18	10256:WVGD6	clamp	No Limit
Clamp19	10256:WVGD7	clamp	No Limit
Clamp20	10256:WVGD8	clamp	No Limit
Clamp21	10256:WVGD9	clamp	No Limit
Clamp22	10256:WVGD10	clamp	No Limit
Clamp23	10256:WVGD11	clamp	No Limit
Clamp24	10256:WVGD12	clamp	No Limit
Clamp25	10256:WVGD13	clamp	No Limit

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

Material List

Stock Number	Item Description	Quantity	Unit of Measure
601420	Tubular Davit property: ARM1	2.00	Each
601515	Tubular Davit property: ARM2	6.00	Each
clamp1	Clamp property: clamp	23.00	Each
10256	Steel Pole property: CL&P10256	1.00	Each

*** Loads Data

Loads from file: J:\Jobs\1906600.WI\12_CT11110C\05_Structural\Backup Documentation\Calcs\Rev (3)\PLS-Pole\cl&p #10256.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) 145.50 (ft)
Structure height 145.50 (ft)
Structure height above ground 145.50 (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 Hardware	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	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	0.0000	1.0000	23 loads	Wind on All	4	0	0.000	56.000	60.0	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	0.0000	1.0000	23 loads	NESC 2017	25.6	0	0.000	0.000	60.0	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	1265	1161	25	Shield Wire
Davit2:End	1205	991	25	OPGW
Davit3:End	8015	3618	50	Conductor
Davit4:End	7875	3599	50	Conductor
Davit5:End	8039	3621	50	Conductor
Davit6:End	7898	3620	50	Conductor
Davit7:End	8021	3625	50	Conductor
Davit8:End	7888	3647	50	Conductor
10256:TopConn	0	3948	0	
10256:BotConn	6719	-2289	0	
10256:WVGD1	1046	139	0	Coax Cables
10256:WVGD2	697	93	0	Coax Cables
10256:WVGD3	697	93	0	Coax Cables
10256:WVGD4	697	93	0	Coax Cables
10256:WVGD5	697	93	0	Coax Cables
10256:WVGD6	697	93	0	Coax Cables
10256:WVGD7	697	93	0	Coax Cables
10256:WVGD8	697	93	0	Coax Cables
10256:WVGD9	697	93	0	Coax Cables
10256:WVGD10	697	93	0	Coax Cables
10256:WVGD11	697	93	0	Coax Cables
10256:WVGD12	697	93	0	Coax Cables
10256:WVGD13	697	93	0	Coax Cables

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	306	838	25	Shield Wire
Davit2:End	305	634	25	OPGW
Davit3:End	3269	4707	50	Conductor
Davit4:End	3200	4469	50	Conductor
Davit5:End	3277	4555	50	Conductor
Davit6:End	3207	4275	50	Conductor
Davit7:End	3255	4367	50	Conductor
Davit8:End	3189	4124	50	Conductor
10256:TopConn	0	13584	0	
10256:BotConn	3118	-8038	0	
10256:WVGD1	281	354	0	Coax Cables
10256:WVGD2	187	236	0	Coax Cables
10256:WVGD3	187	236	0	Coax Cables
10256:WVGD4	187	236	0	Coax Cables
10256:WVGD5	187	236	0	Coax Cables

10256:WVGD6	187	236	0 Coax Cables
10256:WVGD7	187	236	0 Coax Cables
10256:WVGD8	187	236	0 Coax Cables
10256:WVGD9	187	236	0 Coax Cables
10256:WVGD10	187	236	0 Coax Cables
10256:WVGD11	187	236	0 Coax Cables
10256:WVGD12	187	236	0 Coax Cables
10256:WVGD13	187	236	0 Coax Cables

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

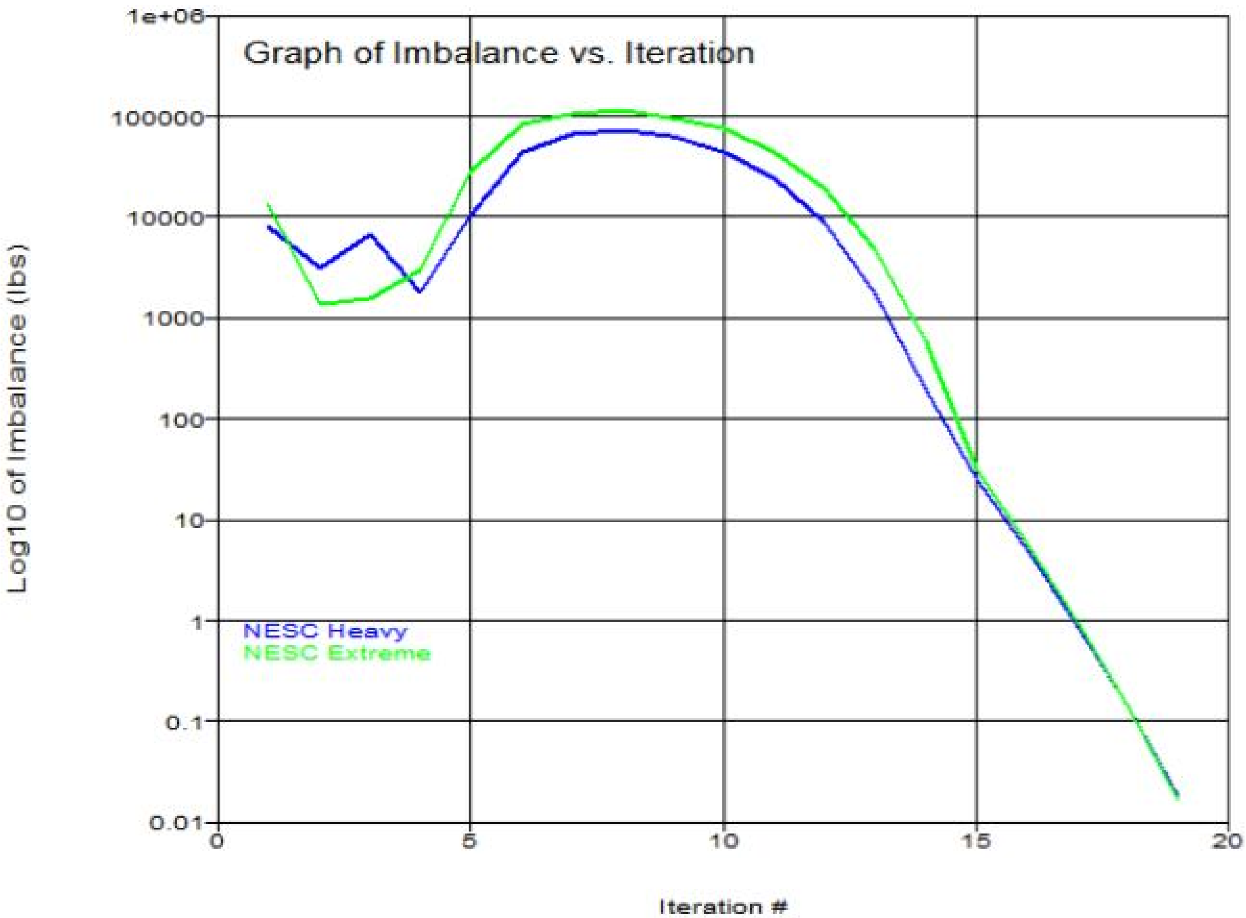
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

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)
10256	10256:t	10256:Arm1	145.00	144.30	144.65	20.275	1.58e+06	1.000	27.02	0.00	47.78	31.96	0.00	0.00	31.96	0.00
10256	10256:Arm1	10256:TopConn	144.30	143.00	143.65	20.523	1.6e+06	1.000	27.02	0.00	89.83	60.08	0.00	0.00	60.08	0.00
10256	10256:TopConn		143.00	139.00	141.00	21.182	1.65e+06	1.000	27.02	0.00	285.43	190.81	0.00	0.00	190.81	0.00
10256		10256:BotConn	139.00	135.00	137.00	22.177	1.73e+06	1.000	27.02	0.00	299.03	199.77	0.00	0.00	199.77	0.00
10256	10256:BotConn	10256:Arm2	135.00	131.63	133.31	23.094	1.8e+06	1.000	27.02	0.00	262.89	175.53	0.00	0.00	175.53	0.00
10256	10256:Arm2		131.63	128.31	129.97	23.926	1.86e+06	1.000	27.02	0.00	267.44	178.48	0.00	0.00	178.48	0.00
10256		10256:WVGD13	128.31	125.00	126.66	24.750	1.93e+06	1.000	27.02	0.00	276.77	184.63	0.00	0.00	184.63	0.00
10256	10256:WVGD13		125.00	120.00	122.50	25.783	2.01e+06	1.000	27.02	0.00	435.44	290.33	0.00	0.00	290.33	0.00
10256		10256:WVGD12	120.00	115.00	117.50	27.027	2.1e+06	1.000	27.02	0.00	456.70	304.33	0.00	0.00	304.33	0.00
10256	10256:WVGD12		115.00	112.31	113.66	27.983	2.18e+06	1.000	27.02	0.00	254.26	169.36	0.00	0.00	169.36	0.00
10256		10256:Arm3	112.31	109.63	110.97	28.651	2.23e+06	1.000	27.02	0.00	260.40	173.41	0.00	0.00	173.41	0.00
10256	10256:Arm3	10256:WVGD11	109.63	105.00	107.31	29.561	2.3e+06	1.000	27.02	0.00	462.52	307.89	0.00	0.00	307.89	0.00
10256	10256:WVGD11		105.00	100.00	102.50	30.758	2.39e+06	1.000	27.02	0.00	520.48	346.33	0.00	0.00	346.33	0.00
10256		10256:WVGD10	100.00	95.00	97.50	32.001	2.49e+06	1.000	27.02	0.00	541.74	360.34	0.00	0.00	360.34	0.00
10256	10256:WVGD10		95.00	94.67	94.84	32.664	2.54e+06	1.000	27.02	0.00	36.50	24.27	0.00	0.00	24.27	0.00
10256			94.67	90.00	92.34	32.973	2.57e+06	1.000	27.02	0.00	1246.82	346.78	0.00	0.00	346.78	0.00
10256		10256:Arm4	90.00	87.63	88.81	33.537	2.61e+06	1.000	27.02	0.00	376.39	179.37	0.00	0.00	179.37	0.00
10256	10256:Arm4	10256:WVGD9	87.63	85.00	86.31	34.158	2.66e+06	1.000	27.02	0.00	423.72	201.93	0.00	0.00	201.93	0.00
10256	10256:WVGD9		85.00	80.00	82.50	35.107	2.73e+06	1.000	27.02	0.00	829.77	395.31	0.00	0.00	395.31	0.00
10256		10256:WVGD8	80.00	75.00	77.50	36.350	2.83e+06	1.000	27.02	0.00	859.53	409.31	0.00	0.00	409.31	0.00
10256	10256:WVGD8		75.00	70.00	72.50	37.594	2.93e+06	1.000	27.02	0.00	889.30	423.31	0.00	0.00	423.31	0.00
10256		10256:WVGD7	70.00	65.00	67.50	38.837	3.02e+06	1.000	27.02	0.00	919.06	437.31	0.00	0.00	437.31	0.00
10256	10256:WVGD7		65.00	60.00	62.50	40.081	3.12e+06	1.000	27.02	0.00	948.82	451.32	0.00	0.00	451.32	0.00
10256		10256:WVGD6	60.00	55.00	57.50	41.324	3.22e+06	1.000	27.02	0.00	978.59	465.32	0.00	0.00	465.32	0.00
10256	10256:WVGD6		55.00	50.59	52.79	42.495	3.31e+06	1.000	27.02	0.00	888.83	422.52	0.00	0.00	422.52	0.00
10256			50.59	46.17	48.38	43.593	3.39e+06	1.000	27.02	0.00	912.04	433.43	0.00	0.00	433.43	0.00
10256		10256:WVGD5	46.17	45.00	45.59	43.850	3.41e+06	1.000	27.02	0.00	503.27	115.54	0.00	0.00	115.54	0.00
10256	10256:WVGD5		45.00	40.00	42.50	44.180	3.44e+06	1.000	27.02	0.00	2188.79	497.47	0.00	0.00	497.47	0.00
10256		10256:WVGD4	40.00	35.00	37.50	45.423	3.54e+06	1.000	27.02	0.00	1152.80	511.48	0.00	0.00	511.48	0.00
10256	10256:WVGD4		35.00	30.00	32.50	46.667	3.63e+06	1.000	27.02	0.00	1184.69	525.48	0.00	0.00	525.48	0.00
10256		10256:WVGD3	30.00	25.00	27.50	47.911	3.73e+06	1.000	27.02	0.00	1216.58	539.48	0.00	0.00	539.48	0.00
10256	10256:WVGD3		25.00	20.00	22.50	49.154	3.83e+06	1.000	27.02	0.00	1248.47	553.48	0.00	0.00	553.48	0.00
10256		10256:WVGD2	20.00	15.00	17.50	50.398	3.92e+06	1.000	27.02	0.00	1280.35	567.49	0.00	0.00	567.49	0.00

10256	10256:WVGD2		15.00	10.00	12.50	51.641	4.02e+06	1.000	27.02	0.00	1312.24	581.49	0.00	0.00	581.49	0.00
10256		10256:WVGD1	10.00	5.00	7.50	52.885	4.12e+06	1.000	27.02	0.00	1344.13	595.49	0.00	0.00	595.49	0.00
10256	10256:WVGD1	10256:g	5.00	0.00	2.50	54.128	4.21e+06	1.000	27.02	0.00	1376.02	609.49	0.00	0.00	609.49	0.00

*** Analysis Results:

Maximum element usage is 88.67% for Base Plate "10256" in load case "NESC Extreme"
Maximum insulator usage is 16.98% for Clamp "Clamp9" in load case "NESC Extreme"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 19

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)
10256:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10256:t	0.111	7.56	-0.2705	-5.4552	0.0789	0.0004	0.111	7.56	144.7
10256:Arm1	0.1101	7.493	-0.2674	-5.4552	0.0789	0.0004	0.1101	7.493	144
10256:TopConn	0.1083	7.37	-0.2615	-5.4538	0.0789	0.0004	0.1083	7.37	142.7
10256:BotConn	0.09731	6.612	-0.2255	-5.3977	0.0782	0.0004	0.09731	6.612	134.8
10256:Arm2	0.09272	6.296	-0.2106	-5.3554	0.0777	0.0004	0.09272	6.296	131.4
10256:WVGD13	0.08383	5.685	-0.182	-5.2119	0.0759	0.0003	0.08383	5.685	124.8
10256:WVGD12	0.07094	4.802	-0.1426	-4.8949	0.0715	0.0003	0.07094	4.802	114.9
10256:Arm3	0.06436	4.352	-0.1235	-4.6949	0.0687	0.0003	0.06436	4.352	109.5
10256:WVGD11	0.05892	3.981	-0.1083	-4.4992	0.0660	0.0002	0.05892	3.981	104.9
10256:WVGD10	0.04798	3.236	-0.07994	-4.0188	0.0591	0.0002	0.04798	3.236	94.92
10256:Arm4	0.04067	2.74	-0.06287	-3.6988	0.0545	0.0001	0.04067	2.74	87.56
10256:WVGD9	0.0382	2.573	-0.05741	-3.5897	0.0529	0.0001	0.0382	2.573	84.94
10256:WVGD8	0.0295	1.983	-0.03948	-3.1533	0.0466	0.0001	0.0295	1.983	74.96
10256:WVGD7	0.02193	1.472	-0.02585	-2.7007	0.0400	0.0001	0.02193	1.472	64.97
10256:WVGD6	0.01551	1.039	-0.01597	-2.2465	0.0334	0.0001	0.01551	1.039	54.98
10256:WVGD5	0.01026	0.6859	-0.009198	-1.7998	0.0268	0.0000	0.01026	0.6859	44.99
10256:WVGD4	0.006125	0.4089	-0.004866	-1.3691	0.0204	0.0000	0.006125	0.4089	35
10256:WVGD3	0.003087	0.2057	-0.002307	-0.9552	0.0143	0.0000	0.003087	0.2057	25
10256:WVGD2	0.0011	0.07318	-0.0009406	-0.5593	0.0084	0.0000	0.0011	0.07318	15
10256:WVGD1	0.0001234	0.008183	-0.0002436	-0.1819	0.0027	0.0000	0.0001234	0.008183	5
Davit1:O	0.1102	7.497	-0.1867	-5.4552	0.0789	0.0004	0.1102	6.649	144.1
Davit1:End	0.1138	7.651	0.7322	-5.1959	0.0803	0.0065	0.1138	-3.197	146.2
Davit2:O	0.1099	7.49	-0.348	-5.4552	0.0789	0.0004	0.1099	8.338	144
Davit2:End	0.1108	7.559	-1.337	-5.7713	0.0790	-0.0056	0.1108	18.41	144.2
Davit3:O	0.09285	6.3	-0.1191	-5.3554	0.0777	0.0004	0.09285	5.32	131.5
Davit3:End	0.0982	6.529	1.167	-4.6229	0.0791	0.0055	0.0982	-9.451	134.8
Davit4:O	0.09259	6.292	-0.302	-5.3554	0.0777	0.0004	0.09259	7.271	131.3
Davit4:End	0.09386	6.417	-1.832	-6.1817	0.0779	-0.0046	0.09386	22.4	131.8

Davit5:O	0.06448	4.356	-0.02465	-4.6949	0.0687	0.0003	0.06448	3.148	109.6
Davit5:End	0.06907	4.548	1.09	-3.9538	0.0700	0.0053	0.06907	-11.66	112.7
Davit6:O	0.06424	4.348	-0.2224	-4.6949	0.0687	0.0003	0.06424	5.556	109.4
Davit6:End	0.06568	4.467	-1.579	-5.5274	0.0690	-0.0048	0.06568	20.67	110
Davit7:O	0.04076	2.743	0.02807	-3.6988	0.0545	0.0001	0.04076	1.333	87.65
Davit7:End	0.04428	2.882	0.8837	-2.9504	0.0557	0.0052	0.04428	-13.53	90.51
Davit8:O	0.04058	2.737	-0.1538	-3.6988	0.0545	0.0001	0.04058	4.147	87.47
Davit8:End	0.04214	2.842	-1.248	-4.5361	0.0549	-0.0049	0.04214	19.25	88.38

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 %
10256:g	-0.54	0.0	-34.03	0.0	0.0	-115.18	0.0	0.0	120.11	0.0	3897.39	0.0	-58.7	0.0	0.0	-0.05	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.
10256	10256:t	Origin	0.00	90.72	1.33	-3.25	-0.00	-0.00	0.0	-0.04	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
10256	10256:Arm1	End	0.70	89.92	1.32	-3.21	0.01	-0.00	0.0	-0.04	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	3
10256	10256:Arm1	Origin	0.70	89.92	1.32	-3.21	2.37	-0.07	0.0	-2.93	2.48	-0.06	-0.15	0.08	0.24	0.00	0.48	0.7	4
10256	10256:TopConn	End	2.00	88.44	1.30	-3.14	5.59	-0.14	0.0	-2.93	2.48	-0.06	-0.14	0.64	0.06	0.00	0.79	1.2	2
10256	10256:TopConn	Origin	2.00	88.44	1.30	-3.14	5.59	-0.14	0.0	-2.84	6.51	-0.06	-0.14	0.19	0.63	0.00	1.13	1.7	4
10256	Tube 1	End	6.00	83.88	1.23	-2.92	31.63	-0.37	0.0	-2.84	6.51	-0.06	-0.13	3.29	0.16	0.00	3.43	5.3	2
10256	Tube 1	Origin	6.00	83.88	1.23	-2.92	31.63	-0.37	0.0	-3.28	6.66	-0.06	-0.15	3.29	0.16	0.00	3.45	5.3	2
10256	10256:BotConn	End	10.00	79.35	1.17	-2.71	58.29	-0.62	0.0	-3.28	6.66	-0.06	-0.15	5.53	0.16	0.00	5.68	8.7	2
10256	10256:BotConn	Origin	10.00	79.35	1.17	-2.71	58.29	-0.62	0.0	-10.61	5.16	-0.07	-0.47	5.53	0.12	0.00	6.00	9.2	2
10256	10256:Arm2	End	13.38	75.55	1.11	-2.53	75.71	-0.87	0.0	-10.61	5.16	-0.07	-0.45	6.67	0.12	0.00	7.13	11.0	2
10256	10256:Arm2	Origin	13.38	75.55	1.11	-2.53	90.10	-1.11	0.0	-27.87	14.12	-0.20	-1.20	7.94	0.32	0.00	9.15	14.1	2
10256	Tube 1	End	16.69	71.86	1.06	-2.35	136.86	-1.79	0.0	-27.87	14.12	-0.20	-1.15	11.24	0.31	0.00	12.41	19.1	2
10256	Tube 1	Origin	16.69	71.86	1.06	-2.35	136.86	-1.79	0.0	-28.29	14.23	-0.21	-1.17	11.24	0.31	0.00	12.43	19.1	2
10256	10256:WVGD13	End	20.00	68.22	1.01	-2.18	183.98	-2.47	0.0	-28.29	14.23	-0.21	-1.13	14.12	0.30	0.00	15.27	23.5	2
10256	10256:WVGD13	Origin	20.00	68.22	1.01	-2.18	183.98	-2.47	0.0	-29.54	14.51	-0.21	-1.18	14.12	0.31	0.00	15.32	23.6	2
10256	Tube 1	End	25.00	62.84	0.93	-1.94	256.54	-3.52	0.0	-29.54	14.51	-0.21	-1.13	17.85	0.29	0.00	18.99	29.2	2
10256	Tube 1	Origin	25.00	62.84	0.93	-1.94	256.54	-3.52	0.0	-30.24	14.66	-0.21	-1.15	17.85	0.30	0.00	19.01	29.3	2
10256	10256:WVGD12	End	30.00	57.62	0.85	-1.71	329.86	-4.59	0.0	-30.24	14.66	-0.21	-1.10	20.90	0.28	0.00	22.01	33.9	2
10256	10256:WVGD12	Origin	30.00	57.62	0.85	-1.71	329.86	-4.59	0.0	-31.50	14.93	-0.22	-1.15	20.90	0.29	0.00	22.06	33.9	2
10256	Tube 1	End	32.69	54.89	0.81	-1.59	369.97	-5.18	0.0	-31.50	14.93	-0.22	-1.12	22.34	0.28	0.00	23.46	36.1	2
10256	Tube 1	Origin	32.69	54.89	0.81	-1.59	369.97	-5.18	0.0	-31.91	15.01	-0.22	-1.13	22.34	0.28	0.00	23.47	36.1	2
10256	10256:Arm3	End	35.38	52.22	0.77	-1.48	410.30	-5.77	0.0	-31.91	15.01	-0.22	-1.11	23.62	0.28	0.00	24.73	38.1	2
10256	10256:Arm3	Origin	35.38	52.22	0.77	-1.48	424.30	-6.01	0.0	-49.50	23.75	-0.35	-1.72	24.43	0.44	0.00	26.16	40.2	2
10256	10256:WVGD11	End	40.00	47.77	0.71	-1.30	534.13	-7.61	0.0	-49.50	23.75	-0.35	-1.65	28.42	0.42	0.00	30.08	46.3	2
10256	10256:WVGD11	Origin	40.00	47.77	0.71	-1.30	534.13	-7.61	0.0	-51.01	23.96	-0.35	-1.70	28.42	0.42	0.00	30.13	46.3	2
10256	Tube 1	End	45.00	43.18	0.64	-1.12	653.90	-9.36	0.0	-51.01	23.96	-0.35	-1.63	32.05	0.41	0.00	33.69	51.8	2
10256	Tube 1	Origin	45.00	43.18	0.64	-1.12	653.90	-9.36	0.0	-51.91	24.01	-0.35	-1.66	32.05	0.41	0.00	33.72	51.9	2
10256	10256:WVGD10	End	50.00	38.83	0.58	-0.96	773.93	-11.13	0.0	-51.91	24.01	-0.35	-1.60	35.05	0.39	0.00	36.66	56.4	2
10256	10256:WVGD10	Origin	50.00	38.83	0.58	-0.96	773.93	-11.13	0.0	-53.08	24.17	-0.36	-1.64	35.05	0.39				

																0.00	36.69	56.5	2
10256	SpliceT	End	50.33	38.56	0.57	-0.95	781.91	-11.25	0.0	-53.08	24.17	-0.36	-1.63	35.23	0.39	0.00	36.87	56.7	2
10256	SpliceT	Origin	50.33	38.56	0.57	-0.95	781.91	-11.24	0.0	-54.09	24.24	-0.36	-1.66	35.23	0.39	0.00	36.90	56.8	2
10256	SpliceB	End	55.00	34.74	0.52	-0.82	895.11	-12.92	0.0	-54.09	24.24	-0.36	-1.17	28.19	0.28	0.00	29.37	45.2	2
10256	SpliceB	Origin	55.00	34.74	0.52	-0.82	895.11	-12.91	0.0	-55.37	24.33	-0.36	-1.20	28.19	0.28	0.00	29.40	45.2	2
10256	10256:Arm4	End	57.38	32.88	0.49	-0.75	952.90	-13.77	0.0	-55.37	24.33	-0.36	-1.18	28.95	0.28	0.00	30.14	46.4	2
10256	10256:Arm4	Origin	57.38	32.88	0.49	-0.75	966.49	-14.00	0.1	-73.14	32.76	-0.48	-1.56	29.37	0.37	0.00	30.93	47.6	2
10256	10256:WVGD9	End	60.00	30.87	0.46	-0.69	1052.49	-15.27	0.1	-73.14	32.76	-0.48	-1.53	30.76	0.36	0.00	32.29	49.7	2
10256	10256:WVGD9	Origin	60.00	30.87	0.46	-0.69	1052.49	-15.26	0.1	-74.86	32.93	-0.48	-1.56	30.76	0.36	0.00	32.33	49.7	2
10256	Tube 2	End	65.00	27.22	0.40	-0.57	1217.13	-17.69	0.1	-74.86	32.93	-0.48	-1.51	33.09	0.35	0.00	34.61	53.2	2
10256	Tube 2	Origin	65.00	27.22	0.40	-0.57	1217.13	-17.68	0.1	-76.25	32.95	-0.49	-1.54	33.09	0.35	0.00	34.63	53.3	2
10256	10256:WVGD8	End	70.00	23.80	0.35	-0.47	1381.88	-20.12	0.1	-76.25	32.95	-0.49	-1.48	35.04	0.34	0.00	36.53	56.2	2
10256	10256:WVGD8	Origin	70.00	23.80	0.35	-0.47	1381.88	-20.12	0.1	-78.38	33.10	-0.49	-1.53	35.04	0.34	0.00	36.57	56.3	2
10256	Tube 2	End	75.00	20.61	0.31	-0.39	1547.37	-22.57	0.1	-78.38	33.10	-0.49	-1.47	36.69	0.33	0.00	38.17	58.7	2
10256	Tube 2	Origin	75.00	20.61	0.31	-0.39	1547.37	-22.57	0.1	-79.87	33.11	-0.49	-1.50	36.69	0.33	0.00	38.19	58.8	2
10256	10256:WVGD7	End	80.00	17.66	0.26	-0.31	1712.91	-25.04	0.1	-79.87	33.11	-0.49	-1.45	38.05	0.32	0.00	39.51	60.8	2
10256	10256:WVGD7	Origin	80.00	17.66	0.26	-0.31	1712.91	-25.03	0.1	-82.09	33.24	-0.50	-1.50	38.05	0.32	0.00	39.55	60.8	2
10256	Tube 2	End	85.00	14.95	0.22	-0.25	1879.12	-27.52	0.1	-82.09	33.24	-0.50	-1.45	39.19	0.31	0.00	40.65	62.5	2
10256	Tube 2	Origin	85.00	14.95	0.22	-0.25	1879.12	-27.51	0.1	-83.67	33.25	-0.50	-1.48	39.19	0.31	0.00	40.67	62.6	2
10256	10256:WVGD6	End	90.00	12.47	0.19	-0.19	2045.35	-30.02	0.1	-83.67	33.25	-0.50	-1.43	40.13	0.30	0.00	41.57	63.9	2
10256	10256:WVGD6	Origin	90.00	12.47	0.19	-0.19	2045.35	-30.01	0.1	-85.88	33.37	-0.50	-1.47	40.13	0.30	0.00	41.60	64.0	2
10256	Tube 2	End	94.42	10.48	0.16	-0.15	2192.67	-32.24	0.1	-85.88	33.37	-0.50	-1.43	40.82	0.29	0.00	42.26	65.0	2
10256	Tube 2	Origin	94.42	10.48	0.16	-0.15	2192.67	-32.23	0.1	-87.35	33.37	-0.51	-1.46	40.82	0.29	0.00	42.28	65.0	2
10256	SpliceT	End	98.83	8.68	0.13	-0.12	2340.00	-34.47	0.1	-87.35	33.37	-0.51	-1.42	41.39	0.29	0.00	42.82	65.9	2
10256	SpliceT	Origin	98.83	8.68	0.13	-0.12	2340.00	-34.47	0.1	-88.48	33.38	-0.51	-1.44	41.39	0.29	0.00	42.83	65.9	2
10256	10256:WVGD5	End	100.00	8.23	0.12	-0.11	2379.05	-35.06	0.1	-88.48	33.38	-0.51	-1.36	40.44	0.27	0.00	41.81	64.3	2
10256	10256:WVGD5	Origin	100.00	8.23	0.12	-0.11	2379.05	-35.06	0.1	-91.27	33.53	-0.51	-1.41	40.44	0.27	0.00	41.85	64.4	2
10256	SpliceB	End	105.00	6.46	0.10	-0.08	2546.67	-37.62	0.1	-91.27	33.53	-0.51	-1.37	40.88	0.27	0.00	42.25	65.0	2
10256	SpliceB	Origin	105.00	6.46	0.10	-0.08	2546.67	-37.62	0.1	-93.90	33.55	-0.52	-1.41	40.88	0.27	0.00	42.29	65.1	2
10256	10256:WVGD4	End	110.00	4.91	0.07	-0.06	2714.40	-40.19	0.1	-93.90	33.55	-0.52	-1.37	41.22	0.26	0.00	42.59	65.5	2
10256	10256:WVGD4	Origin	110.00	4.91	0.07	-0.06	2714.40	-40.19	0.1	-96.47	33.65	-0.52	-1.40	41.22	0.26	0.00	42.63	65.6	2
10256	Tube 3	End	115.00	3.58	0.05	-0.04	2882.65	-42.78	0.1	-96.47	33.65	-0.52	-1.37	41.47	0.25	0.00	42.84	65.9	2
10256	Tube 3	Origin	115.00	3.58	0.05	-0.04	2882.65	-42.78	0.1	-98.40	33.65	-0.52	-1.39	41.47	0.25	0.00	42.87	65.9	2
10256	10256:WVGD3	End	120.00	2.47	0.04	-0.03	3050.91	-45.39	0.1	-98.40	33.65	-0.52	-1.36	41.64	0.25	0.00	43.00	66.2	2
10256	10256:WVGD3	Origin	120.00	2.47	0.04	-0.03	3050.91	-45.39	0.1	-101.06	33.76	-0.53	-1.40	41.64	0.25	0.00	43.04	66.2	2
10256	Tube 3	End	125.00	1.57	0.02	-0.02	3219.70	-48.02	0.1	-101.06	33.76	-0.53	-1.36	41.74	0.24	0.00	43.11	66.3	2
10256	Tube 3	Origin	125.00	1.57	0.02	-0.02	3219.70	-48.02	0.1	-103.07	33.76	-0.53	-1.39	41.74	0.24	0.00	43.13	66.4	2
10256	10256:WVGD2	End	130.00	0.88	0.01	-0.01	3388.51	-50.67	0.1	-103.07	33.76	-0.53	-1.35	41.79	0.23	0.00	43.14	66.4	2
10256	10256:WVGD2	Origin	130.00	0.88	0.01	-0.01	3388.51	-50.67	0.1	-105.83	33.87	-0.53	-1.39	41.79	0.24	0.00	43.18	66.4	2
10256	Tube 3	End	135.00	0.39	0.01	-0.01	3557.85	-53.34	0.1	-105.83	33.87	-0.53	-1.36	41.79	0.23	0.00	43.14	66.4	2
10256	Tube 3	Origin	135.00	0.39	0.01	-0.01	3557.85	-53.34	0.1	-107.93	33.88	-0.54	-1.38	41.79	0.23	0.00	43.17	66.4	2
10256	10256:WVGD1	End	140.00	0.10	0.00	-0.00	3727.23	-56.03	0.1	-107.93	33.88	-0.54	-1.35	41.74	0.22	0.00	43.09	66.3	2
10256	10256:WVGD1	Origin	140.00	0.10	0.00	-0.00	3727.23	-56.03	0.1	-111.12	34.03	-0.54	-1.39	41.74	0.23	0.00	43.13	66.4	2
10256	10256:g	End	145.00	0.00	0.00	0.00	3897.39	-58.74	0.1	-111.12	34.03	-0.54	-1.36	41.66	0.22	0.00	43.02	66.2	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	89.97	1.32	-2.24	-11.21	0.27	0.0	-1.44	1.18	-0.03	-0.21	7.85	0.01	0.00	8.06	12.4	1
Davit1	#Davit1:0	End	5.00	90.90	1.34	3.30	-5.32	0.14	0.0	-1.44	1.18	-0.03	-0.27	6.20	0.01	0.00	6.47	10.0	1
Davit1	#Davit1:0	Origin	5.00	90.90	1.34	3.30	-5.32	0.14	0.0	-1.42	1.08	-0.03	-0.27	6.20	0.01	0.00	6.47	10.0	1
Davit1	#Davit1:1	End	7.54	91.36	1.35	6.06	-2.59	0.07	0.0	-1.42	1.08	-0.03	-0.31	4.15	0.01	0.00	4.46	6.9	1
Davit1	#Davit1:1	Origin	7.54	91.36	1.35	6.06	-2.59	0.07	0.0	-1.41	1.02	-0.03	-0.31	4.15	0.01	0.00	4.46	6.9	1
Davit1	Davit1:End	End	10.07	91.81	1.37	8.79	-0.00	0.00	0.0	-1.41	1.02	-0.03	-0.37	0.00	0.58	0.00	1.07	1.6	3
Davit2	Davit2:O	Origin	0.00	89.87	1.32	-4.18	-13.61	-0.27	-0.0	0.96	1.42	0.03	0.14	9.53	0.01	0.00	9.67	14.9	1
Davit2	#Davit2:0	End	5.00	90.29	1.32	-9.98	-6.49	-0.14	-0.0	0.96	1.42	0.03	0.18	7.58	0.01	0.00	7.76	11.9	1
Davit2	#Davit2:0	Origin	5.00	90.29	1.32	-9.98	-6.49	-0.14	-0.0	0.96	1.31	0.03	0.18	7.58	0.01	0.00	7.76	11.9	1
Davit2	#Davit2:1	End	7.54	90.50	1.33	-12.99	-3.17	-0.07	-0.0	0.96	1.31	0.03	0.21	5.09	0.01	0.00	5.30	8.2	1
Davit2	#Davit2:1	Origin	7.54	90.50	1.33	-12.99	-3.17	-0.07	0.0	0.97	1.25	0.03	0.21	5.09	0.01	0.00	5.30	8.2	1
Davit2	Davit2:End	End	10.07	90.71	1.33	-16.04	0.00	0.00	0.0	0.97	1.25	0.03	0.26	0.00	0.71	0.00	1.25	1.9	3
Davit3	Davit3:O	Origin	0.00	75.60	1.11	-1.43	-112.11	0.93	0.0	-5.46	7.67	-0.06	-0.36	20.33	0.01	0.00	20.69	31.8	1
Davit3	#Davit3:0	End	5.00	76.57	1.13	3.94	-73.74	0.62	0.0	-5.46	7.67	-0.06	-0.44	19.54	0.01	0.00	19.98	30.7	1
Davit3	#Davit3:0	Origin	5.00	76.57	1.13	3.94	-73.74	0.62	0.0	-5.35	7.39	-0.06	-0.43	19.54	0.01	0.00	19.97	30.7	1
Davit3	#Davit3:1	End	10.00	77.47	1.15	9.04	-36.78	0.31	0.0	-5.35	7.39	-0.06	-0.54	15.57	0.01	0.00	16.11	24.8	1
Davit3	#Davit3:1	Origin	10.00	77.47	1.15	9.04	-36.78	0.31	0.0	-5.28	7.22	-0.06	-0.53	15.57	0.01	0.00	16.10	24.8	1
Davit3	#Davit3:2	End	12.57	77.92	1.17	11.55	-18.26	0.16	0.0	-5.28	7.22	-0.06	-0.62	10.34	0.01	0.00	10.96	16.9	1
Davit3	#Davit3:2	Origin	12.57	77.92	1.17	11.55	-18.26	0.16	0.0	-5.25	7.12	-0.06	-0.61	10.34	0.01	0.00	10.95	16.9	1
Davit3	Davit3:End	End	15.13	78.35	1.18	14.01	-0.00	0.00	0.0	-5.25	7.12	-0.06	-0.72	0.00	2.03	0.00	3.60	5.5	3
Davit4	Davit4:O	Origin	0.00	75.50	1.11	-3.62	-126.63	-0.92	-0.0	3.29	8.69	0.06	0.22	22.96	0.01	0.00	23.18	35.7	1
Davit4	#Davit4:0	End	5.00	75.99	1.11	-9.37	-83.19	-0.62	-0.0	3.29	8.69	0.06	0.26	22.04	0.01	0.00	22.31	34.3	1
Davit4	#Davit4:0	Origin	5.00	75.99	1.11	-9.37	-83.19	-0.62	-0.0	3.34	8.35	0.06	0.27	22.04	0.01	0.00	22.31	34.3	1
Davit4	#Davit4:1	End	10.00	76.48	1.12	-15.45	-41.44	-0.31	-0.0	3.34	8.35	0.06	0.34	17.54	0.01	0.00	17.88	27.5	1
Davit4	#Davit4:1	Origin	10.00	76.48	1.12	-15.45	-41.44	-0.31	-0.0	3.38	8.13	0.06	0.34	17.54	0.01	0.00	17.88	27.5	1
Davit4	#Davit4:2	End	12.57	76.74	1.12	-18.68	-20.57	-0.15	-0.0	3.38	8.13	0.06	0.39	11.65	0.01	0.00	12.04	18.5	1
Davit4	#Davit4:2	Origin	12.57	76.74	1.12	-18.68	-20.57	-0.15	0.0	3.40	8.01	0.06	0.40	11.65	0.01	0.00	12.05	18.5	1
Davit4	Davit4:End	End	15.13	77.00	1.13	-21.98	0.00	0.00	0.0	3.40	8.01	0.06	0.47	0.00	2.29	0.00	4.00	6.1	3
Davit5	Davit5:O	Origin	0.00	52.27	0.77	-0.30	-113.40	0.91	0.0	-5.38	7.76	-0.06	-0.36	20.56	0.01	0.00	20.92	32.2	1
Davit5	#Davit5:0	End	5.00	53.09	0.79	4.40	-74.60	0.61	0.0	-5.38	7.76	-0.06	-0.43	19.77	0.01	0.00	20.20	31.1	1
Davit5	#Davit5:0	Origin	5.00	53.09	0.79	4.40	-74.60	0.61	0.0	-5.27	7.48	-0.06	-0.42	19.77	0.01	0.00	20.19	31.1	1
Davit5	#Davit5:1	End	10.00	53.85	0.81	8.81	-37.21	0.31	0.0	-5.27	7.48	-0.06	-0.53	15.75	0.01	0.00	16.28	25.1	1
Davit5	#Davit5:1	Origin	10.00	53.85	0.81	8.81	-37.21	0.31	0.0	-5.21	7.30	-0.06	-0.53	15.75	0.01	0.00	16.28	25.0	1
Davit5	#Davit5:2	End	12.57	54.22	0.82	10.97	-18.48	0.15	0.0	-5.21	7.30	-0.06	-0.61	10.46	0.01	0.00	11.07	17.0	1
Davit5	#Davit5:2	Origin	12.57	54.22	0.82	10.97	-18.48	0.15	0.0	-5.17	7.20	-0.06	-0.60	10.46	0.01	0.00	11.07	17.0	1
Davit5	Davit5:End	End	15.13	54.57	0.83	13.08	-0.00	0.00	0.0	-5.17	7.20	-0.06	-0.71	0.00	2.06	0.00	3.64	5.6	3
Davit6	Davit6:O	Origin	0.00	52.18	0.77	-2.67	-127.56	-0.90	-0.0	3.21	8.75	0.06	0.21	23.13	0.01	0.00	23.34	35.9	1
Davit6	#Davit6:0	End	5.00	52.63	0.78	-7.73	-83.82	-0.60	-0.0	3.21	8.75	0.06	0.26	22.21	0.01	0.00	22.47	34.6	1

Davit6	#Davit6:0	Origin	5.00	52.63	0.78	-7.73	-83.82	-0.60	-0.0	3.27	8.41	0.06	0.26	22.21	0.01	0.00	22.47	34.6	1
Davit6	#Davit6:1	End	10.00	53.11	0.78	-13.11	-41.76	-0.30	-0.0	3.27	8.41	0.06	0.33	17.68	0.01	0.00	18.01	27.7	1
Davit6	#Davit6:1	Origin	10.00	53.11	0.78	-13.11	-41.76	-0.30	-0.0	3.31	8.20	0.06	0.33	17.68	0.01	0.00	18.01	27.7	1
Davit6	#Davit6:2	End	12.57	53.35	0.78	-16.00	-20.73	-0.15	-0.0	3.31	8.20	0.06	0.39	11.74	0.01	0.00	12.12	18.7	1
Davit6	#Davit6:2	Origin	12.57	53.35	0.78	-16.00	-20.73	-0.15	0.0	3.33	8.08	0.06	0.39	11.74	0.01	0.00	12.13	18.7	1
Davit6	Davit6:End	End	15.13	53.60	0.79	-18.95	-0.00	0.00	0.0	3.33	8.08	0.06	0.46	0.00	2.31	0.00	4.03	6.2	3
Davit7	Davit7:O	Origin	0.00	32.91	0.49	0.34	-114.51	0.88	0.0	-5.24	7.84	-0.06	-0.35	20.76	0.01	0.00	21.11	32.5	1
Davit7	#Davit7:0	End	5.00	33.52	0.50	4.01	-75.33	0.59	0.0	-5.24	7.84	-0.06	-0.42	19.96	0.01	0.00	20.38	31.4	1
Davit7	#Davit7:0	Origin	5.00	33.52	0.50	4.01	-75.33	0.59	0.0	-5.14	7.55	-0.06	-0.41	19.96	0.01	0.00	20.37	31.3	1
Davit7	#Davit7:1	End	10.00	34.07	0.52	7.40	-37.58	0.30	0.0	-5.14	7.55	-0.06	-0.52	15.91	0.01	0.00	16.43	25.3	1
Davit7	#Davit7:1	Origin	10.00	34.07	0.52	7.40	-37.58	0.30	0.0	-5.08	7.37	-0.06	-0.51	15.91	0.01	0.00	16.42	25.3	1
Davit7	#Davit7:2	End	12.57	34.33	0.52	9.03	-18.66	0.15	0.0	-5.08	7.37	-0.06	-0.59	10.57	0.01	0.00	11.16	17.2	1
Davit7	#Davit7:2	Origin	12.57	34.33	0.52	9.03	-18.66	0.15	0.0	-5.04	7.27	-0.06	-0.59	10.57	0.01	0.00	11.16	17.2	1
Davit7	Davit7:End	End	15.13	34.59	0.53	10.60	-0.00	0.00	0.0	-5.04	7.27	-0.06	-0.70	0.00	2.08	0.00	3.67	5.6	3
Davit8	Davit8:O	Origin	0.00	32.84	0.49	-1.85	-128.27	-0.87	-0.0	3.08	8.79	0.06	0.20	23.26	0.01	0.00	23.46	36.1	1
Davit8	#Davit8:0	End	5.00	33.24	0.49	-5.87	-84.30	-0.58	-0.0	3.08	8.79	0.06	0.25	22.34	0.01	0.00	22.58	34.7	1
Davit8	#Davit8:0	Origin	5.00	33.24	0.49	-5.87	-84.30	-0.58	-0.0	3.15	8.46	0.06	0.25	22.34	0.01	0.00	22.59	34.8	1
Davit8	#Davit8:1	End	10.00	33.66	0.50	-10.21	-42.01	-0.29	-0.0	3.15	8.46	0.06	0.32	17.78	0.01	0.00	18.10	27.8	1
Davit8	#Davit8:1	Origin	10.00	33.66	0.50	-10.21	-42.01	-0.29	-0.0	3.19	8.24	0.06	0.32	17.78	0.01	0.00	18.10	27.9	1
Davit8	#Davit8:2	End	12.57	33.88	0.50	-12.56	-20.85	-0.15	-0.0	3.19	8.24	0.06	0.37	11.81	0.01	0.00	12.18	18.7	1
Davit8	#Davit8:2	Origin	12.57	33.88	0.50	-12.56	-20.85	-0.15	0.0	3.22	8.12	0.06	0.37	11.81	0.01	0.00	12.18	18.7	1
Davit8	Davit8:End	End	15.13	34.11	0.51	-14.98	-0.00	0.00	0.0	3.22	8.12	0.06	0.44	0.00	2.32	0.00	4.05	6.2	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
Clamp1	1.717	80.00	80.00	2.15	0.00	0.00	0.00	2.15
Clamp2	1.560	80.00	80.00	1.95	0.00	0.00	0.00	1.95
Clamp3	8.794	80.00	80.00	10.99	0.00	0.00	0.00	10.99
Clamp4	8.659	80.00	80.00	10.82	0.00	0.00	0.00	10.82
Clamp5	8.817	80.00	80.00	11.02	0.00	0.00	0.00	11.02
Clamp6	8.688	80.00	80.00	10.86	0.00	0.00	0.00	10.86
Clamp7	8.802	80.00	80.00	11.00	0.00	0.00	0.00	11.00
Clamp8	8.690	80.00	80.00	10.86	0.00	0.00	0.00	10.86
Clamp9	3.948	80.00	80.00	4.93	0.00	0.00	0.00	4.93
Clamp10	7.098	80.00	80.00	8.87	0.00	0.00	0.00	8.87
Clamp13	1.055	80.00	80.00	1.32	0.00	0.00	0.00	1.32
Clamp14	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp15	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp16	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp17	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp18	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp19	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp20	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp21	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp22	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp23	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp24	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88
Clamp25	0.703	80.00	80.00	0.88	0.00	0.00	0.00	0.88

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

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)
10256:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10256:t	0.08411	10.11	-0.4793	-7.5044	0.0606	0.0004	0.08411	10.11	144.5
10256:Arm1	0.08337	10.02	-0.4733	-7.5044	0.0606	0.0004	0.08337	10.02	143.8
10256:TopConn	0.082	9.853	-0.4622	-7.5032	0.0606	0.0004	0.082	9.853	142.5
10256:BotConn	0.07358	8.813	-0.3943	-7.3877	0.0600	0.0004	0.07358	8.813	134.6
10256:Arm2	0.07006	8.382	-0.3666	-7.2986	0.0596	0.0003	0.07006	8.382	131.3
10256:WVGD13	0.06326	7.553	-0.3145	-7.0512	0.0580	0.0002	0.06326	7.553	124.7
10256:WVGD12	0.05341	6.365	-0.2435	-6.5653	0.0546	0.0002	0.05341	6.365	114.8
10256:Arm3	0.0484	5.763	-0.2096	-6.2716	0.0524	0.0001	0.0484	5.763	109.4
10256:WVGD11	0.04425	5.269	-0.183	-5.9921	0.0502	0.0001	0.04425	5.269	104.8
10256:WVGD10	0.03595	4.28	-0.1337	-5.3262	0.0448	0.0001	0.03595	4.28	94.87
10256:Arm4	0.03041	3.624	-0.1043	-4.8907	0.0412	0.0000	0.03041	3.624	87.52
10256:WVGD9	0.02855	3.403	-0.0949	-4.7435	0.0400	0.0000	0.02855	3.403	84.91
10256:WVGD8	0.02198	2.625	-0.06433	-4.1622	0.0351	0.0000	0.02198	2.625	74.94
10256:WVGD7	0.01629	1.95	-0.04126	-3.5654	0.0300	0.0000	0.01629	1.95	64.96
10256:WVGD6	0.01149	1.379	-0.02469	-2.9691	0.0249	0.0000	0.01149	1.379	54.98
10256:WVGD5	0.007566	0.9114	-0.01348	-2.3829	0.0199	0.0000	0.007566	0.9114	44.99
10256:WVGD4	0.004503	0.5443	-0.006487	-1.8167	0.0151	0.0000	0.004503	0.5443	34.99
10256:WVGD3	0.002261	0.2743	-0.002584	-1.2707	0.0105	0.0000	0.002261	0.2743	25
10256:WVGD2	0.000803	0.09781	-0.0007675	-0.7461	0.0061	0.0000	0.000803	0.09781	15
10256:WVGD1	8.954e-05	0.01097	-0.0001311	-0.2433	0.0020	0.0000	8.954e-05	0.01097	5
Davit1:O	0.0835	10.03	-0.3625	-7.5044	0.0606	0.0004	0.0835	9.181	143.9
Davit1:End	0.08686	10.27	0.9298	-7.4719	0.0621	0.0064	0.08686	-0.5771	146.4
Davit2:O	0.08325	10.02	-0.5841	-7.5044	0.0606	0.0004	0.08325	10.86	143.7
Davit2:End	0.08367	10.09	-1.909	-7.5888	0.0605	-0.0057	0.08367	20.93	143.6
Davit3:O	0.0702	8.39	-0.2421	-7.2986	0.0596	0.0003	0.0702	7.41	131.4
Davit3:End	0.07509	8.758	1.617	-7.0876	0.0610	0.0054	0.07509	-7.222	135.2
Davit4:O	0.06993	8.374	-0.4911	-7.2986	0.0596	0.0003	0.06993	9.354	131.1
Davit4:End	0.07062	8.507	-2.463	-7.6360	0.0596	-0.0047	0.07062	24.49	131.2
Davit5:O	0.04852	5.771	-0.07768	-6.2716	0.0524	0.0001	0.04852	4.563	109.5
Davit5:End	0.05262	6.071	1.517	-6.0462	0.0536	0.0052	0.05262	-10.14	113.1
Davit6:O	0.04827	5.756	-0.3415	-6.2716	0.0524	0.0001	0.04827	6.964	109.3
Davit6:End	0.04925	5.886	-2.043	-6.6174	0.0525	-0.0049	0.04925	22.09	109.6
Davit7:O	0.0305	3.629	0.01593	-4.8907	0.0412	0.0000	0.0305	2.219	87.64
Davit7:End	0.0336	3.846	1.253	-4.6505	0.0424	0.0051	0.0336	-12.56	90.88
Davit8:O	0.03032	3.618	-0.2244	-4.8907	0.0412	0.0000	0.03032	5.028	87.4
Davit8:End	0.03153	3.737	-1.563	-5.2442	0.0415	-0.0050	0.03153	20.15	88.06

Joint Support Reactions for Load Case "NESC Extreme":

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 %
10256:g	-0.35	0.0	-48.90	0.0	0.0	-59.62	0.0	0.0	77.11	0.0	5222.72	0.0	-42.7	0.0	0.0	-0.03	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.
10256	10256:t	Origin	0.00	121.37	1.01	-5.75	-0.00	-0.00	0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
10256	10256:Arm1	End	0.70	120.27	1.00	-5.68	0.01	-0.00	0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
10256	10256:Arm1	Origin	0.70	120.27	1.00	-5.68	2.24	-0.06	0.0	-0.85	1.66	-0.05	-0.04	0.20	0.12	0.00	0.32	0.5	3
10256	10256:TopConn	End	2.00	118.23	0.98	-5.55	4.40	-0.13	0.0	-0.85	1.66	-0.05	-0.04	0.51	0.04	0.00	0.55	0.9	2
10256	10256:TopConn	Origin	2.00	118.23	0.98	-5.55	4.40	-0.13	0.0	0.73	15.28	-0.05	0.04	0.01	1.52	0.00	2.63	4.1	5
10256	Tube 1	End	6.00	111.97	0.93	-5.14	65.51	-0.33	0.0	0.73	15.28	-0.05	0.03	6.80	0.38	0.00	6.87	10.6	2
10256	Tube 1	Origin	6.00	111.97	0.93	-5.14	65.51	-0.33	0.0	0.43	15.51	-0.05	0.02	6.80	0.38	0.00	6.85	10.5	2
10256	10256:BotConn	End	10.00	105.76	0.88	-4.73	127.54	-0.54	0.0	0.43	15.51	-0.05	0.02	12.08	0.37	0.00	12.11	18.6	2
10256	10256:BotConn	Origin	10.00	105.76	0.88	-4.73	127.54	-0.54	0.0	-3.99	8.16	-0.06	-0.18	12.08	0.19	0.00	12.26	18.9	2
10256	10256:Arm2	End	13.38	100.58	0.84	-4.40	155.06	-0.73	0.0	-3.99	8.16	-0.06	-0.17	13.63	0.19	0.00	13.81	21.2	2
10256	10256:Arm2	Origin	13.38	100.58	0.84	-4.40	174.35	-0.94	0.0	-10.63	18.43	-0.16	-0.46	15.33	0.42	0.00	15.81	24.3	2
10256	Tube 1	End	16.69	95.57	0.80	-4.08	235.38	-1.48	0.0	-10.63	18.43	-0.16	-0.44	19.30	0.40	0.00	19.75	30.4	2

10256	Tube 1	Origin	16.69	95.57	0.80	-4.08	235.38	-1.48	0.0	-10.94	18.61	-0.16	-0.45	19.30	0.41	0.00	19.77	30.4	2
10256	10256:WVGD13	End	20.00	90.64	0.76	-3.77	297.04	-2.02	0.0	-10.94	18.61	-0.16	-0.44	22.76	0.40	0.00	23.21	35.7	2
10256	10256:WVGD13	Origin	20.00	90.64	0.76	-3.77	297.04	-2.02	0.0	-11.51	19.11	-0.16	-0.46	22.76	0.41	0.00	23.23	35.7	2
10256	Tube 1	End	25.00	83.38	0.70	-3.33	392.61	-2.84	0.0	-11.51	19.11	-0.16	-0.44	27.27	0.39	0.00	27.72	42.6	2
10256	Tube 1	Origin	25.00	83.38	0.70	-3.33	392.61	-2.84	0.0	-12.04	19.41	-0.16	-0.46	27.27	0.39	0.00	27.74	42.7	2
10256	10256:WVGD12	End	30.00	76.38	0.64	-2.92	489.66	-3.66	0.0	-12.04	19.41	-0.16	-0.44	30.98	0.37	0.00	31.42	48.3	2
10256	10256:WVGD12	Origin	30.00	76.38	0.64	-2.92	489.66	-3.66	0.0	-12.62	19.90	-0.16	-0.46	30.98	0.38	0.00	31.44	48.4	2
10256	Tube 1	End	32.69	72.73	0.61	-2.71	543.13	-4.10	0.0	-12.62	19.90	-0.16	-0.45	32.73	0.37	0.00	33.19	51.1	2
10256	Tube 1	Origin	32.69	72.73	0.61	-2.71	543.13	-4.10	0.0	-12.93	20.06	-0.16	-0.46	32.73	0.38	0.00	33.20	51.1	2
10256	10256:Arm3	End	35.38	69.16	0.58	-2.52	597.05	-4.54	0.0	-12.93	20.06	-0.16	-0.45	34.32	0.37	0.00	34.77	53.5	2
10256	10256:Arm3	Origin	35.38	69.16	0.58	-2.52	615.39	-4.75	0.0	-19.97	29.89	-0.27	-0.69	35.37	0.55	0.00	36.08	55.5	2
10256	10256:WVGD11	End	40.00	63.22	0.53	-2.20	753.64	-6.00	0.0	-19.97	29.89	-0.27	-0.67	40.03	0.53	0.00	40.70	62.6	2
10256	10256:WVGD11	Origin	40.00	63.22	0.53	-2.20	753.64	-6.00	0.0	-20.78	30.41	-0.27	-0.69	40.03	0.54	0.00	40.73	62.7	2
10256	Tube 1	End	45.00	57.12	0.48	-1.88	905.70	-7.35	0.0	-20.78	30.41	-0.27	-0.67	44.31	0.52	0.00	44.99	69.2	2
10256	Tube 1	Origin	45.00	57.12	0.48	-1.88	905.70	-7.34	0.0	-21.49	30.69	-0.27	-0.69	44.31	0.52	0.00	45.01	69.2	2
10256	10256:WVGD10	End	50.00	51.36	0.43	-1.60	1059.17	-8.69	0.0	-21.49	30.69	-0.27	-0.66	47.89	0.50	0.00	48.56	74.7	2
10256	10256:WVGD10	Origin	50.00	51.36	0.43	-1.60	1059.17	-8.69	0.0	-22.04	31.09	-0.27	-0.68	47.89	0.51	0.00	48.58	74.7	2
10256	SpliceT	End	50.33	51.00	0.43	-1.59	1069.43	-8.78	0.0	-22.04	31.09	-0.27	-0.68	48.11	0.51	0.00	48.80	75.1	2
10256	SpliceT	Origin	50.33	51.00	0.43	-1.59	1069.43	-8.77	0.0	-22.76	31.28	-0.27	-0.70	48.11	0.51	0.00	48.82	75.1	2
10256	SpliceB	End	55.00	45.95	0.39	-1.36	1215.49	-10.03	0.0	-22.76	31.28	-0.27	-0.49	38.22	0.36	0.00	38.72	59.6	2
10256	SpliceB	Origin	55.00	45.95	0.39	-1.36	1215.49	-10.03	0.0	-23.68	31.52	-0.27	-0.51	38.22	0.36	0.00	38.74	59.6	2
10256	10256:Arm4	End	57.38	43.48	0.36	-1.25	1290.36	-10.67	0.0	-23.68	31.52	-0.27	-0.50	39.14	0.36	0.00	39.65	61.0	2
10256	10256:Arm4	Origin	57.38	43.48	0.36	-1.25	1307.58	-10.88	0.0	-30.98	40.79	-0.37	-0.66	39.67	0.46	0.00	40.33	62.1	2
10256	10256:WVGD9	End	60.00	40.83	0.34	-1.14	1414.66	-11.86	0.0	-30.98	40.79	-0.37	-0.65	41.28	0.45	0.00	41.93	64.5	2
10256	10256:WVGD9	Origin	60.00	40.83	0.34	-1.14	1414.66	-11.85	0.0	-31.93	41.27	-0.37	-0.67	41.28	0.46	0.00	41.95	64.5	2
10256	Tube 2	End	65.00	36.01	0.30	-0.94	1621.03	-13.72	0.0	-31.93	41.27	-0.37	-0.64	44.00	0.44	0.00	44.65	68.7	2
10256	Tube 2	Origin	65.00	36.01	0.30	-0.94	1621.03	-13.72	0.0	-32.98	41.58	-0.37	-0.66	44.00	0.44	0.00	44.67	68.7	2
10256	10256:WVGD8	End	70.00	31.50	0.26	-0.77	1828.90	-15.58	0.0	-32.98	41.58	-0.37	-0.64	46.31	0.43	0.00	46.95	72.2	2
10256	10256:WVGD8	Origin	70.00	31.50	0.26	-0.77	1828.90	-15.57	0.0	-34.24	42.13	-0.37	-0.67	46.31	0.43	0.00	46.98	72.3	2
10256	Tube 2	End	75.00	27.29	0.23	-0.62	2039.53	-17.43	0.0	-34.24	42.13	-0.37	-0.64	48.28	0.42	0.00	48.93	75.3	2
10256	Tube 2	Origin	75.00	27.29	0.23	-0.62	2039.53	-17.43	0.0	-35.36	42.44	-0.37	-0.67	48.28	0.42	0.00	48.95	75.3	2
10256	10256:WVGD7	End	80.00	23.40	0.20	-0.50	2251.71	-19.28	0.0	-35.36	42.44	-0.37	-0.64	49.94	0.41	0.00	50.59	77.8	2
10256	10256:WVGD7	Origin	80.00	23.40	0.20	-0.50	2251.71	-19.27	0.0	-36.69	43.00	-0.37	-0.67	49.94	0.41	0.00	50.61	77.9	2
10256	Tube 2	End	85.00	19.82	0.17	-0.39	2466.68	-21.12	0.0	-36.69	43.00	-0.37	-0.65	51.36	0.40	0.00	52.02	80.0	2
10256	Tube 2	Origin	85.00	19.82	0.17	-0.39	2466.68	-21.11	0.0	-37.88	43.31	-0.37	-0.67	51.36	0.40	0.00	52.04	80.1	2
10256	10256:WVGD6	End	90.00	16.55	0.14	-0.30	2683.24	-22.95	0.0	-37.88	43.31	-0.37	-0.65	52.56	0.39	0.00	53.21	81.9	2
10256	10256:WVGD6	Origin	90.00	16.55	0.14	-0.30	2683.24	-22.95	0.0	-39.20	43.86	-0.37	-0.67	52.56	0.40	0.00	53.23	81.9	2
10256	Tube 2	End	94.42	13.92	0.12	-0.23	2876.89	-24.57	0.0	-39.20	43.86	-0.37	-0.65	53.47	0.39	0.00	54.13	83.3	2
10256	Tube 2	Origin	94.42	13.92	0.12	-0.23	2876.89	-24.56	0.0	-40.29	44.15	-0.37	-0.67	53.47	0.39	0.00	54.15	83.3	2
10256	SpliceT	End	98.83	11.53	0.10	-0.17	3071.81	-26.18	0.0	-40.29	44.15	-0.37	-0.66	54.25	0.38	0.00	54.91	84.5	2
10256	SpliceT	Origin	98.83	11.53	0.10	-0.17	3071.81	-26.17	0.0	-41.13	44.34	-0.36	-0.67	54.25	0.38	0.00	54.92	84.5	2
10256	10256:WVGD5	End	100.00	10.94	0.09	-0.16	3123.69	-26.60	0.0	-41.13	44.34	-0.36	-0.63	53.01	0.36	0.00	53.65	82.5	2
10256	10256:WVGD5	Origin	100.00	10.94	0.09	-0.16	3123.69	-26.60	0.0	-42.79	44.82	-0.36	-0.66	53.01	0.37	0.00	53.67	82.6	2
10256	SpliceB	End	105.00	8.59	0.07	-0.11	3347.77	-28.42	0.0	-42.79	44.82	-0.36	-0.64	53.65	0.35	0.00	54.30	83.5	2
10256	SpliceB	Origin	105.00	8.59	0.07	-0.11	3347.77	-28.41	0.0	-44.68	45.16	-0.36	-0.67	53.65	0.36	0.00	54.33	83.6	2

10256	10256:WVGD4	End	110.00	6.53	0.05	-0.08	3573.58	-30.23	0.0	-44.68	45.16	-0.36	-0.65	54.18	0.35	0.00	54.83	84.4	2
10256	10256:WVGD4	Origin	110.00	6.53	0.05	-0.08	3573.58	-30.22	0.0	-46.25	45.74	-0.36	-0.67	54.18	0.35	0.00	54.85	84.4	2
10256	Tube 3	End	115.00	4.77	0.04	-0.05	3802.28	-32.03	0.0	-46.25	45.74	-0.36	-0.66	54.61	0.34	0.00	55.26	85.0	2
10256	Tube 3	Origin	115.00	4.77	0.04	-0.05	3802.28	-32.03	0.0	-47.67	46.08	-0.36	-0.68	54.61	0.35	0.00	55.28	85.1	2
10256	10256:WVGD3	End	120.00	3.29	0.03	-0.03	4032.69	-33.82	0.0	-47.67	46.08	-0.36	-0.66	54.94	0.34	0.00	55.60	85.5	2
10256	10256:WVGD3	Origin	120.00	3.29	0.03	-0.03	4032.69	-33.82	0.0	-49.30	46.67	-0.36	-0.68	54.94	0.34	0.00	55.63	85.6	2
10256	Tube 3	End	125.00	2.10	0.02	-0.02	4266.02	-35.61	0.0	-49.30	46.67	-0.36	-0.66	55.21	0.33	0.00	55.88	86.0	2
10256	Tube 3	Origin	125.00	2.10	0.02	-0.02	4266.02	-35.61	0.0	-50.78	47.02	-0.36	-0.68	55.21	0.33	0.00	55.90	86.0	2
10256	10256:WVGD2	End	130.00	1.17	0.01	-0.01	4501.13	-37.39	0.0	-50.78	47.02	-0.36	-0.67	55.41	0.33	0.00	56.08	86.3	2
10256	10256:WVGD2	Origin	130.00	1.17	0.01	-0.01	4501.13	-37.39	0.0	-52.47	47.62	-0.35	-0.69	55.41	0.33	0.00	56.10	86.3	2
10256	Tube 3	End	135.00	0.52	0.00	-0.00	4739.23	-39.16	0.0	-52.47	47.62	-0.35	-0.67	55.56	0.32	0.00	56.24	86.5	2
10256	Tube 3	Origin	135.00	0.52	0.00	-0.00	4739.23	-39.16	0.0	-54.01	47.99	-0.35	-0.69	55.56	0.32	0.00	56.26	86.5	2
10256	10256:WVGD1	End	140.00	0.13	0.00	-0.00	4979.15	-40.92	0.0	-54.01	47.99	-0.35	-0.68	55.66	0.32	0.00	56.34	86.7	2
10256	10256:WVGD1	Origin	140.00	0.13	0.00	-0.00	4979.15	-40.92	0.0	-55.85	48.71	-0.35	-0.70	55.66	0.32	0.00	56.36	86.7	2
10256	10256:g	End	145.00	0.00	0.00	0.00	5222.72	-42.67	0.0	-55.85	48.71	-0.35	-0.68	55.72	0.31	0.00	56.41	86.8	2

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	120.36	1.00	-4.35	-1.64	0.26	0.0	-0.92	0.20	-0.03	-0.13	1.15	0.01	0.00	1.29	2.0	1
Davit1	#Davit1:0	End	5.00	121.80	1.02	3.36	-0.62	0.13	0.0	-0.92	0.20	-0.03	-0.17	0.72	0.01	0.00	0.90	1.4	1
Davit1	#Davit1:0	Origin	5.00	121.80	1.02	3.36	-0.62	0.13	0.0	-0.90	0.14	-0.03	-0.17	0.72	0.01	0.00	0.89	1.4	1
Davit1	#Davit1:1	End	7.54	122.53	1.03	7.26	-0.27	0.06	0.0	-0.90	0.14	-0.03	-0.20	0.43	0.01	0.00	0.63	1.0	1
Davit1	#Davit1:1	Origin	7.54	122.53	1.03	7.26	-0.27	0.06	0.0	-0.89	0.11	-0.03	-0.20	0.43	0.01	0.00	0.62	1.0	1
Davit1	Davit1:End	End	10.07	123.26	1.04	11.16	-0.00	0.00	0.0	-0.89	0.11	-0.03	-0.24	0.00	0.06	0.00	0.26	0.4	3
Davit2	Davit2:O	Origin	0.00	120.18	1.00	-7.01	-3.83	-0.26	-0.0	0.64	0.43	0.03	0.09	2.69	0.01	0.00	2.78	4.3	1
Davit2	#Davit2:0	End	5.00	120.61	1.00	-14.88	-1.70	-0.13	-0.0	0.64	0.43	0.03	0.12	1.98	0.01	0.00	2.10	3.2	1
Davit2	#Davit2:0	Origin	5.00	120.61	1.00	-14.88	-1.70	-0.13	-0.0	0.64	0.35	0.03	0.12	1.98	0.01	0.00	2.10	3.2	1
Davit2	#Davit2:1	End	7.54	120.82	1.00	-18.89	-0.80	-0.06	-0.0	0.64	0.35	0.03	0.14	1.28	0.01	0.00	1.42	2.2	1
Davit2	#Davit2:1	Origin	7.54	120.82	1.00	-18.89	-0.80	-0.06	0.0	0.64	0.31	0.03	0.14	1.28	0.01	0.00	1.42	2.2	1
Davit2	Davit2:End	End	10.07	121.03	1.00	-22.91	0.00	0.00	0.0	0.64	0.31	0.03	0.17	0.00	0.18	0.00	0.35	0.5	3
Davit3	Davit3:O	Origin	0.00	100.68	0.84	-2.91	-33.15	0.81	0.0	-5.50	2.36	-0.05	-0.36	6.01	0.01	0.00	6.38	9.8	1
Davit3	#Davit3:0	End	5.00	102.15	0.86	4.54	-21.33	0.55	0.0	-5.50	2.36	-0.05	-0.44	5.65	0.01	0.00	6.09	9.4	1
Davit3	#Davit3:0	Origin	5.00	102.15	0.86	4.54	-21.33	0.54	0.0	-5.45	2.18	-0.05	-0.44	5.65	0.01	0.00	6.09	9.4	1
Davit3	#Davit3:1	End	10.00	103.61	0.88	11.91	-10.43	0.28	0.0	-5.45	2.18	-0.05	-0.55	4.41	0.01	0.00	4.96	7.6	1
Davit3	#Davit3:1	Origin	10.00	103.61	0.88	11.91	-10.43	0.28	0.0	-5.41	2.06	-0.05	-0.55	4.41	0.01	0.00	4.96	7.6	1
Davit3	#Davit3:2	End	12.57	104.35	0.89	15.67	-5.13	0.14	0.0	-5.41	2.06	-0.05	-0.63	2.91	0.01	0.00	3.54	5.4	1
Davit3	#Davit3:2	Origin	12.57	104.35	0.89	15.67	-5.13	0.14	0.0	-5.39	2.00	-0.05	-0.63	2.91	0.01	0.00	3.54	5.4	1
Davit3	Davit3:End	End	15.13	105.09	0.90	19.40	-0.00	0.00	0.0	-5.39	2.00	-0.05	-0.74	0.00	0.57	0.00	1.24	1.9	3
Davit4	Davit4:O	Origin	0.00	100.49	0.84	-5.89	-52.44	-0.81	-0.0	4.45	3.68	0.05	0.30	9.51	0.01	0.00	9.80	15.1	1
Davit4	#Davit4:0	End	5.00	101.01	0.84	-13.58	-34.06	-0.54	-0.0	4.45	3.68	0.05	0.36	9.02	0.01	0.00	9.38	14.4	1
Davit4	#Davit4:0	Origin	5.00	101.01	0.84	-13.58	-34.06	-0.54	-0.0	4.46	3.45	0.05	0.36	9.02	0.01	0.00			

																	9.38	14.4	1
Davit4	#Davit4:1	End	10.00	101.54	0.84	-21.40	-16.79	-0.27	-0.0	4.46	3.45	0.05	0.45	7.11	0.01	0.00	7.56	11.6	1
Davit4	#Davit4:1	Origin	10.00	101.54	0.84	-21.40	-16.79	-0.27	-0.0	4.47	3.31	0.05	0.45	7.11	0.01	0.00	7.56	11.6	1
Davit4	#Davit4:2	End	12.57	101.81	0.84	-25.46	-8.29	-0.14	-0.0	4.47	3.31	0.05	0.52	4.70	0.01	0.00	5.22	8.0	1
Davit4	#Davit4:2	Origin	12.57	101.81	0.84	-25.46	-8.29	-0.14	0.0	4.47	3.23	0.05	0.52	4.70	0.01	0.00	5.22	8.0	1
Davit4	Davit4:End	End	15.13	102.08	0.85	-29.55	-0.00	0.00	0.0	4.47	3.23	0.05	0.62	0.00	0.92	0.00	1.72	2.6	3
Davit5	Davit5:O	Origin	0.00	69.25	0.58	-0.93	-35.34	0.81	0.0	-5.32	2.51	-0.05	-0.35	6.41	0.01	0.00	6.76	10.4	1
Davit5	#Davit5:0	End	5.00	70.46	0.60	5.47	-22.78	0.54	0.0	-5.32	2.51	-0.05	-0.43	6.04	0.01	0.00	6.46	9.9	1
Davit5	#Davit5:0	Origin	5.00	70.46	0.60	5.47	-22.78	0.54	0.0	-5.26	2.33	-0.05	-0.42	6.04	0.01	0.00	6.46	9.9	1
Davit5	#Davit5:1	End	10.00	71.65	0.61	11.79	-11.16	0.27	0.0	-5.26	2.33	-0.05	-0.53	4.72	0.01	0.00	5.25	8.1	1
Davit5	#Davit5:1	Origin	10.00	71.65	0.61	11.79	-11.16	0.27	0.0	-5.23	2.21	-0.05	-0.53	4.72	0.01	0.00	5.25	8.1	1
Davit5	#Davit5:2	End	12.57	72.26	0.62	15.00	-5.50	0.14	0.0	-5.23	2.21	-0.05	-0.61	3.11	0.01	0.00	3.72	5.7	1
Davit5	#Davit5:2	Origin	12.57	72.26	0.62	15.00	-5.50	0.14	0.0	-5.21	2.14	-0.05	-0.61	3.11	0.01	0.00	3.72	5.7	1
Davit5	Davit5:End	End	15.13	72.86	0.63	18.20	-0.00	0.00	0.0	-5.21	2.14	-0.05	-0.72	0.00	0.61	0.00	1.28	2.0	3
Davit6	Davit6:O	Origin	0.00	69.07	0.58	-4.10	-53.68	-0.80	-0.0	4.19	3.76	0.05	0.28	9.73	0.01	0.00	10.01	15.4	1
Davit6	#Davit6:0	End	5.00	69.59	0.58	-10.71	-34.89	-0.53	-0.0	4.19	3.76	0.05	0.34	9.25	0.01	0.00	9.58	14.7	1
Davit6	#Davit6:0	Origin	5.00	69.59	0.58	-10.71	-34.89	-0.53	-0.0	4.21	3.54	0.05	0.34	9.25	0.01	0.00	9.58	14.7	1
Davit6	#Davit6:1	End	10.00	70.10	0.59	-17.46	-17.21	-0.27	-0.0	4.21	3.54	0.05	0.42	7.29	0.01	0.00	7.71	11.9	1
Davit6	#Davit6:1	Origin	10.00	70.10	0.59	-17.46	-17.21	-0.27	-0.0	4.21	3.39	0.05	0.43	7.29	0.01	0.00	7.71	11.9	1
Davit6	#Davit6:2	End	12.57	70.37	0.59	-20.98	-8.51	-0.13	-0.0	4.21	3.39	0.05	0.49	4.82	0.01	0.00	5.31	8.2	1
Davit6	#Davit6:2	Origin	12.57	70.37	0.59	-20.98	-8.51	-0.13	0.0	4.22	3.31	0.05	0.49	4.82	0.01	0.00	5.31	8.2	1
Davit6	Davit6:End	End	15.13	70.63	0.59	-24.52	-0.00	0.00	0.0	4.22	3.31	0.05	0.58	0.00	0.95	0.00	1.74	2.7	3
Davit7	Davit7:O	Origin	0.00	43.54	0.37	0.19	-37.59	0.80	0.0	-5.06	2.66	-0.05	-0.34	6.81	0.01	0.00	7.15	11.0	1
Davit7	#Davit7:0	End	5.00	44.43	0.38	5.19	-24.27	0.53	0.0	-5.06	2.66	-0.05	-0.41	6.43	0.01	0.00	6.84	10.5	1
Davit7	#Davit7:0	Origin	5.00	44.43	0.38	5.19	-24.27	0.53	0.0	-5.01	2.47	-0.05	-0.40	6.43	0.01	0.00	6.83	10.5	1
Davit7	#Davit7:1	End	10.00	45.29	0.39	10.09	-11.91	0.27	0.0	-5.01	2.47	-0.05	-0.51	5.04	0.01	0.00	5.55	8.5	1
Davit7	#Davit7:1	Origin	10.00	45.29	0.39	10.09	-11.91	0.27	0.0	-4.98	2.35	-0.05	-0.50	5.04	0.01	0.00	5.54	8.5	1
Davit7	#Davit7:2	End	12.57	45.73	0.40	12.57	-5.87	0.14	0.0	-4.98	2.35	-0.05	-0.58	3.32	0.01	0.00	3.90	6.0	1
Davit7	#Davit7:2	Origin	12.57	45.73	0.40	12.57	-5.87	0.14	0.0	-4.97	2.29	-0.05	-0.58	3.32	0.01	0.00	3.90	6.0	1
Davit7	Davit7:End	End	15.13	46.16	0.40	15.03	-0.00	0.00	0.0	-4.97	2.29	-0.05	-0.69	0.00	0.65	0.00	1.32	2.0	3
Davit8	Davit8:O	Origin	0.00	43.42	0.36	-2.69	-54.83	-0.79	-0.0	3.95	3.83	0.05	0.26	9.94	0.01	0.00	10.20	15.7	1
Davit8	#Davit8:0	End	5.00	43.88	0.37	-7.86	-35.66	-0.53	-0.0	3.95	3.83	0.05	0.32	9.45	0.01	0.00	9.77	15.0	1
Davit8	#Davit8:0	Origin	5.00	43.88	0.37	-7.86	-35.66	-0.53	-0.0	3.97	3.61	0.05	0.32	9.45	0.01	0.00	9.77	15.0	1
Davit8	#Davit8:1	End	10.00	44.35	0.37	-13.17	-17.60	-0.27	-0.0	3.97	3.61	0.05	0.40	7.45	0.01	0.00	7.85	12.1	1
Davit8	#Davit8:1	Origin	10.00	44.35	0.37	-13.17	-17.60	-0.27	-0.0	3.98	3.47	0.05	0.40	7.45	0.01	0.00	7.85	12.1	1
Davit8	#Davit8:2	End	12.57	44.60	0.37	-15.95	-8.70	-0.13	-0.0	3.98	3.47	0.05	0.46	4.93	0.01	0.00	5.39	8.3	1
Davit8	#Davit8:2	Origin	12.57	44.60	0.37	-15.95	-8.70	-0.13	0.0	3.99	3.39	0.05	0.46	4.93	0.01	0.00	5.39	8.3	1
Davit8	Davit8:End	End	15.13	44.84	0.38	-18.75	-0.00	0.00	0.0	3.99	3.39	0.05	0.55	0.00	0.97	0.00	1.77	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)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
Clamp1	0.892	80.00	80.00	1.12	0.00	0.00	0.00	1.12
Clamp2	0.704	80.00	80.00	0.88	0.00	0.00	0.00	0.88

Clamp3	5.731	80.00	80.00	7.16	0.00	0.00	0.00	7.16
Clamp4	5.497	80.00	80.00	6.87	0.00	0.00	0.00	6.87
Clamp5	5.612	80.00	80.00	7.01	0.00	0.00	0.00	7.01
Clamp6	5.344	80.00	80.00	6.68	0.00	0.00	0.00	6.68
Clamp7	5.447	80.00	80.00	6.81	0.00	0.00	0.00	6.81
Clamp8	5.213	80.00	80.00	6.52	0.00	0.00	0.00	6.52
Clamp9	13.584	80.00	80.00	16.98	0.00	0.00	0.00	16.98
Clamp10	8.622	80.00	80.00	10.78	0.00	0.00	0.00	10.78
Clamp13	0.452	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp14	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp15	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp16	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp17	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp18	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp19	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp20	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp21	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp22	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp23	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp24	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38
Clamp25	0.301	80.00	80.00	0.38	0.00	0.00	0.00	0.38

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
10256	86.78	NESC Extreme	2.5	36	29548.2

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 %
10256	NESC Heavy	1	2.584	1.142	-0.303	2.809	40.000	33.343	166.715	6	93.613	2.236	3.000	55.57
10256	NESC Heavy	2	2.809	-0.303	1.142	2.584	40.000	12.579	62.895	4	79.263	1.374	3.000	20.96
10256	NESC Heavy	3	2.281	-1.667	2.281	1.667	40.000	0.816	4.081	3	52.566	0.350	3.000	1.36
10256	NESC Heavy	4	1.142	-2.584	2.809	0.303	40.000	11.416	57.078	4	-72.605	1.309	3.000	19.03
10256	NESC Heavy	5	-0.303	-2.809	2.584	-1.142	40.000	30.479	152.393	6	-85.258	2.138	3.000	50.80
10256	NESC Heavy	6	-1.667	-2.281	1.667	-2.281	40.000	36.874	184.369	7	-85.258	2.352	3.000	61.46
10256	NESC Heavy	7	-2.584	-1.142	0.303	-2.809	40.000	29.515	147.573	6	-84.261	2.104	3.000	49.19
10256	NESC Heavy	8	-2.809	0.303	-1.142	-2.584	40.000	10.750	53.752	4	-69.912	1.270	3.000	17.92
10256	NESC Heavy	9	-2.281	1.667	-2.281	-1.667	40.000	1.226	6.130	3	56.661	0.429	3.000	2.04
10256	NESC Heavy	10	-1.142	2.584	-2.809	-0.303	40.000	13.367	66.836	4	81.957	1.416	3.000	22.28
10256	NESC Heavy	11	0.303	2.809	-2.584	1.142	40.000	34.307	171.536	6	94.609	2.268	3.000	57.18
10256	NESC Heavy	12	1.667	2.281	-1.667	2.281	40.000	40.984	204.920	7	94.609	2.479	3.000	68.31
10256	NESC Heavy	13	2.221	1.850	-0.999	2.713	40.000	28.569	142.842	5	94.111	2.070	3.000	47.61
10256	NESC Heavy	14	2.849	0.491	0.491	2.849	40.000	20.256	101.279	4	92.616	1.743	3.000	33.76
10256	NESC Heavy	15	2.713	-0.999	1.850	2.221	40.000	2.907	14.533	2	52.566	0.660	3.000	4.84
10256	NESC Heavy	16	1.850	-2.221	2.713	0.999	40.000	2.628	13.138	2	-47.310	0.628	3.000	4.38
10256	NESC Heavy	17	0.491	-2.849	2.849	-0.491	40.000	18.496	92.479	4	-85.258	1.666	3.000	30.83
10256	NESC Heavy	18	-0.999	-2.713	2.221	-1.850	40.000	26.043	130.216	5	-85.258	1.976	3.000	43.41
10256	NESC Heavy	19	-2.221	-1.850	0.999	-2.713	40.000	25.625	128.124	5	-84.760	1.961	3.000	42.71
10256	NESC Heavy	20	-2.849	-0.491	-0.491	-2.849	40.000	17.646	88.232	4	-83.265	1.627	3.000	29.41
10256	NESC Heavy	21	-2.713	0.999	-1.850	-2.221	40.000	2.654	13.271	2	-43.215	0.631	3.000	4.42
10256	NESC Heavy	22	-1.850	2.221	-2.713	-0.999	40.000	3.368	16.840	2	56.661	0.711	3.000	5.61
10256	NESC Heavy	23	-0.491	2.849	-2.849	0.491	40.000	21.105	105.525	4	94.609	1.779	3.000	35.18
10256	NESC Heavy	24	0.999	2.713	-2.221	1.850	40.000	28.987	144.934	5	94.609	2.085	3.000	48.31
10256	NESC Extreme	1	2.584	1.142	-0.303	2.809	40.000	43.379	216.893	6	121.541	2.551	3.000	72.30
10256	NESC Extreme	2	2.809	-0.303	1.142	2.584	40.000	16.259	81.294	4	103.139	1.562	3.000	27.10
10256	NESC Extreme	3	2.281	-1.667	2.281	1.667	40.000	0.886	4.430	3	67.793	0.365	3.000	1.48
10256	NESC Extreme	4	1.142	-2.584	2.809	0.303	40.000	15.833	79.163	4	-100.374	1.541	3.000	26.39
10256	NESC Extreme	5	-0.303	-2.809	2.584	-1.142	40.000	42.146	210.731	6	-117.544	2.514	3.000	70.24
10256	NESC Extreme	6	-1.667	-2.281	1.667	-2.281	40.000	51.130	255.647	7	-117.544	2.769	3.000	85.22
10256	NESC Extreme	7	-2.584	-1.142	0.303	-2.809	40.000	41.446	207.229	6	-116.820	2.493	3.000	69.08
10256	NESC Extreme	8	-2.809	0.303	-1.142	-2.584	40.000	15.349	76.747	4	-98.418	1.517	3.000	25.58
10256	NESC Extreme	9	-2.281	1.667	-2.281	-1.667	40.000	1.184	5.918	3	70.768	0.421	3.000	1.97
10256	NESC Extreme	10	-1.142	2.584	-2.809	-0.303	40.000	16.832	84.157	4	105.095	1.589	3.000	28.05
10256	NESC Extreme	11	0.303	2.809	-2.584	1.142	40.000	44.079	220.394	6	122.265	2.571	3.000	73.46
10256	NESC Extreme	12	1.667	2.281	-1.667	2.281	40.000	53.204	266.022	7	122.265	2.825	3.000	88.67
10256	NESC Extreme	13	2.221	1.850	-0.999	2.713	40.000	37.182	185.912	5	121.903	2.362	3.000	61.97
10256	NESC Extreme	14	2.849	0.491	0.491	2.849	40.000	26.315	131.573	4	120.817	1.987	3.000	43.86
10256	NESC Extreme	15	2.713	-0.999	1.850	2.221	40.000	3.631	18.153	2	67.793	0.738	3.000	6.05
10256	NESC Extreme	16	1.850	-2.221	2.713	0.999	40.000	3.538	17.690	2	-66.047	0.728	3.000	5.90
10256	NESC Extreme	17	0.491	-2.849	2.849	-0.491	40.000	25.614	128.072	4	-117.544	1.960	3.000	42.69
10256	NESC Extreme	18	-0.999	-2.713	2.221	-1.850	40.000	36.000	180.002	5	-117.544	2.324	3.000	60.00
10256	NESC Extreme	19	-2.221	-1.850	0.999	-2.713	40.000	35.696	178.482	5	-117.182	2.314	3.000	59.49
10256	NESC Extreme	20	-2.849	-0.491	-0.491	-2.849	40.000	24.998	124.987	4	-116.097	1.936	3.000	41.66
10256	NESC Extreme	21	-2.713	0.999	-1.850	-2.221	40.000	3.557	17.786	2	-63.072	0.730	3.000	5.93
10256	NESC Extreme	22	-1.850	2.221	-2.713	-0.999	40.000	3.966	19.829	2	70.768	0.771	3.000	6.61
10256	NESC Extreme	23	-0.491	2.849	-2.849	0.491	40.000	26.932	134.658	4	122.265	2.010	3.000	44.89
10256	NESC Extreme	24	0.999	2.713	-2.221	1.850	40.000	37.486	187.432	5	122.265	2.371	3.000	62.48

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
Davit1	12.41	NESC Heavy	144.6	1	182.3
Davit2	14.88	NESC Heavy	144.6	1	182.3
Davit3	31.83	NESC Heavy	132.0	1	575.0
Davit4	35.66	NESC Heavy	132.0	1	575.0
Davit5	32.18	NESC Heavy	110.0	1	575.0
Davit6	35.91	NESC Heavy	110.0	1	575.0
Davit7	32.48	NESC Heavy	88.0	1	575.0
Davit8	36.10	NESC Heavy	88.0	1	575.0

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	68.31	10256	Base Plate

NESC Extreme 88.67 10256 Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Height AGL (ft)	Segment Number
NESC Heavy	66.43	10256	12.5	34
NESC Extreme	86.78	10256	2.5	36

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	10256	12	40.000	112.213	3897.387	-58.736	40.984	204.920	7	94.609	2.479	68.31
NESC Extreme	10256	12	40.000	56.648	5222.720	-42.670	53.204	266.022	7	122.265	2.825	88.67

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Height AGL (ft)	Segment Number
NESC Heavy	36.10	Davit8	88.0	1
NESC Extreme	15.70	Davit8	88.0	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	2.15	NESC Heavy	0.0
Clamp2	Clamp	1.95	NESC Heavy	0.0
Clamp3	Clamp	10.99	NESC Heavy	0.0
Clamp4	Clamp	10.82	NESC Heavy	0.0
Clamp5	Clamp	11.02	NESC Heavy	0.0
Clamp6	Clamp	10.86	NESC Heavy	0.0
Clamp7	Clamp	11.00	NESC Heavy	0.0
Clamp8	Clamp	10.86	NESC Heavy	0.0
Clamp9	Clamp	16.98	NESC Extreme	0.0
Clamp10	Clamp	10.78	NESC Extreme	0.0
Clamp13	Clamp	1.32	NESC Heavy	0.0
Clamp14	Clamp	0.88	NESC Heavy	0.0
Clamp15	Clamp	0.88	NESC Heavy	0.0
Clamp16	Clamp	0.88	NESC Heavy	0.0
Clamp17	Clamp	0.88	NESC Heavy	0.0
Clamp18	Clamp	0.88	NESC Heavy	0.0
Clamp19	Clamp	0.88	NESC Heavy	0.0
Clamp20	Clamp	0.88	NESC Heavy	0.0
Clamp21	Clamp	0.88	NESC Heavy	0.0
Clamp22	Clamp	0.88	NESC Heavy	0.0
Clamp23	Clamp	0.88	NESC Heavy	0.0
Clamp24	Clamp	0.88	NESC Heavy	0.0
Clamp25	Clamp	0.88	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	0.025	1.161	1.265	1.717
NESC Heavy	Clamp2	Clamp	Davit2:End	0.025	0.991	1.205	1.560
NESC Heavy	Clamp3	Clamp	Davit3:End	0.050	3.618	8.015	8.794
NESC Heavy	Clamp4	Clamp	Davit4:End	0.050	3.599	7.875	8.659
NESC Heavy	Clamp5	Clamp	Davit5:End	0.050	3.621	8.039	8.817
NESC Heavy	Clamp6	Clamp	Davit6:End	0.050	3.620	7.898	8.688
NESC Heavy	Clamp7	Clamp	Davit7:End	0.050	3.625	8.021	8.802
NESC Heavy	Clamp8	Clamp	Davit8:End	0.050	3.647	7.888	8.690
NESC Heavy	Clamp9	Clamp	10256:TopConn	0.000	3.948	0.000	3.948
NESC Heavy	Clamp10	Clamp	10256:BotConn	0.000	-2.289	6.719	7.098
NESC Heavy	Clamp13	Clamp	10256:WVGD1	0.000	0.139	1.046	1.055
NESC Heavy	Clamp14	Clamp	10256:WVGD2	0.000	0.093	0.697	0.703
NESC Heavy	Clamp15	Clamp	10256:WVGD3	0.000	0.093	0.697	0.703
NESC Heavy	Clamp16	Clamp	10256:WVGD4	0.000	0.093	0.697	0.703
NESC Heavy	Clamp17	Clamp	10256:WVGD5	0.000	0.093	0.697	0.703
NESC Heavy	Clamp18	Clamp	10256:WVGD6	0.000	0.093	0.697	0.703
NESC Heavy	Clamp19	Clamp	10256:WVGD7	0.000	0.093	0.697	0.703
NESC Heavy	Clamp20	Clamp	10256:WVGD8	0.000	0.093	0.697	0.703
NESC Heavy	Clamp21	Clamp	10256:WVGD9	0.000	0.093	0.697	0.703
NESC Heavy	Clamp22	Clamp	10256:WVGD10	0.000	0.093	0.697	0.703
NESC Heavy	Clamp23	Clamp	10256:WVGD11	0.000	0.093	0.697	0.703
NESC Heavy	Clamp24	Clamp	10256:WVGD12	0.000	0.093	0.697	0.703
NESC Heavy	Clamp25	Clamp	10256:WVGD13	0.000	0.093	0.697	0.703

NESC Extreme	Clamp1	Clamp	Davit1:End	0.025	0.838	0.306	0.892
NESC Extreme	Clamp2	Clamp	Davit2:End	0.025	0.634	0.305	0.704
NESC Extreme	Clamp3	Clamp	Davit3:End	0.050	4.707	3.269	5.731
NESC Extreme	Clamp4	Clamp	Davit4:End	0.050	4.469	3.200	5.497
NESC Extreme	Clamp5	Clamp	Davit5:End	0.050	4.555	3.277	5.612
NESC Extreme	Clamp6	Clamp	Davit6:End	0.050	4.275	3.207	5.344
NESC Extreme	Clamp7	Clamp	Davit7:End	0.050	4.367	3.255	5.447
NESC Extreme	Clamp8	Clamp	Davit8:End	0.050	4.124	3.189	5.213
NESC Extreme	Clamp9	Clamp	10256:TopConn	0.000	13.584	0.000	13.584
NESC Extreme	Clamp10	Clamp	10256:BotConn	0.000	-8.038	3.118	8.622
NESC Extreme	Clamp13	Clamp	10256:WVGD1	0.000	0.354	0.281	0.452
NESC Extreme	Clamp14	Clamp	10256:WVGD2	0.000	0.236	0.187	0.301
NESC Extreme	Clamp15	Clamp	10256:WVGD3	0.000	0.236	0.187	0.301
NESC Extreme	Clamp16	Clamp	10256:WVGD4	0.000	0.236	0.187	0.301
NESC Extreme	Clamp17	Clamp	10256:WVGD5	0.000	0.236	0.187	0.301
NESC Extreme	Clamp18	Clamp	10256:WVGD6	0.000	0.236	0.187	0.301
NESC Extreme	Clamp19	Clamp	10256:WVGD7	0.000	0.236	0.187	0.301
NESC Extreme	Clamp20	Clamp	10256:WVGD8	0.000	0.236	0.187	0.301
NESC Extreme	Clamp21	Clamp	10256:WVGD9	0.000	0.236	0.187	0.301
NESC Extreme	Clamp22	Clamp	10256:WVGD10	0.000	0.236	0.187	0.301
NESC Extreme	Clamp23	Clamp	10256:WVGD11	0.000	0.236	0.187	0.301
NESC Extreme	Clamp24	Clamp	10256:WVGD12	0.000	0.236	0.187	0.301
NESC Extreme	Clamp25	Clamp	10256:WVGD13	0.000	0.236	0.187	0.301

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	26.796	0.350	66.335	3064.525	-40.762	0.000
NESC Extreme	36.701	0.350	25.651	4241.035	-40.762	0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 3814.7
Weight of Steel Poles: 29548.2
Total: 33362.9

*** End of Report

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Subject: Anchor Bolt Analysis Pole #10256

Location: Bethel, CT

Rev. 2: 1/16/20

Prepared by: F.J.P Checked by: T.J.L.
Job No. 19066.12

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 123 \cdot kip$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 48.9 \cdot kip$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 24$ (User Input)

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

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

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

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

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

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

Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2\ kip$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 627.4\ psi$

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

Shear Stress Permitted = $F_v := 0.35 \cdot F_y = 26.25\ ksi$

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

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 50.51\%$

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

$Condition1 = \text{"OK"}$

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

Foundation:

Input Data:

Tower Data

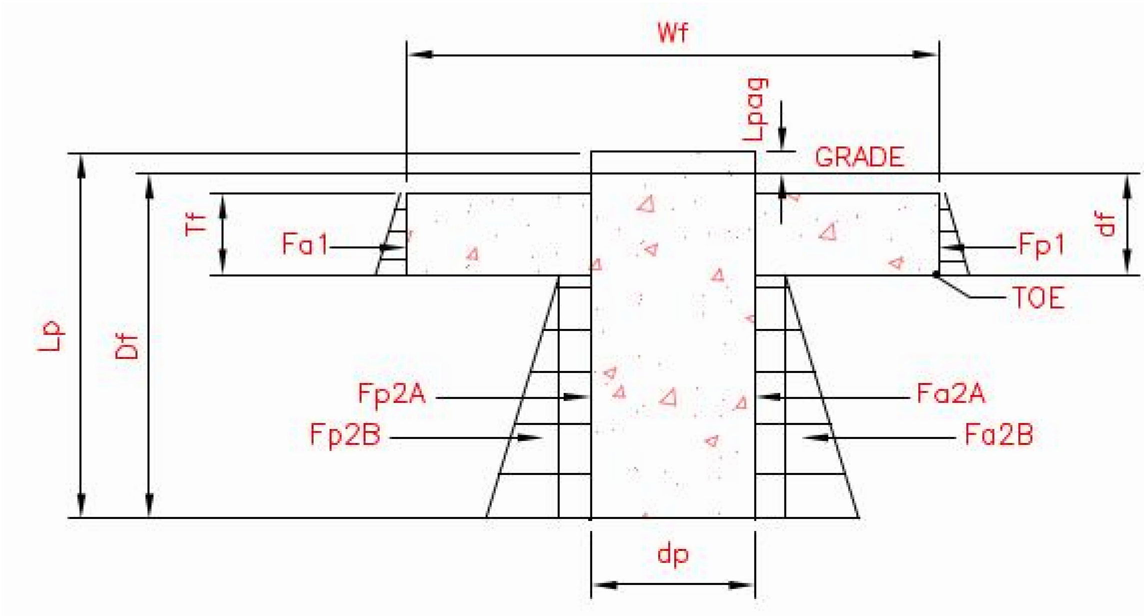
Overturning Moment =	$OM := 5223 \cdot ft \cdot kip \cdot 1.1 = 5745\ ft \cdot kip$	(User Input)
Shear Force =	$Shear := 48.9 \cdot kip \cdot 1.1 = 54\ kip$	(User Input)
Axial Force =	$Axial := 59.6 \cdot kip \cdot 1.1 = 66\ kip$	(User Input)
Tower Height =	$H_t := 145 \cdot ft$	(User Input)

Footing Data:

Overall Depth of Footing =	$D_f := 17.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 18 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Caisson =	$d_p := 8 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 24 \cdot ft$	(User Input)	
Water Depth =	$D_{water} := 0 \cdot ft$	(User Input)	
Distance From Grade to Bottom of Pad =	$d_f := 5 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcement 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 (mat) =	$\Phi_{s1} := 30 \cdot deg$	(User Input)	
Internal Friction Angle of Soil (below mat) =	$\Phi_{s2} := 30 \cdot deg$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil1} := 100 \cdot pcf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil2} := 100 \cdot pcf$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4000 \cdot psf$	(User Input)	(Conservative)
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Buoyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(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)



Calculated Factors:

Coefficient of Lateral Soil Pressure = $K_{p1} := \dfrac{1 + \sin(\Phi_{s1})}{1 - \sin(\Phi_{s1})} = 3$ $\quad Ka1 := \dfrac{(1 - \sin(\Phi_{s1}))}{(1 + \sin(\Phi_{s1}))} = 0.333$

$K_{p2} := \dfrac{1 + \sin(\Phi_{s2})}{1 - \sin(\Phi_{s2})} = 3$ $\quad Ka2 := \dfrac{(1 - \sin(\Phi_{s2}))}{(1 + \sin(\Phi_{s2}))} = 0.333$

Stability of Footing:

Passive Pressure 1 = $P_{p1.top} := K_{p1} \cdot \gamma_{soil1} \cdot (0 \cdot ft) = 0\ ksf$

$P_{p1.bot} := K_{p1} \cdot \gamma_{soil1} \cdot d_f = 1.5\ ksf$

$P_{p1.ave} := \dfrac{P_{p1.top} + P_{p1.bot}}{2} = 0.75\ ksf$

Active Pressure 1 = $P_{a1.top} := Ka1 \cdot \gamma_{soil1} \cdot (0 \cdot ft) = 0\ ksf$

$P_{a1.bot} := Ka1 \cdot \gamma_{soil1} \cdot d_f = 0.167\ ksf$

$P_{a1.ave} := \dfrac{P_{a1.top} + P_{a1.bot}}{2} = 0.083\ ksf$

Area of Pressure 1 = $A_{p1} := T_f \cdot W_f = 96\ ft^2$

Forces 1 = $F_{p1} := P_{p1.ave} \cdot A_{p1} = 72\ kip$

$F_{a1} := P_{a1.ave} \cdot A_{p1} = 8\ kip$

Ultimate Shear 1 = $S_{u1} := (F_{p1} - F_{a1}) = 64\ kip$

Passive Pressure 2 = $P_{p2.top} := K_{p2} \cdot \gamma_{soil2} \cdot d_f = 1.5\ ksf$

$P_{p2.bot} := K_{p2} \cdot \gamma_{soil2} \cdot D_f = 5.25\ ksf$

Active Pressure 2 = $P_{a2.top} := Ka2 \cdot \gamma_{soil2} \cdot d_f = 0.167\ ksf$

$P_{a2.bot} := Ka2 \cdot \gamma_{soil2} \cdot D_f = 0.583\ ksf$

Area of Pressure 2 = $A_{p2} := (D_f - d_f) \cdot d_p = 100\ ft^2$

Forces 2 = $F_{p2A} := P_{p2.top} \cdot A_{p2} = 150\ kip$

$F_{a2A} := P_{a2.top} \cdot A_{p2} = 16.7\ kip$

$F_{p2B} := \frac{1}{2} \cdot (P_{p2.bot} - P_{p2.top}) \cdot A_{p2} = 187.5\ kip$

$F_{a2B} := \frac{1}{2} \cdot (P_{a2.bot} - P_{a2.top}) \cdot A_{p2} = 20.8\ kip$

Ultimate Shear 2 = $S_{u2A} := F_{p2A} - F_{a2A} = 133.3\ kip$

$S_{u2B} := F_{p2B} - F_{a2B} = 166.7\ kip$

Weight of Concrete Mat = $WT_{mat} := \left(W_f^2 - \frac{d_p^2 \cdot \pi}{4}\right) \cdot T_f \cdot \gamma_{conc} = 315.44\ kip$

Weight of Concrete Caisson = $WT_{caission} := \left(\frac{d_p^2 \cdot \pi}{4} \cdot L_p\right) \cdot \gamma_{conc} = 135.72\ kip$

Weight of Soil Above Mat = $WT_s := \left(\left(W_f^2 - \frac{d_p^2 \cdot \pi}{4}\right) \cdot (d_f - T_f)\right) \cdot \gamma_{soil1} = 52.57\ kip$

Total Weight = $W_{tot} := WT_{mat} + WT_{caission} + WT_s + Axial = 569.291\ kip$

Overturning Moment = $M_{ot} := OM + Shear \cdot (d_f + L_{pag}) = 6041\ kip \cdot ft$

Resisting Moment = $M_r := (W_{tot}) \cdot \frac{W_f}{2} + S_{u1} \cdot T_f \cdot \frac{1}{3} + S_{u2A} \cdot \frac{(D_f - d_f)}{2} + S_{u2B} \cdot \frac{2 \cdot (D_f - d_f)}{3} = 9139\ kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.51$

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

Overturing_Check := if (FS ≥ FS_{req}, "Okay", "No Good")

Overturing_Check = "Okay"

Bearing Pressure Check:

Area of Mat = $A_{mat} := W_f^2 - \frac{d_p^2 \cdot \pi}{4} = 525.735\ ft^2$

Section Modulus of Mat = $S_{mat} := \frac{W_f^3}{6} - \frac{d_p^3 \cdot \pi}{32} = 2254\ ft^3$

Axial Force @ Base of Mat = $P_{mat} := WT_{mat} + WT_s = 368.014\ kip$

Resisting Moment Capacity of Caisson = $M_{cap} := S_{u2A} \cdot \left(\frac{1}{2} \cdot (D_f - d_f) + d_f + L_{pag}\right) + S_{u2B} \cdot \left(\frac{2}{3} \cdot (D_f - d_f) + d_f + L_{pag}\right) = 3872\ kip \cdot ft$

Residual Moment @ Base of Mat = $M_{mat} := (OM - M_{cap}) + Shear \cdot (d_f + L_{pag}) - \left(S_{u1} \cdot T_f \cdot \frac{1}{3}\right) = 2084\ kip \cdot ft$

Maximum Pressure in Mat = $P_{max} := \frac{P_{mat}}{A_{mat}} + \frac{M_{mat}}{S_{mat}} = 1.625\ ksf$

Max_Pressure_Check := if ($P_{max} < q_s$, "Okay", "No Good")

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{P_{mat}}{A_{mat}} - \frac{M_{mat}}{S_{mat}} = -0.225\ ksf$

Min_Pressure_Check := if (($P_{min} \geq 0$) · ($P_{min} < q_s$), "Okay", "No Good")

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 7.029\ ft$

Distance to Kern = $X_k := \frac{W_f}{6} = 4\ ft$

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

Eccentricity = $e := \frac{M_{mat}}{P_{mat}} = 5.662\ ft$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot P_{mat}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.613\ ksf$

$q_{adj} := \text{if}\ (P_{min} < 0, P_a, P_{max}) = 1.613\ ksf$

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

Pressure_Check = "Okay"

Section 1 - Site Information

Site ID: CT11110C
Status: Draft
Version: 5.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 4/29/2019 1:13:26 PM
Last Modified By: GSM1900\AMurill9

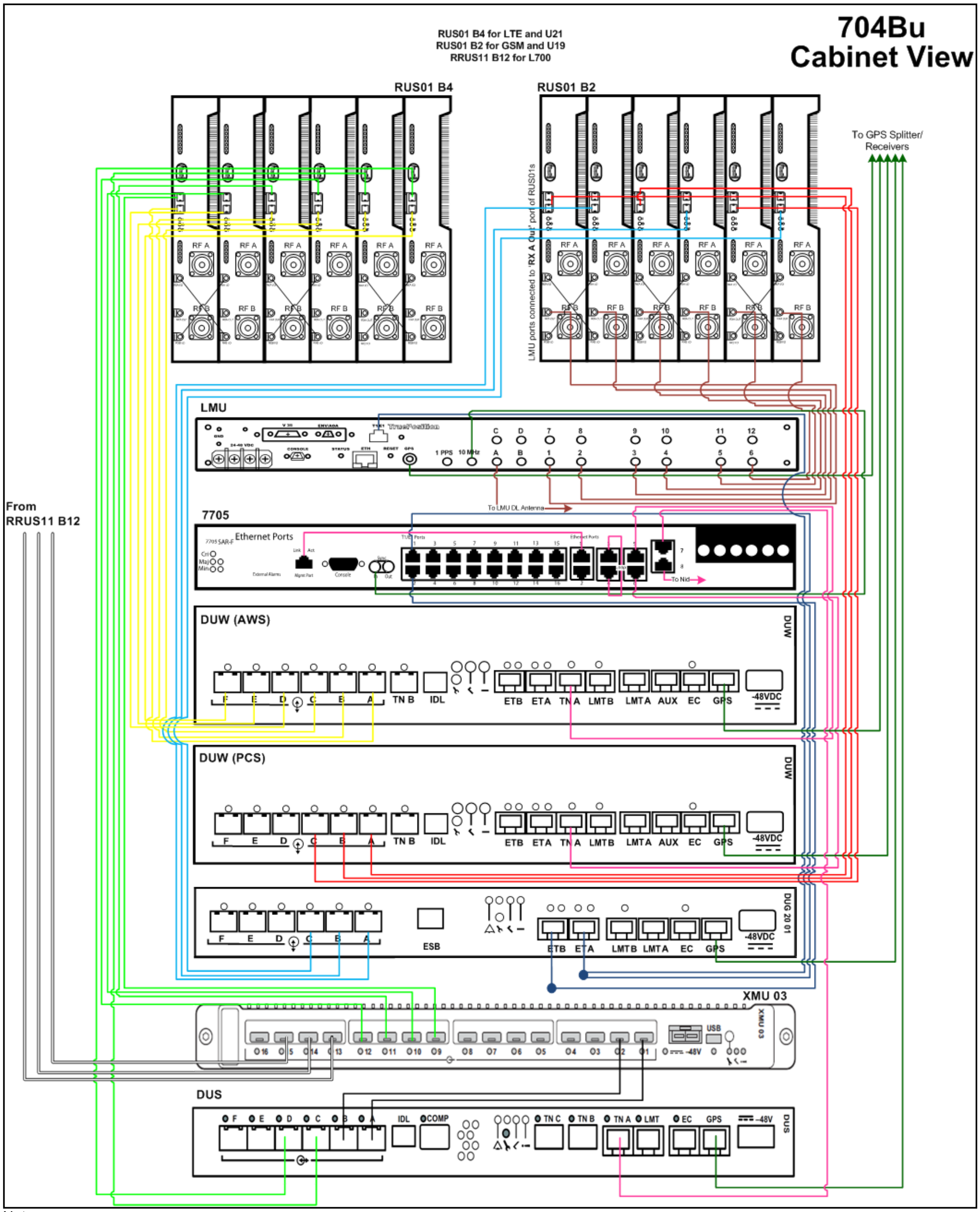
Site Name: Danbury/I-84/X8
Site Class: Utility Lattice Tower
Site Type: Structure Non Building
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: CL&P

Latitude: 41.4108000000
Longitude: -73.4002000000
Address: 8 Chimney Drive CL&P P# 321 L#1770
City, State: Bethel, CT
Region: NORTHEAST

RAN Template: 67D04B Hybrid		AL Template: 67D04B_1QP+1OP		
Sector Count: 3	Antenna Count: 6	Coax Line Count: 18	TMA Count: 0	RRU Count: 3

Section 2 - Existing Template Images

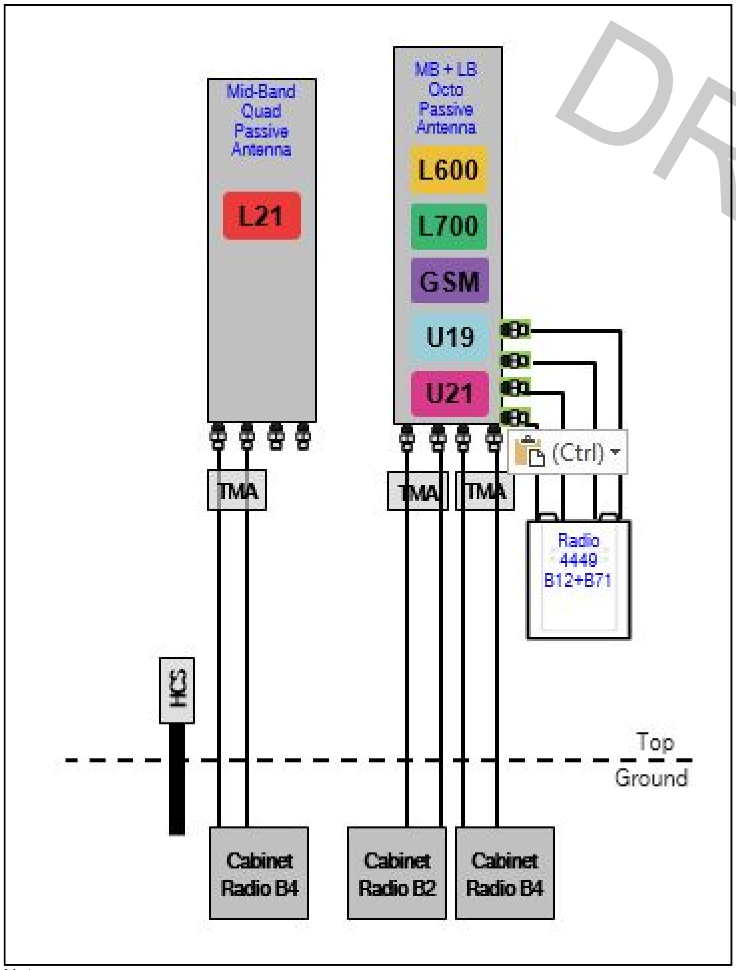
704Bu.png



704Bu
Cabinet View
RUS01 B4 for LTE and U21
RUS01 B2 for GSM and U19
RRUS11 B12 for L700
RUS01 B4
RUS01 B2
To GPS Splitter/ Receivers
LMU ports connected to 'RX A Out' port of RUS01s
LMU
To LMU DL Antenna
From RRUS11 B12
7705
Ethernet Ports
To Nid
DUW (AWS)
DUW (PCS)
DUG 20 01
XMU 03
DUS

Notes:

67D04B.JPG



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704Bu Outdoor

Enclosure	1
Enclosure Type	RBS 6102
Baseband	DUW30 (U1900 (DECOMMISSIONED)); DUW30 (U2100); DUG20 (G1900); DUS31 (L2100, L700)
Multiplexer	XMU (L2100, L700)
Radio	RUS01 B2 (x3) G1900; RUS01 B2 (x3) U1900 (DECOMMISSIONED); RUS01 B4 (x3) U2100; RUS01 B4 (x3) L2100

Proposed RAN Equipment

Template: 67D04B Hybrid

Enclosure	1
Enclosure Type	RBS 6102
Baseband	DUW30 (U1900 (DECOMMISSIONED)); DUW30 (U2100); DUG20 (G1900); BB 6630 (L2100, L700, L600); BB 6630 (N600 (DARK))
Radio	RUS01 B2 (x3) G1900; RUS01 B2 (x3) U1900 (DECOMMISSIONED); RUS01 B4 (x3) U2100; RUS01 B4 (x3) L2100

RAN Scope of Work:

*** Existing Cabinet is RBS6102 ***
Replace (1) DUS31 with (1) BB6630 for LTE.
Add (1) BB6630 for future 5G N600.
Remove (1) XMU.

Existing: (12) Coaxial Lines.
Add (6) Coaxial Lines.

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

Section 6 - A&L Equipment

Existing Template: 704Bu
Proposed Template: 67D04B_1QP+1OP

Sector 1 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	**1**	**2**
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	Andrew - LNX-6512DS-A1M (Dual)
Azimuth	60	60
M. Tilt	0	0
Height	154	162
Ports	**P1**	**P2**
Active Tech.	U2100 L2100 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.	U1900	
E. Tilt	2	2
Cables	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**
TMAs	Generic Twin Style 3B - PCS+AWS (AtCabinet) **(x2)**	
Diplexers / Combiners	Filter (AtCabinet) **(x2)**	
Radio		RRUS11 B12 (At Cabinet)
Sector Equipment		Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

RRU's on the ground for L700. Need RET capability on APX18's via TMA's

RAN Template: 67D04B Hybrid	A&L Template: 67D04B_1QP+1OP	Power System Template: Custom

CT11110C_L600_5.1_draft

Sector 1 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1	2			
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	60	60			
M. Tilt	0	0			
Height	154	162			
Ports	P1	P2	P3	P4	P5
Active Tech.	U2100 L2100 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.	U1900				
E. Tilt	2	2			
Cables	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**		
TMAs	Generic Twin Style 3B - PCS+AWS (AtCabinet) **(x2)**				
Diplexers / Combiners	Filter (AtCabinet) **(x2)**				
Radio		Radio 4449 B71+B12 (At Cabinet)	SHARED Radio 4449 B71+B12 (At Cabinet)		
Sector Equipment					Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (2) Coaxial Lines to Position 2.
Replace RRUS11 B12 with (1) Radio 4449 B71+B12 for L600 and L700 at ground level.

Smart Bias-T should be at site. Daisy Chain RETs.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CT11110C_L600_5.1_draft

Sector 2 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	Andrew - LNX-6512DS-A1M (Dual)
Azimuth	180	180
M. Tilt		0
Height	154	162
Ports	P1	P2
Active Tech.	U2100 L2100 G1900	L700
Dark Tech.		
Restricted Tech.	U1900	
Decomm. Tech.		
E. Tilt	2	2
Cables	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**
TMAs	Generic Twin Style 3B - PCS+AWS (AtCabinet) **(x2)**	
Diplexers / Combiners	Filter (AtCabinet) **(x2)**	
Radio		RRUS11 B12 (At Cabinet)
Sector Equipment		Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

RRU's on the ground for L700. Need RET capability on APX18's via TMA's

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CT11110C_L600_5.1_draft

Sector 2 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1	2			
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	180	180			
M. Tilt	0	0			
Height	154	162			
Ports	P1	P2	P3	P4	P5
Active Tech.	U2100 L2100 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.	U1900				
E. Tilt	2	2			
Cables	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**		
TMAs	Generic Twin Style 3B - PCS+AWS (AtCabinet) **(x2)**				
Diplexers / Combiners	Filter (AtCabinet) **(x2)**				
Radio		Radio 4449 B71+B12 (At Cabinet)	SHARED Radio 4449 B71+B12 (At Cabinet)		
Sector Equipment					Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (2) Coaxial Lines to Position 2.
Replace RRUS11 B12 with (1) Radio 4449 B71+B12 for L600 and L700 at ground level.

Smart Bias-T should be at site. Daisy Chain RETs.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CT11110C_L600_5.1_draft

Sector 3 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	Andrew - LNX-6512DS-A1M (Dual)
Azimuth	300	300
M. Tilt	0	0
Height	154	162
Ports	P1	P2
Active Tech.	U2100 L2100 G1900	L700
Dark Tech.		
Restricted Tech.		
Decomm. Tech.	U1900	
E. Tilt	2	2
Cables	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**
TMAs	Generic Twin Style 3B - PCS+AWS (AtCabinet) **(x2)**	
Diplexers / Combiners	Filter (AtCabinet) **(x2)**	
Radio		RRUS11 B12 (At Cabinet)
Sector Equipment		Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

RRU's on the ground for L700. Need RET capability on APX18's via TMA's

RAN Template:	A&L Template:	Power System Template:
67D04B Hybrid	67D04B_1QP+1OP	Custom

CT11110C_L600_5.1_draft

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro				
Antenna	1	2			
Antenna Model	RFS - APXV18-209014-C-A20 (Dual)	RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	300	300			
M. Tilt	0	0			
Height	154	162			
Ports	P1	P2	P3	P4	P5
Active Tech.	U2100 L2100 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.	U1900				
E. Tilt	2	2			
Cables	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**	7/8" Coax - 185 ft. **(x2)**		
TMAs	Generic Twin Style 3B - PCS+AWS (AtCabinet) **(x2)**				
Diplexers / Combiners	Filter (AtCabinet) **(x2)**				
Radio		Radio 4449 B71+B12 (At Cabinet)	SHARED Radio 4449 B71+B12 (At Cabinet)		
Sector Equipment					Andrew Smart Bias T (At Antenna)

Unconnected Equipment:

Scope of Work:

Replace LB Dual in Position 2 with (1) LB/MB Octo.
Add (2) Coaxial Lines to Position 2.
Replace RRUS11 B12 with (1) Radio 4449 B71+B12 for L600 and L700 at ground level.

Smart Bias-T should be at site. Daisy Chain RETs.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

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 daisy 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 Over All Tilts	dBi	15.1 +/- .3	15.5 +/- .3
Horizontal Beamwidth @3dB	Deg	65 +/- 4	62 +/- 2
Vertical Beamwidth @3dB	Deg	11.4 +/- .7	10.4 +/- .5
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 Over All Tilts	dBi	14.8 +/- .2	15.1 +/- .2
Horizontal Beamwidth @3dB	Deg	65 +/- 4	62 +/- 2
Vertical Beamwidth @3dB	Deg	11.4 +/- .8	10.3 +/- .5
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°

HIGH BAND LEFT ARRAY (1695-2200 MHZ) [B1]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain Over All Tilts	dBi	17.3 +/- .7	17.8 +/- .4	18.5 +/- 1
Horizontal Beamwidth @3dB	Deg	66 +/- 7	59 +/- 4	59 +/- 6
Vertical Beamwidth @3dB	Deg	5.3 +/- .4	4.7 +/- .4	4.3 +/- .3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	25	25
Cross Polar Discrimination (XPD) @ Boresight	dB	19	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	4
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	250	250

HIGH BAND RIGHT ARRAY (1695-2200 MHZ) [B2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200
Gain Over All Tilts	dBi	17.1 +/- .7	17.8 +/- .4	18.5 +/- 1
Horizontal Beamwidth @3dB	Deg	66 +/- 7	59 +/- 4	59 +/- 5
Vertical Beamwidth @3dB	Deg	5.2 +/- .4	4.7 +/- .4	4.3 +/- .3
Electrical Downtilt Range	Deg	2-12	2-12	2-12
Upper Side Lobe Suppression 0 to +20	dB	15	15	15
Front-to-Back, at +/-30°, Copolar	dB	25	24	25
Cross Polar Discrimination (XPD) @ Boresight	dB	20	17	16
Cross Polar Discrimination (XPD) @ +/-60	dB	4	6	5
3rd Order PIM 2 x 43dBm	dBc	-153	-153	-153
VSWR	-	1.5:1	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25	25
Maximum Effective Power per Port	Watt	250	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

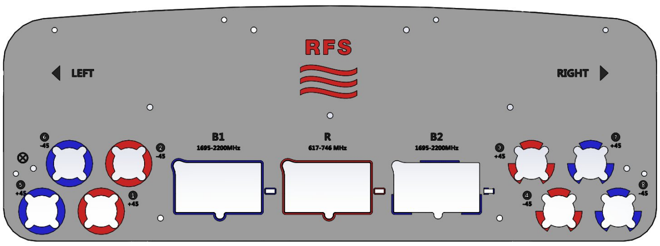
Impedance	Ohm	50.0
Polarization	Deg	±45°

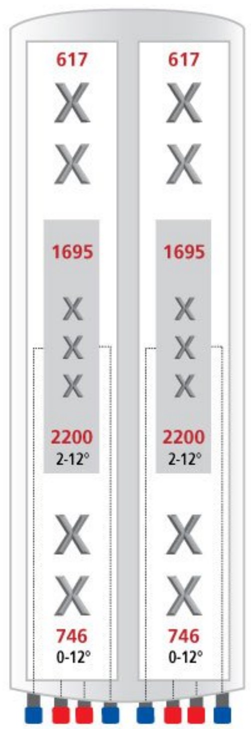
MECHANICAL SPECIFICATIONS

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

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°

External Document Links

APM40_Series_Installation_Instructions
Manual_Overdrive_Instructions
Global RFS Website

Notes

All electrical parameters are compliant with BASTA NGMN 9.6 requirements.

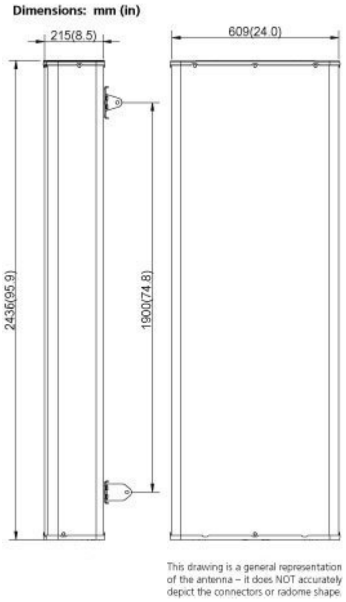
Available Configurations
APXVAARR24_43-U-NA20 -- External ACU is included -- shipping weight 80kg.

For additional mounting information please click "External Document Links".

This data is provisional and subject to changes.

External Link Reference

Global RFS Website	http://www.rfsworld.com



Product Data Sheet | **APXV18-209014-C**

Optimizer® Dual Polarized Antenna, 1710-2170, 90deg, 16.5dBi, 1.3m, VET, 0-10deg

Product Description

This X-Polarized variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2170 MHz).

Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Optional remote tilt - can be retrofitted.**
- **Two X-Polarized panels in a single radome.**
- **Dual polarization.**
- **Low profile for low visual impact.**
- **Broadband design.**

Technical Specifications

Electrical Specifications

Frequency Range, MHz	1710-1900	1900-2170
Horizontal Beamwidth, deg	88	
Vertical Beamwidth, deg	7.0	6.4
Electrical Downtilt Range, deg	0-10	
Gain, dBi (dBd)	16.5 (14.4)	
1st Upper Sidelobe Suppression, dB	>19 first (typically >22)	
Upper Sidelobe Suppression, dB	>17 all other (typically >20)	
Front-To-Back Ratio, dB	>26	
Polarization	Dual pol +/-45°	
VSWR	< 1.5:1	
Isolation between Ports, dB	>30	
3rd Order IMP @ 2 x 43 dBm, dBc	≥153	
7th Order IMP @ 2 x 46 dBm, dBc	N/A, >170	
Impedance, Ohms	50	
Maximum Power Input, W	300	
Lightning Protection	Direct Ground	
Connector Type/Location	(2) 7-16 Long Neck Female/Bottom	

Mechanical Specifications

Dimensions - HxWxD, mm (in)	1349 x 169 x 80 (53.0 x 6.65 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	8.5 (18.7)
Survival/Rated Wind Speed, km/h (mph)	200 (125) / 160 (100)
Wind Load @ Rated Wind, Front, N (lbf)	406 (91)
Wind Load @ Rated Wind, Max., N (lbf)	406 (91)
Wind Load @ Rated Wind, Side, N (lbf)	236 (53)
Wind Load @ Rated Wind, Rear, N (lbf)	196 (44)
Operation temperature, °C (°F)	-40 to +60 (-40 to +140)
Radome Material/Color	Fiberglass/Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Radiating Element Material	Brass
Reflector Material	Aluminum
Shipping Weight, kg (lb)	15.5 (34.1)
Packing Dimensions, HxWxD, mm (in)	1520 x 260 x 200 (59.8 x 10.2 x 7.8)

Ordering Information

Mounting Hardware	APM40-2
Mounting Pipe Diameter, mm (in)	60-120 (2.36-4.72)
Mounting Hardware Weight, kg (lb)	3.4 (7.5)

Product Specifications

POWERED BY ANDREW

ATSBT-TOP-FM-4G

Teletilt® Top Smart Bias Tee

- Injects AISG power and control signals onto a coaxial cable line
- Reduces cable and site lease costs by eliminating the need for AISG home run cables
- AISG 1.1 and 2.0 compliant
- Operates at 10-30 Vdc
- Weatherproof AISG connectors
- Intuitive schematics simplify and ensure proper installation
- Enhanced lightning protection plus grounding stud for additional surge protection
- 7-16 DIN female connector (BTS)
- 7-16 DIN male connector (ANT)

General Specifications

Smart Bias Tee Type	10–30 V Top
Brand	Teletilt®
Operating Frequency Band	694 – 2690 MHz

Electrical Specifications

EU Certification	CE
Protocol	AISG 1.1 | AISG 2.0
Antenna Interface Signal	dc Blocked | RF
BTS Interface Signal	AISG data | dc | RF
Interface Protocol Signal	Data | dc
Voltage Range	10–30 Vdc
VSWR | Return Loss	1.17:1 | 22 dB, typical
Power Consumption, maximum	0.6 W
RF Power, maximum	250 W @ 1850 MHz 500 W @ 850 MHz
Impedance	50 ohm
Insertion Loss, typical	0.1 dB
3rd Order IMD	-158.0 dBc (relative to carrier)
3rd Order IMD Test Method	Two +43 dBm carriers
Electromagnetic Compatibility (EMC)	CFR 47 Part 15, Subpart B, Class B | EN 55022, Class B | ICES-003 Issue 4 CAN/CSA-CEI/IEC CISPR 22:02

Mechanical Specifications

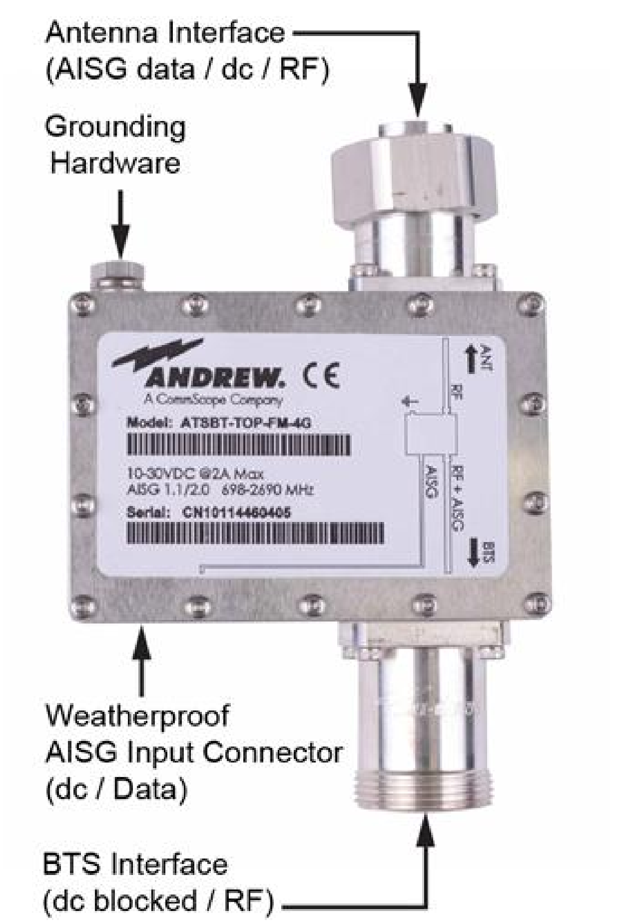
Antenna Interface	7-16 DIN Male
BTS Interface	7-16 DIN Female
AISG Input Connector	8-pin DIN Female
Color	Silver
Grounding Lug Thread Size	M8
Material Type	Aluminum
Lightning Surge Capability	5 times @ -3 kA 5 times @ 3 kA

Lightning Surge Capability Test Method	IEC 61000-4-5, Level X
Lightning Surge Capability Waveform	1.2/50 voltage and 8/20 current combination waveform

Environmental Specifications

Ingress Protection Test Method	IEC 60529:2001, IP66
Operating Temperature	-40 °C to +70 °C (-40 °F to +158 °F)

Interface Port Drawing



Dimensions

Width	94.0 mm | 3.7 in
Depth	50.0 mm | 2.0 in
Height	143.00 mm | 5.63 in
Net Weight	0.8 kg | 1.8 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption

Exhibit E

INFINIGY

Non-Ionizing Radiation Report

Compiled For: Northeast Site Solutions on behalf of T-Mobile

Site Name: CT11110C

Site ID: CT11110C

8 Chimney Drive, Bethel, CT 06801

Latitude: 41.4108; Longitude: -73.4002

Structure Type: Lattice Tower

Report Date: November 30, 2020

Status: T-Mobile will be compliant with FCC rules on RF Exposure.

Table of Contents

1. Executive Summary:

Northeast Site Solutions on behalf of T-Mobile has contracted Infinigy Solutions, LLC to determine whether the site CT11110C located at 8 Chimney Drive in Bethel, CT Will Be Compliant with all Federal Communications Commission (FCC) rules and regulations for radio frequency (RF) exposure as indicated in **47CFR§1.1310**.

The report incorporates a theoretical RF field analysis in accordance with the FCC Rules and Regulations for all individuals classified as "Occupational or Controlled" and "General Public or Uncontrolled" (see Appendix A and B).

This document and the conclusions herein are based on information provided by Northeast Site Solutions on behalf of T-Mobile.

As a result of the analysis, **T-Mobile Will Be Compliant with FCC rules.**

T-Mobile, All Bands Cumulative Exposure %		
Uncontrolled / General Population	Exposure values at the site (mW/cm^2)	0.0058
	% Exposure	0.95 %
Controlled / Occupational	Exposure values at the site (mW/cm^2)	0.0058
	% Exposure	0.20 %

2. Site Summary:

Site Information	
Site Name: CT11110C	
Site Address: 8 Chimney Drive, Bethel, CT 06801	
Site Type: Monopole	
Compliance Status	Will Be Compliant
Mitigation Required	No
Signage Required	Yes
Barriers Required	No
Access Locked	No
Area Controlled or Uncontrolled	Uncontrolled

3. Site Compliance

This report also incorporates overview of the site information:

- Antenna Inventory Table
- Calculation Tables showing exposure for each carrier transmit frequency
- Total exposure for all carriers existing and proposed at ground level considering the centerline of all antennas and horizontal distance from the tower.
- Maximum Effective Radiated Power Assumed as Worst Case for Calculations used in this study
- Calculations based on flat ground around base of the structure

4. Site Compliance Recommendations

Infinigy recommends the following upon the installation of antennas at the site:

Base of tower

Install a yellow caution sign. Note: The recommendation for alerting signage is moot if there is a yellow caution, or greater already installed.

5. Antenna Inventory Table

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	# of TX	ERP TX (Watts)	Total ERP Power (Watts)
1a	Alpha	T-Mobile	RFS	APXV18-209014-C-A20-2100	2100 MHz UMTS	154	1	120	120	1454
1b	Alpha	T-Mobile	RFS	APXV18-209014-C-A20-2100	2100 MHz LTE	154	1	80	80	969
1c	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20-2100	1900 MHz GSM	154	1	80	80	1536
2a	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20-700	700 MHz LTE	162	2	80	160	2469
2b	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20-600	600 MHz LTE	162	2	80	160	2337
3a	Beta	T-Mobile	RFS	APXV18-209014-C-A20-2100	2100 MHz UMTS	154	1	120	120	1454
3b	Beta	T-Mobile	RFS	APXV18-209014-C-A20-2100	2100 MHz LTE	154	1	80	80	969
3c	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20-2100	1900 MHz GSM	154	1	80	80	1536
4a	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20-700	700 MHz LTE	162	2	80	160	2469
4b	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20-600	600 MHz LTE	162	2	80	160	2337
5a	Gamma	T-Mobile	RFS	APXV18-209014-C-A20-2100	2100 MHz UMTS	154	1	120	120	1454
5b	Gamma	T-Mobile	RFS	APXV18-209014-C-A20-2100	2100 MHz LTE	154	1	80	80	969
5c	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20-2100	1900 MHz GSM	154	1	80	80	1536
6a	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20-700	700 MHz LTE	162	2	80	160	2469
6b	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20-600	600 MHz LTE	162	2	80	160	2337

6. RF Guidelines

To ensure safety of company workers, the following points need to be taken into consideration and implemented at wireless sites in accordance with the Carriers policies:

a) Worksite: Any employee at the site should avoid working directly in front of the antenna or in areas predicted to exceed general population exposure limits by 100%. Workers should insist that the transmitters be switched off during the work period.

b) RF Safety Training and Awareness: All employees working in areas exceeding the general population limits should have a basic awareness of RF safety measures. Videos, classroom lectures and online courses are all appropriate training methods on these topics.

c) Site Access: Restricting access to transmitting antenna locations is one of the most important elements of RF safety. This can be done with:
   - Locked doors/gates/ladder access
   - Alarmed doors
   - Restrictive barriers

d) Three-foot Buffer: There is an inverse relationship between the strength of the field and the distance from the antenna. The RF field diminishes with distance from the antenna. Workers should maintain a three-foot distance from the antennas.

e) Antennas: Workers should always assume that the antenna is transmitting and should never stop right in front of the antenna. If someone must pass by an antenna, he/she should move quickly, thus reducing RF exposure.

7. T-Mobile Exposure Analysis By Band and Technology

T-Mobile 600 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	0.4
	Exposure values at the site (mW/cm²)	0.0015
	% Exposure	0.37%
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	2.0
	Exposure values at the site (mW/cm²)	0.0015
	% Exposure	0.07%

T-Mobile 700 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	0.5
	Exposure values at the site (mW/cm²)	0.0016
	% Exposure	0.31%
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	2.3
	Exposure values at the site (mW/cm²)	0.0016
	% Exposure	0.07%

T-Mobile 1900 MHz GSM		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	1.0
	Exposure values at the site (mW/cm²)	0.0011
	% Exposure	0.11%
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	5.0
	Exposure values at the site (mW/cm²)	0.0011
	% Exposure	0.02%

T-Mobile 2100 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0007**
	% Exposure	**0.07%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0007**
	% Exposure	**0.01%**

T-Mobile 2100 MHz UMTS		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0010**
	% Exposure	**0.10%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0010**
	% Exposure	**0.02%**

8. Appendix A: FCC Guidelines

FCC Policies

The Federal Communications Commission (FCC) in 1996 implemented regulations and policies for analysis of RF propagation to evaluate RF emissions. All the analysis and results of this report are compared with FCC's (Federal Communications Commission) rules to determine whether a site is compliant for Occupational/Controlled or General Public/Uncontrolled exposure. All the analysis of RF propagation is done in terms of a percentage. The limits primarily indicate the power density and are generally expressed in terms of milliwatts per centimeter square, mW/cm^2.

FCC guidelines incorporate two separate tiers of exposure limits that are dependent on the scenario/ situation in which that exposure takes place or the status of the individuals who are subjected to that exposure. The decision as to which tier is applied to a scenario is based on the following definitions:

Occupational / Controlled

These limits apply in situations when someone is exposed to RF energy through his/her occupation, is fully aware of the harmful effects of the RF exposure and has an ability to exercise control over this exposure. Occupational / controlled exposure limits also apply when 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. limits for Occupational/Controlled exposure can be found on Table 1(A).

General Population / Uncontrolled

These limits apply to situations in which the general public may be exposed or in which persons who are exposed because of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure to RF. Therefore, members of the general public would always be considered under this category, for example, in the case of a telecommunications tower that exposes people in a nearby residential area. Exposure limits for General Population/Uncontrolled can be found on Table 1(B).

Table 1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure

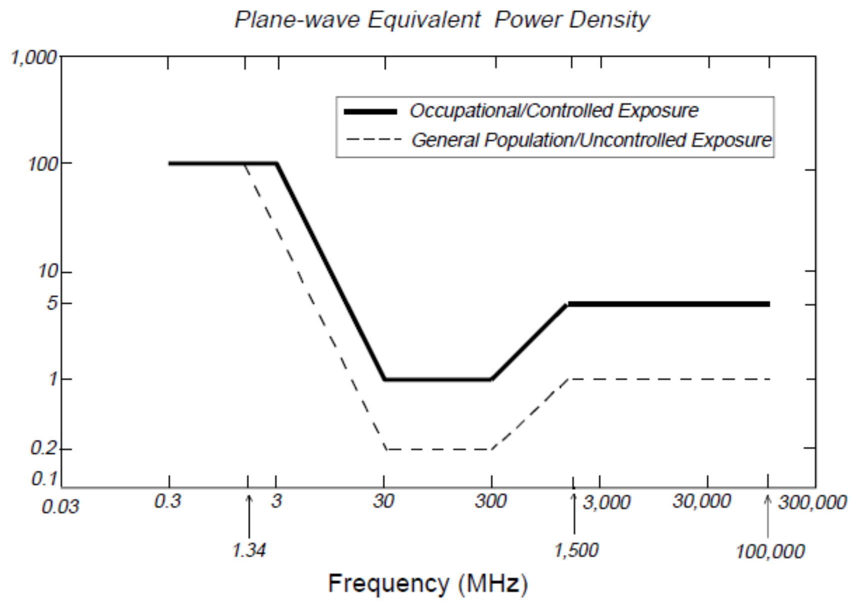
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	$(900/f^2)$*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

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

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

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)



OSHA Statement:

The objective of the OSHA Act is to ensure the safety and health of the working men and women by enforcing certain standards. The act also assists and encourages the states in their efforts to ensure safe and healthy working conditions through means of research, information, education and training in the field of occupational safety and health and for other purposes.

According to OSHA Act section 5, important duties to be considered are:

(a) Each employer
   1) Shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious harm to his employees
   2) Shall comply with occupational safety and health standards promulgated under this act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

9. Preparer Certification

I, Tim Harris, preparer of this report, certify that I am fully trained and aware of the rules and regulations of both the Federal Communications Commission and the Occupational Safety and Heath Administration regarding Human Exposure to Radio Frequency Radiation. In addition, I have been trained in RF safety practices, rules, and regulations.

I certify that the information contained in this report is true and correct to the best of my knowledge.

Timothy A. Harris *11/30/2020*

Signature Date

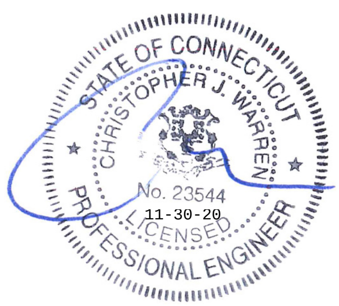


Exhibit F

56 Prospect Street,
Hartford, CT 06103

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

January 09, 2021

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main St,
Sturbridge, MA 01566

RE: T-Mobile Antenna Site CT11110C, 8 Chimney Drive, Danbury, CT, Eversource Structure 10256

Dear Mr. Freincle:

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 (203) 623-0409.

Sincerely,

Richard Badon

Richard Badon
Transmission Line Engineering

Ref: 19066.12 - CT11110C Structural Analysis Rev 3 21.01.07
2021-0108_19066.12 CT11110C Danbury_I-84_X8 CD's Rev 2 (S&S)

Exhibit E

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

P

usps.com
$7.75
US POSTAGE
Flat Rate Env

9405 5036 9930 0234 4309 00 0024 3000 0010 6051

01/15/2021 Mailed from 01566 062S0000000101

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 01/19/21
Ref#: 110C-L600

0006

SHIP TO: LISA A MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

C006

USPS TRACKING #

9405 5036 9930 0234 4309 00

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 0234 4309 00

Trans. #:	521533040	Priority Mail® Postage:	**$7.75**
Print Date:	01/13/2021	Total:	**$7.75**
Ship Date:	01/15/2021		
Expected Delivery Date:	01/19/2021		

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Ref#: 110C-L600

To: LISA A MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

* 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 0234 4309 17 0024 4000 0010 6037

01/15/2021

Mailed from 01566 062S0000001311

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 01/19/21
Ref#: 110C-L600

0006

C015

SHIP TO: CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

USPS TRACKING #

9405 5036 9930 0234 4309 17

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 0234 4309 17

Trans. #:	521533040
Print Date:	01/13/2021
Ship Date:	01/15/2021
Expected Delivery Date:	01/19/2021

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#: 110C-L600

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.

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

Click-N-Ship®

UNITED STATES POSTAL SERVICE®

P

usps.com
$7.75
US POSTAGE
Flat Rate Env

9405 5036 9930 0234 4309 48 0024 4000 0020 6801

01/15/2021 Mailed from 01566 062S0000000311

PRIORITY MAIL 3-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 01/20/21
Ref#: 110C-L600
0006

C011

SHIP TO: MATTHEW KNICKERBOCKER
FIRST SELECTMAN- TOWN OF BETHEL
1 SCHOOL ST
BETHEL CT 06801-1828

USPS TRACKING #

9405 5036 9930 0234 4309 48

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.**
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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0234 4309 48

Trans. #:	521533040	Priority Mail® Postage:	**$7.75**
Print Date:	01/13/2021	Total:	**$7.75**
Ship Date:	01/15/2021		
Expected Delivery Date:	01/20/2021		

From: DEBORAH CHASE — Ref#: 110C-L600
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: MATTHEW KNICKERBOCKER
FIRST SELECTMAN- TOWN OF BETHEL
1 SCHOOL ST
BETHEL CT 06801-1828

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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

Click-N-Ship®

P

usps.com
$7.75
US POSTAGE
Flat Rate Env

9405 5036 9930 0234 4309 86 0024 4000 0020 6801

01/15/2021 Mailed from 01566 062S0000001311

PRIORITY MAIL 3-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 01/20/21
Ref#: 110C-L600
0006

C011

SHIP TO: BETH CAVAGNA
DIRECTOR OF PLANNING-BETHEL TOWN PLANNER
1 SCHOOL ST
BETHEL CT 06801-1828

USPS TRACKING #

9405 5036 9930 0234 4309 86

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0234 4309 86

Trans. #:	521533040
Print Date:	01/13/2021
Ship Date:	01/15/2021
Expected Delivery Date:	01/20/2021

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#: 110C-L600

To: BETH CAVAGNA
DIRECTOR OF PLANNING-BETHEL TOWN PLANNER
1 SCHOOL ST
BETHEL CT 06801-1828

* 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.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

Exhibit H

Deborah Chase

From: Deborah Chase
Sent: Friday, January 15, 2021 9:01 AM
To: 'Firstselectman@bethel-ct.gov'; 'landuse@bethel-ct.gov'
Cc: 'Gelinas, Christopher'
Subject: 8 CHIMNEY DRIVE, BETHEL, CT 06801 T-MOBILE EM APPLICATION (CT11110C-L600)
Attachments: 8 CHIMNEY DRIVE, BETHEL, CT 06801 T-MOBILE EM APPLICATION (CT11110C L600).pdf

Good morning
This is to inform you that you will be receiving a copy of T-Mobile's Exempt Modification (Zoning) Application to the CT Siting Council for the site listed above.
It will be delivered via Priority Mail.
Please let me know if you have any questions.
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.