March 28, 2024

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

Re: Notice of Exempt Modification New Cingular Wireless PCS LLC ("AT&T") Site CT5176
7 Stony Hill Road, Bethel, CT 06801 (the "Property")
Latitude: 41-24-56.85 N Longitude: 73-24-06.11 W

Dear Ms. Bachman:

AT&T currently maintains (9) antennas at the 145' level on the existing 140' Eversource transmission tower #10254 ("Tower") located near 7 Stony Hill Road, Bethel, CT. The property is owned by Target Corporation and the Tower is owned by Connecticut Light & Power ("Eversource"). AT&T intends to modify its facility by replacing (6) antennas with (3) QD6616-7 antennas at the 145' cl, (3) Air6419 B77G at the 146'8" cl & (3) AIR6449 B77D at the 141'11" cl on the Tower. The height of AT&Ts existing antennas is 145' & proposed antennas is 145', 146'8" & 141'11" cl on the Tower. Various at grade equipment changes are also proposed within the existing leased area.

This modification may include B2, B5, B17, B14, B29, B30, B66 & n77 hardware that is 4G(LTE) and/or 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

The AT&T facility received CT Siting Council ("Council") approval in Petition 479 on September 19, 2000. The approval contained no conditions that could feasibly be violated by this modification, including facility height or mounting restrictions. AT&Ts modification complies with the above-mentioned approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies ("R.C.S.A") §16-50j-73 for construction that constitutes an exempt modification pursuant to R.C.S.A §16-50j-72(b)(2). In accordance with to R.C.S.A §16-50j-73, a copy of this letter is being sent to the Honorable Dan Carter, First Selectman, Town of Bethel, as elected official, Ms. Beth Cavagna, Director/Town Planner, Town of Bethel, Target Corporation, the property owner and Eversource, the tower owner.

The planned modification of the facility falls squarely within those activities explicitly provided for in R.C.S.A §16-50j-72(b)(2). Specifically:

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

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

3. The proposed modification 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 modified facility 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 foundation can support the proposed loading.

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

Sincerely,

Hollis M. Redding

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

Enclosures

Cc: Honorable Dan Carter, First Selectman, Town of Bethel
Ms. Beth Cavagna, Director/Town Planner, Town of Bethel
Target Corporation, the property owner
Connecticut Light & Power (''Eversource"), the tower owner

C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report

CT5176
7 Stony Hill Road, Bethel, CT 06801

December 6, 2023

Table of Contents

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List of Tables

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modification of AT&T antenna arrays to be mounted at 145' AGL on an utility pole located at 7 Stony Hill Road in Bethel, CT. The coordinates of the tower are 41° 24' 56.85" N, 73° 24' 6.12" W.

AT&T is proposing the following:

1) Install twelve (12) multi-band antennas (four (4) sector) to support its commercial LTE network and the FirstNet National Public Safety Broadband Network ("NPSBN").

This report considers the planned antenna configuration for AT&T[1] to derive the resulting % MPE of its proposed installation.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

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

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

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

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

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

[1] As referenced to AT&T's Radio Frequency Design Sheet, dated 05/17/2021

3. RF Exposure Prediction Methods

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

$$\text{Power Density} = \left(\frac{GRF^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{\left(H^2 + V^2\right)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Off Beam Loss is determined by the selected antenna patterns

GRF = Ground Reflection Factor of 1.6

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

4. Antenna Inventory

Table 1 below outlines AT&T's proposed antenna configuration for the site. The associated data sheets and antenna patterns for these specific antenna models are included in Attachments C.

Operator	Sector / Call Sign	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Tilt	Length (ft)	Antenna Centerline Height (ft)
	Beta / 30°	722	160	14.2	4208	QD6616-7	71	0	6.0	145
		763	40	14.7	1180		65			
		2100	240	17.7	14132		62			
		739	160	13.2	3343	QS66512-2	67	0	6.0	145
		850	160	13.5	3582		64			
		1900	160	16.0	6370		69			
		2300	100	17.0	5012		58			
		3500	54	25.65	19833	AIR 6419	11	0	2.53	145
		3700	87	25.65	31954	AIR 6449	11	0	2.53	145
	Beta / 150°	700	160	14.2	4208	QD6616-7	71	0	6.0	145
		700	40	14.7	1180		65			
		2100	240	17.7	14132		62			
		700	160	13.2	3343	QS66512-2	67	0	6.0	145
		850	160	13.5	3582		64			
		1900	160	16.0	6370		69			
		2300	100	17.0	5012		58			
		3500	54	25.65	19833	AIR 6419	73	0	2.53	145
		3700	87	25.65	31954	AIR 6449	64	0	2.53	145
	Gamma / 270°	700	160	14.2	4208	QD6616-7	71	0	6.0	145
		700	40	14.7	1180		65			
		2100	240	17.7	14132		62			
		700	160	13.2	3343	QS66512-2	67	0	6.0	145
		850	160	13.5	3582		64			
		1900	160	16.0	6370		69			
		2300	100	17.0	5012		58			
		3500	54	25.65	19833	AIR 6419	11	0	2.53	145
		3700	87	25.65	31954	AIR 6449	11	0	2.53	145

Table 1: Proposed Antenna Inventory[2][3]

[2] AT&T's Radio Frequency Design Sheet, dated 05/17/2021

[3] Transmit power assumes 0 dB of cable loss.

5. Calculation Results

The calculated power density results are shown in Figure 1 below. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the site. In addition to the other worst-case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas was completed using a local maximum off beam antenna gain (within ± 5 degrees of the true mathematical angle) to incorporate a realistic worst-case scenario.

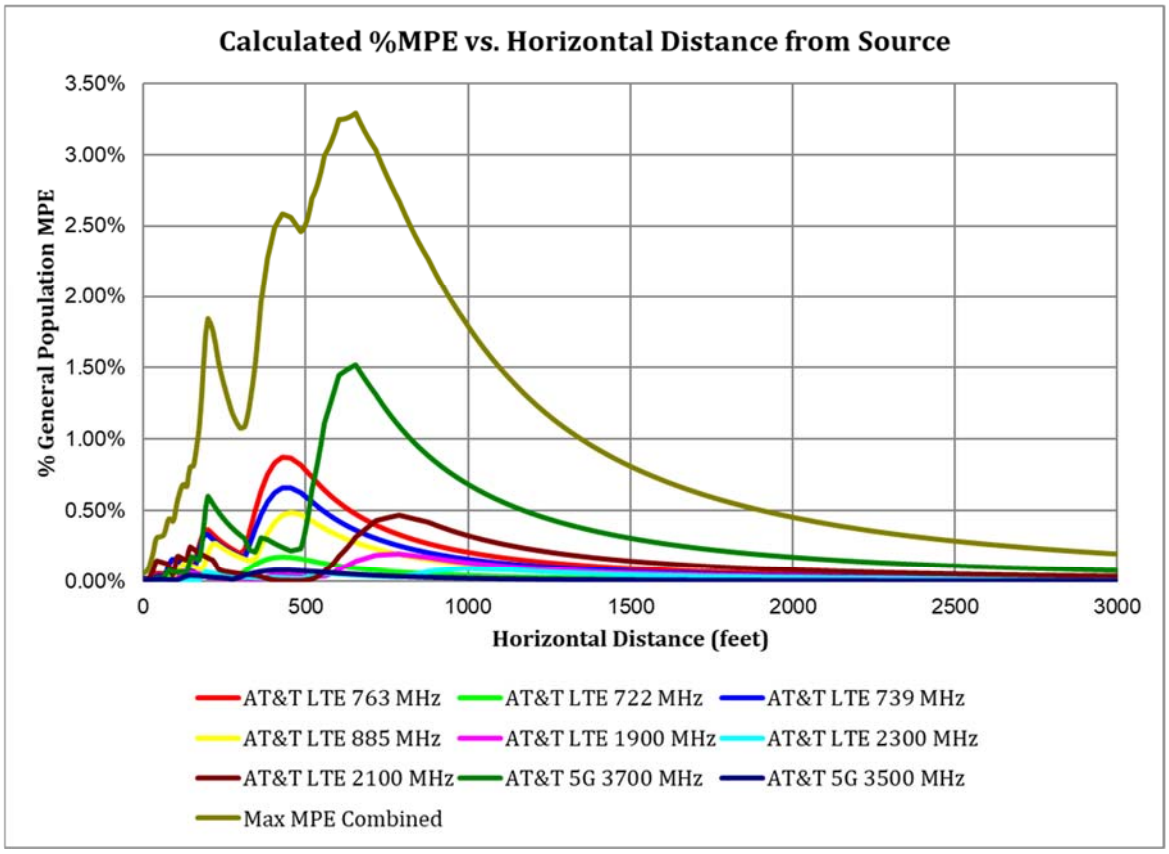


Figure 1: Graph of General Population % MPE vs. Distance

The highest percent of MPE (3.29% of the General Population limit) is calculated to occur at a horizontal distance of 654 feet from antennas. Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 1500 feet and beyond, one would now be in the main beam of the antenna pattern and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

Table 2 below lists percent of MPE values as well as the associated parameters that were included in the calculations. The highest percent of MPE value was calculated to occur at a horizontal distance of 654 feet from the site (reference Figure 1).

As stated in Section 3, all calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. In addition, a six-foot height offset was considered in this analysis to account for average human height. As a result, the predicted signal levels are significantly higher than the actual signal levels will be from the final configuration. The results presented in Figure 1 and Table 2 assume level ground elevation from the base of the tower out to the horizontal distances calculated.

Carrier	Number of Transmitters	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm^2)	Limit (mW/cm^2)	% MPE
AT&T 5G 3500 MHz	1	54.2	145.0	654	0.000507	1.000	0.05%
AT&T 5G 3700 MHz	1	86.8	145.0	654	0.015203	1.000	1.52%
AT&T LTE 1900 MHz	1	160.0	145.0	654	0.001455	1.000	0.15%
AT&T LTE 2100 MHz	1	240.0	145.0	654	0.003170	1.000	0.32%
AT&T LTE 2300 MHz	1	100.0	145.0	654	0.000431	1.000	0.04%
AT&T LTE 722 MHz	1	40.0	145.0	654	0.000459	0.481	0.10%
AT&T LTE 739 MHz	1	160.0	145.0	654	0.001798	0.493	0.36%
AT&T LTE 763 MHz	1	160.0	145.0	654	0.002425	0.509	0.48%
AT&T LTE 885 MHz	1	160.0	145.0	654	0.001640	0.590	0.28%
						Total	**3.29%**

Table 2: Maximum Percent of General Population Exposure Values

6. Conclusion

The above analysis verifies that RF exposure levels from the site with AT&T's proposed antenna configuration will be well below the maximum permissible levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum cumulative percent of MPE in consideration of all transmitters is calculated to be **3.29% of the FCC limit (General Population/Uncontrolled)**. This maximum cumulative percent of MPE value is calculated to occur 654 feet away from the site.

7. Statement of Certification

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

Report Prepared By: Ram Acharya
RF Engineer
C Squared Systems, LLC

December 4, 2023
Date

Reviewed/Approved By: Martin J. Lavin
Senior RF Engineer
C Squared Systems, LLC

November 6, 2023
Date

Attachment A: References

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

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

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

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (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[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (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

Table 3: FCC Limits for Maximum Permissible Exposure

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

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

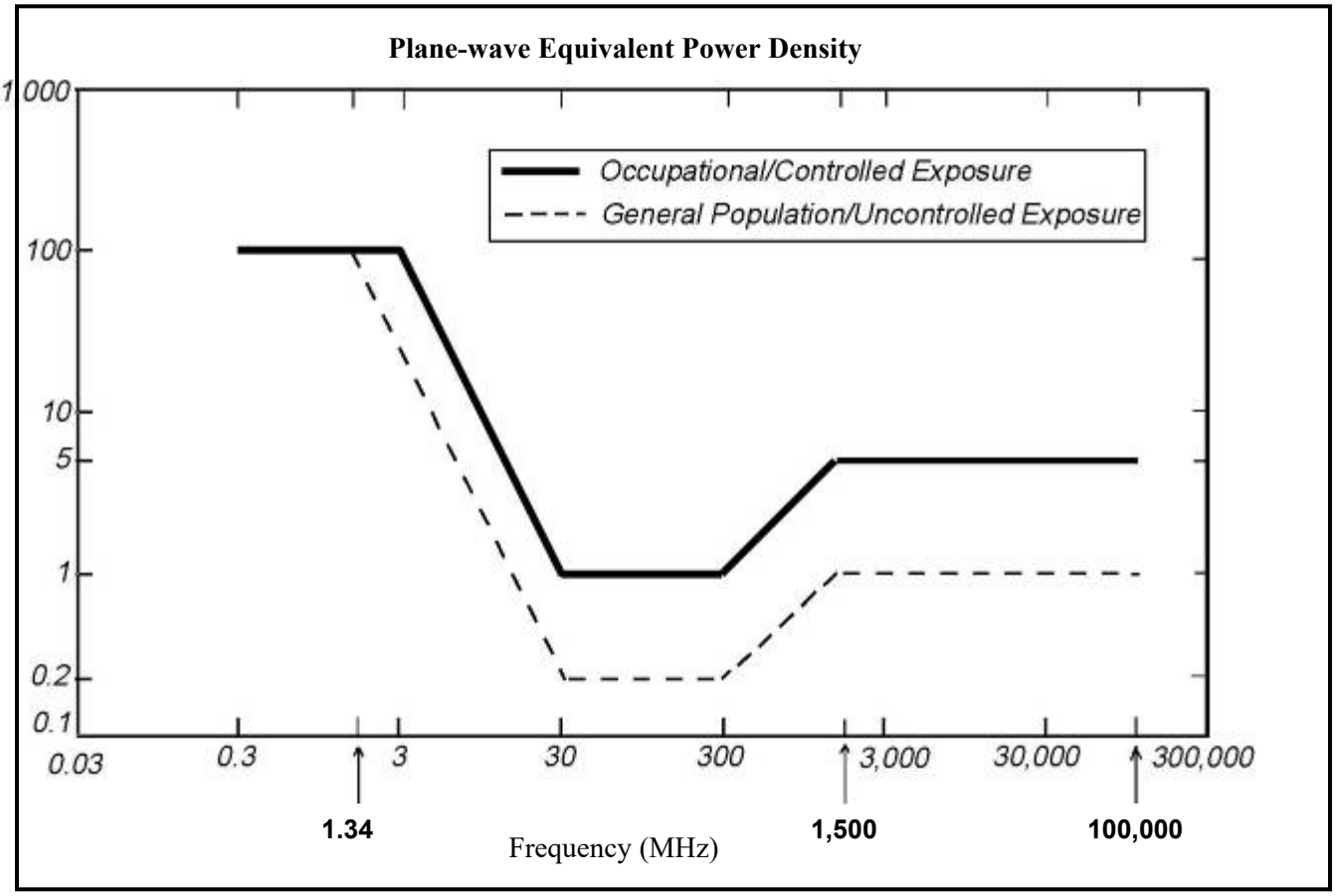
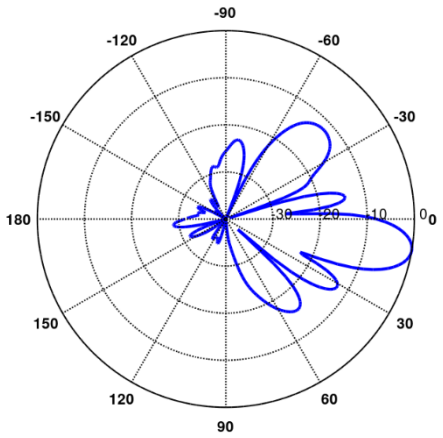


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

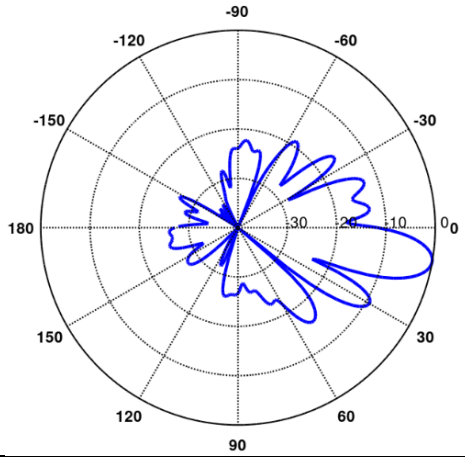
722 MHz

Manufacturer:	QUINTEL
Model #:	QD6616-7
Frequency Band:	698-728 MHz
Gain:	14.2 dBi
Vertical Beamwidth:	12.5°
Horizontal Beamwidth:	71°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	72” x 22” x 9.6”



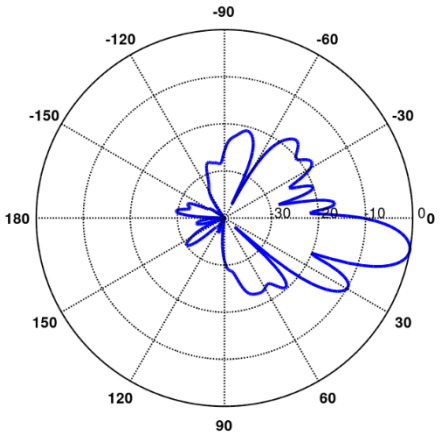
739 MHz

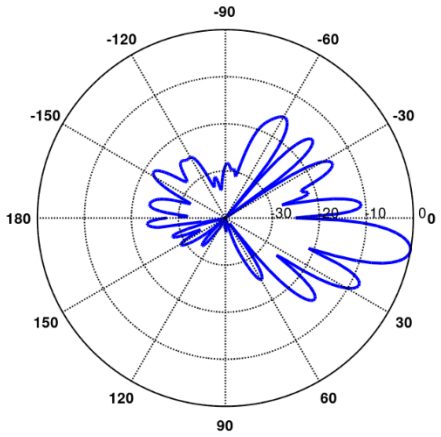
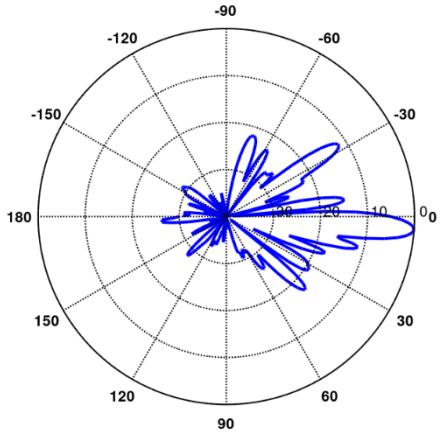
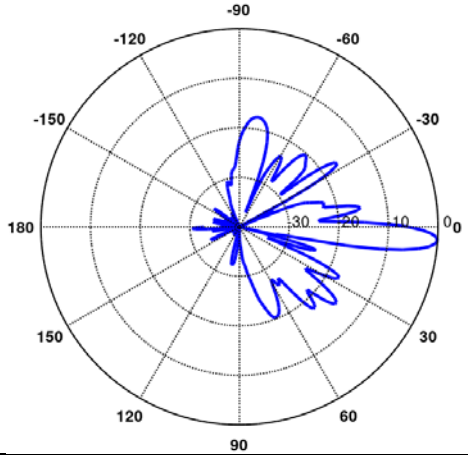
Manufacturer:	QUINTEL
Model #:	QS66512-2
Frequency Band:	698-806 MHz
Gain:	13.2 dBi
Vertical Beamwidth:	12°
Horizontal Beamwidth:	67°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	71” x 12” x 9.6”



763 MHz

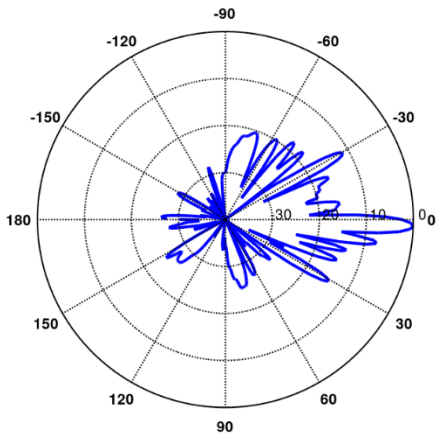
Manufacturer:	QUINTEL
Model #:	QD6616-7
Frequency Band:	758-798 MHz
Gain:	14.7 dBi
Vertical Beamwidth:	11.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	72” x 22” x 9.6”



850 MHz Manufacturer: QUINTEL Model #: QS66512-2 Frequency Band: 824-894 MHz Gain: 13.5 dBi Vertical Beamwidth: 10° Horizontal Beamwidth: 64° Polarization: Dual Linear 45° Dimensions (L x W x D): 71” x 12” x 9.6”	
1900 MHz Manufacturer: QUINTEL Model #: QS66512-2 Frequency Band: 1850-1990 MHz Gain: 16.0 dBi Vertical Beamwidth: 5.5° Horizontal Beamwidth: 69° Polarization: Dual Linear 45° Dimensions (L x W x D): 71” x 12” x 9.6”	
2100 MHz Manufacturer: QUINTEL Model #: QD6616-7 Frequency Band: 2110-2180 MHz Gain: 17.7 dBi Vertical Beamwidth: 5.7° Horizontal Beamwidth: 62° Polarization: Dual Linear 45° Dimensions (L x W x D): 72” x 22” x 9.6”	

2300 MHz

Manufacturer:	QUINTEL
Model #:	QS66512-2
Frequency Band:	2300-2400 MHz
Gain:	17.0 dBi
Vertical Beamwidth:	4.5°
Horizontal Beamwidth:	58°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	71” x 12” x 9.6”



PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING TRANSMISSION TOWER:
- NEW AT&T ANTENNAS: AIR6419 B77G (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T ANTENNAS: AIR6449 B77D (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T ANTENNAS: QD6616-7 (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- NEW AT&T DC & FIBER SURGE ARRESTOR DC6-48-60-18-8C (TOTAL OF 1) WITH (2) AWG 6 DC TRUNK & (1) 24 PAIR FIBER.

ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:
- NEW AT&T RRUS: B5/B12 4449 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- ADD (6) SURGE ARRESTORS: APTDC-BDFDM-DB (TYP OF 2 PER SECTOR, TOTAL OF 6).
- ADD (12) DIPLEXERS CBC426-DS (TYP OF 4 PER SECTOR, TOTAL OF 12).
- ADD (12) TRIPLEXERS CTX41727Q-DS-43 (TYP OF 2 PER SECTOR, TOTAL OF 6).
- ADD (6) BIAS TEE: K SBT 782-11055 (TYP OF 4 PER SECTOR, TOTAL OF 12).
- ADD (1) 6648 + XCEDE CABLE.
- INSTALL (1) DC 12.
- ADD NEW BATTERY CABINET W/ (2) STRINGS OF BATTERIES.
- ADD (4) RECTIFIERS.
- RIP AND REPLACE EXISTING BATTERY.

ITEMS TO BE REMOVED:
- EXISTING AT&T ANTENNAS: P65-16-XLH-RR (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T ANTENNAS: HPA65R-BU6A (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T RRUS: RRUS-11 B12 (700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T RRUS: 4478 B5 (850) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- EXISTING AT&T TMA's: LGP21401 (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- EXISTING AT&T TRIPLEXERS: TPX-070821 (TYP. OF 2 PER SECTOR, TOTAL OF 6).
- EXISTING AT&T QUADPLEXERS: QBC0007F1V51-1 (TYP. OF 4 PER SECTOR, TOTAL OF 12).
- EXISTING AT&T PENTAPLEXERS: 5PX-0726 (TYP. OF 4 PER SECTOR, TOTAL OF 12).
- DECOMM UMTS.

ITEMS TO REMAIN:
ANTENNAS: (3) QS66512-2, RRUS: (3)(G) 4478 B14, (3)(G) 4426 B66, (3)(G) RRUS-E2 B29, (3)(G) RRUS-32 B2, (3)(G) RRUS-32 B30, TMAS, (6) TMABPD7823VG12A, (6) TMA2117F00V1-1, SURGE ARRESTORS: (6)(G) APTDC-BDFDM-DB, (24)(G) TSXDC-4310FM, (30) COAX CABLES.

SITE ADDRESS:	7 STONY HILL ROAD BETHEL, CT 06801
LATITUDE:	41.415791° N, 41° 24' 56.85" N
LONGITUDE:	73.401698° W, 73° 24' 06.11" W
TYPE OF SITE:	TRANSMISSION TOWER / OUTDOOR EQUIPMENT
STRUCTURE HEIGHT:	140'-0"±
RAD CENTER:	145'-0"±
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	2
GN-1	GENERAL NOTES	2
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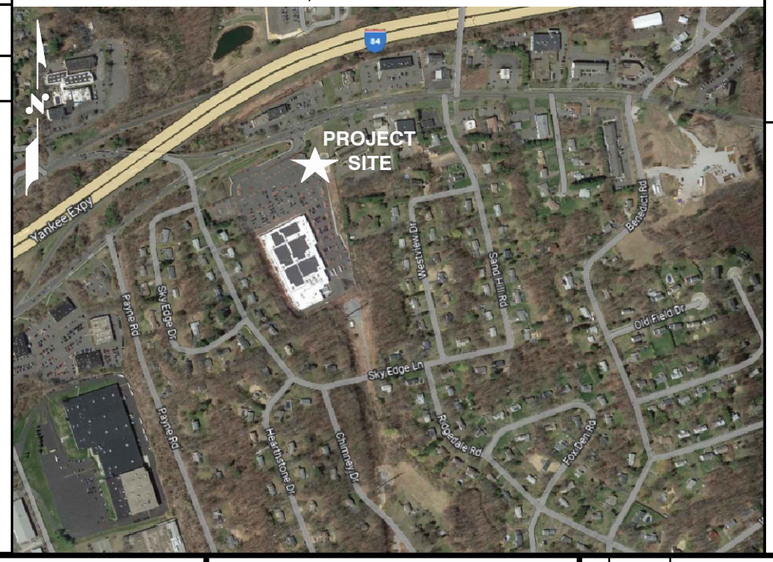
A-2	ANTENNA LAYOUTS & ELEVATION	2
A-3	DETAILS	2
SN-1	STRUCTURAL NOTES	2
G-1	GROUNDING DETAILS	2
RF-1	RF PLUMBING DIAGRAM	2

SITE NUMBER: CTL05176
SITE NAME: BETHEL STONY HILL-AWS
ES STR #: 10254
FA CODE: 10071269
PACE ID: MRCTB063827_MRCTB060496_MRCTB060678_ MRCTB060669_MRCTB060745_MRCTB060524
PROJECT: 4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND UPGRADE

VICINITY MAP

DIRECTIONS TO SITE:
GET ON I-91 S FROM ENTERPRISE DR, CAPITAL BLVD AND STATE HWY 411. HEAD SOUTH TOWARD ENTERPRISE DR. TURN LEFT ONTO ENTERPRISE DR. TURN LEFT ONTO CAPITAL BLVD. USE THE LEFT 2 LANES TO TURN LEFT ONTO STATE HWY 411. TURN LEFT TO MERGE ONTO I-91 S. FOLLOW I-91 S, I-691 W AND I-84 TO NEWTOWN RD IN FAIRFIELD COUNTY. TAKE EXIT 8 FROM I-84. MERGE ONTO I-91 S. KEEP RIGHT TO STAY ON I-91 S. TAKE EXIT 18 FOR I-691 W TOWARD MERIDEN/WATERBURY. CONTINUE ONTO I-691 W. USE THE LEFT 2 LANES TO TAKE EXIT 1 FOR I-84 W TOWARD WATERBURY/DANBURY. MERGE ONTO I-84. TAKE EXIT 8 TO MERGE ONTO NEWTOWN RD TOWARD BETHEL. CONTINUE ON NEWTOWN RD TO YOUR DESTINATION IN BETHEL. MERGE ONTO NEWTOWN RD. CONTINUE STRAIGHT TO STAY ON NEWTOWN RD. TURN LEFT ONTO US-6 E/NEWTOWN RD. CONTINUE TO FOLLOW US-6 E. TURN RIGHT. TURN LEFT. TURN LEFT. TURN RIGHT. TURN RIGHT. 7 STONY HILL RD BETHEL, CT 06801



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

72 HOURS

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SAI
12 INDUSTRIAL WAY
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SITE NUMBER: CTL05176
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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: GA

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	T-1	2

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS AND #2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SAI
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. **APPLICABLE BUILDING CODES:**
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    BUILDING CODE: IBC 2021 WITH 2022 CT STATE BUILDING CODE AMENDMENTS
    ELECTRICAL CODE: 2020 NATIONAL ELECTRICAL CODE (NFPA 70-2020)

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-H, STRUCTURAL STANDARDS FOR STEEL

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

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SITE NUMBER: CTL05176
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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: GA

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

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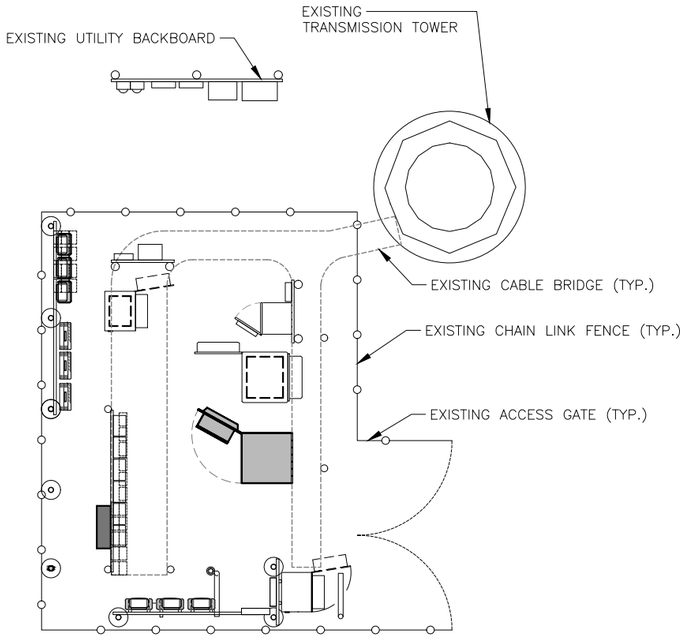
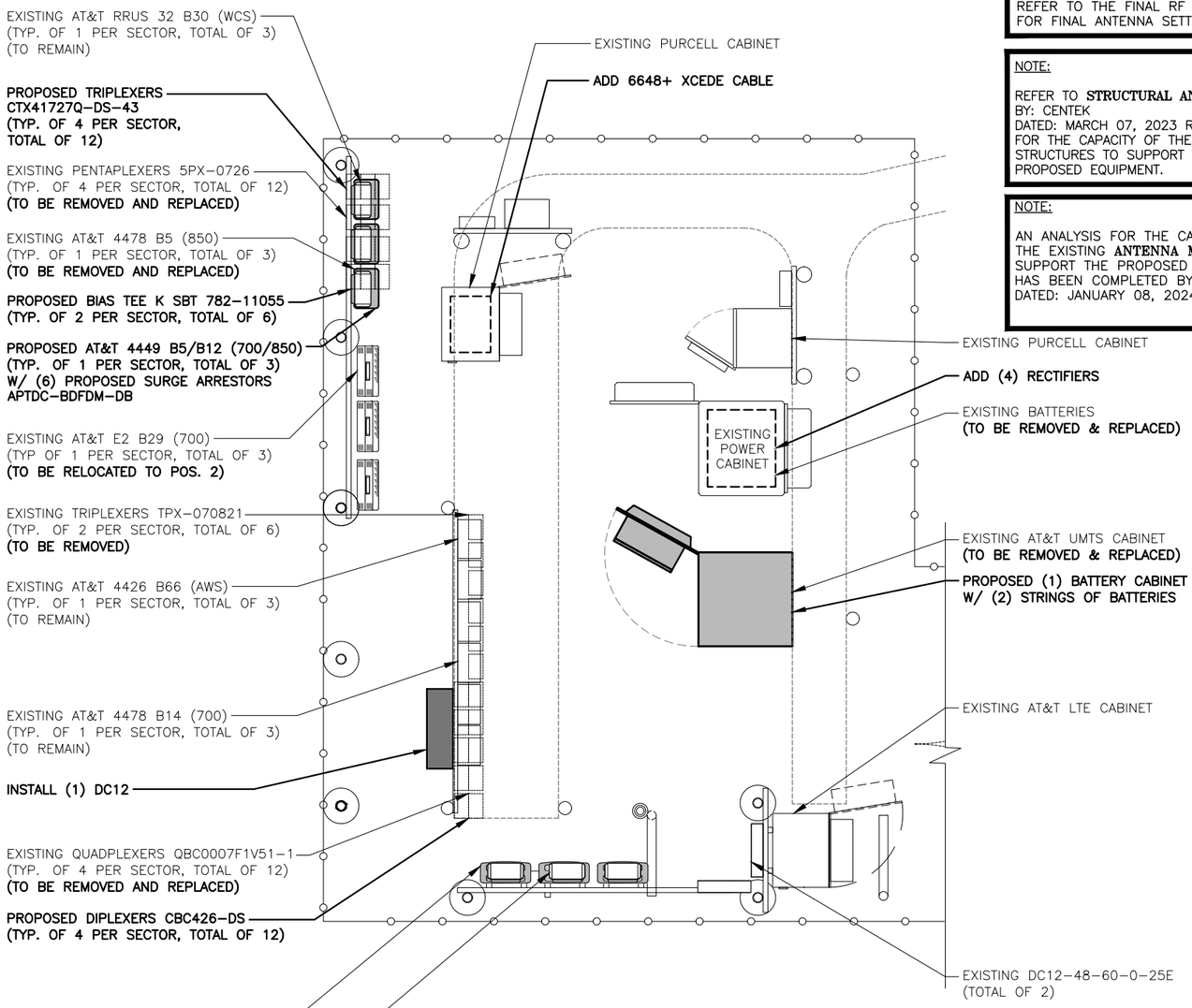
GENERAL NOTES
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	GN-1	2





NOTE:

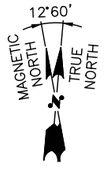
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

REFER TO **STRUCTURAL ANALYSIS**
BY: CENTEK
DATED: MARCH 07, 2023 REV 4
FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

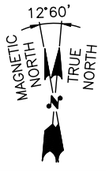
NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: TEP
DATED: JANUARY 08, 2024



COMPOUND PLAN (1 / A-1)
22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"

0 2'-0" 4'-0" 8'-0" 12'-0"



EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 2'-0" 4'-0" 6'-0"

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COMPOUND & EQUIPMENT PLANS
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
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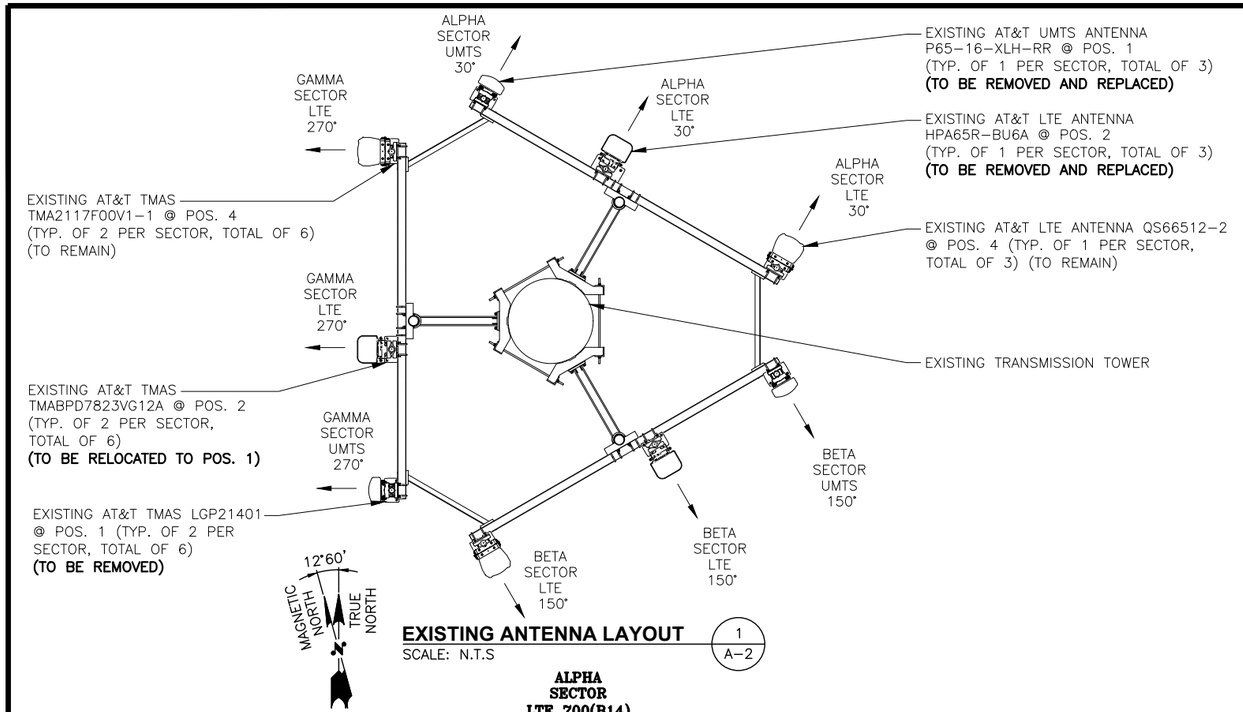
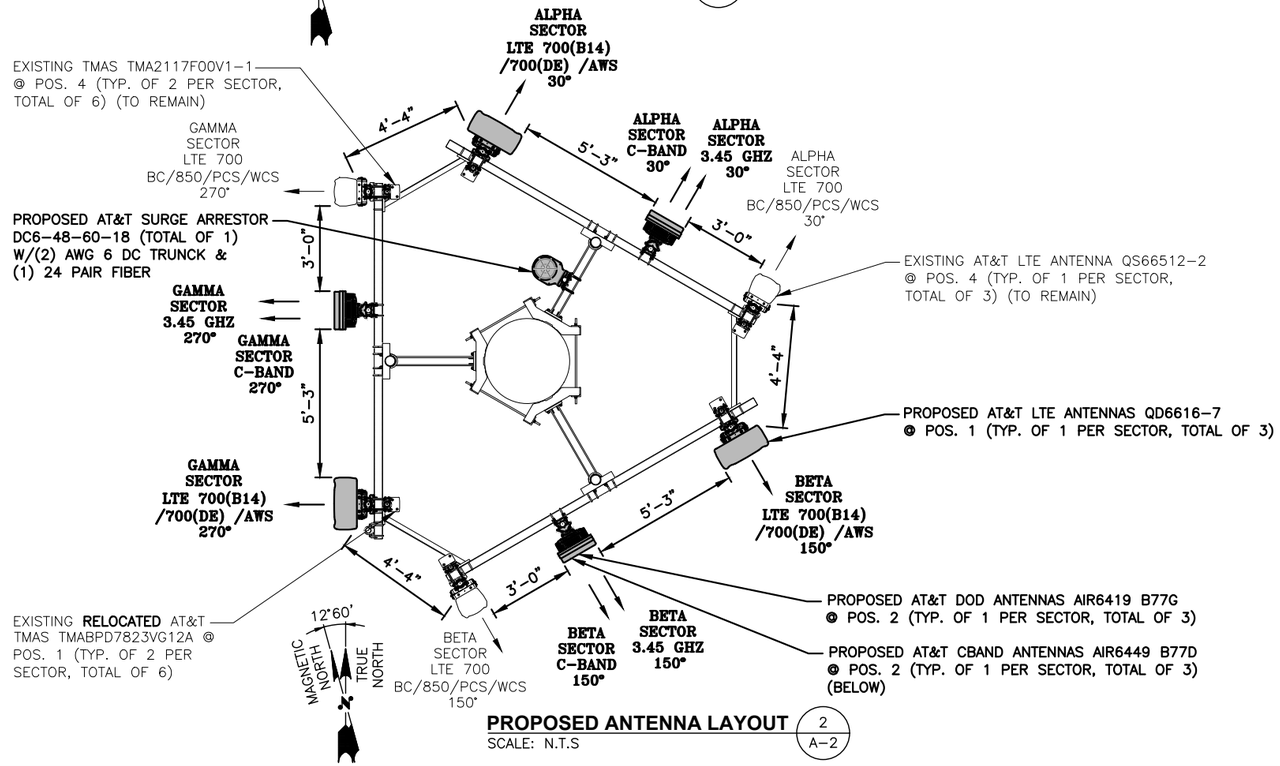


EXISTING ANTENNA LAYOUT

SCALE: N.T.S

1 / A-2



PROPOSED ANTENNA LAYOUT

SCALE: N.T.S

2 / A-2

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: TEP
DATED: JANUARY 08, 2024

NOTE:

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NOTE:

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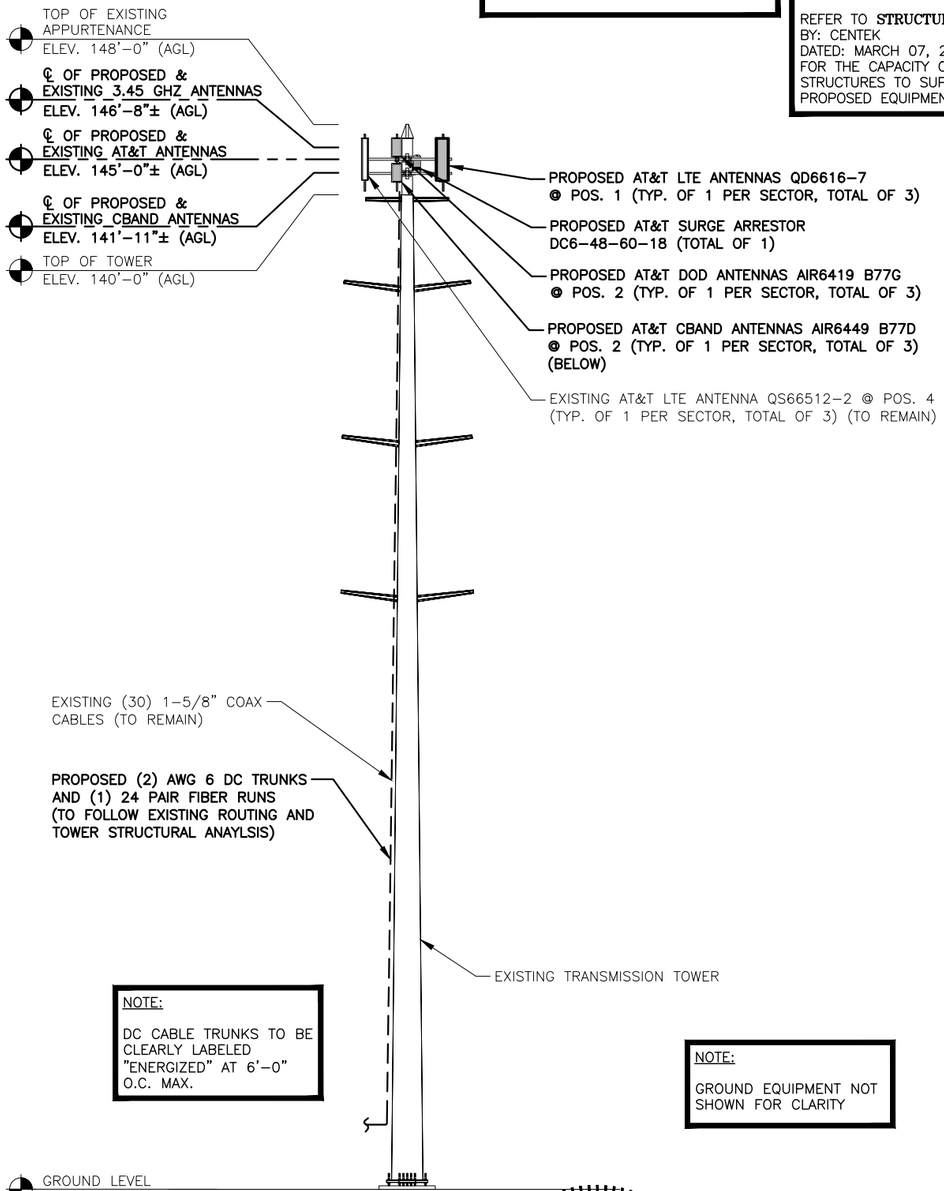

ELEVATION

22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"

3 / A-2

NOTE:

DC CABLE TRUNKS TO BE CLEARLY LABELED "ENERGIZED" AT 6'-0" O.C. MAX.

NOTE:

GROUND EQUIPMENT NOT SHOWN FOR CLARITY

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ANTENNA LAYOUTS & ELEVATION
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	A-2	2

ANTENNA SCHEDULE

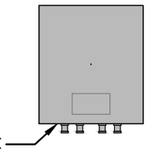
SECTOR	EXISTING/ PROPOSED	BAND	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	ANTENNA TIP HEIGHT	AZIMUTH	TMA/ DIPLEXER	RRU	SIZE (INCHES) (L x W x D)	FEEDER	RAYCAP
A1	PROPOSED	LTE 700(B14) /700(DE) /AWS	QD6616-7	72x22x9.6	145'-0"±	148'-0"±	30°	(E)(2)TMABPD7823VG12A (P)(4)(G) CBC426-DS	(E)(G)(1) 4478 B14 (700) (E)(G)(1) 4426 B66 (AWS) (E)(G)(1) RRUS-E2 B29	– – –	(6)(E) 1-5/8" COAX (P)(2) DC POWER & (1) FIBER	(P) (1) RAYCAP DC6-48-60-18
A2	PROPOSED	3.45 GHZ C-BAND	AIR6419 B77G AIR6449 B77D (STACKED)	31.1X16.1X7.3 30.6X15.9X10.6	146'-8"± 141'-11"±	148'-0"± 144'-5"±	30°	–	–	–	–	
A3	–	–	–	–	–	–	–	–	–	–	–	
A4	EXISTING	LTE 700 BC/850/PCS/WCS	QS66512-2	72X12X9.6	145'-0"±	148'-0"±	30°	(E)(2)TMA2117F00V1-1 (P)(4)(G) CTX41727Q-DS-43	(P)(G)(1) 4449 B5/B12 (850/700) (E)(G)(1) RRUS-32 B2 (PCS) (E)(G)(1) RRUS-32 B30 (WCS)	17.9"X13.2"X10.4" – –	(4)(E) 1-5/8" COAX	
B1	PROPOSED	LTE 700(B14) /700(DE) /AWS	QD6616-7	72x22x9.6	145'-0"±	148'-0"±	150°	(E)(2)TMABPD7823VG12A (P)(4)(G) CBC426-DS	(E)(G)(1) 4478 B14 (700) (E)(G)(1) 4426 B66 (AWS) (E)(G)(1) RRUS-E2 B29	– – –	(6)(E) 1-5/8" COAX	SHARED
B2	PROPOSED	3.45 GHZ C-BAND	AIR6419 B77G AIR6449 B77D (STACKED)	31.1X16.1X7.3 30.6X15.9X10.6	146'-8"± 141'-11"±	148'-0"± 144'-5"±	150°	–	–	–	–	
B3	–	–	–	–	–	–	–	–	–	–	–	
B4	EXISTING	LTE 700 BC/850/PCS/WCS	QS66512-2	72X12X9.6	145'-0"±	148'-0"±	150°	(E)(2)TMA2117F00V1-1 (P)(4)(G) CTX41727Q-DS-43	(P)(G)(1) 4449 B5/B12 (850/700) (E)(G)(1) RRUS-32 B2 (PCS) (E)(G)(1) RRUS-32 B30 (WCS)	17.9"X13.2"X10.4" – –	(4)(E) 1-5/8" COAX	
C1	PROPOSED	LTE 700(B14) /700(DE) /AWS	QD6616-7	72x22x9.6	145'-0"±	148'-0"±	270°	(E)(2)TMABPD7823VG12A (P)(4)(G) CBC426-DS	(E)(G)(1) 4478 B14 (700) (E)(G)(1) 4426 B66 (AWS) (E)(G)(1) RRUS-E2 B29	– – –	(6)(E) 1-5/8" COAX	SHARED
C2	PROPOSED	3.45 GHZ C-BAND	AIR6419 B77G AIR6449 B77D (STACKED)	31.1X16.1X7.3 30.6X15.9X10.6	146'-8"± 141'-11"±	148'-0"± 144'-5"±	270°	–	–	–	–	
C3	–	–	–	–	–	–	–	–	–	–	–	
C4	EXISTING	LTE 700 BC/850/PCS/WCS	QS66512-2	72X12X9.6	145'-0"±	148'-0"±	270°	(E)(2)TMA2117F00V1-1 (P)(4)(G) CTX41727Q-DS-43	(P)(G)(1) 4449 B5/B12 (850/700) (E)(G)(1) RRUS-32 B2 (PCS) (E)(G)(1) RRUS-32 B30 (WCS)	17.9"X13.2"X10.4" – –	(4)(E) 1-5/8" COAX	

RRU CHART

QUANTITY	MODEL	SIZE (L x W x D)
P(G)(3)	4449 B5/B12 (850/700)	17.9"x13.2"x10.4"
E(G)(3)	RRUS-32 B2 (PCS)	27.2"x12.1"x7.0"
E(G)(3)	RRUS-32 B30 (WCS)	27.2"x12.1"x7.0"
E(G)(3)	4478 B14 (700)	18.1"x13.4"x8.3"
E(G)(3)	4426 B66 (AWS)	14.9"x13.2"x5.8"
E(G)(3)	RRUS-E2 B29(700)	20.4"x18.5"x7.5"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS

NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

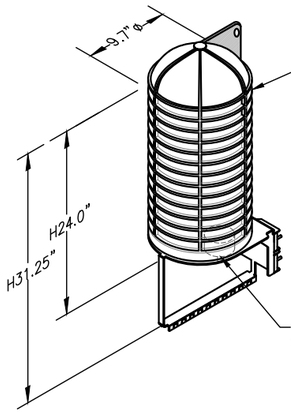
PROPOSED RRUS DETAIL (2 / A-3)
SCALE: N.T.S

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

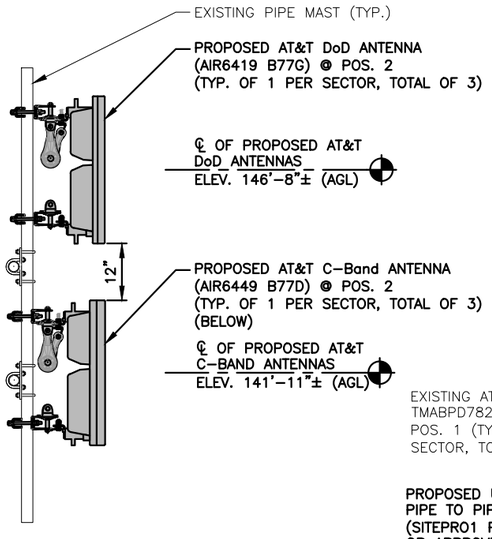
NOTE:
REFER TO **STRUCTURAL ANALYSIS**
BY: CENTEK
DATED: MARCH 07, 2023 REV 4
FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT.

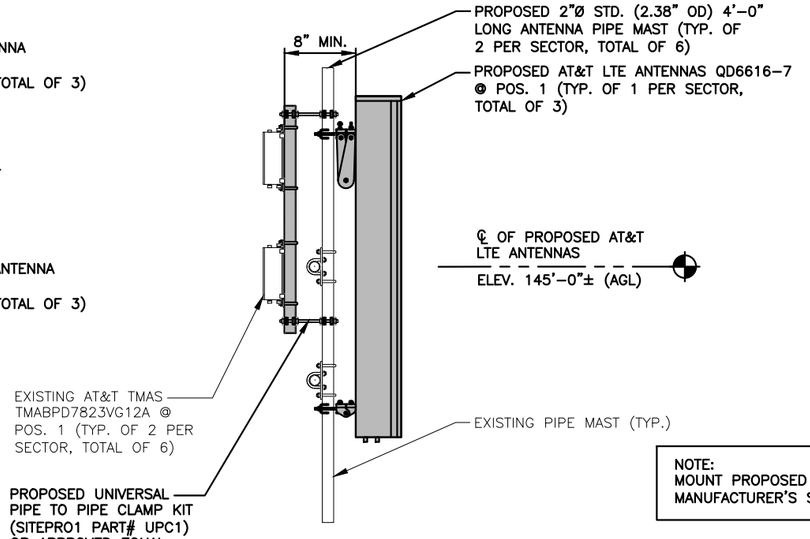
NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: TEP
DATED: JANUARY 08, 2024

FINAL ANTENNA SCHEDULE (1 / A-3)
SCALE: N.T.S

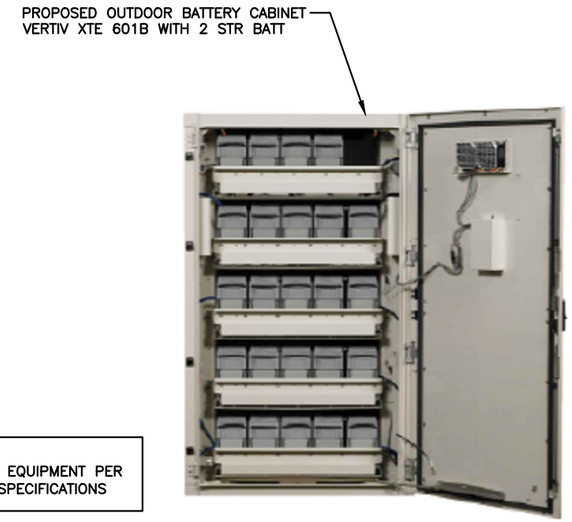


NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.





NOTE:
MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS



DC SURGE SUPPRESSOR DETAIL (3 / A-3)
SCALE: N.T.S

PROPOSED CBAND ANTENNA MOUNTING DETAIL (4 / A-3)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"

PROPOSED LTE ANTENNA MOUNTING DETAIL (5 / A-3)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"

PROPOSED VERTIV BATTERY CABINET (6 / A-3)
SCALE: N.T.S

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A	08/25/22	ISSUED FOR REVIEW	GA	HC	DPH

SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: GA

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	A-3	2

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-H STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-270 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

GENERAL: WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

NOTES:

1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4"ø A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.
2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.
3. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED PRIOR TO STEEL FABRICATION.
4. VERIFICATION OF EXISTING ROOF CONSTRUCTION IS REQUIRED PRIOR TO THE INSTALLATION OF THE ROOF PLATFORM. ENGINEER OF RECORD IS TO APPROVE EXISTING CONDITIONS IN ORDER TO MOVE FORWARD.
5. CENTERLINE OF PROPOSED STEEL PLATFORM SUPPORT COLUMNS TO BE CENTRALLY LOCATED OVER THE EXISTING BUILDING COLUMNS.
6. EXISTING BRICK MASONRY COLUMNS/BEARING TO BE REPAIRED/REPLACED AT ALL PROPOSED PLATFORM SUPPORT POINTS. ENGINEER OF RECORD TO REVIEW AND APPROVE.

NOTES:

1. REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
2. PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
3. PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
4. HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
5. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACI 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACI 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACI 318-11 D.8.2.4.
6. AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

SPECIAL INSPECTION CHECKLIST

BEFORE CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
N/A	ENGINEER OF RECORD APPROVED SHOP DRAWINGS [1]
REQUIRED	MATERIAL SPECIFICATIONS REPORT [2]
N/A	FABRICATOR NDE INSPECTION
REQUIRED	PACKING SLIPS [3]
ADDITIONAL TESTING AND INSPECTIONS:	
DURING CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	STEEL INSPECTIONS
N/A	HIGH STRENGTH BOLT INSPECTIONS
N/A	HIGH WIND ZONE INSPECTIONS [4]
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT
N/A	POST INSTALLED ANCHOR VERIFICATION [5]
N/A	GROUT VERIFICATION
N/A	CERTIFIED WELD INSPECTION
N/A	EARTHWORK: LIFT AND DENSITY
N/A	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
ADDITIONAL TESTING AND INSPECTIONS:	
AFTER CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS [6]
N/A	POST INSTALLED ANCHOR PULL-OUT TESTING
REQUIRED	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

TEP NORTHEAST
TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CTL05176
SITE NAME: BETHEL STONY HILL-AWS

7 STONY HILL ROAD
BETHEL, CT 06801
FAIRFIELD COUNTY

AT&T
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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A	08/25/22	ISSUED FOR REVIEW	GA	HC	DPH

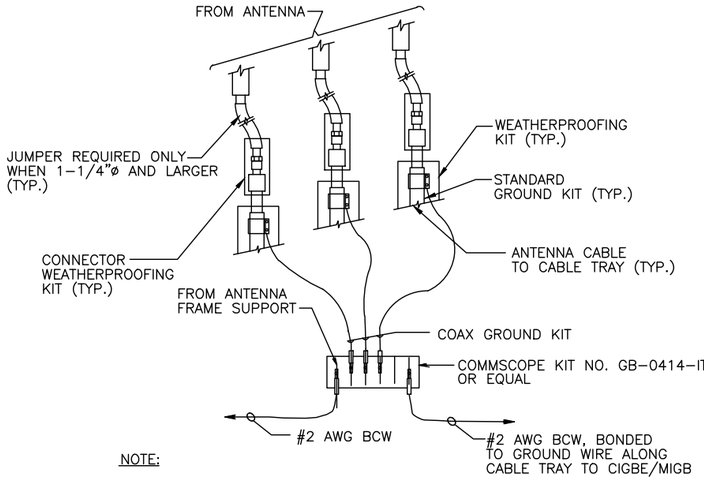
SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: GA

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

STRUCTURAL NOTES
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	SN-1	2



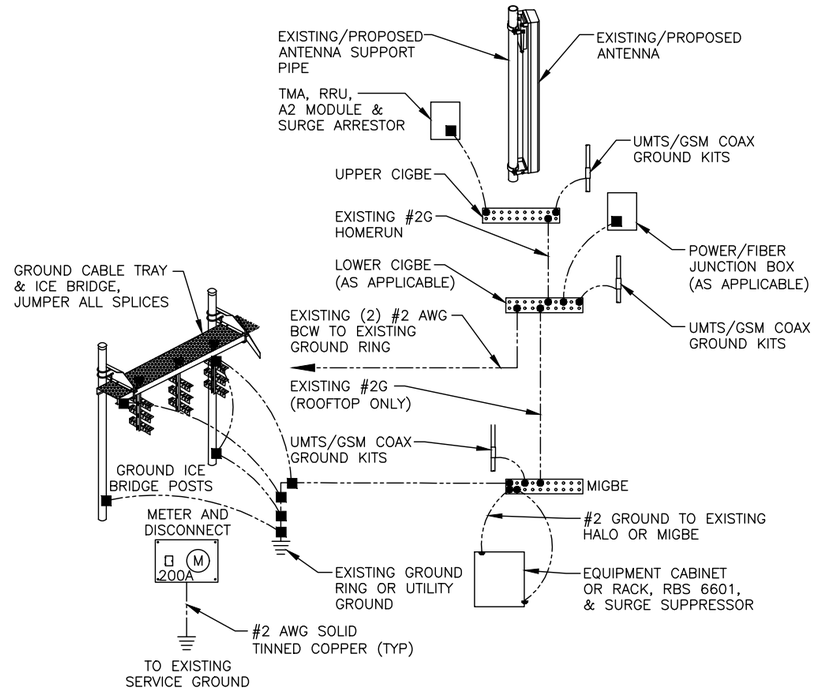
NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

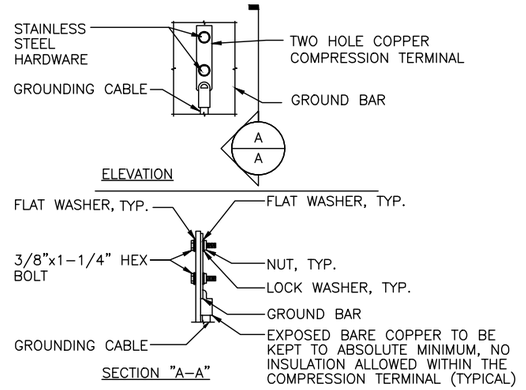
1 / G-1



GROUNDING RISER DIAGRAM

SCALE: N.T.S

2 / G-1



NOTES:

1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

3 / G-1

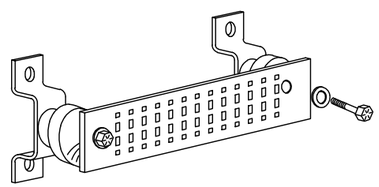
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
+24V POWER SUPPLY RETURN BAR (#2 AWG)
-48V POWER SUPPLY RETURN BAR (#2 AWG)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2 AWG)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
BUILDING STEEL (IF AVAILABLE) (#2 AWG)



GROUND BAR - DETAIL (AS REQUIRED)

SCALE: N.T.S

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TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
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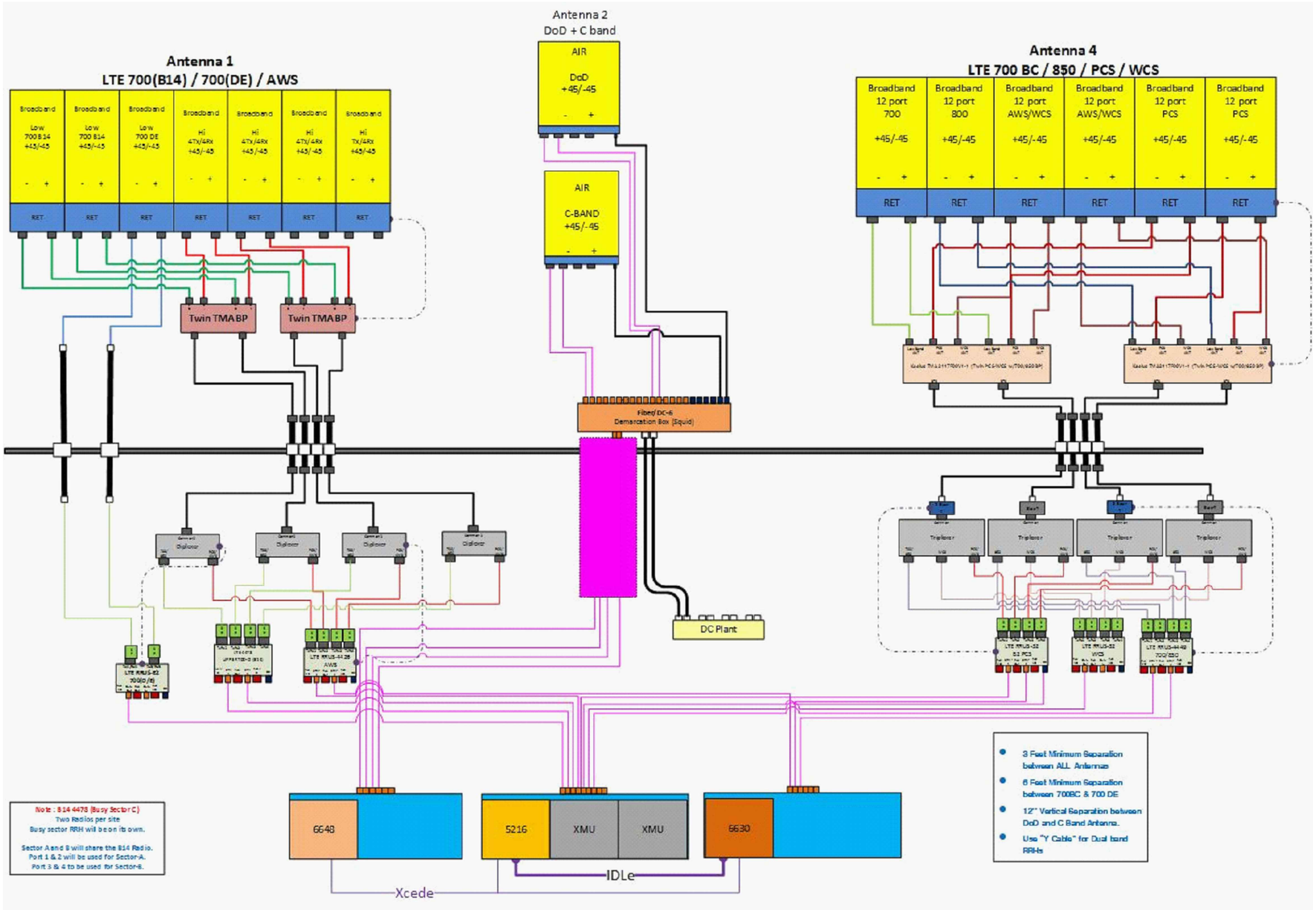
GROUNDING DETAILS
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	G-1	2

NOTE:

REV: 4
DATED: 12/11/2023
RFDS ID: 4541466



RF PLUMBING DIAGRAM (1 / RF–1)
SCALE: N.T.S

NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.
3. RFDS USED FOR REFERENCE.

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: GA

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RF PLUMBING DIAGRAM
4TXRX SOFTWARE/ANTENNA RETROFIT_ 5G NR ACTIVATION_5G NR RADIO_ 5G NR 1SR CBAND

SITE NUMBER	DRAWING NUMBER	REV
CTL05176	RF–1	2

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Pole

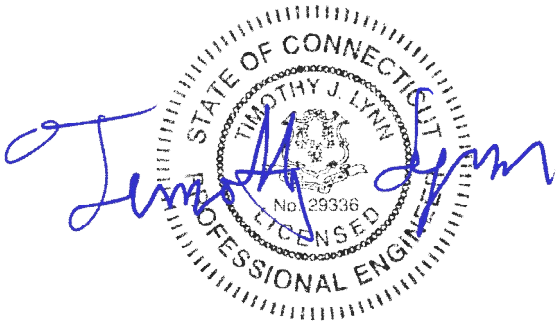
AT&T Site Ref: CT5176

Eversource Structure No. 10254
140' Electric Transmission Pole

7 Stony Hill Road
Bethel, CT

CENTEK Project No. 22021.07

~~Date: October 5, 2022~~
Rev 4: March 7, 2023



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

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Introduction

The purpose of this report is to analyze the existing mast and 140' utility pole located in Bethel, CT for the proposed antenna and equipment upgrade by AT&T.

The existing/proposed loads consist of the following:

- AT&T MOBILITY (Existing to Remain):
  Antennas: Three (3) Quintel QS66512-2 panel antennas, six (6) Kaelus TMA2117F00V1-1 TMAs, six (6) CCI TMABPD7823VG-12A mounted on a Site Pro Triple T-Arm Mount P/N RMV12-396 w/ handrail to the existing mast with a RAD center elevation of 145-ft above grade level.
  Cables: Thirty (30) 1-5/8" ∅ coax cables running on the exterior of the pole as indicated in section 4 of this report.
  Mast: HSS18x0.375 x 8-ft long pipe conforming to ASTM A500 Gr. B (Fy = 42 ksi).
- **AT&T MOBILITY (Existing to Remove):**
  Antennas: Three (3) CCI HPA-65R-BU6A panel antennas, three (3) Powerwave P65-16-XLH-RR panel antennas and six (6) Powerwave LGP-21401 TMAs mounted on a Site Pro Triple T-Arm Mount P/N RMV12-396 w/ handrail to the existing mast with a RAD center elevation of 145-ft above grade level.
- **AT&T MOBILITY (PROPOSED):**
  Antennas: Three (3) Quintel QD6616-7 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson AIR6419 panel antennas and one (1) Raycap DC6 surge arrestor mounted on a Site Pro Triple T-Arm Mount P/N RMV12-396 w/ handrail to the existing mast with a RAD center elevation of 145-ft above grade level.
  Cables: One (1) fiber cable and two (2) DC cables running on the exterior of the pole as indicated in section 4 of this report.

Primary assumptions used in the analysis

- ASCE Manual No. 48-19, "Design of Steel Transmission Pole Structures", defines steel stresses for evaluation of the utility pole.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed within the antenna mast unless specified otherwise.
- Antenna mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Antenna mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

A n a l y s i s

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

The existing mast consisting of HSS18x0.375 x 8-ft long pipe connected to the top of the existing tower was analyzed for its ability to resist loads prescribed by the TIA-222-H standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA-222-H loading and for NESC/EVERSOURCE loading are listed in report Sections 6 and 8, respectively.

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

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

D e s i g n B a s i s

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

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the EVERSOURCE Design Criteria Table, NESC C2-2023 ~ Construction Grade B, and ASCE Manual No. 48-19, "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 C2-2023, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

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

  Load cases considered:

  Load Case 1:
  Wind Speed…….. 125 mph (2022 CSBC Appendix-P)
  Radial Ice Thickness…….. 0”

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

R e s u l t s

- MAST ASSEMBLY

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

Member	Stress Ratio (% of capacity)	Result
HSS18x0.375	15.9%	**PASS**
3/4” ∅ ASTM A325 Bolt	36.1%	**PASS**

Note 1 – Critical connection component.

- UTILITY POLE

  This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 48-19, “Design of Steel Transmission Pole Structures Second Edition”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

  A maximum usage of **98.43%** 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’-41.17’ (AGL)	95.71%	**PASS**

  BASE PLATE:

  The base plate was found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	98.43%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft ∅ x 20.5-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (20) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 9-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01143-60001. A 16-ft ∅ x 12-ft deep area of soil was previously jet grouted in order to decrease the amount of deflection of the caisson.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	38.88 kips	115.71 kips	4294.18 ft-kips
NESC Extreme Wind	53.60 kips	55.22 kips	5517.92 ft-kips

Note 1 – 10% increase to be applied to tower base reactions for foundation verification 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	81.7%	**PASS**

FOUNDATION:

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

Foundation	Design Limit	Proposed Loading (1)	Result
Reinforced Concrete Caisson	Moment Capacity	70.9%.(2)	**PASS**
	Shear Capacity	26.5%.(2)	**PASS**
	Lateral Deflection	3.51 in.(3)	**PASS**

Note 1: 10% increase to PLS base reactions used in foundation analysis per OTRM 051
Note 2: Based on existing 8-ft ∅ x 20.5-ft long concrete caisson.
Note 3: Based on 8-ft of the caisson taken as 16-ft ∅ due to effects of soil jet grouting. Top 4-ft of jet grouted soil ignored per Northeast Utilities.

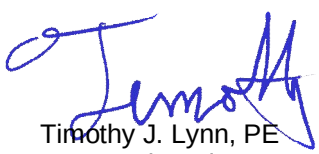
C o n c l u s i o n

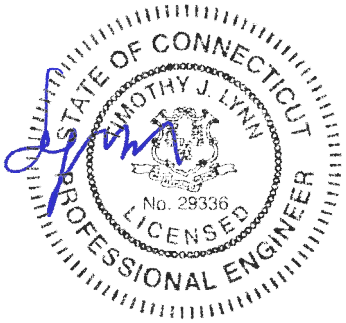
This analysis shows that the subject utility pole **is adequate** to support the proposed AT&T equipment upgrade.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE

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

Modeling Features:

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

Analysis Features:

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

Results Features:

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

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

Introduction

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

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

ANSI Standard C2-2023 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the 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-H:

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
	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
		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
		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
	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor Loads Provided by 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
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor Loads Provided by ES					
		*Only for structures installed after 2007						

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

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

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

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

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

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

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

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

Project: 321/1887 Lines, Structure 10254
Date: 10/10/18
Engineer: JS
Purpose: Recalculate wire loads for AT&T site.

Shield Wires:
321: AFL DNO-4963 0.457" OPGW, sagged to 4200# NESC 250B Final
1887: 7#8 Alumoweld, sagged in PLS-CADD

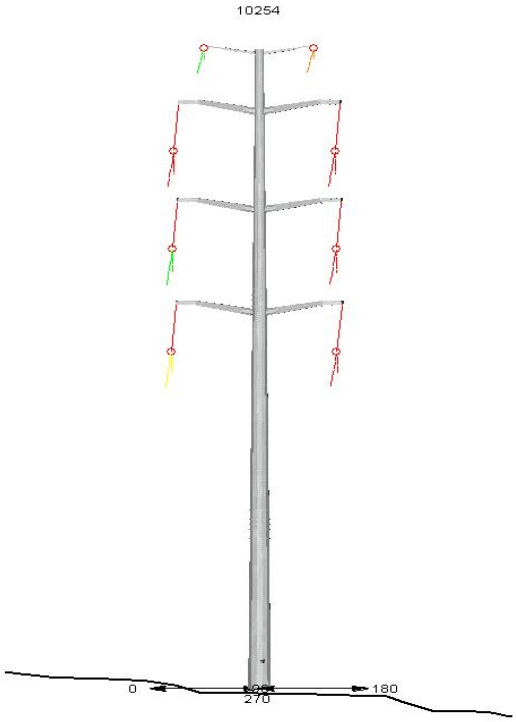
Conductors:
Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250B

	Vertical	Transverse	Longitudinal
Alumoweld	1035	1185	0
OPGW	1072	1234	0
Conductor	7090	4255	0

NESC 250C

	Vertical	Transverse	Longitudinal
Alumoweld	216	733	0
OPGW	201	865	0
Conductor	2748	4942	0



Looking south.
Transverse forces are in the direction of the 0 degree angle.
OPGW is top left as seen here.
Alumoweld is top right as seen here.

℄ AT&T ANTENNAS
EL. ±145'–0" AGL

AT&T (EXISTING TO REMAIN):
THREE (3) QUINTEL QS66512–2 PANEL ANTENNAS, SIX (6) KAELUS TMA2117F00V1–1 TMAs AND SIX (6) CCI TMABPD7823VG12A TMAs.
AT&T (TO BE REMOVED):
THREE (3) POWERWAVE P65–16–XLH–RR PANEL ANTENNAS, THREE (3) CCI HPA–65R–BU6A PANEL ANTENNAS AND SIX (6) POWERWAVE LGP–21401 TMAs.
AT&T (PROPOSED):
THREE (3) QUINTEL QD6616–7 PANEL ANTENNAS, THREE (3) ERICSSON AIR6419 PANEL ANTENNAS, THREE (3) ERICSSON AIR6449 PANEL ANTENNAS AND ONE (1) DC6–48–60–18–8C MOUNTED ON A SITE PRO TRIPLE T–ARM P/N RMV12–396 w/ HANDRAIL.

EXISTING 140' TALL STEEL TRANSMISSION STRUCTURE NO. 10254

AT&T EXISTING THIRTY (30) 1–5/8" DIA. COAX CABLES MOUNTED ON EXTERIOR OF THE TOWER

AT&T PROPOSED ONE (1) FIBER CABLE AND TWO (2) DC CABLES MOUNTED ON EXTERIOR OF THE TOWER

EXIST. GRADE

1 / EL–1 TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	10/5/22	CONSTRUCTION
01	12/1/22	CONSTRUCTION
02	1/9/23	CONSTRUCTION
03	2/6/23	CONSTRUCTION

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CT5176
STONY HILL
EVERSOURCE 10254

7 STONY HILL ROAD
BETHEL, CT 06801

PROJECT NO:	22021.07
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	10/5/22

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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Subject: Loads on AT&T Mast - Structure 10254

Location: Bethel, CT

Rev. 3: 2/2/23

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 22021.07

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

Wind Speeds

Basic Wind Speed	$V := 125$	mph	(User Input - 2022 CSBC Appendix P)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-H)
Basic Wind Speed Service Loads	$V_{Ser} := 60$	mph	(User Input - TIA-222-H Section 2.8.3)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := III		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 140$	ft	(User Input)
Height to Center of Antennas =	$z_{ant} := 145$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 144$	ft	(User Input)
Radial Ice Thickness =	$t_i := 1.0$	in	(User Input per Annex B of TIA-222-H)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
Shielding Factor for Appurtenances =	$K_a := 1.0$		(User Input)
Ground Elevation Factor =	$K_e = 0.996$		(User Input)
Gust Response Factor =	$G_H := 1.35$		(User Input - Section 2.6.9.4 of TIA-222-H)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

Wind Direction Probability Factor (Service) = $K_{dSer} := 0.85$

(Per Section 2.8.3 of TIA-222-H)

$$K_{iz} := \left(\frac{z_{ant}}{33}\right)^{0.1} = 1.16 \qquad t_{izant} := t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.333$$

Velocity Pressure Coefficient Antennas =

$$Kz_{ant} := 2.01\left(\left(\frac{z_{ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.369$$

Velocity Pressure w/o Ice Antennas =

$$qz_{ant} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{ant} \cdot V^2 = 51.777$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.ant} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{ant} \cdot V_i^2 = 8.284$$

Velocity Pressure Service =

$$qz_{ant.Ser} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_{dSer} \cdot Kz_{ant} \cdot V_{Ser}^2 = 10.674$$

$$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.159 \qquad t_{izMast1} := t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.333$$

Velocity Pressure Coefficient Mast =

$$Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.367$$

Velocity Pressure w/o Ice Mast=

$$qz_{Mast1} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast1} \cdot V^2 = 51.702$$

Velocity Pressure with Ice Mast =

$$qz_{ice.Mast1} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 = 8.272$$

Velocity Pressure Service =

$$qz_{Mast1.Ser} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 = 10.658$$

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Subject: Loads on AT&T Mast - Structure 10254

Location: Bethel, CT

Rev. 3: 2/2/23

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 22021.07

Development of Wind & Ice Load on Mast

Mast Data: (HSS18x0.375) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 18$ in (User Input)

Mast Length = $L_{mast} := 8$ ft (User Input)

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

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 5.3$

Mast Force Coefficient = $Ca_{mast} = 0.76$

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^2\right] = 81$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 31$ plf **BLC 3**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.722$ sf/ft

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

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.5$ sf/ft

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 80$ plf **BLC 5**

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 16$ plf **BLC 6**

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Subject:	Loads on AT&T Mast - Structure 10254
Location:	Bethel, CT
Rev. 3: 2/2/23	Prepared by: T.J.L. Checked by: C.F.C. Job No. 22021.07

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Qunitel QS66512-2			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 72$	in	(User Input)	
Antenna Width =	$W_{ant} := 12$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 125$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.0$			
Antenna Force Coefficient =	$Ca_{ant} = 1.36$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 375$	lbs	**BLC 2**

Gravity Loads (ice only)

			cu in
Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 5140$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 167$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 500$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 7.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 22.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 346$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 18$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1706$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 352$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Qunitel QD6616-7			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 72$	in	(User Input)	
Antenna Width =	$W_{ant} := 22$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 125$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.3$			
Antenna Force Coefficient =	$Ca_{ant} = 1.23$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 375$	lbs	**BLC 2**

Gravity Loads (ice only)

cu in

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 7387$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 239$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 718$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 12.8$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 38.4$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 530$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 11$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 33$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2847$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 587$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

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

Gravity Loads (ice only)

cu in

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3655$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 2661$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 86$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 259$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 4.4$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13.2$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 177$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.5$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 10.4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 875$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 180$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

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

Gravity Loads (ice only)

			cu in
Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5157$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 3037$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 98$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 295$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 4.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 12.9$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 173$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.4$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 10.1$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 850$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 175$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Kaelus TMA2117F00V1-1			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 8.46$	in	(User Input)	
Antenna Width =	$W_{ant} := 11.81$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 4.21$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 18$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 6$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{W_{ant}}{L_{ant}} = 1.4$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

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

Gravity Loads (ice only)

cu in

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 421$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 687$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 22$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 134$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 1.1$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 90$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.7$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 4.2$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 349$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 72$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI TMABPD7823VG12A			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 14.25$	in	(User Input)	
Antenna Width =	$W_{ant} := 11.024$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 4.11$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 23$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 6$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.3$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 138$	lbs	**BLC 2**

Gravity Loads (ice only)

cu in

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 646$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 924$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 30$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 180$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 1.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 9.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 130$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.1$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 6.5$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 549$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 113$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

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

Gravity Loads (ice only)

			cu in
Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5878$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot t_{izant}\right)\left(W_{ant} + 2 \cdot t_{izant}\right) \cdot \left(T_{ant} + 2 \cdot t_{izant}\right) - V_{ant} = 3333$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 108$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 108$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{izant}\right) \cdot \left(W_{ant} + 2 \cdot t_{izant}\right)}{144} = 5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 67$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 334$	lbs	**BLC 5**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 69$	lbs	**BLC 6**

Development of Wind & Ice Load on Antennas

Mount Data:

Mount Type:	SitePro RMV12-396 w/ Handrail		
Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 32.9$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 44$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1492$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 2549$	lbs	

Gravity Loads (without ice)

Weight of All Mounts = $WT_{mnt} = 1492$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts = $WT_{mnt.ice} - WT_{mnt} = 1057$ lbs **BLC 3**

Wind Load (with ice)

Total Mount Wind Force = $Fi_{mnt} := qz_{ice.ant} \cdot G_H \cdot CaAa_{ice} = 492$ lbs **BLC 4**

Wind Load (without ice)

Total Mount Wind Force = $F_{mnt} := qz_{ant} \cdot G_H \cdot CaAa = 2300$ lbs **BLC 5**

Wind Load (Service)

Total Mount Wind Force = $Fi_{mnt} := qz_{ant.Ser} \cdot G_H \cdot CaAa = 474$ lbs **BLC 6**

Total Pipe Length = $TPL := 8 \cdot ft \cdot 9 = 72\,ft$

Total Antenna Length = $TAL := 72 \cdot in \cdot 3 + 72 \cdot in \cdot 3 + 31.1 \cdot in \cdot 3 + 30.6 \cdot in \cdot 3 = 51.425\,ft$

Exposed Pipe Area = $ExPA := (TPL - TAL)2.375 \cdot in = 4.072\,ft^2$

CaAa = $1.2 \cdot ExPA + (3.5 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.2 + 4 \cdot in \cdot 36 \cdot in \cdot 3 \cdot 2.0 + (2.375 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.2 = 32.918\,ft^2$

Exposed Pipe Area (with Ice) = $ExPA := (TPL - TAL)3.375 \cdot in = 5.787\,ft^2$

CaAa (with ice) = $1.2 \cdot ExPA + (4.5 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.2 + 5 \cdot in \cdot 36 \cdot in \cdot 3 \cdot 2.0 + (3.375 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.2 = 44\,ft^2$

$1230 \cdot lb + 262 \cdot lb = 1492\,lb$

$$\left[\left[\left(2.375 + 2 \cdot t_{izant}\right)^2 - (2.375)^2\right] \cdot 96 \cdot 9 + \left[\left(3.5 + 2 \cdot t_{izant}\right)^2 - (3.5)^2\right] \cdot 150 \cdot 3 + \left[\left(2.375 + 2 \cdot t_{izant}\right)^2 - (2.375)^2\right] \cdot 150 \cdot 3\right] \cdot in^3 \cdot \frac{\pi}{4} \cdot (Id \cdot pcf) = 957\,lbf$$

$$\left[\left(4 + 2 \cdot t_{izant}\right)^2 - (4)^2\right] \cdot 36 \cdot 3 \cdot in^3 \cdot (Id \cdot pcf) = 100\,lbf$$

Development of Wind & Ice Load on Coax Cables

Cable Data:

Type =	1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 8$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 33$		(User Input - 30 Coax & 1 Hybrid & 2 DC)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 6$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 48.5$

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

Gravity Loads (without ice)

Weight of all cables w/o ice: $WT_{coax} := Wt_{coax} \cdot N_{coax} = 34$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast1}\right)^2 - D_{coax}^2\right] = 13.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 178$ plf **BLC 3**

Wind Load (with ice)

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

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 16$ plf **BLC 4**

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 83$ plf **BLC 5**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 17$ plf **BLC 6**

(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	65	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	65	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	62	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	HSS18.00...	Column	Pipe	A500 Gr.42	Typical	19.4	754	754	1510

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	Mast	8									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
1	M1	N1	N2			Mast	Column	Pipe	A500 Gr.42	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	8	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.375	5
2	M1	Y	-.375	5
3	M1	Y	-.168	5
4	M1	Y	-.288	5
5	M1	Y	-.108	5
6	M1	Y	-.138	5
7	M1	Y	-.026	5
8	M1	Y	-1.492	5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.5	5
2	M1	Y	-.718	5
3	M1	Y	-.259	5
4	M1	Y	-.295	5
5	M1	Y	-.134	5
6	M1	Y	-.18	5
7	M1	Y	-.108	5
8	M1	Y	-1.057	5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.346	5
2	M1	X	.53	5
3	M1	X	.177	5
4	M1	X	.173	5
5	M1	X	.09	5
6	M1	X	.13	5
7	M1	X	.067	5
8	M1	X	.492	5

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.706	5
2	M1	X	2.847	5
3	M1	X	.875	5
4	M1	X	.85	5
5	M1	X	.349	5
6	M1	X	.549	5
7	M1	X	.334	5
8	M1	X	2.3	5

Member Point Loads (BLC 6 : Service Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.352	5
2	M1	X	.587	5
3	M1	X	.18	5
4	M1	X	.175	5
5	M1	X	.072	5
6	M1	X	.113	5
7	M1	X	.069	5
8	M1	X	.474	5

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft..	End Location[ft,...
1	M1	Y	-.034	-.034	0	5

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft..	End Location[ft,...
1	M1	Y	-.031	-.031	0	0
2	M1	Y	-.178	-.178	0	5

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft..	End Location[ft,...
1	M1	X	.015	.015	0	0
2	M1	X	.016	.016	0	5

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft..	End Location[ft,...
1	M1	X	.08	.08	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft..	End Location[ft,...
2	M1	X	.083	.083	0	5

Member Distributed Loads (BLC 6 : Service Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/ft,F,k...	Start Location[ft..	End Location[ft,...
1	M1	X	.016	.016	0	0
2	M1	X	.017	.017	0	5

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					8	1		
3	Weight of Ice Only	None					8	2		
4	TIA Wind with Ice	None					8	2		
5	TIA Wind	None					8	2		
6	Service Wind	None					8	2		

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.0W	Yes	Y		1	1.2	2	1.2	5	1														
2	0.9D + 1.0W	Yes	Y		1	.9	2	.9	5	1														
3	1.2D +1.0Di + 1.0Wi	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.0D + 1.0W Service	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	N1	max	-2.205	3	8.791	3	0	4	0	4	0	4	52.664	1
2		min	-10.865	1	3.301	2	0	1	0	1	0	1	10.712	3
3	Totals:	max	-2.205	3	8.791	3	0	4						
4		min	-10.865	1	3.301	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	4	0	4	0	4	0	4	0	4	0	4
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	.088	1	0	2	0	4	0	4	0	4	-2.198e-04	3
4		min	.018	3	-.001	3	0	1	0	1	0	1	-1.08e-03	1

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

	Memb...	Shape	Code Check	L...	LC	Sh...	L...	Dir	...phi*P...	phi*Pn...	phi*Mn y-y [k-ft]	phi*...	Cb	Eqn
1	M1	HSS18.000...	.159	0	1	.049	0		1	722.7...	733.32	338.093	338..	2....	H1..

Joint Reactions (By Combination)

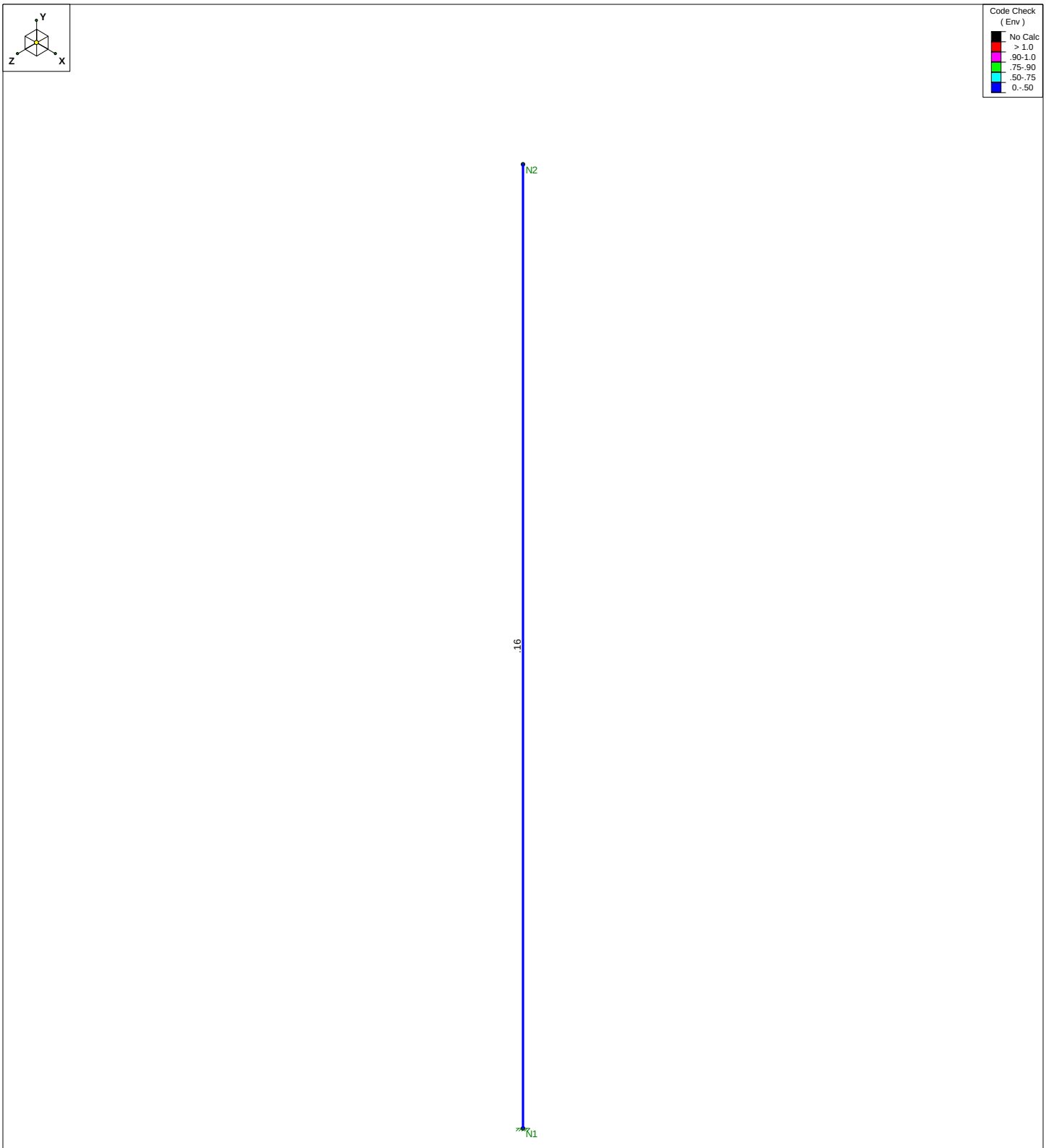
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	-10.865	4.402	0	0	0	52.664
2	1	Totals:	-10.865	4.402	0			
3	1	COG (ft):	X: 0	Y: 4.74	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	-10.865	3.301	0	0	0	52.66
2	2	Totals:	-10.865	3.301	0			
3	2	COG (ft):	X: 0	Y: 4.74	Z: 0			

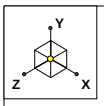
Joint Reactions (By Combination)

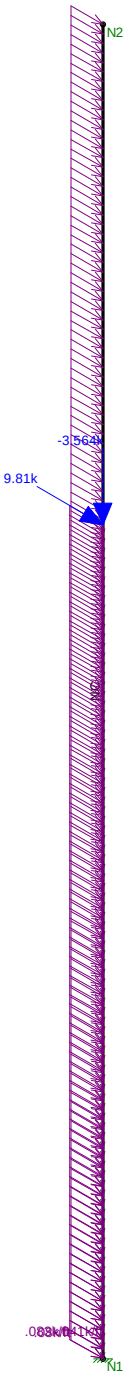
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N1	-2.205	8.791	0	0	0	10.712
2	3	Totals:	-2.205	8.791	0			
3	3	COG (ft):	X: 0	Y: 4.589	Z: 0			



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

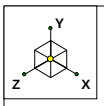
CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:05 PM
22021.07 /AT&T 5176	Unity Check	TIA.r3d





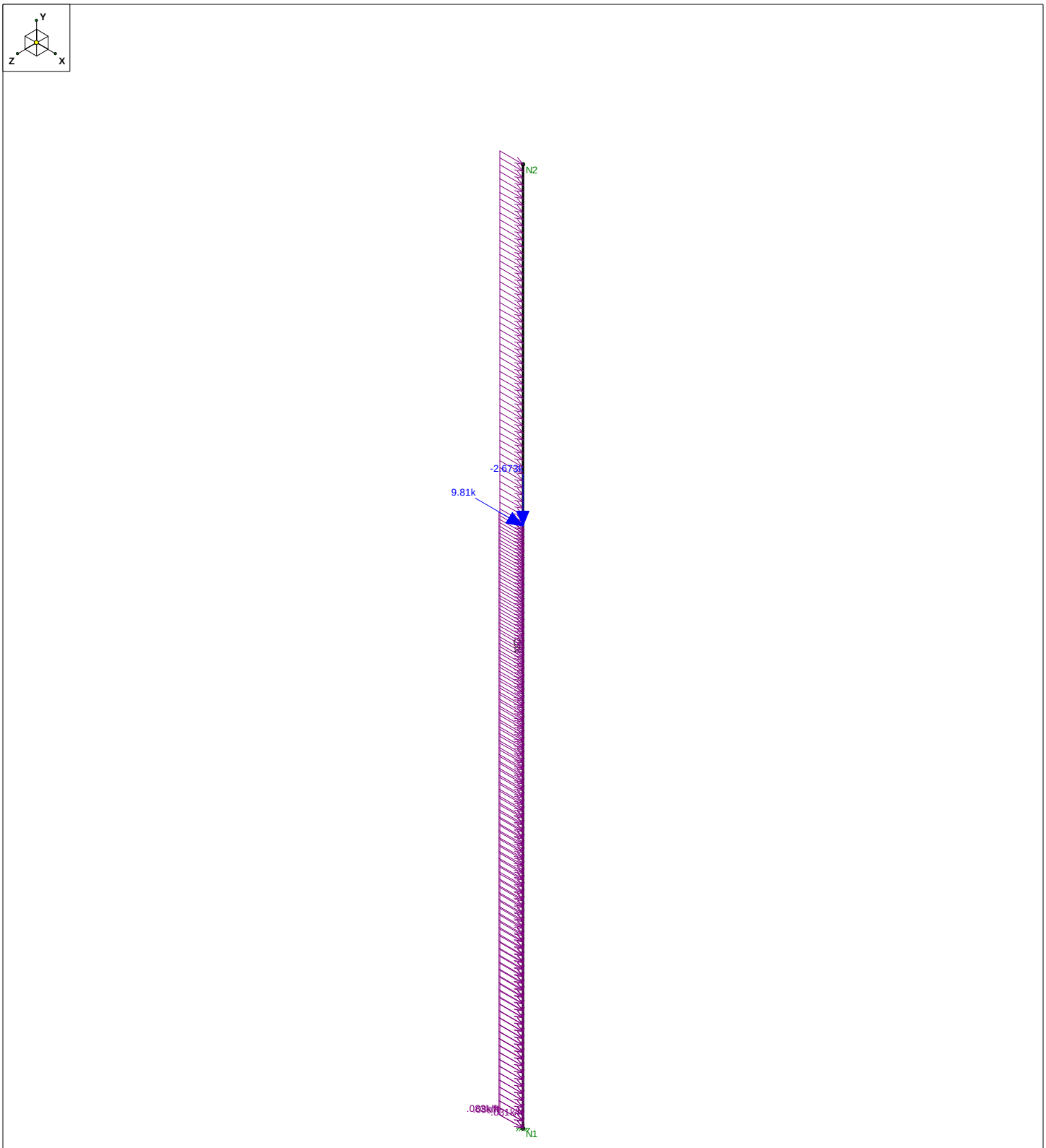
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.0W

CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:10 PM
22021.07 /AT&T 5176	LC #1 Loads	TIA.r3d



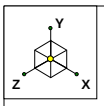
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:13 PM
22021.07 /AT&T 5176	LC #1 Reactions	TIA.r3d



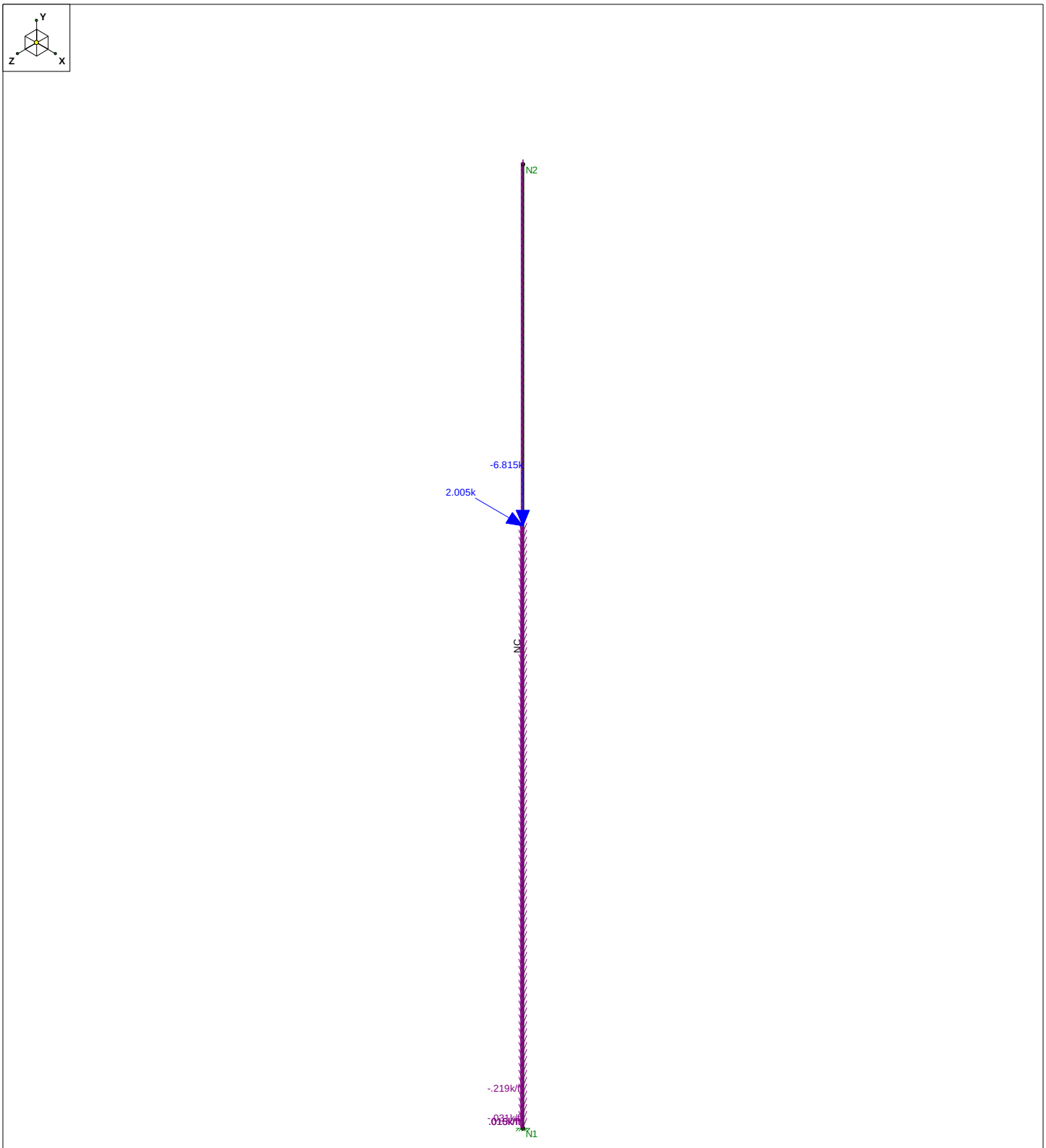
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.0W

CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:12 PM
22021.07 /AT&T 5176	LC #2 Loads	TIA.r3d



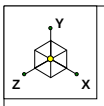
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:13 PM
22021.07 /AT&T 5176	LC #2 Reactions	TIA.r3d



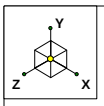
Member Code Checks Displayed
Loads: LC 3, 1.2D +1.0Di + 1.0Wi

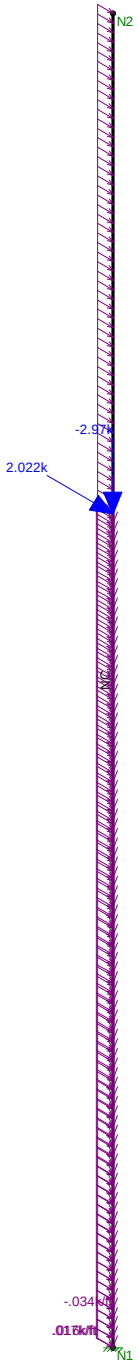
CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:12 PM
22021.07 /AT&T 5176	LC #3 Loads	TIA.r3d



Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:14 PM
22021.07 /AT&T 5176	LC #3 Reactions	TIA.r3d



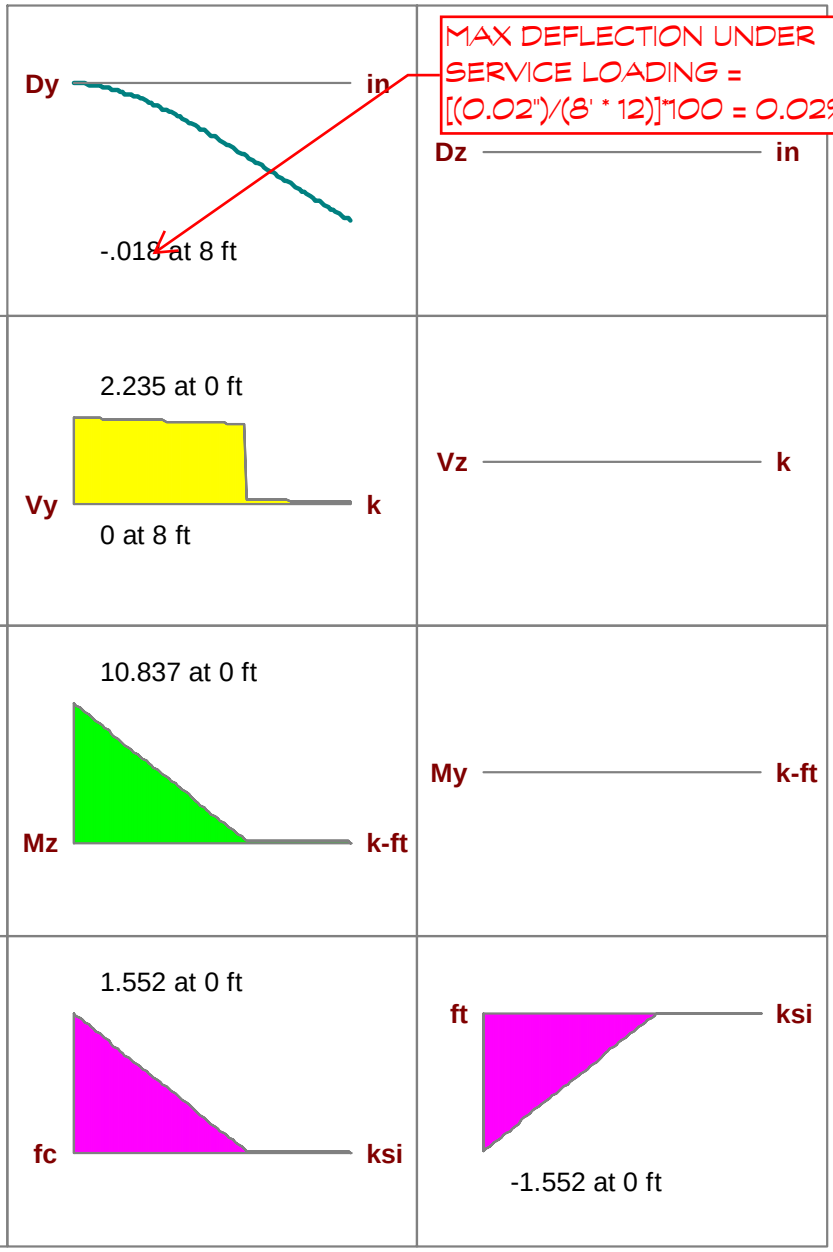


Member Code Checks Displayed
Loads: LC 4, 1.0D + 1.0WService

CENTEK Engineering, INC.		
TJL	Strcuture #10254- Mast	Feb 2, 2023 at 4:12 PM
22021.07 /AT&T 5176	LC #4 Loads	TIA.r3d

Column: ***M1***

Shape: **HSS18.000X0.375**
Material: **A500 Gr.42**
Length: **8 ft**
I Joint: **N1**
J Joint: **N2**
LC 4: 1.0D + 1.0WService
Code Check: **0.035 (bending)**
Report Based On 97 Sections



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

Direct Analysis Method

Max Bending Check	**0.035**	Max Shear Check	**0.010 (s)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/5306**

Bending	**Non-Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**42 ksi**	Lb	**8 ft**	**8 ft**
phi*Pnc	**722.718 k**	KL/r	**15.399**	**15.399**
phi*Pnt	**733.32 k**			
phi*Mny	**338.093 k-ft**	L Comp Flange	**8 ft**	
phi*Mnz	**338.093 k-ft**	L-torque	**8 ft**	
phi*Vny	**219.996 k**	Tau_b	**1**	
phi*Vnz	**219.996 k**			
phi*Tn	**322.809 k-ft**			
Cb	**2.457**			

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
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Subject:	Connection of Mast to Pole # 10254
Location:	Bethel, CT
Rev. 3: 2/2/23	Prepared by: T.J.L. Checked by: C.F.C. Job No. 22021.07

Mast Connection to Pole:

Reactions:

Moment =	Moment := 52.7·kip·ft	(Input From Risa-3D)
Vertical =	Vertical := 0·kips	(Input From Risa-3D)
Horizontal x-dir =	Horizontal := 10.9·kips	(Input From Risa-3D)

Bolt Data:

Bolt Type =	ASTMA325	(User Input)
Bolt Diameter =	D := 0.75·in	(User Input)
Number of Bolts Per Angle =	$N_b := 4$	(User Input)
Design Tensile Strength =	$F_t := 29.8 \cdot kips$	(User Input)
Allowable Shear Strength =	$F_v := 17.9 \cdot kips$	(User Input)
Distance Between Bolts =	$D_{bolt} := 25 \cdot in$	(User Input)

Shear Force =

$$f_v := \sqrt{\left(\frac{Horizontal}{N_b \cdot 2}\right)^2 + \left(\frac{Moment}{D_{bolt} \cdot N_b}\right)^2} = 6.5 \cdot kips$$

Bolt Shear % of Capacity =

$$\frac{f_v}{F_v} = 36.14 \cdot \%$$

Check Bolt Shear =

$$Bolt\_Shear := if\left(\frac{f_v}{F_v} \le 1.00, "OK", "Overstressed"\right)$$

Bolt_Shear = "OK"

Tension Force =

$$f_t := \frac{Horizontal}{N_b} = 2.7 \cdot kips$$

Bolt Tenison % of Capacity =

$$\frac{f_t}{F_t} = 9.14 \cdot \%$$

Check Bolt Tension =

$$Bolt\_Tension := if\left(\frac{f_t}{F_t} \le 1.00, "OK", "Overstressed"\right)$$

Bolt_Tension = "OK"

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Subject: Load Analysis of AT&T Equipment on Structure #10254

Location: Bethel, CT

Rev. 4: 3/7/23 Prepared by: T.J.L Checked by: C.F.C.
Job No. 22021.07

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2023 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 100$	mph	(User Input)
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input NESC 2023 Figure 250-1 & Table 250-1)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade = $TME := 148$ ft (User Input)

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

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.375$ (NESC 2023 Table 250-2)

Turbulence Intensity Constant = $C_{exp} := 0.2$ (NESC 2023 Table 250-3)

Integral Length Scale of Turbulence Constant = $L_s := 220$ (NESC 2023 Table 250-3)

Effective Height = $z_s := 0.67 \cdot TME = 99.16$ (NESC 2023 Table 250-3)

Turbulence Intensity = $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.166$ (NESC 2023 Table 250-3)

Response Term = $B_t := \left[\frac{1}{\left[1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right]}\right]^{0.5} = 0.894$ (NESC 2023 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(4.61 \cdot I_z \cdot B_t\right)\right]}{\left(1 + 6.1 \cdot I_z\right)} = 0.836$ (NESC 2023 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 29.4$ (NESC 2023 Section 250.C.1)

Shape Factors

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

Overload Factors

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

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Subject:	Load Analysis of AT&T Equipment on Structure #10254
Location:	Bethel, CT
Rev. 4: 3/7/23	Prepared by: T.J.L Checked by: C.F.C. Job No. 22021.07

Development of Wind & Ice Load on Mast

Mast Data: (HSS18x0.375)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 18$	in	(User Input)
Mast Length =	$L_{mast} := 8$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.5$ sf/ft

Total Mast Wind Force (Above Structure) =	$qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 88$	plf	**BLC 5**
Total Mast Wind Force (Below Structure) =	$qz \cdot Cd_{coax} \cdot A_{mast} = 71$	plf	**BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.583$ sf/ft

Total Mast Wind Force w/ Ice =	$p \cdot Cd_{coax} \cdot AICE_{mast} = 10$	plf	**BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 29.1$ sq in

Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 11$		plf	**BLC 3**

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Subject:	Load Analysis of AT&T Equipment on Structure #10254
Location:	Bethel, CT
Rev. 4: 3/7/23	Prepared by: T.J.L Checked by: C.F.C. Job No. 22021.07

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Qunitel QS66512-2		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 12$	in	(User Input)
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 125$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{a1} := WT_{ant} \cdot N_{ant} = 375$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 1765$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 57$ lbs

Weight of Ice on All Antennas = $Wt_{i.a1} := W_{ICEant} \cdot N_{ant} = 172$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 6.59$ $EPA_T := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(T_{ant} + 2 \cdot Ir\right)}{144} = 5.$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 6.59$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.68$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 5.68$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 17.946$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 115$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 4.8$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 6$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.1$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 5.1$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 16.2$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 954$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Quintel QD6616-7		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 22$	in	(User Input)
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 125$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{a1} := WT_{ant} \cdot N_{ant} = 375$ lbs

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 2591$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 84$ lbs

Weight of Ice on All Antennas = $Wt_{i.a1} := W_{ICEant} \cdot N_{ant} = 252$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 11.66$ $EPA_T := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(T_{ant} + 2 \cdot Ir\right)}{144} = 5.$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 11.66$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 6.95$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 6.95$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 25.55$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 164$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 11$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 4.8$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 11$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 6.35$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 6.35$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 23.7$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 1395$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $Wt_{a1} := WT_{ant} \cdot N_{ant} = 168$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3655$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 901$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 29$ lbs

Weight of Ice on All Antennas = $Wt_{i.a1} := W_{ICEant} \cdot N_{ant} = 88$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 3.81$ $EPA_T := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(T_{ant} + 2 \cdot Ir\right)}{144} = 1.$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.81$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 2.34$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 2.34$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 8.493$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 54$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 3.48$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 1.58$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.48$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 2.05$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 2.05$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 7.581$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 446$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 30.6$	in	(User Input)
Antenna Width =	$W_{ant} := 15.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 10.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 96$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{a1} := WT_{ant} \cdot N_{ant} = 288$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5157$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 1038$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 34$ lbs

Weight of Ice on All Antennas = $Wt_{i.a1} := W_{ICEant} \cdot N_{ant} = 101$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 3.71$ $EPA_T := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(T_{ant} + 2 \cdot Ir\right)}{144} = 2.$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.71$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 2.84$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 2.84$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 9.381$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 60$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 3.38$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 2.25$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.38$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 2.53$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 2.53$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 8.447$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 497$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Kaelus TMA2117F00V1-1		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 8.46$	in	(User Input)
Antenna Width =	$W_{ant} := 11.81$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.21$	in	(User Input)
Antenna Weight =	$WT_{ant} := 18$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{a1} := WT_{ant} \cdot N_{ant} = 108$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 421$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 211$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 7$ lbs

Weight of Ice on All Antennas = $Wt_{i.a1} := W_{ICEant} \cdot N_{ant} = 41$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 0.84$ $EPA_T := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(T_{ant} + 2 \cdot Ir\right)}{144} = 0.$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.84$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.47$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.47$

$EPA_{tot} := EPA_{A1} \cdot 2 + EPA_{A2} \cdot 2 + EPA_{A3} \cdot 2 = 3.551$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 23$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 0.69$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.25$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.69$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.36$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.36$

$EPA_{tot} := EPA_{A1} \cdot 2 + EPA_{A2} \cdot 2 + EPA_{A3} \cdot 2 = 2.824$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 166$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI TMABPD7823VG12A		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 14.25$	in	(User Input)
Antenna Width =	$W_{ant} := 11.024$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.11$	in	(User Input)
Antenna Weight =	$WT_{ant} := 23$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{a1} := WT_{ant} \cdot N_{ant} = 138$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 646$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 291$ cu in

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

Weight of Ice on All Antennas = $Wt_{i.a1} := W_{ICEant} \cdot N_{ant} = 57$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 1.27$ $EPA_T := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(T_{ant} + 2 \cdot Ir\right)}{144} = 0.!$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.27$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.72$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.72$

$EPA_{tot} := EPA_{A1} \cdot 2 + EPA_{A2} \cdot 2 + EPA_{A3} \cdot 2 = 5.444$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 35$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 1.09$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.41$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.09$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.58$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.58$

$EPA_{tot} := EPA_{A1} \cdot 2 + EPA_{A2} \cdot 2 + EPA_{A3} \cdot 2 = 4.493$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 264$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 235$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.3$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 28$	lbs	**BLC 4**

Gravity Load (without ice)

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

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5878$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1144$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 37$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 37$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type =	SitePro RMV12-396 w/ Handrail		
Mount Shape =	Flat		(User Input)
Mount Area =	$CdA_{mnt} := 34$	sq ft	(User Input)
Mount Area w/ Ice =	$CdA_{ICEmnt} := 45.5$	sq ft	(User Input)
Mount Weight =	$WT_{mnt} := 1492$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{ICEmnt} := 1807$	lbs	(User Input)

Gravity Load (without ice)

Weight of Mount = $WT_{mnt} = 1492$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Mount = $WT_{ICEmnt} - WT_{mnt} = 315$ lbs **BLC 3**

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt} := p \cdot Cd_F \cdot CdA_{ICEmnt} = 291$ lbs **BLC 4**

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt} := qz \cdot Cd_F \cdot CdA_{mnt} \cdot m = 2001$ lbs **BLC 5**

Total Pipe Length = $TPL := 8 \cdot ft \cdot 9 = 72\,ft$

Total Antenna Length = $TAL := 72 \cdot in \cdot 3 + 72 \cdot in \cdot 3 + 31.1 \cdot in \cdot 3 + 30.6 \cdot in \cdot 3 = 51.425\,ft$

Exposed Pipe Area = $ExPA := (TPL - TAL)2.375 \cdot in = 4.072\,ft^2$

CaAa = $1.3 \cdot ExPA + (3.5 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.3 + 4 \cdot in \cdot 36 \cdot in \cdot 3 \cdot 1.6 + (2.375 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.3 = 33.961\,ft^2$

Exposed Pipe Area (with Ice) = $ExPA := (TPL - TAL)3.375 \cdot in = 5.787\,ft^2$

CaAa (with ice) = $1.3 \cdot ExPA + (4.5 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.3 + 5 \cdot in \cdot 36 \cdot in \cdot 3 \cdot 1.6 + (3.375 \cdot in) \cdot 150 \cdot in \cdot 3 \cdot 1.3 = 45.5\,ft^2$

$1230 \cdot lb + 262 \cdot lb = 1492\,lb$

$\left[\left[(3.375)^2 - (2.375)^2\right] \cdot 96 \cdot 9 + \left[(4.5)^2 - (3.5)^2\right] \cdot 150 \cdot 3 + \left[(3.375)^2 - (2.375)^2\right] \cdot 150 \cdot 3\right] \cdot in^3 \cdot \frac{\pi}{4} \cdot (Id \cdot pcf) = 284\,lbf$

$\left[(5)^2 - (4)^2\right] \cdot 36 \cdot 3 \cdot in^3 \cdot (Id \cdot pcf) = 31\,lbf$

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	1-5/8"			
Shape =	Round		(User Input)	
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)	
Coax Cable Length =	$L_{coax} := 8$	ft	(User Input)	
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)	
Total Number of Coax =	$N_{coax} := 33$		(User Input - 30 Coax & 1 Hybrid & 2 DC)	
No. of Coax Projecting Outside Face of Member =	$NP_{coax} := 6$		(User Input)	

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 58$ plf **BLC 5**

Total Coax Wind Force (Below Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 47$ plf **BLC 5**

Wind Load (NESC Heavy)

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

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

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 34$ plf **BLC 2**

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 50$ 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 15th(360-16): 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 Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	HSS18.000X0.375	Column	Pipe	A500 Gr.42	Typical	19.4	754	754	1510

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	Mast	8									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
1	M1	N1	N2			Mast	Column	Pipe	A500 Gr.42	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	8	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.375	5
2	M1	Y	-.375	5
3	M1	Y	-.168	5
4	M1	Y	-.288	5
5	M1	Y	-.108	5
6	M1	Y	-.138	5
7	M1	Y	-.026	5
8	M1	Y	-1.492	5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.172	5
2	M1	Y	-.252	5
3	M1	Y	-.088	5
4	M1	Y	-.101	5
5	M1	Y	-.041	5
6	M1	Y	-.057	5
7	M1	Y	-.037	5
8	M1	Y	-.315	5

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.115	5
2	M1	X	.164	5
3	M1	X	.054	5
4	M1	X	.06	5
5	M1	X	.023	5
6	M1	X	.035	5
7	M1	X	.028	5
8	M1	X	.291	5

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.954	5
2	M1	X	1.395	5
3	M1	X	.446	5
4	M1	X	.497	5
5	M1	X	.166	5
6	M1	X	.264	5
7	M1	X	.235	5
8	M1	X	2.001	5

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	-.034	-.034	0	5

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	-.011	-.011	0	0
2	M1	Y	-.05	-.05	0	5

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	.01	.01	0	0
2	M1	X	.007	.007	0	5

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	.088	.088	0	0
2	M1	X	.058	.058	0	5

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					8	1		
3	Weight of Ice Only	None					8	2		
4	NESC Heavy Wind	None					8	2		
5	NESC Extreme Wind	None					8	2		

Load Combinations

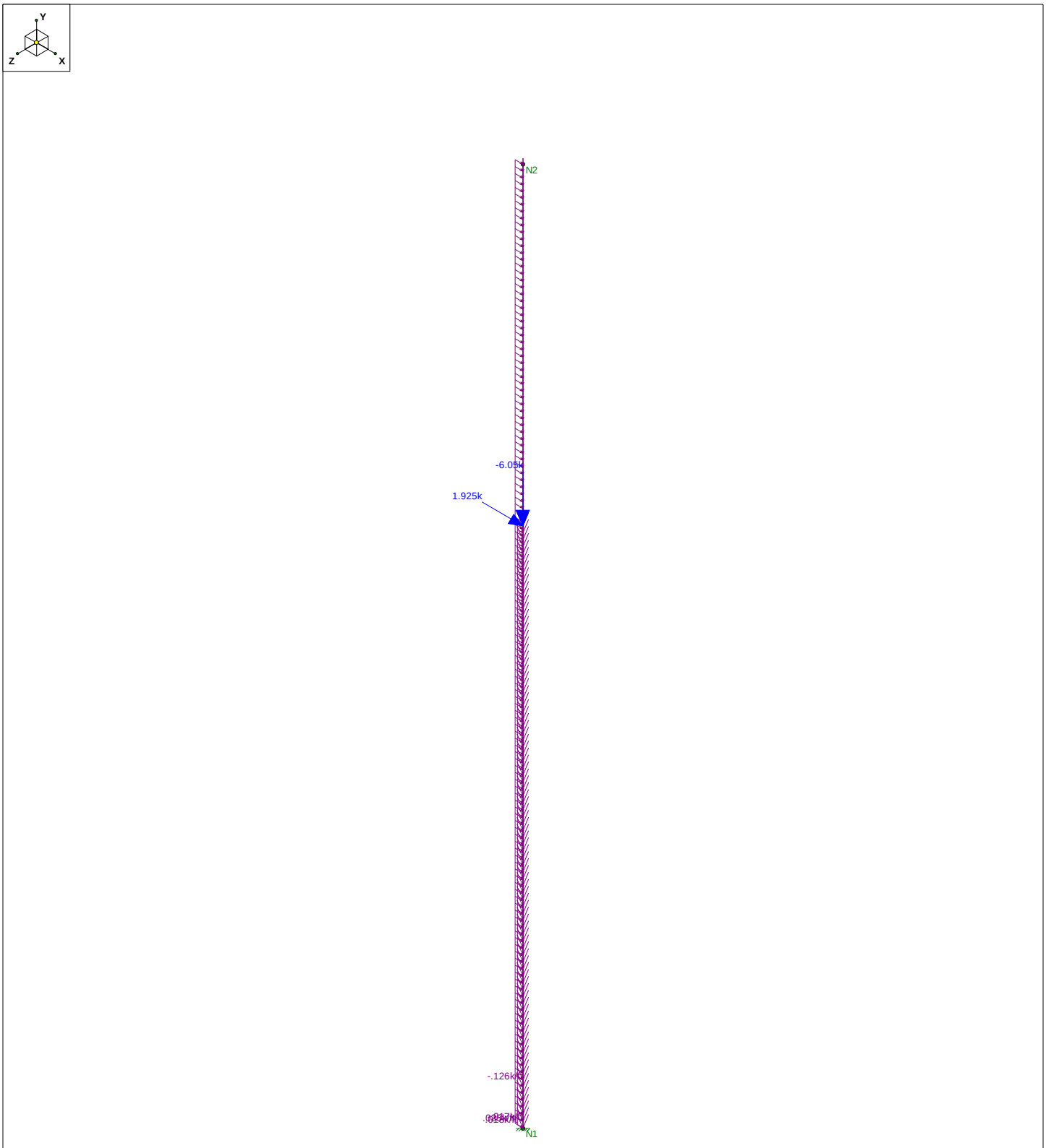
	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind	Yes	Y		1	1.5	2	1.5	3	1.5	4	2.5														
2	NESC Extreme Wind	Yes	Y		1	1	2	1	5	1																

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	-2.212	7.604	0	0	0	10.649
2	1	Totals:	-2.212	7.604	0			
3	1	COG (ft):	X: 0	Y: 4.671	Z: 0			

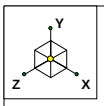
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	-6.952	3.668	0	0	0	33.339
2	2	Totals:	-6.952	3.668	0			
3	2	COG (ft):	X: 0	Y: 4.74	Z: 0			



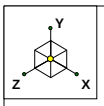
Loads: LC 1, NESC Heavy Wind

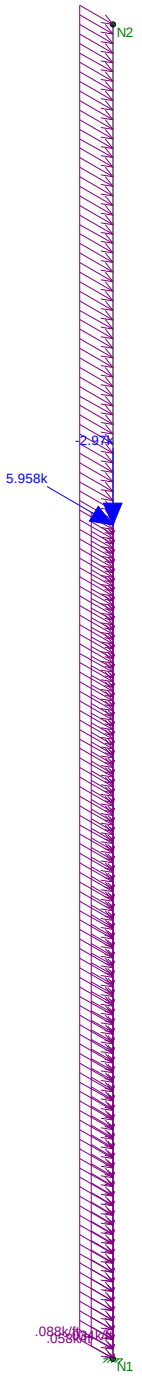
CENTEK Engineering, Inc.		
TJL	Structure # 10254 - Mast	Mar 7, 2023 at 11:49 AM
22021.07 /AT&T 5176	LC #1 Loads	NESC.r3d



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

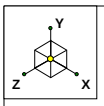
CENTEK Engineering, Inc.		
TJL	Structure # 10254 - Mast	Mar 7, 2023 at 11:50 AM
22021.07 /AT&T 5176	LC #1 Reactions	NESC.r3d





Loads: LC 2, NESC Extreme Wind

CENTEK Engineering, Inc.		
TJL	Structure # 10254 - Mast	Mar 7, 2023 at 11:49 AM
22021.07 /AT&T 5176	LC #2 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
TJL	Structure # 10254 - Mast	Mar 7, 2023 at 11:50 AM
22021.07 /AT&T 5176	LC #2 Reactions	NESC.r3d

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Subject: Coax Cable on Pole #10254

Location: Bethel, CT

Rev. 4: 3/7/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 22021.07

Coax Cable on CL&P Pole

Coaxial Cable Span $Coax_{Span} := 10ft$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ (User Input NESC 2023 Figure 250-1 & Table 250-1)

Radial Ice Thickness = $Ir := 0.5 \cdot in$ (User Input NESC 2023 Figure 250-1 & Table 250-1)

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

Basic Windspeed = $V := 100$ mph (User Input)

Height to Top of Coax Above Grade = $TC := 140$ ft (User Input)

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

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.249$ (NESC 2023 Table 250-2)

Turbulence Intensity Constant = $C_{exp} := 0.2$ (NESC 2023 Table 250-3)

Integral Length Scale of Turbulence Constant = $L_s := 220$ (NESC 2023 Table 250-3)

Effective Height = $z_s := 0.67 \cdot TC = 93.8$ (NESC 2023 Table 250-3)

Turbulence Intensity = $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.168$ (NESC 2023 Table 250-3)

Response Term = $B_t := \left[\frac{1}{\left[1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right]}\right]^{0.5} = 0.898$ (NESC 2023 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(4.61 \cdot I_z \cdot B_t\right)\right]}{\left(1 + 6.1 \cdot I_z\right)} = 0.838$ (NESC 2023 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 26.8$ psf (NESC 2023 Section 250.C.1)

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Branford, CT 06405 F: (203) 488-8587

Subject: Coax Cable on Pole #10254

Location: Bethel, CT

Rev. 4: 3/7/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 22021.07

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 = $N_{coax} := 33$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 4$ *(User Input)*

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

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

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

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

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

Project Width without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 7.92 \cdot in$

Project Width with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 8.92 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 49.993 \cdot plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$Heavy\_WInd_{Vert} = 1265\,lb$ $Heavy\_Wind_{Trans} = 119\,lb$

Extreme Wind Vertical Load =

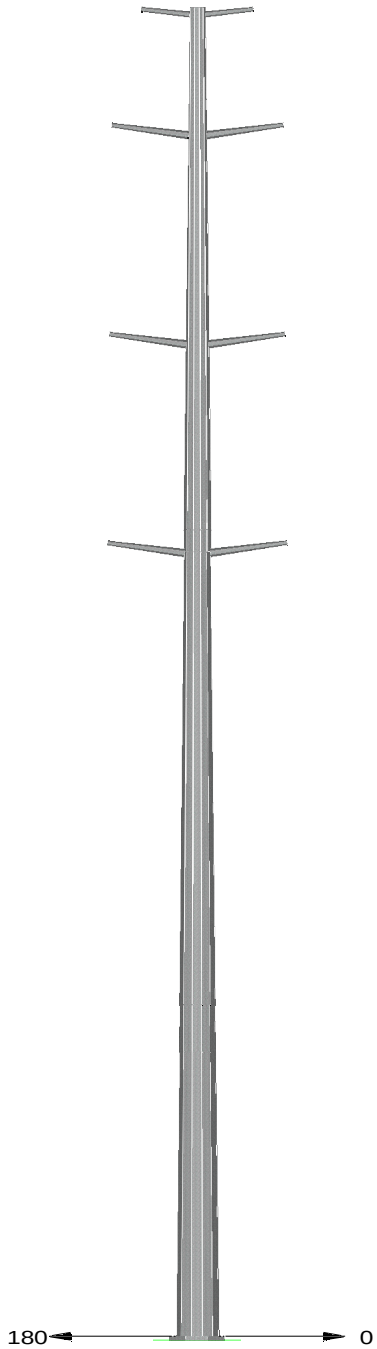
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

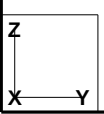
Extreme Wind Transverse Load =

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

$Extreme\_Wind_{Vert} = 343\,lb$ $Extreme\_Wind_{Trans} = 283\,lb$

Centek Engineering Inc, Project: "cl&p structure # 10254"
PLS-POLE Version 16.81, 6:23:32 PM Wednesday, October 05, 2022
Undeformed geometry displayed





20 (ft)

Project Name : 22021.07 - Bethel, CT
Project Notes: Structure # 10254 / AT&T CT5176
Project File : J:\Jobs\2202100.WI\07_CT5176\05_Structural\Backup Documentation\Rev (4)\Calcs\PLS Pole\cl&p structure # 10254.pol
Date run : 11:54:49 AM Tuesday, March 07, 2023
by : PLS-POLE Version 17.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Load case 'NESC Extreme' uses loading method NESC 2023 which is still being tested and/or is a draft. Carefully check your results. ??
The model has 1 warning. ??

Loads from file: J:\Jobs\2202100.WI\07_CT5176\05_Structural\Backup Documentation\Rev (4)\Calcs\PLS Pole\cl&p #10254.lca

*** Analysis Results:

Maximum element usage is 98.43% for Base Plate "10254" in load case "NESC Extreme"
Maximum insulator usage is 41.67% for Clamp "Clamp25" 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)	Resultant Force (kips)	Bending Moment (ft-k)	Foundation Usage %
NESC Heavy	10254:g	115.71	38.88	122.07	4294.18	0.00
NESC Extreme	10254:g	55.22	53.60	76.95	5517.92	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	10254:g	-0.19	-38.88	-115.71	38.88	4294.17	-12.10	4294.18	-0.00	0.00
NESC Extreme	10254:g	-0.05	-53.60	-55.22	53.60	5517.92	-2.94	5517.92	-0.00	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	10254:t	0.21	98.16	-3.90	98.23	0.01	-6.07	0.00
NESC Extreme	10254:t	0.05	125.20	-6.28	125.36	0.00	-7.90	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
10254	1	5023	NESC Extreme	81.03	1159.41
10254	2	10059	NESC Extreme	92.94	3392.57
10254	3	10117	NESC Extreme	95.71	5517.92

*** 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)
10254	95.71	NESC Extreme	2.5	37	28299.2

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
Davit1	13.46	NESC Heavy	139.4	1	61.2
Davit2	17.98	NESC Heavy	139.4	1	61.2
Davit3	78.21	NESC Heavy	126.9	1	121.4
Davit4	90.99	NESC Heavy	126.9	1	121.4
Davit5	79.12	NESC Heavy	104.9	1	121.4
Davit6	91.65	NESC Heavy	104.9	1	121.4
Davit7	80.49	NESC Heavy	82.9	1	121.4
Davit8	92.62	NESC Heavy	82.9	1	121.4

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	92.62	Davit8	Tubular Davit
NESC Extreme	98.43	10254	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Height AGL (ft)	Segment Number
NESC Heavy	76.05	10254	7.5	36
NESC Extreme	95.71	10254	2.5	37

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	10254	12	42.310	112.615	4294.165	-12.098	47.032	291.922	5	158.062	2.877	78.39
NESC Extreme	10254	12	42.310	52.119	5517.916	-2.943	59.056	366.555	5	198.292	3.224	98.43

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Height AGL (ft)	Segment Number

NESC Heavy	92.62	Davit8	82.9	1
NESC Extreme	38.07	Davit8	82.9	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	1.97	NESC Heavy	0.0
Clamp2	Clamp	2.04	NESC Heavy	0.0
Clamp3	Clamp	10.34	NESC Heavy	0.0
Clamp4	Clamp	10.34	NESC Heavy	0.0
Clamp5	Clamp	10.34	NESC Heavy	0.0
Clamp6	Clamp	10.34	NESC Heavy	0.0
Clamp7	Clamp	10.34	NESC Heavy	0.0
Clamp8	Clamp	10.34	NESC Heavy	0.0
Clamp9	Clamp	9.50	NESC Heavy	0.0
Clamp10	Clamp	1.59	NESC Heavy	0.0
Clamp11	Clamp	1.59	NESC Heavy	0.0
Clamp12	Clamp	1.59	NESC Heavy	0.0
Clamp13	Clamp	1.59	NESC Heavy	0.0
Clamp14	Clamp	1.59	NESC Heavy	0.0
Clamp15	Clamp	1.59	NESC Heavy	0.0
Clamp16	Clamp	1.59	NESC Heavy	0.0
Clamp17	Clamp	1.59	NESC Heavy	0.0
Clamp18	Clamp	1.59	NESC Heavy	0.0
Clamp19	Clamp	1.59	NESC Heavy	0.0
Clamp20	Clamp	1.59	NESC Heavy	0.0
Clamp21	Clamp	1.59	NESC Heavy	0.0
Clamp22	Clamp	1.59	NESC Heavy	0.0
Clamp23	Clamp	1.59	NESC Heavy	0.0
Clamp24	Clamp	8.69	NESC Extreme	0.0
Clamp25	Clamp	41.67	NESC Extreme	0.0
Clamp26	Clamp	41.67	NESC Extreme	0.0

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 850.8
Weight of Steel Poles: 28299.2
Total: 29150.0

*** End of Report

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**************************************************************************
*                                                                        *
*                              PLS-POLE                                  *
*                   POLE AND FRAME ANALYSIS AND DESIGN                   *
*               Copyright Power Line Systems 1999-2022                   *
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Project Name : 22021.07 - Bethel, CT
Project Notes: Structure # 10254 / AT&T CT5176
Project File : J:\Jobs\2202100.WI\07_CT5176\05_Structural\Backup Documentation\Rev (4)\Calcs\PLS Pole\cl&p structure # 10254.pol
Date run   : 11:54:47 AM Tuesday, March 07, 2023
by   : PLS-POLE Version 17.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Load case 'NESC Extreme' uses loading method NESC 2023 which is still being tested and/or is a draft. Carefully check your results. ??
The model has 1 warning. ??

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	Stock Length	Default	Base	Shape	Tip	Base	Taper Default	Tubes Modulus of	Weight	Shape	Strength Distance Ultimate	Ultimate	Texture

Property Label	Number	Embedded Length (ft)	Plate Length (ft)	Plate	Diameter (in)	Diameter (in)	Drag Coef. (in/ft)	Elasticity Override (ksi)	Density Override (lbs/ft^3)	At Base	Check Type	From Tip (ft)	Trans. Load (kips)	Long. Load (kips)	
CL&P10254	10254	140.00	0	Yes	12F	20.19	53.5	0	1.6	3 tubes	0	0	Calculated	0.000	0.0000	0.0000	Galvanized Steel

Steel Tubes Properties:

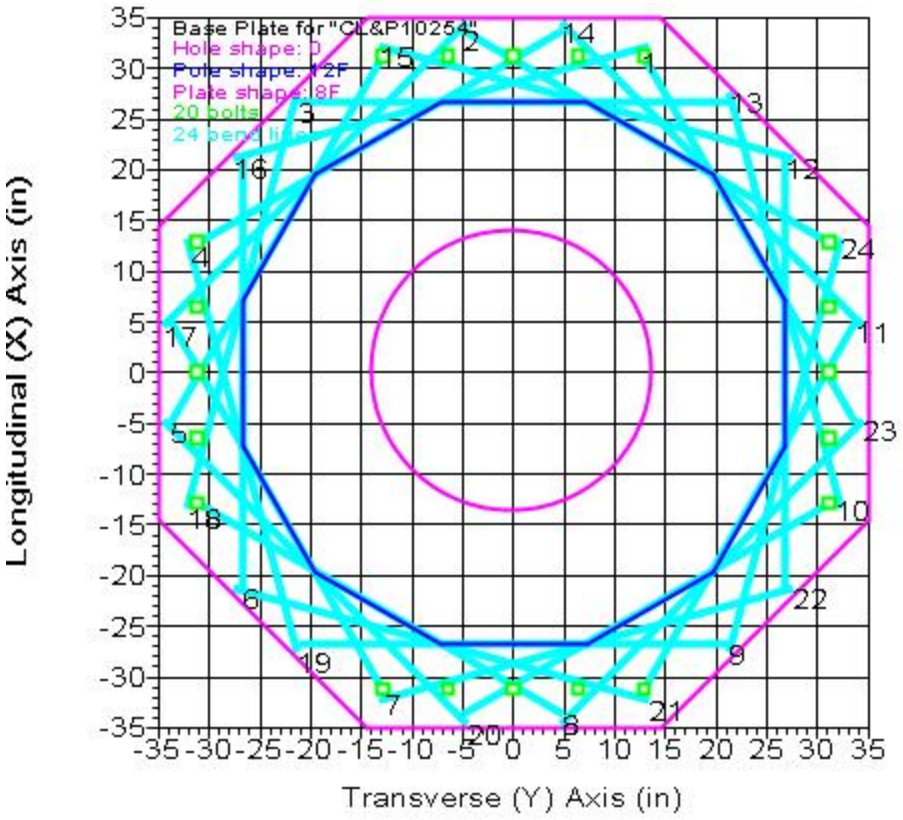
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap or Butt Offset (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Lap Length (ft)	Diam. Actual Overlap (ft)
CL&P10254	1	55	0.3125	4.670	0.000	0.000	65.000	0.000	5023	29.85	0.24866	20.19	33.86	4.155	4.670
CL&P10254	2	54.67	0.4375	6.170	0.000	0.000	65.000	0.000	10059	28.95	0.24866	32.08	45.67	5.600	6.170
CL&P10254	3	41.17	0.46875	0.000	0.000	0.000	65.000	0.000	10117	21.32	0.24866	43.26	53.50	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&P10254	70.000	8F	3.250	3100	42.310	28.000	0	490.00	60.000	2.250	62.375	20	41968.80	41968.80

Base Plate Bolt Coordinates for Property "CL&P10254":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0	1	0
1	0.2064	0
1	0.4128	0
0.4128	1	0
0.2064	1	0
1	0	0



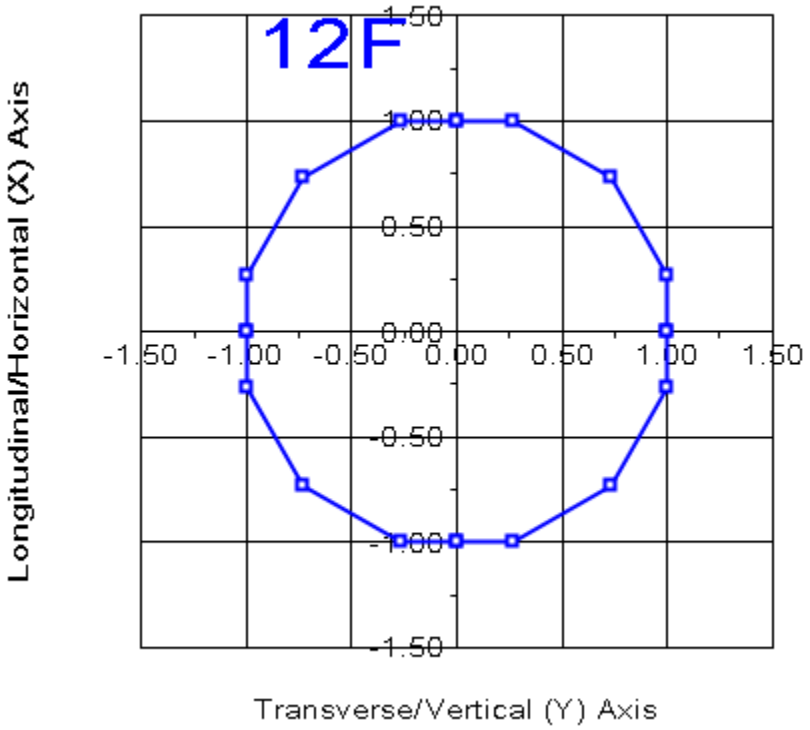
Steel Pole Connectivity:

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)
10254			0	0	0	0	0	CL&P10254	21 labels		0.00	0

Relative Attachment Labels for Steel Pole "10254":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
10254:Arm1	0.00	139.30
10254:Arm2	0.00	126.63
10254:Arm3	0.00	104.63
10254:Arm4	0.00	82.63
10254:TopConn	0.00	138.50

10254:WVGD1	0.00	5.00
10254:WVGD2	0.00	15.00
10254:WVGD3	0.00	25.00
10254:WVGD4	0.00	35.00
10254:WVGD5	0.00	45.00
10254:WVGD6	0.00	55.00
10254:WVGD7	0.00	65.00
10254:WVGD8	0.00	75.00
10254:WVGD9	0.00	85.00
10254:WVGD10	0.00	95.00
10254:WVGD11	0.00	105.00
10254:WVGD12	0.00	115.00
10254:WVGD13	0.00	125.00
10254:WVGD14	0.00	135.00
10254:TopConT	0.00	139.00
10254:TopConB	0.00	138.00



Pole Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
10254	10254:t	10254:t Ori	0.00	20.19	19.97	1009.93	1009.93	0.00	14.6	65.00	65.00	541.96	541.96

10254	10254:Arm1	10254:Arm1	End	0.70	20.36	20.15	1036.69	1036.69	0.00	14.8	65.00	65.00	551.57	551.57
10254	10254:Arm1	10254:Arm1	Ori	0.70	20.36	20.15	1036.69	1036.69	0.00	14.8	65.00	65.00	551.57	551.57
10254	10254:TopConT	10254:TopConT	End	1.00	20.44	20.22	1048.30	1048.30	0.00	14.8	65.00	65.00	555.71	555.71
10254	10254:TopConT	10254:TopConT	Ori	1.00	20.44	20.22	1048.31	1048.31	0.00	14.8	65.00	65.00	555.71	555.71
10254	10254:TopConn	10254:TopConn	End	1.50	20.56	20.35	1067.85	1067.85	0.00	14.9	65.00	65.00	562.65	562.65
10254	10254:TopConn	10254:TopConn	Ori	1.50	20.56	20.35	1067.85	1067.85	0.00	14.9	65.00	65.00	562.65	562.65
10254	10254:TopConB	10254:TopConB	End	2.00	20.68	20.47	1087.64	1087.64	0.00	15.1	65.00	65.00	569.63	569.63
10254	10254:TopConB	10254:TopConB	Ori	2.00	20.68	20.47	1087.64	1087.64	0.00	15.1	65.00	65.00	569.63	569.63
10254	10254:WVGD14	10254:WVGD14	End	5.00	21.43	21.22	1211.53	1211.53	0.00	15.7	65.00	65.00	612.43	612.43
10254	10254:WVGD14	10254:WVGD14	Ori	5.00	21.43	21.22	1211.53	1211.53	0.00	15.7	65.00	65.00	612.43	612.43
10254	#10254:0	Tube 1	End	9.19	22.47	22.27	1399.69	1399.69	0.00	16.6	65.00	65.00	674.76	674.76
10254	#10254:0	Tube 1	Ori	9.19	22.47	22.27	1399.69	1399.69	0.00	16.6	65.00	65.00	674.76	674.76
10254	10254:Arm2	10254:Arm2	End	13.38	23.51	23.31	1606.40	1606.40	0.00	17.5	65.00	65.00	740.12	740.12
10254	10254:Arm2	10254:Arm2	Ori	13.38	23.51	23.31	1606.40	1606.40	0.00	17.5	65.00	65.00	740.12	740.12
10254	10254:WVGD13	10254:WVGD13	End	15.00	23.92	23.72	1691.79	1691.79	0.00	17.8	65.00	65.00	766.29	766.29
10254	10254:WVGD13	10254:WVGD13	Ori	15.00	23.92	23.72	1691.79	1691.79	0.00	17.8	65.00	65.00	766.29	766.29
10254	#10254:1	Tube 1	End	20.00	25.16	24.97	1973.41	1973.41	0.00	18.9	65.00	65.00	849.68	849.68
10254	#10254:1	Tube 1	Ori	20.00	25.16	24.97	1973.41	1973.41	0.00	18.9	65.00	65.00	849.68	849.68
10254	10254:WVGD12	10254:WVGD12	End	25.00	26.40	26.22	2284.67	2284.67	0.00	20.0	65.00	65.00	937.38	937.38
10254	10254:WVGD12	10254:WVGD12	Ori	25.00	26.40	26.22	2284.67	2284.67	0.00	20.0	65.00	65.00	937.38	937.38
10254	#10254:2	Tube 1	End	30.00	27.65	27.47	2627.05	2627.05	0.00	21.0	65.00	65.00	1029.38	1029.38
10254	#10254:2	Tube 1	Ori	30.00	27.65	27.47	2627.05	2627.05	0.00	21.0	65.00	65.00	1029.38	1029.38
10254	10254:WVGD11	10254:WVGD11	End	35.00	28.89	28.72	3002.04	3002.04	0.00	22.1	65.00	65.00	1125.70	1125.70
10254	10254:WVGD11	10254:WVGD11	Ori	35.00	28.89	28.72	3002.04	3002.04	0.00	22.1	65.00	65.00	1125.70	1125.70
10254	10254:Arm3	10254:Arm3	End	35.38	28.98	28.81	3031.52	3031.52	0.00	22.2	65.00	65.00	1133.09	1133.09
10254	10254:Arm3	10254:Arm3	Ori	35.38	28.98	28.81	3031.52	3031.52	0.00	22.2	65.00	65.00	1133.09	1133.09
10254	#10254:3	Tube 1	End	40.19	30.18	30.01	3427.14	3427.14	0.00	23.2	65.00	65.00	1230.17	1230.17
10254	#10254:3	Tube 1	Ori	40.19	30.18	30.01	3427.14	3427.14	0.00	23.2	65.00	65.00	1230.17	1230.17
10254	10254:WVGD10	10254:WVGD10	End	45.00	31.38	31.21	3855.77	3855.77	0.00	24.2	65.00	65.00	1331.24	1331.24
10254	10254:WVGD10	10254:WVGD10	Ori	45.00	31.38	31.21	3855.77	3855.77	0.00	24.2	65.00	65.00	1331.24	1331.24
10254	#10254:4	Tube 1	End	47.67	32.04	31.88	4107.81	4107.81	0.00	24.8	65.00	65.00	1388.93	1388.93
10254	#10254:4	Tube 1	Ori	47.67	32.04	31.88	4107.81	4107.81	0.00	24.8	65.00	65.00	1388.93	1388.93
10254	#10254:5	SpliceT	End	50.33	32.70	32.55	4370.60	4370.60	0.00	25.4	65.00	65.00	1447.84	1447.84
10254	#10254:5	SpliceT	Ori	50.33	32.70	32.55	4370.60	4370.60	0.00	25.4	65.00	65.00	1447.84	1447.84
10254	10254:WVGD9	10254:WVGD9	End	55.00	33.24	46.14	6355.40	6355.40	0.00	17.7	65.00	65.00	2071.37	2071.37
10254	10254:WVGD9	10254:WVGD9	Ori	55.00	33.24	46.14	6355.40	6355.40	0.00	17.7	65.00	65.00	2071.37	2071.37
10254	10254:Arm4	10254:Arm4	End	57.38	33.83	46.97	6704.85	6704.85	0.00	18.0	65.00	65.00	2147.12	2147.12
10254	10254:Arm4	10254:Arm4	Ori	57.38	33.83	46.97	6704.86	6704.86	0.00	18.0	65.00	65.00	2147.12	2147.12
10254	#10254:6	Tube 2	End	61.19	34.78	48.31	7292.22	7292.22	0.00	18.6	65.00	65.00	2271.56	2271.56
10254	#10254:6	Tube 2	Ori	61.19	34.78	48.31	7292.22	7292.22	0.00	18.6	65.00	65.00	2271.56	2271.56
10254	10254:WVGD8	10254:WVGD8	End	65.00	35.73	49.64	7912.93	7912.93	0.00	19.2	65.00	65.00	2399.50	2399.50
10254	10254:WVGD8	10254:WVGD8	Ori	65.00	35.73	49.64	7912.93	7912.93	0.00	19.2	65.00	65.00	2399.50	2399.50
10254	#10254:7	Tube 2	End	70.00	36.97	51.39	8779.05	8779.05	0.00	20.0	65.00	65.00	2572.61	2572.61
10254	#10254:7	Tube 2	Ori	70.00	36.97	51.39	8779.05	8779.05	0.00	20.0	65.00	65.00	2572.61	2572.61
10254	10254:WVGD7	10254:WVGD7	End	75.00	38.21	53.14	9706.17	9706.17	0.00	20.7	65.00	65.00	2751.75	2751.75
10254	10254:WVGD7	10254:WVGD7	Ori	75.00	38.21	53.14	9706.17	9706.17	0.00	20.7	65.00	65.00	2751.75	2751.75
10254	#10254:8	Tube 2	End	80.00	39.46	54.89	10696.37	10696.37	0.00	21.5	65.00	65.00	2936.92	2936.92
10254	#10254:8	Tube 2	Ori	80.00	39.46	54.89	10696.37	10696.37	0.00	21.5	65.00	65.00	2936.92	2936.92
10254	10254:WVGD6	10254:WVGD6	End	85.00	40.70	56.64	11751.73	11751.73	0.00	22.2	65.00	65.00	3128.12	3128.12
10254	10254:WVGD6	10254:WVGD6	Ori	85.00	40.70	56.64	11751.73	11751.73	0.00	22.2	65.00	65.00	3128.12	3128.12
10254	#10254:9	Tube 2	End	90.00	41.94	58.39	12874.33	12874.33	0.00	23.0	65.00	65.00	3325.35	3325.35
10254	#10254:9	Tube 2	Ori	90.00	41.94	58.39	12874.33	12874.33	0.00	23.0	65.00	65.00	3325.35	3325.35
10254	10254:WVGD5	10254:WVGD5	End	95.00	43.19	60.13	14066.23	14066.23	0.00	23.8	65.00	65.00	3528.61	3528.61
10254	10254:WVGD5	10254:WVGD5	Ori	95.00	43.19	60.13	14066.23	14066.23	0.00	23.8	65.00	65.00	3528.61	3528.61
10254	#10254:10	SpliceT	End	98.83	44.14	61.47	15027.40	15027.40	0.00	24.4	65.00	65.00	3688.39	3688.39
10254	#10254:10	SpliceT	Ori	98.83	44.14	61.47	15027.40	15027.40	0.00	24.4	65.00	65.00	3688.39	3688.39
10254	#10254:11	Splice	End	101.92	44.03	65.66	15947.74	15947.74	0.00	22.5	65.00	65.00	3923.87	3923.87
10254	#10254:11	Splice	Ori	101.92	44.03	65.66	15947.74	15947.74	0.00	22.5	65.00	65.00	3923.87	3923.87
10254	10254:WVGD4	10254:WVGD4	End	105.00	44.80	66.81	16805.12	16805.12	0.00	22.9	65.00	65.00	4064.02	4064.02

10254	10254:WVGD4	10254:WVGD4 Ori	105.00	44.80	66.81	16805.13	16805.13	0.00	22.9	65.00	65.00	4064.02	4064.02
10254	#10254:12	Tube 3 End	110.00	46.04	68.69	18259.08	18259.08	0.00	23.6	65.00	65.00	4296.39	4296.39
10254	#10254:12	Tube 3 Ori	110.00	46.04	68.69	18259.09	18259.09	0.00	23.6	65.00	65.00	4296.39	4296.39
10254	10254:WVGD3	10254:WVGD3 End	115.00	47.28	70.56	19794.58	19794.58	0.00	24.3	65.00	65.00	4535.22	4535.22
10254	10254:WVGD3	10254:WVGD3 Ori	115.00	47.28	70.56	19794.58	19794.58	0.00	24.3	65.00	65.00	4535.22	4535.22
10254	#10254:13	Tube 3 End	120.00	48.53	72.43	21413.84	21413.84	0.00	25.1	65.00	65.00	4780.51	4780.51
10254	#10254:13	Tube 3 Ori	120.00	48.53	72.43	21413.84	21413.84	0.00	25.1	65.00	65.00	4780.51	4780.51
10254	10254:WVGD2	10254:WVGD2 End	125.00	49.77	74.31	23119.09	23119.09	0.00	25.8	65.00	65.00	5032.27	5032.27
10254	10254:WVGD2	10254:WVGD2 Ori	125.00	49.77	74.31	23119.09	23119.09	0.00	25.8	65.00	65.00	5032.27	5032.27
10254	#10254:14	Tube 3 End	130.00	51.01	76.18	24912.54	24912.54	0.00	26.5	65.00	65.00	5290.48	5290.48
10254	#10254:14	Tube 3 Ori	130.00	51.01	76.18	24912.55	24912.55	0.00	26.5	65.00	65.00	5290.48	5290.48
10254	10254:WVGD1	10254:WVGD1 End	135.00	52.26	78.06	26796.44	26796.44	0.00	27.2	65.00	65.00	5555.16	5555.16
10254	10254:WVGD1	10254:WVGD1 Ori	135.00	52.26	78.06	26796.44	26796.44	0.00	27.2	65.00	65.00	5555.16	5555.16
10254	10254:g	10254:g End	140.00	53.50	79.93	28772.99	28772.99	0.00	27.9	65.00	65.00	5826.30	5826.30

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 Check	Strength Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Steel Texture Override (lbs/ft^3)
ARM1		6T	0.1875	6.4	5	0	1.3	29000 1 point	Calculated	0	0	0	0	65	0
ARM2		6T	0.1875	9	5	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	5	-0.5

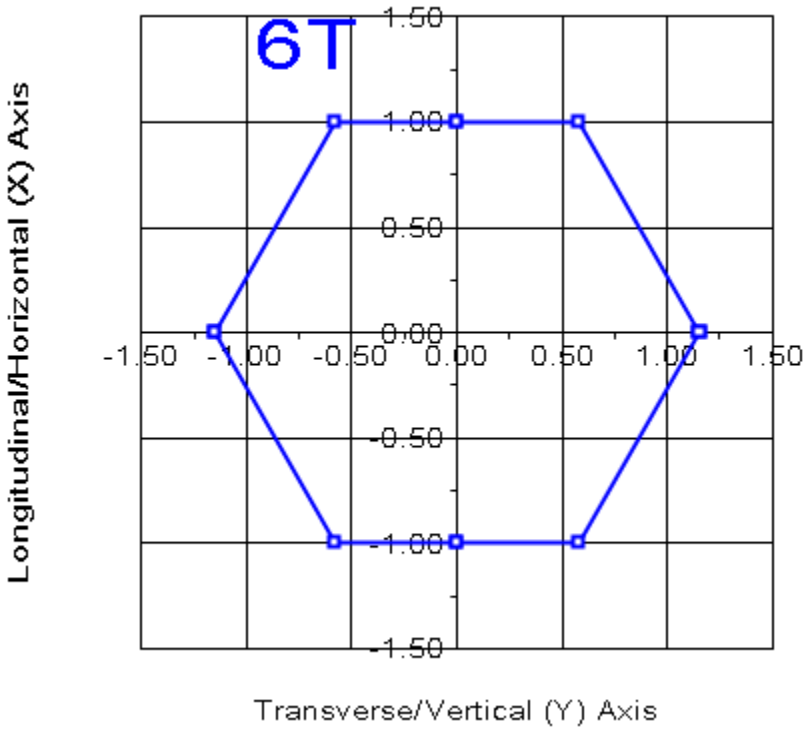
Intermediate Joints for Davit Property "ARM2":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	8	-1

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	10254:Arm1	ARM1	180
Davit2	10254:Arm1	ARM1	0
Davit3	10254:Arm2	ARM2	180
Davit4	10254:Arm2	ARM2	0
Davit5	10254:Arm3	ARM2	180
Davit6	10254:Arm3	ARM2	0
Davit7	10254:Arm4	ARM2	180

Davit8 10254: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:O	Origin	0.00	6.40	4.04	21.65	21.65	0.00	13.9	65.00	65.00	31.74	36.64
Davit1	#Davit1:0	End	2.51	5.70	3.58	15.13	15.13	0.00	11.8	65.00	65.00	24.90	28.75
Davit1	#Davit1:0	Origin	2.51	5.70	3.58	15.13	15.13	0.00	11.8	65.00	65.00	24.90	28.75
Davit1	Davit1:End	End	5.02	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit2	Davit2:O	Origin	0.00	6.40	4.04	21.65	21.65	0.00	13.9	65.00	65.00	31.74	36.64
Davit2	#Davit2:0	End	2.51	5.70	3.58	15.13	15.13	0.00	11.8	65.00	65.00	24.90	28.75
Davit2	#Davit2:0	Origin	2.51	5.70	3.58	15.13	15.13	0.00	11.8	65.00	65.00	24.90	28.75
Davit2	Davit2:End	End	5.02	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit3	Davit3:O	Origin	0.00	9.00	5.72	61.76	61.76	0.00	21.9	65.00	65.00	64.38	74.35
Davit3	#Davit3:0	End	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit3	#Davit3:0	Origin	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit3	Davit3:End	End	8.06	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit4	Davit4:O	Origin	0.00	9.00	5.72	61.76	61.76	0.00	21.9	65.00	65.00	64.38	74.35

Davit4	#Davit4:0	End	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit4	#Davit4:0	Origin	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit4	Davit4:End	End	8.06	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit5	Davit5:O	Origin	0.00	9.00	5.72	61.76	61.76	0.00	21.9	65.00	65.00	64.38	74.35
Davit5	#Davit5:0	End	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit5	#Davit5:0	Origin	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit5	Davit5:End	End	8.06	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit6	Davit6:O	Origin	0.00	9.00	5.72	61.76	61.76	0.00	21.9	65.00	65.00	64.38	74.35
Davit6	#Davit6:0	End	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit6	#Davit6:0	Origin	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit6	Davit6:End	End	8.06	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit7	Davit7:O	Origin	0.00	9.00	5.72	61.76	61.76	0.00	21.9	65.00	65.00	64.38	74.35
Davit7	#Davit7:0	End	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit7	#Davit7:0	Origin	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit7	Davit7:End	End	8.06	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
Davit8	Davit8:O	Origin	0.00	9.00	5.72	61.76	61.76	0.00	21.9	65.00	65.00	64.38	74.35
Davit8	#Davit8:0	End	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit8	#Davit8:0	Origin	4.03	7.00	4.42	28.54	28.54	0.00	15.8	65.00	65.00	38.25	44.17
Davit8	Davit8:End	End	8.06	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82

*** 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	10254:t	clamp	No Limit
Clamp10	10254:WVGD1	clamp	No Limit
Clamp11	10254:WVGD2	clamp	No Limit
Clamp12	10254:WVGD3	clamp	No Limit
Clamp13	10254:WVGD4	clamp	No Limit
Clamp14	10254:WVGD5	clamp	No Limit
Clamp15	10254:WVGD6	clamp	No Limit
Clamp16	10254:WVGD7	clamp	No Limit
Clamp17	10254:WVGD8	clamp	No Limit
Clamp18	10254:WVGD9	clamp	No Limit

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 Clamp19  10254:WVGD10    clamp      No Limit
 Clamp20  10254:WVGD11    clamp      No Limit
 Clamp21  10254:WVGD12    clamp      No Limit
 Clamp22  10254:WVGD13    clamp      No Limit
 Clamp23  10254:WVGD14    clamp      No Limit
 Clamp24 10254:TopConn    clamp      No Limit
 Clamp25 10254:TopConT    clamp      No Limit
 Clamp26 10254:TopConB    clamp      No Limit


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

Stock Number	Item Description	Quantity	Unit of Measure
clamp1	Clamp property: clamp	26.00	Each
10254	Steel Pole property: CL&P10254	1.00	Each

*** Loads Data

Loads from file: J:\Jobs\2202100.WI\07_CT5176\05_Structural\Backup Documentation\Rev (4)\Calcs\PLS Pole\cl&p #10254.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) 140.00 (ft)
  Structure height 140.00 (ft)
  Structure height above ground 140.00 (ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles and Towers	SF for Tubular Arms	SF for Wood Poles	SF for Conc. Poles Ult. Check	SF for Conc. First Crack	SF for Guys Zero Tens.	SF for and Cables	SF for Tubular Arms	SF for Non Insuls.	SF For Hardware Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Ice Temperature (deg F)	Pole Deflection % or (ft)	Pole Deflection Limit
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	26 loads	Wind on All	4	0	0.500	56.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	26 loads	NESC 2023	25.6	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	1035	1185	0	Shield Wire
Davit2:End	1072	1234	0	Shield Wire
Davit3:End	7090	4255	0	Conductor
Davit4:End	7090	4255	0	Conductor
Davit5:End	7090	4255	0	Conductor
Davit6:End	7090	4255	0	Conductor
Davit7:End	7090	4255	0	Conductor
Davit8:End	7090	4255	0	Conductor
10254:WVGD1	1265	119	0	Coax Cable
10254:WVGD2	1265	119	0	Coax Cable
10254:WVGD3	1265	119	0	Coax Cable
10254:WVGD4	1265	119	0	Coax Cable
10254:WVGD5	1265	119	0	Coax Cable
10254:WVGD6	1265	119	0	Coax Cable
10254:WVGD7	1265	119	0	Coax Cable
10254:WVGD8	1265	119	0	Coax Cable

10254:WVGD9	1265	119	0	Coax Cable
10254:WVGD10	1265	119	0	Coax Cable
10254:WVGD11	1265	119	0	Coax Cable
10254:WVGD12	1265	119	0	Coax Cable
10254:WVGD13	1265	119	0	Coax Cable
10254:WVGD14	1265	119	0	Coax Cable
10254:t	7604	0	0	
10254:TopConn	0	2212	0	
10254:TopConT	0	10649	0	
10254:TopConB	0	-10649	0	

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

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

Pole Label	Top Joint	Bottom Joint	Section Top 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)
10254	10254:t	10254:Arm1	140.00	139.30	139.65	20.275	9.6e+05	1.600	10.00	0.50	71.67	18.92	8.87	0.93	19.86	0.00
10254	10254:Arm1	10254:TopConT	139.30	139.00	139.15	20.399	9.66e+05	1.600	10.00	0.50	30.91	8.16	3.83	0.40	8.56	0.00
10254	10254:TopConT	10254:TopConn	139.00	138.50	138.75	20.498	9.71e+05	1.600	10.00	0.50	51.76	13.67	6.41	0.67	14.33	0.00
10254	10254:TopConn	10254:TopConB	138.50	138.00	138.25	20.623	9.76e+05	1.600	10.00	0.50	52.08	13.75	6.45	0.67	14.42	0.00
10254	10254:TopConB	10254:WVGD14	138.00	135.00	136.50	21.058	9.97e+05	1.600	10.00	0.50	319.19	84.24	39.50	4.00	88.24	0.00
10254	10254:WVGD14		135.00	130.81	132.91	21.951	1.04e+06	1.600	10.00	0.50	464.73	122.57	57.47	5.58	128.15	0.00
10254		10254:Arm2	130.81	126.63	128.72	22.993	1.09e+06	1.600	10.00	0.50	487.09	128.38	60.20	5.58	133.97	0.00
10254	10254:Arm2	10254:WVGD13	126.63	125.00	125.81	23.715	1.12e+06	1.600	10.00	0.50	195.04	51.39	24.09	2.17	53.55	0.00
10254	10254:WVGD13		125.00	120.00	122.50	24.539	1.16e+06	1.600	10.00	0.50	621.26	163.60	76.71	6.67	170.27	0.00
10254		10254:WVGD12	120.00	115.00	117.50	25.782	1.22e+06	1.600	10.00	0.50	653.14	171.89	80.60	6.67	178.56	0.00
10254	10254:WVGD12		115.00	110.00	112.50	27.026	1.28e+06	1.600	10.00	0.50	685.02	180.18	84.48	6.67	186.85	0.00
10254		10254:WVGD11	110.00	105.00	107.50	28.269	1.34e+06	1.600	10.00	0.50	716.90	188.47	88.37	6.67	195.14	0.00
10254	10254:WVGD11	10254:Arm3	105.00	104.63	104.81	28.937	1.37e+06	1.600	10.00	0.50	55.05	14.47	6.78	0.50	14.97	0.00
10254	10254:Arm3		104.63	99.81	102.22	29.582	1.4e+06	1.600	10.00	0.50	722.43	189.83	89.01	6.42	196.25	0.00
10254		10254:WVGD10	99.81	95.00	97.41	30.779	1.46e+06	1.600	10.00	0.50	751.97	197.51	92.61	6.42	203.93	0.00
10254	10254:WVGD10		95.00	92.34	93.67	31.709	1.5e+06	1.600	10.00	0.50	429.12	112.68	52.83	3.55	116.23	0.00
10254			92.34	89.67	91.00	32.371	1.53e+06	1.600	10.00	0.50	438.18	115.03	53.94	3.55	118.59	0.00
10254		10254:WVGD9	89.67	85.00	87.34	32.971	1.56e+06	1.600	10.00	0.50	1870.09	205.31	96.27	6.23	211.54	0.00
10254	10254:WVGD9	10254:Arm4	85.00	82.63	83.81	33.534	1.59e+06	1.600	10.00	0.50	564.40	106.20	49.79	3.17	109.36	0.00
10254	10254:Arm4		82.63	78.81	80.72	34.303	1.62e+06	1.600	10.00	0.50	927.06	174.38	81.77	5.08	179.47	0.00
10254		10254:WVGD8	78.81	75.00	76.91	35.251	1.67e+06	1.600	10.00	0.50	953.01	179.20	84.03	5.08	184.29	0.00
10254	10254:WVGD8		75.00	70.00	72.50	36.347	1.72e+06	1.600	10.00	0.50	1289.19	242.33	113.62	6.67	248.99	0.00
10254		10254:WVGD7	70.00	65.00	67.50	37.590	1.78e+06	1.600	10.00	0.50	1333.83	250.62	117.51	6.67	257.28	0.00
10254	10254:WVGD7		65.00	60.00	62.50	38.834	1.84e+06	1.600	10.00	0.50	1378.46	258.91	121.40	6.67	265.57	0.00
10254		10254:WVGD6	60.00	55.00	57.50	40.077	1.9e+06	1.600	10.00	0.50	1423.10	267.19	125.28	6.67	273.86	0.00
10254	10254:WVGD6		55.00	50.00	52.50	41.320	1.96e+06	1.600	10.00	0.50	1467.73	275.48	129.17	6.67	282.15	0.00
10254		10254:WVGD5	50.00	45.00	47.50	42.564	2.02e+06	1.600	10.00	0.50	1512.37	283.77	133.06	6.67	290.44	0.00
10254	10254:WVGD5		45.00	41.17	43.09	43.661	2.07e+06	1.600	10.00	0.50	1188.67	222.98	104.55	5.11	228.08	0.00
10254			41.17	38.09	39.63	44.084	2.09e+06	1.600	10.00	0.50	2001.23	181.34	85.03	4.11	185.45	0.00
10254		10254:WVGD4	38.09	35.00	36.54	44.413	2.1e+06	1.600	10.00	0.50	2036.01	182.70	85.66	4.11	186.81	0.00
10254	10254:WVGD4		35.00	30.00	32.50	45.419	2.15e+06	1.600	10.00	0.50	1729.01	302.81	141.98	6.67	309.47	0.00
10254		10254:WVGD3	30.00	25.00	27.50	46.662	2.21e+06	1.600	10.00	0.50	1776.83	311.10	145.87	6.67	317.76	0.00
10254	10254:WVGD3		25.00	20.00	22.50	47.905	2.27e+06	1.600	10.00	0.50	1824.66	319.38	149.75	6.67	326.05	0.00
10254		10254:WVGD2	20.00	15.00	17.50	49.148	2.33e+06	1.600	10.00	0.50	1872.48	327.67	153.64	6.67	334.34	0.00
10254	10254:WVGD2		15.00	10.00	12.50	50.392	2.39e+06	1.600	10.00	0.50	1920.31	335.96	157.53	6.67	342.63	0.00
10254		10254:WVGD1	10.00	5.00	7.50	51.635	2.44e+06	1.600	10.00	0.50	1968.13	344.25	161.41	6.67	350.92	0.00
10254	10254:WVGD1	10254:g	5.00	0.00	2.50	52.878	2.5e+06	1.600	10.00	0.50	2015.95	352.54	165.30	6.67	359.21	0.00

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	216	733	0	Shield Wire
Davit2:End	201	865	0	Shield Wire
Davit3:End	2748	4942	0	Conductor
Davit4:End	2748	4942	0	Conductor
Davit5:End	2748	4942	0	Conductor
Davit6:End	2748	4942	0	Conductor
Davit7:End	2748	4942	0	Conductor
Davit8:End	2748	4942	0	Conductor
10254:WVGD1	343	283	0	Coax Cable
10254:WVGD2	343	283	0	Coax Cable
10254:WVGD3	343	283	0	Coax Cable
10254:WVGD4	343	283	0	Coax Cable
10254:WVGD5	343	283	0	Coax Cable
10254:WVGD6	343	283	0	Coax Cable
10254:WVGD7	343	283	0	Coax Cable
10254:WVGD8	343	283	0	Coax Cable
10254:WVGD9	343	283	0	Coax Cable
10254:WVGD10	343	283	0	Coax Cable
10254:WVGD11	343	283	0	Coax Cable
10254:WVGD12	343	283	0	Coax Cable
10254:WVGD13	343	283	0	Coax Cable
10254:WVGD14	343	283	0	Coax Cable
10254:t	3668	0	0	
10254:TopConn	0	6952	0	
10254:TopConT	0	33339	0	
10254:TopConB	0	-33339	0	

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

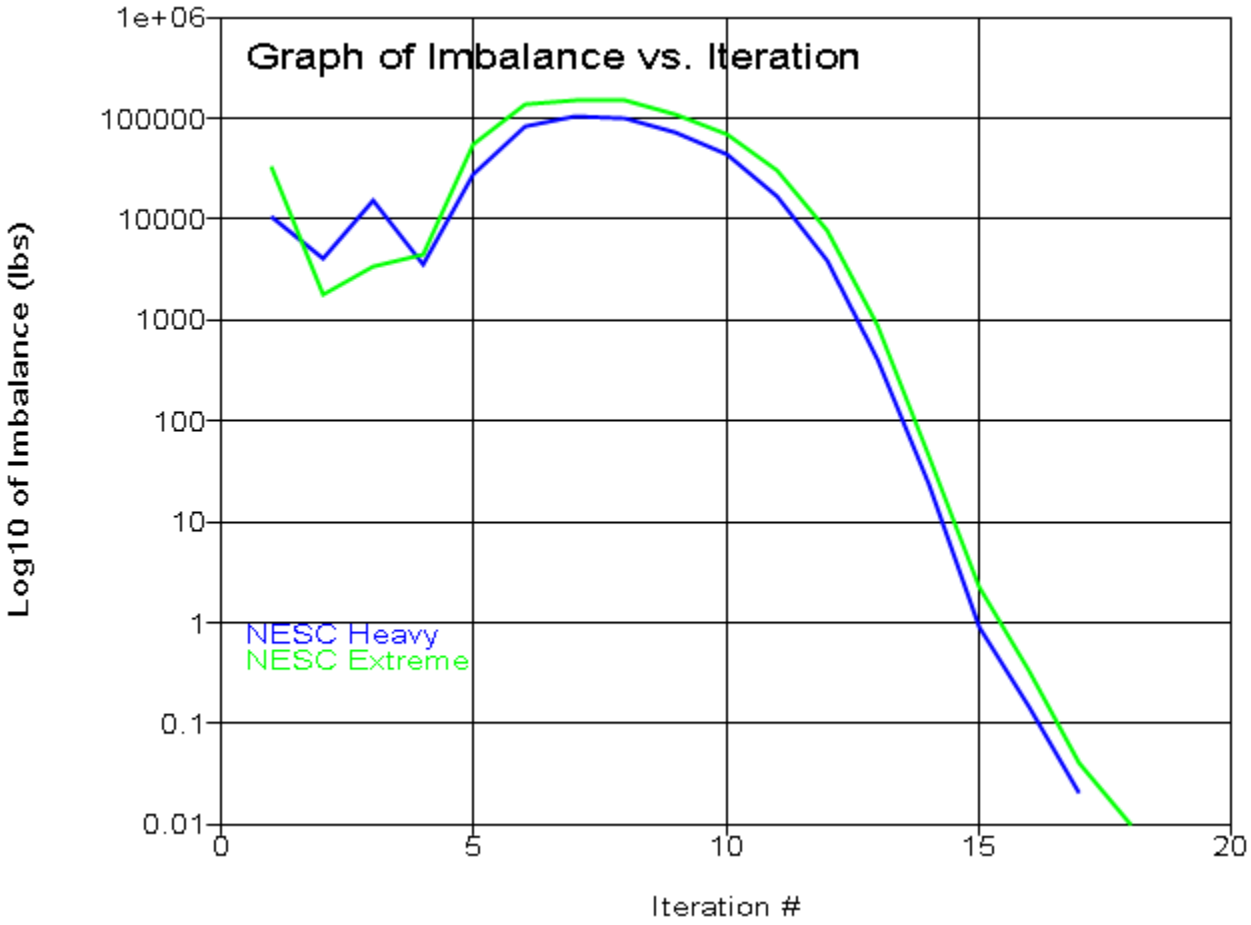
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
10254	10254:t	10254:Arm1	140.00	139.30	139.65	20.275	1.57e+06	1.000	26.74	0.00	47.78	31.62	0.00	0.00	31.62	0.00
10254	10254:Arm1	10254:TopConT	139.30	139.00	139.15	20.399	1.58e+06	1.000	26.74	0.00	20.60	13.64	0.00	0.00	13.64	0.00
10254	10254:TopConT	10254:TopConn	139.00	138.50	138.75	20.498	1.59e+06	1.000	26.74	0.00	34.51	22.84	0.00	0.00	22.84	0.00
10254	10254:TopConn	10254:TopConB	138.50	138.00	138.25	20.623	1.6e+06	1.000	26.74	0.00	34.72	22.98	0.00	0.00	22.98	0.00
10254	10254:TopConB	10254:WVGD14	138.00	135.00	136.50	21.058	1.63e+06	1.000	26.74	0.00	212.79	140.76	0.00	0.00	140.76	0.00
10254	10254:WVGD14		135.00	130.81	132.91	21.951	1.7e+06	1.000	26.74	0.00	309.82	204.82	0.00	0.00	204.82	0.00
10254		10254:Arm2	130.81	126.63	128.72	22.993	1.78e+06	1.000	26.74	0.00	324.73	214.53	0.00	0.00	214.53	0.00
10254	10254:Arm2	10254:WVGD13	126.63	125.00	125.81	23.715	1.84e+06	1.000	26.74	0.00	130.03	85.87	0.00	0.00	85.87	0.00
10254	10254:WVGD13		125.00	120.00	122.50	24.539	1.9e+06	1.000	26.74	0.00	414.17	273.39	0.00	0.00	273.39	0.00
10254		10254:WVGD12	120.00	115.00	117.50	25.782	2e+06	1.000	26.74	0.00	435.43	287.24	0.00	0.00	287.24	0.00
10254	10254:WVGD12		115.00	110.00	112.50	27.026	2.09e+06	1.000	26.74	0.00	456.68	301.09	0.00	0.00	301.09	0.00
10254		10254:WVGD11	110.00	105.00	107.50	28.269	2.19e+06	1.000	26.74	0.00	477.94	314.94	0.00	0.00	314.94	0.00
10254	10254:WVGD11	10254:Arm3	105.00	104.63	104.81	28.937	2.24e+06	1.000	26.74	0.00	36.70	24.18	0.00	0.00	24.18	0.00
10254	10254:Arm3		104.63	99.81	102.22	29.582	2.29e+06	1.000	26.74	0.00	481.62	317.21	0.00	0.00	317.21	0.00
10254		10254:WVGD10	99.81	95.00	97.41	30.779	2.38e+06	1.000	26.74	0.00	501.31	330.04	0.00	0.00	330.04	0.00
10254	10254:WVGD10		95.00	92.34	93.67	31.709	2.45e+06	1.000	26.74	0.00	286.08	188.29	0.00	0.00	188.29	0.00

10254			92.34	89.67	91.00	32.371	2.51e+06	1.000	26.74	0.00	292.12	192.22	0.00	0.00	192.22	0.00
10254		10254:WVGD9	89.67	85.00	87.34	32.971	2.55e+06	1.000	26.74	0.00	1246.73	343.08	0.00	0.00	343.08	0.00
10254	10254:WVGD9	10254:Arm4	85.00	82.63	83.81	33.534	2.6e+06	1.000	26.74	0.00	376.26	177.46	0.00	0.00	177.46	0.00
10254	10254:Arm4		82.63	78.81	80.72	34.303	2.66e+06	1.000	26.74	0.00	618.04	291.40	0.00	0.00	291.40	0.00
10254		10254:WVGD8	78.81	75.00	76.91	35.251	2.73e+06	1.000	26.74	0.00	635.34	299.46	0.00	0.00	299.46	0.00
10254	10254:WVGD8		75.00	70.00	72.50	36.347	2.81e+06	1.000	26.74	0.00	859.46	404.94	0.00	0.00	404.94	0.00
10254		10254:WVGD7	70.00	65.00	67.50	37.590	2.91e+06	1.000	26.74	0.00	889.22	418.79	0.00	0.00	418.79	0.00
10254	10254:WVGD7		65.00	60.00	62.50	38.834	3.01e+06	1.000	26.74	0.00	918.97	432.64	0.00	0.00	432.64	0.00
10254		10254:WVGD6	60.00	55.00	57.50	40.077	3.1e+06	1.000	26.74	0.00	948.73	446.49	0.00	0.00	446.49	0.00
10254	10254:WVGD6		55.00	50.00	52.50	41.320	3.2e+06	1.000	26.74	0.00	978.49	460.34	0.00	0.00	460.34	0.00
10254		10254:WVGD5	50.00	45.00	47.50	42.564	3.3e+06	1.000	26.74	0.00	1008.25	474.19	0.00	0.00	474.19	0.00
10254	10254:WVGD5		45.00	41.17	43.09	43.661	3.38e+06	1.000	26.74	0.00	792.44	372.60	0.00	0.00	372.60	0.00
10254			41.17	38.09	39.63	44.084	3.41e+06	1.000	26.74	0.00	1334.15	303.03	0.00	0.00	303.03	0.00
10254		10254:WVGD4	38.09	35.00	36.54	44.413	3.44e+06	1.000	26.74	0.00	1357.34	305.29	0.00	0.00	305.29	0.00
10254	10254:WVGD4		35.00	30.00	32.50	45.419	3.52e+06	1.000	26.74	0.00	1152.67	506.00	0.00	0.00	506.00	0.00
10254		10254:WVGD3	30.00	25.00	27.50	46.662	3.61e+06	1.000	26.74	0.00	1184.56	519.85	0.00	0.00	519.85	0.00
10254	10254:WVGD3		25.00	20.00	22.50	47.905	3.71e+06	1.000	26.74	0.00	1216.44	533.70	0.00	0.00	533.70	0.00
10254		10254:WVGD2	20.00	15.00	17.50	49.148	3.8e+06	1.000	26.74	0.00	1248.32	547.55	0.00	0.00	547.55	0.00
10254	10254:WVGD2		15.00	10.00	12.50	50.392	3.9e+06	1.000	26.74	0.00	1280.20	561.40	0.00	0.00	561.40	0.00
10254		10254:WVGD1	10.00	5.00	7.50	51.635	4e+06	1.000	26.74	0.00	1312.09	575.26	0.00	0.00	575.26	0.00
10254	10254:WVGD1	10254:g	5.00	0.00	2.50	52.878	4.09e+06	1.000	26.74	0.00	1343.97	589.11	0.00	0.00	589.11	0.00

*** Analysis Results:

Maximum element usage is 98.43% for Base Plate "10254" in load case "NESC Extreme"
Maximum insulator usage is 41.67% for Clamp "Clamp25" in load case "NESC Extreme"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 17

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)
10254:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10254:t	0.01736	8.18	-0.325	-6.0706	0.0116	0.0002	0.01736	8.18	139.7
10254:Arm1	0.01722	8.106	-0.321	-6.0706	0.0116	0.0002	0.01722	8.106	139

10254:TopConT	0.01716	8.074	-0.3193	-6.0704	0.0116	0.0002	0.01716	8.074	138.7
10254:TopConn	0.01706	8.021	-0.3165	-6.0695	0.0116	0.0002	0.01706	8.021	138.2
10254:TopConB	0.01696	7.968	-0.3137	-6.0676	0.0116	0.0002	0.01696	7.968	137.7
10254:WVGD14	0.01635	7.651	-0.2969	-6.0476	0.0116	0.0002	0.01635	7.651	134.7
10254:Arm2	0.01467	6.776	-0.2508	-5.9438	0.0115	0.0002	0.01467	6.776	126.4
10254:WVGD13	0.01434	6.608	-0.2421	-5.9129	0.0115	0.0002	0.01434	6.608	124.8
10254:WVGD12	0.01237	5.6	-0.1908	-5.6172	0.0111	0.0001	0.01237	5.6	114.8
10254:WVGD11	0.01048	4.655	-0.1456	-5.2084	0.0106	0.0001	0.01048	4.655	104.9
10254:Arm3	0.01041	4.621	-0.144	-5.1918	0.0105	0.0001	0.01041	4.621	104.5
10254:WVGD10	0.008701	3.788	-0.1074	-4.7022	0.0098	0.0001	0.008701	3.788	94.89
10254:WVGD9	0.007066	3.016	-0.07699	-4.1593	0.0089	0.0001	0.007066	3.016	84.92
10254:Arm4	0.0067	2.846	-0.07079	-4.0492	0.0088	0.0001	0.0067	2.846	82.55
10254:WVGD8	0.005576	2.331	-0.05301	-3.6777	0.0081	0.0001	0.005576	2.331	74.95
10254:WVGD7	0.004237	1.733	-0.03459	-3.1646	0.0072	0.0000	0.004237	1.733	64.97
10254:WVGD6	0.003065	1.225	-0.02118	-2.6413	0.0062	0.0000	0.003065	1.225	54.98
10254:WVGD5	0.00207	0.8091	-0.012	-2.1215	0.0052	0.0000	0.00207	0.8091	44.99
10254:WVGD4	0.001264	0.4827	-0.006155	-1.6148	0.0041	0.0000	0.001264	0.4827	34.99
10254:WVGD3	0.0006507	0.2429	-0.002776	-1.1276	0.0029	0.0000	0.0006507	0.2429	25
10254:WVGD2	0.0002372	0.08645	-0.00105	-0.6607	0.0018	0.0000	0.0002372	0.08645	15
10254:WVGD1	2.738e-05	0.009668	-0.0002526	-0.2149	0.0006	0.0000	2.738e-05	0.009668	5
Davit1:O	0.01724	8.11	-0.2313	-6.0706	0.0116	0.0002	0.01724	7.262	139.1
Davit1:End	0.01747	8.189	0.285	-5.8952	0.0116	0.0002	0.01747	2.341	140.1
Davit2:O	0.0172	8.101	-0.4108	-6.0706	0.0116	0.0002	0.0172	8.949	138.9
Davit2:End	0.01717	8.126	-0.9557	-6.3084	0.0116	0.0002	0.01717	13.97	138.8
Davit3:O	0.01469	6.781	-0.1494	-5.9438	0.0115	0.0002	0.01469	5.801	126.5
Davit3:End	0.01506	6.898	0.5385	-4.2702	0.0116	0.0003	0.01506	-2.082	128.2
Davit4:O	0.01464	6.77	-0.3523	-5.9438	0.0115	0.0002	0.01464	7.75	126.3
Davit4:End	0.01462	6.832	-1.347	-7.8909	0.0115	0.0002	0.01462	15.81	126.3
Davit5:O	0.01043	4.626	-0.03475	-5.1918	0.0105	0.0001	0.01043	3.418	104.6
Davit5:End	0.01075	4.721	0.5479	-3.4977	0.0106	0.0002	0.01075	-4.487	106.2
Davit6:O	0.01039	4.616	-0.2533	-5.1918	0.0105	0.0001	0.01039	5.823	104.4
Davit6:End	0.01039	4.677	-1.144	-7.1539	0.0105	0.0001	0.01039	13.88	104.5
Davit7:O	0.006716	2.849	0.02874	-4.0492	0.0088	0.0001	0.006716	1.44	82.65
Davit7:End	0.006948	2.914	0.4509	-2.3246	0.0088	0.0001	0.006948	-6.496	84.08
Davit8:O	0.006683	2.842	-0.1703	-4.0492	0.0088	0.0001	0.006683	4.252	82.45
Davit8:End	0.006715	2.9	-0.9019	-6.0335	0.0088	0.0001	0.006715	12.31	82.72

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. Uplift Usage %	Result. Usage %	Result. Force (kips)	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 %
10254:g	-0.19	0.0	-38.88	0.0	0.0	-115.71	0.0	0.0	122.07	0.0	4294.17	0.0	-12.1	0.0	0.0	-0.00	0.0	0.0

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

Element At 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 Pt. %
10254	10254:t	Origin	0.00	98.16	0.21	-3.90	-0.00	-0.00	0.0	-7.60	0.82	-0.00	-0.38	0.00	0.08	0.00	0.41	0.65
10254	10254:Arm1	End	0.70	97.27	0.21	-3.85	0.57	-0.00	0.0	-7.60	0.82	-0.00	-0.38	0.07	0.02	0.00	0.45	0.72

10254	10254:Arm1	Origin	0.70	97.27	0.21	-3.85	2.05	-0.00	0.0	-9.68	3.49	-0.00	-0.48	0.06	0.34	0.00	0.80	1.2
10254	10254:TopConT	End	1.00	96.89	0.21	-3.83	3.10	-0.00	0.0	-9.68	3.49	-0.00	-0.48	0.27	0.25	0.00	0.86	1.3
10254	10254:TopConT	Origin	1.00	96.89	0.21	-3.83	3.10	-0.00	0.0	-8.60	14.09	-0.00	-0.43	0.00	1.42	0.00	2.50	3.8
10254	10254:TopConn	End	1.50	96.25	0.20	-3.80	10.14	-0.00	0.0	-8.60	14.09	-0.00	-0.42	0.00	1.41	0.00	2.48	3.8
10254	10254:TopConn	Origin	1.50	96.25	0.20	-3.80	10.14	-0.00	0.0	-8.42	16.31	-0.00	-0.41	0.00	1.63	0.00	2.86	4.4
10254	10254:TopConB	End	2.00	95.62	0.20	-3.76	18.30	-0.01	0.0	-8.42	16.31	-0.00	-0.41	0.56	1.57	0.00	2.89	4.4
10254	10254:TopConB	Origin	2.00	95.62	0.20	-3.76	18.30	-0.01	0.0	-9.76	5.79	-0.00	-0.48	2.09	0.15	0.00	2.58	4.0
10254	10254:WVGD14	End	5.00	91.82	0.20	-3.56	35.68	-0.02	0.0	-9.76	5.79	-0.00	-0.46	3.79	0.14	0.00	4.25	6.5
10254	10254:WVGD14	Origin	5.00	91.82	0.20	-3.56	35.68	-0.02	0.0	-11.44	6.19	-0.01	-0.54	3.79	0.15	0.00	4.33	6.7
10254	Tube 1	End	9.19	86.54	0.19	-3.28	61.61	-0.05	0.0	-11.44	6.19	-0.01	-0.51	5.94	0.15	0.00	6.46	9.9
10254	Tube 1	Origin	9.19	86.54	0.19	-3.28	61.61	-0.05	0.0	-11.98	6.37	-0.01	-0.54	5.94	0.15	0.00	6.48	10.0
10254	10254:Arm2	End	13.38	81.31	0.18	-3.01	88.27	-0.10	0.0	-11.98	6.37	-0.01	-0.51	7.75	0.14	0.00	8.27	12.7
10254	10254:Arm2	Origin	13.38	81.31	0.18	-3.01	96.77	-0.11	0.0	-25.95	16.46	-0.02	-1.11	8.50	0.37	0.00	9.64	14.8
10254	10254:WVGD13	End	15.00	79.29	0.17	-2.90	123.52	-0.13	0.0	-25.95	16.46	-0.02	-1.09	10.48	0.37	0.00	11.59	17.8
10254	10254:WVGD13	Origin	15.00	79.29	0.17	-2.90	123.52	-0.13	0.0	-27.68	16.83	-0.02	-1.17	10.48	0.38	0.00	11.67	17.9
10254	Tube 1	End	20.00	73.17	0.16	-2.59	207.66	-0.24	0.0	-27.68	16.83	-0.02	-1.11	15.89	0.36	0.00	17.01	26.2
10254	Tube 1	Origin	20.00	73.17	0.16	-2.59	207.66	-0.24	0.0	-28.43	17.00	-0.03	-1.14	15.89	0.36	0.00	17.04	26.2
10254	10254:WVGD12	End	25.00	67.20	0.15	-2.29	292.67	-0.36	0.0	-28.43	17.00	-0.03	-1.08	20.30	0.34	0.00	21.39	32.9
10254	10254:WVGD12	Origin	25.00	67.20	0.15	-2.29	292.67	-0.36	0.0	-30.48	17.40	-0.03	-1.16	20.30	0.35	0.00	21.47	33.0
10254	Tube 1	End	30.00	61.42	0.14	-2.01	379.69	-0.51	0.0	-30.48	17.40	-0.03	-1.11	23.98	0.34	0.00	25.10	38.6
10254	Tube 1	Origin	30.00	61.42	0.14	-2.01	379.69	-0.51	0.0	-31.33	17.56	-0.04	-1.14	23.98	0.34	0.00	25.13	38.7
10254	10254:WVGD11	End	35.00	55.86	0.13	-1.75	467.48	-0.69	0.0	-31.33	17.56	-0.04	-1.09	27.00	0.32	0.00	28.10	43.2
10254	10254:WVGD11	Origin	35.00	55.86	0.13	-1.75	467.48	-0.69	0.0	-33.05	17.87	-0.04	-1.15	27.00	0.33	0.00	28.16	43.3
10254	10254:Arm3	End	35.38	55.45	0.12	-1.73	474.18	-0.70	0.0	-33.05	17.87	-0.04	-1.15	27.21	0.33	0.00	28.36	43.6
10254	10254:Arm3	Origin	35.38	55.45	0.12	-1.73	482.51	-0.71	0.0	-47.25	27.71	-0.04	-1.64	27.69	0.51	0.00	29.34	45.1
10254	Tube 1	End	40.19	50.33	0.11	-1.50	615.86	-0.92	0.0	-47.25	27.71	-0.04	-1.57	32.55	0.49	0.00	34.14	52.5
10254	Tube 1	Origin	40.19	50.33	0.11	-1.50	615.86	-0.92	0.0	-48.19	27.78	-0.05	-1.61	32.55	0.49	0.00	34.17	52.6
10254	10254:WVGD10	End	45.00	45.46	0.10	-1.29	749.53	-1.15	0.0	-48.19	27.78	-0.05	-1.54	36.61	0.47	0.00	38.16	58.7
10254	10254:WVGD10	Origin	45.00	45.46	0.10	-1.29	749.53	-1.15	0.0	-50.20	28.04	-0.05	-1.61	36.61	0.47	0.00	38.23	58.8
10254	Tube 1	End	47.67	42.87	0.10	-1.18	824.24	-1.29	0.0	-50.20	28.04	-0.05	-1.57	38.59	0.46	0.00	40.17	61.8

10254	Tube 1	Origin	47.67	42.87	0.10	-1.18	824.24	-1.29	0.0	-50.76	28.06	-0.06	-1.59	38.59	0.47	0.00	40.19	61.8
10254	SpliceT	End	50.33	40.38	0.09	-1.08	899.01	-1.44	0.0	-50.76	28.06	-0.06	-1.56	40.38	0.46	0.00	41.95	64.5
10254	SpliceT	Origin	50.33	40.38	0.09	-1.08	899.01	-1.44	0.0	-52.09	28.14	-0.06	-1.60	40.38	0.46	0.00	41.99	64.6
10254	10254:WVGD9	End	55.00	36.19	0.08	-0.92	1030.42	-1.72	0.0	-52.09	28.14	-0.06	-1.13	32.35	0.32	0.00	33.48	51.5
10254	10254:WVGD9	Origin	55.00	36.19	0.08	-0.92	1030.42	-1.72	0.0	-54.71	28.44	-0.06	-1.19	32.35	0.33	0.00	33.54	51.6
10254	10254:Arm4	End	57.38	34.15	0.08	-0.85	1097.96	-1.87	0.0	-54.71	28.44	-0.06	-1.16	33.25	0.32	0.00	34.42	53.0
10254	10254:Arm4	Origin	57.38	34.15	0.08	-0.85	1106.04	-1.88	0.0	-69.51	38.00	-0.07	-1.48	33.50	0.43	0.00	34.99	53.8
10254	Tube 2	End	61.19	30.98	0.07	-0.74	1250.90	-2.15	0.0	-69.51	38.00	-0.07	-1.44	35.81	0.42	0.00	37.26	57.3
10254	Tube 2	Origin	61.19	30.98	0.07	-0.74	1250.90	-2.15	0.0	-70.66	38.02	-0.08	-1.46	35.81	0.42	0.00	37.28	57.4
10254	10254:WVGD8	End	65.00	27.97	0.07	-0.64	1395.84	-2.43	0.0	-70.66	38.02	-0.08	-1.42	37.83	0.41	0.00	39.26	60.4
10254	10254:WVGD8	Origin	65.00	27.97	0.07	-0.64	1395.84	-2.43	0.0	-73.28	38.24	-0.08	-1.48	37.83	0.41	0.00	39.31	60.5
10254	Tube 2	End	70.00	24.25	0.06	-0.52	1587.01	-2.83	0.0	-73.28	38.24	-0.08	-1.43	40.12	0.39	0.00	41.55	63.9
10254	Tube 2	Origin	70.00	24.25	0.06	-0.52	1587.01	-2.83	0.0	-74.87	38.24	-0.09	-1.46	40.12	0.39	0.00	41.58	64.0
10254	10254:WVGD7	End	75.00	20.79	0.05	-0.42	1778.21	-3.27	0.0	-74.87	38.24	-0.09	-1.41	42.02	0.38	0.00	43.44	66.8
10254	10254:WVGD7	Origin	75.00	20.79	0.05	-0.42	1778.21	-3.27	0.0	-77.78	38.43	-0.09	-1.46	42.02	0.38	0.00	43.49	66.9
10254	Tube 2	End	80.00	17.61	0.04	-0.33	1970.32	-3.73	0.0	-77.78	38.43	-0.09	-1.42	43.63	0.37	0.00	45.05	69.3
10254	Tube 2	Origin	80.00	17.61	0.04	-0.33	1970.32	-3.73	0.0	-79.47	38.41	-0.10	-1.45	43.63	0.37	0.00	45.08	69.4
10254	10254:WVGD6	End	85.00	14.71	0.04	-0.25	2162.37	-4.23	0.0	-79.47	38.41	-0.10	-1.40	44.96	0.36	0.00	46.36	71.3
10254	10254:WVGD6	Origin	85.00	14.71	0.04	-0.25	2162.37	-4.23	0.0	-82.48	38.57	-0.11	-1.46	44.96	0.36	0.00	46.42	71.4
10254	Tube 2	End	90.00	12.07	0.03	-0.19	2355.21	-4.76	0.0	-82.48	38.57	-0.11	-1.41	46.06	0.35	0.00	47.48	73.0
10254	Tube 2	Origin	90.00	12.07	0.03	-0.19	2355.21	-4.76	0.0	-84.27	38.54	-0.11	-1.44	46.06	0.35	0.00	47.51	73.1
10254	10254:WVGD5	End	95.00	9.71	0.02	-0.14	2547.93	-5.33	0.0	-84.27	38.54	-0.11	-1.40	46.96	0.34	0.00	48.37	74.4
10254	10254:WVGD5	Origin	95.00	9.71	0.02	-0.14	2547.92	-5.33	0.0	-87.16	38.68	-0.12	-1.45	46.96	0.34	0.00	48.41	74.5
10254	SpliceT	End	98.83	8.08	0.02	-0.11	2696.07	-5.79	0.0	-87.16	38.68	-0.12	-1.42	47.54	0.33	0.00	48.96	75.3
10254	SpliceT	Origin	98.83	8.08	0.02	-0.11	2696.07	-5.79	0.0	-88.96	38.67	-0.12	-1.45	47.54	0.33	0.00	48.99	75.4
10254	Splice	End	101.92	6.89	0.02	-0.09	2815.38	-6.17	0.0	-88.96	38.67	-0.12	-1.36	46.66	0.31	0.00	48.02	73.9
10254	Splice	Origin	101.92	6.89	0.02	-0.09	2815.38	-6.17	0.0	-91.17	38.68	-0.13	-1.39	46.66	0.31	0.00	48.06	73.9
10254	10254:WVGD4	End	105.00	5.79	0.02	-0.07	2934.70	-6.57	0.0	-91.17	38.68	-0.13	-1.36	46.97	0.31	0.00	48.33	74.4
10254	10254:WVGD4	Origin	105.00	5.79	0.02	-0.07	2934.70	-6.57	0.0	-94.56	38.82	-0.14	-1.42	46.97	0.31	0.00	48.38	74.4

10254	Tube 3	End	110.00	4.23	0.01	-0.05	3128.77	-7.24	0.0	-94.56	38.82	-0.14	-1.38	47.36	0.30	0.00	48.74	75.0	2
10254	Tube 3	Origin	110.00	4.23	0.01	-0.05	3128.77	-7.24	0.0	-96.63	38.77	-0.14	-1.41	47.36	0.30	0.00	48.77	75.0	2
10254	10254:WVGD3	End	115.00	2.92	0.01	-0.03	3322.60	-7.96	0.0	-96.63	38.77	-0.14	-1.37	47.65	0.29	0.00	49.02	75.4	2
10254	10254:WVGD3	Origin	115.00	2.92	0.01	-0.03	3322.60	-7.96	0.0	-100.00	38.86	-0.15	-1.42	47.65	0.29	0.00	49.07	75.5	2
10254	Tube 3	End	120.00	1.85	0.01	-0.02	3516.91	-8.71	0.0	-100.00	38.86	-0.15	-1.38	47.85	0.28	0.00	49.23	75.7	2
10254	Tube 3	Origin	120.00	1.85	0.01	-0.02	3516.91	-8.71	0.0	-102.16	38.81	-0.16	-1.41	47.85	0.28	0.00	49.26	75.8	2
10254	10254:WVGD2	End	125.00	1.04	0.00	-0.01	3710.96	-9.49	0.0	-102.16	38.81	-0.16	-1.37	47.97	0.28	0.00	49.34	75.9	2
10254	10254:WVGD2	Origin	125.00	1.04	0.00	-0.01	3710.96	-9.49	0.0	-105.63	38.89	-0.17	-1.42	47.97	0.28	0.00	49.39	76.0	2
10254	Tube 3	End	130.00	0.46	0.00	-0.01	3905.42	-10.32	0.0	-105.63	38.89	-0.17	-1.39	48.02	0.27	0.00	49.41	76.0	2
10254	Tube 3	Origin	130.00	0.46	0.00	-0.01	3905.42	-10.32	0.0	-107.88	38.84	-0.17	-1.42	48.02	0.27	0.00	49.44	76.1	2
10254	10254:WVGD1	End	135.00	0.12	0.00	-0.00	4099.62	-11.19	0.0	-107.88	38.84	-0.17	-1.38	48.00	0.26	0.00	49.39	76.0	2
10254	10254:WVGD1	Origin	135.00	0.12	0.00	-0.00	4099.62	-11.19	0.0	-111.45	38.91	-0.18	-1.43	48.00	0.26	0.00	49.43	76.1	2
10254	10254:g	End	140.00	0.00	0.00	0.00	4294.17	-12.10	0.0	-111.45	38.91	-0.18	-1.39	47.94	0.26	0.00	49.34	75.9	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	97.32	0.21	-2.78	-4.10	0.00	0.0	-1.38	0.84	-0.00	-0.34	8.41	0.00	0.00	8.75	13.5	1
Davit1	#Davit1:0	End	2.51	97.80	0.21	0.35	-2.00	0.00	0.0	-1.38	0.84	-0.00	-0.39	5.22	0.00	0.00	5.61	8.6	1
Davit1	#Davit1:0	Origin	2.51	97.80	0.21	0.35	-2.00	0.00	0.0	-1.37	0.80	-0.00	-0.38	5.22	0.00	0.00	5.60	8.6	1
Davit1	Davit1:End	End	5.02	98.27	0.21	3.42	-0.00	0.00	0.0	-1.37	0.80	-0.00	-0.44	0.00	0.54	0.00	1.04	1.6	3
Davit2	Davit2:O	Origin	0.00	97.21	0.21	-4.93	-5.55	-0.00	-0.0	1.24	1.13	0.00	0.31	11.38	0.00	0.00	11.68	18.0	1
Davit2	#Davit2:0	End	2.51	97.36	0.21	-8.17	-2.72	-0.00	-0.0	1.24	1.13	0.00	0.35	7.09	0.00	0.00	7.44	11.4	1
Davit2	#Davit2:0	Origin	2.51	97.36	0.21	-8.17	-2.72	-0.00	0.0	1.24	1.08	0.00	0.35	7.09	0.00	0.00	7.44	11.4	1
Davit2	Davit2:End	End	5.02	97.51	0.21	-11.47	0.00	0.00	0.0	1.24	1.08	0.00	0.40	0.00	0.74	0.00	1.34	2.1	3
Davit3	Davit3:O	Origin	0.00	81.37	0.18	-1.79	-49.36	0.01	0.0	-5.72	6.12	-0.00	-1.00	49.83	0.00	0.00	50.83	78.2	1
Davit3	#Davit3:0	End	4.03	82.15	0.18	2.71	-24.69	0.01	0.0	-5.72	6.12	-0.00	-1.29	41.94	0.00	0.00	43.24	66.5	1
Davit3	#Davit3:0	Origin	4.03	82.15	0.18	2.71	-24.69	0.01	0.0	-5.60	6.12	-0.00	-1.27	41.94	0.00	0.00	43.21	66.5	1
Davit3	Davit3:End	End	8.06	82.77	0.18	6.46	-0.00	0.00	0.0	-5.60	6.12	-0.00	-1.79	0.00	4.19	0.00	7.47	11.5	3
Davit4	Davit4:O	Origin	0.00	81.24	0.18	-4.23	-57.86	-0.01	-0.0	4.18	7.26	0.00	0.73	58.42	0.00	0.00	59.15	91.0	1
Davit4	#Davit4:0	End	4.03	81.62	0.18	-9.75	-28.59	-0.01	-0.0	4.18	7.26	0.00	0.95	48.58	0.00	0.00	49.52	76.2	1
Davit4	#Davit4:0	Origin	4.03	81.62	0.18	-9.75	-28.59	-0.01	0.0	4.32	7.09	0.00	0.98	48.58	0.00	0.00	49.55	76.2	1
Davit4	Davit4:End	End	8.06	81.99	0.18	-16.17	-0.00	0.00	0.0	4.32	7.09	0.00	1.38	0.00	4.85	0.00	8.51	13.1	3
Davit5	Davit5:O	Origin	0.00	55.51	0.13	-0.42	-49.97	0.01	0.0	-5.64	6.20	-0.00	-0.99	50.45	0.00	0.00	51.43	79.1	1
Davit5	#Davit5:0	End	4.03	56.15	0.13	3.46	-24.99	0.01	0.0	-5.64	6.20	-0.00	-1.27	42.46	0.00	0.00	43.73	67.3	1
Davit5	#Davit5:0	Origin	4.03	56.15	0.13	3.46	-24.99	0.01	0.0	-5.52	6.20	-0.00	-1.25	42.46	0.00	0.00	43.70	67.2	1
Davit5	Davit5:End	End	8.06	56.65	0.13	6.57	-0.00	0.00	0.0	-5.52	6.20	-0.00	-1.77	0.00	4.24	0.00	7.55	11.6	3

Davit6	Davit6:O	Origin	0.00	55.39	0.12	-3.04	-58.30	-0.01	-0.0	4.09	7.32	0.00	0.71	58.86	0.00	0.00	59.57	91.7	1
Davit6	#Davit6:0	End	4.03	55.75	0.12	-7.93	-28.81	-0.01	-0.0	4.09	7.32	0.00	0.92	48.96	0.00	0.00	49.88	76.7	1
Davit6	#Davit6:0	Origin	4.03	55.75	0.12	-7.93	-28.81	-0.01	0.0	4.22	7.15	0.00	0.95	48.96	0.00	0.00	49.91	76.8	1
Davit6	Davit6:End	End	8.06	56.13	0.12	-13.73	-0.00	0.00	0.0	4.22	7.15	0.00	1.35	0.00	4.89	0.00	8.57	13.2	3
Davit7	Davit7:O	Origin	0.00	34.19	0.08	0.34	-50.87	0.01	0.0	-5.51	6.31	-0.00	-0.96	51.36	0.00	0.00	52.32	80.5	1
Davit7	#Davit7:0	End	4.03	34.65	0.08	3.27	-25.44	0.00	0.0	-5.51	6.31	-0.00	-1.25	43.22	0.00	0.00	44.47	68.4	1
Davit7	#Davit7:0	Origin	4.03	34.65	0.08	3.27	-25.44	0.00	0.0	-5.39	6.31	-0.00	-1.22	43.22	0.00	0.00	44.44	68.4	1
Davit7	Davit7:End	End	8.06	34.97	0.08	5.41	-0.00	0.00	0.0	-5.39	6.31	-0.00	-1.73	0.00	4.31	0.00	7.67	11.8	3
Davit8	Davit8:O	Origin	0.00	34.11	0.08	-2.04	-58.95	-0.01	-0.0	3.94	7.39	0.00	0.69	59.51	0.00	0.00	60.20	92.6	1
Davit8	#Davit8:0	End	4.03	34.44	0.08	-5.98	-29.14	-0.00	-0.0	3.94	7.39	0.00	0.89	49.51	0.00	0.00	50.40	77.5	1
Davit8	#Davit8:0	Origin	4.03	34.44	0.08	-5.98	-29.14	-0.00	0.0	4.08	7.23	0.00	0.92	49.51	0.00	0.00	50.44	77.6	1
Davit8	Davit8:End	End	8.06	34.80	0.08	-10.82	-0.00	0.00	0.0	4.08	7.23	0.00	1.31	0.00	4.94	0.00	8.66	13.3	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	1.573	80.00	80.00	1.97	0.00	0.00	0.00	1.97
Clamp2	1.635	80.00	80.00	2.04	0.00	0.00	0.00	2.04
Clamp3	8.269	80.00	80.00	10.34	0.00	0.00	0.00	10.34
Clamp4	8.269	80.00	80.00	10.34	0.00	0.00	0.00	10.34
Clamp5	8.269	80.00	80.00	10.34	0.00	0.00	0.00	10.34
Clamp6	8.269	80.00	80.00	10.34	0.00	0.00	0.00	10.34
Clamp7	8.269	80.00	80.00	10.34	0.00	0.00	0.00	10.34
Clamp8	8.269	80.00	80.00	10.34	0.00	0.00	0.00	10.34
Clamp9	7.604	80.00	80.00	9.50	0.00	0.00	0.00	9.50
Clamp10	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp11	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp12	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp13	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp14	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp15	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp16	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp17	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp18	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp19	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp20	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp21	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp22	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp23	1.271	80.00	80.00	1.59	0.00	0.00	0.00	1.59
Clamp24	2.212	80.00	80.00	2.76	0.00	0.00	0.00	2.76
Clamp25	10.649	80.00	80.00	13.31	0.00	0.00	0.00	13.31
Clamp26	10.649	80.00	80.00	13.31	0.00	0.00	0.00	13.31

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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
10254:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10254:t	0.004063	10.43	-0.5237	-7.9014	0.0027	0.0001	0.004063	10.43	139.5
10254:Arm1	0.004031	10.34	-0.5171	-7.9014	0.0027	0.0001	0.004031	10.34	138.8
10254:TopConT	0.004017	10.3	-0.5142	-7.9013	0.0027	0.0001	0.004017	10.3	138.5
10254:TopConn	0.003994	10.23	-0.5095	-7.8999	0.0027	0.0001	0.003994	10.23	138
10254:TopConB	0.00397	10.16	-0.5047	-7.8959	0.0027	0.0001	0.00397	10.16	137.5
10254:WVGD14	0.003831	9.747	-0.4764	-7.8557	0.0027	0.0001	0.003831	9.747	134.5
10254:Arm2	0.003443	8.614	-0.3993	-7.6719	0.0027	0.0001	0.003443	8.614	126.2
10254:WVGD13	0.003369	8.398	-0.3848	-7.6220	0.0026	0.0001	0.003369	8.398	124.6
10254:WVGD12	0.002914	7.105	-0.3007	-7.1924	0.0026	0.0001	0.002914	7.105	114.7
10254:WVGD11	0.002475	5.899	-0.2276	-6.6324	0.0025	0.0000	0.002475	5.899	104.8
10254:Arm3	0.002459	5.856	-0.2251	-6.6099	0.0024	0.0000	0.002459	5.856	104.4
10254:WVGD10	0.002061	4.799	-0.1666	-5.9635	0.0023	0.0000	0.002061	4.799	94.83
10254:WVGD9	0.001679	3.821	-0.1185	-5.2625	0.0021	0.0000	0.001679	3.821	84.88
10254:Arm4	0.001593	3.606	-0.1087	-5.1214	0.0021	0.0000	0.001593	3.606	82.52
10254:WVGD8	0.001329	2.955	-0.08072	-4.6488	0.0019	0.0000	0.001329	2.955	74.92
10254:WVGD7	0.001013	2.2	-0.05189	-4.0016	0.0017	0.0000	0.001013	2.2	64.95
10254:WVGD6	0.0007346	1.558	-0.03103	-3.3442	0.0015	0.0000	0.0007346	1.558	54.97
10254:WVGD5	0.0004977	1.03	-0.01686	-2.6912	0.0012	0.0000	0.0004977	1.03	44.98
10254:WVGD4	0.0003047	0.6159	-0.008017	-2.0534	0.0010	0.0000	0.0003047	0.6159	34.99
10254:WVGD3	0.0001573	0.3106	-0.003108	-1.4378	0.0007	0.0000	0.0001573	0.3106	25
10254:WVGD2	5.752e-05	0.1108	-0.0008621	-0.8449	0.0004	0.0000	5.752e-05	0.1108	15
10254:WVGD1	6.665e-06	0.01243	-0.0001275	-0.2757	0.0001	0.0000	6.665e-06	0.01243	5
Davit1:O	0.004037	10.35	-0.4004	-7.9014	0.0027	0.0001	0.004037	9.497	138.9
Davit1:End	0.0041	10.46	0.2815	-7.8891	0.0027	0.0001	0.0041	4.613	140.1
Davit2:O	0.004024	10.33	-0.6337	-7.9014	0.0027	0.0001	0.004024	11.18	138.7
Davit2:End	0.004008	10.35	-1.328	-7.9424	0.0027	0.0001	0.004008	16.2	138.5
Davit3:O	0.003451	8.623	-0.2685	-7.6719	0.0027	0.0001	0.003451	7.643	126.4
Davit3:End	0.003558	8.82	0.7585	-7.2738	0.0027	0.0001	0.003558	-0.1595	128.4
Davit4:O	0.003436	8.606	-0.5301	-7.6719	0.0027	0.0001	0.003436	9.585	126.1
Davit4:End	0.00342	8.667	-1.668	-8.4070	0.0026	0.0001	0.00342	17.65	126
Davit5:O	0.002466	5.864	-0.08606	-6.6099	0.0024	0.0000	0.002466	4.656	104.5
Davit5:End	0.002556	6.024	0.7938	-6.1835	0.0025	0.0001	0.002556	-3.184	106.4
Davit6:O	0.002453	5.848	-0.3641	-6.6099	0.0024	0.0000	0.002453	7.055	104.3
Davit6:End	0.002447	5.91	-1.355	-7.3698	0.0024	0.0000	0.002447	15.12	104.3
Davit7:O	0.001598	3.612	0.01715	-5.1214	0.0021	0.0000	0.001598	2.202	82.64
Davit7:End	0.001664	3.725	0.6895	-4.6554	0.0021	0.0000	0.001664	-5.685	84.31
Davit8:O	0.001588	3.6	-0.2345	-5.1214	0.0021	0.0000	0.001588	5.01	82.39
Davit8:End	0.001592	3.66	-1.018	-5.9155	0.0021	0.0000	0.001592	13.07	82.61

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. Uplift Usage %	Result. 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 %
10254:g	-0.05	0.0	-53.60	0.0	0.0	-55.22	0.0	0.0	76.95	0.0	5517.92	0.0	-2.9	0.0	0.0	-0.00	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.
10254	10254:t	Origin	0.00	125.20	0.05	-6.28	-0.00	-0.00	-0.0	-3.66	0.52	-0.00	-0.18	0.00	0.05	0.00	0.21	0.3	5
10254	10254:Arm1	End	0.70	124.05	0.05	-6.20	0.37	-0.00	-0.0	-3.66	0.52	-0.00	-0.18	0.04	0.01	0.00	0.23	0.3	2
10254	10254:Arm1	Origin	0.70	124.05	0.05	-6.20	1.01	-0.00	0.0	-4.00	2.21	-0.00	-0.20	0.03	0.22	0.00	0.44	0.7	4
10254	10254:TopConT	End	1.00	123.55	0.05	-6.17	1.67	-0.00	0.0	-4.00	2.21	-0.00	-0.20	0.05	0.22	0.00	0.45	0.7	4
10254	10254:TopConT	Origin	1.00	123.55	0.05	-6.17	1.67	-0.00	0.0	0.56	35.25	-0.00	0.03	0.00	3.55	0.00	6.15	9.5	5
10254	10254:TopConn	End	1.50	122.73	0.05	-6.11	19.30	-0.00	0.0	0.56	35.25	-0.00	0.03	0.00	3.53	0.00	6.11	9.4	5
10254	10254:TopConn	Origin	1.50	122.73	0.05	-6.11	19.30	-0.00	0.0	1.48	42.16	-0.00	0.07	0.00	4.22	0.00	7.31	11.2	5
10254	10254:TopConB	End	2.00	121.90	0.05	-6.06	40.38	-0.00	0.0	1.48	42.16	-0.00	0.07	0.00	4.19	0.00	7.27	11.2	5
10254	10254:TopConB	Origin	2.00	121.90	0.05	-6.06	40.38	-0.00	0.0	-3.23	9.24	-0.00	-0.16	4.61	0.24	0.00	4.78	7.4	2
10254	10254:WVGD14	End	5.00	116.97	0.05	-5.72	68.09	-0.00	0.0	-3.23	9.24	-0.00	-0.15	7.23	0.23	0.00	7.39	11.4	2
10254	10254:WVGD14	Origin	5.00	116.97	0.05	-5.72	68.09	-0.00	0.0	-3.80	9.77	-0.00	-0.18	7.23	0.24	0.00	7.42	11.4	2
10254	Tube 1	End	9.19	110.13	0.04	-5.25	108.99	-0.01	0.0	-3.80	9.77	-0.00	-0.17	10.50	0.23	0.00	10.68	16.4	2
10254	Tube 1	Origin	9.19	110.13	0.04	-5.25	108.99	-0.01	0.0	-4.13	10.01	-0.00	-0.19	10.50	0.24	0.00	10.69	16.5	2
10254	10254:Arm2	End	13.38	103.37	0.04	-4.79	150.91	-0.02	0.0	-4.13	10.01	-0.00	-0.18	13.25	0.23	0.00	13.44	20.7	2
10254	10254:Arm2	Origin	13.38	103.37	0.04	-4.79	161.02	-0.02	0.0	-8.73	20.74	-0.00	-0.37	14.14	0.47	0.00	14.54	22.4	2
10254	10254:WVGD13	End	15.00	100.78	0.04	-4.62	194.73	-0.03	0.0	-8.73	20.74	-0.00	-0.37	16.52	0.46	0.00	16.91	26.0	2
10254	10254:WVGD13	Origin	15.00	100.78	0.04	-4.62	194.73	-0.03	0.0	-9.35	21.26	-0.00	-0.39	16.52	0.48	0.00	16.93	26.0	2
10254	Tube 1	End	20.00	92.91	0.04	-4.10	301.04	-0.05	0.0	-9.35	21.26	-0.00	-0.37	23.03	0.45	0.00	23.42	36.0	2
10254	Tube 1	Origin	20.00	92.91	0.04	-4.10	301.04	-0.05	0.0	-9.85	21.56	-0.01	-0.39	23.03	0.46	0.00	23.44	36.1	2
10254	10254:WVGD12	End	25.00	85.26	0.03	-3.61	408.83	-0.08	0.0	-9.85	21.56	-0.01	-0.38	28.35	0.44	0.00	28.74	44.2	2
10254	10254:WVGD12	Origin	25.00	85.26	0.03	-3.61	408.83	-0.08	0.0	-10.69	22.18	-0.01	-0.41	28.35	0.45	0.00	28.77	44.3	2
10254	Tube 1	End	30.00	77.88	0.03	-3.15	519.74	-0.11	0.0	-10.69	22.18	-0.01	-0.39	32.82	0.43	0.00	33.22	51.1	2
10254	Tube 1	Origin	30.00	77.88	0.03	-3.15	519.74	-0.11	0.0	-11.27	22.49	-0.01	-0.41	32.82	0.43	0.00	33.24	51.1	2
10254	10254:WVGD11	End	35.00	70.79	0.03	-2.73	632.17	-0.15	0.0	-11.27	22.49	-0.01	-0.39	36.51	0.41	0.00	36.90	56.8	2
10254	10254:WVGD11	Origin	35.00	70.79	0.03	-2.73	632.17	-0.15	0.0	-11.89	22.97	-0.01	-0.41	36.51	0.42	0.00	36.93	56.8	2
10254	10254:Arm3	End	35.38	70.27	0.03	-2.70	640.79	-0.15	0.0	-11.89	22.97	-0.01	-0.41	36.76	0.42	0.00	37.18	57.2	2
10254	10254:Arm3	Origin	35.38	70.27	0.03	-2.70	650.79	-0.15	0.0	-16.80	33.61	-0.01	-0.58	37.34	0.62	0.00	37.93	58.4	2
10254	Tube 1	End	40.19	63.76	0.03	-2.33	812.52	-0.20	0.0	-16.80	33.61	-0.01	-0.56	42.93	0.59	0.00	43.51	66.9	2
10254	Tube 1	Origin	40.19	63.76	0.03	-2.33	812.52	-0.20	0.0	-17.47	33.88	-0.01	-0.58	42.93	0.60	0.00	43.53	67.0	2
10254	10254:WVGD10	End	45.00	57.59	0.02	-2.00	975.58	-0.25	0.0	-17.47	33.88	-0.01	-0.56	47.64	0.57	0.00	48.21	74.2	2
10254	10254:WVGD10	Origin	45.00	57.59	0.02	-2.00	975.58	-0.25	0.0	-18.34	34.41	-0.01	-0.59	47.64	0.58	0.00	48.24	74.2	2
10254	Tube 1	End	47.67	54.31	0.02	-1.83	1067.29	-0.29	0.0	-18.34	34.41	-0.01	-0.58	49.95	0.57	0.00	50.54	77.7	2
10254	Tube 1	Origin	47.67	54.31	0.02	-1.83	1067.29	-0.29	0.0	-18.74	34.57	-0.01	-0.59	49.95	0.57	0.00	50.55	77.8	2
10254	SpliceT	End	50.33	51.15	0.02	-1.67	1159.41	-0.32	0.0	-18.74	34.57	-0.01	-0.58	52.06	0.56	0.00	52.64	81.0	2
10254	SpliceT	Origin	50.33	51.15	0.02	-1.67	1159.41	-0.32	0.0	-19.66	34.82	-0.01	-0.60	52.06	0.57	0.00	52.67	81.0	2
10254	10254:WVGD9	End	55.00	45.85	0.02	-1.42	1322.03	-0.39	0.0	-19.66	34.82	-0.01	-0.43	41.49	0.40	0.00	41.92	64.5	2
10254	10254:WVGD9	Origin	55.00	45.85	0.02	-1.42	1322.03	-0.39	0.0	-20.93	35.39	-0.02	-0.45	41.49	0.41	0.00	41.95	64.5	2
10254	10254:Arm4	End	57.38	43.27	0.02	-1.30	1406.08	-0.42	0.0	-20.93	35.39	-0.02	-0.45	42.57	0.40	0.00	43.02	66.2	2
10254	10254:Arm4	Origin	57.38	43.27	0.02	-1.30	1415.93	-0.42	0.0	-26.38	45.95	-0.02	-0.56	42.87	0.52	0.00	43.44	66.8	2
10254	Tube 2	End	61.19	39.27	0.02	-1.13	1591.10	-0.48	0.0	-26.38	45.95	-0.02	-0.55	45.53	0.50	0.00	46.09	70.9	2
10254	Tube 2	Origin	61.19	39.27	0.02	-1.13	1591.10	-0.48	0.0	-27.20	46.18	-0.02	-0.56	45.53	0.51	0.00	46.10	70.9	2
10254	10254:WVGD8	End	65.00	35.47	0.02	-0.97	1767.16	-0.55	0.0	-27.20	46.18	-0.02	-0.55	47.87	0.49	0.00	48.43	74.5	2
10254	10254:WVGD8	Origin	65.00	35.47	0.02	-0.97	1767.16	-0.55	0.0	-28.49	46.77	-0.02	-0.57	47.87	0.50	0.00	48.46	74.5	2
10254	Tube 2	End	70.00	30.76	0.01	-0.78	2000.99	-0.65	0.0	-28.49	46.77	-0.02	-0.55	50.56	0.48	0.00	51.12	78.7	2
10254	Tube 2	Origin	70.00	30.76	0.01	-0.78	2000.99	-0.65	0.0	-29.62	47.08	-0.02	-0.58	50.56	0.49	0.00	51.15	78.7	2
10254	10254:WVGD7	End	75.00	26.40	0.01	-0.62	2236.37	-0.75	0.0	-29.62	47.08	-0.02	-0.56	52.83	0.47	0.00	53.39	82.1	2
10254	10254:WVGD7	Origin	75.00	26.40	0.01	-0.62	2236.37	-0.75	0.0	-31.12	47.70	-0.02	-0.59	52.83	0.48	0.00	53.42	82.2	2
10254	Tube 2	End	80.00	22.37	0.01	-0.49	2474.85	-0.86	0.0	-31.12	47.70	-0.02	-0.57	54.78	0.46	0.00	55.35	85.2	2
10254	Tube 2	Origin	80.00	22.37	0.01	-0.49	2474.85	-0.86	0.0	-32.33	48.01	-0.02	-0.59	54.78	0.46	0.00	55.37	85.2	2
10254	10254:WVGD6	End	85.00	18.69	0.01	-0.37	2714.91	-0.98	0.0	-32.33	48.01	-0.02	-0.57	56.42	0.45	0.00	57.00	87.7	2
10254	10254:WVGD6	Origin	85.00	18.69	0.01	-0.37	2714.91	-0.98	0.0	-33.89	48.63	-0.03	-0.60	56.42	0.45	0.00	57.02	87.7	2
10254	Tube 2	End	90.00	15.36	0.01	-0.28	2958.07	-1.11	0.0	-33.89	48.63	-0.03	-0.58	57.83	0.44	0.00	58.41	89.9	2
10254	Tube 2	Origin	90.00	15.36	0.01	-0.28	2958.07	-1.11	0.0	-35.16	48.95	-0.03	-0.60	57.83	0.44	0.00	58.43	89.9	2
10254	10254:WVGD5	End	95.00	12.37	0.01	-0.20	3202.84	-1.25	0.0	-35.16	48.95	-0.03	-0.58	59.01	0.43	0.00	59.59	91.7	2

10254	10254:WVGD5	Origin	95.00	12.37	0.01	-0.20	3202.84	-1.25	0.0	-36.64	49.54	-0.03	-0.61	59.01	0.44	0.00	59.62	91.7	2
10254	SpliceT	End	98.83	10.30	0.01	-0.16	3392.57	-1.36	0.0	-36.64	49.54	-0.03	-0.60	59.79	0.43	0.00	60.39	92.9	2
10254	SpliceT	Origin	98.83	10.30	0.01	-0.16	3392.57	-1.36	0.0	-37.89	49.78	-0.03	-0.62	59.79	0.43	0.00	60.41	92.9	2
10254	Splice	End	101.92	8.78	0.00	-0.12	3546.13	-1.45	0.0	-37.89	49.78	-0.03	-0.58	58.75	0.40	0.00	59.33	91.3	2
10254	Splice	Origin	101.92	8.78	0.00	-0.12	3546.13	-1.45	0.0	-39.41	50.00	-0.03	-0.60	58.75	0.40	0.00	59.35	91.3	2
10254	10254:WVGD4	End	105.00	7.39	0.00	-0.10	3700.38	-1.55	0.0	-39.41	50.00	-0.03	-0.59	59.19	0.40	0.00	59.78	92.0	2
10254	10254:WVGD4	Origin	105.00	7.39	0.00	-0.10	3700.38	-1.55	0.0	-41.21	50.57	-0.03	-0.62	59.19	0.40	0.00	59.81	92.0	2
10254	Tube 3	End	110.00	5.40	0.00	-0.06	3953.22	-1.72	0.0	-41.21	50.57	-0.03	-0.60	59.82	0.39	0.00	60.42	93.0	2
10254	Tube 3	Origin	110.00	5.40	0.00	-0.06	3953.22	-1.72	0.0	-42.65	50.89	-0.04	-0.62	59.82	0.39	0.00	60.44	93.0	2
10254	10254:WVGD3	End	115.00	3.73	0.00	-0.04	4207.68	-1.90	0.0	-42.65	50.89	-0.04	-0.60	60.31	0.38	0.00	60.92	93.7	2
10254	10254:WVGD3	Origin	115.00	3.73	0.00	-0.04	4207.68	-1.90	0.0	-44.46	51.51	-0.04	-0.63	60.31	0.39	0.00	60.95	93.8	2
10254	Tube 3	End	120.00	2.37	0.00	-0.02	4465.22	-2.08	0.0	-44.46	51.51	-0.04	-0.61	60.72	0.38	0.00	61.34	94.4	2
10254	Tube 3	Origin	120.00	2.37	0.00	-0.02	4465.22	-2.08	0.0	-45.96	51.84	-0.04	-0.63	60.72	0.38	0.00	61.36	94.4	2
10254	10254:WVGD2	End	125.00	1.33	0.00	-0.01	4724.43	-2.28	0.0	-45.96	51.84	-0.04	-0.62	61.03	0.37	0.00	61.65	94.9	2
10254	10254:WVGD2	Origin	125.00	1.33	0.00	-0.01	4724.43	-2.28	0.0	-47.83	52.46	-0.04	-0.64	61.03	0.37	0.00	61.68	94.9	2
10254	Tube 3	End	130.00	0.59	0.00	-0.00	4986.74	-2.49	0.0	-47.83	52.46	-0.04	-0.63	61.28	0.36	0.00	61.91	95.2	2
10254	Tube 3	Origin	130.00	0.59	0.00	-0.00	4986.74	-2.49	0.0	-49.39	52.80	-0.04	-0.65	61.28	0.37	0.00	61.93	95.3	2
10254	10254:WVGD1	End	135.00	0.15	0.00	-0.00	5250.76	-2.71	0.0	-49.39	52.80	-0.04	-0.63	61.45	0.36	0.00	62.08	95.5	2
10254	10254:WVGD1	Origin	135.00	0.15	0.00	-0.00	5250.76	-2.71	0.0	-51.31	53.43	-0.05	-0.66	61.45	0.36	0.00	62.11	95.5	2
10254	10254:g	End	140.00	0.00	0.00	0.00	5517.92	-2.94	0.0	-51.31	53.43	-0.05	-0.64	61.57	0.35	0.00	62.21	95.7	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	124.15	0.05	-4.81	-0.32	0.00	-0.0	-0.77	0.08	-0.00	-0.19	0.66	0.00	0.00	0.85	1.3	1
Davit1	#Davit1:0	End	2.51	124.84	0.05	-0.71	-0.13	0.00	-0.0	-0.77	0.08	-0.00	-0.22	0.33	0.00	0.00	0.55	0.8	1
Davit1	#Davit1:0	Origin	2.51	124.84	0.05	-0.71	-0.13	0.00	0.0	-0.77	0.05	-0.00	-0.21	0.33	0.00	0.00	0.54	0.8	1
Davit1	Davit1:End	End	5.02	125.54	0.05	3.38	-0.00	0.00	0.0	-0.77	0.05	-0.00	-0.25	0.00	0.03	0.00	0.25	0.4	3
Davit2	Davit2:O	Origin	0.00	123.95	0.05	-7.60	-0.99	-0.00	-0.0	0.87	0.21	0.00	0.22	2.03	0.00	0.00	2.24	3.5	1
Davit2	#Davit2:0	End	2.51	124.08	0.05	-11.77	-0.46	-0.00	-0.0	0.87	0.21	0.00	0.24	1.19	0.00	0.00	1.43	2.2	1
Davit2	#Davit2:0	Origin	2.51	124.08	0.05	-11.77	-0.46	-0.00	0.0	0.87	0.18	0.00	0.24	1.19	0.00	0.00	1.43	2.2	1
Davit2	Davit2:End	End	5.02	124.21	0.05	-15.94	0.00	0.00	0.0	0.87	0.18	0.00	0.28	0.00	0.12	0.00	0.35	0.5	3
Davit3	Davit3:O	Origin	0.00	103.48	0.04	-3.22	-11.82	0.00	0.0	-5.50	1.48	-0.00	-0.96	11.94	0.00	0.00	12.90	19.8	1
Davit3	#Davit3:0	End	4.03	104.68	0.04	3.03	-5.85	0.00	0.0	-5.50	1.48	-0.00	-1.24	9.93	0.00	0.00	11.18	17.2	1
Davit3	#Davit3:0	Origin	4.03	104.68	0.04	3.03	-5.85	0.00	0.0	-5.48	1.45	-0.00	-1.24	9.93	0.00	0.00	11.17	17.2	1
Davit3	Davit3:End	End	8.06	105.84	0.04	9.10	-0.00	0.00	0.0	-5.48	1.45	-0.00	-1.75	0.00	0.99	0.00	2.45	3.8	3
Davit4	Davit4:O	Origin	0.00	103.27	0.04	-6.36	-21.92	-0.00	-0.0	4.98	2.77	0.00	0.87	22.13	0.00	0.00	23.00	35.4	1
Davit4	#Davit4:0	End	4.03	103.64	0.04	-13.02	-10.77	-0.00	-0.0	4.98	2.77	0.00	1.13	18.30	0.00	0.00	19.43	29.9	1
Davit4	#Davit4:0	Origin	4.03	103.64	0.04	-13.02	-10.77	-0.00	0.0	5.00	2.67	0.00	1.13	18.30	0.00	0.00	19.43	29.9	1
Davit4	Davit4:End	End	8.06	104.00	0.04	-20.02	-0.00	0.00	0.0	5.00	2.67	0.00	1.60	0.00	1.83	0.00	3.55	5.5	3
Davit5	Davit5:O	Origin	0.00	70.36	0.03	-1.03	-12.66	0.00	0.0	-5.47	1.59	-0.00	-0.96	12.78	0.00	0.00	13.74	21.1	1
Davit5	#Davit5:0	End	4.03	71.35	0.03	4.34	-6.26	0.00	0.0	-5.47	1.59	-0.00	-1.24	10.65	0.00	0.00	11.88	18.3	1
Davit5	#Davit5:0	Origin	4.03	71.35	0.03	4.34	-6.26	0.00	0.0	-5.45	1.55	-0.00	-1.23	10.65	0.00	0.00	11.88	18.3	1
Davit5	Davit5:End	End	8.06	72.29	0.03	9.53	-0.00	0.00	0.0	-5.45	1.55	-0.00	-1.74	0.00	1.06	0.00	2.54	3.9	3
Davit6	Davit6:O	Origin	0.00	70.17	0.03	-4.37	-22.66	-0.00	-0.0	4.93	2.86	0.00	0.86	22.87	0.00	0.00	23.73	36.5	1
Davit6	#Davit6:0	End	4.03	70.55	0.03	-10.14	-11.13	-0.00	-0.0	4.93	2.86	0.00	1.11	18.92	0.00	0.00	20.03	30.8	1
Davit6	#Davit6:0	Origin	4.03	70.55	0.03	-10.14	-11.13	-0.00	0.0	4.95	2.76	0.00	1.12	18.92	0.00	0.00	20.04	30.8	1
Davit6	Davit6:End	End	8.06	70.92	0.03	-16.25	-0.00	0.00	0.0	4.95	2.76	0.00	1.58	0.00	1.89	0.00	3.63	5.6	3
Davit7	Davit7:O	Origin	0.00	43.34	0.02	0.21	-13.82	0.00	0.0	-5.43	1.73	-0.00	-0.95	13.96	0.00	0.00	14.90	22.9	1

Davit7	#Davit7:0	End	4.03	44.04	0.02	4.34	-6.85	0.00	0.0	-5.43	1.73	-0.00	-1.23	11.64	0.00	0.00	12.86	19.8	1
Davit7	#Davit7:0	Origin	4.03	44.04	0.02	4.34	-6.85	0.00	0.0	-5.41	1.70	-0.00	-1.22	11.64	0.00	0.00	12.86	19.8	1
Davit7	Davit7:End	End	8.06	44.70	0.02	8.27	-0.00	0.00	0.0	-5.41	1.70	-0.00	-1.73	0.00	1.16	0.00	2.65	4.1	3
Davit8	Davit8:O	Origin	0.00	43.20	0.02	-2.81	-23.67	-0.00	-0.0	4.85	2.98	0.00	0.85	23.90	0.00	0.00	24.74	38.1	1
Davit8	#Davit8:0	End	4.03	43.56	0.02	-7.34	-11.64	-0.00	-0.0	4.85	2.98	0.00	1.10	19.78	0.00	0.00	20.87	32.1	1
Davit8	#Davit8:0	Origin	4.03	43.56	0.02	-7.34	-11.64	-0.00	0.0	4.88	2.89	0.00	1.10	19.78	0.00	0.00	20.88	32.1	1
Davit8	Davit8:End	End	8.06	43.92	0.02	-12.22	-0.00	0.00	0.0	4.88	2.89	0.00	1.56	0.00	1.97	0.00	3.76	5.8	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	0.764	80.00	80.00	0.96	0.00	0.00	0.00	0.96
Clamp2	0.888	80.00	80.00	1.11	0.00	0.00	0.00	1.11
Clamp3	5.655	80.00	80.00	7.07	0.00	0.00	0.00	7.07
Clamp4	5.655	80.00	80.00	7.07	0.00	0.00	0.00	7.07
Clamp5	5.655	80.00	80.00	7.07	0.00	0.00	0.00	7.07
Clamp6	5.655	80.00	80.00	7.07	0.00	0.00	0.00	7.07
Clamp7	5.655	80.00	80.00	7.07	0.00	0.00	0.00	7.07
Clamp8	5.655	80.00	80.00	7.07	0.00	0.00	0.00	7.07
Clamp9	3.668	80.00	80.00	4.58	0.00	0.00	0.00	4.58
Clamp10	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp11	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp12	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp13	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp14	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp15	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp16	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp17	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp18	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp19	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp20	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp21	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp22	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp23	0.445	80.00	80.00	0.56	0.00	0.00	0.00	0.56
Clamp24	6.952	80.00	80.00	8.69	0.00	0.00	0.00	8.69
Clamp25	33.339	80.00	80.00	41.67	0.00	0.00	0.00	41.67
Clamp26	33.339	80.00	80.00	41.67	0.00	0.00	0.00	41.67

*** 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)
10254	95.71	NESC Extreme	2.5	37	28299.2

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 %
10254	NESC Heavy	1	2.641	1.049	-0.412	2.812	42.310	22.095	137.144	3	157.885	1.972	3.250	36.83
10254	NESC Heavy	2	2.812	-0.412	1.049	2.641	42.310	7.846	48.702	3	68.052	1.175	3.250	13.08
10254	NESC Heavy	3	2.229	-1.763	2.229	1.763	42.310	11.543	71.648	5	68.052	1.426	3.250	19.24
10254	NESC Heavy	4	1.049	-2.641	2.812	0.412	42.310	6.425	39.881	3	-57.649	1.064	3.250	10.71
10254	NESC Heavy	5	-0.412	-2.812	2.641	-1.049	42.310	20.558	127.602	3	-146.800	1.902	3.250	34.26
10254	NESC Heavy	6	-1.763	-2.229	1.763	-2.229	42.310	43.677	271.100	5	-146.800	2.773	3.250	72.80
10254	NESC Heavy	7	-2.641	-1.049	0.412	-2.812	42.310	20.518	127.353	3	-146.623	1.901	3.250	34.20
10254	NESC Heavy	8	-2.812	0.412	-1.049	-2.641	42.310	6.311	39.173	3	-56.791	1.054	3.250	10.52
10254	NESC Heavy	9	-2.229	1.763	-2.229	-1.763	42.310	11.594	71.966	5	68.910	1.429	3.250	19.32
10254	NESC Heavy	10	-1.049	2.641	-2.812	-0.412	42.310	7.967	49.448	3	68.910	1.184	3.250	13.28
10254	NESC Heavy	11	0.412	2.812	-2.641	1.049	42.310	22.135	137.393	3	158.062	1.974	3.250	36.89
10254	NESC Heavy	12	1.763	2.229	-1.763	2.229	42.310	47.032	291.922	5	158.062	2.877	3.250	78.39
10254	NESC Heavy	13	2.300	1.773	-1.106	2.685	42.310	27.659	171.679	4	157.973	2.207	3.250	46.10
10254	NESC Heavy	14	2.878	0.385	0.385	2.878	42.310	10.496	65.145	2	157.708	1.359	3.250	17.49
10254	NESC Heavy	15	2.685	-1.106	1.773	2.300	42.310	7.720	47.915	4	68.052	1.166	3.250	12.87
10254	NESC Heavy	16	1.773	-2.300	2.685	1.106	42.310	6.449	40.030	4	-57.649	1.066	3.250	10.75
10254	NESC Heavy	17	0.385	-2.878	2.878	-0.385	42.310	9.505	58.996	2	-146.800	1.294	3.250	15.84
10254	NESC Heavy	18	-1.106	-2.685	2.300	-1.773	42.310	25.720	159.645	4	-146.800	2.128	3.250	42.87
10254	NESC Heavy	19	-2.300	-1.773	1.106	-2.685	42.310	25.685	159.426	4	-146.712	2.126	3.250	42.81
10254	NESC Heavy	20	-2.878	-0.385	-0.385	-2.878	42.310	9.448	58.646	2	-146.446	1.290	3.250	15.75
10254	NESC Heavy	21	-2.685	1.106	-1.773	-2.300	42.310	6.372	39.553	4	-56.791	1.059	3.250	10.62
10254	NESC Heavy	22	-1.773	2.300	-2.685	-1.106	42.310	7.852	48.739	4	68.910	1.176	3.250	13.09
10254	NESC Heavy	23	-0.385	2.878	-2.878	0.385	42.310	10.552	65.495	2	158.062	1.363	3.250	17.59
10254	NESC Heavy	24	1.106	2.685	-2.300	1.773	42.310	27.695	171.898	4	158.062	2.208	3.250	46.16
10254	NESC Extreme	1	2.641	1.049	-0.412	2.812	42.310	27.765	172.333	3	198.249	2.211	3.250	46.27
10254	NESC Extreme	2	2.812	-0.412	1.049	2.641	42.310	9.497	58.944	3	83.263	1.293	3.250	15.83
10254	NESC Extreme	3	2.229	-1.763	2.229	1.763	42.310	14.584	90.520	5	83.263	1.602	3.250	24.31
10254	NESC Extreme	4	1.049	-2.641	2.812	0.412	42.310	8.813	54.703	3	-78.260	1.246	3.250	14.69
10254	NESC Extreme	5	-0.412	-2.812	2.641	-1.049	42.310	27.044	167.862	3	-193.081	2.182	3.250	45.07
10254	NESC Extreme	6	-1.763	-2.229	1.763	-2.229	42.310	57.503	356.918	5	-193.081	3.182	3.250	95.84
10254	NESC Extreme	7	-2.641	-1.049	0.412	-2.812	42.310	27.035	167.801	3	-193.037	2.182	3.250	45.06
10254	NESC Extreme	8	-2.812	0.412	-1.049	-2.641	42.310	8.785	54.530	3	-78.051	1.244	3.250	14.64
10254	NESC Extreme	9	-2.229	1.763	-2.229	-1.763	42.310	14.596	90.597	5	83.472	1.603	3.250	24.33
10254	NESC Extreme	10	-1.049	2.641	-2.812	-0.412	42.310	9.526	59.126	3	83.472	1.295	3.250	15.88
10254	NESC Extreme	11	0.412	2.812	-2.641	1.049	42.310	27.774	172.393	3	198.292	2.211	3.250	46.29
10254	NESC Extreme	12	1.763	2.229	-1.763	2.229	42.310	59.056	366.555	5	198.292	3.224	3.250	98.43
10254	NESC Extreme	13	2.300	1.773	-1.106	2.685	42.310	34.748	215.681	4	198.271	2.473	3.250	57.91
10254	NESC Extreme	14	2.878	0.385	0.385	2.878	42.310	13.086	81.221	2	198.206	1.518	3.250	21.81
10254	NESC Extreme	15	2.685	-1.106	1.773	2.300	42.310	9.272	57.552	4	83.263	1.278	3.250	15.45
10254	NESC Extreme	16	1.773	-2.300	2.685	1.106	42.310	8.661	53.760	4	-78.260	1.235	3.250	14.44
10254	NESC Extreme	17	0.385	-2.878	2.878	-0.385	42.310	12.615	78.298	2	-193.081	1.490	3.250	21.02

10254	NESC Extreme	18	-1.106	-2.685	2.300	-1.773	42.310	33.843	210.063	4	-193.081	2.441	3.250	56.41
10254	NESC Extreme	19	-2.300	-1.773	1.106	-2.685	42.310	33.835	210.010	4	-193.059	2.441	3.250	56.39
10254	NESC Extreme	20	-2.878	-0.385	-0.385	-2.878	42.310	12.601	78.213	2	-192.994	1.489	3.250	21.00
10254	NESC Extreme	21	-2.685	1.106	-1.773	-2.300	42.310	8.643	53.644	4	-78.051	1.233	3.250	14.40
10254	NESC Extreme	22	-1.773	2.300	-2.685	-1.106	42.310	9.305	57.753	4	83.472	1.280	3.250	15.51
10254	NESC Extreme	23	-0.385	2.878	-2.878	0.385	42.310	13.099	81.306	2	198.292	1.519	3.250	21.83
10254	NESC Extreme	24	1.106	2.685	-2.300	1.773	42.310	34.757	215.734	4	198.292	2.474	3.250	57.93

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
Davit1	13.46	NESC Heavy	139.4	1	61.2
Davit2	17.98	NESC Heavy	139.4	1	61.2
Davit3	78.21	NESC Heavy	126.9	1	121.4
Davit4	90.99	NESC Heavy	126.9	1	121.4
Davit5	79.12	NESC Heavy	104.9	1	121.4
Davit6	91.65	NESC Heavy	104.9	1	121.4
Davit7	80.49	NESC Heavy	82.9	1	121.4
Davit8	92.62	NESC Heavy	82.9	1	121.4

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	92.62	Davit8	Tubular Davit
NESC Extreme	98.43	10254	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Height AGL (ft)	Segment Number
NESC Heavy	76.05	10254	7.5	36
NESC Extreme	95.71	10254	2.5	37

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	10254	12	42.310	112.615	4294.165	-12.098	47.032	291.922	5	158.062	2.877	78.39
NESC Extreme	10254	12	42.310	52.119	5517.916	-2.943	59.056	366.555	5	198.292	3.224	98.43

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Height AGL (ft)	Segment Number
NESC Heavy	92.62	Davit8	82.9	1
NESC Extreme	38.07	Davit8	82.9	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	1.97	NESC Heavy	0.0
Clamp2	Clamp	2.04	NESC Heavy	0.0
Clamp3	Clamp	10.34	NESC Heavy	0.0
Clamp4	Clamp	10.34	NESC Heavy	0.0
Clamp5	Clamp	10.34	NESC Heavy	0.0
Clamp6	Clamp	10.34	NESC Heavy	0.0
Clamp7	Clamp	10.34	NESC Heavy	0.0
Clamp8	Clamp	10.34	NESC Heavy	0.0
Clamp9	Clamp	9.50	NESC Heavy	0.0
Clamp10	Clamp	1.59	NESC Heavy	0.0
Clamp11	Clamp	1.59	NESC Heavy	0.0
Clamp12	Clamp	1.59	NESC Heavy	0.0
Clamp13	Clamp	1.59	NESC Heavy	0.0
Clamp14	Clamp	1.59	NESC Heavy	0.0
Clamp15	Clamp	1.59	NESC Heavy	0.0
Clamp16	Clamp	1.59	NESC Heavy	0.0
Clamp17	Clamp	1.59	NESC Heavy	0.0
Clamp18	Clamp	1.59	NESC Heavy	0.0
Clamp19	Clamp	1.59	NESC Heavy	0.0
Clamp20	Clamp	1.59	NESC Heavy	0.0
Clamp21	Clamp	1.59	NESC Heavy	0.0
Clamp22	Clamp	1.59	NESC Heavy	0.0
Clamp23	Clamp	1.59	NESC Heavy	0.0
Clamp24	Clamp	8.69	NESC Extreme	0.0
Clamp25	Clamp	41.67	NESC Extreme	0.0
Clamp26	Clamp	41.67	NESC Extreme	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	Clamp1	Clamp	Davit1:End	0.000	1.185	1.035	1.573
NESC Heavy	Clamp2	Clamp	Davit2:End	0.000	1.234	1.072	1.635
NESC Heavy	Clamp3	Clamp	Davit3:End	0.000	4.255	7.090	8.269
NESC Heavy	Clamp4	Clamp	Davit4:End	0.000	4.255	7.090	8.269
NESC Heavy	Clamp5	Clamp	Davit5:End	0.000	4.255	7.090	8.269
NESC Heavy	Clamp6	Clamp	Davit6:End	0.000	4.255	7.090	8.269
NESC Heavy	Clamp7	Clamp	Davit7:End	0.000	4.255	7.090	8.269
NESC Heavy	Clamp8	Clamp	Davit8:End	0.000	4.255	7.090	8.269
NESC Heavy	Clamp9	Clamp	10254:t	0.000	0.000	7.604	7.604
NESC Heavy	Clamp10	Clamp	10254:WVGD1	0.000	0.119	1.265	1.271
NESC Heavy	Clamp11	Clamp	10254:WVGD2	0.000	0.119	1.265	1.271
NESC Heavy	Clamp12	Clamp	10254:WVGD3	0.000	0.119	1.265	1.271
NESC Heavy	Clamp13	Clamp	10254:WVGD4	0.000	0.119	1.265	1.271
NESC Heavy	Clamp14	Clamp	10254:WVGD5	0.000	0.119	1.265	1.271
NESC Heavy	Clamp15	Clamp	10254:WVGD6	0.000	0.119	1.265	1.271
NESC Heavy	Clamp16	Clamp	10254:WVGD7	0.000	0.119	1.265	1.271
NESC Heavy	Clamp17	Clamp	10254:WVGD8	0.000	0.119	1.265	1.271
NESC Heavy	Clamp18	Clamp	10254:WVGD9	0.000	0.119	1.265	1.271

NESC Heavy	Clamp19	Clamp	10254:WVGD10	0.000	0.119	1.265	1.271
NESC Heavy	Clamp20	Clamp	10254:WVGD11	0.000	0.119	1.265	1.271
NESC Heavy	Clamp21	Clamp	10254:WVGD12	0.000	0.119	1.265	1.271
NESC Heavy	Clamp22	Clamp	10254:WVGD13	0.000	0.119	1.265	1.271
NESC Heavy	Clamp23	Clamp	10254:WVGD14	0.000	0.119	1.265	1.271
NESC Heavy	Clamp24	Clamp	10254:TopConn	0.000	2.212	0.000	2.212
NESC Heavy	Clamp25	Clamp	10254:TopConT	0.000	10.649	0.000	10.649
NESC Heavy	Clamp26	Clamp	10254:TopConB	0.000	-10.649	0.000	10.649
NESC Extreme	Clamp1	Clamp	Davit1:End	0.000	0.733	0.216	0.764
NESC Extreme	Clamp2	Clamp	Davit2:End	0.000	0.865	0.201	0.888
NESC Extreme	Clamp3	Clamp	Davit3:End	0.000	4.942	2.748	5.655
NESC Extreme	Clamp4	Clamp	Davit4:End	0.000	4.942	2.748	5.655
NESC Extreme	Clamp5	Clamp	Davit5:End	0.000	4.942	2.748	5.655
NESC Extreme	Clamp6	Clamp	Davit6:End	0.000	4.942	2.748	5.655
NESC Extreme	Clamp7	Clamp	Davit7:End	0.000	4.942	2.748	5.655
NESC Extreme	Clamp8	Clamp	Davit8:End	0.000	4.942	2.748	5.655
NESC Extreme	Clamp9	Clamp	10254:t	0.000	0.000	3.668	3.668
NESC Extreme	Clamp10	Clamp	10254:WVGD1	0.000	0.283	0.343	0.445
NESC Extreme	Clamp11	Clamp	10254:WVGD2	0.000	0.283	0.343	0.445
NESC Extreme	Clamp12	Clamp	10254:WVGD3	0.000	0.283	0.343	0.445
NESC Extreme	Clamp13	Clamp	10254:WVGD4	0.000	0.283	0.343	0.445
NESC Extreme	Clamp14	Clamp	10254:WVGD5	0.000	0.283	0.343	0.445
NESC Extreme	Clamp15	Clamp	10254:WVGD6	0.000	0.283	0.343	0.445
NESC Extreme	Clamp16	Clamp	10254:WVGD7	0.000	0.283	0.343	0.445
NESC Extreme	Clamp17	Clamp	10254:WVGD8	0.000	0.283	0.343	0.445
NESC Extreme	Clamp18	Clamp	10254:WVGD9	0.000	0.283	0.343	0.445
NESC Extreme	Clamp19	Clamp	10254:WVGD10	0.000	0.283	0.343	0.445
NESC Extreme	Clamp20	Clamp	10254:WVGD11	0.000	0.283	0.343	0.445
NESC Extreme	Clamp21	Clamp	10254:WVGD12	0.000	0.283	0.343	0.445
NESC Extreme	Clamp22	Clamp	10254:WVGD13	0.000	0.283	0.343	0.445
NESC Extreme	Clamp23	Clamp	10254:WVGD14	0.000	0.283	0.343	0.445
NESC Extreme	Clamp24	Clamp	10254:TopConn	0.000	6.952	0.000	6.952
NESC Extreme	Clamp25	Clamp	10254:TopConT	0.000	33.339	0.000	33.339
NESC Extreme	Clamp26	Clamp	10254:TopConB	0.000	-33.339	0.000	33.339

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	31.827	0.000	69.961	3468.630	0.000	0.000
NESC Extreme	42.164	0.000	25.375	4628.836	0.000	0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 850.8
Weight of Steel Poles: 28299.2
Total: 29150.0

*** End of Report

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Subject:	Anchor Bolt Analysis Pole #10254
Location:	Bethel, CT
Rev. 3: 2/2/23	Prepared by: T.J.L. Checked by: C.F.C. Job No. 22021.07

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force =	$T_{Max} := 199 \cdot kips$	(User Input from PLS-Pole)
Maximum Shear Force at Base =	$V_{base} := 54 \cdot kips$	(User Input from PLS-Pole)

Anchor Bolt Data:

Use AST MA615 Grade 75		
Number of Anchor Bolts =	$N := 20$	(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 = $A_s := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 3.248 \cdot in^2$

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.7 \cdot kips$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 831.4\,psi$

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

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

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

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 81.72 \cdot \%$

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

Condition1 = "OK"

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Subject: CAISSON FOUNDATION ANALYSIS

Location: Bethel, CT

Rev. 4: 3/7/23

Prepared by: TJL Checked by: C.F.C.
Job No. 22021.07

Caisson Foundation:

Input Data:

Shear Force =	S := 53.6k·1.1 = 59·kips	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	M := 5518ft·k·1.1 = 6070·ft·k	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	A1 := 55.2k·1.1 = 60.7·kips	*USER INPUT-FROM PLS-Pole*
Bending Moment =	Mu := 6265ft·k	*USER INPUT--FROM LPILE*
Moment Capacity =	Mn := 9819ft·k	*USER INPUT--FROM LPILE*
Max Shear =	V_u := 804965·lb	*USER INPUT--FROM LPILE*
Foundation Diameter =	d := 8ft	*USER INPUT*
Overall Length of Caisson =	L_c := 20.5ft	*USER INPUT*
Depth From Top of Caisson to Grade =	L_{pag} := 0.5ft	*USER INPUT*
Number of Rebar =	n := 38	*USER INPUT*
Area of Rebar =	Ar := $1.27in^2$	*USER INPUT*
Rebar Yield Strength =	fy := 60ksi	*USER INPUT*
Concrete Comp Strength =	f'c := 3500 psi	*USER INPUT*
Area of Shear Reinforcement =	A_v := $0.22in^2$	*USER INPUT = (2)*(Area of #3) per 11.4.7.3*
Spacing of Shear Reinforcement =	s := 18in	

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9Mn}{Mu} = 1.41$

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

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

FOSCheck = "OK"

Check Shear Capacity:

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

Area of Concrete Pier = $A_c := \frac{1}{4}\cdot\pi\cdot d^2 = 7238\cdot in^2$

Nominal Shear Strength by Concrete = $V_c := 2\cdot\sqrt{f'c}\cdot psi\cdot A_c = 856\cdot kips$

Nominal Shear Strength by Steel = $V_s := \frac{(A_v\cdot fy\cdot 0.8\cdot d)}{s} = 56\cdot kips$

Design Shear Strength = $\phi V_n := \phi\cdot(V_c + V_s) = 685\cdot kips$

$ShearCheck := if(\phi V_n \geq V_u, "OK", "NO GOOD")$ $\frac{V_u}{\phi V_n} = 117.6\cdot\%$

Assume concrete has cracked and shear is resisted through shear friction at interface per ACI 318 section 22.9

Coefficient of Friction= $\mu := 1.4$ *USER INPUT*

Area of Reinforcement Crossing Shear Plane = $A_{vf} := Ar \cdot n = 48.26 \cdot in^2$

Nominal Shear Strength = $V_n := \min\left[\mu \cdot A_{vf} \cdot fy, 0.2 \cdot f'c \cdot psi \cdot A_c, (480psi + 0.08 \cdot f'c \cdot psi) \cdot A_c, 1600 \cdot psi \cdot A_c\right] = 4054 \cdot kips$

Design Shear Strength = $\phi V_n := \phi \cdot (V_n) = 3040 \cdot kips$

$ShearCheck := if(\phi V_n \geq V_u, "OK", "NO GOOD")$ $\frac{V_u}{\phi V_n} = 26.5 \cdot \%$

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\2202100.WI\07_CT5176\05_Structural\Backup Documentation\Rev (4)\Calcs\MathCAD\Foundation\Existing Caisson\
Name of input data file: Caisson Analysis - Existing Caisson.lpd
Name of output file: Caisson Analysis - Existing Caisson.lpo
Name of plot output file: Caisson Analysis - Existing Caisson.lpp
Name of runtime file: Caisson Analysis - Existing Caisson.lpr

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Time and Date of Analysis

Date: March 7, 2023 Time: 11:58:23

Problem Title

22021.07/ CT5176 - Stony Hill / Structure # 10254

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum
bending moment, and shear force only
- Analysis includes effects of soil movement on pile response
- Additional p-y curves computed at specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 250
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment,
  and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 246.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	96.00000000	4169220.	7238.2000	3300000.
2	246.0000	96.00000000	4169220.	7238.2000	3300000.

Please note that because this analysis makes computations of ultimate
moment capacity and pile response using nonlinear bending stiffness
that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   6.000 in
Distance from top of pile to bottom of layer =   90.000 in
p-y subgrade modulus k for top of soil layer =   90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   90.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   90.000 in
Distance from top of pile to bottom of layer =   144.000 in
p-y subgrade modulus k for top of soil layer =   90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   144.000 in
Distance from top of pile to bottom of layer =   186.000 in
p-y subgrade modulus k for top of soil layer =   225.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   225.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   186.000 in
Distance from top of pile to bottom of layer =   246.000 in
p-y subgrade modulus k for top of soil layer =   125.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   125.000 lbs/in**3

(Depth of lowest layer extends   0.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	6.00	0.06700
2	90.00	0.06700
3	90.00	0.06700
4	144.00	0.06700
5	144.00	0.07500
6	186.00	0.07500
7	186.00	0.03900

8	246.00	0.03900

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	0.00000	30.00	------	------
2	90.000	0.00000	30.00	------	------
3	90.000	0.00000	30.00	------	------
4	144.000	0.00000	30.00	------	------
5	144.000	0.00000	40.00	------	------
6	186.000	0.00000	40.00	------	------
7	186.000	0.00000	40.00	------	------
8	246.000	0.00000	40.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X in	Soil Movement in
1	0.000	0.000
2	0.000	0.000

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 59000.000 lbs
Bending moment at pile head = 72840000.000 in-lbs
Axial load at pile head = 60700.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head
may rotate under the applied pile-head loading, but is not a free-head
(zero moment) condition.

Output of p-y Curves at Specified Depths

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p-y curves are generated and printed for verification at 1 depths.

Depth No.	Depth Below Pile Head in	Depth Below Ground Surface in
1	144.000	138.000

Depth of ground surface below top of pile = 6.00 in

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 96.0000 in

Material Properties:

Compressive Strength of Concrete = 3.500 kip/in**2
Yield Stress of Reinforcement = 60. kip/in**2
Modulus of Elasticity of Reinforcement = 29000. kip/in**2
Number of Reinforcing Bars = 38
Area of Single Bar = 1.27000 in**2
Number of Rows of Reinforcing Bars = 19
Area of Steel = 48.260 in**2
Area of Shaft = 7238.229 in**2
Percentage of Steel Reinforcement = 0.667 percent
Cover Thickness (edge to bar center) = 6.000 in

Unfactored Axial Squash Load Capacity = 24285.76 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	2.540	41.857
2	2.540	40.715
3	2.540	38.462
4	2.540	35.161
5	2.540	30.900
6	2.540	25.797
7	2.540	19.990
8	2.540	13.637
9	2.540	6.913
10	2.540	0.000
11	2.540	-6.913
12	2.540	-13.637
13	2.540	-19.990
14	2.540	-25.797
15	2.540	-30.900
16	2.540	-35.161
17	2.540	-38.462
18	2.540	-40.715
19	2.540	-41.857

Axial Thrust Force = 60700.00 lbs

Bending Moment	Bending Stiffness	Bending Curvature	Maximum Strain	Neutral Axis Position	Max. Concrete Stress	Max. Steel Stress

in-lbs	lb-in2	rad/in	in/in	inches	psi	psi
9606048.	1.536968E+13	6.250000E-07	0.00003246	51.94080591	107.73655	830.07705
19108873.	1.528710E+13	0.00000125	0.00006258	50.06321955	205.78877	1592.09160
28509522.	1.520508E+13	0.00000188	0.00009274	49.45961523	302.26971	2355.31641
37805359.	1.512214E+13	0.00000250	0.00012285	49.14105177	396.90730	3117.32603
37805359.	1.209771E+13	0.00000313	0.00007923	25.35251570	255.27979	5845.67799
37805359.	1.008143E+13	0.00000375	0.00009314	24.83661032	298.72345	7070.91830
37805359.	8.641225E+12	0.00000438	0.00010707	24.47208166	341.87299	8295.65426
37805359.	7.561072E+12	0.00000500	0.00012101	24.20218706	384.72743	9519.88244
37805359.	6.720953E+12	0.00000563	0.00013500	23.99999857	427.36715	10742.84974
37805359.	6.048857E+12	0.00000625	0.00014928	23.88404703	470.54648	11957.51593
37805359.	5.498961E+12	0.00000688	0.00016323	23.74317026	512.37791	13181.35483
37805359.	5.040715E+12	0.00000750	0.00017721	23.62833738	553.91607	14404.63596
37805359.	4.652967E+12	0.00000813	0.00019121	23.53355742	595.15991	15627.35482
37805359.	4.320612E+12	0.00000875	0.00020523	23.45455027	636.10836	16849.50710
37805359.	4.032572E+12	0.00000938	0.00021926	23.38818026	676.76040	18071.08767
37805359.	3.780536E+12	0.00001000	0.00023332	23.33208704	717.11474	19292.09388
37805359.	3.558151E+12	0.00001063	0.00024740	23.28447390	757.17035	20512.52055
37805359.	3.360476E+12	0.00001125	0.00026149	23.24393892	796.92602	21732.36394
37805359.	3.183609E+12	0.00001188	0.00027561	23.20938349	836.38079	22951.61752
37805359.	3.024429E+12	0.00001250	0.00028975	23.17991781	875.53332	24170.27870
37805359.	2.880408E+12	0.00001313	0.00030391	23.15482950	914.38252	25388.34187
38581797.	2.805949E+12	0.00001375	0.00031809	23.13353205	952.92714	26605.80289
40238988.	2.799234E+12	0.00001438	0.00033229	23.11554193	991.16598	27822.65720
41894116.	2.792941E+12	0.00001500	0.00034651	23.10045862	1029.09788	

29038.89919
   43547163. 2.787018E+12   0.00001563   0.00036075   23.08794165   1066.72152
30254.52507
   45198127. 2.781423E+12   0.00001625   0.00037501   23.07771063   1104.03588
31469.52744
   46846983. 2.776118E+12   0.00001688   0.00038930   23.06951666   1141.03946
32683.90381
   48493722. 2.771070E+12   0.00001750   0.00040361   23.06315374   1177.73110
33897.64794
   50138329. 2.766253E+12   0.00001813   0.00041793   23.05844164   1214.10946
35110.75503
   51780791. 2.761642E+12   0.00001875   0.00043229   23.05522585   1250.17331
36323.21930
   53421090. 2.757218E+12   0.00001938   0.00044666   23.05336905   1285.92120
37535.03657
   55059213. 2.752961E+12   0.00002000   0.00046106   23.05275393   1321.35186
38746.20097
   56695154. 2.748856E+12   0.00002063   0.00047547   23.05328035   1356.46411
39956.70488
   58328884. 2.744889E+12   0.00002125   0.00048992   23.05485106   1391.25629
41166.54618
   59960405. 2.741047E+12   0.00002188   0.00050438   23.05739164   1425.72735
42375.71526
   61589686. 2.737319E+12   0.00002250   0.00051887   23.06082487   1459.87560
43584.20980
   63216715. 2.733696E+12   0.00002313   0.00053338   23.06508780   1493.69966
44792.02347
   64841482. 2.730168E+12   0.00002375   0.00054792   23.07012606   1527.19825
45999.14860
   66463972. 2.726727E+12   0.00002438   0.00056247   23.07588816   1560.36987
47205.57943
   69702037. 2.720079E+12   0.00002563   0.00059167   23.08940077   1625.72608
49616.33681
   72930786. 2.713704E+12   0.00002688   0.00062096   23.10531378   1689.75642
52024.24372
   76150080. 2.707558E+12   0.00002813   0.00065034   23.12336969   1752.44850
54429.24913
   79359775. 2.701609E+12   0.00002938   0.00067984   23.14335680   1813.78961
56831.30036
   82559725. 2.695828E+12   0.00003063   0.00070943   23.16510057   1873.76675
59230.34237
   85368423. 2.678225E+12   0.00003188   0.00073796   23.15179682   1930.01204
60000.00000
   87583986. 2.644045E+12   0.00003313   0.00076476   23.08697748   1981.36583
60000.00000
   89545111. 2.604949E+12   0.00003438   0.00079082   23.00571012   2030.03164
60000.00000
   91140093. 2.558318E+12   0.00003563   0.00081572   22.89738607   2075.29365
60000.00000
   92724865. 2.514573E+12   0.00003688   0.00084066   22.79759073   2119.52462
60000.00000

93978056.	2.464998E+12	0.00003813	0.00086445	22.67410326	2160.59036
60000.00000					
95226347.	2.418447E+12	0.00003938	0.00088829	22.55975962	2200.73512
60000.00000					
96400872.	2.372945E+12	0.00004063	0.00091190	22.44677496	2239.47521
60000.00000					
97792378.	2.335340E+12	0.00004188	0.00093800	22.40000010	2281.31739
60000.00000					
98361047.	2.280836E+12	0.00004313	0.00096043	22.27077055	2316.06745
60000.00000					
99304153.	2.237840E+12	0.00004438	0.00098287	22.14908838	2349.94306
60000.00000					
1.001389E+08	2.194824E+12	0.00004563	0.00100481	22.02332926	2382.18061
60000.00000					
1.008388E+08	2.151229E+12	0.00004688	0.00102613	21.89078093	2412.62937
60000.00000					
1.015361E+08	2.109842E+12	0.00004813	0.00104749	21.76602602	2442.33831
60000.00000					
1.022307E+08	2.070495E+12	0.00004938	0.00106889	21.64847803	2471.30261
60000.00000					
1.029225E+08	2.033038E+12	0.00005063	0.00109034	21.53761625	2499.51793
60000.00000					
1.035554E+08	1.996249E+12	0.00005188	0.00111150	21.42647409	2526.53486
60000.00000					
1.040547E+08	1.958676E+12	0.00005313	0.00113191	21.30653143	2551.80585
60000.00000					
1.045516E+08	1.922788E+12	0.00005438	0.00115236	21.19282866	2576.39314
60000.00000					
1.050462E+08	1.888471E+12	0.00005563	0.00117285	21.08495378	2600.29283
60000.00000					
1.055385E+08	1.855621E+12	0.00005688	0.00119338	20.98252916	2623.50084
60000.00000					
1.060284E+08	1.824144E+12	0.00005813	0.00121395	20.88520575	2646.01273
60000.00000					
1.060284E+08	1.785741E+12	0.00005938	0.00123500	20.79999876	2668.29992
60000.00000					
1.070789E+08	1.766250E+12	0.00006063	0.00126091	20.79847670	2694.90167
60000.00000					
1.074120E+08	1.735952E+12	0.00006188	0.00127991	20.68534613	2713.37298
60000.00000					
1.077410E+08	1.706788E+12	0.00006313	0.00129892	20.57696486	2731.23081
60000.00000					
1.080683E+08	1.678730E+12	0.00006438	0.00131797	20.47335577	2748.49148
60000.00000					
1.083937E+08	1.651713E+12	0.00006563	0.00133706	20.37424707	2765.15123
60000.00000					
1.087173E+08	1.625680E+12	0.00006688	0.00135618	20.27939558	2781.20675
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1.090391E+08	1.600574E+12	0.00006813	0.00137535	20.18856668	2796.65413
60000.00000					
1.093591E+08	1.576347E+12	0.00006938	0.00139454	20.10154867	2811.48978

60000.00000
1.096772E+08 1.552951E+12 0.00007063 0.00141378 20.01814699 2825.71014
60000.00000
1.099934E+08 1.530343E+12 0.00007188 0.00143306 19.93817568 2839.31134
60000.00000
1.103078E+08 1.508482E+12 0.00007313 0.00145237 19.86146593 2852.28967
60000.00000
1.105476E+08 1.486354E+12 0.00007438 0.00147098 19.77782965 2864.15203
60000.00000
1.109663E+08 1.443464E+12 0.00007688 0.00150772 19.61257696 2885.79031
60000.00000
1.113786E+08 1.403196E+12 0.00007938 0.00154460 19.45947790 2905.15348
60000.00000
1.117846E+08 1.365308E+12 0.00008188 0.00158162 19.31745100 2922.21455
60000.00000
1.122990E+08 1.330951E+12 0.00008438 0.00162000 19.20000029 2937.41357
60000.00000
1.126737E+08 1.296963E+12 0.00008688 0.00166574 19.17402220 2952.27857
60000.00000
1.130434E+08 1.264822E+12 0.00008938 0.00170185 19.04165125 2961.28635
60000.00000
1.134071E+08 1.234363E+12 0.00009188 0.00173810 18.91811800 2968.05675
60000.00000
1.136957E+08 1.204723E+12 0.00009438 0.00177341 18.79109144 2972.45166
60000.00000
1.139140E+08 1.175887E+12 0.00009688 0.00180782 18.66134405 2974.65697
60000.00000
1.141235E+08 1.148412E+12 0.00009938 0.00184236 18.53949308 2972.00612
60000.00000
1.143245E+08 1.122203E+12 0.00010188 0.00187704 18.42497492 2964.89488
60000.00000
1.145229E+08 1.097225E+12 0.00010438 0.00191187 18.31729460 2967.51502
60000.00000
1.147187E+08 1.073391E+12 0.00010688 0.00194683 18.21599436 2971.64169
60000.00000
1.149117E+08 1.050621E+12 0.00010938 0.00198195 18.12065935 2974.14493
60000.00000
1.151020E+08 1.028844E+12 0.00011188 0.00201721 18.03091764 2974.99993
60000.00000
1.152862E+08 1.007967E+12 0.00011438 0.00205274 17.94749308 2968.65910
60000.00000
1.154684E+08 9.879653E+11 0.00011688 0.00208840 17.86867476 2962.20614
60000.00000
1.156487E+08 9.687846E+11 0.00011938 0.00212418 17.79417658 2964.79906
60000.00000
1.158268E+08 9.503740E+11 0.00012188 0.00216008 17.72374964 2969.30624
60000.00000
1.159897E+08 9.325803E+11 0.00012438 0.00219579 17.65462160 2972.48978
60000.00000
1.159897E+08 9.142044E+11 0.00012688 0.00223300 17.59999895 2974.45839
60000.00000

1.159897E+08 8.965386E+11 0.00012938 0.00227700 17.59999895 2972.73770
60000.00000
1.163886E+08 8.825677E+11 0.00013188 0.00231954 17.58893824 2965.65711
60000.00000
1.164702E+08 8.667548E+11 0.00013438 0.00235276 17.50888395 2960.60580
60000.00000
1.165510E+08 8.515140E+11 0.00013688 0.00238605 17.43234015 2958.67957
60000.00000
1.166310E+08 8.368145E+11 0.00013938 0.00241943 17.35912943 2963.19663
60000.00000
1.167102E+08 8.226273E+11 0.00014188 0.00245289 17.28908014 2966.99802
60000.00000
1.167887E+08 8.089258E+11 0.00014438 0.00248643 17.22203779 2970.07455
60000.00000
1.168663E+08 7.956853E+11 0.00014688 0.00252006 17.15786219 2972.41687
60000.00000
1.169431E+08 7.828823E+11 0.00014938 0.00255378 17.09641314 2974.01517
60000.00000
1.170190E+08 7.704954E+11 0.00015188 0.00258758 17.03757048 2974.85957
60000.00000
1.170931E+08 7.584975E+11 0.00015438 0.00262155 16.98172331 2973.26999
60000.00000
1.171651E+08 7.468690E+11 0.00015688 0.00265571 16.92885733 2968.88322
60000.00000
1.172366E+08 7.356023E+11 0.00015938 0.00268993 16.87800837 2964.48401
60000.00000
1.173077E+08 7.246809E+11 0.00016188 0.00272421 16.82909060 2960.07211
60000.00000
1.173784E+08 7.140889E+11 0.00016438 0.00275854 16.78201818 2955.64742
60000.00000
1.174485E+08 7.038115E+11 0.00016688 0.00279294 16.73671389 2951.20975
60000.00000
1.175182E+08 6.938344E+11 0.00016938 0.00282739 16.69310045 2955.61019
60000.00000
1.175874E+08 6.841450E+11 0.00017188 0.00286191 16.65111494 2959.88082
60000.00000
1.176562E+08 6.747306E+11 0.00017438 0.00289649 16.61068869 2963.63394
60000.00000
1.177921E+08 6.566806E+11 0.00017938 0.00296583 16.53427076 2969.56411
60000.00000
1.178614E+08 6.392483E+11 0.00018438 0.00303218 16.44570780 2973.08096
60000.00000
1.179181E+08 6.226697E+11 0.00018938 0.00309817 16.35996294 2974.79749
60000.00000
1.179717E+08 6.069286E+11 0.00019438 0.00316457 16.28075552 2971.52531
60000.00000
1.180232E+08 5.919659E+11 0.00019938 0.00323130 16.20714140 2964.83950
60000.00000
1.180741E+08 5.777325E+11 0.00020438 0.00329815 16.13771296 2958.12774
60000.00000
1.181187E+08 5.641489E+11 0.00020938 0.00336570 16.07500792 2951.26074

```
  60000.00000
  1.181471E+08  5.511234E+11    0.00021438    0.00343499   16.02328348    2944.01798
  60000.00000
  1.184025E+08  5.397267E+11    0.00021938    0.00351000   16.00000048    2947.02846
  60000.00000
  1.188468E+08  5.296792E+11    0.00022438    0.00359000   16.00000048    2957.64282
  60000.00000
  1.192728E+08  5.199904E+11    0.00022938    0.00367000   16.00000048    2965.73664
  60000.00000
  1.196806E+08  5.106372E+11    0.00023438    0.00375000   16.00000048    2971.30994
  60000.00000
  1.200188E+08  5.013839E+11    0.00023938    0.00383000   16.00000048    2974.36271
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  117827.78128
in-kip



p-y Curve in Sand Computed Using Reese Criteria for Static Loading Conditions

Soil Layer Number           =           2
Depth below pile head       =     144.000 in
Depth below ground surface  =     138.000 in
Equivalent Depth (see note) =     137.951 in
Pile Diameter               =      96.000 in
Angle of Friction           =      35.000 deg.
Avg. Eff. Unit Weight       =     0.06700 pci
k                           =      90.000 pci
A (static)                  =      1.8041
B (static)                  =      1.3040
Pst                         =    6821.322 lbs/in
Psd                         =   47747.930 lbs/in
Ps                          =    6821.322 lbs/in
Cbar                        =   7700.7203
n                           =      3.2595
m                           =   1705.6066
yk                          =      0.5021 in
pm                          =    8895.162 lbs/in
ym                          =      1.6000 in
pu                          =   12306.375 lbs/in
yu                          =      3.6000 in
p-multiplier                =     1.00000
y-multiplier                =     1.00000

This p-y curve is computed using the equivalent depth.

        y, in             p, lbs/in
---------------    -----------------
         0.0000           0.0000
```

0.1333333	1655.4172	*
0.2666667	3310.8343	*
0.4000000	4966.2515	*
0.5333333	6350.0414	
0.6666667	6799.9832	
0.8000000	7191.1785	
0.9333333	7539.4359	
1.0667	7854.7136	
1.2000	8143.7339	
1.3333	8411.2712	
1.4667	8660.8518	
1.6000	8895.1620	
2.6000	10600.7686	
3.6000	12306.3751	
99.6000	12306.3751	
195.6000	12306.3751	

* p value(s) computed using p = k * Eff x * y

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head = 59000.000 lbs
Specified moment at pile head = 72840000.000 in-lbs
Specified axial load at pile head = 60700.000 lbs

Output Verification:

Computed forces and moments are within specified convergence limits.

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in

Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 59000.	M= 7.28E+07	60700.0000	7.8273	7.5183E+07	-804965.

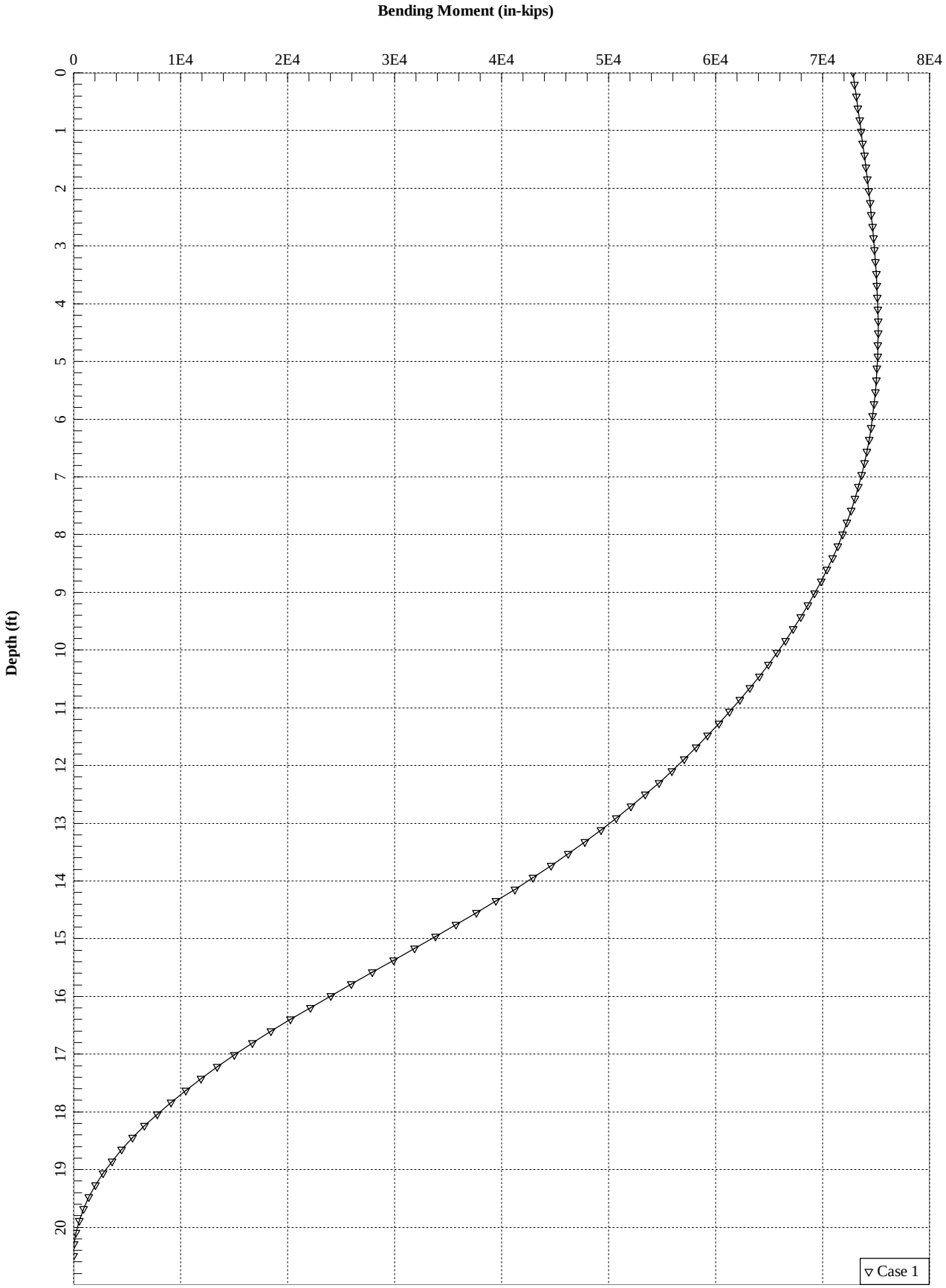
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

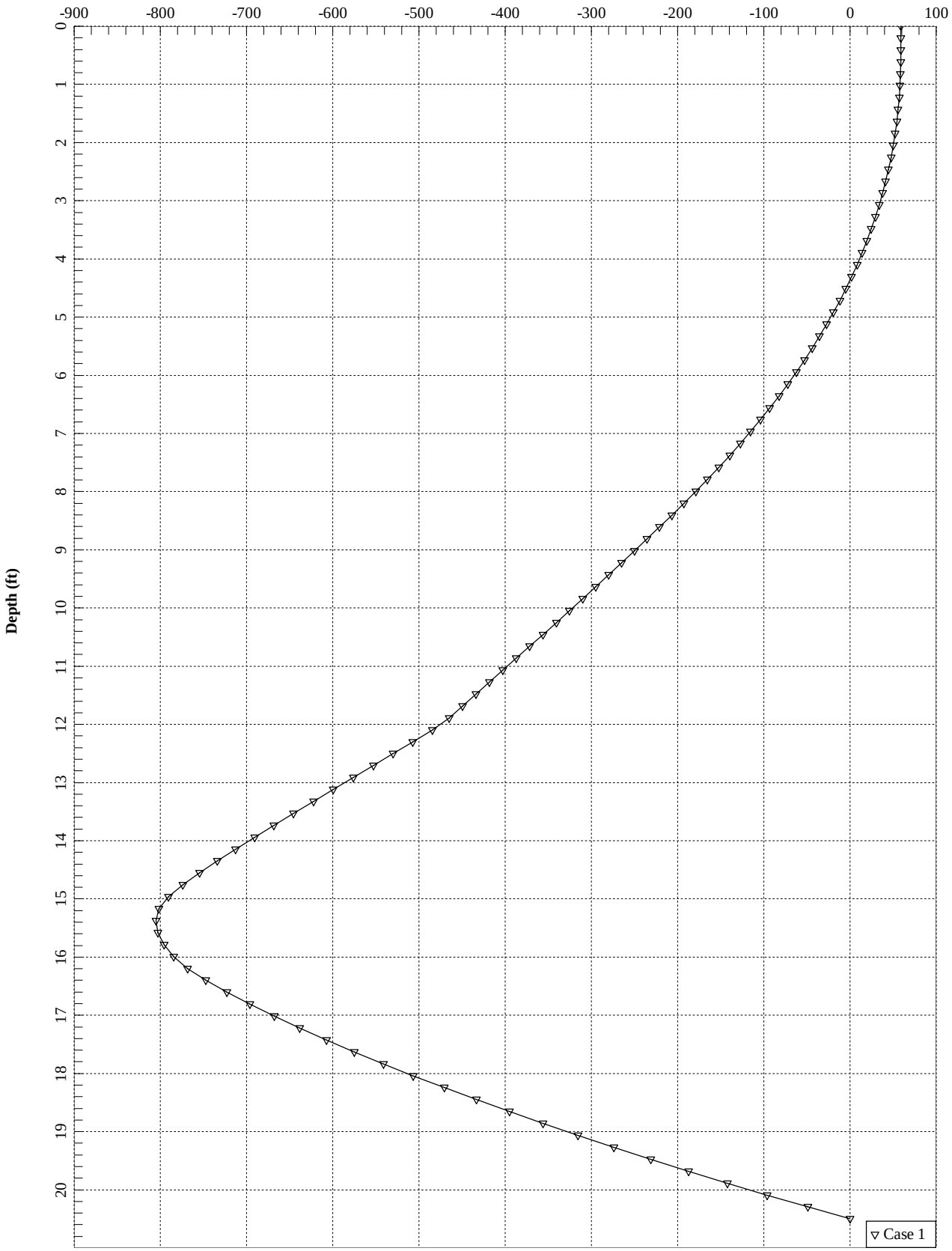
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00239345	5900.00009	950666.62351	2465060.	3.971950E+08
0.00720500	17760.76974	2861792.	2465060.	3.971950E+08
0.01141966	28150.15403	4535832.	2465060.	3.971950E+08
0.01441001	35521.53949	5723583.	2465060.	3.971950E+08
0.01672950	41239.23026	6644874.	2465060.	3.971950E+08
0.01862467	45910.92377	7397624.	2465060.	3.971950E+08
0.02022700	49860.78436	8034065.	2465060.	3.971950E+08
0.02161501	53282.30923	8585375.	2465060.	3.971950E+08
0.02283932	56300.30806	9071665.	2465060.	3.971950E+08
0.02393451	59000.00000	9506666.	2465060.	3.971950E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00010084	40053.66331	7284000.	3.971950E+08	7.223230E+10
0.00030395	120577.48881	21927025.	3.967031E+08	7.214049E+10
0.00048249	191120.50545	34753512.	3.961094E+08	7.202886E+10
0.00063258	241226.78721	43854050.	3.813377E+08	6.932565E+10
0.00118916	282894.98226	50912975.	2.378954E+08	4.281435E+10
0.00145536	317123.21280	56680537.	2.179008E+08	3.894618E+10
0.00166198	346161.84583	61556941.	2.082822E+08	3.703822E+10
0.00183209	371323.32236	65781075.	2.026770E+08	3.590485E+10
0.00197571	393458.73407	69507024.	1.991481E+08	3.518081E+10
0.00210406	413327.44758	72840000.	1.964425E+08	3.461873E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

```
The analysis ended normally.
```


Bending Moment (in-kips)
0
1E4
2E4
3E4
4E4
5E4
6E4
7E4
8E4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1


Shear Force (kips)
-900
-800
-700
-600
-500
-400
-300
-200
-100
0
100
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1

```
================================================================================

                LPILE Plus for Windows, Version 5.0 (5.0.47)

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

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

This program is licensed to:

TJL
Centek Engineering

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

Path to file locations:      J:\Jobs\2202100.WI\07_CT5176\05_Structural\Backup
Documentation\Rev (4)\Calcs\MathCAD\Foundation\Manipulated Soil Diameter\
Name of input data file:     Caisson Analysis - Manipulated Soil Diameter.lpd
Name of output file:         Caisson Analysis - Manipulated Soil Diameter.lpo
Name of plot output file:    Caisson Analysis - Manipulated Soil Diameter.lpp
Name of runtime file:        Caisson Analysis - Manipulated Soil Diameter.lpr


--------------------------------------------------------------------------------
                          Time and Date of Analysis
--------------------------------------------------------------------------------

               Date:  March  7, 2023     Time:  12:00:12


--------------------------------------------------------------------------------
                                Problem Title
--------------------------------------------------------------------------------

15267.000 / CT5176 - Stony Hill / Structure # 10254


--------------------------------------------------------------------------------
                                Program Options
--------------------------------------------------------------------------------

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:
```

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum
bending moment, and shear force only
- Analysis includes effects of soil movement on pile response
- Additional p-y curves computed at specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 250
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment,
  and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 246.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 6 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	96.00000000	4169220.	7238.2000	3300000.
2	54.0000	96.00000000	4169220.	7238.2000	3300000.
3	54.0000	192.00000	66707523.	28952.9000	3300000.
4	150.0000	192.00000	66707523.	28952.9000	3300000.
5	150.0000	96.00000000	4169220.	7238.2000	3300000.
6	246.0000	96.00000000	4169220.	7238.2000	3300000.

Please note that because this analysis makes computations of ultimate
moment capacity and pile response using nonlinear bending stiffness

that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   6.000 in
Distance from top of pile to bottom of layer =   90.000 in
p-y subgrade modulus k for top of soil layer =   90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   90.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   90.000 in
Distance from top of pile to bottom of layer =   144.000 in
p-y subgrade modulus k for top of soil layer =   90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   144.000 in
Distance from top of pile to bottom of layer =   186.000 in
p-y subgrade modulus k for top of soil layer =   225.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   225.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer   =   186.000 in
Distance from top of pile to bottom of layer =   246.000 in
p-y subgrade modulus k for top of soil layer =   125.000 lbs/in**3
p-y subgrade modulus k for bottom of layer   =   125.000 lbs/in**3

(Depth of lowest layer extends   0.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	6.00	0.06700
2	90.00	0.06700
3	90.00	0.06700

4	144.00	0.06700
5	144.00	0.07500
6	186.00	0.07500
7	186.00	0.03900
8	246.00	0.03900

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	0.00000	30.00	------	------
2	90.000	0.00000	30.00	------	------
3	90.000	0.00000	30.00	------	------
4	144.000	0.00000	30.00	------	------
5	144.000	0.00000	40.00	------	------
6	186.000	0.00000	40.00	------	------
7	186.000	0.00000	40.00	------	------
8	246.000	0.00000	40.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X in	Soil Movement in
1	0.000	0.000
2	0.000	0.000

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 59000.000 lbs
Bending moment at pile head = 72840000.000 in-lbs
Axial load at pile head = 60700.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Output of p-y Curves at Specified Depths

p-y curves are generated and printed for verification at 1 depths.

Depth No.	Depth Below Pile Head in	Depth Below Ground Surface in
1	144.000	138.000

Depth of ground surface below top of pile = 6.00 in

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Number of sections = 3

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 96.0000 in

Material Properties:

Compressive Strength of Concrete	=	3.500	kip/in**2
Yield Stress of Reinforcement	=	60.	kip/in**2
Modulus of Elasticity of Reinforcement	=	29000.	kip/in**2
Number of Reinforcing Bars	=	38	
Area of Single Bar	=	1.27000	in**2
Number of Rows of Reinforcing Bars	=	19	
Area of Steel	=	48.260	in**2
Area of Shaft	=	7238.229	in**2
Percentage of Steel Reinforcement	=	0.667	percent
Cover Thickness (edge to bar center)	=	6.000	in

Unfactored Axial Squash Load Capacity = 24285.76 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	2.540	41.857
2	2.540	40.715
3	2.540	38.462
4	2.540	35.161
5	2.540	30.900
6	2.540	25.797
7	2.540	19.990
8	2.540	13.637
9	2.540	6.913
10	2.540	0.000
11	2.540	-6.913
12	2.540	-13.637
13	2.540	-19.990
14	2.540	-25.797
15	2.540	-30.900
16	2.540	-35.161
17	2.540	-38.462
18	2.540	-40.715
19	2.540	-41.857

Axial Thrust Force = 60700.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
9606048.	1.536968E+13	6.250000E-07	0.00003246	51.94080591	107.73655	830.07705
19108873.	1.528710E+13	0.00000125	0.00006258	50.06321955	205.78877	1592.09160
28509522.	1.520508E+13	0.00000188	0.00009274	49.45961523	302.26971	2355.31641
37805359.	1.512214E+13	0.00000250	0.00012285	49.14105177	396.90730	3117.32603
37805359.	1.209771E+13	0.00000313	0.00007923	25.35251570	255.27979	5845.67799
37805359.	1.008143E+13	0.00000375	0.00009314	24.83661032	298.72345	7070.91830
37805359.	8.641225E+12	0.00000438	0.00010707	24.47208166	341.87299	8295.65426
37805359.	7.561072E+12	0.00000500	0.00012101	24.20218706	384.72743	9519.88244
37805359.	6.720953E+12	0.00000563	0.00013500	23.99999857	427.36715	10742.84974
37805359.	6.048857E+12	0.00000625	0.00014928	23.88404703	470.54648	11957.51593
37805359.	5.498961E+12	0.00000688	0.00016323	23.74317026	512.37791	13181.35483
37805359.	5.040715E+12	0.00000750	0.00017721	23.62833738	553.91607	14404.63596
37805359.	4.652967E+12	0.00000813	0.00019121	23.53355742	595.15991	15627.35482
37805359.	4.320612E+12	0.00000875	0.00020523	23.45455027	636.10836	16849.50710
37805359.	4.032572E+12	0.00000938	0.00021926	23.38818026	676.76040	18071.08767
37805359.	3.780536E+12	0.00001000	0.00023332	23.33208704	717.11474	19292.09388
37805359.	3.558151E+12	0.00001063	0.00024740	23.28447390	757.17035	20512.52055
37805359.	3.360476E+12	0.00001125	0.00026149	23.24393892	796.92602	21732.36394
37805359.	3.183609E+12	0.00001188	0.00027561	23.20938349	836.38079	22951.61752
37805359.	3.024429E+12	0.00001250	0.00028975	23.17991781	875.53332	24170.27870
37805359.	2.880408E+12	0.00001313	0.00030391	23.15482950	914.38252	25388.34187
38581797.	2.805949E+12	0.00001375	0.00031809	23.13353205	952.92714	

26605.80289
   40238988. 2.799234E+12   0.00001438   0.00033229   23.11554193   991.16598
27822.65720
   41894116. 2.792941E+12   0.00001500   0.00034651   23.10045862   1029.09788
29038.89919
   43547163. 2.787018E+12   0.00001563   0.00036075   23.08794165   1066.72152
30254.52507
   45198127. 2.781423E+12   0.00001625   0.00037501   23.07771063   1104.03588
31469.52744
   46846983. 2.776118E+12   0.00001688   0.00038930   23.06951666   1141.03946
32683.90381
   48493722. 2.771070E+12   0.00001750   0.00040361   23.06315374   1177.73110
33897.64794
   50138329. 2.766253E+12   0.00001813   0.00041793   23.05844164   1214.10946
35110.75503
   51780791. 2.761642E+12   0.00001875   0.00043229   23.05522585   1250.17331
36323.21930
   53421090. 2.757218E+12   0.00001938   0.00044666   23.05336905   1285.92120
37535.03657
   55059213. 2.752961E+12   0.00002000   0.00046106   23.05275393   1321.35186
38746.20097
   56695154. 2.748856E+12   0.00002063   0.00047547   23.05328035   1356.46411
39956.70488
   58328884. 2.744889E+12   0.00002125   0.00048992   23.05485106   1391.25629
41166.54618
   59960405. 2.741047E+12   0.00002188   0.00050438   23.05739164   1425.72735
42375.71526
   61589686. 2.737319E+12   0.00002250   0.00051887   23.06082487   1459.87560
43584.20980
   63216715. 2.733696E+12   0.00002313   0.00053338   23.06508780   1493.69966
44792.02347
   64841482. 2.730168E+12   0.00002375   0.00054792   23.07012606   1527.19825
45999.14860
   66463972. 2.726727E+12   0.00002438   0.00056247   23.07588816   1560.36987
47205.57943
   69702037. 2.720079E+12   0.00002563   0.00059167   23.08940077   1625.72608
49616.33681
   72930786. 2.713704E+12   0.00002688   0.00062096   23.10531378   1689.75642
52024.24372
   76150080. 2.707558E+12   0.00002813   0.00065034   23.12336969   1752.44850
54429.24913
   79359775. 2.701609E+12   0.00002938   0.00067984   23.14335680   1813.78961
56831.30036
   82559725. 2.695828E+12   0.00003063   0.00070943   23.16510057   1873.76675
59230.34237
   85368423. 2.678225E+12   0.00003188   0.00073796   23.15179682   1930.01204
60000.00000
   87583986. 2.644045E+12   0.00003313   0.00076476   23.08697748   1981.36583
60000.00000
   89545111. 2.604949E+12   0.00003438   0.00079082   23.00571012   2030.03164
60000.00000

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   92724865.  2.514573E+12    0.00003688    0.00084066   22.79759073    2119.52462
60000.00000
   93978056.  2.464998E+12    0.00003813    0.00086445   22.67410326    2160.59036
60000.00000
   95226347.  2.418447E+12    0.00003938    0.00088829   22.55975962    2200.73512
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   96400872.  2.372945E+12    0.00004063    0.00091190   22.44677496    2239.47521
60000.00000
   97792378.  2.335340E+12    0.00004188    0.00093800   22.40000010    2281.31739
60000.00000
   98361047.  2.280836E+12    0.00004313    0.00096043   22.27077055    2316.06745
60000.00000
   99304153.  2.237840E+12    0.00004438    0.00098287   22.14908838    2349.94306
60000.00000
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1.015361E+08  2.109842E+12    0.00004813    0.00104749   21.76602602    2442.33831
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1.022307E+08  2.070495E+12    0.00004938    0.00106889   21.64847803    2471.30261
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1.060284E+08  1.824144E+12    0.00005813    0.00121395   20.88520575    2646.01273
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1.099934E+08 1.530343E+12 0.00007188 0.00143306 19.93817568 2839.31134
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1.105476E+08 1.486354E+12 0.00007438 0.00147098 19.77782965 2864.15203
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1.122990E+08 1.330951E+12 0.00008438 0.00162000 19.20000029 2937.41357
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1.126737E+08 1.296963E+12 0.00008688 0.00166574 19.17402220 2952.27857
60000.00000
1.130434E+08 1.264822E+12 0.00008938 0.00170185 19.04165125 2961.28635
60000.00000
1.134071E+08 1.234363E+12 0.00009188 0.00173810 18.91811800 2968.05675
60000.00000
1.136957E+08 1.204723E+12 0.00009438 0.00177341 18.79109144 2972.45166
60000.00000
1.139140E+08 1.175887E+12 0.00009688 0.00180782 18.66134405 2974.65697
60000.00000
1.141235E+08 1.148412E+12 0.00009938 0.00184236 18.53949308 2972.00612
60000.00000
1.143245E+08 1.122203E+12 0.00010188 0.00187704 18.42497492 2964.89488
60000.00000
1.145229E+08 1.097225E+12 0.00010438 0.00191187 18.31729460 2967.51502
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1.147187E+08 1.073391E+12 0.00010688 0.00194683 18.21599436 2971.64169
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1.149117E+08 1.050621E+12 0.00010938 0.00198195 18.12065935 2974.14493
60000.00000
1.151020E+08 1.028844E+12 0.00011188 0.00201721 18.03091764 2974.99993
60000.00000
1.152862E+08 1.007967E+12 0.00011438 0.00205274 17.94749308 2968.65910
60000.00000
1.154684E+08 9.879653E+11 0.00011688 0.00208840 17.86867476 2962.20614
60000.00000
1.156487E+08 9.687846E+11 0.00011938 0.00212418 17.79417658 2964.79906
60000.00000
1.158268E+08 9.503740E+11 0.00012188 0.00216008 17.72374964 2969.30624
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1.163886E+08 8.825677E+11 0.00013188 0.00231954 17.58893824 2965.65711
60000.00000
1.164702E+08 8.667548E+11 0.00013438 0.00235276 17.50888395 2960.60580
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1.165510E+08 8.515140E+11 0.00013688 0.00238605 17.43234015 2958.67957
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1.167102E+08 8.226273E+11 0.00014188 0.00245289 17.28908014 2966.99802
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1.169431E+08 7.828823E+11 0.00014938 0.00255378 17.09641314 2974.01517
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1.170190E+08 7.704954E+11 0.00015188 0.00258758 17.03757048 2974.85957
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1.170931E+08 7.584975E+11 0.00015438 0.00262155 16.98172331 2973.26999
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1.171651E+08 7.468690E+11 0.00015688 0.00265571 16.92885733 2968.88322
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1.172366E+08 7.356023E+11 0.00015938 0.00268993 16.87800837 2964.48401
60000.00000
1.173077E+08 7.246809E+11 0.00016188 0.00272421 16.82909060 2960.07211
60000.00000
1.173784E+08 7.140889E+11 0.00016438 0.00275854 16.78201818 2955.64742
60000.00000
1.174485E+08 7.038115E+11 0.00016688 0.00279294 16.73671389 2951.20975
60000.00000
1.175182E+08 6.938344E+11 0.00016938 0.00282739 16.69310045 2955.61019
60000.00000
1.175874E+08 6.841450E+11 0.00017188 0.00286191 16.65111494 2959.88082
60000.00000
1.176562E+08 6.747306E+11 0.00017438 0.00289649 16.61068869 2963.63394
60000.00000
1.177921E+08 6.566806E+11 0.00017938 0.00296583 16.53427076 2969.56411
60000.00000
1.178614E+08 6.392483E+11 0.00018438 0.00303218 16.44570780 2973.08096
60000.00000
1.179181E+08 6.226697E+11 0.00018938 0.00309817 16.35996294 2974.79749
60000.00000
1.179717E+08 6.069286E+11 0.00019438 0.00316457 16.28075552 2971.52531
60000.00000
1.180232E+08 5.919659E+11 0.00019938 0.00323130 16.20714140 2964.83950

```
  60000.00000
  1.180741E+08  5.777325E+11    0.00020438    0.00329815   16.13771296    2958.12774
  60000.00000
  1.181187E+08  5.641489E+11    0.00020938    0.00336570   16.07500792    2951.26074
  60000.00000
  1.181471E+08  5.511234E+11    0.00021438    0.00343499   16.02328348    2944.01798
  60000.00000
  1.184025E+08  5.397267E+11    0.00021938    0.00351000   16.00000048    2947.02846
  60000.00000
  1.188468E+08  5.296792E+11    0.00022438    0.00359000   16.00000048    2957.64282
  60000.00000
  1.192728E+08  5.199904E+11    0.00022938    0.00367000   16.00000048    2965.73664
  60000.00000
  1.196806E+08  5.106372E+11    0.00023438    0.00375000   16.00000048    2971.30994
  60000.00000
  1.200188E+08  5.013839E+11    0.00023938    0.00383000   16.00000048    2974.36271
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  117827.78128
in-kip



--------------------------------------------------------------------------------
   Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
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Number of sections =  3



Pile Section No.  2

**** WARNING ****

An unreasonable input value for concrete cover thickness has been specified.
The input value is either smaller than 0.8 inches or larger than 8 inches.
You should check your input for correctness.

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter                       =     192.0000 in

Material Properties:

Compressive Strength of Concrete       =        3.500 kip/in**2
Yield Stress of Reinforcement          =          60. kip/in**2
Modulus of Elasticity of Reinforcement =       29000. kip/in**2
Number of Reinforcing Bars             =           38
Area of Single Bar                     =      1.27000 in**2
```

Number of Rows of Reinforcing Bars = 19
Area of Steel = 48.260 in**2
Area of Shaft = 28952.918 in**2
Percentage of Steel Reinforcement = 0.167 percent
Cover Thickness (edge to bar center) = 52.000 in

Unfactored Axial Squash Load Capacity = 88886.96 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	2.540	43.850
2	2.540	42.654
3	2.540	40.294
4	2.540	36.835
5	2.540	32.372
6	2.540	27.025
7	2.540	20.942
8	2.540	14.287
9	2.540	7.242
10	2.540	0.000
11	2.540	-7.242
12	2.540	-14.287
13	2.540	-20.942
14	2.540	-27.025
15	2.540	-32.372
16	2.540	-36.835
17	2.540	-40.294
18	2.540	-42.654
19	2.540	-43.850

Axial Thrust Force = 60700.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
71107506.	2.275440E+14	3.125000E-07	0.00003073	98.34014368	101.95045	418.59562
1.413843E+08	2.262148E+14	6.250000E-07	0.00006084	97.34332323	200.07699	819.12387
2.108319E+08	2.248874E+14	9.375000E-07	0.00009095	97.01066065	296.49740	1219.64154

2.794505E+08 2.235604E+14 0.00000125 0.00012106 96.84403181 391.21172 1620.14842
2.794505E+08 1.788483E+14 0.00000156 0.00005000 31.99999952 159.38889 4886.94035
2.794505E+08 1.490403E+14 0.00000188 0.00005919 31.57054853 188.08958 5887.67982
2.794505E+08 1.277488E+14 0.00000219 0.00006811 31.13436842 215.71576 6896.62997
2.794505E+08 1.117802E+14 0.00000250 0.00007703 30.81049776 243.23094 7905.34345
2.794505E+08 9.936017E+13 0.00000281 0.00008595 30.56151438 270.63484 8913.81908
2.794505E+08 8.942416E+13 0.00000313 0.00009489 30.36497068 297.92725 9922.05520
2.794505E+08 8.129469E+13 0.00000344 0.00010384 30.20657301 325.10784 10930.05099
2.794505E+08 7.452013E+13 0.00000375 0.00011279 30.07679701 352.17637 11937.80512
2.794505E+08 6.878781E+13 0.00000406 0.00012175 29.96904802 379.13254 12945.31640
2.794505E+08 6.387440E+13 0.00000438 0.00013072 29.87861681 405.97610 13952.58342
2.794505E+08 5.961610E+13 0.00000469 0.00013970 29.80205011 432.70678 14959.60481
2.794505E+08 5.589010E+13 0.00000500 0.00014868 29.73675585 459.32427 15966.37947
2.794505E+08 5.260245E+13 0.00000531 0.00015768 29.68075418 485.82833 16972.90594
2.794505E+08 4.968009E+13 0.00000563 0.00016668 29.63250303 512.21863 17979.18314
2.794505E+08 4.706535E+13 0.00000594 0.00017570 29.59078932 538.49494 18985.20923
2.794505E+08 4.471208E+13 0.00000625 0.00018472 29.55463457 564.65688 19990.98382
2.794505E+08 4.258293E+13 0.00000656 0.00019375 29.52325773 590.70428 20996.50441
2.794505E+08 4.064734E+13 0.00000688 0.00020279 29.49601221 616.63680 22001.77003
2.794505E+08 3.888007E+13 0.00000719 0.00021183 29.47236300 642.45409 23006.77987
2.794505E+08 3.726007E+13 0.00000750 0.00022089 29.45186949 668.15590 24011.53198
2.794505E+08 3.576966E+13 0.00000781 0.00022995 29.43415689 693.74190 25016.02549
2.794505E+08 3.439391E+13 0.00000813 0.00023903 29.41891336 719.21184 26020.25827
2.794505E+08 3.312006E+13 0.00000844 0.00024811 29.40586996 744.56542 27024.22899
2.794505E+08 3.193720E+13 0.00000875 0.00025720 29.39479780 769.80235 28027.93592
2.794505E+08 3.083592E+13 0.00000906 0.00026631 29.38549376 794.92220

29031.37885
2.794505E+08 2.980805E+13 0.00000938 0.00027542 29.37779188 819.92482
30034.55483
2.794505E+08 2.884650E+13 0.00000969 0.00028454 29.37153769 844.80974
31037.46370
2.794505E+08 2.794505E+13 0.00001000 0.00029367 29.36660242 869.57671
32040.10343
2.794505E+08 2.709823E+13 0.00001031 0.00030280 29.36287451 894.22550
33042.47154
2.794505E+08 2.630122E+13 0.00001063 0.00031195 29.36024809 918.75567
34044.56782
2.794505E+08 2.554976E+13 0.00001094 0.00032111 29.35863733 943.16701
35046.38955
2.794505E+08 2.484004E+13 0.00001125 0.00033028 29.35795927 967.45908
36047.93619
2.794505E+08 2.416869E+13 0.00001156 0.00033945 29.35814524 991.63163
37049.20539
2.794505E+08 2.353267E+13 0.00001188 0.00034864 29.35912943 1015.68426
38050.19633
2.794505E+08 2.292927E+13 0.00001219 0.00035784 29.36085463 1039.61662
39050.90754
2.794505E+08 2.181077E+13 0.00001281 0.00037626 29.36633921 1087.11955
41051.48032
2.794505E+08 2.079632E+13 0.00001344 0.00039472 29.37423849 1134.13741
43050.91330
2.794505E+08 1.987203E+13 0.00001406 0.00041322 29.38426924 1180.66766
45049.19070
2.794505E+08 1.902642E+13 0.00001469 0.00043176 29.39619112 1226.70742
47046.29897
2.794505E+08 1.824983E+13 0.00001531 0.00045034 29.40980387 1272.25382
49042.22423
2.794505E+08 1.753415E+13 0.00001594 0.00046896 29.42493868 1317.30388
51036.95255
2.794505E+08 1.687248E+13 0.00001656 0.00048762 29.44145823 1361.85481
53030.46713
2.794505E+08 1.625894E+13 0.00001719 0.00050633 29.45923662 1405.90338
55022.75541
2.794505E+08 1.568845E+13 0.00001781 0.00052508 29.47817373 1449.44661
57013.80068
2.794505E+08 1.515664E+13 0.00001844 0.00054387 29.49818373 1492.48148
59003.58582
2.794505E+08 1.465970E+13 0.00001906 0.00056234 29.49963999 1534.12266
60000.00000
2.794505E+08 1.419431E+13 0.00001969 0.00057982 29.45096540 1572.87098
60000.00000
2.794505E+08 1.375756E+13 0.00002031 0.00059679 29.38018656 1609.91661
60000.00000
2.794505E+08 1.334689E+13 0.00002094 0.00061346 29.29952574 1645.79472
60000.00000
2.794505E+08 1.296002E+13 0.00002156 0.00062967 29.20201921 1680.15379
60000.00000

2.794505E+08 1.259495E+13 0.00002219 0.00064578 29.10551405 1713.84222
60000.00000
2.794505E+08 1.224988E+13 0.00002281 0.00066152 28.99814272 1746.28110
60000.00000
2.794505E+08 1.192322E+13 0.00002344 0.00067729 28.89754915 1778.35050
60000.00000
2.794505E+08 1.161353E+13 0.00002406 0.00069300 28.79999971 1809.88410
60000.00000
2.794505E+08 1.131951E+13 0.00002469 0.00071100 28.79999971 1845.79334
60000.00000
2.794505E+08 1.104002E+13 0.00002531 0.00072900 28.79999971 1881.14053
60000.00000
2.794505E+08 1.077399E+13 0.00002594 0.00074504 28.72451162 1911.94791
60000.00000
2.794505E+08 1.052049E+13 0.00002656 0.00075953 28.59400034 1939.19453
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2.794505E+08 1.027864E+13 0.00002719 0.00077404 28.47031832 1966.13206
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2.794505E+08 1.004766E+13 0.00002781 0.00078842 28.34752321 1992.46068
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2.794505E+08 9.826830E+12 0.00002844 0.00080242 28.21693182 2017.71733
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2.794505E+08 9.615501E+12 0.00002906 0.00081644 28.09265184 2042.68356
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2.794505E+08 9.413069E+12 0.00002969 0.00083049 27.97429132 2067.35821
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2.794505E+08 9.218985E+12 0.00003031 0.00084455 27.86148691 2091.73989
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2.794505E+08 9.032743E+12 0.00003094 0.00085816 27.73849440 2114.95542
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2.794505E+08 8.853877E+12 0.00003156 0.00087175 27.61970758 2137.82389
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2.794505E+08 8.681957E+12 0.00003219 0.00088535 27.50611067 2160.41726
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2.794505E+08 8.357398E+12 0.00003344 0.00091262 27.29333925 2204.77422
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2.794505E+08 7.913642E+12 0.00003531 0.00095237 26.96989489 2267.07641
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2.794505E+08 7.776014E+12 0.00003594 0.00096561 26.86907530 2287.23032
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2.794505E+08 7.643090E+12 0.00003656 0.00097886 26.77217531 2307.12106
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2.794505E+08 7.514635E+12 0.00003719 0.00099213 26.67900610 2326.74790
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60000.00000
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2.794505E+08 6.826272E+12 0.00004094 0.00106967 26.12938643 2435.38031
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2.794505E+08 6.624012E+12 0.00004219 0.00109554 25.96834803 2469.40570
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2.794505E+08 6.253438E+12 0.00004469 0.00114587 25.64179087 2532.28693
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2.794505E+08 5.922130E+12 0.00004719 0.00120800 25.59999990 2605.28559
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2.794505E+08 5.769300E+12 0.00004844 0.00123885 25.57624769 2639.07256
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2.794505E+08 5.109952E+12 0.00005469 0.00135447 24.76737642 2748.95458
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2.794505E+08 4.995763E+12 0.00005594 0.00137700 24.61672640 2767.79737
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2.794505E+08 4.886566E+12 0.00005719 0.00139959 24.47364378 2785.86841
60000.00000
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60000.00000
2.794505E+08 4.681893E+12 0.00005969 0.00144463 24.20314550 2819.43002
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2.794505E+08 4.585854E+12 0.00006094 0.00146648 24.06526995 2834.48967
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2.794505E+08 4.405131E+12 0.00006344 0.00151034 23.80831575 2862.41436
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2.794505E+08 4.320008E+12 0.00006469 0.00153231 23.68791819 2875.24324
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2.794505E+08 4.238112E+12 0.00006594 0.00155351 23.56030226 2886.84197
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2.798581E+08 4.089250E+12 0.00006844 0.00159605 23.32123804 2907.96591
60000.00000
2.802216E+08 4.021117E+12 0.00006969 0.00161681 23.20079184 2917.20213
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2.805371E+08 3.954708E+12 0.00007094 0.00163735 23.08151579 2925.65853
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2.807403E+08 3.889043E+12 0.00007219 0.00165721 22.95695829 2933.17282
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2.809170E+08 3.825253E+12 0.00007344 0.00167698 22.83543348 2940.03401
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2.810863E+08 3.763499E+12 0.00007469 0.00169679 22.71857214 2946.29583
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2.812482E+08 3.703680E+12 0.00007594 0.00171665 22.60614824 2951.95373
60000.00000
2.814025E+08 3.645701E+12 0.00007719 0.00173656 22.49795008 2957.00314
60000.00000
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2.842568E+08 3.567144E+12 0.00007969 0.00178500 22.40000010 2966.84054
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2.938591E+08 3.419451E+12 0.00008594 0.00192392 22.38737726 2966.88125
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2.938591E+08 3.370427E+12 0.00008719 0.00194147 22.26778078 2963.49626
60000.00000
2.938591E+08 3.276478E+12 0.00008969 0.00197671 22.03998041 2956.69913
60000.00000
2.938591E+08 3.187624E+12 0.00009219 0.00201212 21.82637358 2949.86512
60000.00000
2.938591E+08 3.103462E+12 0.00009469 0.00204770 21.62586737 2951.36466
60000.00000
2.938591E+08 3.023631E+12 0.00009719 0.00208346 21.43748331 2958.01890
60000.00000
2.938591E+08 2.947803E+12 0.00009969 0.00211939 21.26034594 2963.61330
60000.00000
2.938591E+08 2.875685E+12 0.00010219 0.00215551 21.09366274 2968.12340
60000.00000
2.938591E+08 2.807012E+12 0.00010469 0.00219181 20.93672419 2971.52398
60000.00000
2.938591E+08 2.741543E+12 0.00010719 0.00222831 20.78888369 2973.78880
60000.00000
2.938591E+08 2.679057E+12 0.00010969 0.00226500 20.64956331 2974.89076
60000.00000
2.938591E+08 2.619357E+12 0.00011219 0.00230215 20.52052546 2971.83546
60000.00000
2.938591E+08 2.562259E+12 0.00011469 0.00233961 20.39988470 2966.29452
60000.00000
2.938591E+08 2.507598E+12 0.00011719 0.00237718 20.28528929 2960.73068

```
  60000.00000
  2.938591E+08  2.455220E+12    0.00011969    0.00241486   20.17637873    2955.14347
  60000.00000
  2.938591E+08  2.404985E+12    0.00012219    0.00245265   20.07281256    2949.53266
  60000.00000
  2.938591E+08  2.356765E+12    0.00012469    0.00249054   19.97428751    2943.89775
  60000.00000
  2.938591E+08  2.310440E+12    0.00012719    0.00252855   19.88051748    2938.23844
  60000.00000
  2.938591E+08  2.265902E+12    0.00012969    0.00256668   19.79123926    2932.55439
  60000.00000
  2.938591E+08  2.223048E+12    0.00013219    0.00260492   19.70621824    2935.44439
  60000.00000
  2.938591E+08  2.181785E+12    0.00013469    0.00264327   19.62522554    2942.31718
  60000.00000
  2.938591E+08  2.142025E+12    0.00013719    0.00268175   19.54806089    2948.57315
  60000.00000
  2.938591E+08  2.103689E+12    0.00013969    0.00272035   19.47453547    2954.20002
  60000.00000
  2.938591E+08  2.066701E+12    0.00014219    0.00275907   19.40446901    2959.18489
  60000.00000
  2.938591E+08  2.030992E+12    0.00014469    0.00279792   19.33770132    2963.51479
  60000.00000
  2.938591E+08  1.996495E+12    0.00014719    0.00283690   19.27408075    2967.17618
  60000.00000
  2.938591E+08  1.963151E+12    0.00014969    0.00287602   19.21346998    2970.15514
  60000.00000
  2.938591E+08  1.930902E+12    0.00015219    0.00292200   19.20000029    2973.06561
  60000.00000
  2.938591E+08  1.899695E+12    0.00015469    0.00297000   19.20000029    2974.73206
  60000.00000
  2.938591E+08  1.869481E+12    0.00015719    0.00301800   19.20000029    2972.52008
  60000.00000
  2.938591E+08  1.840214E+12    0.00015969    0.00306600   19.20000029    2966.42762
  60000.00000
  2.938591E+08  1.811848E+12    0.00016219    0.00311400   19.20000029    2960.33517
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  293859.10247
in-kip



--------------------------------------------------------------------------------
   Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
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Number of sections =  3
```

Pile Section No. 3

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 96.0000 in

Material Properties:

Compressive Strength of Concrete	=	3.500	kip/in**2
Yield Stress of Reinforcement	=	60.	kip/in**2
Modulus of Elasticity of Reinforcement	=	29000.	kip/in**2
Number of Reinforcing Bars	=	38	
Area of Single Bar	=	1.27000	in**2
Number of Rows of Reinforcing Bars	=	19	
Area of Steel	=	48.260	in**2
Area of Shaft	=	7238.229	in**2
Percentage of Steel Reinforcement	=	0.667	percent
Cover Thickness (edge to bar center)	=	6.000	in

Unfactored Axial Squash Load Capacity = 24285.76 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	2.540	41.857
2	2.540	40.715
3	2.540	38.462
4	2.540	35.161
5	2.540	30.900
6	2.540	25.797
7	2.540	19.990
8	2.540	13.637
9	2.540	6.913
10	2.540	0.000
11	2.540	-6.913
12	2.540	-13.637
13	2.540	-19.990
14	2.540	-25.797
15	2.540	-30.900
16	2.540	-35.161
17	2.540	-38.462
18	2.540	-40.715
19	2.540	-41.857

Axial Thrust Force = 60700.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
9606048.	1.536968E+13	6.250000E-07	0.00003246	51.94080591	107.73655	830.07705
19108873.	1.528710E+13	0.00000125	0.00006258	50.06321955	205.78877	1592.09160
28509522.	1.520508E+13	0.00000188	0.00009274	49.45961523	302.26971	2355.31641
37805359.	1.512214E+13	0.00000250	0.00012285	49.14105177	396.90730	3117.32603
37805359.	1.209771E+13	0.00000313	0.00007923	25.35251570	255.27979	5845.67799
37805359.	1.008143E+13	0.00000375	0.00009314	24.83661032	298.72345	7070.91830
37805359.	8.641225E+12	0.00000438	0.00010707	24.47208166	341.87299	8295.65426
37805359.	7.561072E+12	0.00000500	0.00012101	24.20218706	384.72743	9519.88244
37805359.	6.720953E+12	0.00000563	0.00013500	23.99999857	427.36715	10742.84974
37805359.	6.048857E+12	0.00000625	0.00014928	23.88404703	470.54648	11957.51593
37805359.	5.498961E+12	0.00000688	0.00016323	23.74317026	512.37791	13181.35483
37805359.	5.040715E+12	0.00000750	0.00017721	23.62833738	553.91607	14404.63596
37805359.	4.652967E+12	0.00000813	0.00019121	23.53355742	595.15991	15627.35482
37805359.	4.320612E+12	0.00000875	0.00020523	23.45455027	636.10836	16849.50710
37805359.	4.032572E+12	0.00000938	0.00021926	23.38818026	676.76040	18071.08767
37805359.	3.780536E+12	0.00001000	0.00023332	23.33208704	717.11474	19292.09388
37805359.	3.558151E+12	0.00001063	0.00024740	23.28447390	757.17035	20512.52055
37805359.	3.360476E+12	0.00001125	0.00026149	23.24393892	796.92602	21732.36394
37805359.	3.183609E+12	0.00001188	0.00027561	23.20938349	836.38079	22951.61752
37805359.	3.024429E+12	0.00001250	0.00028975	23.17991781	875.53332	24170.27870
37805359.	2.880408E+12	0.00001313	0.00030391	23.15482950	914.38252	25388.34187
38581797.	2.805949E+12	0.00001375	0.00031809	23.13353205	952.92714	

26605.80289
   40238988. 2.799234E+12   0.00001438   0.00033229   23.11554193   991.16598
27822.65720
   41894116. 2.792941E+12   0.00001500   0.00034651   23.10045862   1029.09788
29038.89919
   43547163. 2.787018E+12   0.00001563   0.00036075   23.08794165   1066.72152
30254.52507
   45198127. 2.781423E+12   0.00001625   0.00037501   23.07771063   1104.03588
31469.52744
   46846983. 2.776118E+12   0.00001688   0.00038930   23.06951666   1141.03946
32683.90381
   48493722. 2.771070E+12   0.00001750   0.00040361   23.06315374   1177.73110
33897.64794
   50138329. 2.766253E+12   0.00001813   0.00041793   23.05844164   1214.10946
35110.75503
   51780791. 2.761642E+12   0.00001875   0.00043229   23.05522585   1250.17331
36323.21930
   53421090. 2.757218E+12   0.00001938   0.00044666   23.05336905   1285.92120
37535.03657
   55059213. 2.752961E+12   0.00002000   0.00046106   23.05275393   1321.35186
38746.20097
   56695154. 2.748856E+12   0.00002063   0.00047547   23.05328035   1356.46411
39956.70488
   58328884. 2.744889E+12   0.00002125   0.00048992   23.05485106   1391.25629
41166.54618
   59960405. 2.741047E+12   0.00002188   0.00050438   23.05739164   1425.72735
42375.71526
   61589686. 2.737319E+12   0.00002250   0.00051887   23.06082487   1459.87560
43584.20980
   63216715. 2.733696E+12   0.00002313   0.00053338   23.06508780   1493.69966
44792.02347
   64841482. 2.730168E+12   0.00002375   0.00054792   23.07012606   1527.19825
45999.14860
   66463972. 2.726727E+12   0.00002438   0.00056247   23.07588816   1560.36987
47205.57943
   69702037. 2.720079E+12   0.00002563   0.00059167   23.08940077   1625.72608
49616.33681
   72930786. 2.713704E+12   0.00002688   0.00062096   23.10531378   1689.75642
52024.24372
   76150080. 2.707558E+12   0.00002813   0.00065034   23.12336969   1752.44850
54429.24913
   79359775. 2.701609E+12   0.00002938   0.00067984   23.14335680   1813.78961
56831.30036
   82559725. 2.695828E+12   0.00003063   0.00070943   23.16510057   1873.76675
59230.34237
   85368423. 2.678225E+12   0.00003188   0.00073796   23.15179682   1930.01204
60000.00000
   87583986. 2.644045E+12   0.00003313   0.00076476   23.08697748   1981.36583
60000.00000
   89545111. 2.604949E+12   0.00003438   0.00079082   23.00571012   2030.03164
60000.00000

```
   91140093.  2.558318E+12    0.00003563    0.00081572   22.89738607    2075.29365
60000.00000
   92724865.  2.514573E+12    0.00003688    0.00084066   22.79759073    2119.52462
60000.00000
   93978056.  2.464998E+12    0.00003813    0.00086445   22.67410326    2160.59036
60000.00000
   95226347.  2.418447E+12    0.00003938    0.00088829   22.55975962    2200.73512
60000.00000
   96400872.  2.372945E+12    0.00004063    0.00091190   22.44677496    2239.47521
60000.00000
   97792378.  2.335340E+12    0.00004188    0.00093800   22.40000010    2281.31739
60000.00000
   98361047.  2.280836E+12    0.00004313    0.00096043   22.27077055    2316.06745
60000.00000
   99304153.  2.237840E+12    0.00004438    0.00098287   22.14908838    2349.94306
60000.00000
1.001389E+08  2.194824E+12    0.00004563    0.00100481   22.02332926    2382.18061
60000.00000
1.008388E+08  2.151229E+12    0.00004688    0.00102613   21.89078093    2412.62937
60000.00000
1.015361E+08  2.109842E+12    0.00004813    0.00104749   21.76602602    2442.33831
60000.00000
1.022307E+08  2.070495E+12    0.00004938    0.00106889   21.64847803    2471.30261
60000.00000
1.029225E+08  2.033038E+12    0.00005063    0.00109034   21.53761625    2499.51793
60000.00000
1.035554E+08  1.996249E+12    0.00005188    0.00111150   21.42647409    2526.53486
60000.00000
1.040547E+08  1.958676E+12    0.00005313    0.00113191   21.30653143    2551.80585
60000.00000
1.045516E+08  1.922788E+12    0.00005438    0.00115236   21.19282866    2576.39314
60000.00000
1.050462E+08  1.888471E+12    0.00005563    0.00117285   21.08495378    2600.29283
60000.00000
1.055385E+08  1.855621E+12    0.00005688    0.00119338   20.98252916    2623.50084
60000.00000
1.060284E+08  1.824144E+12    0.00005813    0.00121395   20.88520575    2646.01273
60000.00000
1.060284E+08  1.785741E+12    0.00005938    0.00123500   20.79999876    2668.29992
60000.00000
1.070789E+08  1.766250E+12    0.00006063    0.00126091   20.79847670    2694.90167
60000.00000
1.074120E+08  1.735952E+12    0.00006188    0.00127991   20.68534613    2713.37298
60000.00000
1.077410E+08  1.706788E+12    0.00006313    0.00129892   20.57696486    2731.23081
60000.00000
1.080683E+08  1.678730E+12    0.00006438    0.00131797   20.47335577    2748.49148
60000.00000
1.083937E+08  1.651713E+12    0.00006563    0.00133706   20.37424707    2765.15123
60000.00000
1.087173E+08  1.625680E+12    0.00006688    0.00135618   20.27939558    2781.20675
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60000.00000
1.090391E+08 1.600574E+12 0.00006813 0.00137535 20.18856668 2796.65413
60000.00000
1.093591E+08 1.576347E+12 0.00006938 0.00139454 20.10154867 2811.48978
60000.00000
1.096772E+08 1.552951E+12 0.00007063 0.00141378 20.01814699 2825.71014
60000.00000
1.099934E+08 1.530343E+12 0.00007188 0.00143306 19.93817568 2839.31134
60000.00000
1.103078E+08 1.508482E+12 0.00007313 0.00145237 19.86146593 2852.28967
60000.00000
1.105476E+08 1.486354E+12 0.00007438 0.00147098 19.77782965 2864.15203
60000.00000
1.109663E+08 1.443464E+12 0.00007688 0.00150772 19.61257696 2885.79031
60000.00000
1.113786E+08 1.403196E+12 0.00007938 0.00154460 19.45947790 2905.15348
60000.00000
1.117846E+08 1.365308E+12 0.00008188 0.00158162 19.31745100 2922.21455
60000.00000
1.122990E+08 1.330951E+12 0.00008438 0.00162000 19.20000029 2937.41357
60000.00000
1.126737E+08 1.296963E+12 0.00008688 0.00166574 19.17402220 2952.27857
60000.00000
1.130434E+08 1.264822E+12 0.00008938 0.00170185 19.04165125 2961.28635
60000.00000
1.134071E+08 1.234363E+12 0.00009188 0.00173810 18.91811800 2968.05675
60000.00000
1.136957E+08 1.204723E+12 0.00009438 0.00177341 18.79109144 2972.45166
60000.00000
1.139140E+08 1.175887E+12 0.00009688 0.00180782 18.66134405 2974.65697
60000.00000
1.141235E+08 1.148412E+12 0.00009938 0.00184236 18.53949308 2972.00612
60000.00000
1.143245E+08 1.122203E+12 0.00010188 0.00187704 18.42497492 2964.89488
60000.00000
1.145229E+08 1.097225E+12 0.00010438 0.00191187 18.31729460 2967.51502
60000.00000
1.147187E+08 1.073391E+12 0.00010688 0.00194683 18.21599436 2971.64169
60000.00000
1.149117E+08 1.050621E+12 0.00010938 0.00198195 18.12065935 2974.14493
60000.00000
1.151020E+08 1.028844E+12 0.00011188 0.00201721 18.03091764 2974.99993
60000.00000
1.152862E+08 1.007967E+12 0.00011438 0.00205274 17.94749308 2968.65910
60000.00000
1.154684E+08 9.879653E+11 0.00011688 0.00208840 17.86867476 2962.20614
60000.00000
1.156487E+08 9.687846E+11 0.00011938 0.00212418 17.79417658 2964.79906
60000.00000
1.158268E+08 9.503740E+11 0.00012188 0.00216008 17.72374964 2969.30624
60000.00000

1.159897E+08 9.325803E+11 0.00012438 0.00219579 17.65462160 2972.48978
60000.00000
1.159897E+08 9.142044E+11 0.00012688 0.00223300 17.59999895 2974.45839
60000.00000
1.159897E+08 8.965386E+11 0.00012938 0.00227700 17.59999895 2972.73770
60000.00000
1.163886E+08 8.825677E+11 0.00013188 0.00231954 17.58893824 2965.65711
60000.00000
1.164702E+08 8.667548E+11 0.00013438 0.00235276 17.50888395 2960.60580
60000.00000
1.165510E+08 8.515140E+11 0.00013688 0.00238605 17.43234015 2958.67957
60000.00000
1.166310E+08 8.368145E+11 0.00013938 0.00241943 17.35912943 2963.19663
60000.00000
1.167102E+08 8.226273E+11 0.00014188 0.00245289 17.28908014 2966.99802
60000.00000
1.167887E+08 8.089258E+11 0.00014438 0.00248643 17.22203779 2970.07455
60000.00000
1.168663E+08 7.956853E+11 0.00014688 0.00252006 17.15786219 2972.41687
60000.00000
1.169431E+08 7.828823E+11 0.00014938 0.00255378 17.09641314 2974.01517
60000.00000
1.170190E+08 7.704954E+11 0.00015188 0.00258758 17.03757048 2974.85957
60000.00000
1.170931E+08 7.584975E+11 0.00015438 0.00262155 16.98172331 2973.26999
60000.00000
1.171651E+08 7.468690E+11 0.00015688 0.00265571 16.92885733 2968.88322
60000.00000
1.172366E+08 7.356023E+11 0.00015938 0.00268993 16.87800837 2964.48401
60000.00000
1.173077E+08 7.246809E+11 0.00016188 0.00272421 16.82909060 2960.07211
60000.00000
1.173784E+08 7.140889E+11 0.00016438 0.00275854 16.78201818 2955.64742
60000.00000
1.174485E+08 7.038115E+11 0.00016688 0.00279294 16.73671389 2951.20975
60000.00000
1.175182E+08 6.938344E+11 0.00016938 0.00282739 16.69310045 2955.61019
60000.00000
1.175874E+08 6.841450E+11 0.00017188 0.00286191 16.65111494 2959.88082
60000.00000
1.176562E+08 6.747306E+11 0.00017438 0.00289649 16.61068869 2963.63394
60000.00000
1.177921E+08 6.566806E+11 0.00017938 0.00296583 16.53427076 2969.56411
60000.00000
1.178614E+08 6.392483E+11 0.00018438 0.00303218 16.44570780 2973.08096
60000.00000
1.179181E+08 6.226697E+11 0.00018938 0.00309817 16.35996294 2974.79749
60000.00000
1.179717E+08 6.069286E+11 0.00019438 0.00316457 16.28075552 2971.52531
60000.00000
1.180232E+08 5.919659E+11 0.00019938 0.00323130 16.20714140 2964.83950

```
  60000.00000
  1.180741E+08  5.777325E+11    0.00020438    0.00329815   16.13771296    2958.12774
  60000.00000
  1.181187E+08  5.641489E+11    0.00020938    0.00336570   16.07500792    2951.26074
  60000.00000
  1.181471E+08  5.511234E+11    0.00021438    0.00343499   16.02328348    2944.01798
  60000.00000
  1.184025E+08  5.397267E+11    0.00021938    0.00351000   16.00000048    2947.02846
  60000.00000
  1.188468E+08  5.296792E+11    0.00022438    0.00359000   16.00000048    2957.64282
  60000.00000
  1.192728E+08  5.199904E+11    0.00022938    0.00367000   16.00000048    2965.73664
  60000.00000
  1.196806E+08  5.106372E+11    0.00023438    0.00375000   16.00000048    2971.30994
  60000.00000
  1.200188E+08  5.013839E+11    0.00023938    0.00383000   16.00000048    2974.36271
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  117827.78128
in-kip



p-y Curve in Sand Computed Using Reese Criteria for Static Loading Conditions

Soil Layer Number           =           2
Depth below pile head       =     144.000 in
Depth below ground surface  =     138.000 in
Equivalent Depth (see note) =     132.062 in
Pile Diameter               =     192.000 in
Angle of Friction           =      35.000 deg.
Avg. Eff. Unit Weight       =     0.06700 pci
k                           =      90.000 pci
A (static)                  =      2.3410
B (static)                  =      1.7211
Pst                         =    9279.623 lbs/in
Psd                         =   95495.860 lbs/in
Ps                          =    9279.623 lbs/in
Cbar                        =  11422.4203
n                           =      3.4702
m                           =   1438.2221
yk                          =      0.9457 in
pm                          =   15970.819 lbs/in
ym                          =      3.2000 in
pu                          =   21723.708 lbs/in
yu                          =      7.2000 in
p-multiplier                =     1.00000
y-multiplier                =     1.00000

This p-y curve is computed using the equivalent depth.
```

y, in	p, lbs/in	
0.0000	0.0000	
0.2666667	3169.4825	*
0.5333333	6338.9649	*
0.8000000	9508.4474	*
1.0667	11636.8430	
1.3333	12409.7128	
1.6000	13079.1461	
1.8667	13673.2403	
2.1333	14209.6370	
2.4000	14700.2123	
2.6667	15153.3810	
2.9333	15575.3449	
3.2000	15970.8195	
5.2000	18847.2638	
7.2000	21723.7080	
199.2000	21723.7080	
391.2000	21723.7080	

* p value(s) computed using p = k * Eff x * y

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head = 59000.000 lbs
Specified moment at pile head = 72840000.000 in-lbs
Specified axial load at pile head = 60700.000 lbs

Output Verification:

Computed forces and moments are within specified convergence limits.

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 59000.	M= 7.28E+07	60700.0000	3.5129	7.5195E+07	-741589.

Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00217142	5900.00009	981680.22551	2717119.	4.520919E+08
0.00653662	17760.76974	2955152.	2717119.	4.520919E+08
0.01036029	28150.15403	4683805.	2717119.	4.520919E+08
0.01307324	35521.53949	5910304.	2717119.	4.520919E+08
0.01517756	41239.23026	6861650.	2717119.	4.520919E+08
0.01689691	45910.92377	7638957.	2717119.	4.520919E+08
0.01835061	49860.78436	8296160.	2717119.	4.520919E+08
0.01960985	53282.30923	8865456.	2717119.	4.520919E+08
0.02072059	56300.30806	9367610.	2717119.	4.520919E+08
0.02171422	59000.00000	9816800.	2717113.	4.520908E+08

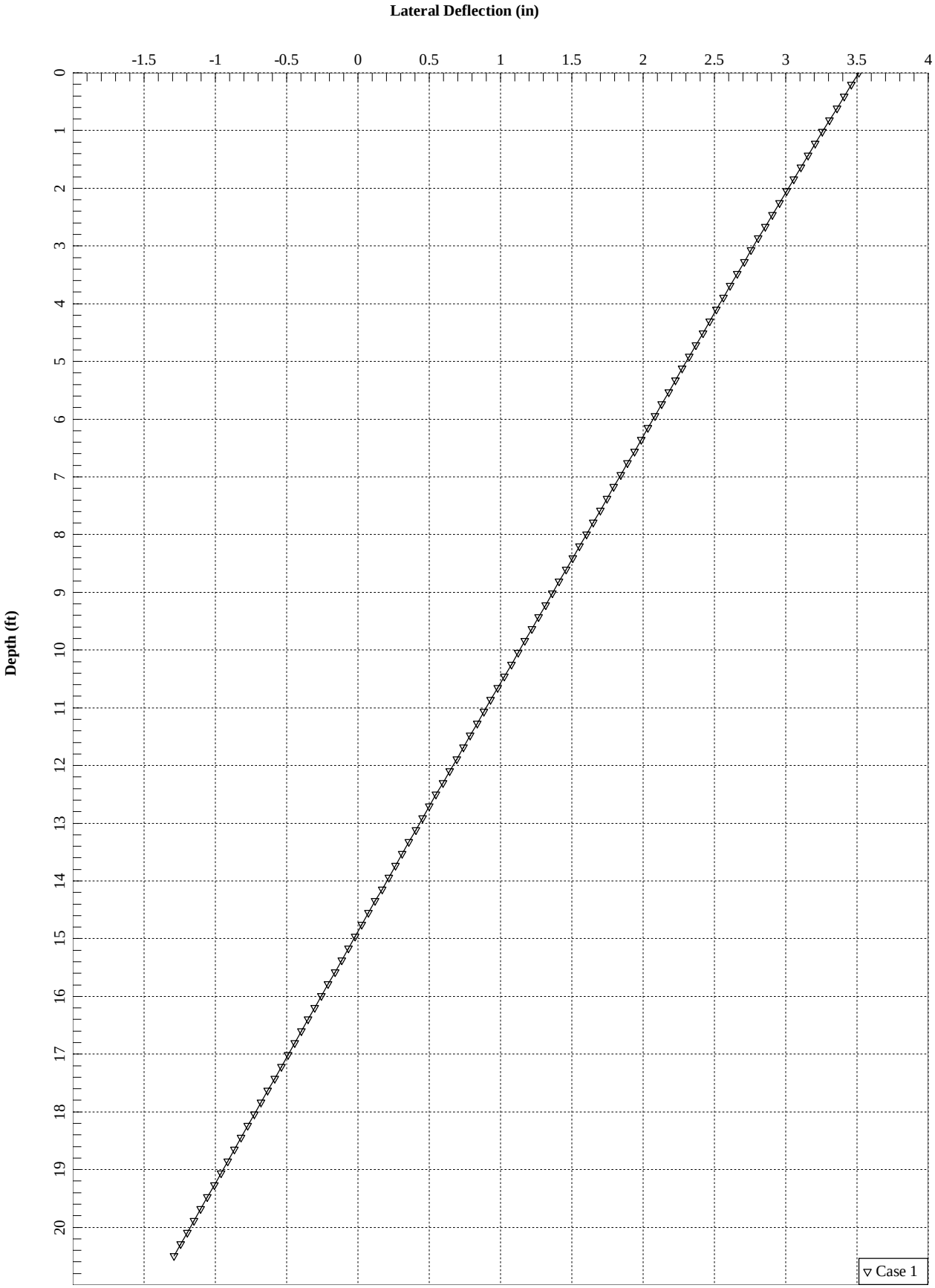
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00008671	39199.36636	7284000.	4.520919E+08	8.400742E+10
0.00026134	118004.11880	21927025.	4.515399E+08	8.390324E+10
0.00041478	187036.27031	34753512.	4.509258E+08	8.378725E+10
0.00054753	236070.76818	43854050.	4.311537E+08	8.009393E+10
0.00109532	276993.83729	50912975.	2.528894E+08	4.648245E+10
0.00132668	310092.18905	56680537.	2.337354E+08	4.272358E+10
0.00145050	336911.66074	61556941.	2.322721E+08	4.243831E+10
0.00155324	360056.76929	65781075.	2.318099E+08	4.235083E+10
0.00164402	380473.30949	69507024.	2.314281E+08	4.227861E+10
0.00172534	398737.12668	72840000.	2.311063E+08	4.221774E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)

K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.

Summary of Warning Messages


Lateral Deflection (in)
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTL05176	DATE:	5/17/2021	RF DESIGN ENG:	Mohammad Minhaj Hussain	RF PERF ENG:	
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	510-493-3024	RF PERF PHONE:	
REVISION:	Preliminary	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	mh705r@att.com	RF PERF EMAIL:	
INITIATIVE PROJECT	C-Band, DoD and other multi carrier SOW					ADDITIONAL WORKFLOW NOTIFICATIONS:	
						RFDS VERSION:	3.00
						UMTS FREQUENCY:	
						LTE FREQUENCY:	700,1900,AWS,WCS
						5G FREQUENCY:	850,1900,AWS,CBAND,DoD
						IPLAN JOB # 1:	ER_-RCTB-21-09468
						IPLAN JOB # 2:	ER_-RCTB-21-09467
						IPLAN JOB # 3:	ER_-RCTB-21-09783
						IPLAN JOB # 4:	ER_-RCTB-21-09782
						IPLAN JOB # 5:	ER_-RCTB-21-09465
						IPLAN JOB # 6:	
						IPLAN JOB # 7:	
						IPLAN JOB # 8:	
						IPLAN JOB # 9:	
						IPLAN JOB #10:	
						IPLAN JOB # 11:	
						IPLAN JOB # 12:	
						IPLAN JOB # 13:	
						IPLAN JOB # 14:	
						IPLAN JOB # 15:	
						IPLAN JOB # 16:	

RFDS PROGRAM TYPE:	2021 5G NR Radio		
RFDS TECHNOLOGY:	5G NR 1SR CBAND		
STATE/STATUS:	Final/Approved		
RFDS ID:	4541466		
Created By:	mh705r	Updated By:	mh705r
Created:	5/17/2021	Updated:	4/6/2022
Estimated SQIN:	12.062	Expiration:	
RER Initiative:		Calculation ID:	20220406121926038S
PRD || SUB GRP #1	Antenna Modifications || 41RRX Antenna Retrofit		
PRD || SUB GRP #2	5G NR Radio || 5G NR 1SR CBand		
PRD || SUB GRP #3	5G NR Software Radio || 5G NR Activation		
PRD || SUB GRP #4	5G NR Software Radio || 5G NR Activation		
PRD || SUB GRP #5	5G NR Radio || 5G NR 1SR CBand		
PRD || SUB GRP #6			
PRD || SUB GRP #7			
PRD || SUB GRP #8			
PRD || SUB GRP #9			
PRD || SUB GRP #10			
PRD || SUB GRP #11			
PRD || SUB GRP #12			
PRD || SUB GRP #13			
PRD || SUB GRP #14			
PRD || SUB GRP #15			
PRD || SUB GRP #16			

Section 2 - LOCATION INFORMATION

USID:	60443	FA LOCATION CODE:	10071269	LOCATION NAME:	BETHEL STONY HILL-AWS	ORACLE PRJT # 1:	2051A134PR
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PRJT # 2:	2051A134W7
ADDRESS:	7 STONY HILL ROAD	CITY:	BETHEL	STATE:	CT	ORACLE PRJT # 3:	
ZIP CODE:	06801	COUNTY:	FAIRFIELD	LONG (DEC. DEG.):	-73.4016989	ORACLE PRJT # 4:	
LATITUDE (D-M-S):	41d 24m 56.85084s	LONGITUDE (D-M-S):	-73d -24m -6.11604s	LAT (DEC. DEG.):	41.4157919	ORACLE PRJT # 5:	2051A134W6
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	84 EAST DANBURY FOLLOW TO EXIT 8 MAKE LEFT AT THE BOTTOM OF THE RAMP FOLLOW ON STONY HILL RD SITE IS ON THE RIGHT ABOUT MILE POWER LINE MONO POLE DRIVEWAY BEFORE THE BEST WESTERN HOTEL ON THE RIGHT. THE DRIVEWAY IS THE SAME AS TARGETS. FOLLOW UP HILL, SITE IS TO THE LEFT. DEMARC IS IN A GRAY BOX ON SITE SECURITY NO ISSUES ACCESS 24 7. EVERSOURCE ENERGY POWER POLE.					ORACLE PRJT # 6:	
						ORACLE PRJT # 7:	
						ORACLE PRJT # 8:	
						ORACLE PRJT # 9:	
						ORACLE PRJT # 10:	
						ORACLE PRJT # 11:	
						ORACLE PRJT # 12:	
						ORACLE PRJT # 13:	
						ORACLE PRJT # 14:	
						ORACLE PRJT # 15:	
						ORACLE PRJT # 16:	
						BORDER CELL WITH CONTOUR COORD:	
						AM STUDY REQ'D (Y/N):	No
						FREQ COORD:	
						RF DISTRICT:	TBD
						RF ZONE:	TBD
						PARENT NAME(UMTS):	BRPTCT04CR0R05

PACE JOB #1:	MRCTB060678		
PACE JOB #2:	MRCTB060669		
PACE JOB #3:	MRCTB060524		
PACE JOB #4:	MRCTB060496		
PACE JOB #5:	MRCTB060745		
PACE JOB #6:			
PACE JOB #7:			
PACE JOB #8:			
PACE JOB #9:			
PACE JOB #10:			
PACE JOB #11:			
PACE JOB #12:			
PACE JOB #13:			
PACE JOB #14:			
PACE JOB #15:			
PACE JOB #16:			
SEARCH RING NAME:			
SEARCH RING ID:			
BTA:		MSA / RSA:	
LAC(UMTS):	05995		
RNC(UMTS):	BRIDGEPORT RNC05		
MME POOL ID(LTE):	FF01		

Section 3 - LICENSE COVERAGE/FILING INFORMATION

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

CGSA CALL SIGNS:

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	No	GROUND ELEVATION (ft):	0	STRUCTURE TYPE:	UTILITY
ADDITIONAL REGULATORY?:	No	HEIGHT OVERALL (ft):	0.00	FCC ASR NUMBER:	
SUB-LEASE RIGHTS?:	No	STRUCTURE HEIGHT (ft):	148.00		
LIGHTING TYPE:	NOT REQUIRED				

MARKET LOCATION 700 MHz Band:	
MARKET LOCATION 850 MHz Band:	
MARKET LOCATION 1900 MHz Band:	
MARKET LOCATION AWS Band:	
MARKET LOCATION WCS Band:	
MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

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

Section 5 - E-911 INFORMATION - final

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

Section 6/7 - BBU INFORMATION - existing

	BBU 1	BBU 2	BBU 3	BBU 4	BBU 5	BBU 6	BBU 7
BBU ID:	257794	278028	423158	210670	605860	360126	824698
TECHNOLOGY:	UMTS	UMTS	UMTS	UMTS	LTE	LTE	5G
BBU NAME:	CTU4176	CTU5176	CTV4176	CTV5176	CTL00876R	CTL05176	CTCN005176
BBU USID:	60443	60443	60443	60443	60443	60443	60443
CELL ID / BCF:	CTV4176	CTV5176	CTV4176	CTV5176	CTL00876R	CTL05176	CTCN005176
BTA/TID:	321V	321W	321W	321U	321L	321L	321N
4-9 DIGIT SITE ID:	4176	5176	04176	5176	0876	5176	14005176
COW OR TOY?:	No	No	No	No	No	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL
BTS LOCATION ID:	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL	INTERNAL
BASE STATION TYPE:	OVERLAY	OVERLAY	BASE	BASE	BASE	BASE	BASE
EQUIPMENT NAME:	STONY HILL	BETHEL STONY HILL-AWS	STONY HILL	BETHEL STONY HILL-AWS	BETHEL STONY HILL-AWS	BETHEL STONY HILL-AWS	BETHEL STONY HILL-AWS
DISASTER PRIORITY:	0	0	0	0	3	3	3
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	ERICSSON	ERICSSON	ERICSSON	ERICSSON	ERICSSON
EQUIPMENT TYPE (Model):					6601 RADIONODE 5216	6601 RADIONODE 5216	BASEBAND 6630
BASEBAND CONFIGURATION :							
MARKET STATE CODE:					CT	CT	CTC
NODE B NUMBER:	0	0	0	0	876	5176	5176
SIDEHAUL SWITCH VENDOR:							
SIDEHAUL SWITCH MODEL:							
SIDEHAUL SWITCH NAME:							
CSS - CTS COMMON ID:	CTU4176	CTU5176	CTV4176	CTV5176	CTL00876R	CTL05176	CTCN005176
CSS - SECONDARY FUNCTION ID:							

Section 6/7 - BBU INFORMATION - final

	BBU 1	BBU 2	BBU 3
BBU ID:	360126	0	824698
TECHNOLOGY:	LTE	5G	LTE,5G
BBU NAME:	CTL05176	CTCN035176	CTL08176R,CTCN005176
BBU USID:	60443	60443	60443
CELL ID / BCF:	CTL05176	CTCN035176	CTCN005176
BTA/TID:	321L	321L	321N
4-9 DIGIT SITE ID:	5176	14135176	14005176
COW OR TOY?:	No	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL
BTS LOCATION ID:	INTERNAL	INTERNAL	INTERNAL
BASE STATION TYPE:	BASE	OVERLAY	OVERLAY
EQUIPMENT NAME:	BETHEL STONY HILL-AWS	CTCN035176	BETHEL STONY HILL-AWS
DISASTER PRIORITY:	3	3	3
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	ERICSSON
EQUIPMENT TYPE (Model):	6601 RADIONODE 5216	BASEBAND 6648	BASEBAND 6630
BASEBAND CONFIGURATION :	1x6601 / 1x5216 / 2xXMU03	xxxxx / 1x6648 / xxxxx + IDLe	xxxxx / 1x6630 Mixed-Mode / xxxxx + I
MARKET STATE CODE:	CT	CTC	CT,CTC
NODE B NUMBER:	5176	35176	8176,5176
SIDEHAUL SWITCH VENDOR:			
SIDEHAUL SWITCH MODEL:			
SIDEHAUL SWITCH NAME:			
CSS - CTS COMMON ID:	CTL05176		CTCN005176
CSS - SECONDARY FUNCTION ID:			

Section 7b - Radio INFORMATION - existing

Section 7b - Radio INFORMATION - final

Section 8 - RBS/SECTOR ASSOCIATION - existing

	BBU 1	BBU 2	BBU 3	BBU 4	BBU 5	BBU 6	BBU 7
CTS Common ID	CTU4176	CTU5176	CTV4176	CTV5176	CTL00876R	CTL05176	CTCN005176
Soft Sector IDs	CTU41767	CTU51767	CTV4176A	CTV51761	CTL00876_2A_2	CTL05176_3A_1	CTCN005176_N005A_1
	CTU41768	CTU51768	CTV4176B	CTV51762	CTL00876_2B_2	CTL05176_3B_1	CTCN005176_N005B_1
	CTU41769	CTU51769	CTV4176C	CTV51763	CTL00876_2C_2	CTL05176_3C_1	CTCN005176_N005C_1
					CTL00876_7A_2_E	CTL05176_7A_1	
					CTL00876_7A_3_F	CTL05176_7A_2_E	
					CTL00876_7B_2_E	CTL05176_7B_1	
					CTL00876_7B_3_F	CTL05176_7B_2_E	
					CTL00876_7C_2_E	CTL05176_7C_1	
					CTL00876_7C_3_F	CTL05176_7C_2_E	
					CTL00876_8A_1	CTL05176_8A_1	
					CTL00876_8B_1	CTL05176_8B_1	
					CTL00876_8C_1	CTL05176_8C_1	
					CTL00876_9A_1	CTL05176_9A_1	
					CTL00876_9A_2	CTL05176_9A_2	
					CTL00876_9B_1	CTL05176_9B_1	
					CTL00876_9B_2	CTL05176_9B_2	
					CTL00876_9C_1	CTL05176_9C_1	
					CTL00876_9C_2	CTL05176_9C_2	

Section 8 - RBS/SECTOR ASSOCIATION - final

	BBU 1	BBU 2	BBU 3
CTS Common ID	CTL05176	CTCN035176	CTL08176R,CTCN005176
Soft Sector IDs	CTL05176_3A_1	CTCN035176_N077A_1	CTCN005176_N002A_1
	CTL05176_3B_1	CTCN035176_N077A_2	CTCN005176_N002B_1
	CTL05176_3C_1	CTCN035176_N077B_1	CTCN005176_N002C_1
	CTL05176_7A_1	CTCN035176_N077B_2	CTCN005176_N005A_1
	CTL05176_7A_2_E	CTCN035176_N077C_1	CTCN005176_N005B_1
	CTL05176_7A_3_F	CTCN035176_N077C_2	CTCN005176_N005C_1
	CTL05176_7B_1		CTCN005176_N066A_1
	CTL05176_7B_2_E		CTCN005176_N066B_1
	CTL05176_7B_3_F		CTCN005176_N066C_1
	CTL05176_7C_1		CTL08176_2A_2
	CTL05176_7C_2_E		CTL08176_2B_2
	CTL05176_7C_3_F		CTL08176_2C_2
			CTL08176_9A_1
			CTL08176_9A_2
			CTL08176_9B_1
			CTL08176_9B_2
			CTL08176_9C_1
			CTL08176_9C_2

Section 9 - SOFT SECTOR ID - existing

	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 3RD 700	LTE 3RD 1900	LTE 4TH 700	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS	5G 1ST CBAND	5G 2ND CBAND
USEID (excluding Hard Sector)	60443.850.3G.1	60443.1900.3G.1	60443.850.3G.4	60443.1900.3G.3																			
SECTOR A SOFT SECTOR ID	CTV51761	CTU41767	CTV4176A	CTU51767	CTL05176_7A_1	CTL05176_8A_1	CTL00876_9A_1	CTL00876_2A_2	CTL05176_3A_1	CTL05176_7A_2_E	CTL00876_8A_1	CTL00876_9A_2	CTL00876_7A_3_F	CTL05176_9A_1	CTL00876_7A_2_E	CTL05176_9A_2			CTCN005176_N005A_1				
SECTOR B	CTV51762	CTU41768	CTV4176B	CTU51768	CTL05176_7B_1	CTL05176_8B_1	CTL00876_9B_1	CTL00876_2B_2	CTL05176_3B_1	CTL05176_7B_2_E	CTL00876_8B_1	CTL00876_9B_2	CTL00876_7B_3_F	CTL05176_9B_1	CTL00876_7B_2_E	CTL05176_9B_2			CTCN005176_N005B_1				
SECTOR C	CTV51763	CTU41769	CTV4176C	CTU51769	CTL05176_7C_1	CTL05176_8C_1	CTL00876_9C_1	CTL00876_2C_2	CTL05176_3C_1	CTL05176_7C_2_E	CTL00876_8C_1	CTL00876_9C_2	CTL00876_7C_3_F	CTL05176_9C_1	CTL00876_7C_2_E	CTL05176_9C_2			CTCN005176_N005C_1				
SECTOR D																							
SECTOR E																							
SECTOR F																							
OMNI																							

Section 9 - SOFT SECTOR ID - final

	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 3RD 700	LTE 3RD 1900	LTE 4TH 700	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS	5G 1ST CBAND	5G 2ND CBAND
USEID (excluding Hard Sector)																							
SECTOR A SOFT SECTOR ID					CTL05176_7A_1		CTL08176_9A_1		CTL05176_3A_1	CTL05176_7A_2_E						CTL08176_9A_2	CTL08176_2A_2	CTL05176_7A_3_F	CTCN005176_N005	CTCN005176_N002	CTCN005176_N066	CTCN035176_N077	CTCN035176_N077A_2
SECTOR B					CTL05176_7B_1		CTL08176_9B_1		CTL05176_3B_1	CTL05176_7B_2_E						CTL08176_9B_2	CTL08176_2B_2	CTL05176_7B_3_F	CTCN005176_N005	CTCN005176_N002	CTCN005176_N066	CTCN035176_N077	CTCN035176_N077B_2
SECTOR C					CTL05176_7C_1		CTL08176_9C_1		CTL05176_3C_1	CTL05176_7C_2_E						CTL08176_9C_2	CTL08176_2C_2	CTL05176_7C_3_F	CTCN005176_N005	CTCN005176_N002	CTCN005176_N066	CTCN035176_N077	CTCN035176_N077C_2
SECTOR D																							
SECTOR E																							
SECTOR F																							
OMNI																							

Section 9 - Cell Number - existing

	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 3RD 700	LTE 3RD 1900	LTE 4TH 700	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS	5G 1ST CBAND	5G 2ND CBAND
USEID (excluding Hard Sector)	60443.850.3G.1	60443.1900.3G.1	60443.850.3G.4	60443.1900.3G.3																			
SECTOR A CELL NUMBER					15	1	8	192	149	185	1	178	171	8	185	178			25				
SECTOR B					16	2	9	193	150	186	2	179	172	9	186	179			49				
SECTOR C					17	3	10	194	151	187	3	180	173	10	187	180			73				
SECTOR D																							
SECTOR E																							
SECTOR F																							
OMNI																							

Section 9 - Cell Number - final

	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 3RD 700	LTE 3RD 1900	LTE 4TH 700	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS	5G 1ST CBAND	5G 2ND CBAND
USEID (excluding Hard Sector)																							
SECTOR A CELL NUMBER					15		8		149	185						178	192	171	25	26	27	36	37
SECTOR B					16		9		150	186						179	193	172	49	50	51	60	61

SECTOR C					17		10		151	187						180	194	173	73	74	75	84	85
SECTOR D																							
SECTOR E																							
SECTOR F																							
OMNI																							

Section 10 - CID/SAC - existing

	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 3RD 700	LTE 3RD 1900	LTE 4TH 700	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS	5G 1ST CBAND	5G 2ND CBAND
SECTOR A CID/SAC	51761	41767	41761	51767																			
SECTOR B	51762	41768	41762	51768																			
SECTOR C	51763	41769	41763	51769																			
SECTOR D																							
SECTOR E																							
SECTOR F																							
OMNI																							

Section 10 - CID/SAC - final

	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 3RD 700	LTE 3RD 1900	LTE 4TH 700	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS	5G 1ST CBAND	5G 2ND CBAND
SECTOR A CID/SAC																							
SECTOR B																							
SECTOR C																							
SECTOR D																							
SECTOR E																							
SECTOR F																							
OMNI																							

Section 11 - CURRENT RADIO COUNTS existing

Section 12 - CURRENT T1 COUNTS existing

Section 13 - NEW/PROPOSED RADIO COUNTS

Section 14 - NEW/PROPOSED T1 COUNTS

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	P65-16-XLH-RR		HPA65R-BU6A				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI				Quintel							
ANTENNA SIZE (H x W x D)	72.0X12.0X6.0		71X11.7X7.6				72.0X12.0X9.6							
ANTENNA WEIGHT	50		51				111							
AZIMUTH	30		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	145		145				145							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020		Built-in				Built-in						
SURGE ARRESTOR (QTY/MODEL)	2	APTDC-BDFDM-DB	8	TSXDC-4310FM			4	TSXDC-4310FM						
DIPLEXER (QTY/MODEL)	2	TPX-070821	4	QBC0007F1V51-1			4	SPX-0726						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	860-10006		RRH CONTROLLED				RRH CONTROLLED						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP21401	2	TMABPD7823VG12A			2	TMA2117F00V1-1						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP12104												
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	RRUS-E2 B29	1	4478 B14			1	RRUS-11 B12						
RRH - 850 band (QTY/MODEL)							1	4478 B5						
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)			1	4426 B66										
RRH - WCS band (QTY/MODEL)							1	RRUS-32 B30						
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
RRH_7B_1 (QTY/MODEL)														
RRH_7B_2 (QTY/MODEL)														
RRH_7B_3 (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							10	APTDC-BDFDM-DB						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1			CTV51761	CTV51761		UMTS 850	7770.00.850.10	13.5	30	10	None	1 - 5/8 Coax	170.04						259.42			
	PORT 2			CTL00876_7A_2_E	CTL00876_7A_2_E		LTE 700	7770.00.700.3	13.5	30	10	None	1 - 5/8 Coax	170.04						1475.7065			
ANTENNA POSITION 2	PORT 1			CTL00876_7A_3_F	CTL00876_7A_3_F		LTE 700	BU6A_770MHz_10DT	14.1	30	10	Bottom	1 - 5/8 Coax	170.04						2951.413			
	PORT 3			CTL00876_2A_2	CTL00876_2A_2		LTE AWS	BU6A_2170MHz_04DT	18.2	30	4	Bottom	1 - 5/8 Coax	170.04						5070.2572			
ANTENNA POSITION 4	PORT 1			CTL05176_8A_1	CTL05176_8A_1		LTE 850	2_850MHz_10DT	13.5	30	10	Bottom	1 - 5/8 Coax	170.04						1000			
	PORT 2			CTL05176_7A_1	CTL05176_7A_1		LTE 700	2_722MHz_10DT	13.1	30	10	Bottom	1 - 5/8 Coax	170.04						1475.7065			
	PORT 3			CTL05176_3A_1	CTL05176_3A_1		LTE WCS	2_2355MHz_02DT	16.8	30	2	Bottom	1 - 5/8 Coax	170.04						1285.2866			
	PORT 4			CTL00876_9A_1	CTL00876_9A_1		LTE 1900	2_1930MHz_04DT	15.6	30	4	Bottom	1 - 5/8 Coax	170.04						4842.058			
	PORT 5			CTCN005176_N005A_1	CTCN005176_N005A_1		5G 850	2_850MHz_10DT	13.5	30	10	Bottom	1 - 5/8 Coax	170.04						1000			
	PORT 7			CTL00876_9A_2	CTL00876_9A_2		LTE 1900	2_1930MHz_04DT	15.6	30	4	Bottom	1 - 5/8 Coax	170.04						4842.058			

Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	P65-16-XLH-RR		HPA65R-BU6A				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI				Quintel							
ANTENNA SIZE (H x W x D)	72.0X12.0X6.0		71X11.7X7.6				72.0X12.0X9.6							
ANTENNA WEIGHT	50		51				111							
AZIMUTH	150		150				150							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	145		145				145							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020		Built-in				Built-in						
SURGE ARRESTOR (QTY/MODEL)	2	APTDC-BDFDM-DB	4	TSXDC-4310FM			4	TSXDC-4310FM						
DIPLEXER (QTY/MODEL)	2	TPX-070821	4	QBC0007F1V51-1			4	SPX-0726						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				RRH CONTROLLED				RRH CONTROLLED						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP21401	2	TMABPD7823VG12A			2	TMA2117F00V1-1						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	RRUS-E2 B29	1	with another sector			1	RRUS-11 B12						
RRH - 850 band (QTY/MODEL)							1	4478 B5						
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)			1	4426 B66										
RRH - WCS band (QTY/MODEL)							1	RRUS-32 B30						
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
RRH_7B_1 (QTY/MODEL)														
RRH_7B_2 (QTY/MODEL)														
RRH_7B_3 (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)			2	APTDC-BDFDM-DB			10	APTDC-BDFDM-DB						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1			CTV51762	CTV51762		UMTS 850	7770.00.850.08	13.5	150	8	None	1 - 5/8 Coax	170.04						259.42			
	PORT 2			CTL00876_7B_2_E	CTL00876_7B_2_E		LTE 700	7770.00.700.3	13.5	150	2	None	1 - 5/8 Coax	170.04						1475.7065			
ANTENNA POSITION 2	PORT 1			CTL00876_7B_3_F	CTL00876_7B_3_F		LTE 700	BU6A_770MHz_03DT	14.4	150	3	Bottom	1 - 5/8 Coax	170.04						2951.413			
	PORT 3			CTL00876_2B_2	CTL00876_2B_2		LTE AWS	BU6A_2170MHz_02DT	17.8	150	2	Bottom	1 - 5/8 Coax	170.04						5070.2572			
ANTENNA POSITION 4	PORT 1			CTL05176_8B_1	CTL05176_8B_1		LTE 850	2_850MHz_03DT	13.5	150	3	Bottom	1 - 5/8 Coax	170.04						1000			
	PORT 2			CTL05176_7B_1	CTL05176_7B_1		LTE 700	2_722MHz_03DT	13.5	150	3	Bottom	1 - 5/8 Coax	170.04						1475.7065			
	PORT 3			CTL05176_3B_1	CTL05176_3B_1		LTE WCS	2_2355MHz_02DT	16.8	150	2	BOTTOM	1 - 5/8 Coax	170.04						1285.2866			
	PORT 4			CTL00876_9B_1	CTL00876_9B_1		LTE 1900	2_1930MHz_02DT	16	150	2	Bottom	1 - 5/8 Coax	170.04						4842.058			
	PORT 5			CTCN005176_N005B_1	CTCN005176_N005B_1		5G 850	2_850MHz_03DT	13.5	150	3	Bottom	1 - 5/8 Coax	170.04						1000			
	PORT 7			CTL00876_9B_2	CTL00876_9B_2		LTE 1900	2_1930MHz_02DT	16	150	2	Bottom	1 - 5/8 Coax	170.04						4842.058			

Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	P65-16-XLH-RR		HPA65R-BU6A				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI				Quintel							
ANTENNA SIZE (H x W x D)	72.0X12.0X6.0		71X11.7X7.6				72.0X12.0X9.6							
ANTENNA WEIGHT	50		51				111							
AZIMUTH	270		270				270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	145		145				145							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		4				4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020		Built-in				Built-in						
SURGE ARRESTOR (QTY/MODEL)	2	APTDC-BDFDM-DB	8	TSXDC-4310FM			4	TSXDC-4310FM						
DIPLEXER (QTY/MODEL)	2	TPX-070821	4	QBC0007F1V51-1			4	SPX-0726						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				RRH CONTROLLED				RRH CONTROLLED						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP21401	2	TMABPD7823VG12A			2	TMA2117F00V1-1						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	RRUS-E2 B29	1	4478 B14			1	RRUS-11 B12						
RRH - 850 band (QTY/MODEL)							1	4478 B5						
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)			1	4426 B66										
RRH - WCS band (QTY/MODEL)							1	RRUS-32 B30						
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
RRH_7B_1 (QTY/MODEL)														
RRH_7B_2 (QTY/MODEL)														
RRH_7B_3 (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							10	APTDC-BDFDM-DB						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1			CTV51763	CTV51763		UMTS 850	7770.00.850.10	13.5	270	10	None	1 - 5/8 Coax	170.04						259.42			
	PORT 2			CTL00876_7C_2_E	CTL00876_7C_2_E		LTE 700	7770.00.700.3	13.5	270	8	None	1 - 5/8 Coax	170.04						1475.7065			
ANTENNA POSITION 2	PORT 1			CTL00876_7C_3_F	CTL00876_7C_3_F		LTE 700	BU6A_770MHz_08DT	14.1	270	8	Bottom	1 - 5/8 Coax	170.04						2951.413			
	PORT 3			CTL00876_2C_2	CTL00876_2C_2		LTE AWS	BU6A_2170MHz_07DT	17.9	270	7	Bottom	1 - 5/8 Coax	170.04						5070.2572			
ANTENNA POSITION 4	PORT 1			CTL05176_8C_1	CTL05176_8C_1		LTE 850	2_850MHz_08DT	13.4	270	8	Bottom	1 - 5/8 Coax	170.04						1000			
	PORT 2			CTL05176_7C_1	CTL05176_7C_1		LTE 700	2_722MHz_08DT	13.1	270	8	Bottom	1 - 5/8 Coax	170.04						1475.7065			
	PORT 3			CTL05176_3C_1	CTL05176_3C_1		LTE WCS	2_2355MHz_02DT	16.8	270	2	BOTTOM	1 - 5/8 Coax	170.04						1285.2866			
	PORT 4			CTL00876_9C_1	CTL00876_9C_1		LTE 1900	2_1930MHz_07DT	15.9	270	7	Bottom	1 - 5/8 Coax	170.04						4842.058			
	PORT 5			CTCN005176_N005C_1	CTCN005176_N005C_1		5G 850	2_850MHz_08DT	13.4	270	8	Bottom	1 - 5/8 Coax	170.04						1000			
	PORT 7			CTL00876_9C_2	CTL00876_9C_2		LTE 1900	2_1930MHz_07DT	15.9	270	7	Bottom	1 - 5/8 Coax	170.04						4842.058			

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?				Yes			
ANTENNA MAKE - MODEL	AIR6449 B77D+AIR6419 B77G STACKED	QD6616-7					
ANTENNA VENDOR	Ericsson	Quintel					
ANTENNA SIZE (H x W x D)	30.4X15.9X8.1	72X22X9.6					
ANTENNA WEIGHT	81.6	59.1					
AZIMUTH	30	30					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	145	145					
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	Fiber						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Built-In	Built-In					
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)	1 DC6-48-60-18						
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)	1 integrated within: AIR6449 B77D						
Additional RRH #2 - any band (QTY/MODEL)	1 integrated within: AIR6419 B77G						
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)		4 CBC426-DS		4 CTX41727Q-DS-43			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)				4 DB(2)K SBT 782-11055(2)			
Local Market Note 1	-Follow Antenna/RRHs positions as per PDs. -Add C-Band/DoD Antennas along with 1xDC/Fiber Squid.						
Local Market Note 2							
Local Market Note 3	1x5216+2x0MU+1x6630+IDLe+1x6648+Xcede.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2						5G CBAND			30	0	Integrated	Fiber	0								1	
	PORT 3						5G CBAND			30	0	Integrated	Fiber	0								1	
ANTENNA POSITION 2	PORT 1			CTL05176_7A_3_F	CTL05176_7A_3_F		LTE 700	7_770MHz_10DT	14.1	30	10	Bottom	1 - 5/8 Coax	170.04						2951.413		5	
	PORT 2			CTL05176_7A_2_E	CTL05176_7A_2_E		LTE 700	7770.00.700.3	13.5	30	10	Bottom	1 - 5/8 Coax	170.04						1475.7065		3	
	PORT 3			CTL08176_2A_2	CTL08176_2A_2		LTE AWS	7_2170MHz_04DT	18.2	30	4	Bottom	1 - 5/8 Coax	170.04						5070.2572		6	
	PORT 4			CTCN005176_N066A_1	CTCN005176_N066A_1		5G AWS	7_2170MHz_04DT	18.2	30	4	Bottom	1 - 5/8 Coax	170.04						5070.2572		6	
ANTENNA POSITION 4	PORT 8			CTCN005176_N002A_1	CTCN005176_N002A_1		5G 1900	2_1930MHz_04DT	15.6	30	4	Bottom	1 - 5/8 Coax							4842.058		8	

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?				Yes			
ANTENNA MAKE - MODEL	AIR6449 B77D+AIR6419 B77G STACKED	QD6616-7					
ANTENNA VENDOR	Ericsson	Quintel					
ANTENNA SIZE (H x W x D)	30.4X15.9X8.1	72X22X9.6					
ANTENNA WEIGHT	81.6	59.1					
AZIMUTH	150	150					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	145	145					
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	Fiber						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)		Built-In		Built-In			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)	1 integrated within: AIR6449 B77D						
Additional RRH #2 - any band (QTY/MODEL)	1 integrated within: AIR6419 B77G						
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)		4 CBC426-DS		4 CTX41727Q-DS-43			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)				4 DB(2)K SBT 782-11055(2)			
Local Market Note 1	-Follow Antenna/RRHs positions as per PDs. -Add C-Band/DoD Antennas along with 1xDC/Fiber Squid.						
Local Market Note 2							
Local Market Note 3	1x5216+2x0MU+1x6630+IDLe+1x6648+Xcede.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2						5G CBAND			150	0	Integrated	Fiber	0								9	
	PORT 3						5G CBAND			150	0	Integrated	Fiber	0								9	
ANTENNA POSITION 2	PORT 1			CTL05176_7B_3_F	CTL05176_7B_3_F		LTE 700	7_770MHz_03DT	14.4	150	3	Bottom	1 - 5/8 Coax	170.04						2951.413		13	
	PORT 2			CTL05176_7B_2_E	CTL05176_7B_2_E		LTE 700	770.00.700.3	13.5	150	2	Bottom	1 - 5/8 Coax	170.04						1475.7065		11	
	PORT 3			CTL08176_2B_2	CTL08176_2B_2		LTE AWS	7_2170MHz_02DT	17.8	150	2	Bottom	1 - 5/8 Coax	170.04						5070.2572		14	
	PORT 4			CTCN005176_N066B_1	CTCN005176_N066B_1		5G AWS	7_2170MHz_02DT	17.8	150	2	Bottom	1 - 5/8 Coax	170.04						5070.2572		14	
ANTENNA POSITION 4	PORT 8			CTCN005176_N002B_1	CTCN005176_N002B_1		5G 1900	2_1930MHz_02DT	16	150	2	Bottom	1 - 5/8 Coax							4842.058		16	

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?				Yes			
ANTENNA MAKE - MODEL	AIR6449 B77D+AIR6419 B77G STACKED	QD6616-7					
ANTENNA VENDOR	Ericsson	Quintel					
ANTENNA SIZE (H x W x D)	30.4X15.9X8.1	72X22X9.6					
ANTENNA WEIGHT	81.6	59.1					
AZIMUTH	270	270					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	145	145					
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	Fiber						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)		Built-In		Built-In			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)	1 integrated within: AIR6449 B77D						
Additional RRH #2 - any band (QTY/MODEL)	1 integrated within: AIR6419 B77G						
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)		4 CBC426-DS		4 CTX41727Q-DS-43			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)				4 DB(2)K SBT 782-11055(2)			
Local Market Note 1	-Follow Antenna/RRHs positions as per PDs. -Add C-Band/DoD Antennas along with 1xDC/Fiber Squid.						
Local Market Note 2							
Local Market Note 3	1x5216+2x0MU+1x6630+IDLe+1x6648+Xcede.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2						5G CBAND			270	0	Integrated	Fiber	0								17	
	PORT 3						5G CBAND			270	0	Integrated	Fiber	0								17	
ANTENNA POSITION 2	PORT 1			CTL05176_7C_3_F	CTL05176_7C_3_F		LTE 700	7_770MHz_08DT	14.1	270	8	Bottom	1 - 5/8 Coax	170.04						2951.413		21	
	PORT 2			CTL05176_7C_2_E	CTL05176_7C_2_E		LTE 700	7770.00.700.3	13.5	270	8	Bottom	1 - 5/8 Coax	170.04						1475.7065		19	
	PORT 3			CTL08176_2C_2	CTL08176_2C_2		LTE AWS	7_2170MHz_07DT	17.9	270	7	Bottom	1 - 5/8 Coax	170.04						5070.2572		22	
	PORT 4			CTCN005176_N066C_1	CTCN005176_N066C_1		5G AWS	7_2170MHz_07DT	17.9	270	7	Bottom	1 - 5/8 Coax	170.04						5070.2572		22	
ANTENNA POSITION 4	PORT 8			CTCN005176_N002C_1	CTCN005176_N002C_1		5G 1900	2_1930MHz_07DT	15.9	270	7	Bottom	1 - 5/8 Coax							4842.058		24	

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

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	AIR6449 B77D+AIR6419 B77G STACKED	QD6616-7		QS66512-2			
ANTENNA VENDOR	Ericsson	Quintel		Quintel			
ANTENNA SIZE (H x W x D)	30.4X15.9X8.1	72X22X9.6		72.0X12.0X9.6			
ANTENNA WEIGHT	81.6	59.1		111			
AZIMUTH	30	30		30			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	145	145		145			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	Fiber	6		4			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Built-In	Built-in		Built-in			
SURGE ARRESTOR (QTY/MODEL)		8 TSXDC-4310FM		4 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		RRH CONTROLLED		RRH CONTROLLED			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMABPD7823VG12A		2 TMA2117F00V1-1			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)	1 DC6-48-60-18						
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 RRUS-32 B2			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32 B30			
Additional RRH #1 - any band (QTY/MODEL)	1 integrated within: AIR6449 B77D	1 RRUS-E2 B29					
Additional RRH #2 - any band (QTY/MODEL)	1 integrated within: AIR6419 B77G						
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)		4 CBC426-DS		4 CTX41727Q-DS-43			
Additional Component 2 (QTY/MODEL)		2 APTDC-BDFDM-DB		8 APTDC-BDFDM-DB			
Additional Component 3 (QTY/MODEL)				4 DB(2)K SBT 782-11055(2)			
Local Market Note 1	-Follow Antenna/RRHs positions as per PDs. -Add C-Band/DoD Antennas along with 1xDC/Fiber Squid.						
Local Market Note 2							
Local Market Note 3	1x5216+2x0MU+1x6630+IDLe+1x6648+Xcede.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RX/AIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2	60443.A.CBAND.5G.tmp1		CTCN035176_N077A_1	CTCN035176_N077A_1		5G CBAND			30	0	Integrated	Fiber	0								1	
	PORT 3	60443.A.CBAND.5G.tmp2		CTCN035176_N077A_2	CTCN035176_N077A_2		5G CBAND			30	0	Integrated	Fiber	0								1	
ANTENNA POSITION 2	PORT 1	60443.A.700.4G.1.tmp5		CTL05176_7A_3_F	CTL05176_7A_3_F		LTE 700	7_770MHz_10DT	14.1	30	10	Bottom	1 - 5/8 Coax	170.04						2951.413		5	
	PORT 2	60443.A.700.4G.2		CTL05176_7A_2_E	CTL05176_7A_2_E		LTE 700	7770.00.700.3	13.5	30	10	Bottom	1 - 5/8 Coax	170.04						1475.7065		3	
	PORT 3	60443.A.AWS.4G.tmp4		CTL08176_2A_2	CTL08176_2A_2		LTE AWS	7_2170MHz_04DT	18.2	30	4	Bottom	1 - 5/8 Coax	170.04						5070.2572		6	
	PORT 4	60443.A.AWS.5G.tmp1		CTCN005176_N066A_1	CTCN005176_N066A_1		5G AWS	7_2170MHz_04DT	18.2	30	4	Bottom	1 - 5/8 Coax	170.04						5070.2572		6	
ANTENNA POSITION 4	PORT 1	60443.A.700.4G.1		CTL05176_7A_1	CTL05176_7A_1		LTE 700	2_722MHz_10DT	13.1	30	10	Bottom	1 - 5/8 Coax							1475.7065		7	
	PORT 2	60443.A.850.5G.1		CTCN005176_N005A_1	CTCN005176_N005A_1		5G 850	2_850MHz_10DT	13.5	30	10	Bottom	1 - 5/8 Coax							1000		7	
	PORT 3	60443.A.1900.4G.tmp1		CTL08176_9A_1	CTL08176_9A_1		LTE 1900	2_1930MHz_04DT	15.6	30	4	Bottom	1 - 5/8 Coax							4842.058		8	
	PORT 4	60443.A.1900.4G.tmp4		CTL08176_9A_2	CTL08176_9A_2		LTE 1900	2_1930MHz_04DT	15.6	30	4	Bottom	1 - 5/8 Coax							4842.058		8	
	PORT 7	60443.A.WCS.4G.1		CTL05176_3A_1	CTL05176_3A_1		LTE WCS	2_2355MHz_02DT	16.8	30	2	Bottom	1 - 5/8 Coax							1285.2866		8	
	PORT 8	60443.A.1900.5G.tmp1		CTCN005176_N002A_1	CTCN005176_N002A_1		5G 1900	2_1930MHz_04DT	15.6	30	4	Bottom	1 - 5/8 Coax							4842.058		8	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	AIR6449 B77D+AIR6419 B77G STACKED	QD6616-7		QS66512-2			
ANTENNA VENDOR	Ericsson	Quintel		Quintel			
ANTENNA SIZE (H x W x D)	30.4X15.9X8.1	72X22X9.6		72.0X12.0X9.6			
ANTENNA WEIGHT	81.6	59.1		111			
AZIMUTH	150	150		150			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	145	145		145			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	Fiber	6		4			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Built-In	Built-in		Built-in			
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		4 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		RRH CONTROLLED		RRH CONTROLLED			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMABPD7823VG12A		2 TMA2117F00V1-1			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		with another band		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 RRUS-32 B2			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32 B30			
Additional RRH #1 - any band (QTY/MODEL)	1 integrated within: AIR6449 B77D	1 RRUS-E2 B29					
Additional RRH #2 - any band (QTY/MODEL)	1 integrated within: AIR6419 B77G						
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)		4 CBC426-DS		4 CTX41727Q-DS-43			
Additional Component 2 (QTY/MODEL)		2 APTDC-BDFDM-DB		8 APTDC-BDFDM-DB			
Additional Component 3 (QTY/MODEL)				4 DB(2)K SBT 782-11055(2)			
Local Market Note 1	-Follow Antenna/RRHs positions as per PDs. -Add C-Band/DoD Antennas along with 1xDC/Fiber Squid.						
Local Market Note 2							
Local Market Note 3	1x5216+2x0MU+1x6630+IDLe+1x6648+Xcede.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2	60443.B.CBAND.5G.tmp1		CTCN035176_N077B_1	CTCN035176_N077B_1		5G CBAND			150	0	Integrated	Fiber	0								9	
	PORT 3	60443.B.CBAND.5G.tmp2		CTCN035176_N077B_2	CTCN035176_N077B_2		5G CBAND			150	0	Integrated	Fiber	0								9	
ANTENNA POSITION 2	PORT 1	60443.B.700.4G.tmp5		CTL05176_7B_3_F	CTL05176_7B_3_F		LTE 700	7_770MHz_03DT	14.4	150	3	Bottom	1 - 5/8 Coax	170.04						2951.413		13	
	PORT 2	60443.B.700.4G.2		CTL05176_7B_2_E	CTL05176_7B_2_E		LTE 700	7770.00.700.3	13.5	150	2	Bottom	1 - 5/8 Coax	170.04						1475.7065		11	
	PORT 3	60443.B.AWS.4G.tmp4		CTL08176_2B_2	CTL08176_2B_2		LTE AWS	7_2170MHz_02DT	17.8	150	2	Bottom	1 - 5/8 Coax	170.04						5070.2572		14	
	PORT 4	60443.B.AWS.5G.tmp1		CTCN005176_N066B_1	CTCN005176_N066B_1		5G AWS	7_2170MHz_02DT	17.8	150	2	Bottom	1 - 5/8 Coax	170.04						5070.2572		14	
ANTENNA POSITION 4	PORT 1	60443.B.700.4G.1		CTL05176 7B 1	CTL05176 7B 1		LTE 700	2_722MHz_03DT	13.5	150	3	Bottom	1 - 5/8 Coax							1475.7065		15	
	PORT 2	60443.B.850.5G.2		CTCN005176_N005B_1	CTCN005176_N005B_1		5G 850	2_850MHz_03DT	13.5	150	3	Bottom	1 - 5/8 Coax							1000		15	
	PORT 3	60443.B.1900.4G.tmp1		CTL08176_9B_1	CTL08176_9B_1		LTE 1900	2_1930MHz_02DT	16	150	2	Bottom	1 - 5/8 Coax							4842.058		16	
	PORT 4	60443.B.1900.4G.tmp4		CTL08176_9B_2	CTL08176_9B_2		LTE 1900	2_1930MHz_02DT	16	150	2	Bottom	1 - 5/8 Coax							4842.058		16	
	PORT 7	60443.B.WCS.4G.1		CTL05176_3B_1	CTL05176_3B_1		LTE WCS	2_2355MHz_02DT	16.8	150	2	Bottom	1 - 5/8 Coax							1285.2866		16	
	PORT 8	60443.B.1900.5G.tmp1		CTCN005176_N002B_1	CTCN005176_N002B_1		5G 1900	2_1930MHz_02DT	16	150	2	Bottom	1 - 5/8 Coax							4842.058		16	

Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	AIR6449 B77D+AIR6419 B77G STACKED	QD6616-7		QS66512-2			
ANTENNA VENDOR	Ericsson	Quintel		Quintel			
ANTENNA SIZE (H x W x D)	30.4X15.9X8.1	72X22X9.6		72.0X12.0X9.6			
ANTENNA WEIGHT	81.6	59.1		111			
AZIMUTH	270	270		270			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	145	145		145			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	Fiber	6		4			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Built-In	Built-in		Built-in			
SURGE ARRESTOR (QTY/MODEL)		8 TSXDC-4310FM		4 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		RRH CONTROLLED		RRH CONTROLLED			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMABPD7823VG12A		2 TMA2117F00V1-1			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 RRUS-32 B2			
RRH - AWS band (QTY/MODEL)		1 4426 B66					
RRH - WCS band (QTY/MODEL)				1 RRUS-32 B30			
Additional RRH #1 - any band (QTY/MODEL)	1 integrated within: AIR6449 B77D	1 RRUS-E2 B29					
Additional RRH #2 - any band (QTY/MODEL)	1 integrated within: AIR6419 B77G						
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)		4 CBC426-DS		4 CTX41727Q-DS-43			
Additional Component 2 (QTY/MODEL)		2 APTDC-BDFDM-DB		8 APTDC-BDFDM-DB			
Additional Component 3 (QTY/MODEL)				4 DB(2)K SBT 782-11055(2)			
Local Market Note 1	-Follow Antenna/RRHs positions as per PDs. -Add C-Band/DoD Antennas along with 1xDC/Fiber Squid.						
Local Market Note 2							
Local Market Note 3	1x5216+2x0MU+1x6630+IDLe+1x6648+Xcede.						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2	60443.C.CBAND_5G.tmp1		CTCN035176_N077C_1	CTCN035176_N077C_1		5G CBAND			270	0	Integrated	Fiber	0								17	
	PORT 3	60443.C.CBAND_5G.tmp2		CTCN035176_N077C_2	CTCN035176_N077C_2		5G CBAND			270	0	Integrated	Fiber	0								17	
ANTENNA POSITION 2	PORT 1	60443.C.700.4G.tmp5		CTL05176_7C_3_F	CTL05176_7C_3_F		LTE 700	7_770MHz_08DT	14.1	270	8	Bottom	1 - 5/8 Coax	170.04						2951.413		21	
	PORT 2	60443.C.700.4G.2		CTL05176_7C_2_E	CTL05176_7C_2_E		LTE 700	7770.00.700.3	13.5	270	8	Bottom	1 - 5/8 Coax	170.04						1475.7065		19	
	PORT 3	60443.C.AWS.4G.tmp4		CTL08176_2C_2	CTL08176_2C_2		LTE AWS	7_2170MHz_07DT	17.9	270	7	Bottom	1 - 5/8 Coax	170.04						5070.2572		22	
	PORT 4	60443.C.AWS.5G.tmp1		CTCN005176_N066C_1	CTCN005176_N066C_1		5G AWS	7_2170MHz_07DT	17.9	270	7	Bottom	1 - 5/8 Coax	170.04						5070.2572		22	
ANTENNA POSITION 4	PORT 1	60443.C.700.4G.1		CTL05176_7C_1	CTL05176_7C_1		LTE 700	2_722MHz_08DT	13.1	270	8	Bottom	1 - 5/8 Coax							1475.7065		23	
	PORT 2	60443.C.850.5G.3		CTCN005176_N005C_1	CTCN005176_N005C_1		5G 850	2_850MHz_08DT	13.4	270	8	Bottom	1 - 5/8 Coax							1000		23	
	PORT 3	60443.C.1900.4G.tmp1		CTL08176_9C_1	CTL08176_9C_1		LTE 1900	2_1930MHz_07DT	15.9	270	7	Bottom	1 - 5/8 Coax							4842.058		24	
	PORT 4	60443.C.1900.4G.tmp4		CTL08176_9C_2	CTL08176_9C_2		LTE 1900	2_1930MHz_07DT	15.9	270	7	Bottom	1 - 5/8 Coax							4842.058		24	
	PORT 7	60443.C.WCS.4G.1		CTL05176_3C_1	CTL05176_3C_1		LTE WCS	2_2355MHz_02DT	16.8	270	2	Bottom	1 - 5/8 Coax							1285.2866		24	
	PORT 8	60443.C.1900.5G.tmp1		CTCN005176_N002C_1	CTCN005176_N002C_1		5G 1900	2_1930MHz_07DT	15.9	270	7	Bottom	1 - 5/8 Coax							4842.058		24	

Quintel®
New Dimensions in Wireless™

QS66512-2

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-806*MHz / 2x824-894MHz / 4x1850-1990MHz / 4x1695-1780+2110-2400MHz

MultiServ

- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design
- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >159dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers four independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS66512-2 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each set of 4 ports having independent tilt for connection to 2T4R/4T4R services.

Electrical Characteristics	2x Ports 1&2	2x Ports 3&4	4x Ports 5-8			4 Ports 9-12
Operating Frequency (MHz	698-806*	824-894	1695-1780 and 2110-2400			1850-1990
	698-806	824-894	1695-1780	2110-2180	2300-2400	1850-1990
Azimuth beamwidth[1]	67°	64°	68°	63°	58°	69°
Elevation beamwidth[1]	12°	10°	6.5°	5.5°	4.5°	5.5°
Gain[1] (dBi)	13.2	13.5	16.2	16.5	17.0	16.0
Polarization	±45°	±45°		±45° ±45°		±45° ±45°
Electrical down-tilt range	2°-10°	2°-10°		2° – 7°		2° – 7°
Upper SLL (20° > mainbeam)[1]	-17dB	-19dB	-18dB	-18B	-18dB	-16dB
Front to Back Ratio(180°±10°)[1]	≥27dB	≥29dB	≥28dB	≥28dB	≥28dB	≥27dB
Port to Port isolation[1]	≥28dB	≥30dB	≥30dB	≥30dB	≥30dB	≥30dB
Return loss (VSWR)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB (1.5)	14dB(1.5)
X Polar Discrimination (at 0°)	>18dB	>16dB	>20dB	>20dB	>18dB	>20dB
Max Power handling (per any port)	500 watts	500 watts		250 watts		250 watts
Total Composite Power (all ports)				1750 watts		
PIM (3rd Order) (2x43dBm)	>153dBc	>153dBc		>153dBc		>153dBc
XBand PIM (3rd Order) (2x43dBm)				>159dBc		

[1] *Typical Performance across frequency and Downtilt. *Products Ordered after Jan 2016 will be 698-806MHz*

Mechanical Characteristics	
Dimensions	L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm)
Weight (excl mounting brackets)	111lbs (50.3kg)
No. of Connectors	12x 4.3-10.0 DIN Female Long Neck
Max Wind Speed	150mph (67m/s)
Equivalent Flat Plate Area	2.96ft² (0.275m²)
Wind Load @160km/h (45m/s)	Front: 587N (132 lbs), Side: 382N (86 lbs)
Operating Temperature	-40°C to +65°C

Fully Integrated RET Characteristics	
AISG Standards	V1.1,V 2.0 and 3GPP
Factory Default	AISG 2.0
Surge immunity	IEC 61000-4-5:2005 4KV(AISG PIN)
Device Type	SRET Type 1
AISG Data rate	9.6 kbps
No of connectors	1in/1out.
Connector type	IEC 60130-9 (Ed 3.0)
MTBF	36,000 Operational moves

All specifications are subject to change without notice. Please contact your Quintel representative for complete information.

Quintel®
New Dimensions in Wireless™

QS66512-2

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-806*MHz / 2x824-894MHz / 4x1850-1990MHz / 4x1695-1780+2110-2400MHz

MultiServ

RET Configuration

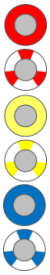
The Quintel MultiServ™ Multiband 12 Port Antenna has the following Array, RF Port and AISG I/O Configurations.

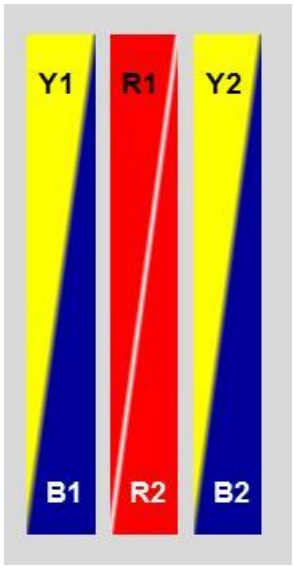
The 12-Port array topology consists of 3 radiating arrays:

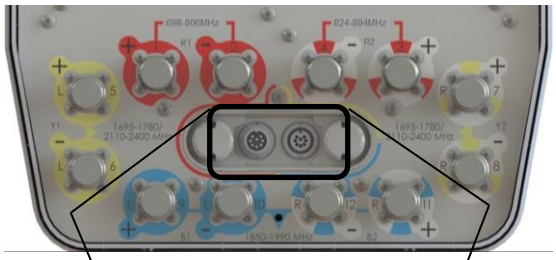
R1/R2 – 698-894MHz
Y1/B1 – 1695-2400MHz
Y2/B2 – 1695-2400MHz

RF Connector Port Configuration

	Ports	Freq (MHz)
R1	1-2	698-806
R2	3-4	824-894
Y1	5-6	1695-1780+ 2110-2400
Y2	7-8	1695-1780+ 2110-2400
B1	9-10	1850-1990
B2	11-12	1850-1990







AISG I/O Configuration

RET Device	Band	RF Ports
1	698-806	1-2
2	824-894	3-4
3	AWS/WCS	5-8
4	PCS	9-12

Multiband Optimization

The Quintel MultiServ™ Multiband 12 Port Antenna is an ideal solution for independently optimizing multiple services when rapidly introducing new technologies. Technology agnostic, each pair of ports provides flexibility for existing and future technologies such as CDMA/EVDO, GSM/EDGE, UMTS/HSPA, and LTE and advanced 2T4R and 4T4R MIMO implementations at high-bands.

The tilt of each service is controlled independently via internal RET actuators compliant to AISG1.1, AISG2.0 and 3GPP protocols. The QS66512-2 provides a total of 4 independent tilts:

- 1x(698-806MHz)
- 1x(824-894MHz)
- 1x Left & Right Array (1695-1780 and 2110-2400MHz)
- 1x Left & Right Array (1850-1990MHz)

Design Optimization

All Quintel antennas use the same mechanical mounting brackets thus making maintenance swaps easy and future proof. All Quintel Antennas also have Azimuth patterns optimized with network design and deployment in mind. The 3dB Azimuth beamwidth is ~65° as with most Antennas, but we have optimized how the pattern rolls-off and where the sidelobes emerge such that there is minimal Inter-Sector Interference when 3x sectors are deployed. For interference limited networks, we can deliver 25% more capacity.

The QS66512-2 12-Port antenna has been designed for delivering best in class, maximum PIM performance. This includes using 4.3-10.0 connectors externally and internally for all array diplexing filters used with our QTilt™ technology.

About Quintel

Quintel is a leading innovator in the design, development, and delivery of network-efficient antenna solutions for wireless operators worldwide. The company's products enable global wireless operators to independently deploy and optimize multiple air interfaces or services on a single standard antenna platform. Quintel is the only antenna maker whose products can increase a wireless network's capacity and provide additional services, without increasing the number or size of antennas. Quintel is headquartered in Rochester, New York with additional offices throughout North America and Europe. More information about Quintel is available at www.quintelsolutions.com.

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Quintel®
New Dimensions in Wireless™

QD6616-7

6ft 65° MultiServ™ 16-Port Antenna

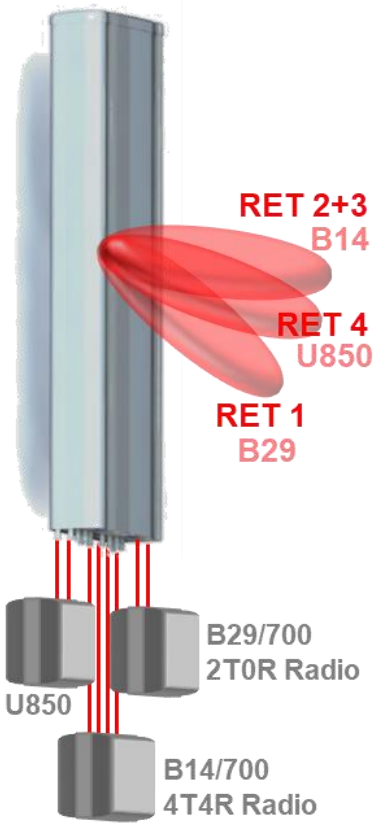
2x698-728MHz / 4x758-798MHz / 2x824-894MHz /8x1695-2400MHz

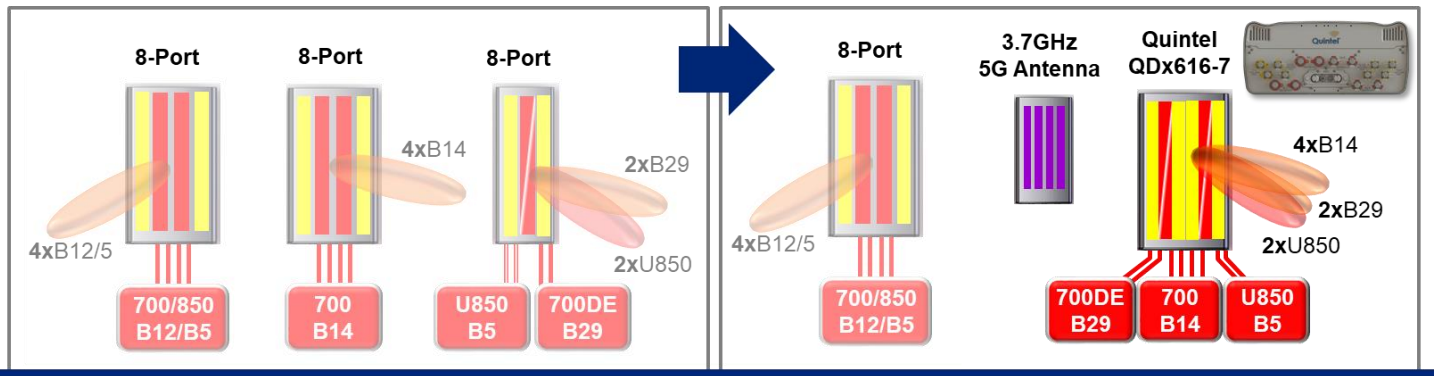
- Allows B29 and B5 services to share same antenna with B14
- Frees up an Antenna position at sites for 3.7GHz Antenna
- B29/B14 Cross-Band Internal PIM > 159dBc

- Full length Low & High-band Arrays for optimal VBW and Gain
- Best in class Quality, Internal and External PIM performance
- Rooftop Optimized using Patented Feed network

Electrical Characteristics	Ports 1 2	Ports 3 4 5 6	Ports 7 8	Ports 9 - 16			
Polarization	±45°	2x ±45°	±45°	4x ±45°			
Operating Frequency (MHz)	698-728	758-798	824-894	1695-2400			
	698-728	758-798	824-894	1695-1880	1850-1990	2110-2180	2300-2400
Gain (dBi)	14.2	14.7	15.1	16.7	17.2	17.7	18.4
Azimuth beamwidth[1]	71±6.6°	65±4.6°	64±5.8°	70±6.5°	67±5.2°	62±4.5°	61±4.6°
Electrical down-tilt range	2°-14°	2x 2°-14°	2°-14°	2x 0°–9°			
Elevation beamwidth[1]	12.5±0.7°	11.3±0.4°	10.3±0.8°	7.0±0.4°	6.5±0.4°	5.7±0.2°	5.1±0.2°
BASTA Gain (dBi)	13.8±0.6	14.4±0.5	14.6±0.7	16.3±0.6	16.9±0.5	17.4±0.6	18.2±0.4
Min Tilt	14.3	14.5	14.9	16.3	16.9	17.3	18.1
Mid Tilt	13.9	14.6	14.8	16.4	17.0	17.4	18.3
Max Tilt	13.1	14.1	14.0	16.3	16.8	17.3	18.1
USLS 20°>mainbeam (dB)	11.4	11.8	11.5	11.7	12.4	15.6	14.6
FTB at 180°±30° (dB)[1]	18.4	17.6	17.8	28.2	28.2	28.8	28.0
Isolation Port to Port (dB)	36	35	36	35	35	37	37
Return loss/VSWR (dB)	14/1.5	14/1.5	14/1.5	14/1.5	14/1.5	14/1.5	14/1.5
X Polar at 0° (dB)[1]	17.6	15.5	15.3	18.6	18.6	18.8	19.3
Max Power handling (port)	75 Watts	100 Watts	200 Watts	250 Watts			
Max Power (all ports)	900 Watts						
PIM (dBc: 2x43dBm)	>153 (>159 X-Band B29/B14)			>153			

[1] *BASTA*





Application Example: Allows 3.7GHz deployment maintaining 3x Antenna Positions with all services

QD6616-7

6ft 65° MultiServ™ 16-Port Antenna

2x698-728MHz / 4x758-798MHz / 2x824-894MHz /8x1695-2400MHz

Mechanical Characteristics

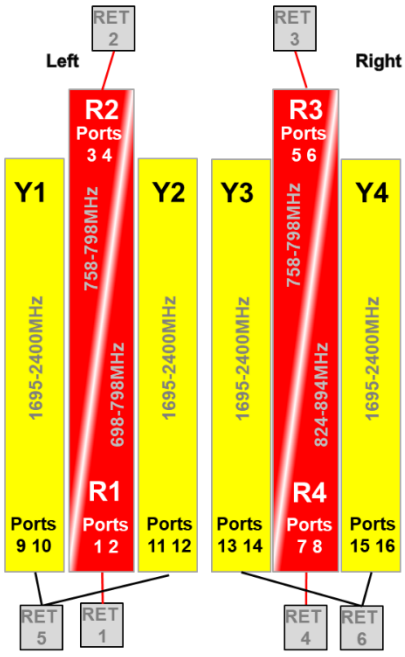
Dimensions	L 72”(1828mm) x W 22”(558mm) x D 9.6”(245mm)
Weight (excl mounting brackets)	114lbs (51.8kg)
No. of Connectors	16x 4.3-10.0 DIN Female Long Neck
Max Wind Speed	150mph (67m/s)
Equivalent Projected Area[2]	Front: 9.5ft² (0.89m²) Side: 3.1ft² (0.28m²)
Wind Load[2] @161km/h (45m/s)	Front: 243lbs (1081N), Side: 78lbs (348N)
Operating Temperature	-40°C to +65°C

[2] Equivalent Projected Area and Wind Load derived from simulation measurements. Equivalent Projected Area assumed C_d=1

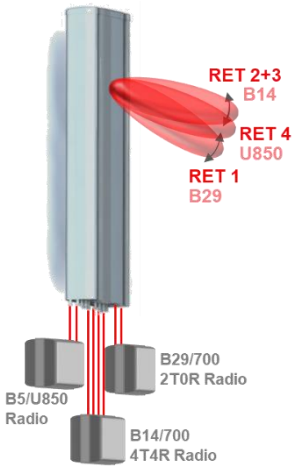
Fully Integrated RET Characteristics

Protocol	V 1.1/2.0/3GPP (SRET Type 1)
Surge immunity	IEC 61000-4-5:2005 4KV(AISG PIN)
AISG Data rate	9.6 kbps
RET Connectors	1x 8-Pin DIN Female & 1x 8-Pin DIN Male

Port Layout, Array Configuration and RET ID



RET ID	Ports				Arrays				Freq Range
1	1	2			R1				698-728MHz
2	3	4			R2				758-798MHz
3			5	6			R3		758-798MHz
4			7	8			R4		824-894MHz
5	9	10	11	12	Y1	Y2			1695-2400MHz
6	13	14	15	16			Y3	Y4	1695-2400MHz



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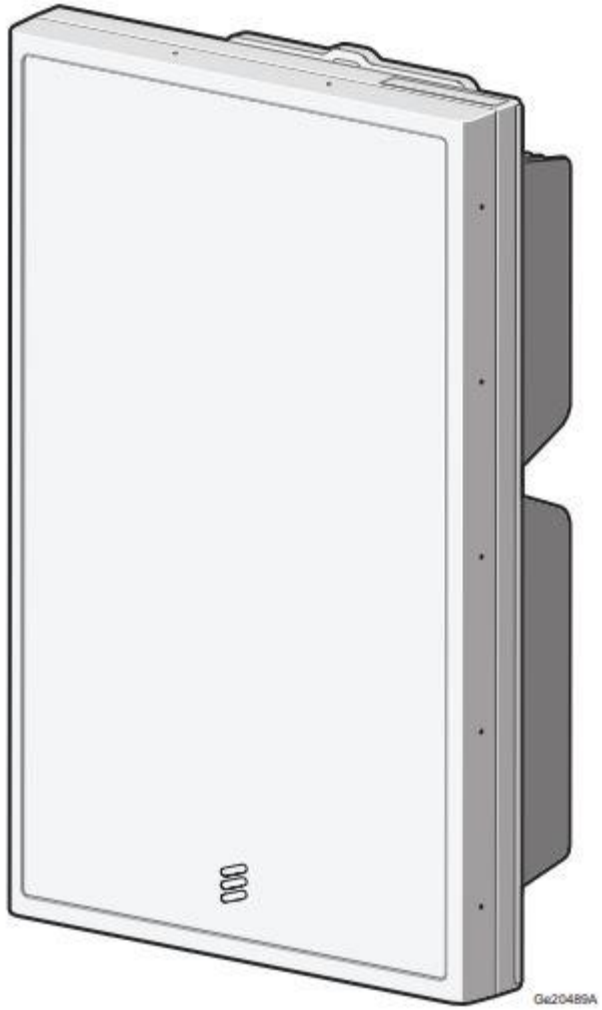
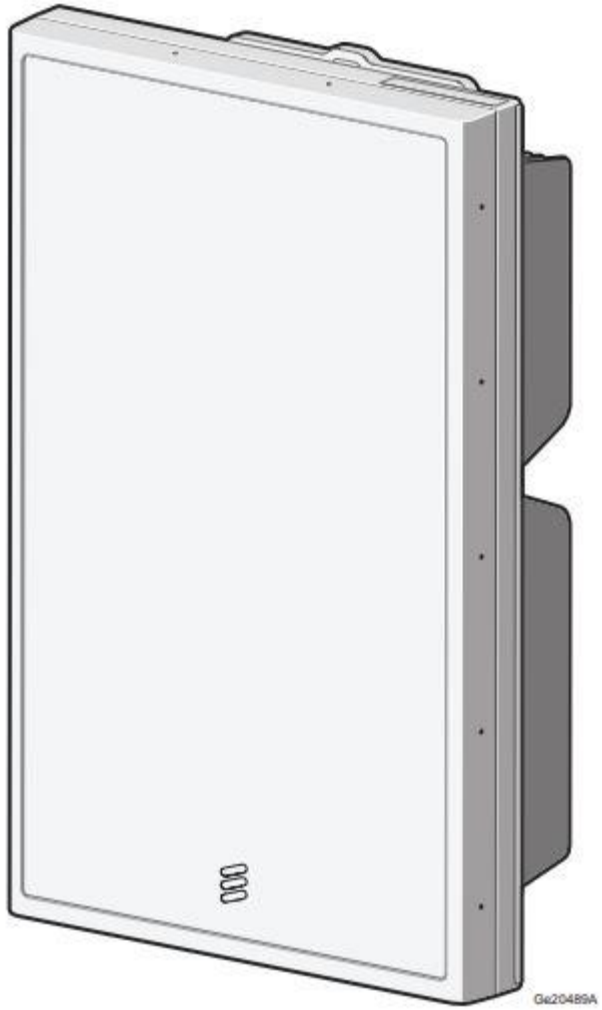
ERICSSON AIR 6419 B77G

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



ERICSSON AIR 6449 B77

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



TMA2117F00V1-1

PCS / WCS Dual Band Twin TMA, with 700/850 bypass, AISG2.0

Designed to be deployed in co-located PCS & WCS systems with wideband antennas, the Kaelus TMA provides internal diplexing and gain in both bands while allowing 700/850 services to pass through to a separate antenna, thereby saving hardware costs.

PRODUCT FEATURES

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

TECHNICAL SPECIFICATIONS

Downlink Path, Band 1	PCS
Passband	1930 - 1990
Insertion Loss	0.5dB typ
Return Loss	18dB min
Max Average input power (W)	160
Max PEP Input Power (W)	2000
Intermodulation, 2 x 43dBm TX carriers (dBc)	-153dBc max
Uplink Path, Band 1	
Passband	1850 - 1910
Gain (dB)	3dB to 13dB in 1dB steps
Gain window	+/- 1dB max
Return Loss (Operating)	18dB min
Return Loss (Bypass)	12dB min
Noise Figure	1.4dB typ
Bypass Loss	2.5dB typ

Supply Current, alarm mode	320 +/- 30mA per port (programmable)

AISG MODE OF OPERATION (AUTO SELECTED ON VALID AISG 2.0 FRAMES)

AISG Version	2
AISG Supply Current	400mA @ 8.5V, 120mA @ 30V typical
AISG Connector	IEC60130-9, 8-pin female
AISG Connector Current rating	< 4A peak, 2A continuous, pin 6
Field firmware upgradable	Yes

ENVIRONMENTAL

Temperature range	-40ºC to +65ºC | -40º to +149ºF
Environmental sealing	IP67
Lightning protection	RF port: +/- 5kA max (8/20us), AISG port: +/- 2kA max (8/20us) IEC61312-1
MTBF	>1,000,000 hours
Compliance	EMC:EN301 489, Ingress ETSI EN 300 019 class 4.1, RoHS

MECHANICAL

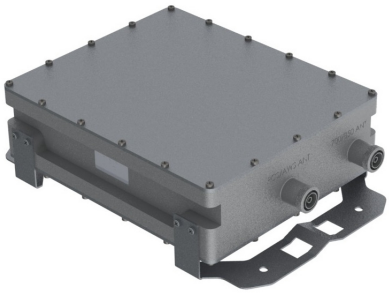
Connectors	DIN 4.3-10 (F) x 8 long shank, AISG (F) x 1
Dimensions, H x D x W	216 x 300 x 107mm | 8.46 x 11.81 x 4.21in
Finish	Powder coated, light grey (RAL7035)
Weight	8 kg | 17.6lbs est
Mounting	Pole / wall bracket supplied with two metal clamps for 45-178 mm diameter poles

ELECTRICAL BLOCK DIAGRAM

Triple Band (AWS/PCS/WCS) Twin TMA with 700/850 Bypass

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information



CCI's Triple Band TMA with 700/850 bypass contains two triple band TMA's in a single housing. The TMA's are fully duplexed and share a single LNA for all three bands. The bypass path provides excellent isolation to the TMA path. Separate antenna ports for the bypass path and TMA path are combined onto a single BTS port. Low noise high linearity amplifiers improve the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports CDMA, EDGE/GSM, UMTS and LTE BTS equipment. The TMA is ideally suited for sites upgraded to quad-band using the existing infrastructure. The TMA allows the sharing of feeder lines for both AWS and PCS bands thus reducing tower loading, leasing, and installation costs. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Model TMABPDB7823VG12A

Contents:

Features:

- Small lightweight unit
- Triple Band (AWS/PCS/WCS) Twin TMA with 700/850 Bypass
- Independent Gain Control
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

The TMA system is an outdoor quad band tower mount unit which provides low noise amplification of PCS, AWS, and WCS uplink signals combined with 700/850 bypassed signals from separate antenna ports to a common BTS port. The tower mount unit consists of 14 band-pass filters, two redundant low noise amplifiers (LNA) with bypass failure circuitry, two bias tees, AISG control circuitry, and lightning protection circuitry all housed in an IP68 enclosure suited to long life masthead mounting. The AWS, PCS and WCS paths are dual duplexed to separate the low power uplink signals from the high power down link signals at the BTS and antenna ports. The AWS, PCS, and WCS uplink signals are amplified with a dedicated ultra-low noise PHEMT LNA with adjustable gain control. The unit provides protection against lightning strikes via a multistage surge protection circuit. DC power and AISG 2.0 control is provided via the BTS feeder cable. The unit operates in current window alarm (CWA) mode until a valid AISG message is detected, at which point it automatically switches to AISG mode. Once in AISG mode, the unit can only switch back to CWA mode with the receipt of an AISG CCI vendor defined command. In CWA mode, the unit requires 12VDC at each BTS port and follows typical current window convention. In AISG mode, the unit will accept 10-30 VDC from either BTS port. In AISG mode, the unit does not require an AISG 2.0 compatible site control unit (SCU) and may also be powered by a standard power distribution unit (PDU).

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

CCI Triple Band (AWS/PCS/WCS) Twin TMA with 700/850 Bypass Typical Specifications

Description	Typical Specifications			
Electrical Specifications	**700/850**	**PCS**	**AWS**	**WCS**
Receive Frequency Range	-	1850 – 1910 MHz	1710 – 1755 MHz	2305 – 2320 MHz
Transmit Frequency Range	-	1930 – 1990 MHz	2110 – 2155 MHz	2345 – 2360 MHz
Bypass Frequency Range	698 - 894 MHz	-	-	-
Amplifier Gain	-	6 to 12 dB Adjustable in 0.25 dB steps via AISG	6 to 12 dB Adjustable in 0.25 dB steps via AISG	6 to 12 dB Adjustable in 0.25 dB steps via AISG
Gain Variation	-	±1.0 dB	±1.0 dB	±1.0 dB
System Noise Figure	-	1.4 dB Typ.	1.3 dB Typ.	1.3 dB Typ.
Input Third Order Intercept Point	-	+12 dBm Min at Max. Gain		
Input / Output Return Loss	18 dB Min all ports, 12 dB Min. Bypass Mode			
Insertion Loss	0.25 dB Typ.			
Transmit Passband	-	0.5 dB Typical	0.4 dB Typical	0.4 dB Typical
Bypass Mode, (PCS/AWS/WCS) Rx Passband	-	2.5 dB Typ.	2.5 dB Typ.	2.5 dB Typ.
Filter Characteristics				
Continuous Average Power	200 Watts max			
Peak Envelope Power	2 KW max			
Intermodulation Performance				
IMD at ANT port in Rx Band	< -112 dBm (-155 dBc) [2 tones at +43 dBm]			
Operating Voltage	+10V to +30V DC provided via coax or AISG			
Power Consumption	<2.0 Watts			
Mechanical Specifications				
Connectors	DIN 7-16 female x 2; AISG x 1			
Dimensions (Body Only)	10.63” (H) x 11.024” (W) x 3.72” (D); (290.60 (H) x 280.00 (W) x 95.0 (D) mm)			
Dimensions (with Conn. & Bracket)	14.25” (H) x 11.024” (W) x 4.11” (D); (362.00 (H) x 280.00 (W) x 104.40 (D) mm)			
Weight	23.1 Lbs. (10.5 Kg) - with Brackets; 22 Lbs. (10 Kg) - without brackets			
Mounting	Pole/Wall Mounting Bracket			
Environmental Specifications				
Operating Temperature	-40˚ C to +65˚C			
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5			
Enclosure	IP68			
MTBF	>500,000 hours			

All specifications are subject to change. The latest specifications are available at www.cciproducts.com

DATA SHEET

DC Surge Protection Solutions

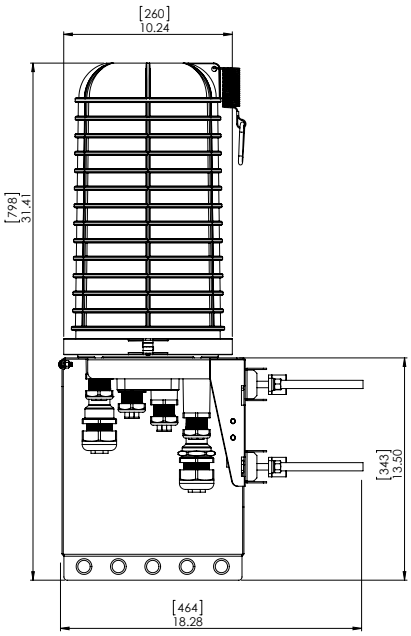
DC6-48-60-18-8C-EV

Overvoltage Protection and Fiber Distribution/Cable Management Solution

Rooftop / Towertop

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

powered by **Strikesorb®**



Features

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

Benefits

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

G02-01-203 180122

Raycap

www.raycap.com

SPECIFICATIONS

DC Surge Protection Solutions

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

Overvoltage Protection and Fiber Distribution/Cable Management Solution

powered by **Strikesorb®**

Electrical

Model Number		DC6-48-60-18-8C-EV
CEQ / ANT Number		CEQ.18537
Number of Circuits Protected		6
Surge Protective Device (SPD) Type per UL 1449 4th Edition		Type 2
Surge Protection Class as per IEC 61643-11		Class I
Nominal Operating DC Voltage [U_n]		48 V
Nominal Discharge Current [I_n] per UL 1449 4th Edition		20 kA 8/20 µs
Maximum Surge Current [I_{max}] per IEC 61643-11		90 kA 8/20 µs
Maximum Impulse (Lightning) Current [I_{imp}] per IEC 61643-11		12.5 kA 10/350 µs
Maximum Continuous Operating DC Voltage [U_c] (MCOV)		60 VDC
Voltage Protection Level [U_p] per IEC 61643-11		160 V
Voltage Protection Rating (VPR) per UL 1449 4th Edition		330 V
Suppression Technology		MOV
Strikesorb Module Type 2CA (UL 1449 4th edition)		30-V1-EV
Protection Modes:	Normal Mode	-48V to Return
	Common Mode	Return to Ground

Mechanical

Connection Terminal (Alarm) Method		Form C Hardwired, #22 to #12 AWG [0.34 to 4 mm²]
Connection Terminal (Suppression) Method (for all power cables)		Compression lug 2 hole, #10, 5/8 pitch, #12 – #4 AWG [3.3 – 21.15 mm²]
Connection Terminal (Terminal Block) Method	Copper	#12 to #4 AWG [3.3 – 21.15 mm²]
Fiber Connection Method		LC-LC Single Mode
Environmental Ingress Protection (IP) Rating		IP 68
Operating Temperature (°C)		-40° C to +100° C
Storage Temperature (°C)		-70° C to +80° C
Cold Temperature Cycling IEC 61300-2-22		-30° C to +60° C 200 hrs @5 PSI
Resistance to Aggressive Materials CEI IEC 61073-2		Including Acids and Bases
UV Protection ISO 4892-2 Method A		Xenon-Arc 2160 hrs
Enclosure Type		Outdoor NEMA 4X
Enclosure Dimensions (L x W x H)		18.28" x 10.24" x 31.4" [464 x 260 x 797 mm]
Weight*		System: 16.0 lbs [7.25 kg] Mount: 10.2 lbs [4.62 kg] Total: 26.2 lbs [11.87 kg]
Combined Wind Loading	Sustained	150 mph Sustained: 105.7 lbs [470 N]
	Gust	195 mph Gust: 213.6 lbs [950 N]

Standards Compliance & Certifications

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

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

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

Certifications: UL, VDE, CE

AWG=American Wire Gauge

January 8, 2024

Tarah Nolan
SAI Communications
12 Industrial Way
Salem, NH 03079

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
CS-SP@tepgroup.net

Subject: **Appurtenance Mount Analysis**

Carrier Designation:	***AT&T* Reconfiguration**	
	Site Name:	Bethel Stony Hill-AWS
	FA Number:	10071269
Engineering Firm Designation:	**TEP Project Number:**	315631.914611
Site Data:	**7 Stony Hill Road, Bethel, Fairfield County, CT 06801** **Latitude *41° 24' 56.85"*, Longitude *-73° 24' 06.11"*** **148.0± Foot - Transmission Pole** **145.0 Foot Mount Height - 12.5-ft T-Arm w/ Support Rails**	

Dear Tarah Nolan,

Tower Engineering Professionals is pleased to submit this **"Appurtenance Mount Analysis"** to determine the structural integrity of the antenna mount on the above-mentioned transmission pole.

The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level for the mount structure, under the following load case, to be:

LC1: Existing + Proposed Loading **Sufficient Capacity - 81.4%**
Note: See Table 2 for the existing and proposed loading

The analysis has been performed in accordance with the ANSI/TIA-222-H Structural Standard for Antenna Supporting Structures, Antennas, and Small Wind Turbine Support Structures, the 2022 Connecticut State Building Code.

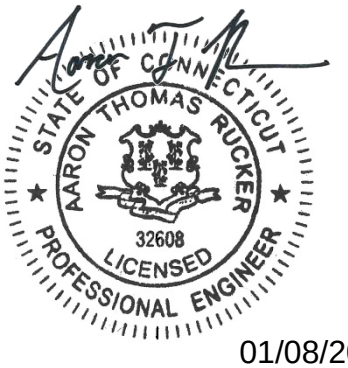
All equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 2 for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *SAI Communications.* If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: Matthew T. Weavil, P.E. / CLT

Respectfully submitted by:

Aaron T. Rucker, P.E.



01/08/2024

ANALYSIS CRITERIA

Table 1 - Mount Analysis Parameters

Ultimate Wind Speed (MPH)	Ice Thickness (in)	Ice Wind Speed (MPH)	Exposure Category	Risk Category	Topo Category	Crest Height (ft.)	Seismic Design Category
115	***1.0***	***50***	***C***	***II***	***1.0***	***N/A***	***B***

Table 2 - Existing and Proposed Antenna Loading Configuration

Existing/ Proposed	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Owner/ Tenant
Existing	145.0	145.0	3	Quintel QS66512-2	RMV12-396 w/ Support Rails	AT&T
			6	Kaelus TMABPD7823VG12A		
			6	Kaelus TMA2117F00V1-1		
To Be Removed	*145.0*	*145.0*	*3*	*Powerwave P65-16-XLH-RR*	-	*AT&T*
			3	*CCI Antenna HPA65R-BU6A*		
			6	*Powerwave LPG21401*		
Proposed	***145.0***	***145.0***	***3***	***Ericsson AIR 6449 B77D***	-	***AT&T***
			3	***Ericsson AIR 6419 B77G***		
			3	***Quintel QD6616-7***		
			1	***Raycap DC6-48-60-18***		

ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity

Notes	Component	% Capacity	Pass / Fail
1,2	Face Horizontals	78.2	Pass
1,2	Support Rails	35.9	Pass
1,2	Support Arms	49.1	Pass
1,2	Mount Pipes	81.4	Pass
1,3	Connection Bolts	38.8	Pass
1,3	Connection Plate	27.2	Pass

Notes:
1) Rating per TIA-222-H, Section 15.5
2) See additional documentation in “Appendix A - RISA-3D Output” for calculations supporting the % capacity listed.
3) See additional documentation in “Appendix B - Additional Calculations” for calculations supporting the % capacity listed.

Table 4 - Documents Provided

Document	Remarks	Source
Mount Assembly Drawings	Site Pro 1 RMV12-XXX	TEP
Construction Drawings	Maser Consulting, dated December 11, 2023	TEP
Correspondence	Correspondence from AT&T in reference to the existing and proposed loading RFDS dated December 1, 2023	SAI

RECOMMENDATIONS

1) If the load differs from that described in Table 2 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The mount has sufficient capacity to carry the existing and proposed loading. No modifications are required at this time.

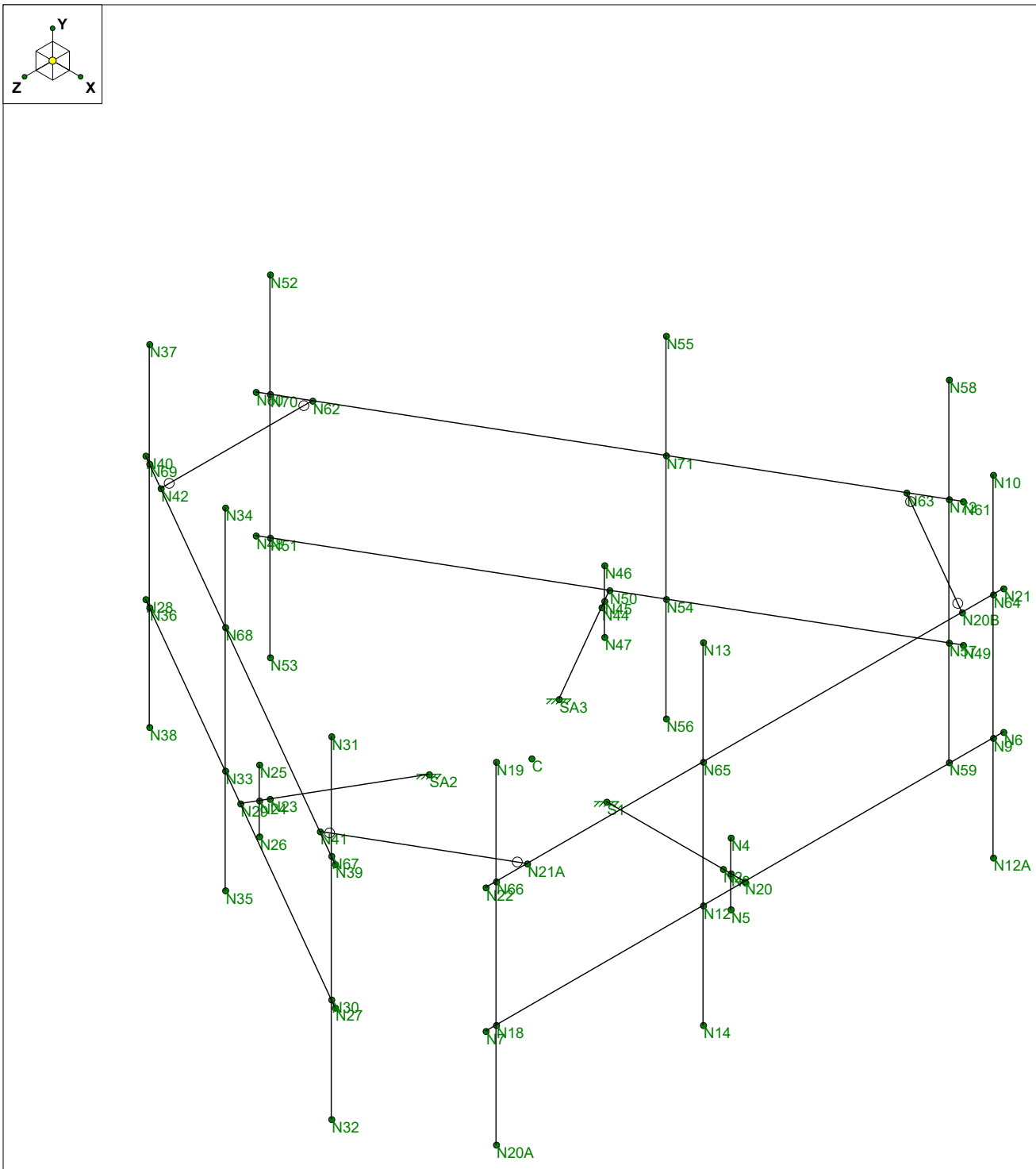
ANALYSIS ASSUMPTIONS

1) The mount was built in accordance with the manufacturer's specifications.
2) The mount has been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Table 2. All mount components have been assumed to be in sufficient condition to carry their full design capacity for this analysis. Refer to the issued mapping for any structural and/or maintenance issues found during our site visit.
4) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
5) TEP did not analyze the collar mount connection to the pole and assumes it to have sufficient structural capacity to transfer the applied forces from the mount to the tower.
6) All material grades used for this analysis, unless verified by mount manufacturer design, were assumed per AISC Table 2-4, 15th Edition. See RISA 3-D output for confirmation on grades used in this analysis.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the mount.

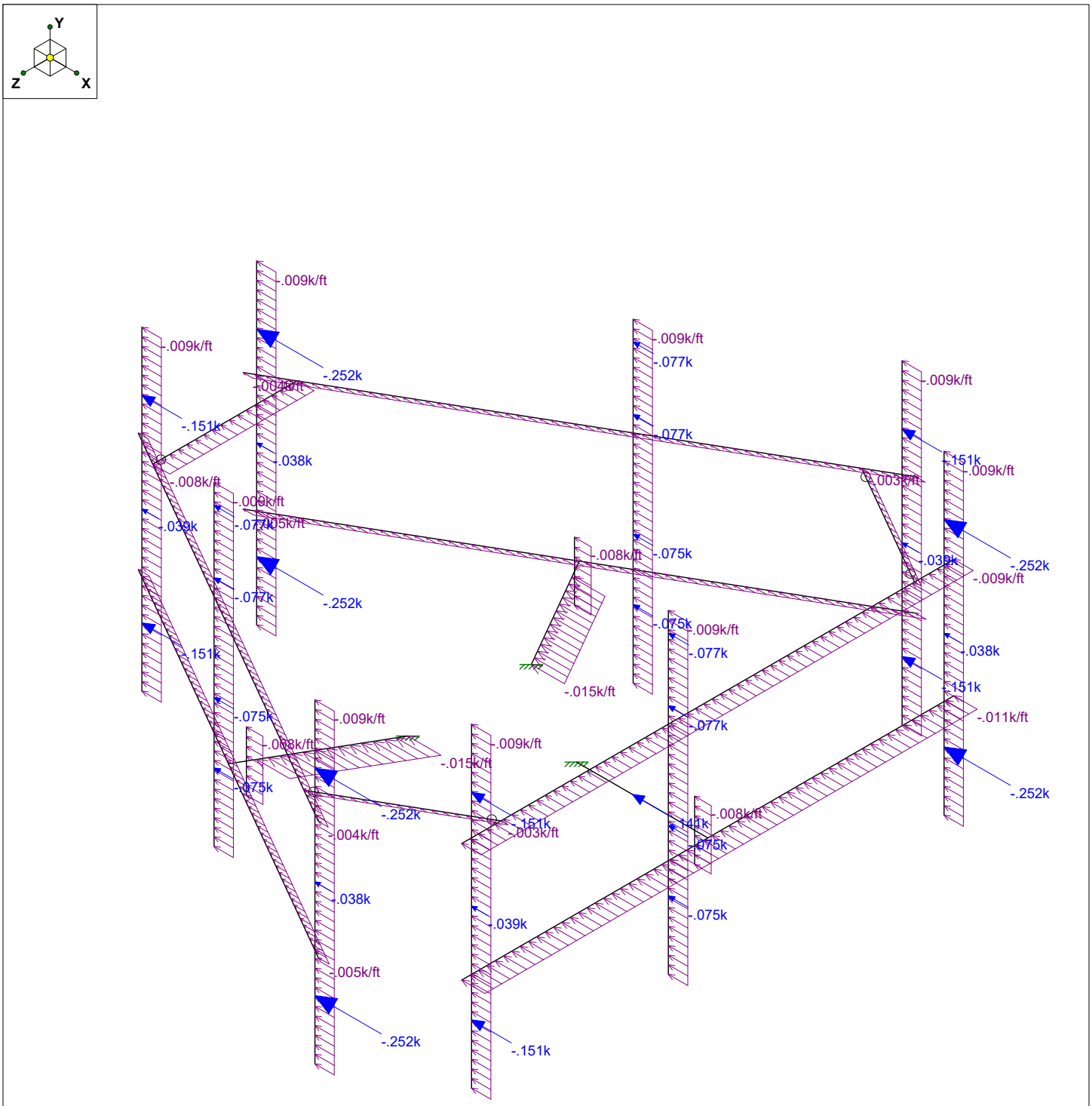
APPENDIX A

RISA-3D OUTPUT



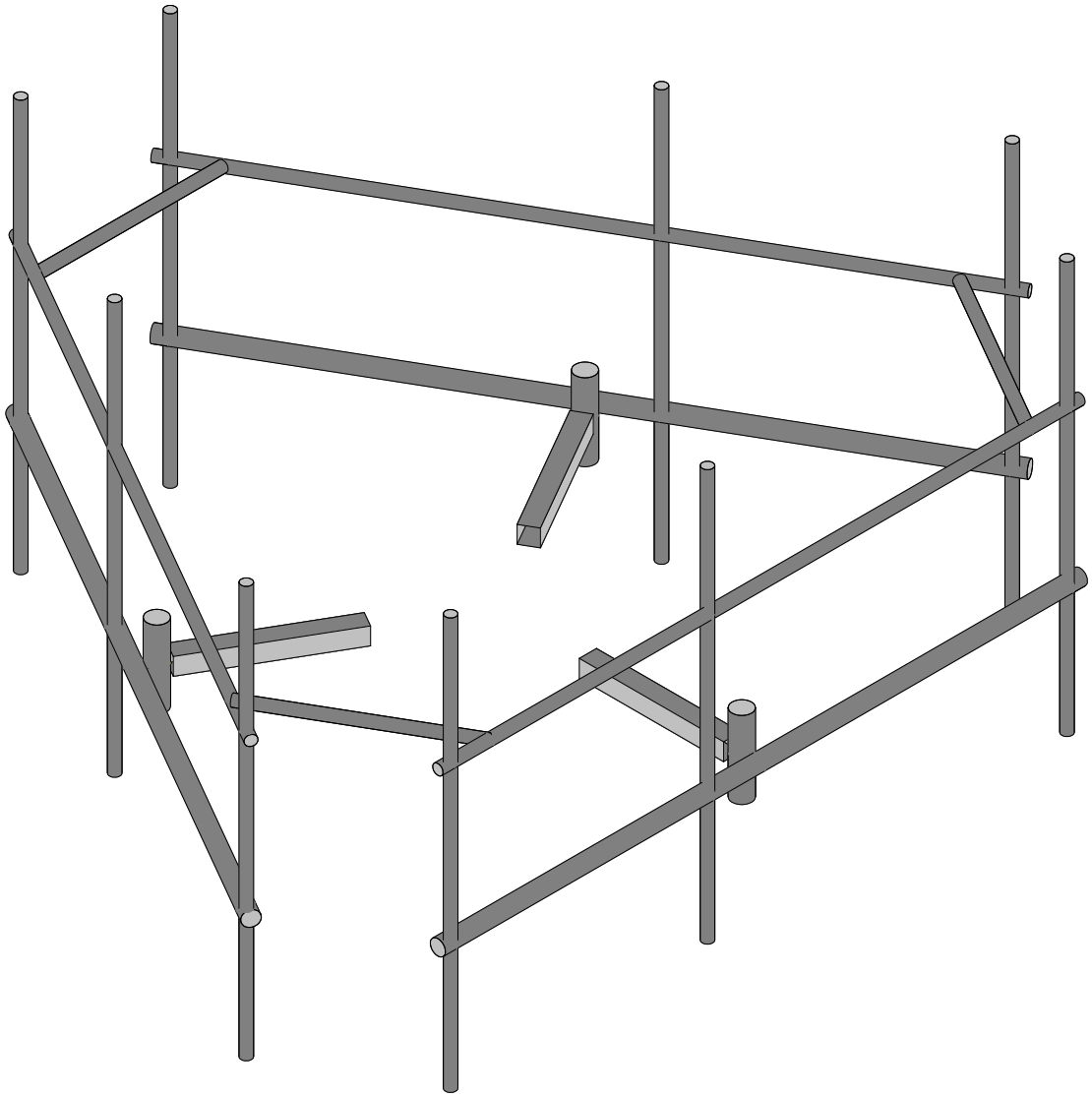
Envelope Only Solution

Tower Engineering Profes...	CTL05176 - Bethel Stony Hill-AWS	1
MTW		Jan 8, 2024 at 11:15 AM
TEP No. 315631.914611		Site Pro 1 RMV12-396.r3d



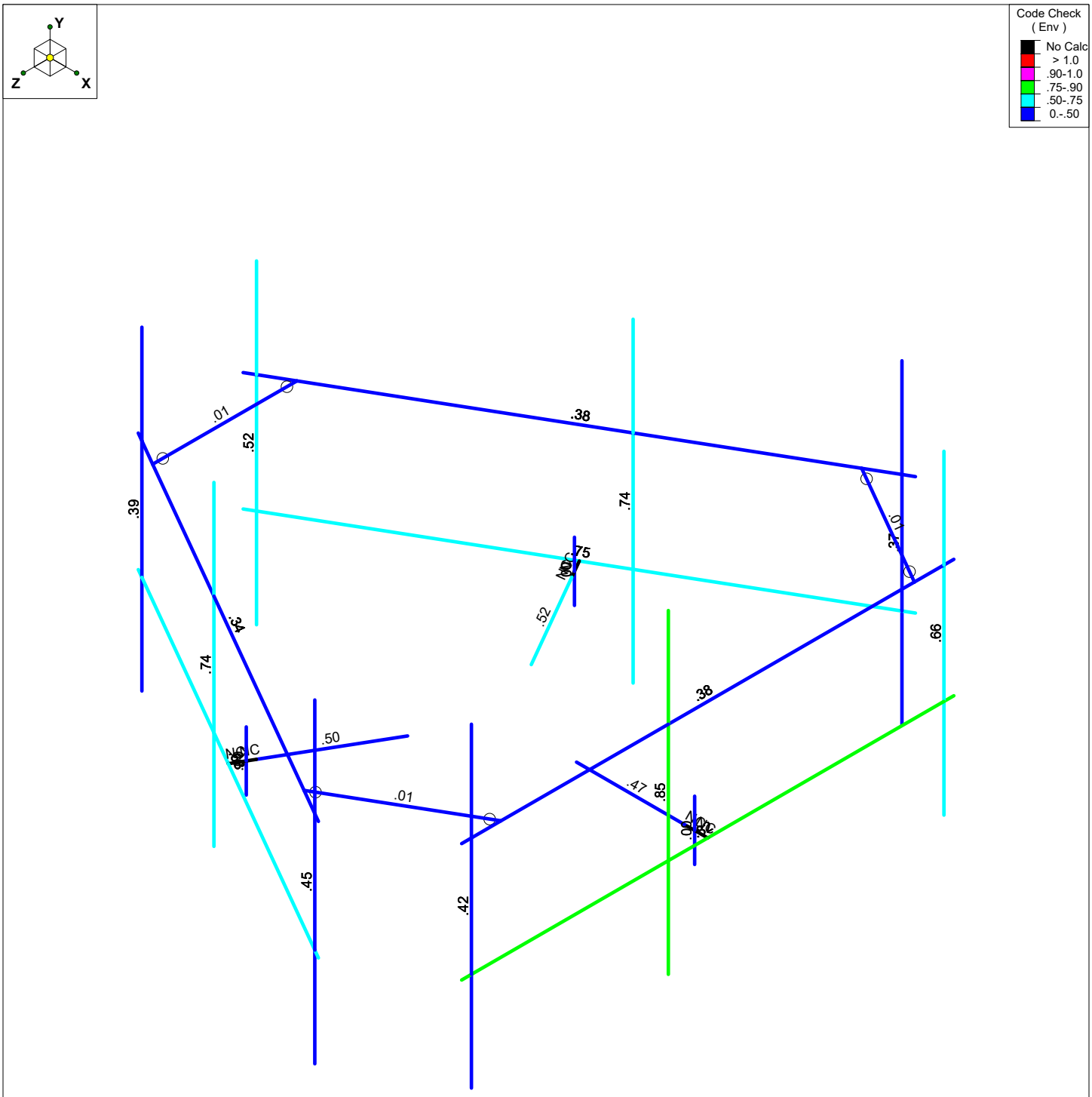
Loads: BLC 2, 0 Wind - No Ice
Envelope Only Solution

Tower Engineering Profes...		2
MTW	CTL05176 - Bethel Stony Hill-AWS	Jan 8, 2024 at 11:15 AM
TEP No. 315631.914611		Site Pro 1 RMV12-396.r3d



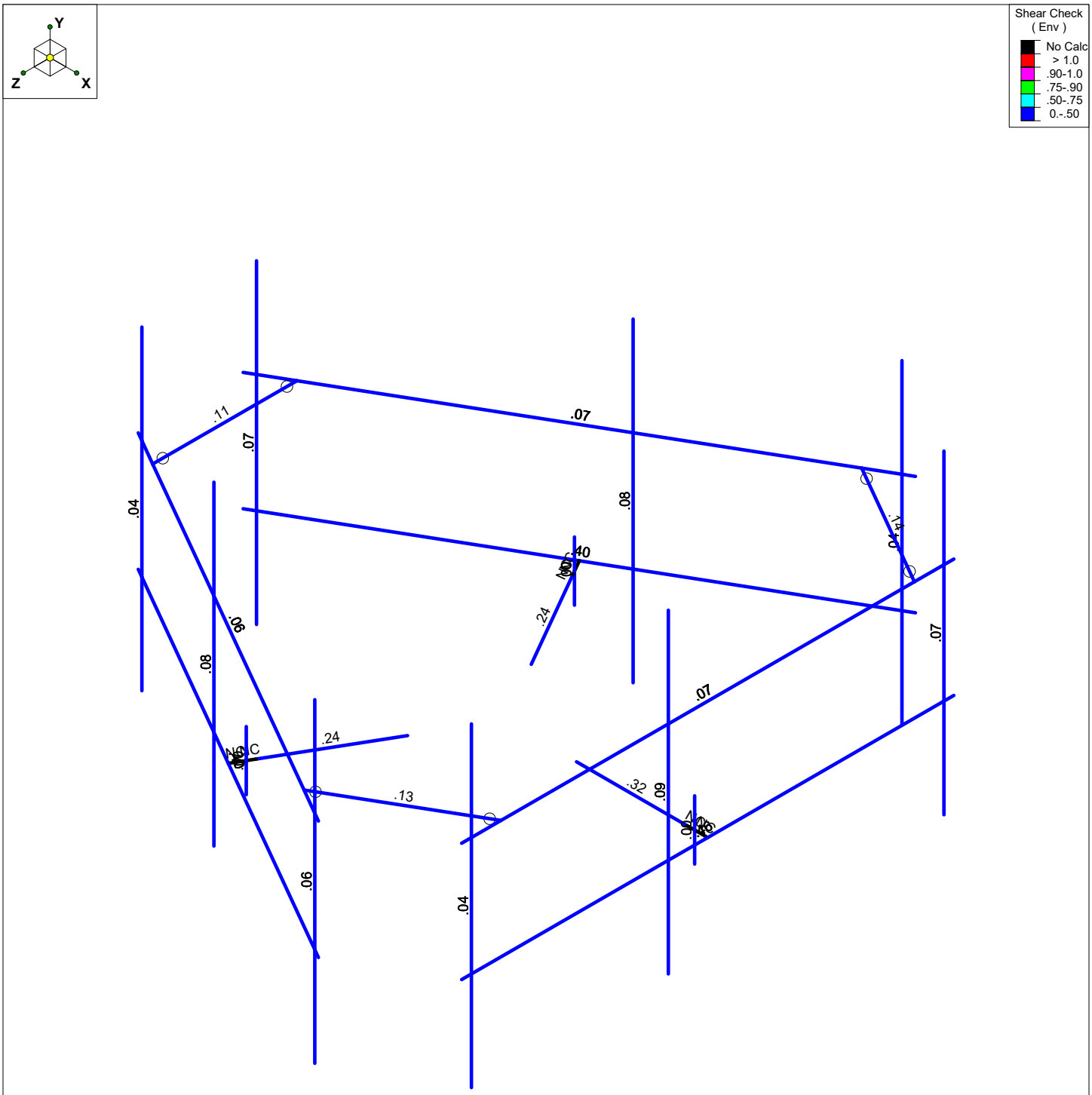
Envelope Only Solution

Tower Engineering Profes...	CTL05176 - Bethel Stony Hill-AWS	3
MTW		Jan 8, 2024 at 11:16 AM
TEP No. 315631.914611		Site Pro 1 RMV12-396.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Tower Engineering Profes...	CTL05176 - Bethel Stony Hill-AWS	4
MTW		Jan 8, 2024 at 11:16 AM
TEP No. 315631.914611		Site Pro 1 RMV12-396.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Tower Engineering Profes...	CTL05176 - Bethel Stony Hill-AWS	5
MTW		Jan 8, 2024 at 11:16 AM
TEP No. 315631.914611		Site Pro 1 RMV12-396.r3d

TOWER ENGINEERING PROFESSIONALS

CTL05176 - Bethel Stony Hill-AWS

TEP No.	315631.914611	
Analysis By:	MTW	1/8/2024
Checked By:	CLT	1/8/2024

Code Revisions:	TIA-222-H	IBC 2021
Tower Type:	Monopole	

Wind Inputs:

Ult. Wind Velocity:	115	mph
Live Load Velocity:	30	mph
Ice Wind Velocity:	30	mph
Base Ice Thickness:	1.00	inches
Mount Centerline:	145.0	ft
Antenna Centerline:	145.0	ft
Exposure Category:	C	
Topo Category:	1	
Risk Category:	II	
Ground Elevation:	421	ft

Wind Calculations:

K_{zt}:	1.000	Section 2.6.6
K_d:	0.950	
$K_{z\text{-}Mount}$:	1.369	Section 2.6.5.2
$K_{z\text{-}Antenna}$:	1.369	Section 2.6.5.2
K_{iz}:	1.160	Section 2.6.10
Ice Thickness:	0.986	inches - Section 2.6.10
$K_{es\text{-}wind}$:	0.95	Annex S (Table S-1)
$K_{es\text{-}ice}$:	0.85	Annex S (Table S-1)
K_e:	0.985	Table 2-6

Without Ice - (psf)		With Ice - (psf)	
$(q_zG_h)_{Mount}$:	41.19	**$(q_zG_h)_{Mount}$:**	2.95
$(q_zG_h)_{Antenna}$:	41.19	**$(q_zG_h)_{Antenna}$:**	2.95

Seismic Code Revisions:	TIA-222-H	
Seismic Risk Category:	II	

Seismic Input

S_{DS}:	0.232	Design Short Period Spectral Accel.
I_p:	1.0	Importance Factor
R_p:	2.0	Response Modification Factor
ρ:	1.0	
A_s:	1.0	Applification Factor - TIA-222-H Section 2.7.8.1
S_1:	0.056	Spectral Acceleration at a Period of 1 Second

Seismic Design Force — TIA-H Sec 2.7.7.1.1

Cs:	0.116	kips/kip	TIA-H Sec 2.7.7.1.1
Cs-min:	0.030	kips/kip	

Antenna Loads are Calculated in Accordance with TIA-222-H

Azimuth is the absolute angle measured clockwise from RISA-3D global X-axis.

										Distance from start node of the member		
MFR	**Model**	**Height (in)**	**Width (in)**	**Depth (in)**	**Wt. (lbs)**	**Azimuth°**	**Qty**	**Shape**	**Member Label**	**Location #1 (ft,%)**	**Location #2 (ft,%)**	**Location #3 (ft,%)**
Quintel	QD6616-7	72.00	22.00	9.60	59.10	0.00	1	Flat	MP-1	1.50	6.50	
Ericsson	AIR 6419 B77G	31.10	16.10	7.30	44.00	0.00	1	Flat	MP-2	0.50	2.09	
Ericsson	AIR 6449 B77D	30.60	15.90	10.60	81.60	0.00	1	Flat	MP-2	4.73	6.28	
Quintel	QS66512-2	72.00	12.00	9.60	111.00	0.00	1	Flat	MP-3	1.50	6.50	
Kaelus	TMABPD7823VG12A	14.22	11.56	4.24	26.00	90.00	2	Flat	MP-1	4.00		
Kaelus	TMA2117F00V1-1	12.48	11.81	5.00	17.60	90.00	2	Flat	MP-3	4.00		
Quintel	QD6616-7	72.00	22.00	9.60	59.10	0.00	1	Flat	MP-4	1.50	6.50	
Ericsson	AIR 6419 B77G	31.10	16.10	7.30	44.00	0.00	1	Flat	MP-5	0.50	2.09	
Ericsson	AIR 6449 B77D	30.60	15.90	10.60	81.60	0.00	1	Flat	MP-5	4.73	6.28	
Quintel	QS66512-2	72.00	12.00	9.60	111.00	0.00	1	Flat	MP-6	1.50	6.50	
Kaelus	TMABPD7823VG12A	14.22	11.56	4.24	26.00	90.00	2	Flat	MP-4	4.00		
Kaelus	TMA2117F00V1-1	12.48	11.81	5.00	17.60	90.00	2	Flat	MP-6	4.00		
Quintel	QD6616-7	72.00	22.00	9.60	59.10	0.00	1	Flat	MP-7	1.50	6.50	
Ericsson	AIR 6419 B77G	31.10	16.10	7.30	44.00	0.00	1	Flat	MP-8	0.50	2.09	
Ericsson	AIR 6449 B77D	30.60	15.90	10.60	81.60	0.00	1	Flat	MP-8	4.73	6.28	
Quintel	QS66512-2	72.00	12.00	9.60	111.00	0.00	1	Flat	MP-9	1.50	6.50	
Kaelus	TMABPD7823VG12A	14.22	11.56	4.24	26.00	90.00	2	Flat	MP-7	4.00		
Kaelus	TMA2117F00V1-1	12.48	11.81	5.00	17.60	90.00	2	Flat	MP-9	4.00		
Raycap	DC6-48-60-18	27.40	16.70	5.50	48.00	0.00	1	Flat	SF-H1	1.42		

Member Forces are Calculated in Accordance with TIA-222-H

Member Name	Wind Proj. (in)	Length (in)	Shape	θ (°)	Perimeter (in)
FFBH1	3.500	150.00	Round	90.00	11.00
MP-1	2.375	96.00	Round		7.46
MP-2	2.375	96.00	Round		7.46
MP-3	2.375	96.00	Round		7.46
SF-H1	4.000	33.75	Flat	0.00	16.00
SF-V1	4.500	18.00	Round		14.14
SR1	2.375	150.00	Round	90.00	7.46
FFBH2	3.500	150.00	Round	-30.00	11.00
MP-4	2.375	96.00	Round		7.46
MP-5	2.375	96.00	Round		7.46
MP-6	2.375	96.00	Round		7.46
SF-H2	4.000	33.75	Flat	60.00	16.00
SF-V2	4.500	18.00	Round		14.14
SR2	2.375	150.00	Round	-30.00	7.46
FFBH3	3.500	150.00	Round	30.00	11.00
MP-7	2.375	96.00	Round		7.46
MP-8	2.375	96.00	Round		7.46
MP-9	2.375	96.00	Round		7.46
SF-H3	4.000	33.75	Flat	-60.00	16.00
SF-V3	4.500	18.00	Round		14.14
SR3	2.375	150.00	Round	30.00	7.46
M28	2.375	43.95	Round	-30.00	7.46
M29	2.375	43.95	Round	30.00	7.46
M30	2.375	43.95	Round	90.00	7.46

(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?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
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 15th(360-16): LRFD
Adjust Stiffness?	No
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
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

Company : Tower Engineering Professionals
Designer : MTW
Job Number : TEP No. 315631.914611
Model Name : CTL05176 - Bethel Stony Hill-AWS

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(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mount Pipes	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
2	Support Horizont...	HSS4X4X4	Beam	SquareTube	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
3	Support Verticals	PIPE_4.0	Column	Pipe	A53 Gr.B	Typical	2.96	6.82	6.82	13.6
4	Face Horizontals	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
5	HRK12	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
6	Support Rail Brace	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	FFBH1	N6	N7			Face Horizontals	Beam	Pipe	A53 Gr.B	Typical
2	M8	N3	N2			RIGID	None	None	RIGID	Typical
3	M9	N3	N20			RIGID	None	None	RIGID	Typical
4	MP-1	N10	N12A			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
5	MP-2	N13	N14			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
6	MP-3	N19	N20A			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
7	SF-H1	S1	N2			Support Horizontals	Beam	SquareTube	A500 Gr.B Rect	Typical
8	SF-V1	N4	N5			Support Verticals	Column	Pipe	A53 Gr.B	Typical
9	SR1	N21	N22			HRK12	Beam	Pipe	A53 Gr.B	Typical
10	FFBH2	N27	N28			Face Horizontals	Beam	Pipe	A53 Gr.B	Typical
11	M11	N24	N23			RIGID	None	None	RIGID	Typical
12	M12	N24	N29			RIGID	None	None	RIGID	Typical
13	MP-4	N31	N32			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
14	MP-5	N34	N35			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
15	MP-6	N37	N38			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
16	SF-H2	SA2	N23			Support Horizontals	Beam	SquareTube	A500 Gr.B Rect	Typical
17	SF-V2	N25	N26			Support Verticals	Column	Pipe	A53 Gr.B	Typical
18	SR2	N39	N40			HRK12	Beam	Pipe	A53 Gr.B	Typical
19	FFBH3	N48	N49			Face Horizontals	Beam	Pipe	A53 Gr.B	Typical
20	M20	N45	N44			RIGID	None	None	RIGID	Typical
21	M21	N45	N50			RIGID	None	None	RIGID	Typical
22	MP-7	N52	N53			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
23	MP-8	N55	N56			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
24	MP-9	N58	N59			Mount Pipes	Column	Pipe	A53 Gr.B	Typical
25	SF-H3	SA3	N44			Support Horizontals	Beam	SquareTube	A500 Gr.B Rect	Typical
26	SF-V3	N46	N47			Support Verticals	Column	Pipe	A53 Gr.B	Typical
27	SR3	N60	N61			HRK12	Beam	Pipe	A53 Gr.B	Typical
28	M28	N63	N20B			Support Rail Brace	Beam	Pipe	A53 Gr.B	Typical
29	M29	N21A	N41			Support Rail Brace	Beam	Pipe	A53 Gr.B	Typical
30	M30	N42	N62			Support Rail Brace	Beam	Pipe	A53 Gr.B	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-tor...	Kyy	Kzz	Cb	Func...
1	FFBH1	Face Horizontals	12.5	6.25	6.25				2.1	2.1		Lateral
2	MP-1	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
3	MP-2	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
4	MP-3	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
5	SF-H1	Support Horizontals	2.813						2.1	2.1		Lateral
6	SF-V1	Support Verticals	1.5						2.1	2.1		Lateral
7	SR1	HRK12	12.5	11.5					2.1	2.1		Lateral
8	FFBH2	Face Horizontals	12.5	6.25	6.25				2.1	2.1		Lateral
9	MP-4	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
10	MP-5	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
11	MP-6	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
12	SF-H2	Support Horizontals	2.813						2.1	2.1		Lateral
13	SF-V2	Support Verticals	1.5						2.1	2.1		Lateral
14	SR2	HRK12	12.5	11.5					2.1	2.1		Lateral
15	FFBH3	Face Horizontals	12.5	6.25	6.25				2.1	2.1		Lateral
16	MP-7	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
17	MP-8	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
18	MP-9	Mount Pipes	8	Segment	Segment				2.1	2.1		Lateral
19	SF-H3	Support Horizontals	2.813						2.1	2.1		Lateral
20	SF-V3	Support Verticals	1.5						2.1	2.1		Lateral
21	SR3	HRK12	12.5	11.5					2.1	2.1		Lateral
22	M28	Support Rail Brace	3.663						1	1		Lateral
23	M29	Support Rail Brace	3.663						1	1		Lateral
24	M30	Support Rail Brace	3.663						1	1		Lateral

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physic...	Defl R...	Analysi...	Inactive	Seism...
1	FFBH1						Yes				None
2	M8						Yes	** NA **			None
3	M9						Yes	** NA **			None
4	MP-1						Yes	** NA **			None
5	MP-2						Yes	** NA **			None
6	MP-3						Yes	** NA **			None
7	SF-H1						Yes	Default			None
8	SF-V1						Yes	** NA **			None
9	SR1						Yes				None
10	FFBH2						Yes				None
11	M11						Yes	** NA **			None
12	M12						Yes	** NA **			None
13	MP-4						Yes	** NA **			None
14	MP-5						Yes	** NA **			None
15	MP-6						Yes	** NA **			None
16	SF-H2						Yes				None
17	SF-V2						Yes	** NA **			None
18	SR2						Yes				None
19	FFBH3						Yes				None
20	M20						Yes	** NA **			None
21	M21						Yes	** NA **			None
22	MP-7						Yes	** NA **			None
23	MP-8						Yes	** NA **			None
24	MP-9						Yes	** NA **			None
25	SF-H3						Yes				None
26	SF-V3						Yes	** NA **			None
27	SR3						Yes				None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physic...	Defl R...	Analysi...	Inactive	Seism...
28	M28	BenPIN	BenPIN				Yes	Default			None
29	M29	BenPIN	BenPIN				Yes	Default			None
30	M30	BenPIN	BenPIN				Yes	Default			None

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distri...	Area(Member)	Surface(Plate/Wall)
1	Dead	None		-1			31			
2	0 Wind - No Ice	None					31	24		
3	30 Wind - No Ice	None					62	48		
4	45 Wind - No Ice	None					62	48		
5	60 Wind - No Ice	None					62	48		
6	90 Wind - No Ice	None					31	24		
7	120 Wind - No Ice	None					62	48		
8	135 Wind - No Ice	None					62	48		
9	150 Wind - No Ice	None					62	48		
10	180 Wind - No Ice	None					31	24		
11	210 Wind - No Ice	None					62	48		
12	225 Wind - No Ice	None					62	48		
13	240 Wind - No Ice	None					62	48		
14	270 Wind - No Ice	None					31	24		
15	300 Wind - No Ice	None					62	48		
16	315 Wind - No Ice	None					62	48		
17	330 Wind - No Ice	None					62	48		
18	Ice Weight	None					31	24		
19	0 Wind - Ice	None					31	24		
20	30 Wind - Ice	None					62	48		
21	45 Wind - Ice	None					62	48		
22	60 Wind - Ice	None					62	48		
23	90 Wind - Ice	None					31	24		
24	120 Wind - Ice	None					62	48		
25	135 Wind - Ice	None					62	48		
26	150 Wind - Ice	None					62	48		
27	180 Wind - Ice	None					31	24		
28	210 Wind - Ice	None					62	48		
29	225 Wind - Ice	None					62	48		
30	240 Wind - Ice	None					62	48		
31	270 Wind - Ice	None					31	24		
32	300 Wind - Ice	None					62	48		
33	315 Wind - Ice	None					62	48		
34	330 Wind - Ice	None					62	48		
35	Lm	None				1				
36	Lv	None				1				
37	Seismic Load X	ELX	-1				31			
38	Seismic Load Z	ELZ			-1		31			

Joint Loads and Enforced Displacements (BLC 35 : Lm)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	N9	L	Y	-.5

Joint Loads and Enforced Displacements (BLC 36 : Lv)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	N64	L	Y	-.25

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		1	1.4																				
2	0.9D+1.0 0-Wind	Yes	Y		1	.9	2	1																		
3	0.9D+1.0 30-Wind	Yes	Y		1	.9	3	1																		
4	0.9D+1.0 45-Wind	Yes	Y		1	.9	4	1																		
5	0.9D+1.0 60-Wind	Yes	Y		1	.9	5	1																		
6	0.9D+1.0 90-Wind	Yes	Y		1	.9	6	1																		
7	0.9D+1.0 120-Wind	Yes	Y		1	.9	7	1																		
8	0.9D+1.0 135-Wind	Yes	Y		1	.9	8	1																		
9	0.9D+1.0 150-Wind	Yes	Y		1	.9	9	1																		
10	0.9D+1.0 180-Wind	Yes	Y		1	.9	10	1																		
11	0.9D+1.0 210-Wind	Yes	Y		1	.9	11	1																		
12	0.9D+1.0 225-Wind	Yes	Y		1	.9	12	1																		
13	0.9D+1.0 240-Wind	Yes	Y		1	.9	13	1																		
14	0.9D+1.0 270-Wind	Yes	Y		1	.9	14	1																		
15	0.9D+1.0 300-Wind	Yes	Y		1	.9	15	1																		
16	0.9D+1.0 315-Wind	Yes	Y		1	.9	16	1																		
17	0.9D+1.0 330-Wind	Yes	Y		1	.9	17	1																		
18	1.2D+1.0 0-Wind	Yes	Y		1	1.2	2	1																		
19	1.2D+1.0 30-Wind	Yes	Y		1	1.2	3	1																		
20	1.2D+1.0 45-Wind	Yes	Y		1	1.2	4	1																		
21	1.2D+1.0 60-Wind	Yes	Y		1	1.2	5	1																		
22	1.2D+1.0 90-Wind	Yes	Y		1	1.2	6	1																		
23	1.2D+1.0 120-Wind	Yes	Y		1	1.2	7	1																		
24	1.2D+1.0 135-Wind	Yes	Y		1	1.2	8	1																		
25	1.2D+1.0 150-Wind	Yes	Y		1	1.2	9	1																		
26	1.2D+1.0 180-Wind	Yes	Y		1	1.2	10	1																		
27	1.2D+1.0 210-Wind	Yes	Y		1	1.2	11	1																		
28	1.2D+1.0 225-Wind	Yes	Y		1	1.2	12	1																		
29	1.2D+1.0 240-Wind	Yes	Y		1	1.2	13	1																		
30	1.2D+1.0 270-Wind	Yes	Y		1	1.2	14	1																		
31	1.2D+1.0 300-Wind	Yes	Y		1	1.2	15	1																		
32	1.2D+1.0 315-Wind	Yes	Y		1	1.2	16	1																		
33	1.2D+1.0 330-Wind	Yes	Y		1	1.2	17	1																		
34	1.2D+1.0Di+1.0 0-Wind Ice	Yes	Y		1	1.2	18	1	19	1																
35	1.2D+1.0Di+1.0 30-Wind Ice	Yes	Y		1	1.2	18	1	20	1																
36	1.2D+1.0Di+1.0 45-Wind Ice	Yes	Y		1	1.2	18	1	21	1																
37	1.2D+1.0Di+1.0 60-Wind Ice	Yes	Y		1	1.2	18	1	22	1																
38	1.2D+1.0Di+1.0 90-Wind Ice	Yes	Y		1	1.2	18	1	23	1																
39	1.2D+1.0Di+1.0 120-Wind ...	Yes	Y		1	1.2	18	1	24	1																
40	1.2D+1.0Di+1.0 135-Wind ...	Yes	Y		1	1.2	18	1	25	1																
41	1.2D+1.0Di+1.0 150-Wind ...	Yes	Y		1	1.2	18	1	26	1																
42	1.2D+1.0Di+1.0 180-Wind ...	Yes	Y		1	1.2	18	1	27	1																
43	1.2D+1.0Di+1.0 210-Wind ...	Yes	Y		1	1.2	18	1	28	1																
44	1.2D+1.0Di+1.0 225-Wind ...	Yes	Y		1	1.2	18	1	29	1																
45	1.2D+1.0Di+1.0 240-Wind ...	Yes	Y		1	1.2	18	1	30	1																
46	1.2D+1.0Di+1.0 270-Wind ...	Yes	Y		1	1.2	18	1	31	1																
47	1.2D+1.0Di+1.0 300-Wind ...	Yes	Y		1	1.2	18	1	32	1																
48	1.2D+1.0Di+1.0 315-Wind ...	Yes	Y		1	1.2	18	1	33	1																
49	1.2D+1.0Di+1.0 330-Wind ...	Yes	Y		1	1.2	18	1	34	1																
50	1.2D+1.5Lv	Yes	Y		36	1.5	1	1.2																		
51	1.2D+1.5Lm+1.0 0-Wind	Yes	Y		1	1.2	2	.068	35	1.5																
52	1.2D+1.5Lm+1.0 30-Wind	Yes	Y		1	1.2	3	.068	35	1.5																
53	1.2D+1.5Lm+1.0 45-Wind	Yes	Y		1	1.2	4	.068	35	1.5																
54	1.2D+1.5Lm+1.0 60-Wind	Yes	Y		1	1.2	5	.068	35	1.5																
55	1.2D+1.5Lm+1.0 90-Wind	Yes	Y		1	1.2	6	.068	35	1.5																
56	1.2D+1.5Lm+1.0 120-Wind	Yes	Y		1	1.2	7	.068	35	1.5																

Company : Tower Engineering Professionals
Designer : MTW
Job Number : TEP No. 315631.914611
Model Name : CTL05176 - Bethel Stony Hill-AWS

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Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
57	1.2D+1.5Lm+1.0 135-Wind	Yes	Y		1	1.2	8	.068	35	1.5																
58	1.2D+1.5Lm+1.0 150-Wind	Yes	Y		1	1.2	9	.068	35	1.5																
59	1.2D+1.5Lm+1.0 180-Wind	Yes	Y		1	1.2	10	.068	35	1.5																
60	1.2D+1.5Lm+1.0 210-Wind	Yes	Y		1	1.2	11	.068	35	1.5																
61	1.2D+1.5Lm+1.0 225-Wind	Yes	Y		1	1.2	12	.068	35	1.5																
62	1.2D+1.5Lm+1.0 240-Wind	Yes	Y		1	1.2	13	.068	35	1.5																
63	1.2D+1.5Lm+1.0 270-Wind	Yes	Y		1	1.2	14	.068	35	1.5																
64	1.2D+1.5Lm+1.0 300-Wind	Yes	Y		1	1.2	15	.068	35	1.5																
65	1.2D+1.5Lm+1.0 315-Wind	Yes	Y		1	1.2	16	.068	35	1.5																
66	1.2D+1.5Lm+1.0 330-Wind	Yes	Y		1	1.2	17	.068	35	1.5																
67	(1.2+0.2Sds)D+1.0 0 Seis...	Yes	Y		1	1.2...	E...	.116	0																	
68	(1.2+0.2Sds)D+1.0 30 Sei...	Yes	Y		1	1.2...	E...	.1	ELZ	.058																
69	(1.2+0.2Sds)D+1.0 45 Sei...	Yes	Y		1	1.2...	E...	.082	ELZ	.082																
70	(1.2+0.2Sds)D+1.0 60 Sei...	Yes	Y		1	1.2...	E...	.058	ELZ	.1																
71	(1.2+0.2Sds)D+1.0 90 Sei...	Yes	Y		1	1.2...	0		ELZ	.116																
72	(1.2+0.2Sds)D+1.0 120 Se...	Yes	Y		1	1.2...	E...	-.058	ELZ	.1																
73	(1.2+0.2Sds)D+1.0 135 Se...	Yes	Y		1	1.2...	E...	-.082	ELZ	.082																
74	(1.2+0.2Sds)D+1.0 150 Se...	Yes	Y		1	1.2...	E...	-.1	ELZ	.058																
75	(1.2+0.2Sds)D+1.0 180 Se...	Yes	Y		1	1.2...	E...	-.116	0																	
76	(1.2+0.2Sds)D+1.0 210 Se...	Yes	Y		1	1.2...	E...	-.1	ELZ	-.058																
77	(1.2+0.2Sds)D+1.0 225 Se...	Yes	Y		1	1.2...	E...	-.082	ELZ	-.082																
78	(1.2+0.2Sds)D+1.0 240 Se...	Yes	Y		1	1.2...	E...	-.058	ELZ	-.1																
79	(1.2+0.2Sds)D+1.0 270 Se...	Yes	Y		1	1.2...	0		ELZ	-.116																
80	(1.2+0.2Sds)D+1.0 300 Se...	Yes	Y		1	1.2...	E...	.058	ELZ	-.1																
81	(1.2+0.2Sds)D+1.0 315 Se...	Yes	Y		1	1.2...	E...	.082	ELZ	-.082																
82	(1.2+0.2Sds)D+1.0 330 Se...	Yes	Y		1	1.2...	E...	.1	ELZ	-.058																
83	(0.9-0.2Sds)*DL+1.0 0 Sei...	Yes	Y		1	.854	E...	.116	0																	
84	(0.9-0.2Sds)*DL+1.0 30 S...	Yes	Y		1	.854	E...	.1	ELZ	.058																
85	(0.9-0.2Sds)*DL+1.0 Seis...	Yes	Y		1	.854	E...	.082	ELZ	.082																
86	(0.9-0.2Sds)*DL+1.0 60 S...	Yes	Y		1	.854	E...	.058	ELZ	.1																
87	(0.9-0.2Sds)*DL+1.0 90 S...	Yes	Y		1	.854	0		ELZ	.116																
88	(0.9-0.2Sds)*DL+1.0 120 ...	Yes	Y		1	.854	E...	-.058	ELZ	.1																
89	(0.9-0.2Sds)*DL+1.0 135 ...	Yes	Y		1	.854	E...	-.082	ELZ	.082																
90	(0.9-0.2Sds)*DL+1.0 150 ...	Yes	Y		1	.854	E...	-.1	ELZ	.058																
91	(0.9-0.2Sds)*DL+1.0 180 ...	Yes	Y		1	.854	E...	-.116	0																	
92	(0.9-0.2Sds)*DL+1.0 210 ...	Yes	Y		1	.854	E...	-.1	ELZ	-.058																
93	(0.9-0.2Sds)*DL+1.0 225 ...	Yes	Y		1	.854	E...	-.082	ELZ	-.082																
94	(0.9-0.2Sds)*DL+1.0 240 ...	Yes	Y		1	.854	E...	-.058	ELZ	-.1																
95	(0.9-0.2Sds)*DL+1.0 270 ...	Yes	Y		1	.854	0		ELZ	-.116																
96	(0.9-0.2Sds)*DL+1.0 300 ...	Yes	Y		1	.854	E...	.058	ELZ	-.1																
97	(0.9-0.2Sds)*DL+1.0 315 ...	Yes	Y		1	.854	E...	.082	ELZ	-.082																
98	(0.9-0.2Sds)*DL+1.0 330 ...	Yes	Y		1	.854	E...	.1	ELZ	-.058																

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[...	LC	Shea...	Loc[...	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [...	phi*Mn z-z [...	Cb	Eqn
1	MP-2	PIPE_2.0	.855	5.5	18	.086	5.5		18	19.964	32.13	1.872	1.872	2...	H1-1b
2	FFBH1	PIPE_3.0	.821	6.25	18	.465	6.25		18	25.929	65.205	5.749	5.749	1...	H3-6
3	FFBH3	PIPE_3.0	.750	6.25	27	.403	6.25		28	25.929	65.205	5.749	5.749	1...	H3-6
4	MP-8	PIPE_2.0	.745	5.5	27	.083	5.5		19	19.964	32.13	1.872	1.872	2...	H1-1b
5	MP-5	PIPE_2.0	.736	5.5	24	.076	5.5		25	19.964	32.13	1.872	1.872	2...	H1-1b
6	FFBH2	PIPE_3.0	.680	6.25	24	.395	6.25		24	25.929	65.205	5.749	5.749	1...	H3-6
7	MP-1	PIPE_2.0	.661	5.5	64	.067	5.5		18	19.964	32.13	1.872	1.872	1...	H1-1b
8	MP-7	PIPE_2.0	.518	5.5	27	.067	5.5		27	19.964	32.13	1.872	1.872	2...	H1-1b
9	SF-H3	HSS4X4X4	.516	0	18	.239	0	z	26	120.567	139.518	16.181	16.181	1...	H1-1b
10	SF-H2	HSS4X4X4	.498	0	19	.238	0	z	19	120.567	139.518	16.181	16.181	1...	H3-6

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[..	LC	Shea..	Loc[..	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [..	phi*Mn z-z [..	Cb	Eqn
11	SF-H1	HSS4X4X4	.474	0	24	.316	0	y	56	120.567	139.518	16.181	16.181	1..	H1-1b
12	MP-4	PIPE_2.0	.453	5.5	23	.060	5.5		23	19.964	32.13	1.872	1.872	2..	H1-1b
13	MP-3	PIPE_2.0	.424	5.5	18	.041	5.5		21	19.964	32.13	1.872	1.872	2..	H1-1b
14	MP-6	PIPE_2.0	.391	5.5	25	.039	5.5		42	19.964	32.13	1.872	1.872	2..	H1-1b
15	SR3	PIPE_2.0	.377	7.161	27	.070	7.292		19	1.428	32.13	1.872	1.872	2..	H1-1b
16	SR1	PIPE_2.0	.376	7.161	33	.071	7.292		26	1.428	32.13	1.872	1.872	2..	H1-1b
17	MP-9	PIPE_2.0	.371	5.5	29	.041	5.5		31	19.964	32.13	1.872	1.872	2..	H1-1b
18	SR2	PIPE_2.0	.341	7.161	23	.059	7.292		31	1.428	32.13	1.872	1.872	2..	H1-1b
19	M28	PIPE_2.0	.009	1.831	42	.143	0		18	27.356	32.13	1.872	1.872	1..	H1-1b
20	M29	PIPE_2.0	.009	1.831	34	.134	0		25	27.356	32.13	1.872	1.872	1..	H1-1b
21	M30	PIPE_2.0	.009	1.831	35	.115	3.663		28	27.356	32.13	1.872	1.872	1..	H1-1b
22	SF-V2	PIPE_4.0	.000	.75	18	.000	.75		18	90.327	93.24	10.631	10.631	1..	H1-1b
23	SF-V3	PIPE_4.0	.000	.75	25	.000	.75		25	90.327	93.24	10.631	10.631	1..	H1-1b
24	SF-V1	PIPE_4.0	.000	.75	29	.000	.75		29	90.327	93.24	10.631	10.631	1..	H1-1b

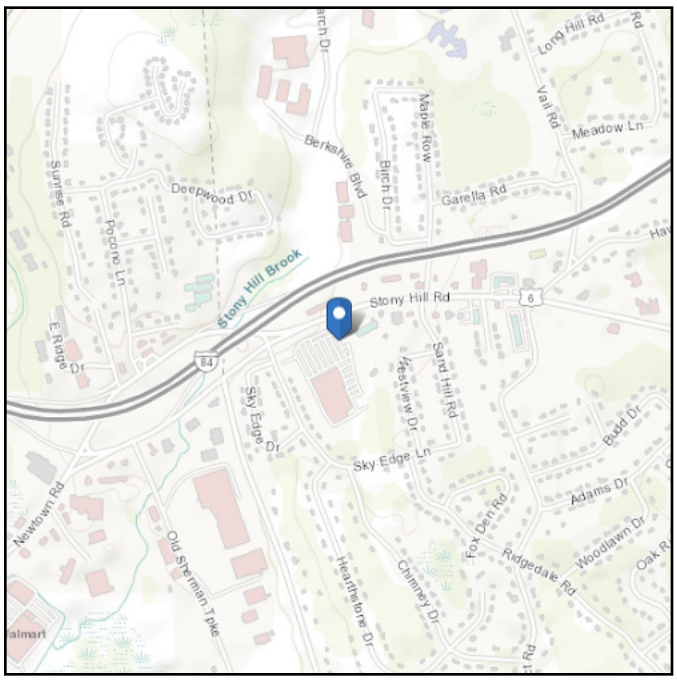
APPENDIX B

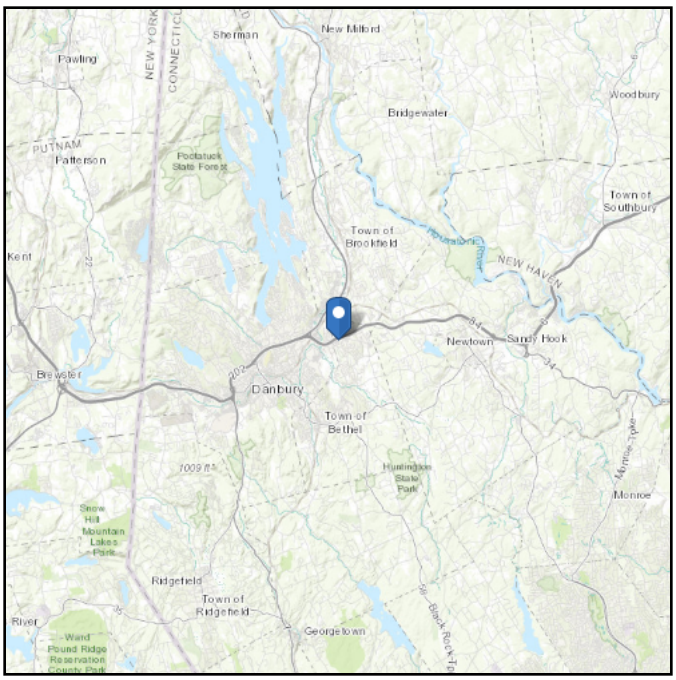
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	41.415791
Risk Category:	II	**Longitude:**	-73.401698
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	420.8880781961084 ft (NAVD 88)





Wind

Results:

Wind Speed	115 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Mon Jan 08 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

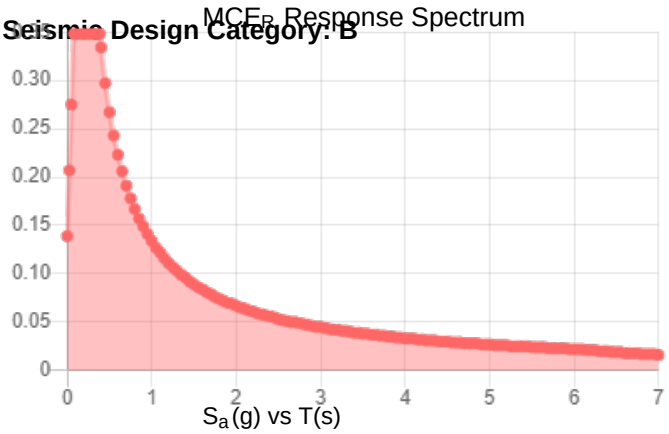
Seismic

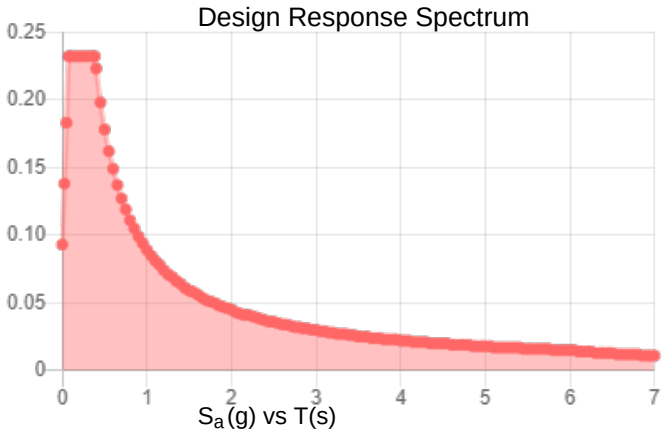
Site Soil Class: D - Default (see Section 11.4.3)

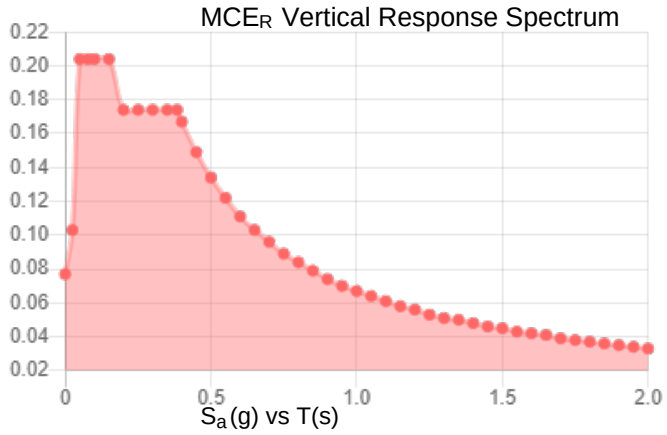
Results:

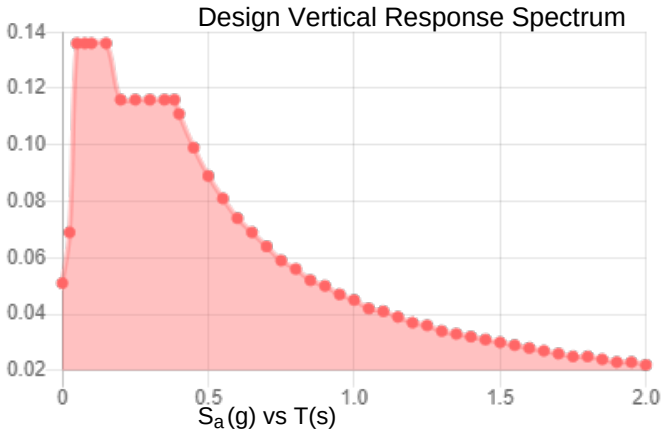
S_S :	0.217	S_{D1} :	0.089
S_1 :	0.056	T_L :	6
F_a :	1.6	PGA :	0.124
F_v :	2.4	PGA_M :	0.193
S_{MS} :	0.348	F_{PGA} :	1.552
S_{M1} :	0.134	I_e :	1
S_{DS} :	0.232	C_v :	0.735

Seismic Design Category: B









Data Accessed: Mon Jan 08 2024

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Jan 08 2024

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

TOWER ENGINEERING PROFESSIONALS

CTL05176 - Bethel Stony Hill-AWS
TEP No. 315631.914611
Analysis By: MTW 1/8/2024
Checked By: CLT 1/8/2024

Moment Bolt Group - Plate Connection to Collar

Code Revisions:	ANSI/TIA-222-H
Bolt Type:	Headed Bolts

Connection Inputs:

Bolt Size:	0.625	in
# Bolts:	4	
Plate Width:	8.00	in
Plate Height:	8.00	in
Bolt H Gap:	6.00	in
Bolt V Gap:	6.00	in
Plate T:	0.750	in
Slip Member Ø:	N/A	in
Bolt Grade:	A325N	

Capacities:

Bolt Capacity=	38.8%	PASS*
Plate Capacity=	27.2%	PASS*

*Value Adjusted per TIA-H Section 15.5

Bolt Properties:

Fy_{bolt}:	92.0	ksi
Fu_{bolt}:	120.0	ksi
r:	4.2	in
J:	72.0	in^4/in^2
A_{bolt}:	0.3	in^2
$A_{bolt, Net Tensile}$:	0.2	in^2
Pretension:	19.0	kips

Member Properties:

Member Shape:	Flat	
Plate Fy:	35.0	ksi
Plate Fu:	60.0	ksi
Member Height:	4.0	in
Member Width:	4.0	in

AT&T TARP Mount Program Spec Sheet

Site: Bethel Stony Hill-AWS

TARP Mount Specification

Basic Wind Speed (MPH)	Radial Ice (in.)	Height (ft.)	Exposure Category	Class	Topo Category	Number of Loaded Mount Pipes / Sector	Allowable[1] EPA / Pipe (ft^2)	Allowable[1] Weight / Pipe (lbf)
115	*1.0*	*145*	*C*	*II*	*1.0*	*3*	*9.97*	*130.1*

Notes:
1) This allowable value is an average of the loaded mount pipes per sector

Bethel, CT : Assessor Database

Property Search:

Parcel ID:	Alternate ID:	Owner 1 Name:	Street Number:	Street Name:
			7	STONY HILL ROAD

Search Reset

Property Detail:

Parcel ID:	Alternate ID/Map Block Lot:	Card:	Card:	Street Name:	Street Number:	Zoning:	LUC:	Acres:
59 095 01	R06416	1	1	STONY HILL ROAD	7	RT 6	DISCOUNT/DEPT STORES	14.14

Owner Information:

Owner 1 Name:	TARGET CORPORATION
Owner 2 Name:	STORE #T1528
Street 1:	PO BOX 9456
Street 2:	% PROPERTY TAX DEPT
City:	MINNEAPOLIS
State:	MN
Zip:	55440
Volume:	779
Page:	217
Deed Date:	0000-00-00

Building Information:

Building Number:	1
Units:	1
Structure Type:	RETAIL GENERAL OCCUP
Grade:	C
Identical Units:	1
Year Built:	2003

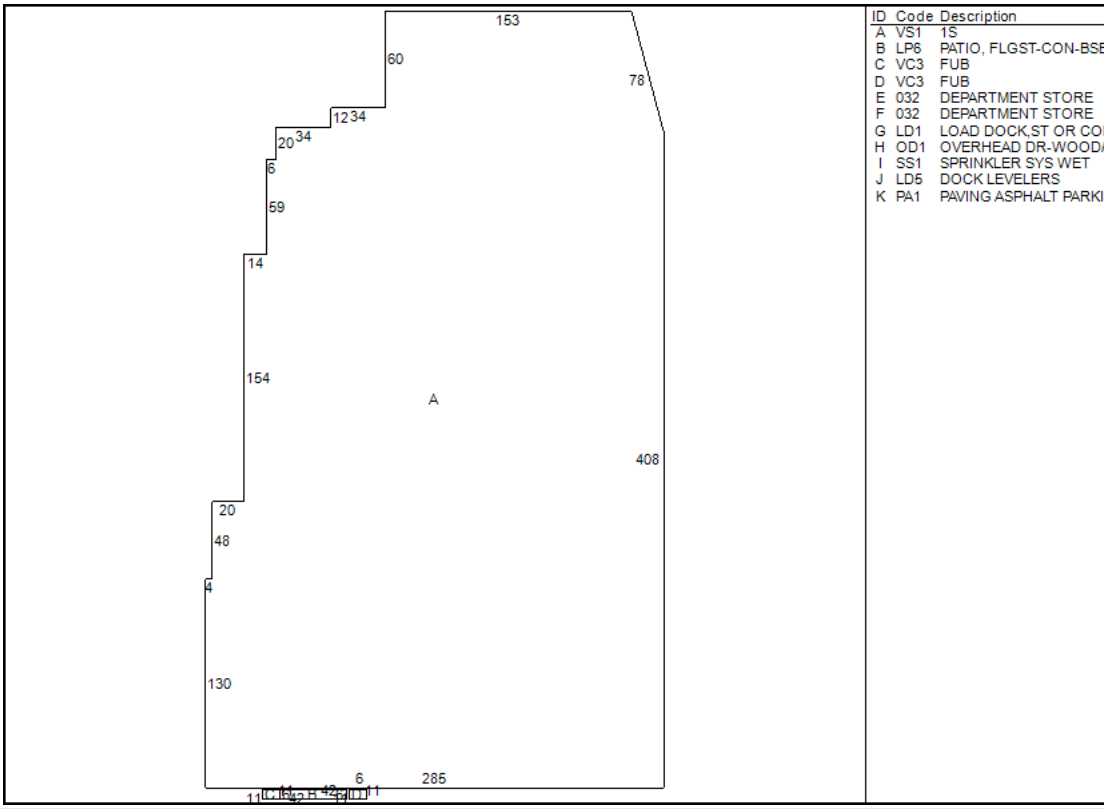
Valuation:

Appraised Land:	$5,101,300.00
Appraised Land PA490:	$0.00
Appraised Bldg:	$7,561,300.00
Appraised Total:	$12,662,600.00
Total Assessment:	$8,863,820.00

Property Images:

Picture:

Sketch:



Sales History:

Book:	Page:	Sale Date:	Price:	Validity:	Sale Type:
779	217	11/08/02	3,600,000	VALID SALE	LAND + BLDG
466	475	01/01/00			

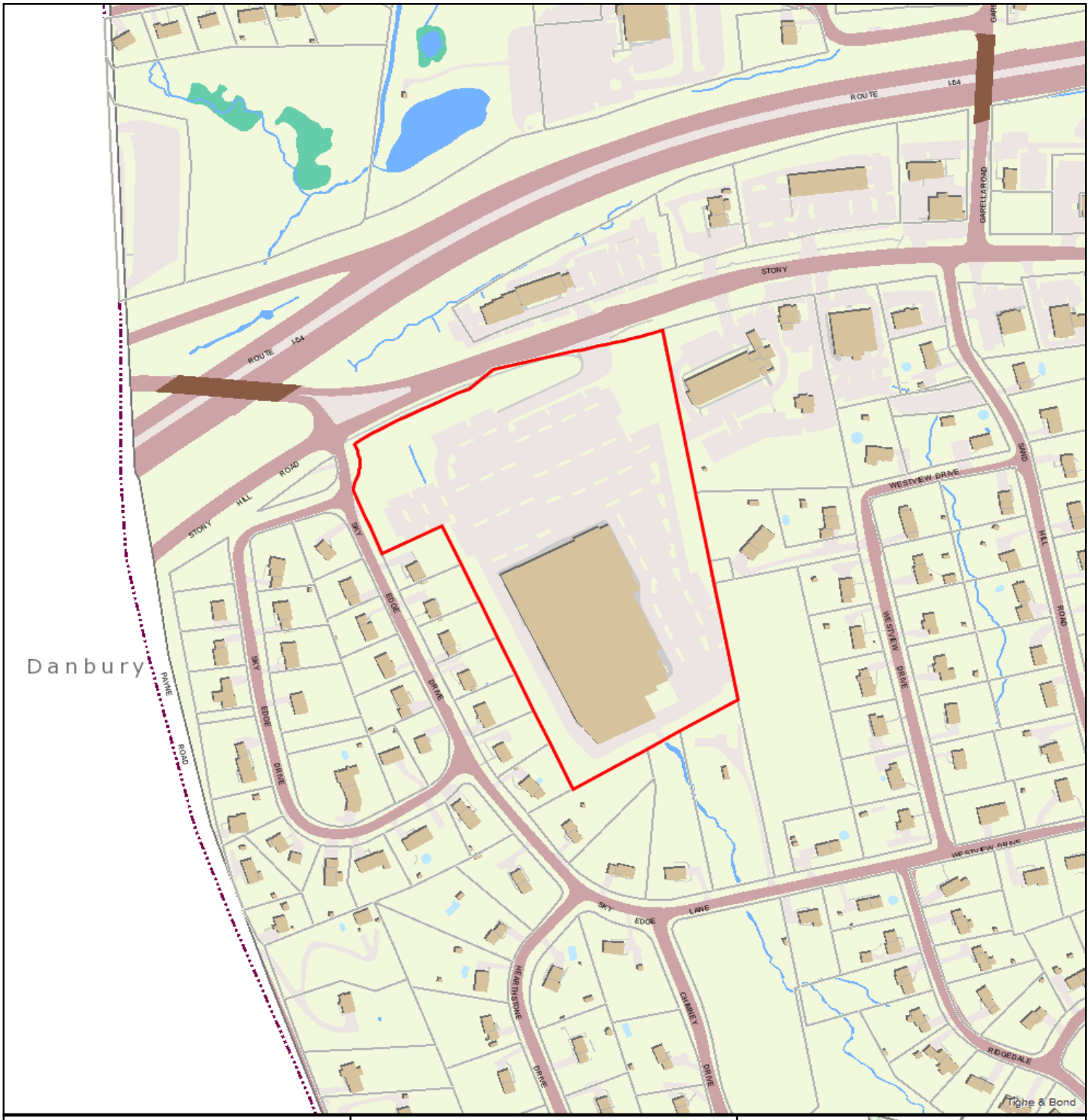
Out-Buildings:

Code:	Description:	Units:	Year Built:	Size1:	Size2:	Area:	Grade:	Condition:
PA1	PAVING ASPHALT PARKING	1	2003	0	0	400000	C	GOOD (Comm)

Building Interior/Exterior Information:

Floor From:	Floor To:	Area:	Use Type:	Exterior Walls:	Contruction Type:	Heating:	A/C:	Plumbing:	Functional
01	01	330	DEPARTMENT STORE	BRICK & CONCRETE BLOCK	PRE-ENGINEERED STEEL	HOT AIR	CENTRAL	NORMAL	3
01	01	122569	DEPARTMENT STORE	BRICK & CONCRETE BLOCK	PRE-ENGINEERED STEEL	HOT AIR	CENTRAL	NORMAL	3

Wed. December 20, 2023 : 09:57 AM : 0.06s : 10mb



7 STONY HILL ROAD

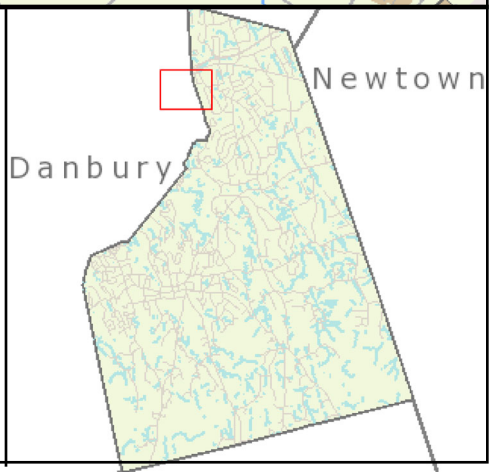
12/20/2023

1"=333'

Property Information

Parcel ID	undefined
Address	7 STONY HILL ROAD
Total Value	undefined

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 22, 2000

Susan J. Bellion
Senior Real Estate & Zoning Manager
Nextel Communications
100 Corporate Place
Rocky Hill, Connecticut 06067

Re: **PETITION NO. 479** - Nextel Communications for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modification of an existing Connecticut Light and Power electric transmission facility located at 7 Stony Hill Road, Bethel, Connecticut.

Dear Ms. Bellion:

At a public meeting held on September 19, 2000, the Connecticut Siting Council (Council) considered and ruled that this proposal would not have a substantial adverse environmental effect, and pursuant to General Statutes § 16-50k would not require a Certificate of Environmental Compatibility and Public Need. This decision was conditioned on a requirement that landscaping be placed on the north side of the site and erosion and sedimentation (E&S) controls be installed prior to construction consistent with Connecticut Guidelines for Erosion and Sedimentation Control, and that the landscaping and E&S control plans be subject to local review.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the petition, dated August 29, and September 14, 2000.

Enclosed for your information is a copy of the staff report on this project.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/FOC

Enclosure: Staff Report dated September 19, 2000

c: Honorable Judith Novachek, First Selectwoman, Town of Bethel
Joseph R. Potenza, Planning and Zoning Official, Town of Bethel
Rick Madej, Northeast Utilities
Michael Austin, AT&T

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

Petition No. 479
Nextel Communications and AT&T Wireless Inc.
Bethel, Connecticut
Staff Report
September 19, 2000

On September 12, 2000, Connecticut Siting Council (Council) member Edward S. Wilensky, and Council staff Fred Cunliffe and Christina Lepage met with Nextel Communications (Nextel) representatives Susan Bellion and Scott Chasse, and Michael Austin of AT&T at 7 Stony Hill Road (Route 6) Bethel, Connecticut for inspection of an electric transmission structure. The property and structure is owned by Connecticut Light and Power Co. (CL&P). Nextel and AT&T, with the agreement of CL&P, propose to modify the structure by installing antennas and associated equipment 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.

Nextel proposes to install two aCELLerator™ antennas onto a ten-foot high by 4.5 inches inch diameter pipe to the top of an existing steel monopole transmission support structure (#10254). The height of this structure is 140 feet above ground level (agl) and is located approximately 230 feet south of Stony Hill Road (Route 6). The base diameter of this structure is approximately 5 feet tapering to a width of 20 inches. The aCELLerator™ antennas are 30 inches in diameter and 6 feet 4 inches in height. The two antennas stacked onto each other would extend 22 feet 8 inches including the pipe above the existing CL&P structure for a total height of 162 feet 8 inches feet agl. Nextel proposes to install a 10-foot by 20-foot prefabricated enclosure for telecommunications equipment.

AT&T proposes to attach three low-profile antennas onto the pipe at a centerline elevation of 145 feet agl. Outdoor equipment cabinets would be installed at the base of the structure. AT&T would reduce the foundation pad for equipment from 15 feet by 19 feet to 10 feet by 14 feet.

Electric and telephone service would be installed underground approximately 300 feet from an existing service pole on Stony Hill Road. A 200-foot long by 12-foot wide gravel-covered access drive would be constructed from an existing paved area. Both Nextel and AT&T equipment would be surrounded by a 50-foot by 15-foot security fence. Staff recommends landscaping consistent with CL&P criteria for plantings within a right-of-way along the north side of the site and erosion and sediment controls consistent with Connecticut Guidelines for Erosion and Sediment Control.

Alternatives for a single equipment enclosure would require 440 square feet for both carriers (equivalent to a 15-foot by 30-foot building) but would delay the project by 3-4 months for design, would cost more than a prefabricated building, and would not preclude the need for fencing. While Nextel could install antennas similar to AT&T, Nextel contends the aCELLerator™ minimizes wind loading and visual effects, and provides for a one time installation of several antennas compared to other antenna configurations.

The proposed site is adjacent to a former CL&P service center. An existing 80-foot self-supporting lattice tower is associated with this building. The antennas are not in service and Nextel states CL&P will dismantle the tower.

Properties along Stony Hill Road is zoned Commercial/Industrial (C/I). Surrounding land use is primarily offices, hotels, and similar businesses.

The combined worst-case power density for the telecommunications operations at the site has been calculated to be 4% of the applicable standard for uncontrolled environments.

Nextel and AT&T submit that the proposed modification will reduce the need for a new telecommunications tower by utilizing an existing structure and contends that the proposed installation will not cause a substantial adverse environmental effect, and for this reason would not require a Certificate.

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

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

March 27, 2024

Ms. Tarah Nolan
SAI Communications
12 Industrial Way
Salem, NH 03079

RE: AT&T Antenna Site CT5176 Stony Hill Rd, Bethe CT, Eversource Structure 10254

Dear Ms. Nolan:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at (860) 728-4862.

Sincerely,

Masie Hartt

Masie Hartt
Transmission Line Engineering

Ref: 2023-0307 - CT5176 - Structural Analysis Rev4 (22021.07)
CT5058_C-BAND_CD Rev3_03.11.24
TEP MA - Pass - CTL05176 - Bethel Stony Hill-AWS - 2024-01-08

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CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

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Ref#: CT5176
0003

C006

MELANIE BACHMAN EXECUTIVE DIRECTOR
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

USPS TRACKING #

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Electronic Rate Approved #038555749

From: auto-reply@usps.com
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To: Hollis Redding
Subject: USPS® Expected Delivery by Saturday, March 30, 2024 arriving by 9:00pm 9405503699300674304014

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Hello **HOLLIS M REDDING**,

USPS is now in possession of your item as of 1:48 pm on March 28, 2024 in MERIDEN, CT 06450.

Tracking Number: **9405503699300674304014**

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Mar

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From: auto-reply@usps.com
Sent: Thursday, March 28, 2024 2:03 PM
To: Hollis Redding
Subject: USPS® Expected Delivery by Saturday, March 30, 2024 arriving by 9:00pm 9405503699300674304021

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Tracking Number: **9405503699300674304021**

Expected Delivery By

Sat
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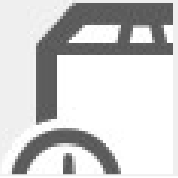
Mar

By 9:00pm



From: auto-reply@usps.com
Sent: Thursday, March 28, 2024 2:03 PM
To: Hollis Redding
Subject: USPS® Expected Delivery by Saturday, March 30, 2024 arriving by 9:00pm 9405503699300674304038

Hello **HOLLIS M REDDING**,

USPS is now in possession of your item as of 1:48 pm on March 28, 2024 in MERIDEN, CT 06450.

Tracking Number: **9405503699300674304038**

Expected Delivery By

Sat
30
Mar

By 9:00pm