September 12, 2023

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 CT5436
Bartholomew Road, Middletown, CT 06457 (the "Property")
Latitude: 41.520078 N Longitude: 72.60811 W

Dear Ms. Bachman:

AT&T currently maintains (6) antennas at the 93-foot level on the existing 95'+- wood laminate utility structure #14027 ("Structure") located off Bartholomew Road, Middletown, CT. The Structure and property are owned by Connecticut Light & Power ("Eversource"). Eversource plans on replacing the existing Structure with a 95' monopole Structure. AT&T intends to modify its facility by removing all (6) antennas & equipment from the existing Structure and placing (6) TPA65R-BU6DA-K antennas at the 93' level of the replacement Structure. The height of AT&Ts existing antennas is 93'and proposed antennas is 93'on the replacement Structure.

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 original Facility received Connecticut Siting Council ("CSC") approval under Petition 606T on June 19, 2003. The CSC approved Eversource's Structure replacement under Petition 1576 on August 31, 2023. The approvals contained no conditions that could be violated by this modification. Therefore, AT&Ts modification complies with the above-mentioned approvals.

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 R.C.S.A §16-50j-73, a copy of this letter is being sent to the Honorable Benjamin Florsheim, Mayor, City of Middletown, Mr. Marek Kozikowski, Director of Land Use, City of Middletown and Eversource, the tower & property 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 modification will not result in an increase in the height of the existing structure.

2. The proposed modification 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 modification to the above referenced telecommunication facility constitute an exempt modification pursuant to R.C.S.A §16-50j-72(b)(2).

Please contact me at 860-834-6964 if you should have any questions regarding this matter. Thank you for your time & consideration.

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: The Honorable Benjamin Florsheim, Mayor, City of Middletown
Mr. Mr. Marek Kozikowski, Director of Land Use, City of Middletown
Eversource, tower & property owner

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

Calculated Radio Frequency Emissions Report

CT5436

114 Bartholomew Road, Middletown, CT

September 7, 2023

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of AT&T antenna arrays to be mounted at 93' AGL on a proposed monopole tower located at 114 Bartholomew Road in Middletown, CT. The coordinates of the tower are 41° 31' 14.49" N, 72° 36' 29.52" W.

AT&T is proposing the following:

1) Install six (6) multi-band antennas (two (2) per 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] and the existing[2] antennas for T-Mobile 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 08/08/2023

[2] As referenced to Connecticut Siting Council Notice of Exempt Modification – 701 Bartholomew Street, Middletown CT, dated 09/17/2014

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:

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

Where:

EIRP = Effective Isotropic Radiated Power

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

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)
AT&T	Alpha / 30°	763	160	14.5	4509	TPA65R-BU6D	73	0	5.93	93
		2100	240	18.4	16604		66			
		739	160	14.5	4509	TPA65R-BU6D	73	0	5.93	93
		850	160	15.1	5177		63			
		1900	160	18.1	10330		66			
		2300	100	18	6310		60			
	Beta / 140°	763	160	14.5	4509	TPA65R-BU6D	73	0	5.93	93
		2100	240	18.4	16604		66			
		739	160	14.5	4509	TPA65R-BU6D	73	0	5.93	93
		850	160	15.1	5177		63			
		1900	160	18.1	10330		66			
		2300	100	18	6310		60			
	Gamma / 260°	763	160	14.5	4509	TPA65R-BU6D	73	0	5.93	93
		2100	240	18.4	16604		66			
		739	160	14.5	4509	TPA65R-BU6D	73	0	5.93	93
		850	160	15.1	5177		63			
		1900	160	18.1	10330		66			
		2300	100	18	6310		60			

Table 1: Proposed Antenna Inventory[3] [4]

[3] AT&T's Radio Frequency Design Sheet, dated 08/08/2023

[4] 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.

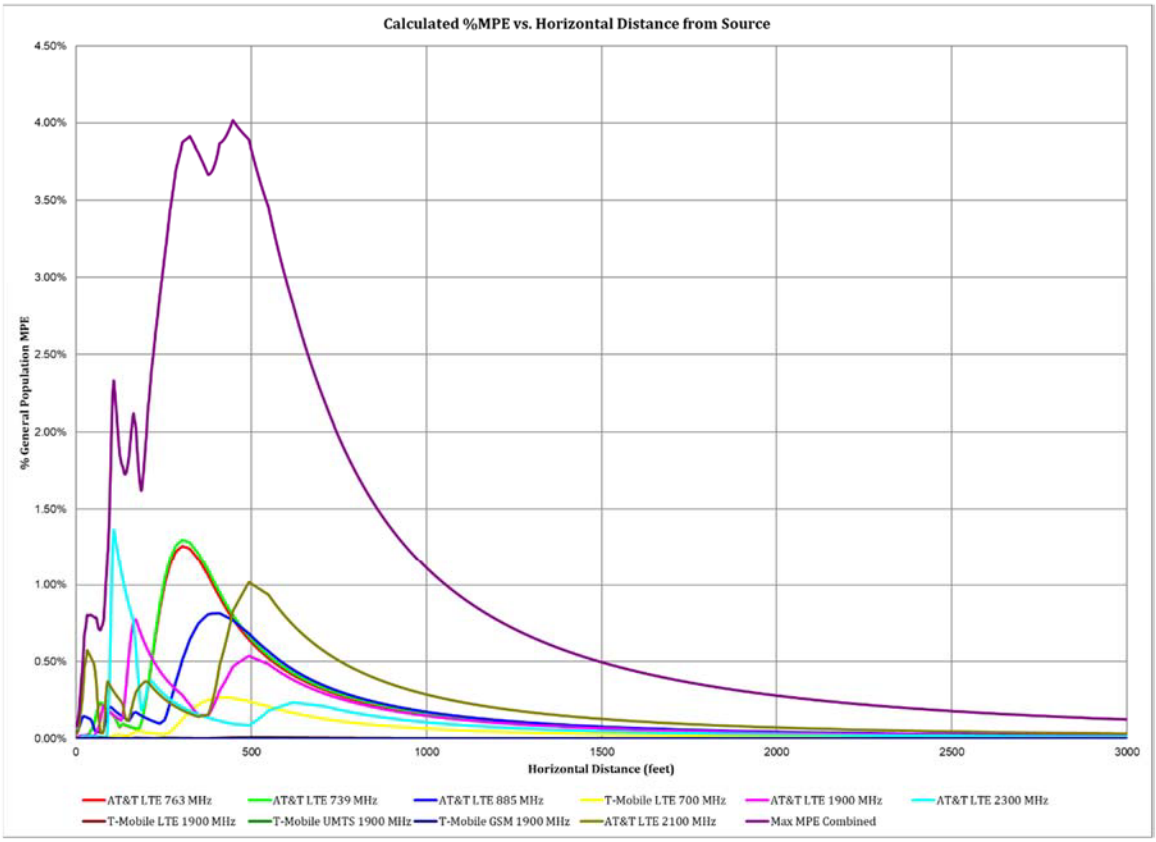


Figure 1: Graph of General Population % MPE vs. Distance

The highest percent of MPE (4.02% of the General Population limit) is calculated to occur at a horizontal distance of 448 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 448 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 LTE 1900 MHz	1	160.0	93.0	448	0.004687	1.000	0.47%
AT&T LTE 2100 MHz	1	240.0	93.0	448	0.008305	1.000	0.83%
AT&T LTE 2300 MHz	1	100.0	93.0	448	0.000952	1.000	0.10%
AT&T LTE 739 MHz	1	160.0	93.0	448	0.003949	0.493	0.80%
AT&T LTE 763 MHz	1	160.0	93.0	448	0.003949	0.509	0.78%
AT&T LTE 885 MHz	1	160.0	93.0	448	0.004537	0.590	0.77%
T-Mobile GSM 1900 MHz	1	60.0	83.0	448	0.000032	1.000	0.00%
T-Mobile LTE 1900 MHz	1	120.0	83.0	448	0.000063	1.000	0.01%
T-Mobile LTE 700 MHz	1	30.0	83.0	448	0.001225	0.467	0.26%
T-Mobile UMTS 1900 MHz	1	60.0	83.0	448	0.000032	1.000	0.00%
						Total	**4.02%**

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 **4.02% of the FCC limit (General Population/Uncontrolled)**. This maximum cumulative percent of MPE value is calculated to occur 448 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 1
C Squared Systems, LLC

September 6, 2023
Date

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

September 7, 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[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)
0.3-3.0	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[6]

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

[5] 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.

[6] 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.

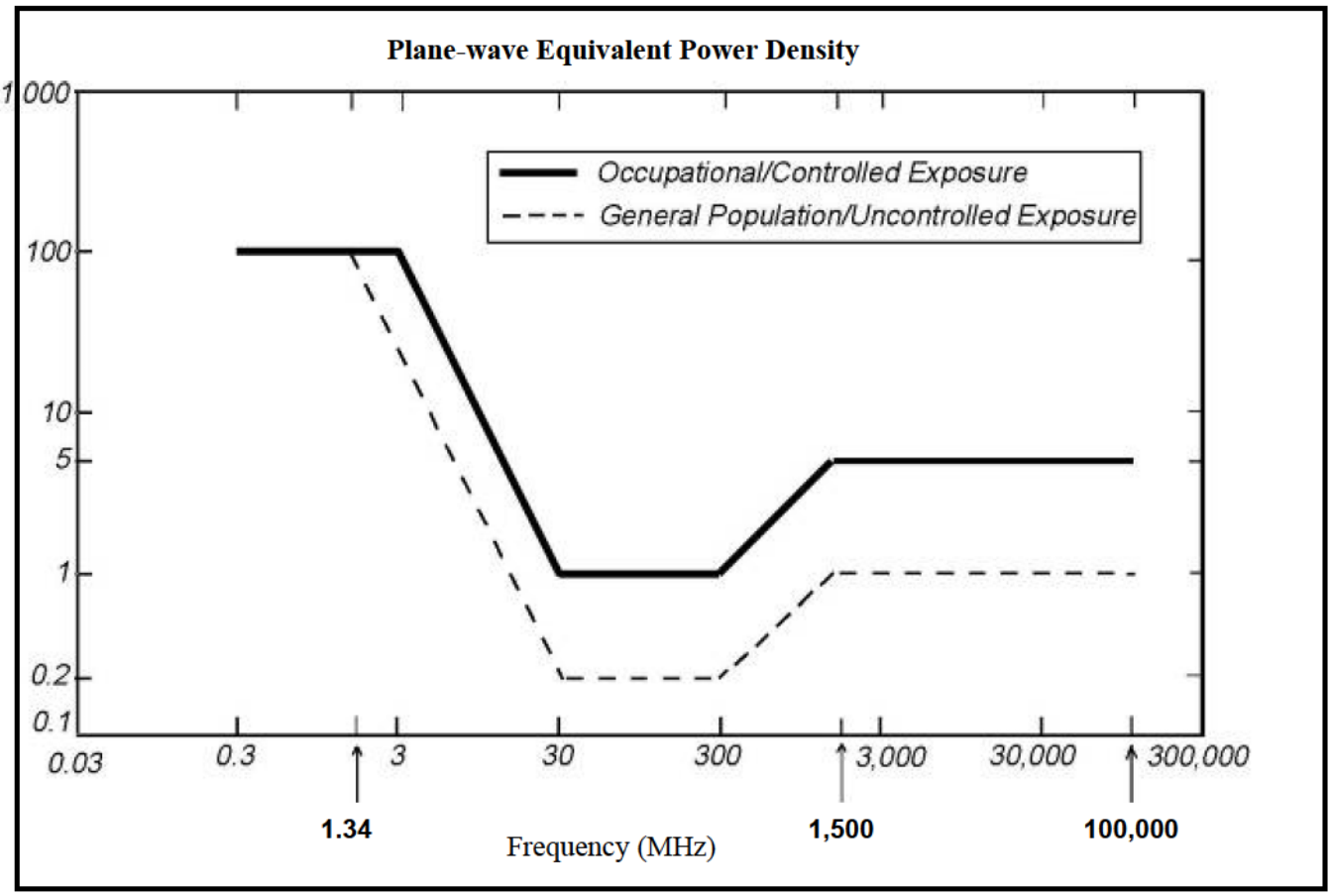
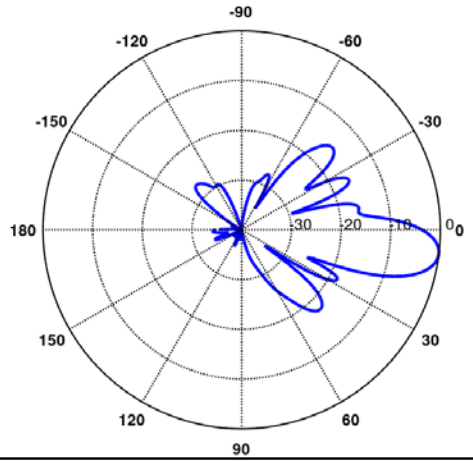


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

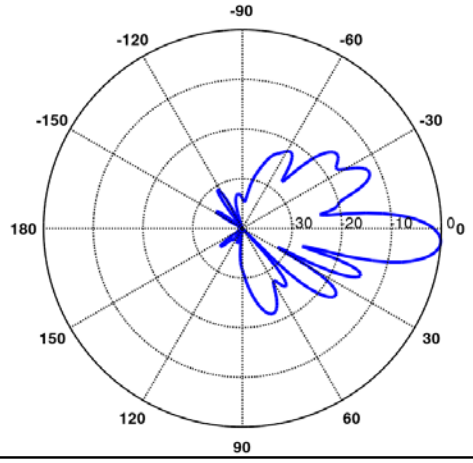
739/763 MHz

Manufacturer:	CCI
Model #:	TPA65R-BU6D
Frequency Band:	698-806 MHz
Gain:	14.5 dBi
Vertical Beamwidth:	12.8°
Horizontal Beamwidth:	73°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	71.2" x 20.7" x 7.7"



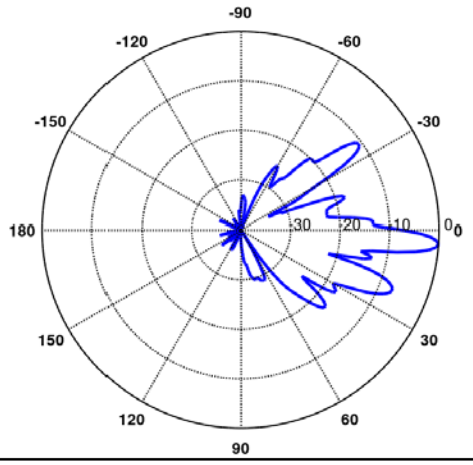
885 MHz

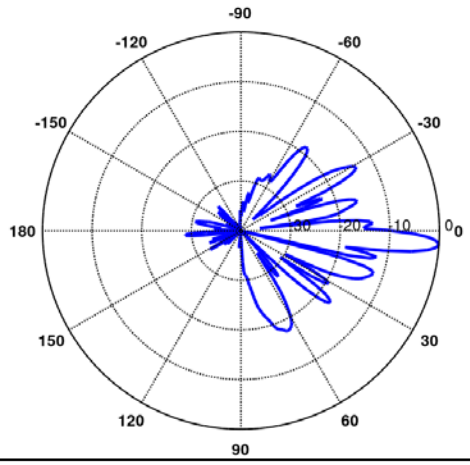
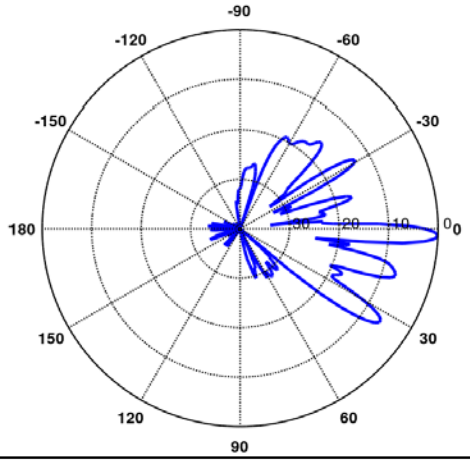
Manufacturer:	CCI
Model #:	TPA65R-BU6D
Frequency Band:	824-896 MHz
Gain:	15.1 dBi
Vertical Beamwidth:	11.1°
Horizontal Beamwidth:	63°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	71.2" x 20.7" x 7.7"



1900 MHz

Manufacturer:	CCI
Model #:	TPA65R-BU6D
Frequency Band:	1850-1990 MHz
Gain:	18.1 dBi
Vertical Beamwidth:	5.2°
Horizontal Beamwidth:	66°
Polarization:	Dual Linear 45°
Dimensions (L x W x D):	71.2" x 20.7" x 7.7"



2100 MHz Manufacturer: CCI Model #: TPA65R-BU6D Frequency Band: 1920-2180 MHz Gain: 18.4 dBi Vertical Beamwidth: 4.8° Horizontal Beamwidth: 66° Polarization: Dual Linear 45° Dimensions (L x W x D): 71.2" x 20.7" x 7.7"	
2300 MHz Manufacturer: CCI Model #: TPA65R-BU6D Frequency Band: 2300-2400 MHz Gain: 18.0 dBi Vertical Beamwidth: 4.0° Horizontal Beamwidth: 60° Polarization: Dual Linear 45° Dimensions (L x W x D): 71.2" x 20.7" x 7.7"	

CTL05436 – MIDDLETOWN SOUTH
EVERSOURCE STRUCT. NO. 14027
1114 BARTHOLOMEW RD
MIDDLETOWN, CT 06457

RFDS GENERAL INFORMATION

CELL SITE RF MODIFICATIONS:	CELL SITE RF MODIFICATIONS 5G NR SOFTWARE UPGRADE 5G NR RADIO 5G NR 1DR–1 LTE NEXT CARRIER LTE 3C ANTENNA MODIFICATIONS 4TX4RX SOFTWARE RETROFIT
PACE ID:	PACE JOB #1 – MRCTB067607 PACE JOB #2 – MRCTB067612 PACE JOB #3 – MRCTB067536 PACE JOB #4 – MRCTB067603 PACE JOB #5 – MRCTB067595 PACE JOB #6 – MRCTB065973
FA LOCATION CODE:	10071126

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2021 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2022 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "H" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2022 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE, WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
6. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS, AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
7. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
8. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
9. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
10. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS–BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
11. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
13. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB–CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
14. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
15. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
16. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
17. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
19. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
20. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
21. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND CONFIRMED WITH THE PROJECT MANAGER AND OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK
22. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
23. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
24. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
25. THE COUNTY/CITY/TOWN MAY MAKE PERIODIC FIELD INSPECTIONS TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS.
26. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.
27. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE 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 ENGINEER ON RECORD, PRIOR TO THE COMMENCEMENT OF ANY WORK.

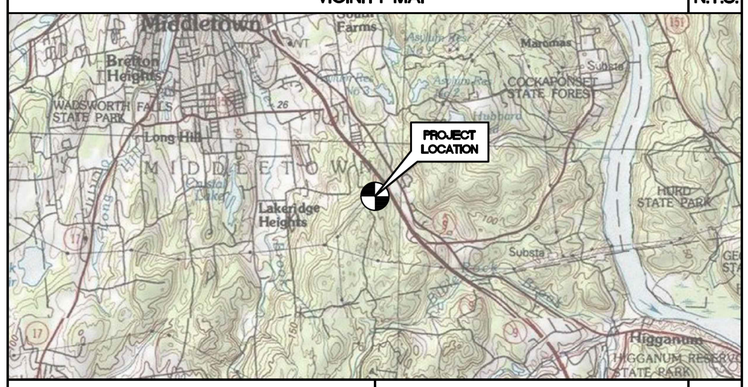
SITE LOCATION MAP — N.T.S.

SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH

SITE COORDINATES: LATITUDE: 41°–31'–14.49" N
LONGITUDE: 72°–36'–29.52" W

NORTH

VICINITY MAP — N.T.S.



SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH

SITE COORDINATES: LATITUDE: 41°–31'–14.49" N
LONGITUDE: 72°–36'–29.52" W

NORTH

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. REMOVE (6) EXISTING AT&T ANTENNAS
2. REMOVE (12) EXISTING AT&T TMAs
3. REMOVE (12) EXISTING AT&T DIPLEXERS
4. REMOVE ALL EXISTING AT&T COAX CABLES
5. REMOVE EXISTING 6601 AND INSTALL 6651 W/ XCEDE CABLE
6. REMOVE EXISTING NETSURE 701 POWER PLANT
7. INSTALL PROPOSED NETSURE 512 POWER PLANT
8. INSTALL (24) PROPOSED ANDREW 1–5/8" COAX CABLES
9. INSTALL PROPOSED ICE CABLE BRIDGE AS SHOWN HEREIN
10. INSTALL (16) PROPOSED TSXDC–4310FM SURGE ARRESTORS PER SECTOR AT GRADE, TOTAL OF (48)
11. INSTALL (2) PROPOSED DBC0115F1V91–2 DIPLEXERS PER SECTOR AT GRADE, TOTAL OF (6)
12. INSTALL (2) PROPOSED CBC61923T–DS TRIPLEXERS PER SECTOR AT GRADE, TOTAL OF (6)
13. INSTALL (1) PROPOSED 14'–6" ANTENNA MOUNT PLATFORM (P/N: RMQLP–4120–H10)
14. INSTALL (2) PROPOSED CCI TPA65R–BU6DA–K ANTENNAS PER SECTOR, TOTAL OF (6)
15. INSTALL (1) PROPOSED 4478 B14 RADIO PER SECTOR AT GRADE, TOTAL OF (3)
16. INSTALL (1) PROPOSED 4449 B5/B12 RADIO PER SECTOR AT GRADE, TOTAL OF (3)
17. INSTALL (1) PROPOSED 8843 B2/B66A RADIO PER SECTOR AT GRADE, TOTAL OF (3)
18. INSTALL (4) PROPOSED TMAT192123B68–31 TMAS PER SECTOR AT ANTENNA, TOTAL OF (12)

PROJECT INFORMATION

SITE NAME:	CT5436 – MIDDLETOWN SOUTH
SITE ADDRESS:	EVERSOURCE STRUCT. NO. 14027 1114 BARTHOLOMEW RD MIDDLETOWN, CT 06457
PROPERTY OWNER:	EVERSOURCE 107 SELDEN STREET BERLIN, CT 06037
LESSEE/TENANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
CONTACT PERSON:	TARAH NOLAN SAI COMMUNICATIONS (603) 212–5049
ENGINEER:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD, BRANFORD, CT 06405 (203) 488–0580
SITE COORDINATES:	LATITUDE: 41°–31'–14.49" N LONGITUDE: 72°–36'–29.52" W GROUND ELEVATION: ±461' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH

SHEET INDEX

SHEET. NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
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C–1	COMPOUND AND EQUIPMENT PLANS	0
C–2	ANTENNA PLAN AND ELEVATIONS	0
C–3	TYPICAL EQUIPMENT DETAILS	0
C–4	TYPICAL EQUIPMENT DETAILS	0
C–5	RF PLUMBING DIAGRAMS	0
E–1	ELECTRICAL COMPOUND PLAN	0
E–2	ELECTRICAL SCHEMATIC DIAGRAM	0
E–3	ELECTRICAL GROUNDING PLANS	0
E–4	TYPICAL GROUNDING DETAILS	0
E–5	TYPICAL GROUNDING DETAILS	0
E–6	ELECTRICAL SPECIFICATIONS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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B	05/19/23	BSP	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
C	06/22/23	BSP	TJR	CONSTRUCTION DRAWINGS – REVISED TMA MODEL
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EVERSOURCE STRUCTURE #14027
1114 BARTHOLOMEW RD
MIDDLETOWN, CT 06457

DATE: 05/01/23
SCALE: AS NOTED
JOB NO. 23016.01

TITLE SHEET

T–1

Sheet No. 1 of 13

NOTES AND SPECIFICATIONS:

DESIGN BASIS:

GOVERNING CODE: 2021 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2022 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED: 101 MPH (Vasd)
  (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–16).

SITE NOTES

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

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2021 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2022 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "H" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2022 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE, WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
6. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS, AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
7. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
8. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
9. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
10. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
11. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
13. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB–CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
14. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
15. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
16. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
17. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
19. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
20. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
21. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND CONFIRMED WITH THE PROJECT MANAGER AND OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK
22. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
23. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
24. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
25. THE COUNTY/CITY/TOWN MAY MAKE PERIODIC FIELD INSPECTIONS TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS.
26. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.
27. PRIOR TO THE SUBMISSION OF BIDS, THE CONTRACTOR SHALL VISIT THE 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 ENGINEER ON RECORD, PRIOR TO THE COMMENCEMENT OF ANY WORK.

ANTENNA/APPURTENANCE SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA (AT TOWER)	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (AT GRADE)	(E/P) TMA (AT TOWER) DIPLEXER (AT GRADE)	(QTY) PROPOSED HYBRID/COAX (AT TOWER)
A2	PROPOSED	CCI (TPA65R–BU6DA–K)	71.2 x 20.7 x 7.7	93'	30°	(P) 4478 B14 (1)	(P) TMAT192123B68–31 (2), (P) DBC0115F1V91–2 (2)	(24) ANDREW 1–5/8" COAX (±140FT)
A3	–	–	–	–	–			
A4	PROPOSED	CCI (TPA65R–BU6DA–K)	71.2 x 20.7 x 7.7	93'	30°	(P) 4449 B5/B12 (1), (P) 8843 B2/B66A (1)	(P) TMAT192123B68–31 (2), (P) CBC61923T–DS (2)	
B2	PROPOSED	CCI (TPA65R–BU6DA–K)	71.2 x 20.7 x 7.7	93'	140°	(P) 4478 B14 (1)	(P) TMAT192123B68–31 (2), (P) DBC0115F1V91–2 (2)	
B3	–	–	–	–	–			
B4	PROPOSED	CCI (TPA65R–BU6DA–K)	71.2 x 20.7 x 7.7	93'	140°	(P) 4449 B5/B12 (1), (P) 8843 B2/B66A (1)	(P) TMAT192123B68–31 (2), (P) CBC61923T–DS (2)	
C2	PROPOSED	CCI (TPA65R–BU6DA–K)	71.2 x 20.7 x 7.7	93'	260°	(P) 4478 B14 (1)	(P) TMAT192123B68–31 (2), (P) DBC0115F1V91–2 (2)	
C3	–	–	–	–	–			
C4	PROPOSED	CCI (TPA65R–BU6DA–K)	71.2 x 20.7 x 7.7	93'	260°	(P) 4449 B5/B12 (1), (P) 8843 B2/B66A (1)	(P) TMAT192123B68–31 (2), (P) CBC61923T–DS (2)	

NOTE:
ALL HYBRID/COAX LENGTHS TO BE MEASURED AND VERIFIED IN FIELD BEFORE ORDERING

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/11/23	ASC	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
E	09/06/23	ASC	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
D	08/24/23	ASC	TJR	CONSTRUCTION DRAWINGS – REVISED RFDS
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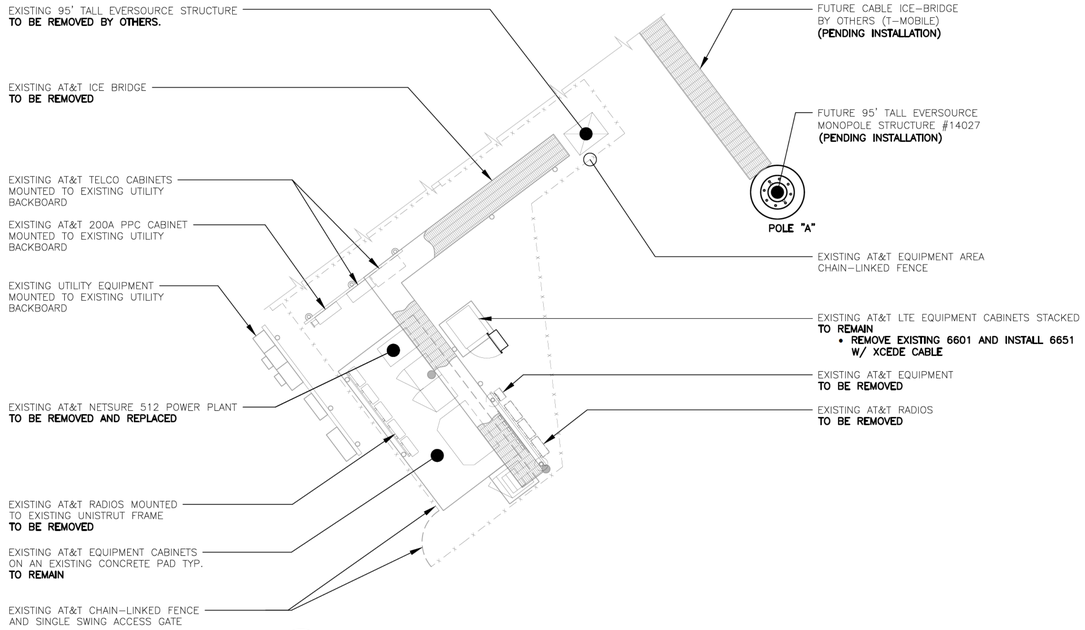
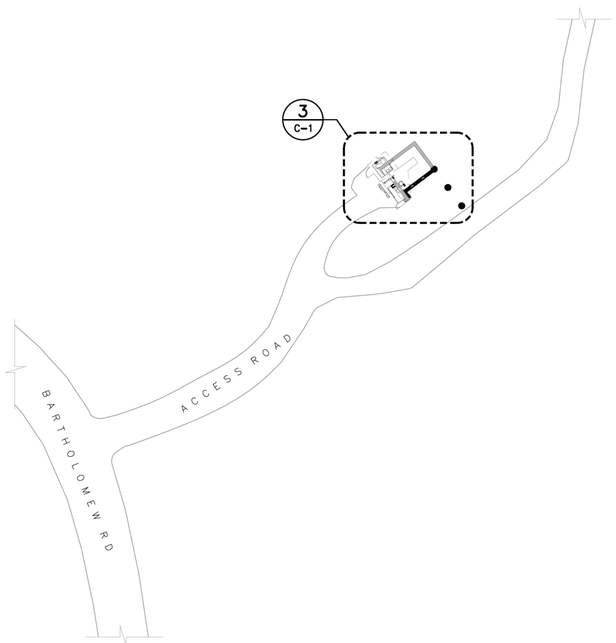
GENERAL NOTES, SPECIFICATIONS AND ANT. SCHEDULE

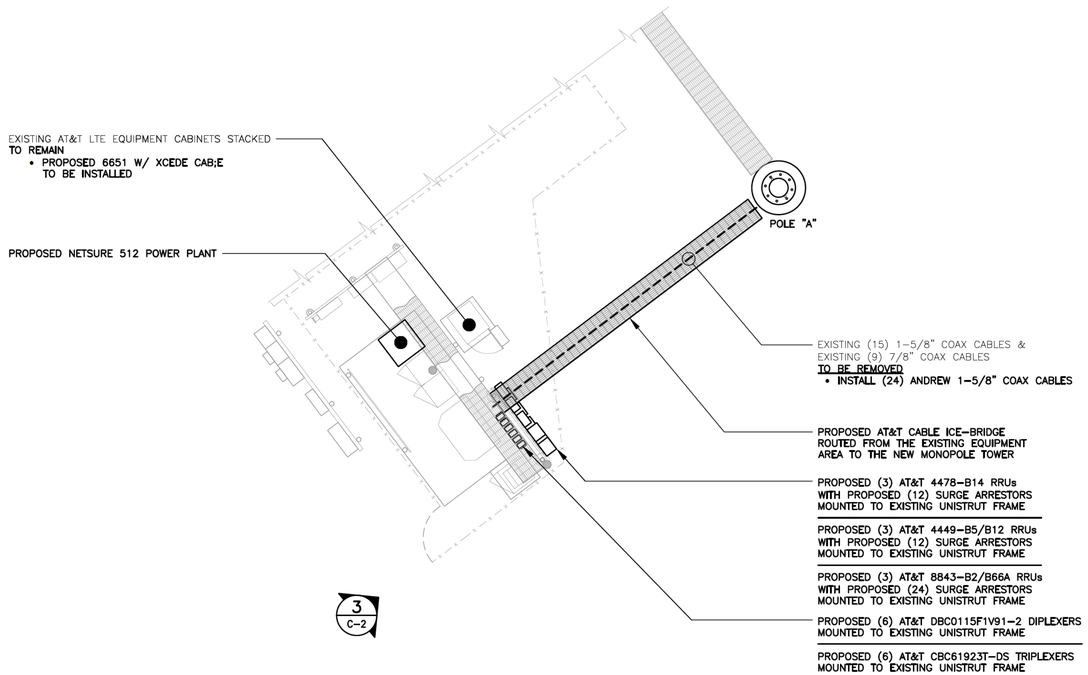
N–1



2 / C-1 **EQUIPMENT PLAN - EXISTING**
SCALE: 1/8" = 1'-0"
TRUE NORTH



1 / C-1 **COMPOUND PLAN - PROPOSED**
SCALE: 1" = 20'-0"
TRUE NORTH



3 / C-1 **EQUIPMENT PLAN - PROPOSED**
SCALE: 1/8" = 1'-0"
TRUE NORTH

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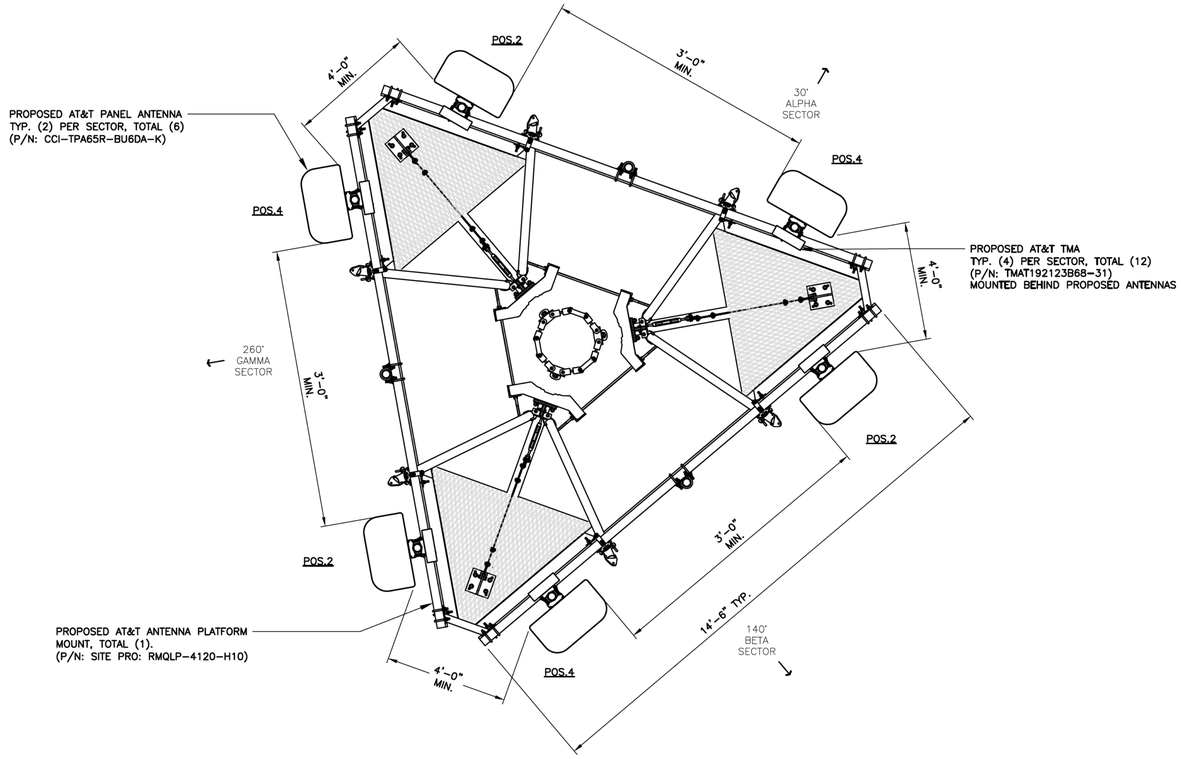
JOB NO. 23016.01

COMPOUND AND EQUIPMENT PLANS

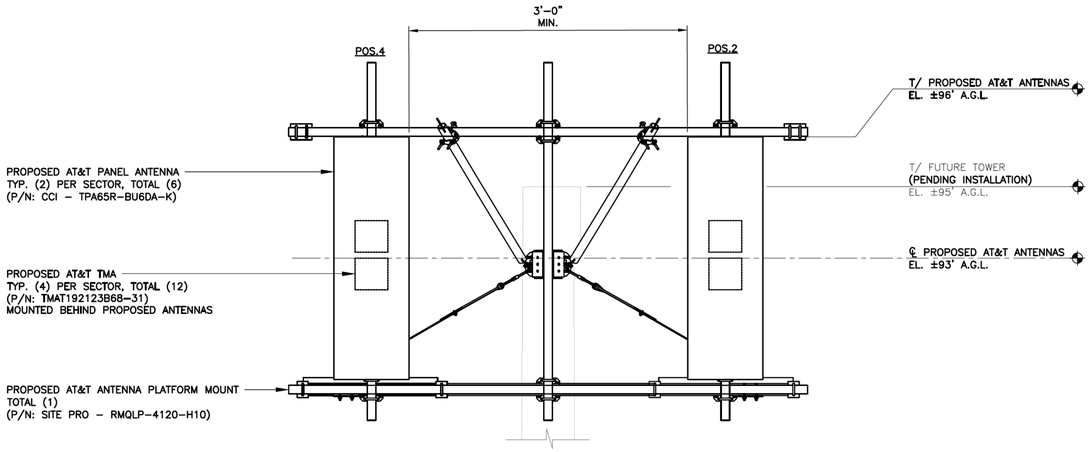
C-1

Sheet No. 3 of 13



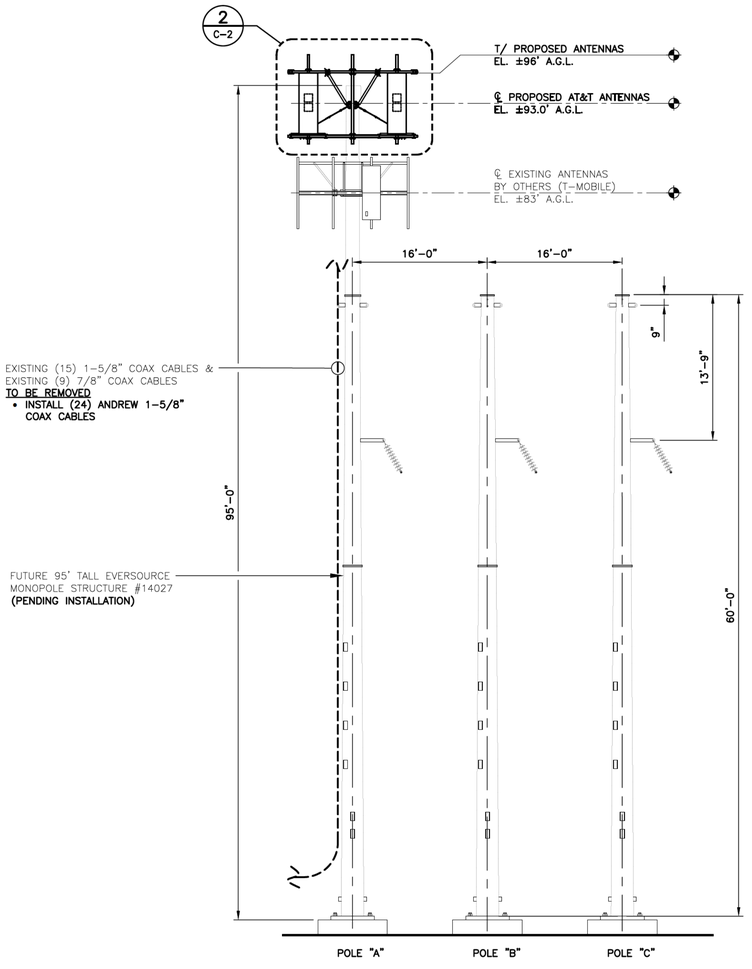
1 C-2 **ANTENNA CONFIGURATION PLAN** TRUE NORTH

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



2 C-2 **TYPICAL ANTENNA CONFIGURATION ELEVATION**

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



3 C-2 **TOWER ELEVATION - PROPOSED**

SCALE: 1" = 8'-0"

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING..

REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY TEP NORTHEAST (PROJECT # 23016.01) DATED 08/31/23, REV.1 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 23016.01) DATED 08/31/23 REV.2 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.

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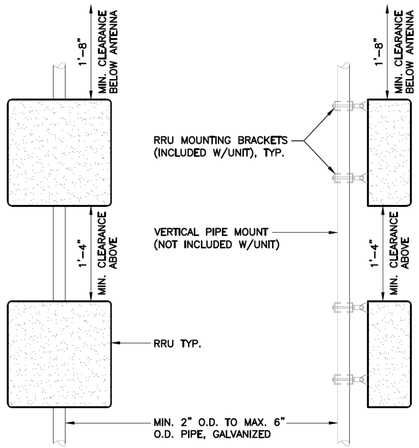
ANTENNA PLAN AND ELEVATIONS

C-2

Sheet No. 4 of 13

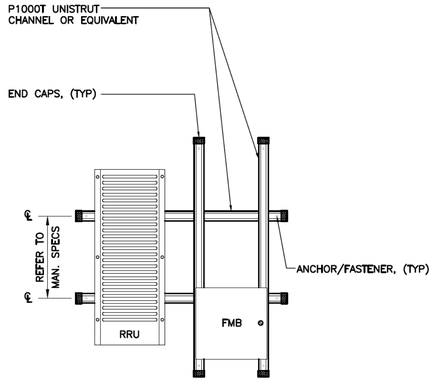


FRONT ELEVATION SIDE ELEVATION

NOTES: (PIPE MOUNTING)

1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 TYPICAL RRU MOUNTING DETAILS
C-3 SCALE: NOT TO SCALE



FRONT ELEVATION

NOTES: (UNISTRUT MOUNTING)

1. INSTALL A MINIMUM OF (2) ANCHORS PER UNISTRUT (± 16"o/c MIN).
2. MOUNT RRU TO UNISTRUT WITH 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER BRACKET.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

2 PROPOSED RRU DETAILS
C-3 SCALE: NOT TO SCALE

RRU 4449 B5/B12
RRU 8843 B2/B66A

RRU 4478 B14

RRU (REMOTE RADIO UNIT)		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: 4449 B5/B12	17.9"H x 13.2"W x 9.4"D	±71 LBS.
MAKE: ERICSSON MODEL: 4478 B14	14.9"H x 13.1"W x 7.3"D	±60 LBS.
MAKE: ERICSSON MODEL: 8843 B2/B66A	14.9"H x 13.2"W x 10.9"D	±72 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

3 PROPOSED DIPLEXER DETAIL
C-3 SCALE: NOT TO SCALE

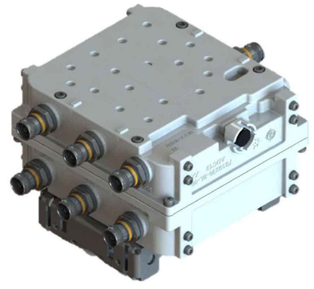
DBC0115F1V91-2

DIPLEXER (SINGLE UNIT)		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: KAELUS MODEL: DBC0115F1V91-2	4.5"H x 7.5"W x 5.9"D	±7.0 LBS
CONNECTORS: (3) LONG NECK 4.3-10 FEMALE		

TMAT192123B68-31

TMA (SINGLE UNIT)		
EQUIPMENT	DIMENSIONS	WEIGHT
MODEL: TMAT192123B68-31	11.1"H x 9.4"W x 3.8"D	±22.9 LBS
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

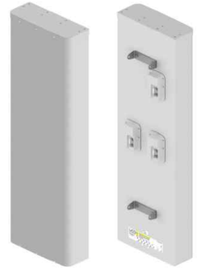
4 PROPOSED TMA DETAIL
C-3 SCALE: NOT TO SCALE



CBC61923T-DS

TRIPLEXER (SINGLE UNIT)		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: CBC61923T-DS	6.9"H x 7.7"W x 4.2"D	±11.7 LBS
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

5 PROPOSED TRIPLEXER DETAIL
C-3 SCALE: NOT TO SCALE



TPA65R-BU6DA-K

SECTOR ANTENNAS		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: TPA65R-BU6DA-K	71.2"H x 20.7"W x 7.7"D	±68.3 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

6 PROPOSED ANTENNA DETAIL
C-3 SCALE: NOT TO SCALE

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0	09/11/23	ASC	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
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TYPICAL EQUIPMENT DETAILS

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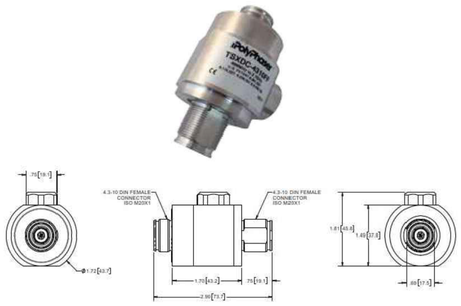
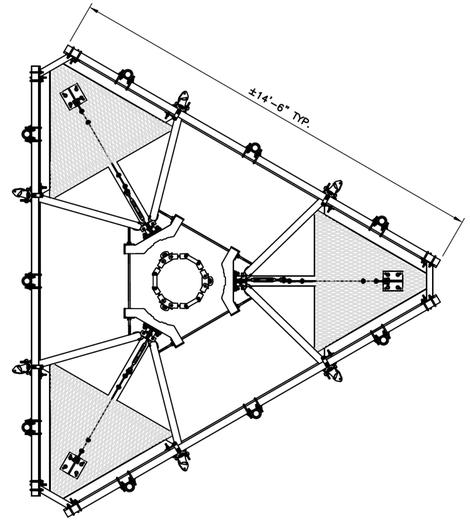


TSXDC-4310FM

SURGE ARRESTOR	
EQUIPMENT	DIMENSIONS
MAKE: POLYPHASER MODEL: TSXDC-4310FM	2.9"H x 1.81"W x 1.72"D

1 / C-4 **PROPOSED SURGE ARRESTOR**

SCALE: NOT TO SCALE



SITEPRO1:
RMQLP-4120-H10

2 / C-4 **PLATFORM ANTENNA MOUNT DETAIL**

SCALE: NOT SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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TYPICAL EQUIPMENT DETAILS

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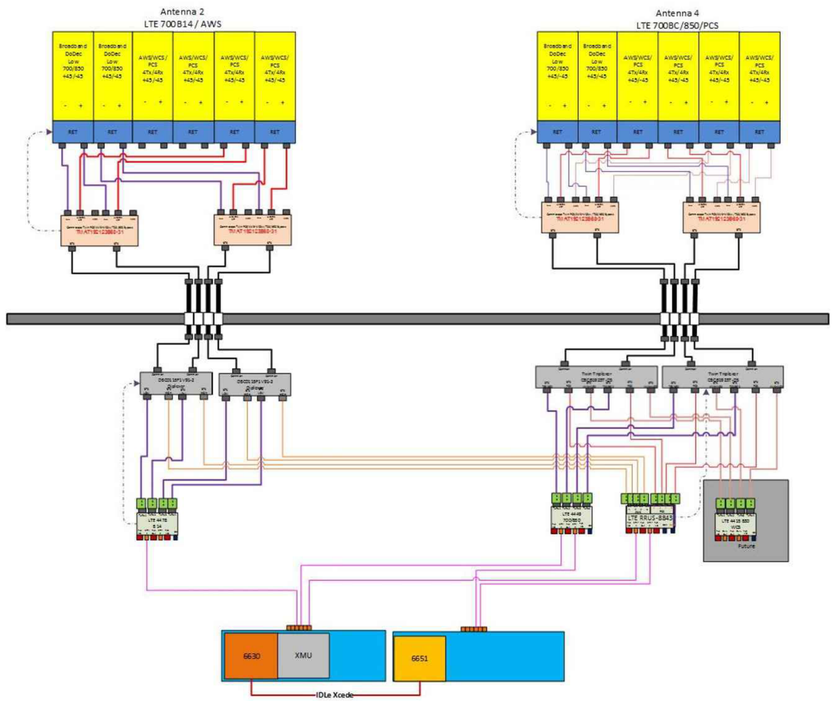
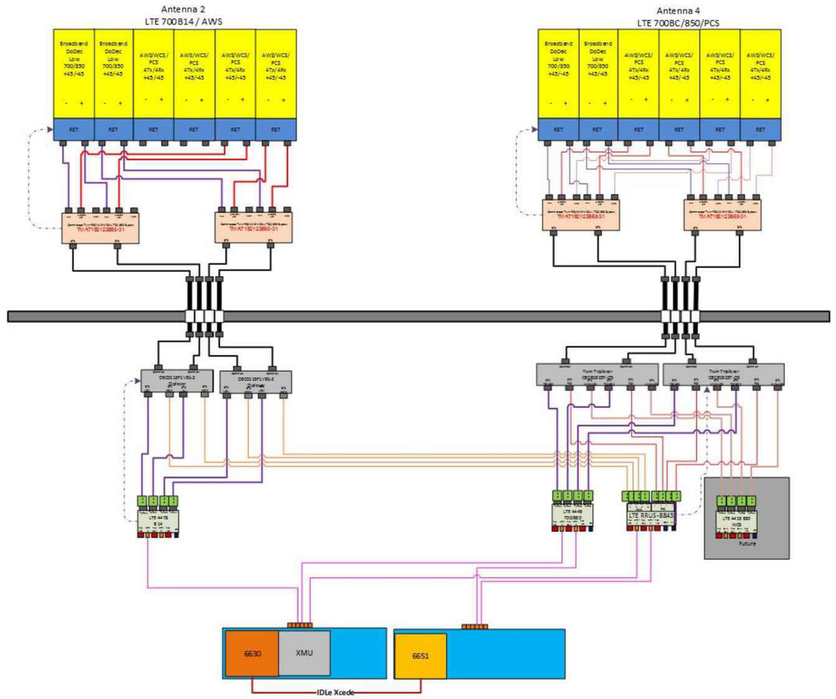
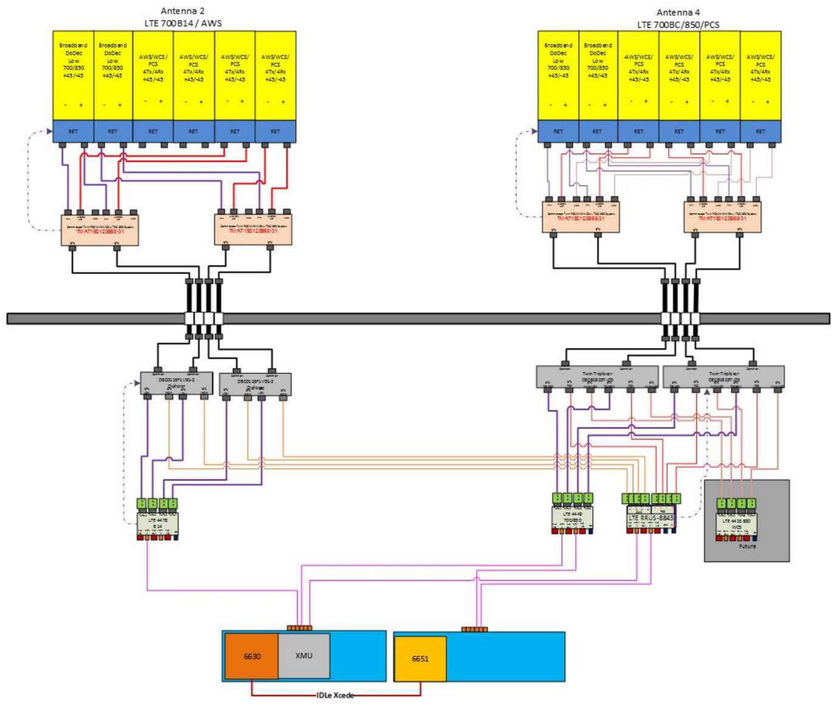


ALPHA SECTOR



BETA SECTOR



GAMMA SECTOR

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RF PLUMBING DIAGRAMS

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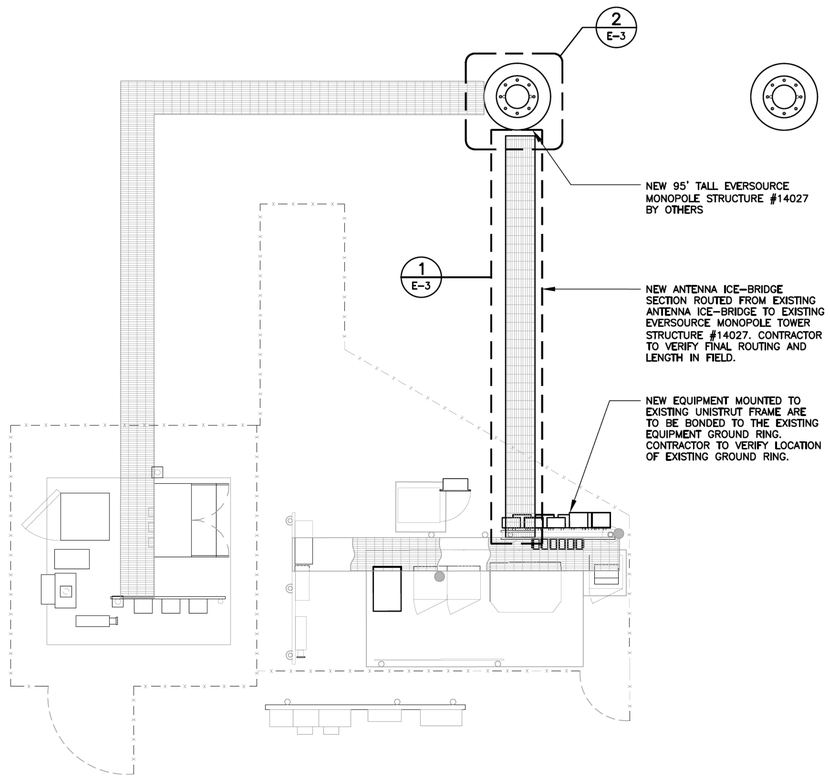

1 / E-1 **ELECTRICAL COMPOUND PLAN**
SCALE: 1/4" = 1'

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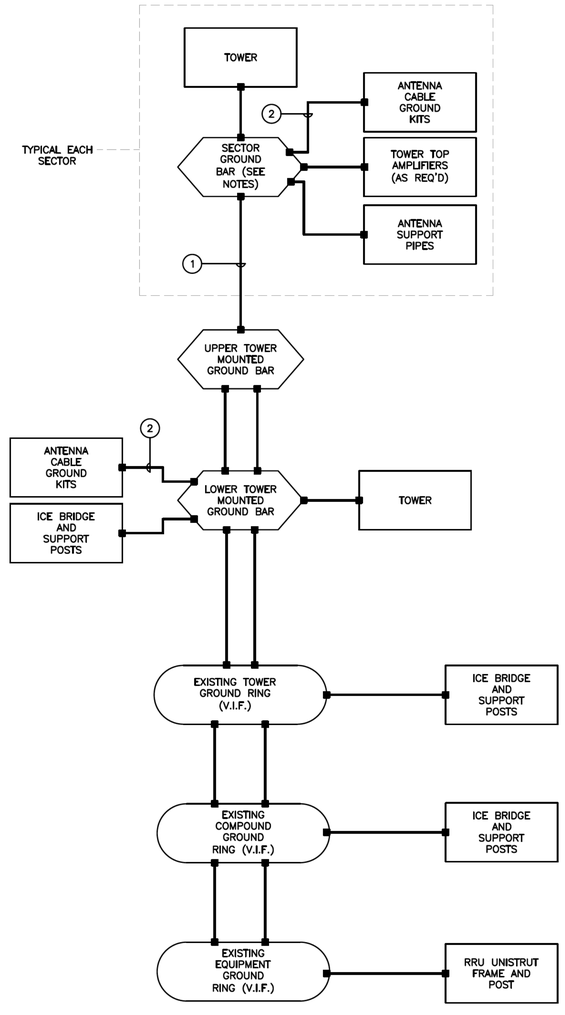
ELECTRICAL COMPOUND PLAN

E-1
Sheet No. 8 of 13



1 / E-2 **ELECTRICAL SCHEMATIC DIAGRAM**

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

(1) #2/0 GREEN INSULATED

(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY AND ICE BRIDGE SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. ALL BONDS TO TOWER SHALL BE MADE IN STRICT ACCORDANCE WITH SPECIFICATIONS OF TOWER MANUFACTURER OR STRUCTURAL ENGINEER.
7. REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
8. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
9. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
10. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
11. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.
12. COORDINATE WITH EVERSOURCE TRANSMISSION DEPARTMENT REPRESENTATIVE TO DETERMINE ADDITIONAL GROUNDING REQUIREMENTS. PROVIDE ALL REQUIRED ELEMENTS TO MEET EVERSOURCE APPROVAL.
13. COORDINATE WITH TOWER OWNER BEFORE INSTALLING ANY GROUNDING ELEMENTS ON TOWER OR BONDING TO EXISTING TOWER GROUND RING.

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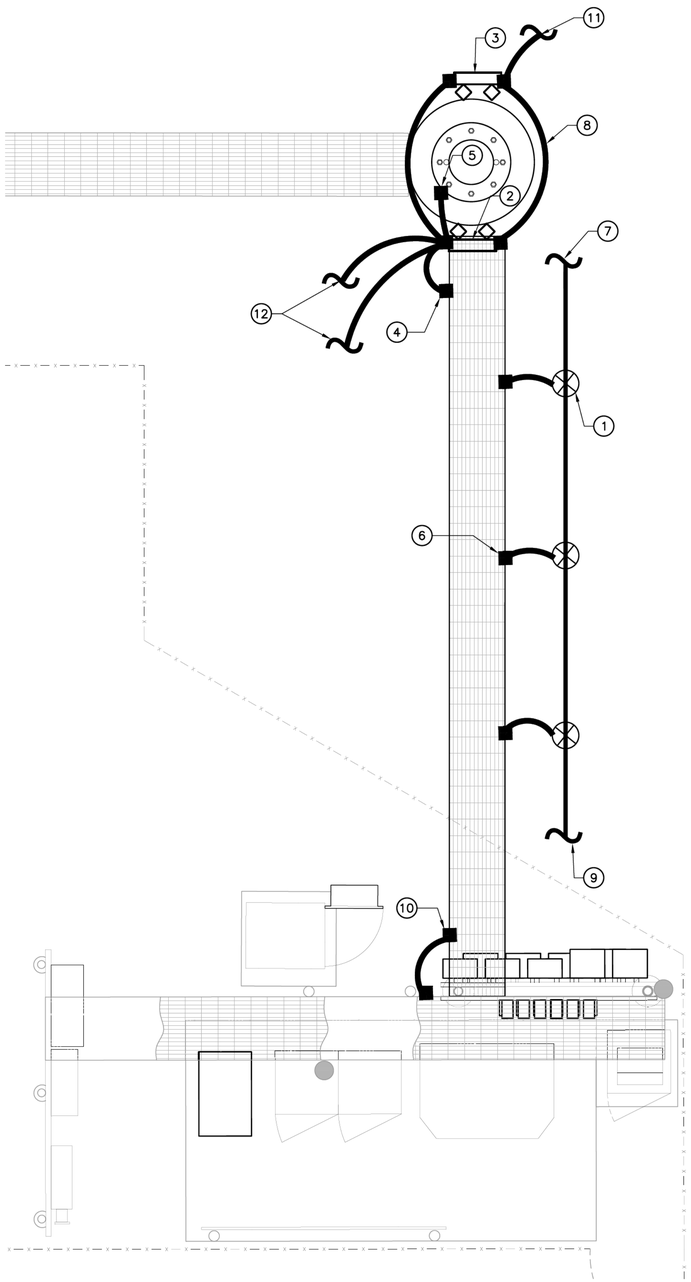
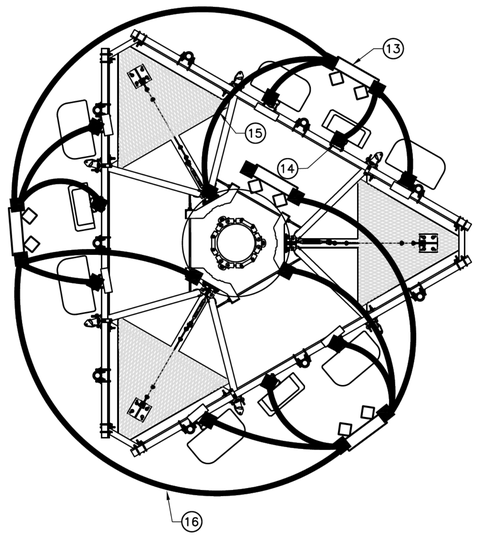
ELECTRICAL SCHEMATIC DIAGRAM

E-2

Sheet No. 9 of 13



1 E-3 **ELECTRICAL GROUNDING PLAN**
SCALE: NOT TO SCALE



2 E-3 **ELECTRICAL GROUNDING PLAN - ANTENNA**
SCALE: NOT TO SCALE

GROUNDING PLAN NOTES

1. GROUNDING ROD TYP.
2. LOWER TOWER MOUNTED GROUND BAR PER DETAILS.
3. UPPER TOWER MOUNTED GROUND BAR.
4. BOND GROUND BAR TO ICE-BRIDGE TYP.
5. BOND LOWER TOWER MOUNTED GROUND BAR TO TOWER STEEL
6. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO GROUND RING.
7. BOND GROUND RING TO EXISTING TOWER GROUND RING. VERIFY LOCATION OF EXISTING GROUND RING IN FIELD.
8. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2) GROUND LEADS.
9. BOND GROUND RING TO EXISTING COMPOUND GROUND RING. VERIFY LOCATION OF EXISTING GROUND RING IN FIELD.
10. BOND EXISTING SECTION OF ICE-BRIGDE TO NEW SECTION OF ICE-BRIDGE.
11. BOND UPPER TOWER MOUNTED GROUND BAR TO SECTOR GROUND BAR TYP.
12. BOND LOWER TOWER MOUNTED GROUND BAR TO EXISTING TOWER GROUND RING TYP 2 PLACES. VERIFY LOCATION OF EXISTING GROUND RING IN FIELD.
13. SECTOR GROUND BAR TYP.
14. BOND ANTENNA MOUNTING PIPES TO SECTOR GROUND BAR. (TYPICAL)
15. BOND SECTOR GROUND BAR TO TOWER STEEL.
16. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.

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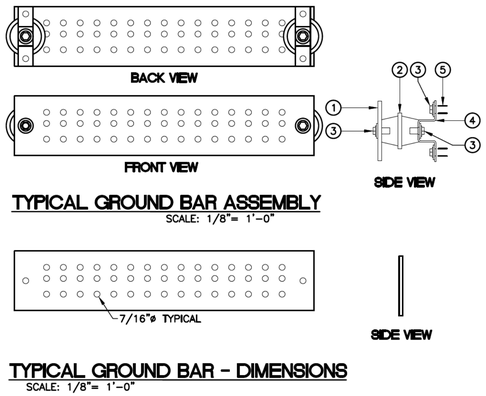
ELECTRICAL GROUNDING PLANS

E-3
Sheet No. 10 of 13

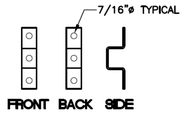


TYPICAL GROUND BAR ASSEMBLY
SCALE: 1/8"= 1'-0"

TYPICAL GROUND BAR - DIMENSIONS
SCALE: 1/8"= 1'-0"

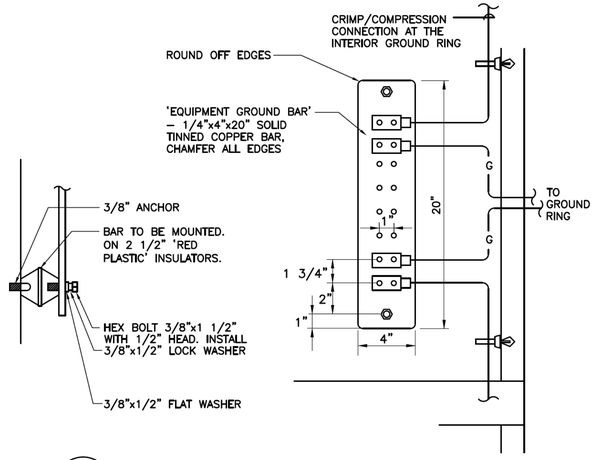
NOTES

1. HIGH CONDUCTIVITY TINNED COPPER BAR 1'-8"Lx4"Wx1/4"D.
2. RED COLORED STANDOFF INSULATOR PLASTIC #1872-1A.
3. STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS, SPLIT LOCKWASHER AND FLAT WASHER.
4. 1"Wx1/8"T STAINLESS STEEL TYPE 304 BRACKET.
5. STAINLESS STEEL TYPE 304 HARDWARE - 3/8"ø EXPANSION BOLT FOR CONCRETE.

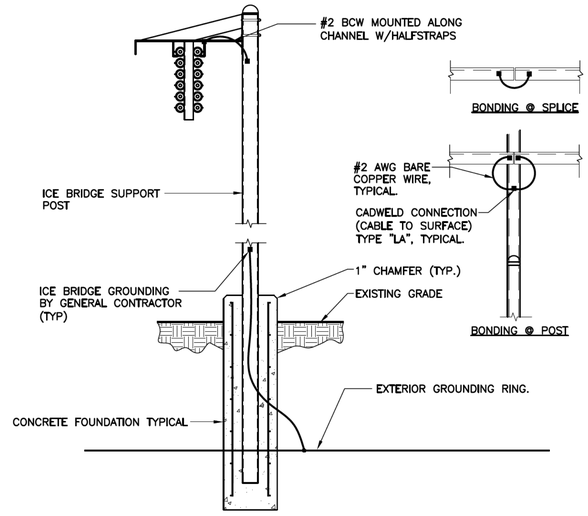


BRACKET FOR GROUND BAR-DIMENSIONS
SCALE: 1/8"= 1'-0"

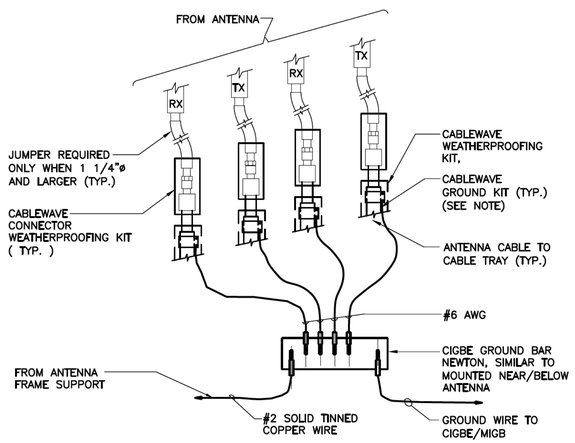
1 E-4 **MASTER/EQUIPMENT GROUND BAR DETAILS**
SCALE: NOT TO SCALE



2 E-4 **EQUIPMENT GROUND BAR DETAIL**
SCALE: NOT TO SCALE



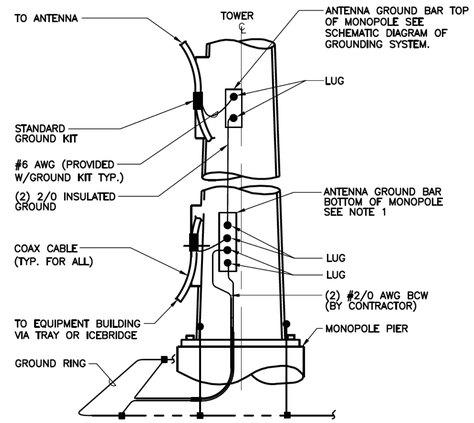
3 E-4 **ICE BRIDGE BONDING DETAIL**
SCALE: NOT TO SCALE



NOTES:

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

4 E-4 **CONNECTION OF GROUND WIRES TO GROUND BAR**
SCALE: NOT TO SCALE



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

5 E-4 **ANTENNA CABLE GROUNDING**
SCALE: NOT TO SCALE

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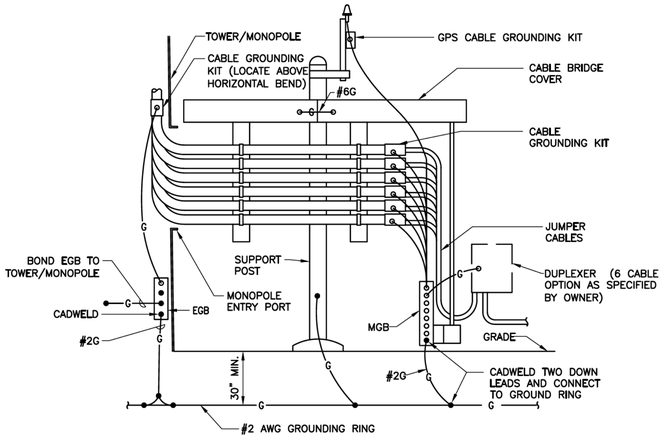
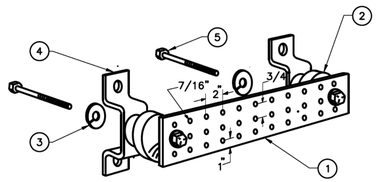
TYPICAL GROUNDING DETAILS

E-4

Sheet No. 11 of 13.



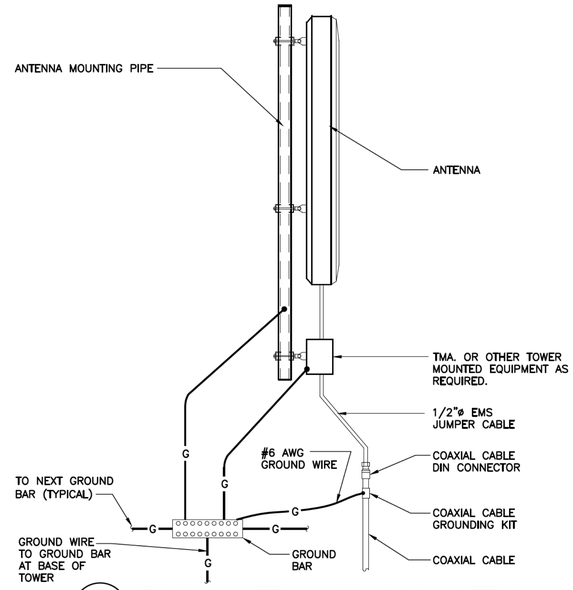
1 E-5 **CABLE BRIDGE GROUNDING DIAGRAM**
SCALE: NOT TO SCALE



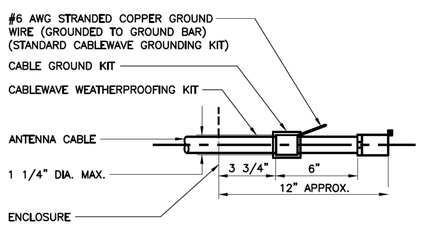
NOTES

1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

2 E-5 **GROUND BAR DETAIL**
SCALE: NOT TO SCALE



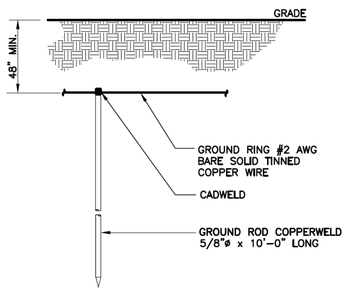
3 E-5 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NOT TO SCALE



NOTES:

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

4 E-5 **ANTENNA CABLE GROUNDING DETAIL**
SCALE: NOT TO SCALE

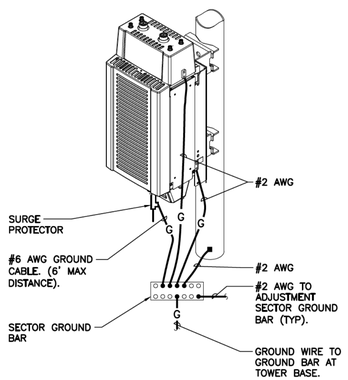


NOTES:

1. USE GROUND PLATE DETAIL IF 10 FT. GROUND ROD DEPTH CANNOT BE ACHIEVED DUE TO LEDGE CONDITION OR IF EXISTING TOWER FOUNDATION IS ENCOUNTERED.

5 E-5 **GROUND ROD DETAIL**
SCALE: NOT TO SCALE

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



6 E-5 **RRH POLE MOUNT GROUNDING**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/11/23	ASC	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
E	09/06/23	ASC	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
D	08/24/23	ASC	TJR	CONSTRUCTION DRAWINGS – REVISED RFDS
C	06/22/23	BSP	TJR	CONSTRUCTION DRAWINGS – REVISED TMA MODEL
B	05/19/23	BSP	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
A	05/01/23	BSP	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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(203) 488-8587 Fax
63-2 North Branford Road
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EVERSOURCE STRUCTURE #14027
1114 BARTHOLOMEW RD
MIDDLETOWN, CT 06457

DATE:	05/01/23
SCALE:	AS NOTED
JOB NO.	23016.01

TYPICAL GROUNDING DETAILS

E-5

Sheet No. 12 of 13

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.02. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR THE SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

F. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

G. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

H. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3-RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

I. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

J. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

K. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS-BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

L. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

M. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.

2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

N. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUITS

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". CONDUITS SHALL BE PROPERLY FASTENED AS REQUIRED BY THE N.E.C.

B. THE INTERIOR OF RACEWAYS/ENCLOSURES INSTALLED UNDERGROUND SHALL BE CONSIDERED TO BE WET LOCATION, INSULATED CONDUCTORS SHALL BE LISTED FOR USE IN WET LOCATIONS. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

C. CONDUIT INSTALLED UNDERGROUND SHALL BE INSTALLED TO MEET MINIMUM COVER REQUIREMENTS OF TABLE 300.5.

D. PROVIDE RIGID GALVANIZED STEEL CONDUIT (RMC) FOR THE FIRST 10 FOOT SECTION WHEN LEAVING A BUILDING OR SECTIONS PASSING THROUGH FLOOR SLABS

E. ONLY LISTED PVC CONDUIT AND FITTINGS ARE PERMITTED FOR THE INSTALLATION OF ELECTRICAL CONDUCTORS, SUITABLE FOR UNDERGROUND APPLICATIONS.

CONDUIT SCHEDULE SECTION 16111

CONDUIT TYPE	NEC REFERENCE	APPLICATION	MIN. BURIAL DEPTH (PER NEC TABLE 300.5) [2][3]
EMT	ARTICLE 358	INTERIOR CIRCUITING, EQUIPMENT ROOMS, SHELTERS	N/A
RMC, RIGID GALV. STEEL	ARTICLE 344, 300.5, 300.50	ALL INTERIOR/ EXTERIOR CIRCUITING, ALL UNDERGROUND INSTALLATIONS.	6 INCHES
PVC, SCHEDULE 40	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
PVC, SCHEDULE 80	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
LIQUID TIGHT FLEX. METAL	ARTICLE 350	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A
FLEX. METAL	ARTICLE 348	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A

[1] PHYSICAL DAMAGE IS SUBJECT TO THE AUTHORITY HAVING JURISDICTION.

[2] UNDERGROUND CONDUIT INSTALLED UNDER ROADS, HIGHWAYS, DRIVEWAYS, PARKING LOTS SHALL HAVE MINIMUM DEPTH OF 24".

[3] WHERE SOLID ROCK PREVENTS COMPLIANCE WITH MINIMUM COVER DEPTHS, WIRING SHALL BE INSTALLED IN PERMITTED RACEWAY FOR DIRECT BURIAL. THE RACEWAY SHALL BE COVERED BY A MINIMUM OF 2" OF CONCRETE EXTENDING DOWN TO ROCK.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

	120/208/240V	277/480V
LINE	COLOR	COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE

3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE

4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON-FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON-METALLIC ENGRAVED BACK-LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1-1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.

2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.

2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.

3. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 10 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS

2. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).

3. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN-RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME-DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.

2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.

3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE CONNECTED TO THE PANELBOARDS SO THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	09/11/23	ASC	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
E	09/06/23	ASC	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
D	08/24/23	ASC	TJR	CONSTRUCTION DRAWINGS – REVISED RFDS
C	06/22/23	BSP	TJR	CONSTRUCTION DRAWINGS – REVISED TMA MODEL
B	05/19/23	BSP	TJR	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
A	05/01/23	BSP	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
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www.CentekEng.com

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EVERSOURCE STRUCTURE #14027
114 BARTHOLOMEW RD
MIDDLETOWN, CT 06457

DATE: 05/01/23
SCALE: AS NOTED
JOB NO. 23016.01

ELECTRICAL SPECIFICATIONS

E-6

Sheet No. 13 of 13

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Utility Pole

AT&T Site Ref: CT5436

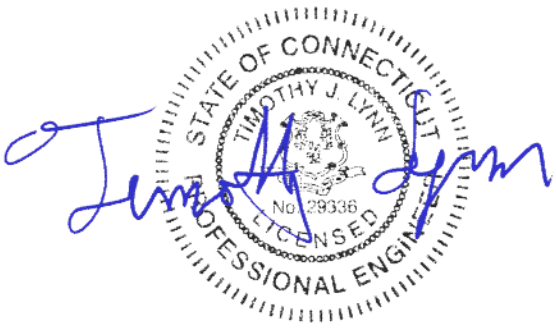
Eversource Structure No. 14027
95' Tall Electric Transmission Pole

701 Bartholomew Street
Middletown, CT

CENTEK Project No. 23016.01

~~Date: March 14, 2023~~
Rev 2: August 31, 2023

Max Stress Ratio = 59.3%



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

Table of Contents

Introduction

The purpose of this report is to analyze the 95' utility pole located in Middletown, CT for the proposed antenna and equipment upgrade by AT&T.

The loads consist of the following:

- **AT&T (Final Configuration):**
  Antennas: Six (6) CCI TPA65R-BU6D panel antennas and twelve (12) Commscope TMAT192123B68-31 TMAs mounted on one (1) Platform (SitePro p/n RMQLP-4120-H10) to the utility pole with a RAD center elevation of 93-ft above grade.
  Cables: Twenty-four (24) 1-5/8" ∅ coax cables mounted to the outside of the pole as indicated in Section 4 of this report.
- T-MOBILE (Final Configuration):
  Antennas: Three (3) RFS APXVAALL18_43 panel antennas and three (3) Commscope ATSBT-TOP-MF-4G Bias Tees mounted on one (1) Platform (SitePro p/n RMQLP-496-HK) to the utility pole with a RAD center elevation of 83-ft above grade.
  Cables: Twenty-four (24) 1-5/8" ∅ coax cables mounted to the outside of the pole as indicated in Section 4 of this report.

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 48-19, "Design of Steel Transmission Pole Structures", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Structural analysis of the utility pole was independently completed using the current version of PLSPole computer program licensed to CENTEK Engineering, Inc.

NESC prescribed loads for the proposed wireless equipment were calculated to analyze the utility tower. Section 5 of this report details these loads.

Design Basis

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

- UTILITY POLE ANALYSIS

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

  Load cases considered:

  Load Case 1: NESC Heavy Wind

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

Wind Speed.....	110 mph [(1)]
Radial Ice Thickness.....	0"

  Load Case 3: NESC Extreme Ice w/ Wind

Wind Pressure.....	6.4 psf
Radial Ice Thickness.....	0.75"
Vertical Overload Capacity Factor.....	1.0
Wind Overload Capacity Factor.....	1.0

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

Results

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 48-19, "Design of Steel Transmission Pole Structures", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

A maximum usage of 59.30**%** 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
Section 3	0.00' -40.00' (AGL)	42.39%	**PASS**

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	59.30%	**PASS**

FLANGE:

The flange bolts and flange plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Flange Bolts	Tension	27.1%	**PASS**
Flange Plate	Bending	24.4%	**PASS**

- FOUNDATION AND ANCHORS

The base of the tower is connected to the foundation by means of (20) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure. Review of the foundation consisted of a comparison of the base reactions obtained from the proposed tower analysis and the original foundation design.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	35.60 kips	82.81 kips	1880.43 ft-kips
NESC Extreme Wind	53.79 kips	40.79 kips	2976.54 ft-kips
NESC Extreme Ice w/ Wind	29.69 kips	72.05 kips	1620.12 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	48.46%	**PASS**

FOUNDATION:

Force	Original Design Loading	Proposed Loading	Result
Moment	6,338 ft-kips	3,374 ft-kips	**PASS**
Shear	103.4 kips	59.2 kips	**PASS**
Axial	130.0 kips	44.9 kips	**PASS**

Note 1: Taken from Sabre design drawing 23-23807-001 dated 7/11/23.

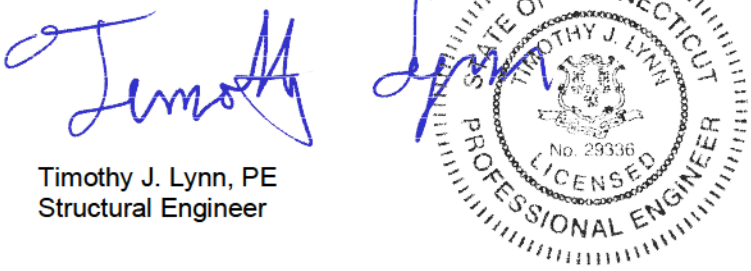
Conclusion

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

The analysis is based, in part on the information provided to this office by Eversource and 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 ~ PLS-POLE

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

Modeling Features:

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

Analysis Features:

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

Results Features:

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

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

Introduction

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

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

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

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

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 1700-year recurrence for TIA-22-H risk category III and a 100-year recurrence for NESC Grade B. The second is a winter condition combining wind and ice loadings.

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

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

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 2023 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

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

Attachment A
Eversource Design Criteria

		Attachment A ES Design Criteria	Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	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:

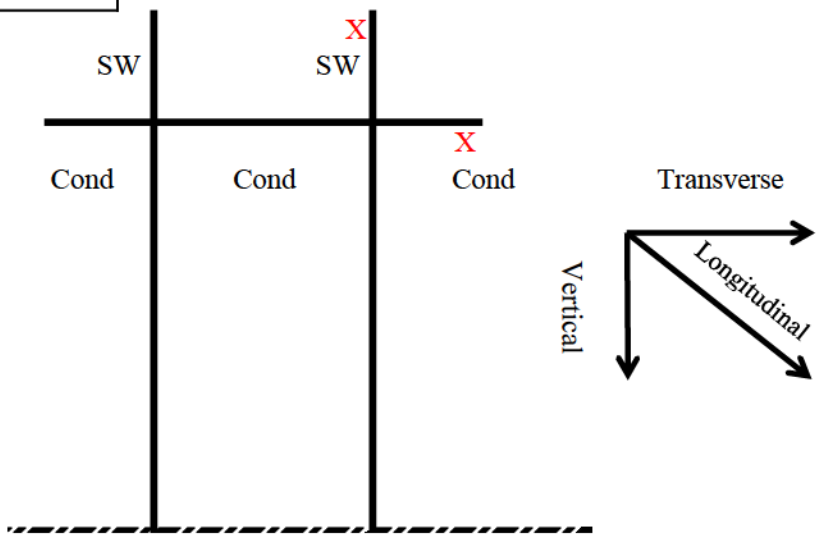
Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

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.

EVERSOURCE

Wire Loads
Load Tree

Project Number
Line 1620 OPGW Instal
Structure Number
14027
Line Number
1620



Single Circuit Steel H-Frame Configuration
X Denotes Broken Wire Location

	Case	Vertical	Transverse	Longitudinal
Conductor	1	18792.306	21636.539	0
	2	7949.04	25705.413	0
	3	7949.04	7084.8456	0
	4	19346.568	18689.813	0
	5	12528.204	15306.035	0
	6	7949.04	7084.8456	0
	7a	17657.264	17924.407	-12522.81
	7b	10887.179	10500.144	-37568.44
	Case	Vertical	Transverse	Longitudinal
Shield Wire	1	2103.8616	3922.5122	0
	2	547.2	3592.8743	0
	3	547.2	937.70016	0
	4	3004.3488	3577.6745	0
	5	1402.5744	2658.1263	0
	6	547.2	937.70016	0
	7a	1227.2526	1892.6728	-6151.558
	7b	1227.2526	1892.6728	-6151.558

EVERSOURCE

Wire Loads

Project Name	Line 1620 OPGW Install and Structure Replacement
Work Order	80184053
Structure #	14027
Line #	1620
Prepared By	TM
Date	9/14/2022
Checked By	
Date	

Structure Data

Structure Height (AGL)	60	Load Zone	Central CT
# of Circuits	1	Insulation Type	Suspension (Concrete Foundation
Insulator Weight	300	Broken Wire Side	Ahead
Broken Wire Side	Left	Structure Type	Single Circuit Steel H-Frame

Wire Data

Circuit #	Left	Right
Shield Wire	0.646 OPGW 48	0.646 OPGW 48
Conductor	FALCON/ACSS	(Select)
# of Conductors	3	

Line Geometry

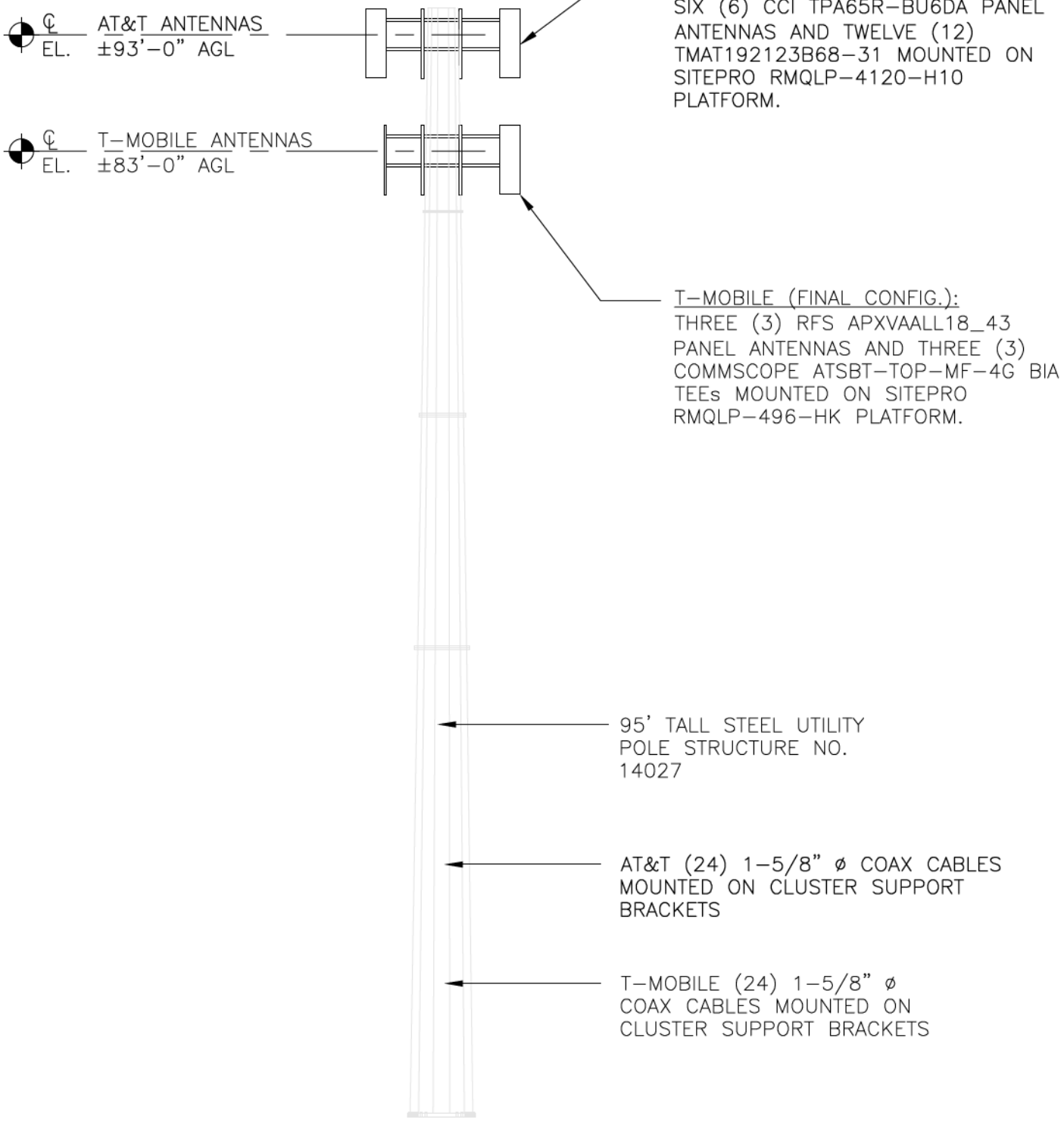
	Circuit 1			Circuit 2		
	Ahead	Back	Total	Ahead	Back	Total
Wind Span	700	600	1300			0
Weight Span	500	700	1200			0
Minimum Line Angle	3	3	6			0
Maximum Line Angle	10	10	20			0

Wire Tensions

	Left Circuit		Right Circuit		
	Ahead	Back	Ahead	Back	
NESC Rule 250B	11400	11400			Conductor
NESC Rule 250C	9350	9350			
NESC Rule 250D	13400	13400			
60°F, No wind or ice	6800	6800			
NESC Rule 250B	5600	5600			Shield Wire
NESC Rule 250C	4300	4300			
NESC Rule 250D	7000	7000			
60°F, No wind or ice	2700	2700			

All Loads include Overload Factors but not Pole Shape Factors

Load Case	Description
1	NESC Rule 250B; 0°F, ½" of ice, 4 psf wind
2	NESC Rule 250C; (Extreme Wind Loading)
3	NESC Rule 250C; Extreme Wind Longtitudinal On The Pole Only
4	NESC Rule 250D; 15°F 1" of ice, 4 psf or NU Ice Case; 32°F 1" Ice
5	NESC Rule 250B with no OLFs (Service Load)
6	60°F, No wind or Ice (Deflection)
7a	NESC Rule 250B/261C Broken Wire Case (Broken SW and Borken Conductor)
7b	NESC Rule 250B/261C Broken Wire Case (Broken SW or Broken Phase)



1
SK-1

TOWER ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	3/14/23	ISSUED FOR REVIEW
01	4/5/23	CONSTRUCTION
02	8/31/23	CONSTRUCTION

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

CT5436
STRUCTURE 14027

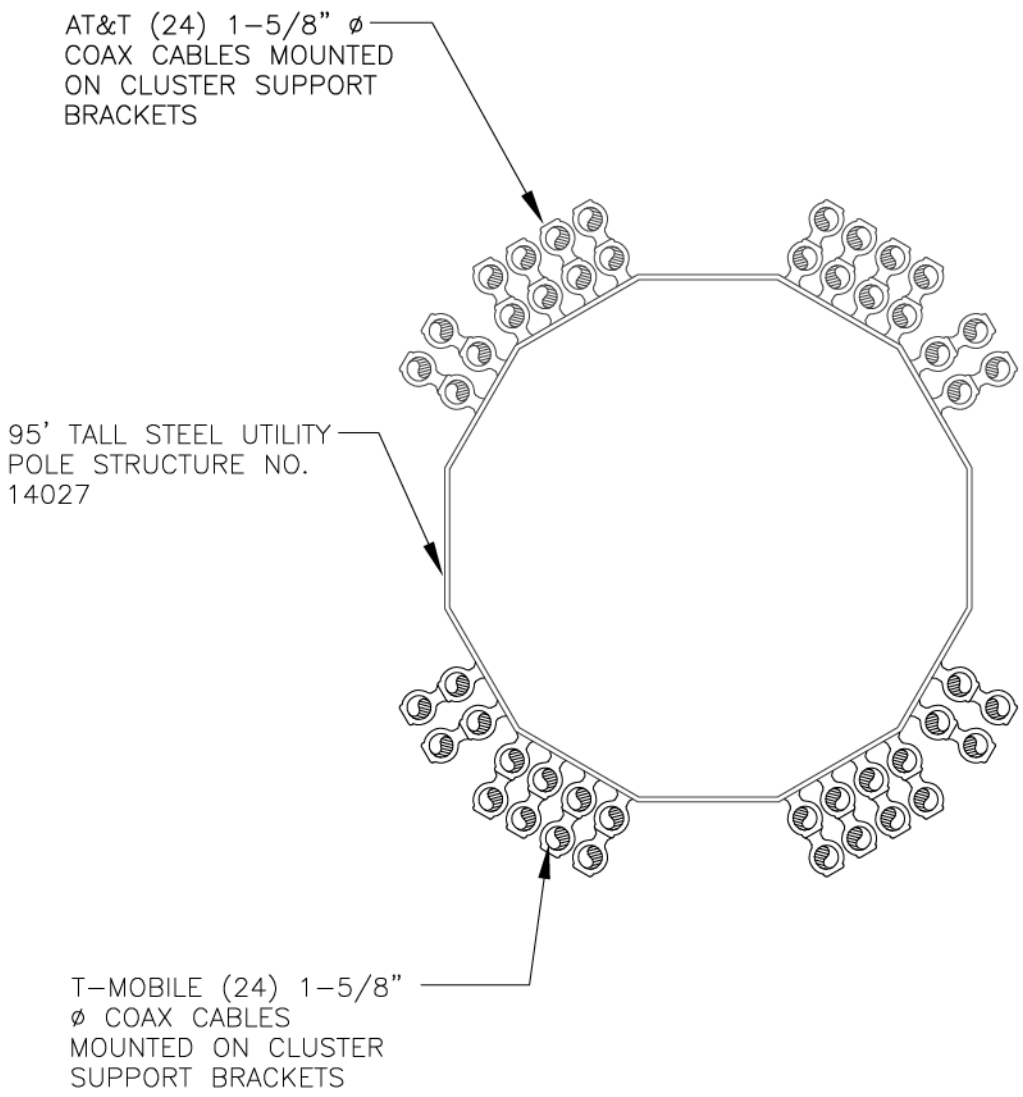
701 BARTHOLOMEW STREET
MIDDLETOWN, CT

PROJECT NO:	23016.01
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	3/8/23

TOWER ELEVATION

SK-1

DWG. 1 OF 2



1 / SK–2 **COAX CABLE PLAN**

SCALE: NOT TO SCALE

REVISIONS		
00	3/14/23	ISSUED FOR REVIEW
01	4/5/23	CONSTRUCTION
02	8/31/23	CONSTRUCTION

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

CT5436
STRUCTURE 14027

701 BARTHOLOMEW STREET
MIDDLETOWN, CT

PROJECT NO:	23016.01
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	3/8/23

FEELINE PLAN

SK-2

DWG. 2 OF 2

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

Subject: Loads - Structure #14027

Location: Middletown, CT

Rev. 2: 8/31/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 23016.01

Basic Components

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

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	$TME := 95$ ft	(User Input)
Multiplier Gust Response Factor =	$m := 1.25$	(User Input - Only for NESC Extreme wind case)
Velocity Pressure Coefficient =	$Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.252$	(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 =	$z_s := 0.67 \cdot TME = 63.65$	(NESC 2023 Table 250-3)
Turbulence Intensity =	$I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.179$	(NESC 2023 Table 250-3)
Response Term =	$B_t := \left[\frac{1}{\left[1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right]}\right]^{0.5} = 0.928$	(NESC 2023 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(4.61 \cdot I_z \cdot B_t\right)\right]}{\left(1 + 6.1 \cdot I_z\right)} = 0.844$	(NESC 2023 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot psf = 32.7 \cdot psf$	(NESC 2023 Section 250.C.1)

NESC Extreme Ice w/ Wind Components

Heavy Wind Pressure =	$p_{ex} := 6.4 \cdot psf$	(User Input NESC 2023 Figure 250-3 & Table 250-4)
Radial Ice Thickness =	$Ir_{ex} := 0.75 \cdot in$	(User Input NESC 2023 Figure 250-3)

Shape Factors

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

Overload Factors

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Loads - Structure #14027

Location: Middletown, CT

Rev. 2: 8/31/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 23016.01

Development of Wind & Ice Load on Antennas

Antenna Data: (AT&T)

Antenna Model =	CCI TPA65-BU6D	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 71.2 \cdot in$	(User Input)
Antenna Width =	$W_{ant} := 20.7 \cdot in$	(User Input)
Antenna Thickness =	$T_{ant} := 7.7 \cdot in$	(User Input)
Antenna Weight =	$WT_{ant} := 70 \cdot lb$	(User Input)
Number of Antennas =	$N_{ant} := 6$	(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 420 lb$

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 11349 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot lr)(W_{ant} + 2 \cdot lr)(T_{ant} + 2 \cdot lr) - V_{ant} = 2282 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot ld = 74 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 444 lb$

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot lr_{ex})(W_{ant} + 2 \cdot lr_{ex})(T_{ant} + 2 \cdot lr_{ex}) - V_{ant} = 3500 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot ld = 113 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant1} := W_{ICE.exant} \cdot N_{ant} = 680 lb$

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot lr) \cdot (W_{ant} + 2 \cdot lr) = 10.9 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 65.3 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 418 lb$

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 10.2 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 61.4 ft^2$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 4020 lb$

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot lr_{ex}) \cdot (W_{ant} + 2 \cdot lr_{ex}) = 11.2 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 67.2 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant1} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 861 lb$

Development of Wind & Ice Load on Antennas

Antenna Data: (AT&T)

Antenna Model =	Commscope TMAT192123B68-31	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 9.37 \cdot in$	(User Input)
Antenna Width =	$W_{ant} := 11.142 \cdot in$	(User Input)
Antenna Thickness =	$T_{ant} := 3.819 \cdot in$	(User Input)
Antenna Weight =	$WT_{ant} := 23 \cdot lb$	(User Input)
Number of Antennas =	$N_{ant} := 12$	(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 276 lb$

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 399 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot lr)(W_{ant} + 2 \cdot lr)(T_{ant} + 2 \cdot lr) - V_{ant} = 208 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot ld = 7 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 81 lb$

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot lr_{ex})(W_{ant} + 2 \cdot lr_{ex})(T_{ant} + 2 \cdot lr_{ex}) - V_{ant} = 332 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot ld = 11 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant2} := W_{ICE.exant} \cdot N_{ant} = 129 lb$

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot lr) \cdot (W_{ant} + 2 \cdot lr) = 0.9 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 10.5 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 67 lb$

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 0.7 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 8.7 ft^2$

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 569 lb$

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot lr_{ex}) \cdot (W_{ant} + 2 \cdot lr_{ex}) = 1 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 11.5 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant2} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 147 lb$

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Subject:	Loads - Structure #14027
Location:	Middletown, CT
Rev. 2: 8/31/23	Prepared by: T.J.L Checked by: C.F.C. Job No. 23016.01

Development of Wind & Ice Load on Mounts

Mount Data: (AT&T)

Mount Type:	SitePro RMQLP-4120-H10	
Mount EPA (no ice) =	$EPA := 28.15 \cdot ft^2$	(User Input from SitePro Document)
Mount EPA (0.5" ice) =	$EPA_{ice} := 34.10 \cdot ft^2$	(User Input from SitePro Document)
Mount EPA (0.75" ice) =	$EPA_{ice.ex} := 37.10 \cdot ft^2$	(User Input from SitePro Document/Interpolation)
Weight (no ice) =	$W := 3265 \cdot lb$	(User Input from SitePro Document)
Weight (0.5" ice) =	$W_{ice} := 3657 \cdot lb$	(User Input from SitePro Document)
Weight (0.75" ice) =	$W_{ice.ex} := 3920 \cdot lb$	(User Input from SitePro Document/Interpolation)
Total Pipe Length =	$TPL := 12 \cdot 10 \cdot ft = 120 ft$	
Total Antenna Length =	$TAL := 71.2 \cdot in \cdot 6 + 31.1 \cdot in \cdot 3 + 30.6 \cdot in \cdot 3 = 51.025 ft$	
Exposed Pipe Area =	$ExPA := (TPL - TAL) 2.375 \cdot in = 13.651 ft^2$	
Exposed Pipe Area (0.5" Ice) =	$ExPA_{ice} := (TPL - TAL) 3.375 \cdot in = 19.399 ft^2$	
Exposed Pipe Area (0.75" Ice) =	$ExPA_{ice.ex} := (TPL - TAL) 3.875 \cdot in = 22.273 ft^2$	
Mount Projected Surface Area =	$CdAa := 1.3 \cdot ExPA + EPA = 45.9 ft^2$	
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 1.3 \cdot ExPA_{ice} + EPA_{ice} = 59.3 ft^2$	
Mount Projected Surface Area w/ Extreme Ice =	$CdAa_{ice.ex} := 1.3 \cdot ExPA_{ice.ex} + EPA_{ice.ex} = 66.1 ft^2$	

Gravity Loads (without ice)	
Weight of All Mounts =	$Wt_{mnt1} := W = 3265 lb$
Gravity Load (ice only)	
Weight of Ice on All Mounts =	$Wt_{ice.mnt1} := W_{ice} - W = 392 lb$
Gravity Load (extreme ice only)	
Weight of Ice on All Mounts =	$Wt_{ice.ex.mnt1} := W_{ice.ex} - W = 655 lb$
Wind Load (NESC Heavy)	
Total Mount Wind Force w/ Ice =	$Fi_{mnt1} := p \cdot CdAa_{ice} = 237 lb$
Wind Load (NESC Extreme)	
Total Mount Wind Force =	$F_{mnt1} := qz \cdot CdAa \cdot m = 1878 lb$
Wind Load (NESC Extreme Ice w/ Wind)	
Total Mount Wind Force w/ Extreme Ice =	$Fi_{ex.mnt1} := p_{ex} \cdot CdAa_{ice.ex} \cdot m = 528 lb$

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Subject:	Loads - Structure #14027
Location:	Middletown, CT
Rev. 2: 8/31/23	Prepared by: T.J.L Checked by: C.F.C. Job No. 23016.01

Development of Wind & Ice Load on Antennas

Antenna Data: (T-Mobile)

Antenna Model =	RFSAPXVAALL18_43	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 72 \cdot in$	(User Input)
Antenna Width =	$W_{ant} := 24 \cdot in$	(User Input)
Antenna Thickness =	$T_{ant} := 8.5 \cdot in$	(User Input)
Antenna Weight =	$WT_{ant} := 118 \cdot lb$	(User Input)
Number of Antennas =	$N_{ant} := 3$	(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 354\,lb$

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 14688 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot lr)(W_{ant} + 2 \cdot lr)(T_{ant} + 2 \cdot lr) - V_{ant} = 2650 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot ld = 86\,lb$

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 258\,lb$

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot lr_{ex})(W_{ant} + 2 \cdot lr_{ex})(T_{ant} + 2 \cdot lr_{ex}) - V_{ant} = 4055 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot ld = 131\,lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant3} := W_{ICE.exant} \cdot N_{ant} = 394\,lb$

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot lr) \cdot (W_{ant} + 2 \cdot lr) = 12.7\,ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 38\,ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 243\,lb$

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 12\,ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 36\,ft^2$

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2356\,lb$

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot lr_{ex}) \cdot (W_{ant} + 2 \cdot lr_{ex}) = 13\,ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 39\,ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant3} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 500\,lb$

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Subject: Loads - Structure #14027

Location: Middletown, CT

Rev. 2: 8/31/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 23016.01

Development of Wind & Ice Load on Antennas

Antenna Data: (T-Mobile)

Antenna Model =	CommscopeATSBT-TOP-MF-4G	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 5.63 \cdot in$	(User Input)
Antenna Width =	$W_{ant} := 3.701 \cdot in$	(User Input)
Antenna Thickness =	$T_{ant} := 1.969 \cdot in$	(User Input)
Antenna Weight =	$WT_{ant} := 2 \cdot lb$	(User Input)
Number of Antennas =	$N_{ant} := 3$	(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant4} := WT_{ant} \cdot N_{ant} = 6 lb$

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 41 \cdot in^3$

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot lr)(W_{ant} + 2 \cdot lr)(T_{ant} + 2 \cdot lr) - V_{ant} = 52 \cdot in^3$

Weight of Ice on Each Antenna = $W_{ICEant} := V_{ice} \cdot ld = 2 lb$

Weight of Ice on All Antennas = $Wt_{ice.ant4} := W_{ICEant} \cdot N_{ant} = 5 lb$

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot lr_{ex})(W_{ant} + 2 \cdot lr_{ex})(T_{ant} + 2 \cdot lr_{ex}) - V_{ant} = 88 \cdot in^3$

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := V_{ice.ex} \cdot ld = 3 lb$

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant4} := W_{ICE.exant} \cdot N_{ant} = 9 lb$

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := (L_{ant} + 2 \cdot lr) \cdot (W_{ant} + 2 \cdot lr) = 0.2 ft^2$

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.6 ft^2$

Total Antenna Wind Force w/ Ice = $Fi_{ant4} := p \cdot Cd_F \cdot A_{ICEant} = 4 lb$

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := L_{ant} \cdot W_{ant} = 0.1 ft^2$

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.4 ft^2$

Total Antenna Wind Force = $F_{ant4} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 28 lb$

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := (L_{ant} + 2 \cdot lr_{ex}) \cdot (W_{ant} + 2 \cdot lr_{ex}) = 0.3 ft^2$

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 0.8 ft^2$

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant4} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 10 lb$

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Subject: Loads - Structure #14027

Location: Middletown, CT

Rev. 2: 8/31/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 23016.01

Development of Wind & Ice Load on Mounts

Mount Data: (T-Mobile)

Mount Type:	SitePro RMQLP-496-HK	
Mount EPA (no ice) =	$EPA := 26.29 \cdot ft^2$	(User Input from SitePro Document)
Mount EPA (0.5" ice) =	$EPA_{ice} := 32.25 \cdot ft^2$	(User Input from SitePro Document)
Mount EPA (0.75" ice) =	$EPA_{ice.ex} := 35.12 \cdot ft^2$	(User Input from SitePro Document/Interpolation)
Weight (no ice) =	$W := 2130 \cdot lb$	(User Input from SitePro Document)
Weight (0.5" ice) =	$W_{ice} := 2580 \cdot lb$	(User Input from SitePro Document)
Weight (0.75" ice) =	$W_{ice.ex} := 2873 \cdot lb$	(User Input from SitePro Document/Interpolation)
Total Pipe Length =	$TPL := 12 \cdot 8 \cdot ft = 96\,ft$	
Total Antenna Length =	$TAL := 72 \cdot in \cdot 3 = 18\,ft$	
Exposed Pipe Area =	$ExPA := (TPL - TAL)2.375 \cdot in = 15.438\,ft^2$	
Exposed Pipe Area (0.5" Ice) =	$ExPA_{ice} := (TPL - TAL)3.375 \cdot in = 21.938\,ft^2$	
Exposed Pipe Area (0.75" Ice) =	$ExPA_{ice.ex} := (TPL - TAL)3.875 \cdot in = 25.188\,ft^2$	
Mount Projected Surface Area =	$CdAa := 1.3 \cdot ExPA + EPA = 46.4\,ft^2$	
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 1.3 \cdot ExPA_{ice} + EPA_{ice} = 60.8\,ft^2$	
Mount Projected Surface Area w/ Extreme Ice =	$CdAa_{ice.ex} := 1.3 \cdot ExPA_{ice.ex} + EPA_{ice.ex} = 67.9\,ft^2$	

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt2} := W = 2130\,lb$

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt2} := W_{ice} - W = 450\,lb$

Gravity Load (extreme ice only)

Weight of Ice on All Mounts = $Wt_{ice.ex.mnt2} := W_{ice.ex} - W = 743\,lb$

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt2} := p \cdot CdAa_{ice} = 243\,lb$

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt2} := qz \cdot CdAa \cdot m = 1896\,lb$

Wind Load (NESC Extreme Ice w/ Wind)

Total Mount Wind Force w/ Extreme Ice = $Fi_{ex.mnt2} := p_{ex} \cdot CdAa_{ice.ex} \cdot m = 543\,lb$

Total Equipment Loads:

AT&T Loads:

NESC Heavy Wind Vertical =

$Wt_{tot} := (Wt_{ant1} + Wt_{ant2} + Wt_{mnt1}) = 3961\,lb$

$Wt_{ice.tot} := (Wt_{ice.ant1} + Wt_{ice.ant2} + Wt_{ice.mnt1}) = 917\,lb$

$(Wt_{tot} + Wt_{ice.tot}) \cdot 1.5 = 7316\,lb$

NESC Heavy Wind Trasnsverse = $(Fi_{ant1} + Fi_{ant2} + Fi_{mnt1}) \cdot 2.5 = 1806\,lb$

NESC Extreme Wind Vertical = $(Wt_{ant1} + Wt_{ant2} + Wt_{mnt1}) = 3961\,lb$

NESC Extreme Wind Trasnsverse = $(F_{ant1} + F_{ant2} + F_{mnt1}) = 6467\,lb$

NESC Extreme Ice w/Wind Vertical =

$Wt_{ice.ex.tot} := (Wt_{ice.ex.ant1} + Wt_{ice.ex.ant2} + Wt_{ice.ex.mnt1}) = 1465\,lb$

$(Wt_{tot} + Wt_{ice.ex.tot}) = 5426\,lb$

NESC Extreme Ice w/Wind Trasnsverse = $(Fi_{ex.ant1} + Fi_{ex.ant2} + Fi_{ex.mnt1}) = 1536\,lb$

T-Mobile Loads:

NESC Heavy Wind Vertical =

$Wt_{tot} := (Wt_{ant3} + Wt_{ant4} + Wt_{mnt2}) = 2490\,lb$

$Wt_{ice.tot} := (Wt_{ice.ant3} + Wt_{ice.ant4} + Wt_{ice.mnt2}) = 713\,lb$

$(Wt_{tot} + Wt_{ice.tot}) \cdot 1.5 = 4804\,lb$

NESC Heavy Wind Trasnsverse = $(Fi_{ant3} + Fi_{ant4} + Fi_{mnt2}) \cdot 2.5 = 1226\,lb$

NESC Extreme Wind Vertical = $(Wt_{ant3} + Wt_{ant4} + Wt_{mnt2}) = 2490\,lb$

NESC Extreme Wind Trasnsverse = $(F_{ant3} + F_{ant4} + F_{mnt2}) = 4281\,lb$

NESC Extreme Ice w/Wind Vertical =

$Wt_{ice.ex.tot} := (Wt_{ice.ex.ant3} + Wt_{ice.ex.ant4} + Wt_{ice.ex.mnt2}) = 1146\,lb$

$(Wt_{tot} + Wt_{ice.ex.tot}) = 3636\,lb$

NESC Extreme Ice w/Wind Trasnsverse = $(Fi_{ex.ant3} + Fi_{ex.ant4} + Fi_{ex.mnt2}) = 1053\,lb$

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Subject:	Coax Cable on Pole #14027
Location:	Middletown, CT
Rev. 2: 8/31/23	Prepared by: T.J.L Checked by: C.F.C. Job No. 23016.01

Coax Cable on CL&P Pole

Coaxial Cable Span	$Coax_{Span} := 10ft$		*(User Input)*
Heavy Wind Pressure =	$p := 4 \cdot psf$		*(User Input)*
Radial Ice Thickness =	$Ir := 0.5 \cdot in$		*(User Input)*
Radial Ice Density =	$Id := 56 \cdot pcf$		*(User Input)*
Extreme Ice w/Wind Pressure =	$p_{ex} := 6.4 \cdot psf$		*(User Input)*
Extreme Radial Ice Thickness =	$Ir_{ex} := 0.75 \cdot in$		*(User Input)*
Basic Windspeed =	$V := 110$	mph	(User Input)
Height to Top of Coax Above Grade =	$TC := 90$	ft	(User Input)
Multiplier Gust Response Factor =	$m := 1.00$		(User Input - Only for NESC Extreme wind case)
Velocity Pressure Coefficient =	$Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.138$		(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 =	$z_s := 0.67 \cdot TC = 60.3$		(NESC 2023 Table 250-3)
Turbulence Intensity =	$I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.181$		(NESC 2023 Table 250-3)
Response Term =	$B_t := \left[\frac{1}{\left[1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right]}\right]^{0.5} = 0.931$		(NESC 2023 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(4.61 \cdot I_z \cdot B_t\right)\right]}{\left(1 + 6.1 \cdot I_z\right)} = 0.845$		(NESC 2023 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 29.8$	psf	(NESC 2023 Section 250.C.1)

Diameter of Coax Cable =	$D_{coax} := 1.98 \cdot in$	*(User Input)*	
Weight of Coax Cable =	$W_{coax} := 1.04 \cdot plf$	*(User Input)*	
Number of Coax Cables =	$N_{coax} := 48$	*(User Input)*	(24) AT&T Coax Cables (24) T-Mobile Coax Cables
Number of Projected Coax Cables =	$NP_{coax} := 4$	*(User Input)*	

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Subject: Coax Cable on Pole #14027

Location: Middletown, CT

Rev. 2: 8/31/23

Prepared by: T.J.L Checked by: C.F.C.
Job No. 23016.01

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)*

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

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

Wind Area without Ice = $A := (NP_{coax} \cdot D_{coax}) = 7.92 \cdot in$

Wind Area with Ice = $A_{ice} := (NP_{coax} \cdot D_{coax} + 2 \cdot Ir) = 8.92 \cdot in$

Wind Area with Extreme Ice = $A_{ice.ex} := (NP_{coax} \cdot D_{coax} + 2 \cdot Ir_{ex}) = 9.42 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 72.717 \cdot plf$

Extreme Ice Area per Liner Ft = $Ai_{coax.ex} := \frac{\pi}{4} \cdot \left[(D_{coax} + 2 \cdot Ir_{ex})^2 - D_{coax}^2 \right] = 0.045 ft^2$

Weight of Extreme Ice on All Coax Cables = $W_{ice.ex} := Ai_{coax.ex} \cdot Id \cdot N_{coax} = 120.072 \cdot plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$Heavy\_WInd_{Vert} = 1840 lb$ $Heavy\_Wind_{Trans} = 119 lb$

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 =

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

$Extreme\_Wind_{Vert} = 499 lb$ $Extreme\_Wind_{Trans} = 314 lb$

Extreme Ice w/ Wind Vertical Load =

$$Extreme\_Ice_{Vert} := \overrightarrow{\left[(N_{coax} \cdot W_{coax} + W_{ice.ex}) \cdot Coax_{Span} \cdot OF_{EIV} \right]}$$

Extreme Ice w/ Wind Transverse Load =

$$Extreme\_Ice_{Trans} := \overrightarrow{\left(p_{ex} \cdot A_{ice.ex} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{EIT} \right)}$$

$Extreme\_Ice_{Vert} = 1700 lb$ $Extreme\_Ice_{Trans} = 80 lb$

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PLS-POLE Version 17.50, 1:55:44 PM Thursday, August 31, 2023
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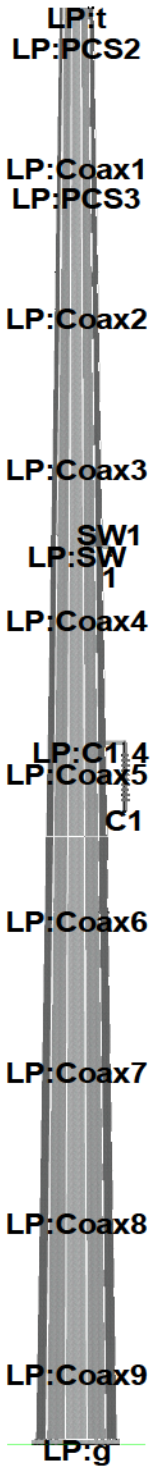

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10 (ft)

Project Name : 23016.01 - Middletown, CT
Project Notes: Struct # 14027 / AT&T CT5436
Project File : J:\Jobs\2301600.WI\01_CT5436\05_Structural\Tower Analysis\Backup Documentation\Rev (2)\Calcs\PLS-Pole\001,002-23-23807-95FT,60FT.POL
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Successfully performed nonlinear analysis

Load case 'NESC EXT. WIND (250C)' 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\2301600.WI\01_CT5436\05_Structural\Tower Analysis\Backup Documentation\Rev (2)\Calcs\PLS-Pole\001,002-23-23807.lca

*** Analysis Results:

Maximum element usage is 59.30% for Base Plate "LP" in load case "NESC EXT. ICE (250D)"
Maximum insulator usage is 57.32% for Suspension "C1" in load case "NESC HEAVY (250B)"

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 (250B)	LP:g	82.81	35.60	90.14	1880.43	0.00
NESC EXT. WIND (250C)	LP:g	40.79	53.79	67.51	2976.54	0.00
NESC EXT. ICE (250D)	LP:g	72.05	29.69	77.93	1620.12	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 (250B)	LP:g	-0.16	-35.60	-82.81	35.60	1880.42	-6.45	1880.43	0.00	0.00
NESC EXT. WIND (250C)	LP:g	-0.04	-53.79	-40.79	53.79	2976.54	-1.52	2976.54	0.00	0.00
NESC EXT. ICE (250D)	LP:g	-4.00	-29.42	-72.05	29.69	1580.37	-356.69	1620.12	0.14	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 (250B)	LP:t	0.03	7.85	-0.06	7.85	0.00	-0.59	-0.00
NESC EXT. WIND (250C)	LP:t	0.01	14.14	-0.12	14.14	0.00	-1.16	0.00
NESC EXT. ICE (250D)	LP:t	2.49	6.61	-0.05	7.06	0.24	-0.49	-0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)

LP	1	1806	NESC EXT. WIND (250C)	9.32	139.24
LP	2	2219	NESC EXT. WIND (250C)	17.84	379.59
LP	3	3654	NESC EXT. WIND (250C)	26.30	962.00
LP	4	10804	NESC EXT. WIND (250C)	42.39	2976.54

*** 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)
LP	42.39	NESC EXT. WIND (250C)	2.5	24	21231.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY (250B)	53.63	LP	Base Plate
NESC EXT. WIND (250C)	52.43	LP	Base Plate
NESC EXT. ICE (250D)	59.30	LP	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Height AGL (ft)	Segment Number
NESC HEAVY (250B)	27.85	LP	2.5	24
NESC EXT. WIND (250C)	42.39	LP	2.5	24
NESC EXT. ICE (250D)	24.77	LP	2.5	24

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 (250B)	LP	1	17.350	80.063	3572.198	-12.252	26.814	79.151	-2.5	110.034	2.563	53.63
NESC EXT. WIND (250C)	LP	1	17.350	38.040	3572.219	-1.820	26.215	77.383	-2.5	107.782	2.534	52.43
NESC EXT. ICE (250D)	LP	1	17.350	69.305	3484.569	-786.466	29.648	87.516	-2.5	118.109	2.695	59.30

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
PCS2	Clamp	15.17	NESC EXT. WIND (250C)	0.0
PCS3	Clamp	9.92	NESC HEAVY (250B)	0.0
SW	Clamp	0.00	NESC HEAVY (250B)	0.0
C1	Clamp	0.00	NESC HEAVY (250B)	0.0
Coax1	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax2	Clamp	3.69	NESC HEAVY (250B)	0.0

Coax3	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax4	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax5	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax6	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax7	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax8	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax9	Clamp	3.69	NESC HEAVY (250B)	0.0
SW1	Suspension	46.72	NESC EXT. ICE (250D)	0.0
C1	Suspension	57.32	NESC HEAVY (250B)	0.0

*** Weight of structure (lbs):

Weight of Steel Poles:	21231.6
Total:	21231.6

*** End of Report

```
*****************************************************************************
*                                                                           *
*                                PLS-POLE                                   *
*                    POLE AND FRAME ANALYSIS AND DESIGN                     *
*                Copyright Power Line Systems 1999-2022                     *
*                                                                           *
*****************************************************************************

Project Name : 23016.01 - Middletown, CT
Project Notes: Struct # 14027 / AT&T CT5436
Project File : J:\Jobs\2301600.WI\01_CT5436\05_Structural\Tower Analysis\Backup Documentation\Rev (2)\Calcs\PLS-Pole\001,002-23-23807-95FT,60FT.POL
Date run     : 1:54:45 PM Thursday, August 31, 2023
by           : PLS-POLE Version 17.50
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

Load case 'NESC EXT. WIND (250C)' 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 48-19
```

Vang Connectivity:

Vang Label	Attach Label	Tip Label	Azimuth (deg)	Length (ft)	Measured Relative To
1	LP:SW	1	0	0.5	Face
4	LP:C1	4	0	1.25	Face

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

Steel Pole Properties:

Steel Pole Property	Stock Number	Length (ft)	Default Embedded Length (ft)	Base Plate	Shape	Tip Diameter (in)	Base Diameter (in)	Taper (in/ft)	Default Drag Coef.	Tubes	Modulus of Elasticity Override (ksi)	Weight Density Override (lbs/ft^3)	Shape At Base	Strength Check Type	Distance From Tip (ft)	Ultimate Trans. Load (kips)	Ultimate Long. Load (kips)	Texture Label
001-23-23807-95FT		95.00	0	Yes	12F	0	64.75	0.3943	1.6	4 tubes	0	0		Calculated	0.000	0.0000	0.0000	

Steel Tubes Properties:

Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap or Butt Offset (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
001-23-23807-95FT	1	17.5	0.3125	0.000	0.000	0.000	65.000	0.000	1806	9.08	0.39432	27.04	33.94	4.164	0.000
001-23-23807-95FT	2	17.5	0.3125	0.000	0.000	0.000	65.000	0.000	2219	9.02	0.39432	33.94	40.84	5.027	0.000
001-23-23807-95FT	3	20	0.375	0.000	0.000	0.000	65.000	0.000	3654	10.30	0.39432	40.97	48.85	6.013	0.000
001-23-23807-95FT	4	40	0.4375	0.000	0.000	0.000	65.000	0.000	10804	20.93	0.39432	48.98	64.75	0.000	0.000

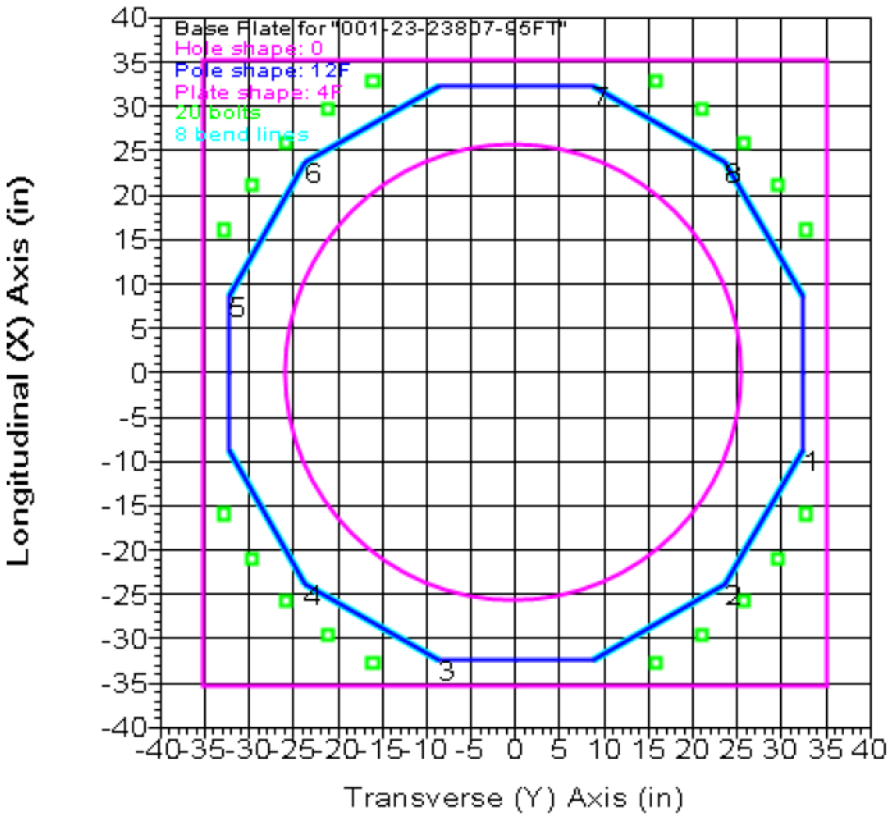
Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
001-23-23807-95FT	70.375	4F	3.500	2749	0.000	51.750	0	490.00	50.000	2.250	72.750	20	52730.12	52730.12

Base Plate Bolt Coordinates for Property "001-23-23807-95FT":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.4399	0.9003	0
0.5808	0.8144	0
0.7079	0.7079	0
0.8144	0.5808	0

0.9003 0.4399 0



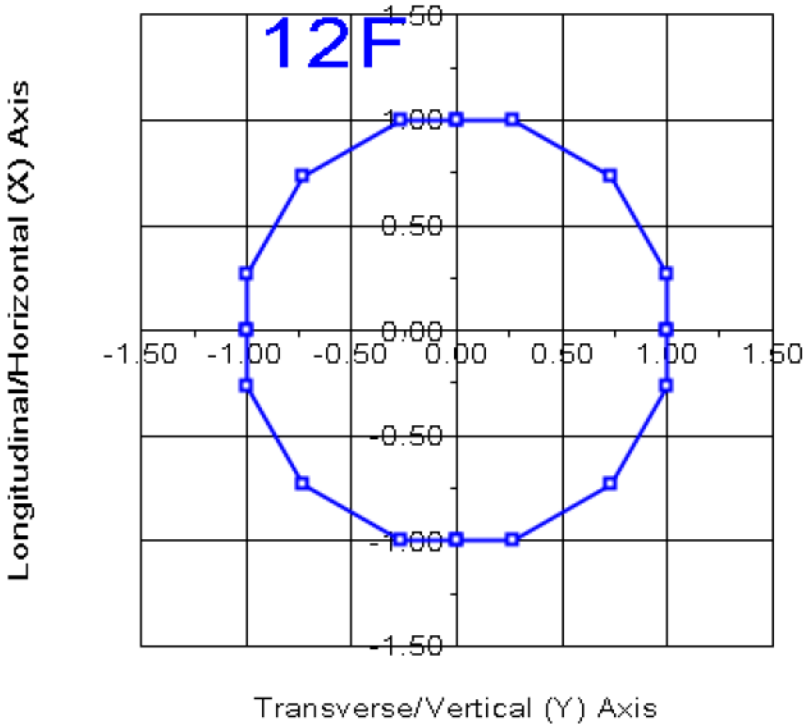
Steel Pole Connectivity:

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)
LP			0	-16	0	0	0	001-23-23807-95FT	13 labels		0.00	0

Relative Attachment Labels for Steel Pole "LP":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
LP:PCS2	2.00	0.00
LP:PCS3	12.00	0.00
LP:SW	35.75	0.00
LP:C1	48.75	0.00

LP:Coax1	0.00	85.00
LP:Coax2	0.00	75.00
LP:Coax3	0.00	65.00
LP:Coax4	0.00	55.00
LP:Coax5	0.00	45.00
LP:Coax6	0.00	35.00
LP:Coax7	0.00	25.00
LP:Coax8	0.00	15.00
LP:Coax9	0.00	5.00



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)
LP	LP:t	LP:t Ori	0.00	27.04	26.86	2455.72	2455.72	0.00	20.5	65.00	65.00	983.87	983.87
LP	LP:PCS2	LP:PCS2 End	2.00	27.83	27.65	2679.56	2679.56	0.00	21.2	65.00	65.00	1043.13	1043.13
LP	LP:PCS2	LP:PCS2 Ori	2.00	27.83	27.65	2679.56	2679.56	0.00	21.2	65.00	65.00	1043.13	1043.13
LP	#LP:0	Tube 1 End	6.00	29.41	29.23	3167.23	3167.23	0.00	22.5	65.00	65.00	1166.84	1166.84
LP	#LP:0	Tube 1 Ori	6.00	29.41	29.23	3167.24	3167.24	0.00	22.5	65.00	65.00	1166.84	1166.84
LP	LP:Coax1	LP:Coax1 End	10.00	30.98	30.82	3710.76	3710.76	0.00	23.9	65.00	65.00	1297.49	1297.49
LP	LP:Coax1	LP:Coax1 Ori	10.00	30.98	30.82	3710.76	3710.76	0.00	23.9	65.00	65.00	1297.49	1297.49
LP	LP:PCS3	LP:PCS3 End	12.00	31.77	31.61	4004.41	4004.41	0.00	24.6	65.00	65.00	1365.41	1365.41

LP	LP:PCS3	LP:PCS3 Ori	12.00	31.77	31.61	4004.42	4004.42	0.00	24.6	65.00	65.00	1365.41	1365.41
LP	#LP:1	Tube 1 End	14.75	32.86	32.70	4432.92	4432.92	0.00	25.5	65.00	65.00	1461.63	1461.63
LP	#LP:1	Tube 1 Ori	14.75	32.86	32.70	4432.92	4432.92	0.00	25.5	65.00	65.00	1461.63	1461.63
LP	#LP:2	SpliceT End	17.50	33.94	33.79	4890.95	4890.95	0.00	26.4	65.00	65.00	1561.13	1561.13
LP	#LP:2	SpliceT Ori	17.50	33.94	33.79	4890.95	4890.95	0.00	26.4	65.00	65.00	1561.13	1561.13
LP	LP:Coax2	LP:Coax2 End	20.00	34.93	34.78	5333.79	5333.79	0.00	27.3	65.00	65.00	1654.43	1654.43
LP	LP:Coax2	LP:Coax2 Ori	20.00	34.93	34.78	5333.79	5333.79	0.00	27.3	65.00	65.00	1654.43	1654.43
LP	#LP:3	Tube 2 End	25.00	36.90	36.76	6298.09	6298.09	0.00	29.0	65.00	65.00	1849.15	1849.15
LP	#LP:3	Tube 2 Ori	25.00	36.90	36.76	6298.09	6298.09	0.00	29.0	65.00	65.00	1849.15	1849.15
LP	LP:Coax3	LP:Coax3 End	30.00	38.87	38.74	7372.12	7372.12	0.00	30.6	65.00	64.16	2028.26	2028.26
LP	LP:Coax3	LP:Coax3 Ori	30.00	38.87	38.74	7372.12	7372.12	0.00	30.6	65.00	64.16	2028.26	2028.26
LP	#LP:4	SpliceT End	35.00	40.84	40.72	8561.80	8561.80	0.00	32.3	65.00	62.50	2183.87	2183.87
LP	#LP:4	SpliceT Ori	35.00	40.97	48.94	10322.03	10322.03	0.00	26.6	65.00	65.00	2729.64	2729.64
LP	LP:SW	LP:SW End	35.75	41.26	49.30	10549.28	10549.28	0.00	26.8	65.00	65.00	2769.74	2769.74
LP	LP:SW	LP:SW Ori	35.75	41.26	49.30	10549.28	10549.28	0.00	26.8	65.00	65.00	2769.74	2769.74
LP	LP:Coax4	LP:Coax4 End	40.00	42.94	51.32	11900.29	11900.29	0.00	28.0	65.00	65.00	3002.50	3002.50
LP	LP:Coax4	LP:Coax4 Ori	40.00	42.94	51.32	11900.29	11900.29	0.00	28.0	65.00	65.00	3002.50	3002.50
LP	#LP:5	Tube 3 End	44.38	44.66	53.40	13406.69	13406.69	0.00	29.2	65.00	65.00	3251.92	3251.92
LP	#LP:5	Tube 3 Ori	44.38	44.66	53.40	13406.69	13406.69	0.00	29.2	65.00	65.00	3251.92	3251.92
LP	LP:C1	LP:C1 End	48.75	46.39	55.48	15035.14	15035.14	0.00	30.5	65.00	64.34	3475.78	3475.78
LP	LP:C1	LP:C1 Ori	48.75	46.39	55.48	15035.14	15035.14	0.00	30.5	65.00	64.34	3475.78	3475.78
LP	LP:Coax5	LP:Coax5 End	50.00	46.88	56.08	15523.49	15523.49	0.00	30.8	65.00	64.00	3531.86	3531.86
LP	LP:Coax5	LP:Coax5 Ori	50.00	46.88	56.08	15523.50	15523.50	0.00	30.8	65.00	64.00	3531.86	3531.86
LP	#LP:6	SpliceT End	55.00	48.85	58.45	17582.64	17582.64	0.00	32.2	65.00	62.61	3755.95	3755.95
LP	#LP:6	SpliceT Ori	55.00	48.98	68.28	20592.96	20592.96	0.00	27.3	65.00	65.00	4554.98	4554.98
LP	LP:Coax6	LP:Coax6 End	60.00	50.95	71.06	23205.47	23205.47	0.00	28.5	65.00	65.00	4934.21	4934.21
LP	LP:Coax6	LP:Coax6 Ori	60.00	50.95	71.06	23205.48	23205.48	0.00	28.5	65.00	65.00	4934.21	4934.21
LP	#LP:7	Tube 4 End	65.00	52.92	73.83	26030.10	26030.10	0.00	29.7	65.00	65.00	5328.61	5328.61
LP	#LP:7	Tube 4 Ori	65.00	52.92	73.83	26030.11	26030.11	0.00	29.7	65.00	65.00	5328.61	5328.61
LP	LP:Coax7	LP:Coax7 End	70.00	54.89	76.60	29075.13	29075.13	0.00	30.9	65.00	63.88	5639.12	5639.12
LP	LP:Coax7	LP:Coax7 Ori	70.00	54.89	76.60	29075.13	29075.13	0.00	30.9	65.00	63.88	5639.12	5639.12
LP	#LP:8	Tube 4 End	75.00	56.86	79.38	32348.83	32348.83	0.00	32.1	65.00	62.69	5944.13	5944.13
LP	#LP:8	Tube 4 Ori	75.00	56.86	79.38	32348.83	32348.83	0.00	32.1	65.00	62.69	5944.13	5944.13
LP	LP:Coax8	LP:Coax8 End	80.00	58.84	82.15	35859.48	35859.48	0.00	33.4	65.00	61.51	6247.99	6247.99
LP	LP:Coax8	LP:Coax8 Ori	80.00	58.84	82.15	35859.48	35859.48	0.00	33.4	65.00	61.51	6247.99	6247.99
LP	#LP:9	Tube 4 End	85.00	60.81	84.92	39615.36	39615.36	0.00	34.6	65.00	60.32	6549.88	6549.88
LP	#LP:9	Tube 4 Ori	85.00	60.81	84.92	39615.37	39615.37	0.00	34.6	65.00	60.32	6549.88	6549.88
LP	LP:Coax9	LP:Coax9 End	90.00	62.78	87.70	43624.76	43624.76	0.00	35.8	65.00	59.14	6848.98	6848.98
LP	LP:Coax9	LP:Coax9 Ori	90.00	62.78	87.70	43624.76	43624.76	0.00	35.8	65.00	59.14	6848.98	6848.98
LP	LP:g	LP:g End	95.00	64.75	90.47	47895.94	47895.94	0.00	37.0	65.00	57.95	7144.44	7144.44

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)	Hardware Capacity (lbs)	Notes
CLAMP		5e+04	5e+04	

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)

PCS2	LP:PCS2	CLAMP	No Limit
PCS3	LP:PCS3	CLAMP	No Limit
SW	LP:SW	CLAMP	No Limit
C1	LP:C1	CLAMP	No Limit
Coax1	LP:Coax1	CLAMP	No Limit
Coax2	LP:Coax2	CLAMP	No Limit
Coax3	LP:Coax3	CLAMP	No Limit
Coax4	LP:Coax4	CLAMP	No Limit
Coax5	LP:Coax5	CLAMP	No Limit
Coax6	LP:Coax6	CLAMP	No Limit
Coax7	LP:Coax7	CLAMP	No Limit
Coax8	LP:Coax8	CLAMP	No Limit
Coax9	LP:Coax9	CLAMP	No Limit

Suspension Properties:

Label	Stock Number	Length (ft)	Weight (lbs)	Wind Area (ft^2)	Tension Capacity (lbs)	Top Rect Width (ft)	Top Rect Height (ft)	Bot. Rect Width (ft)	Bot. Rect Height (ft)	Vert. Rect Width (ft)	Vert. Rect Height (ft)	Hardware Capacity (lbs)	Notes	Draw	Rigid
SUS		0.5	0	10	1e+04	0	0	0	0	0	0	1e+04	Sheds		No
SUS-CON		4.5	0	20	5e+04	0	0	0	0	0	0	5e+04	Sheds		No

Suspension Insulator Connectivity:

Suspension Label	Structure Attach	Tip Label	Property Set	Cond. 1 Minimum Swing (deg)	Cond. 1 Maximum Swing (deg)	Cond. 2 Minimum Swing (deg)	Cond. 2 Maximum Swing (deg)	Cond. 3 Minimum Swing (deg)	Cond. 3 Maximum Swing (deg)	Cond. 4 Minimum Swing (deg)	Cond. 4 Maximum Swing (deg)	Min. Required Vertical Load (uplift) (lbs)
SW1	1	SW1	SUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	No Limit
C1	4	C1	SUS-CON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	No Limit

*** Loads Data

Loads from file: J:\Jobs\2301600.WI\01_CT5436\05_Structural\Tower Analysis\Backup Documentation\Rev (2)\Calcs\PLS-Pole\001,002-23-23807.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)	95.00 (ft)	
Structure height	95.00 (ft)	
Structure height above ground	95.00 (ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	Ice Steel Tubular Poles	Ice Arms	Temperature	SF for Wood Poles	SF for Conc. Poles	SF for Conc. Poles	SF for Guys and Towers	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF For Hardware	Point Loads	Wind/Ice Model
Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)		(deg F)	Deflection Ult. Check %	Deflection First Limit or (ft)	Zero Crack	Tens. Cables				Found.		
NESC HEAVY (250B)	1.5000	2.5000	1.00000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	13 loads	Wind on All
4	0	0.500	56.000		0.0	No Limit		0							
NESC EXT. WIND (250C)	1.0000	1.0000	1.00000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	13 loads	NESC 2023
31	0	0.000	56.000		60.0	No Limit		0							
NESC EXT. ICE (250D)	1.0000	1.0000	1.00000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	13 loads	Wind on All
6.4	0	0.750	56.000		15.0	No Limit		0							

Point Loads for Load Case "NESC HEAVY (250B)":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
LP:PCS2	7316	1806	0	AT&T
LP:PCS3	4804	1226	0	T-Mobile
SW1	2104	3923	0	
C1	18792	21637	0	
LP:Coax1	1840	119	0	Coax
LP:Coax2	1840	119	0	Coax
LP:Coax3	1840	119	0	Coax
LP:Coax4	1840	119	0	Coax
LP:Coax5	1840	119	0	Coax
LP:Coax6	1840	119	0	Coax
LP:Coax7	1840	119	0	Coax
LP:Coax8	1840	119	0	Coax
LP:Coax9	1840	119	0	Coax

Detailed Pole Loading Data for Load Case "NESC HEAVY (250B)":

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)
LP	LP:t	LP:PCS2	95.00	93.00	94.00	27.434	1.3e+06	1.600	10.00	0.50	278.20	73.16	34.30	2.67	75.83	0.00
LP	LP:PCS2		93.00	89.00	91.00	28.617	1.35e+06	1.600	10.00	0.50	580.66	152.63	71.57	5.33	157.97	0.00
LP		LP:Coax1	89.00	85.00	87.00	30.194	1.43e+06	1.600	10.00	0.50	613.02	161.04	75.51	5.33	166.38	0.00
LP	LP:Coax1	LP:PCS3	85.00	83.00	84.00	31.377	1.49e+06	1.600	10.00	0.50	318.64	83.68	39.23	2.67	86.34	0.00
LP	LP:PCS3		83.00	80.25	81.63	32.314	1.53e+06	1.600	10.00	0.50	451.34	118.49	55.56	3.67	122.16	0.00
LP			80.25	77.50	78.88	33.398	1.58e+06	1.600	10.00	0.50	466.64	122.47	57.42	3.67	126.13	0.00
LP		LP:Coax2	77.50	75.00	76.25	34.433	1.63e+06	1.600	10.00	0.50	437.49	114.78	53.82	3.33	118.12	0.00
LP	LP:Coax2		75.00	70.00	72.50	35.912	1.7e+06	1.600	10.00	0.50	912.89	239.42	112.26	6.67	246.09	0.00
LP		LP:Coax3	70.00	65.00	67.50	37.883	1.79e+06	1.600	10.00	0.50	963.45	252.57	118.43	6.67	259.24	0.00
LP	LP:Coax3		65.00	60.00	62.50	39.855	1.89e+06	1.600	10.00	0.50	1014.01	265.71	124.59	6.67	272.38	0.00
LP		LP:SW	60.00	59.25	59.63	41.114	1.95e+06	1.600	10.00	0.50	188.02	41.12	19.28	1.00	42.12	0.00
LP	LP:SW	LP:Coax4	59.25	55.00	57.13	42.099	1.99e+06	1.600	10.00	0.50	1091.36	238.58	111.87	5.67	244.24	0.00
LP	LP:Coax4		55.00	50.63	52.81	43.800	2.07e+06	1.600	10.00	0.50	1169.25	255.51	119.81	5.83	261.35	0.00
LP		LP:C1	50.63	46.25	48.44	45.525	2.16e+06	1.600	10.00	0.50	1215.70	265.58	124.53	5.83	271.41	0.00
LP	LP:C1	LP:Coax5	46.25	45.00	45.63	46.634	2.21e+06	1.600	10.00	0.50	355.87	77.73	36.45	1.67	79.39	0.00
LP	LP:Coax5		45.00	40.00	42.50	47.866	2.27e+06	1.600	10.00	0.50	1461.42	319.13	149.63	6.67	325.79	0.00
LP		LP:Coax6	40.00	35.00	37.50	49.963	2.37e+06	1.600	10.00	0.50	1777.99	333.10	156.19	6.67	339.77	0.00
LP	LP:Coax6		35.00	30.00	32.50	51.935	2.46e+06	1.600	10.00	0.50	1848.80	346.25	162.35	6.67	352.92	0.00
LP		LP:Coax7	30.00	25.00	27.50	53.906	2.55e+06	1.600	10.00	0.50	1919.58	359.39	168.51	6.67	366.06	0.00
LP	LP:Coax7		25.00	20.00	22.50	55.878	2.65e+06	1.600	10.00	0.50	1990.36	372.54	174.68	6.67	379.21	0.00
LP		LP:Coax8	20.00	15.00	17.50	57.849	2.74e+06	1.600	10.00	0.50	2061.14	385.68	180.84	6.67	392.35	0.00
LP	LP:Coax8		15.00	10.00	12.50	59.821	2.83e+06	1.600	10.00	0.50	2131.93	398.83	187.00	6.67	405.49	0.00
LP		LP:Coax9	10.00	5.00	7.50	61.793	2.93e+06	1.600	10.00	0.50	2202.71	411.97	193.17	6.67	418.64	0.00
LP	LP:Coax9	LP:g	5.00	0.00	2.50	63.764	3.02e+06	1.600	10.00	0.50	2273.49	425.12	199.33	6.67	431.78	0.00

Point Loads for Load Case "NESC EXT. WIND (250C)":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
LP:PCS2	3961	6467	0	
LP:PCS3	2490	4281	0	
SW1	547	3593	0	
C1	7949	25705	0	
LP:Coax1	499	314	0	Coax
LP:Coax2	499	314	0	Coax
LP:Coax3	499	314	0	Coax
LP:Coax4	499	314	0	Coax
LP:Coax5	499	314	0	Coax
LP:Coax6	499	314	0	Coax
LP:Coax7	499	314	0	Coax
LP:Coax8	499	314	0	Coax
LP:Coax9	499	314	0	Coax

Detailed Pole Loading Data for Load Case "NESC EXT. WIND (250C)":

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)
LP	LP:t	LP:PCS2	95.00	93.00	94.00	27.434	2.25e+06	1.000	30.06	0.00	185.46	137.46	0.00	0.00	137.46	0.00
LP	LP:PCS2		93.00	89.00	91.00	28.617	2.35e+06	1.000	30.06	0.00	387.11	286.77	0.00	0.00	286.77	0.00
LP		LP:Coax1	89.00	85.00	87.00	30.194	2.48e+06	1.000	30.06	0.00	408.68	302.58	0.00	0.00	302.58	0.00
LP	LP:Coax1	LP:PCS3	85.00	83.00	84.00	31.377	2.58e+06	1.000	30.06	0.00	212.43	157.21	0.00	0.00	157.21	0.00
LP	LP:PCS3		83.00	80.25	81.63	32.314	2.65e+06	1.000	30.06	0.00	300.90	222.62	0.00	0.00	222.62	0.00
LP			80.25	77.50	78.88	33.398	2.74e+06	1.000	30.06	0.00	311.09	230.09	0.00	0.00	230.09	0.00
LP		LP:Coax2	77.50	75.00	76.25	34.433	2.83e+06	1.000	30.06	0.00	291.66	215.66	0.00	0.00	215.66	0.00
LP	LP:Coax2		75.00	70.00	72.50	35.912	2.95e+06	1.000	30.06	0.00	608.60	449.84	0.00	0.00	449.84	0.00
LP		LP:Coax3	70.00	65.00	67.50	37.883	3.11e+06	1.000	30.06	0.00	642.30	474.54	0.00	0.00	474.54	0.00
LP	LP:Coax3		65.00	60.00	62.50	39.855	3.27e+06	1.000	30.06	0.00	676.01	499.23	0.00	0.00	499.23	0.00
LP		LP:SW	60.00	59.25	59.63	41.114	3.37e+06	1.000	30.06	0.00	125.35	77.25	0.00	0.00	77.25	0.00
LP	LP:SW	LP:Coax4	59.25	55.00	57.13	42.099	3.46e+06	1.000	30.06	0.00	727.58	448.25	0.00	0.00	448.25	0.00
LP	LP:Coax4		55.00	50.63	52.81	43.800	3.6e+06	1.000	30.06	0.00	779.50	480.07	0.00	0.00	480.07	0.00
LP		LP:C1	50.63	46.25	48.44	45.525	3.74e+06	1.000	30.06	0.00	810.47	498.98	0.00	0.00	498.98	0.00
LP	LP:C1	LP:Coax5	46.25	45.00	45.63	46.634	3.83e+06	1.000	30.06	0.00	237.25	146.04	0.00	0.00	146.04	0.00
LP	LP:Coax5		45.00	40.00	42.50	47.866	3.93e+06	1.000	30.06	0.00	974.28	599.59	0.00	0.00	599.59	0.00
LP		LP:Coax6	40.00	35.00	37.50	49.963	4.1e+06	1.000	30.06	0.00	1185.32	625.85	0.00	0.00	625.85	0.00
LP	LP:Coax6		35.00	30.00	32.50	51.935	4.26e+06	1.000	30.06	0.00	1232.53	650.55	0.00	0.00	650.55	0.00
LP		LP:Coax7	30.00	25.00	27.50	53.906	4.43e+06	1.000	30.06	0.00	1279.72	675.24	0.00	0.00	675.24	0.00
LP	LP:Coax7		25.00	20.00	22.50	55.878	4.59e+06	1.000	30.06	0.00	1326.91	699.94	0.00	0.00	699.94	0.00
LP		LP:Coax8	20.00	15.00	17.50	57.849	4.75e+06	1.000	30.06	0.00	1374.10	724.64	0.00	0.00	724.64	0.00
LP	LP:Coax8		15.00	10.00	12.50	59.821	4.91e+06	1.000	30.06	0.00	1421.28	749.33	0.00	0.00	749.33	0.00
LP		LP:Coax9	10.00	5.00	7.50	61.793	5.07e+06	1.000	30.06	0.00	1468.47	774.03	0.00	0.00	774.03	0.00
LP	LP:Coax9	LP:g	5.00	0.00	2.50	63.764	5.23e+06	1.000	30.06	0.00	1515.66	798.73	0.00	0.00	798.73	0.00

Point Loads for Load Case "NESC EXT. ICE (250D)":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
LP:PCS2	5426	1536	2000	
LP:PCS3	3636	1053	2000	
SW1	3004	3578	0	
C1	19347	18690	0	
LP:Coax1	1700	80	0	Coax
LP:Coax2	1700	80	0	Coax
LP:Coax3	1700	80	0	Coax
LP:Coax4	1700	80	0	Coax
LP:Coax5	1700	80	0	Coax
LP:Coax6	1700	80	0	Coax
LP:Coax7	1700	80	0	Coax
LP:Coax8	1700	80	0	Coax
LP:Coax9	1700	80	0	Coax

Detailed Pole Loading Data for Load Case "NESC EXT. ICE (250D)":

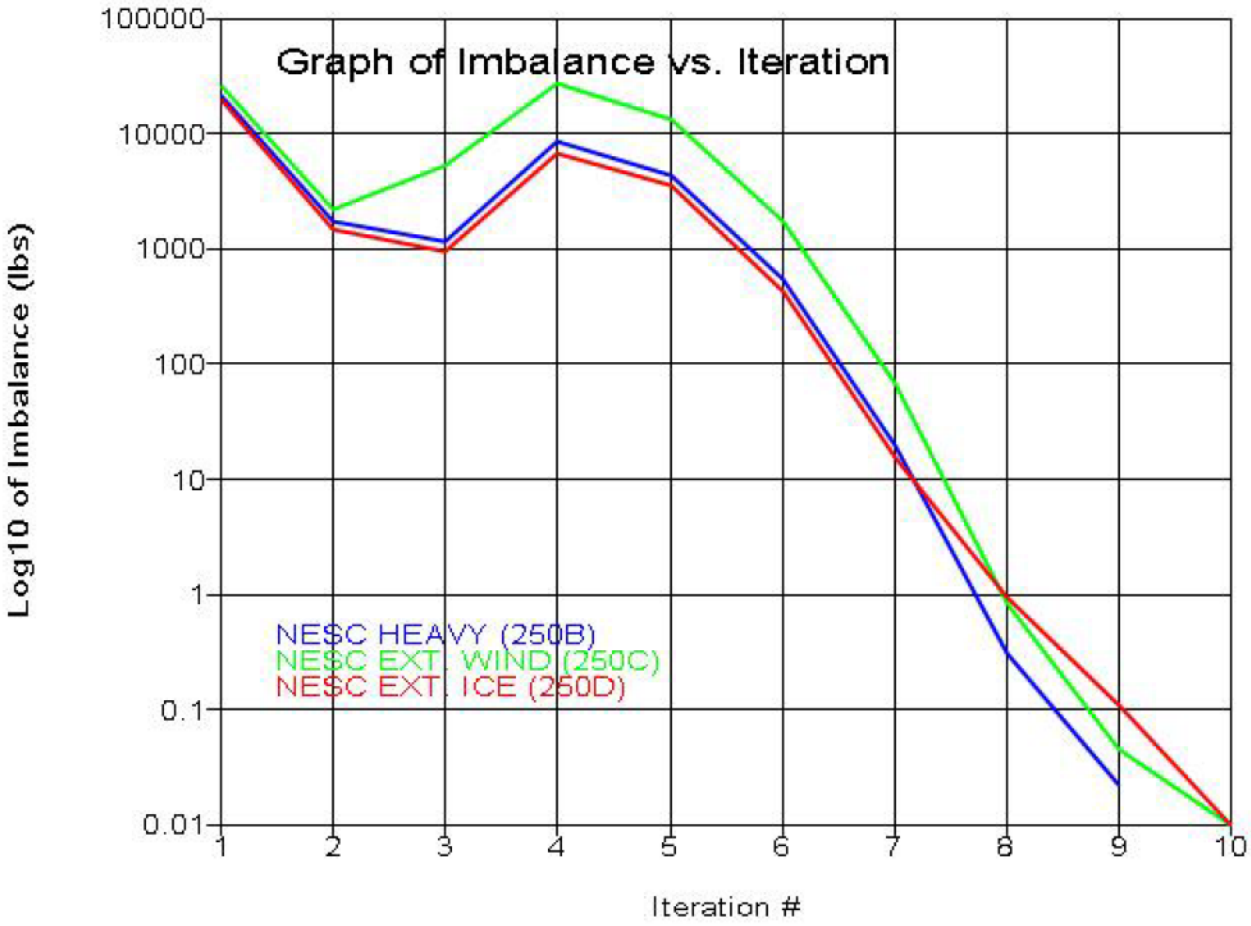
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z	Section Bottom Z	Section Average Elevation	Outer Diameter	Reynolds Number	Drag Coef.	Adjusted Wind Pressure	Adjusted Ice Thickness	Pole Vert. Load	Pole Wind Load	Pole Ice Vertical Load	Pole Ice Wind Load	Tran. Wind Load	Long. Wind Load

			(ft)	(ft)	(ft)	(in)		(psf)	(in)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
LP	LP:t	LP:PCS2	95.00	93.00	94.00	27.434	1.04e+06 1.600	6.40	0.75	185.46	46.82	51.46	2.56	49.38	0.00
LP	LP:PCS2		93.00	89.00	91.00	28.617	1.08e+06 1.600	6.40	0.75	387.11	97.68	107.35	5.12	102.80	0.00
LP		LP:Coax1	89.00	85.00	87.00	30.194	1.14e+06 1.600	6.40	0.75	408.68	103.06	113.27	5.12	108.18	0.00
LP	LP:Coax1	LP:PCS3	85.00	83.00	84.00	31.377	1.19e+06 1.600	6.40	0.75	212.43	53.55	58.85	2.56	56.11	0.00
LP	LP:PCS3		83.00	80.25	81.63	32.314	1.22e+06 1.600	6.40	0.75	300.90	75.83	83.34	3.52	79.35	0.00
LP			80.25	77.50	78.88	33.398	1.26e+06 1.600	6.40	0.75	311.09	78.37	86.13	3.52	81.89	0.00
LP		LP:Coax2	77.50	75.00	76.25	34.433	1.3e+06 1.600	6.40	0.75	291.66	73.46	80.73	3.20	76.66	0.00
LP	LP:Coax2		75.00	70.00	72.50	35.912	1.36e+06 1.600	6.40	0.75	608.60	153.22	168.39	6.40	159.62	0.00
LP		LP:Coax3	70.00	65.00	67.50	37.883	1.43e+06 1.600	6.40	0.75	642.30	161.64	177.64	6.40	168.04	0.00
LP	LP:Coax3		65.00	60.00	62.50	39.855	1.51e+06 1.600	6.40	0.75	676.01	170.05	186.88	6.40	176.45	0.00
LP		LP:SW	60.00	59.25	59.63	41.114	1.56e+06 1.600	6.40	0.75	125.35	26.31	28.92	0.96	27.27	0.00
LP	LP:SW	LP:Coax4	59.25	55.00	57.13	42.099	1.59e+06 1.600	6.40	0.75	727.58	152.68	167.80	5.44	158.12	0.00
LP	LP:Coax4		55.00	50.63	52.81	43.800	1.66e+06 1.600	6.40	0.75	779.50	163.52	179.71	5.60	169.12	0.00
LP		LP:C1	50.63	46.25	48.44	45.525	1.72e+06 1.600	6.40	0.75	810.47	169.96	186.79	5.60	175.56	0.00
LP	LP:C1	LP:Coax5	46.25	45.00	45.63	46.634	1.77e+06 1.600	6.40	0.75	237.25	49.74	54.67	1.60	51.34	0.00
LP	LP:Coax5		45.00	40.00	42.50	47.866	1.81e+06 1.600	6.40	0.75	974.28	204.23	224.45	6.40	210.63	0.00
LP		LP:Coax6	40.00	35.00	37.50	49.963	1.89e+06 1.600	6.40	0.75	1185.32	213.18	234.28	6.40	219.58	0.00
LP	LP:Coax6		35.00	30.00	32.50	51.935	1.97e+06 1.600	6.40	0.75	1232.53	221.59	243.53	6.40	227.99	0.00
LP		LP:Coax7	30.00	25.00	27.50	53.906	2.04e+06 1.600	6.40	0.75	1279.72	230.00	252.77	6.40	236.40	0.00
LP	LP:Coax7		25.00	20.00	22.50	55.878	2.12e+06 1.600	6.40	0.75	1326.91	238.41	262.02	6.40	244.81	0.00
LP		LP:Coax8	20.00	15.00	17.50	57.849	2.19e+06 1.600	6.40	0.75	1374.10	246.82	271.26	6.40	253.22	0.00
LP	LP:Coax8		15.00	10.00	12.50	59.821	2.27e+06 1.600	6.40	0.75	1421.28	255.24	280.51	6.40	261.64	0.00
LP		LP:Coax9	10.00	5.00	7.50	61.793	2.34e+06 1.600	6.40	0.75	1468.47	263.65	289.75	6.40	270.05	0.00
LP	LP:Coax9	LP:g	5.00	0.00	2.50	63.764	2.42e+06 1.600	6.40	0.75	1515.66	272.06	299.00	6.40	278.46	0.00

*** Analysis Results:

Maximum element usage is 59.30% for Base Plate "LP" in load case "NESC EXT. ICE (250D)"
Maximum insulator usage is 57.32% for Suspension "C1" in load case "NESC HEAVY (250B)"



*** Analysis Results for Load Case No. 1 "NESC HEAVY (250B)" - Number of iterations in SAPS 9

Equilibrium Joint Positions and Rotations for Load Case "NESC HEAVY (250B)":

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)
LP:g	0	0	0	0.0000	0.0000	0.0000	0	-16	0
LP:t	0.002328	0.654	-0.004864	-0.5868	0.0022	-0.0000	0.002328	-15.35	95
LP:PCS2	0.002251	0.6335	-0.004759	-0.5868	0.0022	-0.0000	0.002251	-15.37	93

LP:Coax1	0.001946	0.5518	-0.004263	-0.5810	0.0022	-0.0000	0.001946	-15.45	85
LP:PCS3	0.00187	0.5316	-0.004137	-0.5781	0.0022	-0.0000	0.00187	-15.47	83
LP:Coax2	0.001571	0.4519	-0.003601	-0.5598	0.0021	-0.0000	0.001571	-15.55	75
LP:Coax3	0.001216	0.3569	-0.002959	-0.5257	0.0019	-0.0000	0.001216	-15.64	65
LP:SW	0.001028	0.3052	-0.00261	-0.5030	0.0018	-0.0000	0.001028	-15.69	59.25
LP:Coax4	0.000896	0.2684	-0.002372	-0.4865	0.0017	-0.0000	0.000896	-15.73	55
LP:C1	0.0006485	0.1969	-0.001904	-0.4465	0.0015	-0.0000	0.0006485	-15.8	46.25
LP:Coax5	0.000616	0.1872	-0.001827	-0.4386	0.0015	-0.0000	0.000616	-15.81	45
LP:Coax6	0.0003841	0.1167	-0.001277	-0.3616	0.0012	-0.0000	0.0003841	-15.88	35
LP:Coax7	0.0002023	0.06093	-0.0008371	-0.2692	0.0009	-0.0000	0.0002023	-15.94	25
LP:Coax8	7.555e-05	0.02243	-0.0004716	-0.1653	0.0005	-0.0000	7.555e-05	-15.98	15
LP:Coax9	9.163e-06	0.002649	-0.0001532	-0.0557	0.0002	-0.0000	9.163e-06	-16	5
1	0.001027	0.3051	-0.02209	-0.5030	0.0018	-0.0000	0.001027	-13.48	59.23
4	0.0006479	0.1968	-0.02671	-0.4465	0.0015	-0.0000	0.0006479	-12.62	46.22

Joint Support Reactions for Load Case "NESC HEAVY (250B)":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
LP:g	-0.16	0.0	-35.60	0.0	0.0	-82.81	0.0	0.0	90.14	0.0	1880.42	0.0	-6.4	0.0	0.0	0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC HEAVY (250B)":

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.
LP	LP:t	Origin	0.00	7.85	0.03	-0.06	-0.00	-0.00	0.0	-0.16	0.04	-0.00	-0.01	0.00	0.00	0.00	0.01	0.0	5
LP	LP:PCS2	End	2.00	7.60	0.03	-0.06	0.08	-0.00	0.0	-0.16	0.04	-0.00	-0.01	0.00	0.00	0.00	0.01	0.0	2
LP	LP:PCS2	Origin	2.00	7.60	0.03	-0.06	0.08	-0.00	-0.0	-7.94	2.04	-0.00	-0.29	0.00	0.15	0.00	0.39	0.6	5
LP	Tube 1	End	6.00	7.11	0.03	-0.05	8.25	-0.02	-0.0	-7.94	2.04	-0.00	-0.27	0.46	0.04	0.00	0.73	1.1	2
LP	Tube 1	Origin	6.00	7.11	0.03	-0.05	8.25	-0.02	0.0	-8.61	2.21	-0.01	-0.29	0.46	0.04	0.00	0.76	1.2	2
LP	LP:Coax1	End	10.00	6.62	0.02	-0.05	17.09	-0.05	0.0	-8.61	2.21	-0.01	-0.28	0.86	0.04	0.00	1.14	1.8	2
LP	LP:Coax1	Origin	10.00	6.62	0.02	-0.05	17.09	-0.05	-0.0	-10.97	2.48	-0.01	-0.36	0.86	0.04	0.00	1.22	1.9	2
LP	LP:PCS3	End	12.00	6.38	0.02	-0.05	22.05	-0.08	-0.0	-10.97	2.48	-0.01	-0.35	1.05	0.04	0.00	1.40	2.2	2
LP	LP:PCS3	Origin	12.00	6.38	0.02	-0.05	22.05	-0.08	-0.0	-16.19	3.86	-0.01	-0.51	1.05	0.06	0.00	1.57	2.4	2
LP	Tube 1	End	14.75	6.05	0.02	-0.05	32.67	-0.12	-0.0	-16.19	3.86	-0.01	-0.50	1.45	0.06	0.00	1.95	3.0	2
LP	Tube 1	Origin	14.75	6.05	0.02	-0.05	32.67	-0.12	-0.0	-16.71	3.99	-0.02	-0.51	1.45	0.06	0.00	1.97	3.0	2
LP	SpliceT	End	17.50	5.72	0.02	-0.05	43.64	-0.17	-0.0	-16.71	3.99	-0.02	-0.49	1.82	0.06	0.00	2.32	3.6	2
LP	SpliceT	Origin	17.50	5.72	0.02	-0.05	43.64	-0.17	-0.0	-17.22	4.11	-0.02	-0.51	1.82	0.06	0.00	2.33	3.6	2
LP	LP:Coax2	End	20.00	5.42	0.02	-0.04	53.92	-0.22	-0.0	-17.22	4.11	-0.02	-0.50	2.12	0.06	0.00	2.62	4.0	2
LP	LP:Coax2	Origin	20.00	5.42	0.02	-0.04	53.92	-0.22	0.0	-19.81	4.44	-0.03	-0.57	2.12	0.07	0.00	2.69	4.1	2
LP	Tube 2	End	25.00	4.84	0.02	-0.04	76.11	-0.35	0.0	-19.81	4.44	-0.03	-0.54	2.68	0.06	0.00	3.22	5.0	2
LP	Tube 2	Origin	25.00	4.84	0.02	-0.04	76.11	-0.35	0.0	-20.87	4.69	-0.03	-0.57	2.68	0.07	0.00	3.25	5.0	2
LP	LP:Coax3	End	30.00	4.28	0.01	-0.04	99.58	-0.52	0.0	-20.87	4.69	-0.03	-0.54	3.15	0.06	0.00	3.69	5.8	2
LP	LP:Coax3	Origin	30.00	4.28	0.01	-0.04	99.58	-0.52	0.0	-23.82	5.10	-0.04	-0.61	3.15	0.07	0.00	3.77	5.9	2
LP	SpliceT	End	35.00	3.74	0.01	-0.03	125.07	-0.72	0.0	-23.82	5.10	-0.04	-0.58	3.58	0.07	0.00	4.17	6.7	2
LP	SpliceT	Origin	35.00	3.74	0.01	-0.03	125.07	-0.72	-0.0	-24.49	5.26	-0.04	-0.50	2.98	0.06	0.00	3.48	5.4	2
LP	LP:SW	End	35.75	3.66	0.01	-0.03	129.01	-0.75	-0.0	-24.49	5.26	-0.04	-0.50	3.03	0.06	0.00	3.53	5.4	2
LP	LP:SW	Origin	35.75	3.66	0.01	-0.03	133.68	-0.75	-0.0	-27.27	9.34	-0.05	-0.55	3.14	0.10	0.00	3.70	5.7	2
LP	LP:Coax4	End	40.00	3.22	0.01	-0.03	173.38	-0.95	-0.0	-27.27	9.34	-0.05	-0.53	3.76	0.10	0.00	4.29	6.6	2
LP	LP:Coax4	Origin	40.00	3.22	0.01	-0.03	173.38	-0.95	-0.0	-30.36	9.73	-0.05	-0.59	3.76	0.10	0.00	4.35	6.7	2
LP	Tube 3	End	44.38	2.78	0.01	-0.03	215.96	-1.19	-0.0	-30.36	9.73	-0.05	-0.57	4.32	0.10	0.00	4.89	7.5	2
LP	Tube 3	Origin	44.38	2.78	0.01	-0.03	215.96	-1.19	-0.0	-31.68	10.00	-0.06	-0.59	4.32	0.10	0.00	4.92	7.6	2
LP	LP:C1	End	48.75	2.36	0.01	-0.02	259.70	-1.46	-0.0	-31.68	10.00	-0.06	-0.57	4.81	0.10	0.00	5.39	8.4	2
LP	LP:C1	Origin	48.75	2.36	0.01	-0.02	319.51	-1.46	-0.0	-51.17	31.96	-0.07	-0.92	5.92	0.30	0.00	6.86	10.7	2

LP	LP:Coax5	End	50.00	2.25	0.01	-0.02	359.45	-1.54	-0.0	-51.17	31.96	-0.07	-0.91	6.52	0.30	0.00	7.45	11.6	2
LP	LP:Coax5	Origin	50.00	2.25	0.01	-0.02	359.45	-1.54	-0.0	-54.02	32.28	-0.07	-0.96	6.52	0.30	0.00	7.50	11.7	2
LP	SpliceT	End	55.00	1.80	0.01	-0.02	520.84	-1.90	-0.0	-54.02	32.28	-0.07	-0.92	8.69	0.29	0.00	9.63	15.4	2
LP	SpliceT	Origin	55.00	1.80	0.01	-0.02	520.84	-1.90	-0.0	-55.81	32.59	-0.08	-0.82	7.44	0.25	0.00	8.27	12.7	2
LP	LP:Coax6	End	60.00	1.40	0.00	-0.02	683.77	-2.30	-0.0	-55.81	32.59	-0.08	-0.79	9.02	0.24	0.00	9.81	15.1	2
LP	LP:Coax6	Origin	60.00	1.40	0.00	-0.02	683.77	-2.30	-0.0	-59.65	33.03	-0.09	-0.84	9.02	0.25	0.00	9.86	15.2	2
LP	Tube 4	End	65.00	1.04	0.00	-0.01	848.94	-2.75	-0.0	-59.65	33.03	-0.09	-0.81	10.36	0.24	0.00	11.18	17.2	2
LP	Tube 4	Origin	65.00	1.04	0.00	-0.01	848.94	-2.75	-0.0	-61.73	33.36	-0.10	-0.84	10.36	0.24	0.00	11.21	17.2	2
LP	LP:Coax7	End	70.00	0.73	0.00	-0.01	1015.71	-3.24	-0.0	-61.73	33.36	-0.10	-0.81	11.52	0.23	0.00	12.33	19.3	2
LP	LP:Coax7	Origin	70.00	0.73	0.00	-0.01	1015.71	-3.24	-0.0	-65.72	33.81	-0.11	-0.86	11.52	0.23	0.00	12.38	19.4	2
LP	Tube 4	End	75.00	0.47	0.00	-0.01	1184.76	-3.78	-0.0	-65.72	33.81	-0.11	-0.83	12.51	0.22	0.00	13.34	21.3	2
LP	Tube 4	Origin	75.00	0.47	0.00	-0.01	1184.76	-3.78	-0.0	-67.96	34.14	-0.12	-0.86	12.51	0.23	0.00	13.37	21.3	2
LP	LP:Coax8	End	80.00	0.27	0.00	-0.01	1355.47	-4.37	-0.0	-67.96	34.14	-0.12	-0.83	13.36	0.22	0.00	14.19	23.1	2
LP	LP:Coax8	Origin	80.00	0.27	0.00	-0.01	1355.47	-4.37	-0.0	-72.11	34.61	-0.13	-0.88	13.36	0.22	0.00	14.24	23.1	2
LP	Tube 4	End	85.00	0.12	0.00	-0.00	1528.51	-5.01	-0.0	-72.11	34.61	-0.13	-0.85	14.09	0.21	0.00	14.94	24.8	2
LP	Tube 4	Origin	85.00	0.12	0.00	-0.00	1528.51	-5.01	-0.0	-74.50	34.95	-0.14	-0.88	14.09	0.22	0.00	14.97	24.8	2
LP	LP:Coax9	End	90.00	0.03	0.00	-0.00	1703.28	-5.70	-0.0	-74.50	34.95	-0.14	-0.85	14.72	0.21	0.00	15.57	26.3	2
LP	LP:Coax9	Origin	90.00	0.03	0.00	-0.00	1703.28	-5.70	-0.0	-78.81	35.43	-0.15	-0.90	14.72	0.21	0.00	15.62	26.4	2
LP	LP:g	End	95.00	0.00	0.00	0.00	1880.42	-6.45	-0.0	-78.81	35.43	-0.15	-0.87	15.27	0.21	0.00	16.14	27.9	2

Summary of Clamp Capacities and Usages for Load Case "NESC HEAVY (250B)":

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 %
PCS2	7.536	50.00	50.00	15.07	50.00	50.00	15.07	15.07
PCS3	4.958	50.00	50.00	9.92	50.00	50.00	9.92	9.92
SW	0.000	50.00	50.00	0.00	50.00	50.00	0.00	0.00
C1	0.000	50.00	50.00	0.00	50.00	50.00	0.00	0.00
Coax1	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax2	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax3	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax4	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax5	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax6	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax7	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax8	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69
Coax9	1.844	50.00	50.00	3.69	50.00	50.00	3.69	3.69

Summary of Suspension Capacities and Usages for Load Case "NESC HEAVY (250B)":

Suspension Label	Tension (kips)	Input Tension Capacity (kips)	Factored Tension Capacity (kips)	Tension Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
SW1	4.452	10.00	10.00	44.52	10.00	10.00	44.52	44.52
C1	28.658	50.00	50.00	57.32	50.00	50.00	57.32	57.32

*** Analysis Results for Load Case No. 2 "NESC EXT. WIND (250C)" - Number of iterations in SAPS 10

Equilibrium Joint Positions and Rotations for Load Case "NESC EXT. WIND (250C)":

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)
LP:g	0	0	0	0.0000	0.0000	0.0000	0	-16	0
LP:t	0.000544	1.178	-0.01014	-1.1624	0.0005	0.0000	0.000544	-14.82	94.99
LP:PCS2	0.0005261	1.138	-0.009729	-1.1623	0.0005	0.0000	0.0005261	-14.86	92.99
LP:Coax1	0.0004548	0.9763	-0.008056	-1.1432	0.0005	0.0000	0.0004548	-15.02	84.99
LP:PCS3	0.0004371	0.9365	-0.007649	-1.1338	0.0005	0.0000	0.0004371	-15.06	82.99
LP:Coax2	0.0003674	0.7817	-0.006079	-1.0753	0.0005	0.0000	0.0003674	-15.22	74.99
LP:Coax3	0.0002847	0.6024	-0.004379	-0.9687	0.0005	-0.0000	0.0002847	-15.4	65
LP:SW	0.0002406	0.5085	-0.003555	-0.8996	0.0004	-0.0000	0.0002406	-15.49	59.25
LP:Coax4	0.0002098	0.4433	-0.003018	-0.8531	0.0004	-0.0000	0.0002098	-15.56	55
LP:C1	0.0001519	0.3204	-0.002072	-0.7499	0.0004	-0.0000	0.0001519	-15.68	46.25
LP:Coax5	0.0001444	0.3041	-0.001949	-0.7336	0.0003	-0.0000	0.0001444	-15.7	45
LP:Coax6	9.007e-05	0.1877	-0.001134	-0.5908	0.0003	0.0000	9.007e-05	-15.81	35
LP:Coax7	4.746e-05	0.09735	-0.0005935	-0.4338	0.0002	-0.0000	4.746e-05	-15.9	25
LP:Coax8	1.774e-05	0.03564	-0.0002659	-0.2639	0.0001	-0.0000	1.774e-05	-15.96	15
LP:Coax9	2.155e-06	0.004185	-7.382e-05	-0.0884	0.0000	-0.0000	2.155e-06	-16	5
1	0.0002403	0.5082	-0.0384	-0.8996	0.0004	-0.0000	0.0002403	-13.27	59.21
4	0.0001517	0.3201	-0.04373	-0.7499	0.0004	-0.0000	0.0001517	-12.5	46.21

Joint Support Reactions for Load Case "NESC EXT. WIND (250C)":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
LP:g	-0.04	0.0	-53.79	0.0	0.0	-40.79	0.0	0.0	67.51	0.0	2976.54	0.0	-1.5	0.0	0.0	0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC EXT. WIND (250C)":

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.
LP	LP:t	Origin	0.00	14.14	0.01	-0.12	-0.00	-0.00	0.0	-0.09	0.07	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	5
LP	LP:PCS2	End	2.00	13.65	0.01	-0.12	0.14	-0.00	0.0	-0.09	0.07	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
LP	LP:PCS2	Origin	2.00	13.65	0.01	-0.12	0.14	-0.00	-0.0	-4.21	6.83	-0.00	-0.15	0.00	0.50	0.00	0.88	1.4	5
LP	Tube 1	End	6.00	12.68	0.01	-0.11	27.48	-0.00	-0.0	-4.21	6.83	-0.00	-0.14	1.53	0.12	0.00	1.69	2.6	2
LP	Tube 1	Origin	6.00	12.68	0.01	-0.11	27.48	-0.00	0.0	-4.61	7.14	-0.00	-0.16	1.53	0.13	0.00	1.70	2.6	2
LP	LP:Coax1	End	10.00	11.72	0.01	-0.10	56.02	-0.01	0.0	-4.61	7.14	-0.00	-0.15	2.81	0.12	0.00	2.96	4.6	2
LP	LP:Coax1	Origin	10.00	11.72	0.01	-0.10	56.02	-0.01	-0.0	-5.41	7.70	-0.00	-0.18	2.81	0.13	0.00	2.99	4.6	2
LP	LP:PCS3	End	12.00	11.24	0.01	-0.09	71.41	-0.02	-0.0	-5.41	7.70	-0.00	-0.17	3.40	0.13	0.00	3.58	5.5	2
LP	LP:PCS3	Origin	12.00	11.24	0.01	-0.09	71.41	-0.02	-0.0	-8.08	12.22	-0.00	-0.26	3.40	0.20	0.00	3.67	5.6	2
LP	Tube 1	End	14.75	10.59	0.00	-0.09	105.01	-0.03	-0.0	-8.08	12.22	-0.00	-0.25	4.67	0.20	0.00	4.93	7.6	2
LP	Tube 1	Origin	14.75	10.59	0.00	-0.09	105.01	-0.03	-0.0	-8.39	12.45	-0.00	-0.26	4.67	0.20	0.00	4.94	7.6	2
LP	SpliceT	End	17.50	9.95	0.00	-0.08	139.24	-0.04	-0.0	-8.39	12.45	-0.00	-0.25	5.80	0.19	0.00	6.06	9.3	2
LP	SpliceT	Origin	17.50	9.95	0.00	-0.08	139.24	-0.04	-0.0	-8.69	12.67	-0.00	-0.26	5.80	0.20	0.00	6.06	9.3	2
LP	LP:Coax2	End	20.00	9.38	0.00	-0.07	170.93	-0.05	-0.0	-8.69	12.67	-0.00	-0.25	6.72	0.19	0.00	6.97	10.7	2
LP	LP:Coax2	Origin	20.00	9.38	0.00	-0.07	170.93	-0.05	0.0	-9.64	13.33	-0.01	-0.28	6.72	0.20	0.00	7.00	10.8	2
LP	Tube 2	End	25.00	8.28	0.00	-0.06	237.58	-0.08	0.0	-9.64	13.33	-0.01	-0.26	8.35	0.19	0.00	8.62	13.3	2
LP	Tube 2	Origin	25.00	8.28	0.00	-0.06	237.58	-0.08	0.0	-10.28	13.80	-0.01	-0.28	8.35	0.20	0.00	8.64	13.3	2

LP	LP:Coax3	End	30.00	7.23	0.00	-0.05	306.56	-0.12	0.0	-10.28	13.80	-0.01	-0.27	9.70	0.19	0.00	9.97	15.5	2
LP	LP:Coax3	Origin	30.00	7.23	0.00	-0.05	306.56	-0.12	0.0	-11.45	14.60	-0.01	-0.30	9.70	0.20	0.00	10.00	15.6	2
LP	SpliceT	End	35.00	6.24	0.00	-0.04	379.59	-0.17	0.0	-11.45	14.60	-0.01	-0.28	10.87	0.19	0.00	11.15	17.8	2
LP	SpliceT	Origin	35.00	6.24	0.00	-0.04	379.59	-0.17	-0.0	-11.86	14.89	-0.01	-0.24	9.04	0.16	0.00	9.29	14.3	2
LP	LP:SW	End	35.75	6.10	0.00	-0.04	390.76	-0.17	-0.0	-11.86	14.89	-0.01	-0.24	9.17	0.16	0.00	9.42	14.5	2
LP	LP:SW	Origin	35.75	6.10	0.00	-0.04	391.97	-0.17	-0.0	-12.78	18.76	-0.01	-0.26	9.20	0.20	0.00	9.47	14.6	2
LP	LP:Coax4	End	40.00	5.32	0.00	-0.04	471.69	-0.22	-0.0	-12.78	18.76	-0.01	-0.25	10.21	0.19	0.00	10.47	16.1	2
LP	LP:Coax4	Origin	40.00	5.32	0.00	-0.04	471.69	-0.22	-0.0	-14.05	19.54	-0.01	-0.27	10.21	0.20	0.00	10.49	16.1	2
LP	Tube 3	End	44.38	4.56	0.00	-0.03	557.18	-0.28	-0.0	-14.05	19.54	-0.01	-0.26	11.14	0.19	0.00	11.41	17.5	2
LP	Tube 3	Origin	44.38	4.56	0.00	-0.03	557.18	-0.28	-0.0	-14.86	20.03	-0.01	-0.28	11.14	0.20	0.00	11.42	17.6	2
LP	LP:C1	End	48.75	3.85	0.00	-0.02	644.81	-0.34	-0.0	-14.86	20.03	-0.01	-0.27	11.94	0.19	0.00	12.21	19.0	2
LP	LP:C1	Origin	48.75	3.85	0.00	-0.02	670.11	-0.34	-0.0	-23.01	46.16	-0.02	-0.41	12.41	0.44	0.00	12.84	20.0	2
LP	LP:Coax5	End	50.00	3.65	0.00	-0.02	727.81	-0.36	-0.0	-23.01	46.16	-0.02	-0.41	13.19	0.43	0.00	13.62	21.3	2
LP	LP:Coax5	Origin	50.00	3.65	0.00	-0.02	727.81	-0.36	-0.0	-24.14	46.84	-0.02	-0.43	13.19	0.44	0.00	13.64	21.3	2
LP	SpliceT	End	55.00	2.91	0.00	-0.02	962.00	-0.44	-0.0	-24.14	46.84	-0.02	-0.41	16.04	0.42	0.00	16.47	26.3	2
LP	SpliceT	Origin	55.00	2.91	0.00	-0.02	962.00	-0.44	-0.0	-25.28	47.43	-0.02	-0.37	13.73	0.37	0.00	14.11	21.7	2
LP	LP:Coax6	End	60.00	2.25	0.00	-0.01	1199.17	-0.54	-0.0	-25.28	47.43	-0.02	-0.36	15.80	0.35	0.00	16.17	24.9	2
LP	LP:Coax6	Origin	60.00	2.25	0.00	-0.01	1199.17	-0.54	-0.0	-27.05	48.37	-0.02	-0.38	15.80	0.36	0.00	16.19	24.9	2
LP	Tube 4	End	65.00	1.67	0.00	-0.01	1441.02	-0.64	-0.0	-27.05	48.37	-0.02	-0.37	17.58	0.35	0.00	17.96	27.6	2
LP	Tube 4	Origin	65.00	1.67	0.00	-0.01	1441.02	-0.64	-0.0	-28.37	49.01	-0.02	-0.38	17.58	0.35	0.00	17.97	27.7	2
LP	LP:Coax7	End	70.00	1.17	0.00	-0.01	1686.05	-0.76	-0.0	-28.37	49.01	-0.02	-0.37	19.10	0.34	0.00	19.48	30.5	2
LP	LP:Coax7	Origin	70.00	1.17	0.00	-0.01	1686.05	-0.76	-0.0	-30.24	49.98	-0.03	-0.39	19.10	0.34	0.00	19.51	30.5	2
LP	Tube 4	End	75.00	0.75	0.00	-0.00	1935.94	-0.88	-0.0	-30.24	49.98	-0.03	-0.38	20.42	0.33	0.00	20.81	33.2	2
LP	Tube 4	Origin	75.00	0.75	0.00	-0.00	1935.94	-0.88	-0.0	-31.67	50.65	-0.03	-0.40	20.42	0.34	0.00	20.83	33.2	2
LP	LP:Coax8	End	80.00	0.43	0.00	-0.00	2189.21	-1.02	-0.0	-31.67	50.65	-0.03	-0.39	21.55	0.33	0.00	21.95	35.7	2
LP	LP:Coax8	Origin	80.00	0.43	0.00	-0.00	2189.21	-1.02	-0.0	-33.64	51.66	-0.03	-0.41	21.55	0.33	0.00	21.97	35.7	2
LP	Tube 4	End	85.00	0.19	0.00	-0.00	2447.53	-1.17	-0.0	-33.64	51.66	-0.03	-0.40	22.54	0.32	0.00	22.95	38.0	2
LP	Tube 4	Origin	85.00	0.19	0.00	-0.00	2447.53	-1.17	-0.0	-35.17	52.38	-0.03	-0.41	22.54	0.33	0.00	22.96	38.1	2
LP	LP:Coax9	End	90.00	0.05	0.00	-0.00	2709.41	-1.34	-0.0	-35.17	52.38	-0.03	-0.40	23.40	0.31	0.00	23.80	40.3	2
LP	LP:Coax9	Origin	90.00	0.05	0.00	-0.00	2709.41	-1.34	-0.0	-37.24	53.43	-0.04	-0.42	23.40	0.32	0.00	23.83	40.3	2
LP	LP:g	End	95.00	0.00	0.00	0.00	2976.54	-1.52	-0.0	-37.24	53.43	-0.04	-0.41	24.15	0.31	0.00	24.56	42.4	2

Summary of Clamp Capacities and Usages for Load Case "NESC EXT. WIND (250C)":

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 %
PCS2	7.584	50.00	50.00	15.17	50.00	50.00	15.17	15.17
PCS3	4.952	50.00	50.00	9.90	50.00	50.00	9.90	9.90
SW	0.000	50.00	50.00	0.00	50.00	50.00	0.00	0.00
C1	0.000	50.00	50.00	0.00	50.00	50.00	0.00	0.00
Coax1	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax2	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax3	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax4	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax5	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax6	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax7	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax8	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18
Coax9	0.590	50.00	50.00	1.18	50.00	50.00	1.18	1.18

Summary of Suspension Capacities and Usages for Load Case "NESC EXT. WIND (250C)":

Suspension Label	Tension	Input Tension	Factored Tension	Tension Usage	Input Hardware	Factored Hardware	Hardware Usage	Max. Usage

	(kips)	Capacity (kips)	Capacity (kips)	%	Capacity (kips)	Capacity (kips)	%	%
SW1	3.634	10.00	10.00	36.34	10.00	10.00	36.34	36.34
C1	26.906	50.00	50.00	53.81	50.00	50.00	53.81	53.81

*** Analysis Results for Load Case No. 3 "NESC EXT. ICE (250D)" - Number of iterations in SAPS 10

Equilibrium Joint Positions and Rotations for Load Case "NESC EXT. ICE (250D)":

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)
LP:g	0	0	0	0.0000	0.0000	0.0000	0	-16	0
LP:t	0.2073	0.5506	-0.004067	-0.4918	0.2376	-0.0008	0.2073	-15.45	95
LP:PCS2	0.199	0.5334	-0.003976	-0.4918	0.2376	-0.0008	0.199	-15.47	93
LP:Coax1	0.1661	0.465	-0.003557	-0.4870	0.2320	-0.0008	0.1661	-15.54	85
LP:PCS3	0.158	0.448	-0.00345	-0.4846	0.2293	-0.0007	0.158	-15.55	83
LP:Coax2	0.127	0.3812	-0.003004	-0.4698	0.2117	-0.0007	0.127	-15.62	75
LP:Coax3	0.09267	0.3014	-0.002477	-0.4424	0.1790	-0.0005	0.09267	-15.7	65
LP:SW	0.07569	0.2578	-0.002195	-0.4243	0.1582	-0.0004	0.07569	-15.74	59.25
LP:Coax4	0.06441	0.2268	-0.002	-0.4108	0.1447	-0.0003	0.06441	-15.77	55
LP:C1	0.04437	0.1663	-0.001622	-0.3781	0.1167	-0.0002	0.04437	-15.83	46.25
LP:Coax5	0.04186	0.1581	-0.001556	-0.3713	0.1127	-0.0002	0.04186	-15.84	45
LP:Coax6	0.02477	0.09842	-0.001092	-0.3057	0.0835	-0.0001	0.02477	-15.9	35
LP:Coax7	0.0124	0.05133	-0.0007208	-0.2272	0.0578	-0.0000	0.0124	-15.95	25
LP:Coax8	0.004394	0.01887	-0.0004082	-0.1392	0.0335	-0.0000	0.004394	-15.98	15
LP:Coax9	0.0004949	0.002225	-0.0001329	-0.0468	0.0108	-0.0000	0.0004949	-16	5
1	0.07566	0.2578	-0.01863	-0.4243	0.1582	-0.0004	0.07566	-13.52	59.23
4	0.04434	0.1662	-0.02263	-0.3781	0.1167	-0.0002	0.04434	-12.65	46.23

Joint Support Reactions for Load Case "NESC EXT. ICE (250D)":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
LP:g	-4.00	0.0	-29.42	0.0	0.0	-72.05	0.0	0.0	77.93	0.0	1580.37	0.0	-356.7	0.0	0.0	0.14	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC EXT. ICE (250D)":

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.
LP	LP:t	Origin	0.00	6.61	2.49	-0.05	-0.00	-0.00	0.0	-0.12	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	5
LP	LP:PCS2	End	2.00	6.40	2.39	-0.05	0.05	-0.00	0.0	-0.12	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	2
LP	LP:PCS2	Origin	2.00	6.40	2.39	-0.05	0.05	-0.00	0.0	-5.89	1.69	-2.02	-0.21	0.00	0.15	0.00	0.34	0.5	1
LP	Tube 1	End	6.00	5.99	2.19	-0.05	6.80	-8.10	0.0	-5.89	1.69	-2.02	-0.20	0.61	0.13	0.00	0.84	1.3	3
LP	Tube 1	Origin	6.00	5.99	2.19	-0.05	6.80	-8.10	-0.0	-6.40	1.80	-2.03	-0.22	0.61	0.13	0.00	0.86	1.3	3
LP	LP:Coax1	End	10.00	5.58	1.99	-0.04	13.99	-16.20	-0.0	-6.40	1.80	-2.03	-0.21	1.11	0.13	0.00	1.33	2.1	3
LP	LP:Coax1	Origin	10.00	5.58	1.99	-0.04	13.99	-16.20	0.0	-8.49	1.98	-2.03	-0.28	1.11	0.13	0.00	1.40	2.2	3
LP	LP:PCS3	End	12.00	5.38	1.90	-0.04	17.94	-20.27	0.0	-8.49	1.98	-2.03	-0.27	1.33	0.13	0.00	1.62	2.5	3
LP	LP:PCS3	Origin	12.00	5.38	1.90	-0.04	17.94	-20.27	-0.0	-12.44	3.13	-4.05	-0.39	1.33	0.23	0.00	1.77	2.7	3
LP	Tube 1	End	14.75	5.10	1.77	-0.04	26.55	-31.41	-0.0	-12.44	3.13	-4.05	-0.38	1.89	0.23	0.00	2.30	3.5	3
LP	Tube 1	Origin	14.75	5.10	1.77	-0.04	26.55	-31.41	-0.0	-12.83	3.21	-4.05	-0.39	1.89	0.23	0.00	2.31	3.6	3
LP	SpliceT	End	17.50	4.82	1.64	-0.04	35.39	-42.55	-0.0	-12.83	3.21	-4.05	-0.38	2.38	0.22	0.00	2.78	4.3	3
LP	SpliceT	Origin	17.50	4.82	1.64	-0.04	35.39	-42.55	-0.0	-13.22	3.29	-4.05	-0.39	2.38	0.22	0.00	2.79	4.3	3
LP	LP:Coax2	End	20.00	4.57	1.52	-0.04	43.62	-52.67	-0.0	-13.22	3.29	-4.05	-0.38	2.77	0.22	0.00	3.17	4.9	3
LP	LP:Coax2	Origin	20.00	4.57	1.52	-0.04	43.62	-52.67	-0.0	-15.49	3.51	-4.06	-0.45	2.77	0.22	0.00	3.24	5.0	3
LP	Tube 2	End	25.00	4.09	1.31	-0.03	61.16	-72.95	-0.0	-15.49	3.51	-4.06	-0.42	3.45	0.21	0.00	3.89	6.0	3
LP	Tube 2	Origin	25.00	4.09	1.31	-0.03	61.16	-72.95	-0.0	-16.29	3.68	-4.05	-0.44	3.45	0.21	0.00	3.91	6.0	3

LP	LP:Coax3	End	30.00	3.62	1.11	-0.03	79.54	-93.21	-0.0	-16.29	3.68	-4.05	-0.42	4.00	0.20	0.00	4.44	6.9	3
LP	LP:Coax3	Origin	30.00	3.62	1.11	-0.03	79.54	-93.21	-0.0	-18.84	3.94	-4.06	-0.49	4.00	0.21	0.00	4.50	7.0	3
LP	SpliceT	End	35.00	3.16	0.93	-0.03	99.25	-113.50	-0.0	-18.84	3.94	-4.06	-0.46	4.46	0.20	0.00	4.93	7.9	3
LP	SpliceT	Origin	35.00	3.16	0.93	-0.03	99.25	-113.50	0.0	-19.35	4.04	-4.05	-0.40	3.71	0.17	0.00	4.11	6.3	3
LP	LP:SW	End	35.75	3.09	0.91	-0.03	102.29	-116.54	0.0	-19.35	4.04	-4.05	-0.39	3.76	0.17	0.00	4.16	6.4	3
LP	LP:SW	Origin	35.75	3.09	0.91	-0.03	108.95	-116.54	-0.0	-22.85	7.74	-4.06	-0.46	3.87	0.26	0.00	4.36	6.7	3
LP	LP:Coax4	End	40.00	2.72	0.77	-0.02	141.84	-133.79	-0.0	-22.85	7.74	-4.06	-0.45	4.37	0.25	0.00	4.83	7.4	3
LP	LP:Coax4	Origin	40.00	2.72	0.77	-0.02	141.84	-133.79	-0.0	-25.48	8.00	-4.06	-0.50	4.37	0.25	0.00	4.88	7.5	3
LP	Tube 3	End	44.38	2.35	0.65	-0.02	176.82	-151.56	-0.0	-25.48	8.00	-4.06	-0.48	4.81	0.24	0.00	5.30	8.2	3
LP	Tube 3	Origin	44.38	2.35	0.65	-0.02	176.82	-151.56	-0.0	-26.46	8.17	-4.06	-0.50	4.81	0.25	0.00	5.32	8.2	3
LP	LP:C1	End	48.75	2.00	0.53	-0.02	212.55	-169.31	-0.0	-26.46	8.17	-4.06	-0.48	5.17	0.24	0.00	5.67	8.8	3
LP	LP:C1	Origin	48.75	2.00	0.53	-0.02	274.13	-169.31	-0.1	-46.33	27.10	-4.09	-0.84	6.01	0.71	0.00	6.95	10.8	3
LP	LP:Coax5	End	50.00	1.90	0.50	-0.02	308.00	-174.43	-0.1	-46.33	27.10	-4.09	-0.83	6.40	0.70	0.00	7.33	11.5	3
LP	LP:Coax5	Origin	50.00	1.90	0.50	-0.02	308.00	-174.43	-0.1	-48.78	27.31	-4.09	-0.87	6.40	0.71	0.00	7.37	11.5	3
LP	SpliceT	End	55.00	1.52	0.39	-0.02	444.53	-194.88	-0.1	-48.78	27.31	-4.09	-0.83	8.28	0.28	0.00	9.13	14.6	2
LP	SpliceT	Origin	55.00	1.52	0.39	-0.02	444.53	-194.88	-0.1	-50.11	27.50	-4.08	-0.73	7.09	0.24	0.00	7.83	12.1	2
LP	LP:Coax6	End	60.00	1.18	0.30	-0.01	582.04	-215.27	-0.1	-50.11	27.50	-4.08	-0.71	8.43	0.23	0.00	9.14	14.1	2
LP	LP:Coax6	Origin	60.00	1.18	0.30	-0.01	582.04	-215.27	-0.1	-53.28	27.79	-4.07	-0.75	8.43	0.24	0.00	9.19	14.1	2
LP	Tube 4	End	65.00	0.88	0.22	-0.01	720.99	-235.63	-0.1	-53.28	27.79	-4.07	-0.72	9.57	0.23	0.00	10.29	15.8	2
LP	Tube 4	Origin	65.00	0.88	0.22	-0.01	720.99	-235.63	-0.1	-54.80	27.99	-4.06	-0.74	9.57	0.23	0.00	10.31	15.9	2
LP	LP:Coax7	End	70.00	0.62	0.15	-0.01	860.95	-255.94	-0.1	-54.80	27.99	-4.06	-0.72	10.53	0.22	0.00	11.25	17.6	2
LP	LP:Coax7	Origin	70.00	0.62	0.15	-0.01	860.95	-255.94	-0.1	-58.08	28.28	-4.05	-0.76	10.53	0.22	0.00	11.29	17.7	2
LP	Tube 4	End	75.00	0.40	0.09	-0.01	1002.37	-276.20	-0.1	-58.08	28.28	-4.05	-0.73	11.35	0.21	0.00	12.09	19.3	2
LP	Tube 4	Origin	75.00	0.40	0.09	-0.01	1002.37	-276.20	-0.1	-59.72	28.49	-4.04	-0.75	11.35	0.21	0.00	12.11	19.3	2
LP	LP:Coax8	End	80.00	0.23	0.05	-0.00	1144.83	-296.41	-0.1	-59.72	28.49	-4.04	-0.73	12.05	0.21	0.00	12.78	20.8	2
LP	LP:Coax8	Origin	80.00	0.23	0.05	-0.00	1144.83	-296.41	-0.1	-63.12	28.79	-4.03	-0.77	12.05	0.21	0.00	12.83	20.9	2
LP	Tube 4	End	85.00	0.10	0.02	-0.00	1288.78	-316.56	-0.1	-63.12	28.79	-4.03	-0.74	12.65	0.20	0.00	13.40	22.2	2
LP	Tube 4	Origin	85.00	0.10	0.02	-0.00	1288.78	-316.56	-0.1	-64.87	29.01	-4.02	-0.76	12.65	0.20	0.00	13.42	22.2	2
LP	LP:Coax9	End	90.00	0.03	0.01	-0.00	1433.82	-336.66	-0.1	-64.87	29.01	-4.02	-0.74	13.16	0.20	0.00	13.90	23.5	2
LP	LP:Coax9	Origin	90.00	0.03	0.01	-0.00	1433.82	-336.66	-0.1	-68.38	29.31	-4.01	-0.78	13.16	0.20	0.00	13.94	23.6	2
LP	LP:g	End	95.00	0.00	0.00	0.00	1580.37	-356.69	-0.1	-68.38	29.31	-4.01	-0.76	13.59	0.19	0.00	14.35	24.8	2

Summary of Clamp Capacities and Usages for Load Case "NESC EXT. ICE (250D)":

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 %
PCS2	5.983	50.00	50.00	11.97	50.00	50.00	11.97	11.97
PCS3	4.281	50.00	50.00	8.56	50.00	50.00	8.56	8.56
SW	0.000	50.00	50.00	0.00	50.00	50.00	0.00	0.00
C1	0.000	50.00	50.00	0.00	50.00	50.00	0.00	0.00
Coax1	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax2	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax3	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax4	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax5	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax6	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax7	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax8	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40
Coax9	1.702	50.00	50.00	3.40	50.00	50.00	3.40	3.40

Summary of Suspension Capacities and Usages for Load Case "NESC EXT. ICE (250D)":

Suspension Label	Tension	Input Tension	Factored Tension	Tension Usage	Input Hardware	Factored Hardware	Hardware Usage	Max. Usage

	(kips)	Capacity (kips)	Capacity (kips)	%	Capacity (kips)	Capacity (kips)	%	%
SW1	4.672	10.00	10.00	46.72	10.00	10.00	46.72	46.72
C1	26.900	50.00	50.00	53.80	50.00	50.00	53.80	53.80

*** 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)
LP	42.39	NESC EXT. WIND (250C)	2.5	24	21231.6

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 %	
LP	NESC HEAVY (250B)	1	-0.723	2.698	-1.975	1.975	17.350	26.814	79.151	-2.5	110.034	2.563	3.500	53.63	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	2	-1.975	1.975	-2.698	0.723	17.350	17.773	52.462	-2.5	87.520	2.087	3.500	35.55	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	3	-2.698	-0.723	-1.975	-1.975	17.350	15.499	45.751	-2.5	-78.943	1.949	3.500	31.00	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	4	-1.975	-1.975	-0.723	-2.698	17.350	24.602	72.623	-2.5	-101.672	2.455	3.500	49.20	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	5	0.723	-2.698	1.975	-1.975	17.350	24.717	72.960	-2.5	-102.027	2.461	3.500	49.43	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	6	1.975	-1.975	2.698	-0.723	17.350	15.675	46.271	-2.5	-79.514	1.960	3.500	31.35	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	7	2.698	0.723	1.975	1.975	17.350	17.596	51.942	-2.5	86.949	2.076	3.500	35.19	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC HEAVY (250B)	8	1.975	1.975	0.723	2.698	17.350	26.700	78.814	-2.5	109.679	2.558	3.500	53.40	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	1	-0.723	2.698	-1.975	1.975	17.350	26.215	77.383	-2.5	107.782	2.534	3.500	52.43	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	2	-1.975	1.975	-2.698	0.723	17.350	17.147	50.616	-2.5	85.176	2.050	3.500	34.29	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	3	-2.698	-0.723	-1.975	-1.975	17.350	16.125	47.597	-2.5	-81.288	1.988	3.500	32.25	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	4	-1.975	-1.975	-0.723	-2.698	17.350	25.202	74.391	-2.5	-103.925	2.485	3.500	50.40	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	5	0.723	-2.698	1.975	-1.975	17.350	25.219	74.441	-2.5	-103.978	2.486	3.500	50.44	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	6	1.975	-1.975	2.698	-0.723	17.350	16.151	47.675	-2.5	-81.372	1.989	3.500	32.30	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	7	2.698	0.723	1.975	1.975	17.350	17.121	50.539	-2.5	85.092	2.048	3.500	34.24	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. WIND (250C)	8	1.975	1.975	0.723	2.698	17.350	26.198	77.333	-2.5	107.729	2.533	3.500	52.40	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. ICE (250D)	1	-0.723	2.698	-1.975	1.975	17.350	29.648	87.516	-2.5	118.109	2.695	3.500	59.30	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. ICE (250D)	2	-1.975	1.975	-2.698	0.723	17.350	22.796	67.289	-2.5	102.980	2.363	3.500	45.59	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. ICE (250D)	3	-2.698	-0.723	-1.975	-1.975	17.350	9.660	28.515	-2.5	-59.400	1.538	3.500	19.32	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP	NESC EXT. ICE (250D)	4	-1.975	-1.975	-0.723	-2.698	17.350	20.507	60.534	-2.5	-88.404	2.241	3.500	41.01	Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2

LP NESC EXT. ICE (250D) 5 0.723 -2.698 1.975 -1.975 17.350 27.832 82.157 -2.5 -111.178 2.611 3.500 55.66 Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP NESC EXT. ICE (250D) 6 1.975 -1.975 2.698 -0.723 17.350 20.980 61.930 -2.5 -96.049 2.267 3.500 41.96 Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP NESC EXT. ICE (250D) 7 2.698 0.723 1.975 1.975 17.350 11.476 33.874 -2.5 66.331 1.677 3.500 22.95 Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2
LP NESC EXT. ICE (250D) 8 1.975 1.975 0.723 2.698 17.350 22.323 65.893 -2.5 95.334 2.339 3.500 44.65 Note: actual load overridden by one half of pole moment capacity at the base as per ASCE/SEI 48-19 6.4.2

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC HEAVY (250B)	53.63	LP	Base Plate
NESC EXT. WIND (250C)	52.43	LP	Base Plate
NESC EXT. ICE (250D)	59.30	LP	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Steel Pole Usage %	Label	Height AGL (ft)	Segment Number
NESC HEAVY (250B)	27.85	LP	2.5	24
NESC EXT. WIND (250C)	42.39	LP	2.5	24
NESC EXT. ICE (250D)	24.77	LP	2.5	24

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 (250B)	LP	1	17.350	80.063	3572.198	-12.252	26.814	79.151	-2.5	110.034	2.563	53.63
NESC EXT. WIND (250C)	LP	1	17.350	38.040	3572.219	-1.820	26.215	77.383	-2.5	107.782	2.534	52.43
NESC EXT. ICE (250D)	LP	1	17.350	69.305	3484.569	-786.466	29.648	87.516	-2.5	118.109	2.695	59.30

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
PCS2	Clamp	15.17	NESC EXT. WIND (250C)	0.0
PCS3	Clamp	9.92	NESC HEAVY (250B)	0.0
SW	Clamp	0.00	NESC HEAVY (250B)	0.0
C1	Clamp	0.00	NESC HEAVY (250B)	0.0
Coax1	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax2	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax3	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax4	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax5	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax6	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax7	Clamp	3.69	NESC HEAVY (250B)	0.0

Coax8	Clamp	3.69	NESC HEAVY (250B)	0.0
Coax9	Clamp	3.69	NESC HEAVY (250B)	0.0
SW1	Suspension	46.72	NESC EXT. ICE (250D)	0.0
C1	Suspension	57.32	NESC HEAVY (250B)	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 (250B)	PCS2	Clamp	LP:PCS2	0.000	1.806	7.316	7.536
NESC HEAVY (250B)	PCS3	Clamp	LP:PCS3	0.000	1.226	4.804	4.958
NESC HEAVY (250B)	SW	Clamp	LP:SW	0.000	0.000	-0.000	0.000
NESC HEAVY (250B)	C1	Clamp	LP:C1	0.000	0.000	-0.000	0.000
NESC HEAVY (250B)	Coax1	Clamp	LP:Coax1	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax2	Clamp	LP:Coax2	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax3	Clamp	LP:Coax3	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax4	Clamp	LP:Coax4	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax5	Clamp	LP:Coax5	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax6	Clamp	LP:Coax6	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax7	Clamp	LP:Coax7	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax8	Clamp	LP:Coax8	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	Coax9	Clamp	LP:Coax9	0.000	0.119	1.840	1.844
NESC HEAVY (250B)	SW1	Suspension	1	0.000	3.923	2.104	4.452
NESC HEAVY (250B)	C1	Suspension	4	0.000	21.637	18.792	28.658
NESC EXT. WIND (250C)	PCS2	Clamp	LP:PCS2	0.000	6.467	3.961	7.584
NESC EXT. WIND (250C)	PCS3	Clamp	LP:PCS3	0.000	4.281	2.490	4.952
NESC EXT. WIND (250C)	SW	Clamp	LP:SW	0.000	0.000	-0.000	0.000
NESC EXT. WIND (250C)	C1	Clamp	LP:C1	0.000	0.000	-0.000	0.000
NESC EXT. WIND (250C)	Coax1	Clamp	LP:Coax1	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax2	Clamp	LP:Coax2	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax3	Clamp	LP:Coax3	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax4	Clamp	LP:Coax4	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax5	Clamp	LP:Coax5	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax6	Clamp	LP:Coax6	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax7	Clamp	LP:Coax7	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax8	Clamp	LP:Coax8	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	Coax9	Clamp	LP:Coax9	0.000	0.314	0.499	0.590
NESC EXT. WIND (250C)	SW1	Suspension	1	0.000	3.593	0.547	3.634
NESC EXT. WIND (250C)	C1	Suspension	4	0.000	25.705	7.949	26.906
NESC EXT. ICE (250D)	PCS2	Clamp	LP:PCS2	2.000	1.536	5.426	5.983
NESC EXT. ICE (250D)	PCS3	Clamp	LP:PCS3	2.000	1.053	3.636	4.281
NESC EXT. ICE (250D)	SW	Clamp	LP:SW	0.000	0.000	-0.000	0.000
NESC EXT. ICE (250D)	C1	Clamp	LP:C1	0.000	0.000	-0.000	0.000
NESC EXT. ICE (250D)	Coax1	Clamp	LP:Coax1	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax2	Clamp	LP:Coax2	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax3	Clamp	LP:Coax3	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax4	Clamp	LP:Coax4	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax5	Clamp	LP:Coax5	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax6	Clamp	LP:Coax6	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax7	Clamp	LP:Coax7	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax8	Clamp	LP:Coax8	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	Coax9	Clamp	LP:Coax9	0.000	0.080	1.700	1.702
NESC EXT. ICE (250D)	SW1	Suspension	1	0.000	3.578	3.004	4.672
NESC EXT. ICE (250D)	C1	Suspension	4	0.000	18.690	19.347	26.900

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 (250B)	29.663	0.000	49.576	822.325	0.000	0.000
NESC EXT. WIND (250C)	42.872	0.000	19.438	2201.172	0.000	0.000
NESC EXT. ICE (250D)	25.577	4.000	46.713	659.893	-352.000	-64.000

*** Weight of structure (lbs):
Weight of Steel Poles: 21231.6
Total: 21231.6

*** End of Report

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Anchor Bolt Analysis Pole #14027
Location:	Middletown, CT
Rev. 2: 8/31/23	Prepared by: T.J.L. Checked by: C.F.C. Job No. 23016.01

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 118 \cdot kips$ (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 Yeild Strength= $F_y := 75 \cdot ksi$ (User Input)

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

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

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

Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.7 \times 10^3 \, lbf$

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 = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 48.46 \cdot \%$

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

Condition1 = "OK"

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Flange Bolts and Flangeplate Analysis

Location: Structure 14027
Middletown, CT

Rev. 2: 8/31/23 Prepared by: T.J.L. Checked by: C.F.C.
Job No. 23016.01

Flange Bolt and Flange Plate Analysis:

Input Data: Left Pole - Flange @77.5-ft

Tower Reactions:

Overturning Moment =	OM := 139·ft·kips	(User Input)
Shear Force =	Shear := 13·kips	(User Input)
Axial Force =	Axial := 9·kips	(User Input)

Flange Bolt Data:

Use AST MA325

Number of Flange Bolts =	N := 24	(User Input)
Diameter of Bolt Circle =	D_{bc} := 38.25·in	(User Input)
Bolt Minimum Tensile Strength =	F_{ub} := 120·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Flange Plate Data:

Use AST MA871 Grade 65

Plate Yield Strength =	Fy_{bp} := 65·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 1.25·in	(User Input)
Flange Plate Diameter =	D_{bp} := 41·in	(User Input)
Outer Pole Diameter =	D_{pole} := 33.94·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 19.125 \cdot in$

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

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

$d_1 = 4.95 \cdot in$	$d_7 = 18.47 \cdot in$
$d_2 = 9.56 \cdot in$	$d_8 = 16.56 \cdot in$
$d_3 = 13.52 \cdot in$	$d_9 = 13.52 \cdot in$
$d_4 = 16.56 \cdot in$	$d_{10} = 9.56 \cdot in$
$d_5 = 18.47 \cdot in$	$d_{11} = 4.95 \cdot in$
$d_6 = 19.13 \cdot in$	$d_{12} = 0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 16.97 \cdot in$

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

$MA_1 = 0.00 \cdot in$	$MA_7 = 1.50 \cdot in$
$MA_2 = 0.00 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_3 = 0.00 \cdot in$	$MA_9 = 0.00 \cdot in$
$MA_4 = 0.00 \cdot in$	$MA_{10} = 0.00 \cdot in$
$MA_5 = 1.50 \cdot in$	$MA_{11} = 0.00 \cdot in$
$MA_6 = 2.15 \cdot in$	$MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 18.4 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 4.389 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Check Flange Bolts:

Maximum Shear Stress = $V_{Max} := \frac{Shear}{N \cdot A_g} = 0.7 \cdot ksi$

Permitted Shear Stress = $F_v := \left(0.35 \cdot F_{ub}\right) = 42 \cdot ksi$

Condition1 = $Condition1 := if\left(V_{Max} \le F_v, "OK", "Overstressed"\right)$ $\frac{V_{Max}}{F_v} = 1.64 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 11.4 \cdot ksi$

Permitted Tensile Stress = $F_t := \left(0.75 \cdot F_{ub}\right) = 90 \cdot ksi$

Condition2 = $Condition2 := if\left(\frac{T_{Max}}{F_t} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_t} = 12.64 \cdot \%$

Condition2 = "OK"

Permitted Tensile Stress with Shear = $F_{t.v} := F_t \cdot \sqrt{1 - \left(\frac{V_{Max}}{F_v}\right)^2} = 90 \cdot ksi$

Condition3 = $Condition3 := if\left(\frac{T_{Max}}{F_{t.v}} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_{t.v}} = 12.65 \cdot \%$

Condition3 = "OK"

Flange Plate Analysis:

Force from Bolts =

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

$C_1 = 2.3 \cdot kips$ $C_7 = 7.4 \cdot kips$

$C_2 = 4.0 \cdot kips$ $C_8 = 6.7 \cdot kips$

$C_3 = 5.5 \cdot kips$ $C_9 = 5.5 \cdot kips$

$C_4 = 6.7 \cdot kips$ $C_{10} = 4.0 \cdot kips$

$C_5 = 7.4 \cdot kips$ $C_{11} = 2.3 \cdot kips$

$C_6 = 7.6 \cdot kips$ $C_{12} = 0.4 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 8.1 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 58.5 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} = 13.8 \cdot \%$$

Condition1 =

$$Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$$

Condition1 = "Ok"

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: Flange Bolts and Flangeplate Analysis

Location: Structure 14027
Middletown, CT

Rev. 2: 8/31/23

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 23016.01

Flange Bolt and Flange Plate Analysis:

Input Data:

Left Pole - Flange @60-ft

Tower Reactions:

Overturning Moment =	OM := 380·ft·kips	(User Input)
Shear Force =	Shear := 15·kips	(User Input)
Axial Force =	Axial := 12·kips	(User Input)

Flange Bolt Data:

Use AST MA325

Number of Flange Bolts =	N := 40	(User Input)
Diameter of Bolt Circle =	D_{bc} := 45.75·in	(User Input)
Bolt Minimum Tensile Strength =	F_{ub} := 120·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Flange Plate Data:

Use AST MA588 Grade 50

Plate Yield Strength =	Fy_{bp} := 50·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 2·in	(User Input)
Flange Plate Diameter =	D_{bp} := 48.5·in	(User Input)
Outer Pole Diameter =	D_{pole} := 40.84·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 22.875 \cdot in$

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

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

$d_1 = 3.58 \cdot in$ $d_7 = 20.38 \cdot in$

$d_2 = 7.07 \cdot in$ $d_8 = 21.76 \cdot in$

$d_3 = 10.39 \cdot in$ $d_9 = 22.59 \cdot in$

$d_4 = 13.45 \cdot in$ $d_{10} = 22.88 \cdot in$

$d_5 = 16.18 \cdot in$ $d_{11} = 22.59 \cdot in$

$d_6 = 18.51 \cdot in$ $d_{12} = 21.76 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 20.42 \cdot in$

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

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 1.34 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 2.17 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 2.46 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 2.17 \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = 1.34 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 20.9 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 1.047 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Check Flange Bolts:

Maximum Shear Stress = $V_{Max} := \frac{Shear}{N \cdot A_g} = 0.5 \cdot ksi$

Permitted Shear Stress = $F_v := \left(0.35 \cdot F_{ub}\right) = 42 \cdot ksi$

Condition1 = $Condition1 := if\left(V_{Max} \le F_v, "OK", "Overstressed"\right)$ $\frac{V_{Max}}{F_v} = 1.14 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 16 \cdot ksi$

Permitted Tensile Stress = $F_t := \left(0.75 \cdot F_{ub}\right) = 90 \cdot ksi$

Condition2 = $Condition2 := if\left(\frac{T_{Max}}{F_t} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_t} = 17.73 \cdot \%$

Condition2 = "OK"

Permitted Tensile Stress with Shear = $F_{t.v} := F_t \cdot \sqrt{1 - \left(\frac{V_{Max}}{F_v}\right)^2} = 90 \cdot ksi$

Condition3 = $Condition3 := if\left(\frac{T_{Max}}{F_{t.v}} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_{t.v}} = 17.73 \cdot \%$

Condition3 = "OK"

Flange Plate Analysis:

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

$C_1 = 1.9 \cdot kips$ $C_7 = 9.2 \cdot kips$

$C_2 = 3.4 \cdot kips$ $C_8 = 9.8 \cdot kips$

$C_3 = 4.8 \cdot kips$ $C_9 = 10.1 \cdot kips$

$C_4 = 6.2 \cdot kips$ $C_{10} = 10.3 \cdot kips$

$C_5 = 7.3 \cdot kips$ $C_{11} = 10.1 \cdot kips$

$C_6 = 8.4 \cdot kips$ $C_{12} = 9.8 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\,2}\right)} = 6.8 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 15.2 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition1 = "Ok"

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Subject: Flange Bolts and Flangeplate Analysis

Location: Structure 14027
Middletown, CT

Rev. 2: 8/31/23 Prepared by: T.J.L. Checked by: C.F.C.
Job No. 23016.01

Flange Bolt and Flange Plate Analysis:

Input Data: Left Pole - Flange @40-ft

Tower Reactions:

Overturning Moment =	OM := 962·ft·kips	(User Input)
Shear Force =	Shear := 48·kips	(User Input)
Axial Force =	Axial := 25·kips	(User Input)

Flange Bolt Data:

Use AST MA325

Number of Flange Bolts =	N := 56	(User Input)
Diameter of Bolt Circle =	D_{bc} := 54.25·in	(User Input)
Bolt Minimum Tensile Strength =	F_{ub} := 120·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Flange Plate Data:

Use AST MA588 Grade 50

Plate Yield Strength =	Fy_{bp} := 50·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 2.25·in	(User Input)
Flange Plate Diameter =	D_{bp} := 57.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 48.85·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 27.125 \cdot in$

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

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

$d_1 = 3.04 \cdot in$ $d_2 = 6.04 \cdot in$ $d_3 = 8.96 \cdot in$ $d_4 = 11.77 \cdot in$ $d_5 = 14.43 \cdot in$ $d_6 = 16.91 \cdot in$ $d_7 = 19.18 \cdot in$ $d_8 = 21.21 \cdot in$ $d_9 = 22.97 \cdot in$ $d_{10} = 24.44 \cdot in$ $d_{11} = 25.60 \cdot in$ $d_{12} = 26.44 \cdot in$ $d_{13} = 26.95 \cdot in$ $d_{14} = 27.13 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 24.425 \cdot in$

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

$MA_1 = 0.00 \cdot in$ $MA_2 = 0.00 \cdot in$ $MA_3 = 0.00 \cdot in$ $MA_4 = 0.00 \cdot in$ $MA_5 = 0.00 \cdot in$ $MA_6 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$ $MA_9 = 0.00 \cdot in$ $MA_{10} = 0.01 \cdot in$ $MA_{11} = 1.18 \cdot in$ $MA_{12} = 2.02 \cdot in$ $MA_{13} = 2.53 \cdot in$ $MA_{14} = 2.70 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 23.5 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 2.06 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Check Flange Bolts:

Maximum Shear Stress = $V_{Max} := \frac{Shear}{N \cdot A_g} = 1.1 \cdot ksi$

Permitted Shear Stress = $F_v := \left(0.35 \cdot F_{ub}\right) = 42 \cdot ksi$

Condition1 = $Condition1 := if\left(V_{Max} \le F_v, "OK", "Overstressed"\right)$ $\frac{V_{Max}}{F_v} = 2.60 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 24.4 \cdot ksi$

Permitted Tensile Stress = $F_t := \left(0.75 \cdot F_{ub}\right) = 90 \cdot ksi$

Condition2 = $Condition2 := if\left(\frac{T_{Max}}{F_t} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_t} = 27.06 \cdot \%$

Condition2 = "OK"

Permitted Tensile Stress with Shear = $F_{t.v} := F_t \cdot \sqrt{1 - \left(\frac{V_{Max}}{F_v}\right)^2} = 90 \cdot ksi$

Condition3 = $Condition3 := if\left(\frac{T_{Max}}{F_{t.v}} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_{t.v}} = 27.07 \cdot \%$

Condition3 = "OK"

Flange Plate Analysis:

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

$C_1 = 2.1 \cdot kips$	$C_7 = 11.2 \cdot kips$	$C_{13} = 15.6 \cdot kips$
$C_2 = 3.8 \cdot kips$	$C_8 = 12.3 \cdot kips$	$C_{14} = 15.6 \cdot kips$
$C_3 = 5.5 \cdot kips$	$C_9 = 13.3 \cdot kips$	
$C_4 = 7.0 \cdot kips$	$C_{10} = 14.1 \cdot kips$	
$C_5 = 8.5 \cdot kips$	$C_{11} = 14.8 \cdot kips$	
$C_6 = 9.9 \cdot kips$	$C_{12} = 15.3 \cdot kips$	

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 11 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 24.4 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition1 = "Ok"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTL05436	DATE:	5/14/2022	RF DESIGN ENG:	Meteen Mohammed	RF PERF ENG:	
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	5107757382	RF PERF PHONE:	
REVISION:	Descope - RRH bottom	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	mm093q@att.com	RF PERF EMAIL:	
INITIATIVE PROJECT	Combined RFDS Edeting structure is transmission pole RF Mod to Replace tower. CBAND 4 GHz B4+B5+C1+C2 (80MHz) Band n77 DoD 3.45 GHz A+B+C+D (40 MHz) Band n77 AWS3 J (10 MHz) Band 66 850 MHz BL+BH (10MHz) E-UTRA Band 5 PCS MHz A3+A4 (10MHz) E-UTRA Band 2 700 MHz UPPER D (10 MHz) Band 14 700 MHz OFFSET LOWER_B+C (10 MHz) E-UTRA BAND 17					ADDITIONAL WORKFLOW NOTIFICATIONS:	

RFDS PROGRAM TYPE:	2023 LTE Next Carrier		
RFDS TECHNOLOGY:	5G NR Upgrade		
STATE/STATUS:	Final/Approved		
RFDS ID:	5421902		
RFDS VERSION:	5.00	Created By:	mm093q
Updated By:	mh705r		
UMTS FREQUENCY:		Created:	6/6/2022
Updated:	6/8/2023		
LTE FREQUENCY:	700,1900,AWS	Estimated SQN:	10,359
Expiration:			
5G FREQUENCY:	CBAND,DoD,850,1900,AWS	RER Initiative:	
Calculation ID:	20230807181725389		
IPLAN JOB # 1:	ER_-RCTB-22-05546	PRD || SUB GRP #1:	Cell Site RF Modifications || 5G NR Software Upgrade
IPLAN JOB # 2:	ER_-RCTB-22-05545	PRD || SUB GRP #2:	5G NR Radio || 5G NR 1DR-1
IPLAN JOB # 3:	ER_-RCTB-22-05544	PRD || SUB GRP #3:	5G NR Radio || 5G NR 1DR-1
IPLAN JOB # 4:	ER_-RCTB-22-05547	PRD || SUB GRP #4:	LTE Next Carrier || LTE 3C
IPLAN JOB # 5:	ER_-RCTB-22-05548	PRD || SUB GRP #5:	Antenna Modifications || 4T4R/4X Software Retrofit
IPLAN JOB # 6:	ER_-RCTB-22-01802	PRD || SUB GRP #6:	Cell Site RF Modifications || Cell Site RF Modifications
IPLAN JOB # 7:		PRD || SUB GRP #7:	
IPLAN JOB # 8:		PRD || SUB GRP #8:	
IPLAN JOB # 9:		PRD || SUB GRP #9:	
IPLAN JOB #10:		PRD || SUB GRP #10:	
IPLAN JOB # 11:		PRD || SUB GRP #11:	
IPLAN JOB # 12:		PRD || SUB GRP #12:	
IPLAN JOB # 13:		PRD || SUB GRP #13:	
IPLAN JOB # 14:		PRD || SUB GRP #14:	
IPLAN JOB # 15:		PRD || SUB GRP #15:	
IPLAN JOB # 16:		PRD || SUB GRP #16:	

Section 2 - LOCATION INFORMATION

USID:	26992	FA LOCATION CODE:	10071126	LOCATION NAME:	MIDDLETOWN SOUTH	ORACLE PRJT # 1:	2051AI75Q2
PACE JOB #1:	MRCTB067607						
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PRJT # 2:	2051AI75Q1
PACE JOB #2:	MRCTB067612						
ADDRESS:	1114 AND 1176 BARTHOLOMEW ROAD	CITY:	MIDDLETOWN	STATE:	CT	ORACLE PRJT # 3:	2051AI75Q0
PACE JOB #3:	MRCTB067536						
ZIP CODE:	06457	COUNTY:	MIDDLESEX	LONG (DEC. DEG.):	-72.6081989	ORACLE PRJT # 4:	2051AI75Q3
PACE JOB #4:	MRCTB067603						
LATITUDE (D-M-S):	41d 31m14.49084s	LONGITUDE (D-M-S):	-72d -36m-29.51604s	LAT (DEC. DEG.):	41.5208919	ORACLE PRJT # 5:	2051AI75Q4
PACE JOB #5:	MRCTB067595						
ORACLE PRJT # 6:	2051AI6GJD	PACE JOB #6:	MRCTB065973				
ORACLE PRJT # 7:		PACE JOB #7:					
ORACLE PRJT # 8:		PACE JOB #8:					
ORACLE PRJT # 9:		PACE JOB #9:					
ORACLE PRJT # 10:		PACE JOB #10:					
ORACLE PRJT # 11:		PACE JOB #11:					
ORACLE PRJT # 12:		PACE JOB #12:					
ORACLE PRJT # 13:		PACE JOB #13:					
ORACLE PRJT # 14:		PACE JOB #14:					
ORACLE PRJT # 15:		PACE JOB #15:					
ORACLE PRJT # 16:		PACE JOB #16:					
BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:					
AM STUDY REQ'D (Y/N):	No	SEARCH RING ID:					
FREQ COORD:		STA:		MSA / RSA:			
		LAC(UMTS):					
RF DISTRICT:	TBD						
RF ZONE:	TBD	RNC(UMTS):					
		MME POOL ID(LTE):	FF01				
PARENT NAME(UMTS):							

DIRECTIONS, ACCESS AND EQUIPMENT LOCATION: UPDATED 01/21/2021STEVE SCTL05436 MIDDLETOWN SOUTHI95 TO EXIT FOR ROUTE 9 NORTHS GET ON ROUTE 9 NORTH AND GET OFF EXIT 11 AT THE END OF RAMP MAKE RIGHT ONTO RT 155 TAKE THIS TO SAY BROOK RD MAKE RIGHT THEN ANOTHER RIGHT ONTO BARTHOLOMEW RD FOLLOW THIS ROAD FOR APPROXIMATELY 2 MILES TO ADDRESS SITE IS ON A MONOPOLE ON THE LEFT SITE COMPOUND COMBO:4050CABINETS:GROUND LEVELADDRESS: 1176 BARTHOLOMEW ROAD MIDDLETOWN CT 06457ACCESS: 24/7 MAIN GATE2488EVERSOURCE CODECOMPOUND COMBO: 4050ATT CABINETS:4050SECURITY: NOPOWER COMPANY:EVERSOURCE ENERGY METER:89109922

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CQSA - NO FILING TRIGGERED (Yes/No):	No	CQSA LOSS:		PCS REDUCED - UPS ZIP:		CQSA CALL SIGNS:	x_KNLB312,z_KNLB312,z_KNLB312
CQSA - MINOR FILING NEEDED (Yes/No):	No	CQSA EXT AGMT NEEDED:		PCS POPS REDUCED:			
CQSA - MAJOR FILING NEEDED (Yes/No):	Yes	CQSA SCORECARD UPDATED:					

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	No	GROUND ELEVATION (ft):		STRUCTURE TYPE:	UTILITY	MARKET LOCATION 700 MHz Band:	
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	0.00	FCC ASR NUMBER:		MARKET LOCATION 850 MHz Band:	
SUB-LEASE RIGHTS?:	No	STRUCTURE HEIGHT (ft):	94.00			MARKET LOCATION 1900 MHz Band:	
LIGHTING TYPE:	NOT REQUIRED					MARKET LOCATION AWS Band:	
						MARKET LOCATION WCS Band:	
						MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

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

Section 5 - E-911 INFORMATION - final

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

Section 6/7 - BBU INFORMATION - existing

	BBU 1
BBU ID:	367003
TECHNOLOGY:	LTE
BBU NAME:	CTL05436
BBU UBID:	26992
CELL ID / BCF:	CTL05436
BTA/TID:	184L
4-8 DIGIT SITE ID:	5436
COW OR TOY?	No
CELL SITE TYPE:	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL
BTS LOCATION ID:	INTERNAL
BASE STATION TYPE:	BASE
EQUIPMENT NAME:	MIDDLETOWN SOUTH
DISASTER PRIORITY:	3
EQUIPMENT VENDOR:	ERICSSON
EQUIPMENT TYPE (Model):	6601 INDOOR MU
BASEBAND CONFIGURATION :	
MARKET STATE CODE:	CT
NODE B NUMBER:	5436
SIDEHAUL SWITCH VENDOR:	
SIDEHAUL SWITCH MODEL:	
SIDEHAUL SWITCH NAME:	
SIDEHAUL SWITCH ADDITIONAL CARDS:	
UL-CoMP:	
CSS - CTS COMMON ID:	CTL05436
CSS - SECONDARY FUNCTION ID:	

Section 6/7 - BBU INFORMATION - final

	BBU 1	BBU 2
BBU ID:	367003	963117
TECHNOLOGY:	LTE	LTE,5G
BBU NAME:	CTL05436	CTL04436B,CTCN005436
BBU UBID:	26992	26992
CELL ID / BCF:	CTL05436	CTCN005436
BTA/TID:	184L	
4-8 DIGIT SITE ID:	5436	14005436
COW OR TOY?	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL
BTS LOCATION ID:	INTERNAL	INTERNAL
BASE STATION TYPE:	BASE	OVERLAY
EQUIPMENT NAME:	MIDDLETOWN SOUTH	CTCN005436
DISASTER PRIORITY:	3	0
EQUIPMENT VENDOR:	ERICSSON	ERICSSON
EQUIPMENT TYPE (Model):	BASEBAND 6630	BASEBAND 6648
BASEBAND CONFIGURATION :	1x6601 / 1x6630 / 1x0MU	xxxxx / 1x6651 / xxxxx + IDLe
MARKET STATE CODE:	CT	CT,CTC
NODE B NUMBER:	5436	4436,5436
SIDEHAUL SWITCH VENDOR:		
SIDEHAUL SWITCH MODEL:		
SIDEHAUL SWITCH NAME:		
SIDEHAUL SWITCH ADDITIONAL CARDS:		
UL-CoMP:		
CSS - CTS COMMON ID:	CTL05436	CTCN005436
CSS - SECONDARY FUNCTION ID:		CTL04436B

Section 7b - Radio INFORMATION - existing

Section 7b - Radio INFORMATION - final

Section 8 - RBS/SECTOR ASSOCIATION - existing

	BBU 1
CTS Common ID:	CTL05436
Soft Sector IDs:	CTL05436_7A_1
	CTL05436_7B_1
	CTL05436_7C_1
	CTL05436_9A_1
	CTL05436_9A_2
	CTL05436_9B_1
	CTL05436_9B_2
	CTL05436_9C_1
	CTL05436_9C_2

Section 8 - RBS/SECTOR ASSOCIATION - final

	BBU 1	BBU 2
CTS Common ID	CTL05436	CTL04436R,CTCN005436
Soft Sector IDs	CTL05436_7A_1	CTCN005436_N002A_1
	CTL05436_7A_3_F	CTCN005436_N002B_1
	CTL05436_7B_1	CTCN005436_N002C_1
	CTL05436_7B_3_F	CTCN005436_N005A_1
	CTL05436_7C_1	CTCN005436_N005B_1
	CTL05436_7C_3_F	CTCN005436_N005C_1
		CTCN005436_N066A_1
		CTCN005436_N066B_1
		CTCN005436_N066C_1
		CTL04436_2A_2
		CTL04436_2B_2
		CTL04436_2C_2
		CTL04436_9A_1
		CTL04436_9A_2
		CTL04436_9B_1
		CTL04436_9B_2
		CTL04436_9C_1
		CTL04436_9C_2

Section 9 - SOFT SECTOR ID - existing

	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS
USEID (excluding Hard Sector)									
SECTOR A SOFT SECTOR ID	CTL05436_7A_1	CTL05436_9A_1	CTL05436_9A_2						
SECTOR B	CTL05436_7B_1	CTL05436_9B_1	CTL05436_9B_2						
SECTOR C	CTL05436_7C_1	CTL05436_9C_1	CTL05436_9C_2						
SECTOR D									
SECTOR E									
SECTOR F									
OMNI									

Section 9 - SOFT SECTOR ID - final

	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900	LTE 4TH 1900	LTE 4TH AWS	LTE 5TH 700	5G 1ST 850	5G 1ST 1900	5G 1ST AWS
USEID (excluding Hard Sector)									
SECTOR A SOFT SECTOR ID	CTL05436_7A_1	CTL04436_9A_1		CTL04436_9A_2	CTL04436_2A_2	CTL05436_7A_3_F	CTCN005436_N005	CTCN005436_N002	CTCN005436_N066A_1
SECTOR B	CTL05436_7B_1	CTL04436_9B_1		CTL04436_9B_2	CTL04436_2B_2	CTL05436_7B_3_F	CTCN005436_N005	CTCN005436_N002	CTCN005436_N066B_1
SECTOR C	CTL05436_7C_1	CTL04436_9C_1		CTL04436_9C_2	CTL04436_2C_2	CTL05436_7C_3_F	CTCN005436_N005	CTCN005436_N002	CTCN005436_N066C_1
SECTOR D									
SECTOR E									
SECTOR F									
OMNI									

Section 9 - Cell Number - existing

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

Section 9 - Cell Number - final

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

Section 10 - CID/SAC - existing

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

Section 10 - CID/SAC - final

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

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	HPA-65R-BUU-H6					
ANTENNA VENDOR	Powerwave	CCI Products					
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X8					
ANTENNA WEIGHT	35	51					
AZIMUTH	140	30					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	93	93.02					
ANTENNA TIP HEIGHT	95	96.02					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	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	Internal					
SURGE ARRESTOR (QTY/MODEL)	4	APTDC-BDFDM-D8W					
DIPLEXER (QTY/MODEL)	2 LGP21901	2 DBC2055F1V1-2					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2 LGP21401	2 TMA2093F00V1-1					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 1000860	AISG Equipment					
PDU FOR TMAS (QTY/MODEL)	1 LGP12104						
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
RBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 RRUS-11 B12					
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)		1 RRUS-12 B2 + RRUS-A2 B25					
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Ascii)	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		26992.A.850.3G.1	CTV54381	CTV54381		UMTS 850	7770.00.850.06	13.5	140	6	None	Andrew 1-5/8 (850)	140.035847						271.02		1	
	PORT 2		26992.A.850.3G.1	CTV54381	CTV5436A		UMTS 850	7770.00.850.06	13.5	140	6	Bottom	Andrew 1-5/8 (850)	140.035847						271.02		3	
	PORT 3		26992.A.1900.3G.2	CTU54367	CTU54367		UMTS 1900	7770.00.1900.00	15.5	140	0	None	Andrew 1-5/8 (850)	140.035847						362.24		3	
	PORT 4		26992.A.1900.3G.1	CTU54367	CTU54364		UMTS 1900	7770.00.1900.00	15.5	140	0	Bottom	Andrew 1-5/8 (850)	140.035847						829.51		3	
	PORT 7		26992.A.1900.2S.G.1	184P54381	184P54381		GSM 1900	7770.00.1900.00	16.79	140	0	None	Andrew 1-5/8 (1900)	140.035847	RxAIT 1900	1	LLC 1900		11.22	228.03			
ANTENNA POSITION 2	PORT 1		26992.A.700.4G.1	CTL05436_7A_1	CTL05436_7A_1		LTE 700	H6_719MHz_07DT	14.03	30	7	Bottom	7/8" ANDREW FXL 780_1900 MHz	120.030726						827.9421			
	PORT 3		26992.A.1900.4G.1	CTL05436_9A_1	CTL05436_9A_1		LTE 1900	H6_1930MHz_04DT	17.15	30	4	Bottom	7/8" ANDREW FXL 780_1900 MHz	120.030726						3258.367			
	PORT 4			CTL05436_9A_2	CTL05436_9A_2		LTE 1900	H6_1930MHz_04DT	17.15	30	4	Bottom	7/8" ANDREW FXL 780_1900 MHz	120.030726						3258.367			

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	7770	HPA-65R-BUU-H6					
ANTENNA VENDOR	Powerwave	CCI Products					
ANTENNA SIZE (H x W x D)	55X11X5	72X14.6X8					
ANTENNA WEIGHT	35	51					
AZIMUTH	240	140					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	93	93.02					
ANTENNA TIP HEIGHT	95	96.02					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	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	Internal					
SURGE ARRESTOR (QTY/MODEL)	4	APTDC-BDFDM-D8W					
DIPLEXER (QTY/MODEL)	2 LGP21901	2 DBC2055F1V1-2					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2 LGP21401	2 TMA2093F00V1-1					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 1000860	AISG Equipment					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 RRUS-11 B12					
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)		1 RRUS-12 B2 + RRUS-A2 B25					
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Ascii)	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		26992.B.850.3G.1	CTV54362	CTV54362		UMTS 850	7770.00.850.06	13.5	240	6	None	Andrew 1-5/8 (850)	140.035847						271.02			
	PORT 2		26992.B.850.3G.1	CTV54362	CTV54362		UMTS 850	7770.00.850.06	13.5	240	6	Bottom	Andrew 1-5/8 (850)	140.035847						271.02			
	PORT 3		26992.B.1900.3G.2	CTU54368	CTU54368		UMTS 1900	7770.00.1900.00	15.5	240	0	None	Andrew 1-5/8 (1900)	140.035847						415.91			
	PORT 4		26992.B.1900.3G.1	CTU54368	CTU54365		UMTS 1900	7770.00.1900.00	15.5	240	0	Bottom	Andrew 1-5/8 (1900)	140.035847						829.51			
	PORT 7		26992.B.1900.25G.1	184P54362	184P54362		GSM 1900	7770.00.1900.00	16.79	240	0	None	Andrew 1-5/8 (1900)	140.035847	RxAIT 1900	1	LLC 1900		12.58	255.85			
ANTENNA POSITION 2	PORT 1		26992.B.700.4G.1	CTL05436_7B_1	CTL05436_7B_1		LTE 700	H6_719MHz_04DT	14.16	140	4	Bottom	7/8" ANDREW FXL 78Q_1900 MHz	120.030726						827.9421		9	
	PORT 3		26992.B.1900.4G.1	CTL05436_9B_1	CTL05436_9B_1		LTE 1900	H6_1930MHz_04DT	17.18	140	6	Bottom	7/8" ANDREW FXL 78Q_1900 MHz	120.030726						3258.367		11	
	PORT 4			CTL05436_9B_2	CTL05436_9B_2		LTE 1900	H6_1930MHz_04DT	17.18	140	6	Bottom	7/8" ANDREW FXL 78Q_1900 MHz	120.030726						3258.367		11	

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	7770	HPA-65R-BUU-H6					
ANTENNA VENDOR	Powerwave	CCI Products					
ANTENNA SIZE (H x W x D)	55X11X5	72X14.6X9					
ANTENNA WEIGHT	35	51					
AZIMUTH	340	260					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	93	93.02					
ANTENNA TIP HEIGHT	95	96.02					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	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 7C20	Internal					
SURGE ARRESTOR (QTY/MODEL)	4	APTDC-BDFDM-D8W					
DIPLEXER (QTY/MODEL)	2 LGP21901	2 DBC2055F1V1-2					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	2 LGP21401	2 TMA2093F00V1-1					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 1000860	AISG Equipment					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
RBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)	1 RRUS-11 B12						
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)	1 RRUS-12 B2 + RRUS-A2 B25						
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Ascii)	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		26992.C.850.3G.1	CTV54383	CTV54383		UMTS 850	7770.00.850.06	13.5	340	6	None	Andrew 1-5/8 (850)	140.035847						271.02		11	
	PORT 2		26992.C.850.3G.1	CTV54383	CTV5438C		UMTS 850	7770.00.850.06	13.5	340	6	Bottom	Andrew 1-5/8 (850)	140.035847						271.02			
	PORT 3		26992.C.1900.3G.2	CTU54389	CTU54389		UMTS 1900	7770.00.1900.04	15.5	340	4	None	Andrew 1-5/8 (1900)	140.035847						415.91			
	PORT 4		26992.C.1900.3G.1	CTU54389	CTU54366		UMTS 1900	7770.00.1900.04	15.5	340	4	Bottom	Andrew 1-5/8 (1900)	140.035847						829.51			
	PORT 7		26992.C.1900.2SG.1	184P54383	184P54383		GSM 1900	7770.00.1900.04	16.79	340	4	None	Andrew 1-5/8 (1900)	140.035847	RxAIT 1900	1	LLC 1900		12.58	255.85			
ANTENNA POSITION 2	PORT 1		26992.C.700.4G.1	CTL05436_7C_1	CTL05436_7C_1		LTE 700	H6_719MHz_10DT	13.9	260	10	Bottom	7/8" ANDREW FXL 78Q_1900 MHz	120.030726						827.9421			
	PORT 3		26992.C.1900.4G.1	CTL05436_9C_1	CTL05436_9C_1		LTE 1900	H6_1930MHz_0SDT	17.18	260	6	Bottom	7/8" ANDREW FXL 78Q_1900 MHz	120.030726						3258.367			
	PORT 4			CTL05436_9C_2	CTL05436_9C_2		LTE 1900	H6_1930MHz_0SDT	17.18	260	6	Bottom	7/8" ANDREW FXL 78Q_1900 MHz	120.030726						3258.367			

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL		TPA65R-BU6DA-K		TPA65R-BU6DA-K			
ANTENNA VENDOR		CCI		CCI			
ANTENNA SIZE (H x W x D)		71.2X20.7X7.7		71.2X20.7X7.7			
ANTENNA WEIGHT		69		69			
AZIMUTH		30		30			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		93		93			
ANTENNA TIP HEIGHT		96		96			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT		2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)							
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		12 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)		2 DBC0115F1V61-2		2 CBC61923T-DS			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMAT192123868 31		2 TMAT192123868 31			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 8843 B2/B66A			
RRH - AWS band (QTY/MODEL)		with another band					
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	// Swap existing Antenna with 12 port Antennas. // Add / Swap radios with SA's at bottom.						
Local Market Note 2							
Local Market Note 3	8830+XMU+6651+IDLe Xcede						

PORT SPECIFIC FIELDS	PORT NUMBER	USED (CSSng)	USED (Abdl)	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/AT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1			CTL05436_7A_3_F	CTL05436_7A_3_F		LTE 700	K_719MHz_07DT	14.03	30	7	Bottom	Andrew 1-5/8	140									
	PORT 3			CTL04436_2A_2	CTL04436_2A_2		LTE AWS	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140									
	PORT 11			CTCN005436_N066A_1	CTCN005436_N066A_1		5G AWS	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140									
ANTENNA POSITION 4	PORT 1			CTL05436_7A_1	CTL05436_7A_1		LTE 700	K_719MHz_07DT	14.03	30	7	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 3			CTL04436_9A_1	CTL04436_9A_1		LTE 1900	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 4			CTL04436_9A_2	CTL04436_9A_2		LTE 1900	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 8			CTCN005436_N005A_1	CTCN005436_N005A_1		5G 850	K_719MHz_07DT	14.03	30	7	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 12			CTCN005436_N002A_1	CTCN005436_N002A_1		5G 1900	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140						3258.367			

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL		TPA65R-BU6DA-K		TPA65R-BU6DA-K			
ANTENNA VENDOR		CCI		CCI			
ANTENNA SIZE (H x W x D)		71.2X20.7X7.7		71.2X20.7X7.7			
ANTENNA WEIGHT		69		69			
AZIMUTH		140		140			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		93		93			
ANTENNA TIP HEIGHT		96		96			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT		2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)							
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		12 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)		2 DBC0115F1W91-2		2 CBC61923T-DS			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMAT192123868 31		2 TMAT192123868 31			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 8843 B2/B66A			
RRH - AWS band (QTY/MODEL)		with another band					
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	// Swap existing Antenna with 12 port Antennas. // Add / Swap radios with SA's at bottom.						
Local Market Note 2							
Local Market Note 3	8830+XMU+6651+IDLe Xcede						

PORT SPECIFIC FIELDS	PORT NUMBER	USED (CSSng)	USEID (Abdl)	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/AT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1			CTL05436_7B_3_F	CTL05436_7B_3_F		LTE 700	K_719MHz_04DT	14.16	140	4	Bottom	Andrew 1-5/8	140									
	PORT 3			CTL04436_2B_2	CTL04436_2B_2		LTE AWS	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140									
	PORT 11			CTCN005436_N066B_1	CTCN005436_N066B_1		5G AWS	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140									
ANTENNA POSITION 4	PORT 1			CTL05436_7B_1	CTL05436_7B_1		LTE 700	K_719MHz_04DT	14.16	140	4	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 3			CTL04436_9B_1	CTL04436_9B_1		LTE 1900	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 4			CTL04436_9B_2	CTL04436_9B_2		LTE 1900	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 8			CTCN005436_N005B_1	CTCN005436_N005B_1		5G 850	K_719MHz_04DT	14.16	140	4	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 12			CTCN005436_N002B_1	CTCN005436_N002B_1		5G 1900	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140						3258.367			

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL		TPA65R-BU8DA-K		TPA65R-BU8DA-K			
ANTENNA VENDOR		CCI		CCI			
ANTENNA SIZE (H x W x D)		71.2X20.7X7.7		71.2X20.7X7.7			
ANTENNA WEIGHT		69		69			
AZIMUTH		260		260			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		93		93			
ANTENNA TIP HEIGHT		96		96			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT		2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)							
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		12 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)		2 DBC0115F1V61-2		2 CBC61923T-DS			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMAT192123868 31		2 TMAT192123868 31			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 8843 B2/B66A			
RRH - AWS band (QTY/MODEL)		with another band					
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	tower RRH bottom : Add						
Local Market Note 2							
Local Market Note 3	6630+XMU+6651+IDLe Xcede						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Abdl)	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/AT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1			CTL05436_7C_3_F	CTL05436_7C_3_F		LTE 700	K_719MHz_10DT	13.9	260	10	Bottom	Andrew 1-5/8	140									
	PORT 3			CTL04436_2C_2	CTL04436_2C_2		LTE AWS	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140									
	PORT 4			CTCN005436_N066C_1	CTCN005436_N066C_1		5G AWS	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140									
ANTENNA POSITION 4	PORT 1			CTL05436_7C_1	CTL05436_7C_1		LTE 700	K_719MHz_10DT	13.9	260	10	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 3			CTL04436_9C_1	CTL04436_9C_1		LTE 1900	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 4			CTL04436_9C_2	CTL04436_9C_2		LTE 1900	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 8			CTCN005436_N005C_1	CTCN005436_N005C_1		5G 850	K_719MHz_10DT	13.9	260	10	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 12			CTCN005436_N002C_1	CTCN005436_N002C_1		5G 1900	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140						3258.367			

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

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL		TPA65R-BU8DA-K		TPA65R-BU8DA-K			
ANTENNA VENDOR		CCI		CCI			
ANTENNA SIZE (H x W x D)		71.2X20.7X7.7		71.2X20.7X7.7			
ANTENNA WEIGHT		69		69			
AZIMUTH		30		30			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		93		93			
ANTENNA TIP HEIGHT		96		96			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT		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)							
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		12 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)		2 DBC0115F1V61-2		2 CBC6192GT-DS			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMAT192123868 31		2 TMAT192123868 31			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 8843 B2/B66A			
RRH - AWS band (QTY/MODEL)		with another band					
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	// Swap existing Antenna with 12 port Antennas. // Add / Swap radios with SA's at bottom.						
Local Market Note 2							
Local Market Note 3	6630+XMU+6651+IDLe Xcede						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Abdl)	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)	RXANT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 5	26992.A.700.4G.5		CTL05436_7A_3_F	CTL05436_7A_3_F		LTE 700	K_719MHz_07DT	14.03	30	7	Bottom	Andrew 1-5/8	140									
	PORT 7	26992.A.AWS.4G.4		CTL04436_2A_2	CTL04436_2A_2		LTE AWS	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140									
	PORT 11	26992.A.AWS.5G.1		CTCN005436_N066A_1	CTCN005436_N066A_1		5G AWS	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140									
ANTENNA POSITION 4	PORT 1	26992.A.700.4G.1		CTL05436_7A_1	CTL05436_7A_1		LTE 700	K_719MHz_07DT	14.03	30	7	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 3	26992.A.1900.4G.5		CTL04436_9A_1	CTL04436_9A_1		LTE 1900	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 4	26992.A.1900.4G.6		CTL04436_9A_2	CTL04436_9A_2		LTE 1900	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 9	26992.A.850.5G.5		CTCN005436_N005A_1	CTCN005436_N005A_1		5G 850	K_719MHz_07DT	14.03	30	7	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 12	26992.A.1900.5G.1		CTCN005436_N002A_1	CTCN005436_N002A_1		5G 1900	K_1930MHz_04DT	17.15	30	4	Bottom	Andrew 1-5/8	140						3258.367			

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL		TPA65R-BU6DA-K		TPA65R-BU6DA-K			
ANTENNA VENDOR		CCI		CCI			
ANTENNA SIZE (H x W x D)		71.2X20.7X7.7		71.2X20.7X7.7			
ANTENNA WEIGHT		69		69			
AZIMUTH		140		140			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		93		93			
ANTENNA TIP HEIGHT		96		96			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT		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)							
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		12 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)		2 DBC0115F1V61-2		2 CBC81923T-DS			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMAT192123B6831		2 TMAT192123B6831			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
RBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 8843 B2/B66A			
RRH - AWS band (QTY/MODEL)		with another band					
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	If Swap existing Antenna with 12 port Antennas. If Add / Swap radios with SA's at bottom.						
Local Market Note 2							
Local Market Note 3	6630+XMU+6651+IDLe Xcede						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Ascii)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 5	26992.B.700.4G.5		CTL05436_7B_3_F	CTL05436_7B_3_F		LTE 700	K_719MHz_04DT	14.16	140	4	Bottom	Andrew 1-5/8	140									
	PORT 3	26992.B.AWS.4G.4		CTL04436_2B_2	CTL04436_2B_2		LTE AWS	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140									
	PORT 11	26992.B.AWS.5G.1		CTCN005436_N066B_1	CTCN005436_N066B_1		5G AWS	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140									
ANTENNA POSITION 4	PORT 1	26992.B.700.4G.1		CTL05436_7B_1	CTL05436_7B_1		LTE 700	K_719MHz_04DT	14.16	140	4	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 3	26992.B.1900.4G.5		CTL04436_9B_1	CTL04436_9B_1		LTE 1900	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 4	26992.B.1900.4G.6		CTL04436_9B_2	CTL04436_9B_2		LTE 1900	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 8	26992.B.850.5G.1		CTCN005436_N005B_1	CTCN005436_N005B_1		5G 850	K_719MHz_04DT	14.16	140	4	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 12	26992.B.1900.5G.1		CTCN005436_N062B_1	CTCN005436_N062B_1		5G 1900	K_1930MHz_06DT	17.18	140	6	Bottom	Andrew 1-5/8	140						3258.367			

Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL		TPA65R-BU6DA-K		TPA65R-BU6DA-K			
ANTENNA VENDOR		CCI		CCI			
ANTENNA SIZE (H x W x D)		71.2X20.7X7.7		71.2X20.7X7.7			
ANTENNA WEIGHT		69		69			
AZIMUTH		260		260			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		93		93			
ANTENNA TIP HEIGHT		96		96			
MECHANICAL DOWNTILT		0		0			
FEEDER AMOUNT		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)							
SURGE ARRESTOR (QTY/MODEL)		4 TSXDC-4310FM		12 TSXDC-4310FM			
DIPLEXER (QTY/MODEL)		2 DBC0115F1V61-2		2 CBC81923T-DS			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)		2 TMAT192123B6831		2 TMAT192123B6831			
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
RBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14		1 4449 B5/B12			
RRH - 850 band (QTY/MODEL)				with another band			
RRH - 1900 band (QTY/MODEL)				1 8843 B2/B66A			
RRH - AWS band (QTY/MODEL)		with another band					
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
RRH_7B_1 (QTY/MODEL)							
RRH_7B_2 (QTY/MODEL)							
RRH_7B_3 (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	If Swap existing Antenna with 12 port Antennas. If Add / Swap radios with SAs at bottom.						
Local Market Note 2							
Local Market Note 3	8830+XMU+8851+IDLe Xcede						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Ascii)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1	26992.C.700.4G.5		CTL05436_7C_3_F	CTL05436_7C_3_F		LTE 700	K_719MHz_10DT	13.9	260	10	Bottom	Andrew 1-5/8	140									
	PORT 3	26992.C.AWS.4.G.4		CTL04436_2C_2	CTL04436_2C_2		LTE AWS	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140									
	PORT 4	26992.C.AWS.5.G.1		CTCN005436_N066C_1	CTCN005436_N066C_1		5G AWS	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140									
ANTENNA POSITION 4	PORT 1	26992.C.700.4G.1		CTL05436_7C_1	CTL05436_7C_1		LTE 700	K_719MHz_10DT	13.9	260	10	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 3	26992.C.1900.4.G.5		CTL04436_9C_1	CTL04436_9C_1		LTE 1900	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 4	26992.C.1900.4.G.6		CTL04436_9C_2	CTL04436_9C_2		LTE 1900	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140						3258.367			
	PORT 5	26992.C.850.5G.1		CTCN005436_N005C_1	CTCN005436_N005C_1		5G 850	K_719MHz_10DT	13.9	260	10	Bottom	Andrew 1-5/8	140						827.9421			
	PORT 12	26992.C.1900.5.G.1		CTCN005436_N062C_1	CTCN005436_N002C_1		5G 1900	K_1930MHz_06DT	17.18	260	6	Bottom	Andrew 1-5/8	140						3258.367			

DATA SHEET

Multi-Band Twelve-Port Antenna

TPA65R-BU6D

- Six foot (1.8 m) multiband, twelve port antenna with a 65° azimuth beamwidth covering 698-896 MHz and 1695-2400 MHz frequencies
- Eight high band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz in a single antenna enclosure
- Innovative Low and High Band Array configuration allows for 4T4R (4x4 MIMO) on Low Band and Dual 4T4R (4x4 MIMO) High Band Arrays, using full length arrays (non stacked), all in a 20.7" (525 mm) width enclosure, an Industry First
- Full Spectrum Compliance for WCS and AWS-3 frequencies and Band 14 Operations
- Array configuration allows for 4T4R (4X4 MIMO) on Low Band, essential for Band 14 Operations
- LTE Optimized FBR and SPR performance, providing for an efficient use of valuable radio capacity
- LTE Optimized Boresight and Sector XPD and USL performance, essential for LTE Performance
- Exceeds minimum PIM performance requirements
- Equipped with new 4.3-10 connector, which is 40% smaller than traditional 7/16 DIN connector
- Ordering options for External RET Controllers (Type 1) or Internally Integrated RET Controllers (Type 17)

Overview

The CCI 12-Port multiband array is a twelve port antenna, with eight wide band ports covering 1695-2400 MHz and four low band ports covering 698-896 MHz. The antenna provides the capability to deploy Dual 4x4 Multiple-input Multiple-output (MIMO) in the high band and 4X4 Multiple-input Multiple-output (MIMO) across low band ports. The CCI 12-Port allows independent tilt control between the low band ports and high band ports and independent tilt control between left and right antenna arrays.

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

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

Applications

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

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SPECIFICATIONS

Multi-Band Twelve-Port Antenna

TPA65R-BU6D

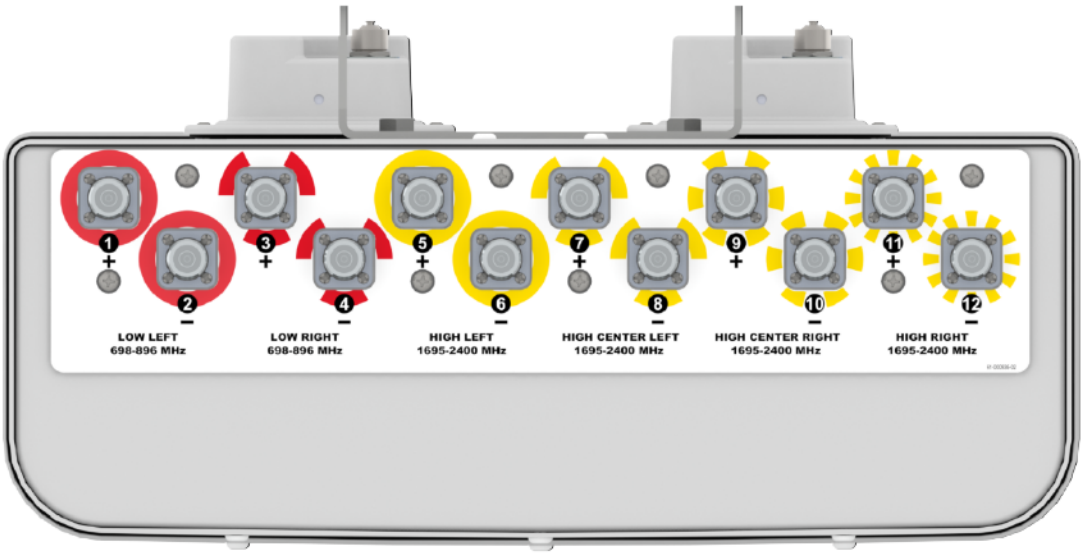
Mechanical

Dimensions (LxWxD)	71.2x20.7x7.7 in (1808x525x197 mm)
Survival Wind Speed	> 150 mph (> 241 kph)
Front Wind Load	325 lbs (1446 N) @ 100 mph (161 kph)
Side Wind Load	144 lbs (642 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	12.7 ft^2 (1.2 m^2)
Weight *	68.3 lbs (31.0 kg)
Packaging Dimensions (LxWxD)	81.4x25.2x13.9 in (2067x641x354 mm)
Packaged Weight ~	116.8 lbs (53.0 kg)
Connector	12 x 4.3-10 female
Mounting Pole	2 to 5 in (5 to 12 cm)

** Weight excludes mounting*

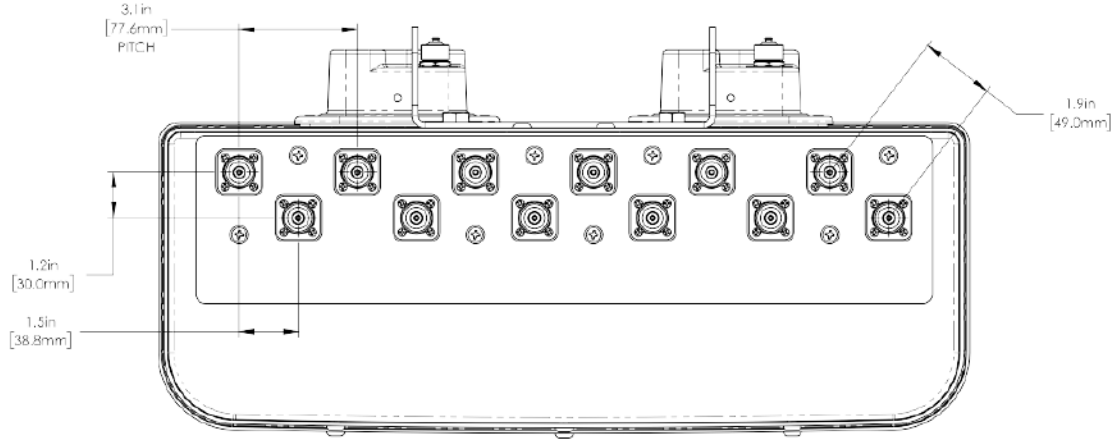
Bottom View

TPA65R-BU6DA



Connector Spacing

TPA65R-BU6DA



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TMAT192123B68-31 | E14R00P33

Tower Mounted Amplifier,Twin Configuration PCS/AWS 1–4 WCS, 617–894 MHz bypass 4.3-10

- New Triple-band TMA for PCS, AWS 1-4 and WCS in a compact twin form factor
- Low frequency bypass of 617-894 MHz covers Band 14 public safety operating frequencies
- Significantly reduces complexity of tower top architectures
- Also available in a quad configuration to support 4 x 4 requirements
- New 4.3-10 connectors for improved PIM performance and size reduction
- Support DC/AISG antenna Auto-forward

Product Classification

Product Type	1-BTS:3-ANT (Triplex) | Tower mounted amplifier

General Specifications

Color	Gray
Modularity	2-Twin
Mounting	Pole | Wall
Mounting Pipe Hardware	Band clamps (2)
RF Connector Interface	4.3-10 Female

Dimensions

Height	238 mm | 9.37 in
Width	283 mm | 11.142 in
Depth	97 mm | 3.819 in
Ground Screw Diameter	6 mm | 0.236 in
Mounting Pipe Diameter Range	40–160 mm

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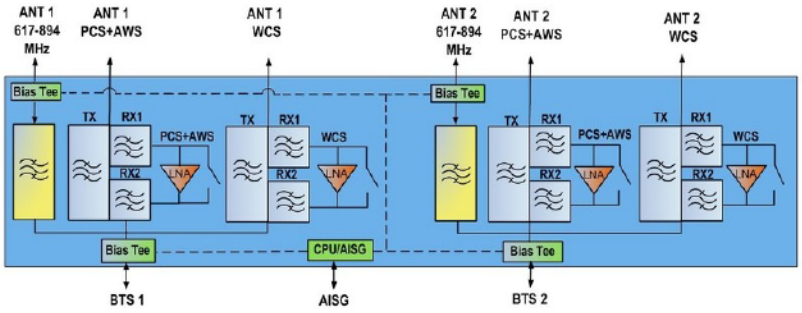
Block Diagram



Material Specifications

Finish	Painted

Environmental Specifications

Operating Temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Relative Humidity	Up to 100%
Corrosion Test Method	IEC 60068-2-11, 30 days
Ingress Protection Test Method	IEC 60529:2001, IP67

Packaging and Weights

Included	Mounting hardware
Mounting Hardware Weight	1 kg | 2.205 lb
Weight, without mounting hardware	9.4 kg | 20.723 lb

* Footnotes

License Band, Band Pass	License Bands that are to be passed through with no amplification
License Band, LNA	License Bands that have RxUplink amplification

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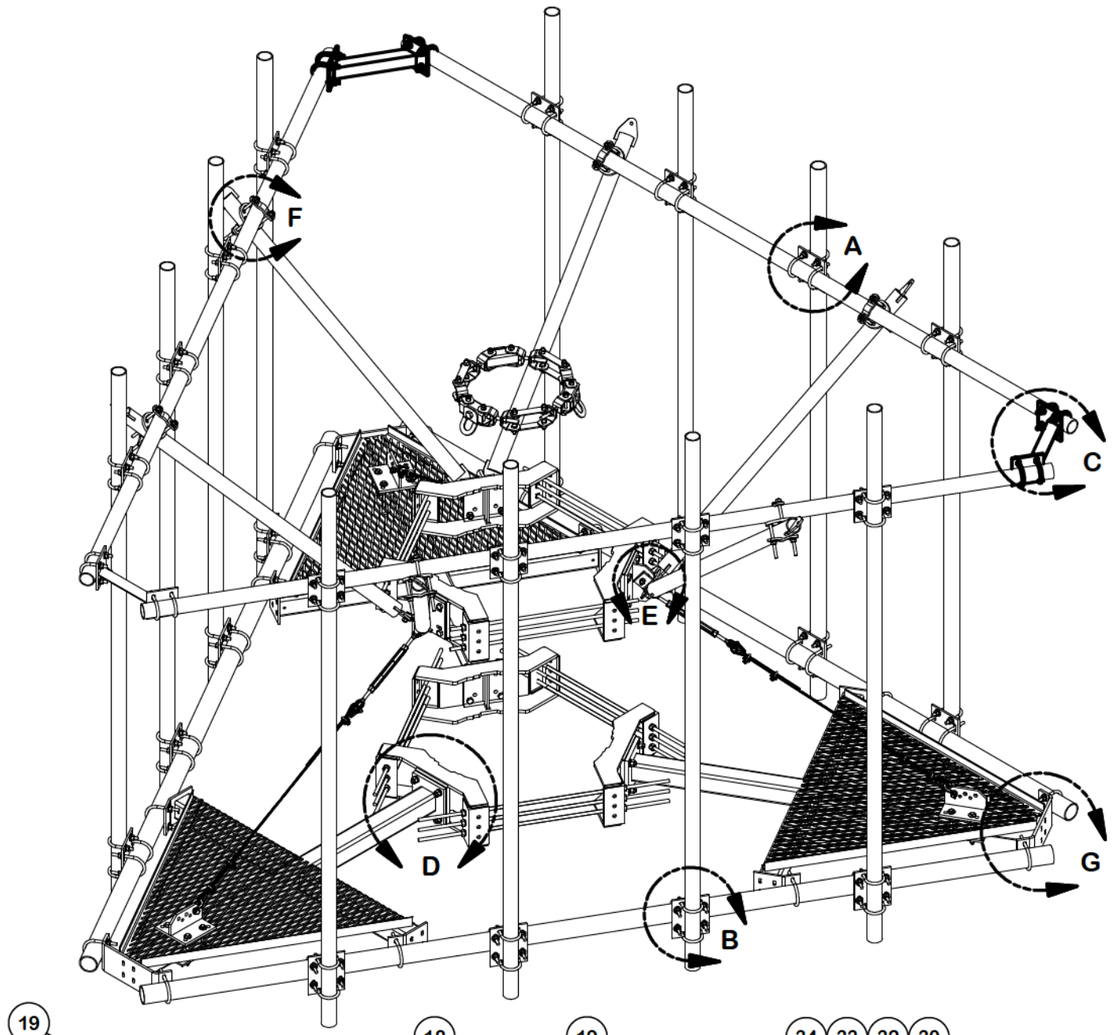
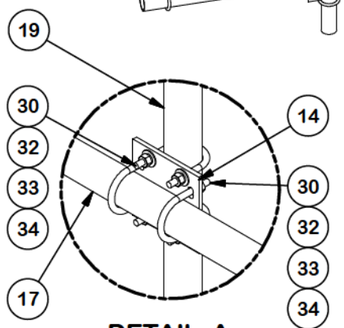
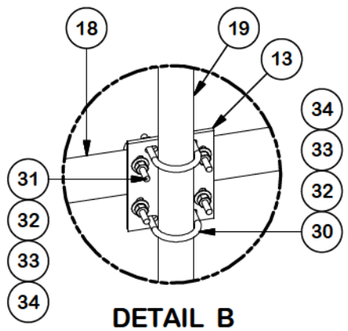


PARTS LIST

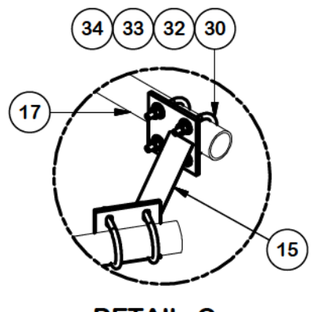
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
3	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
4	6	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	11.15
5	6	X-VSKL	LONG SUPPORT WELDMENT FOR VSK REINFORCEMENTS		37.05	222.33
6	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.51	15.04
7	12	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.92	11.06
8	3	320751-I	1/2" CHAIN SHACKLE		0.76	2.29
9	3	320601-I	5/8" TURNBUCKLE		2.63	7.89
10	6	320777-I	5/16" THIMBLE		0.06	0.36
11	12	320152-I	5/16" WIRE ROPE CLIP		1.32	15.78
12	3	AC516-10	5/16" AIRECRAFT CABLE		1.25	3.76
13	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
14	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
15	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
17	3	P30174	2-7/8" O.D. x 174" SCH. 40 PIPE	174 in	84.20	252.59
18	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
19	12	P30120	2-7/8" x 120" (2-1/2" SCH. 40) GALVANIZED PIPE	120 in	58.07	696.79
20	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
20	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
21	12	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	3.75
22	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
23	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
24	60	G58LW	5/8" HDG LOCKWASHER		0.03	1.57
25	60	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	7.79
26	6	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	0.89
27	3	G12212	1/2" x 2-1/2" HDG HEX BOLT GR5	2 1/2 in	0.20	0.61
28	12	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	3.24
29	24	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	9.83
30	84	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.67	56.19
31	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
32	288	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.82
33	285	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.96
34	285	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	20.41
35	1	HALO40	5,000 LB. MAINTENANCE TIE-OFF POINT		41.12	41.12
					TOTAL WT. #	3249.41



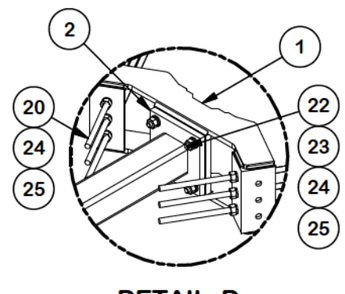
DETAIL A



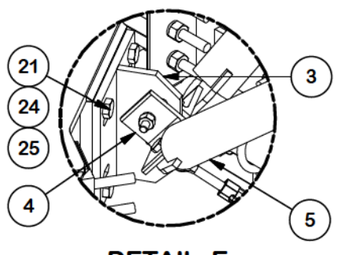
DETAIL B



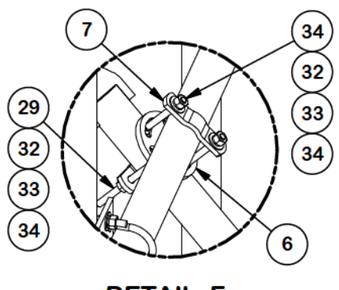
DETAIL C



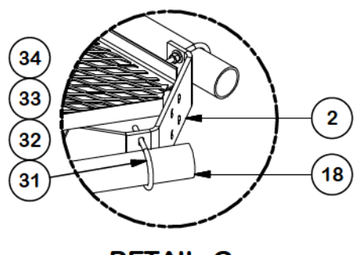
DETAIL D



DETAIL E



DETAIL F



DETAIL G

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS AND ANGLES ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (± 0.060")

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX
Tampa, FL

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CSL 10/17/2019	10/18/2019	RMQLP-4120-H10

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10

SITE PRO 1
A valmont COMPANY

1545 Pidco Drive
Plymouth, IN 46563
Phone: 574.936.4221
Fax: 574.936.8925
Email: SP1Engineering@valmont.com
www.sitepro1.com

June 5, 2020

Site Pro 1 / Valmont Mounting System:

Part Number = RMQLP-4120-H10
Part Description = 14' Low Pro-Platform with Handrail System

Mount EPA (no antenna pipes, walkway included (0.67*EPA)):

EPA_N	= 42.20(28.15) sq-Ft	$EPA_{N\ (0.5"\ Ice)}$	= 51.14(34.10) sq-Ft	$EPA_{N\ (1"\ Ice)}$	= 60.14(40.10) sq-Ft
EPA_T	= 39.62(26.41) sq-Ft	$EPA_{T\ (0.5"\ Ice)}$	= 48.52(32.35) sq-Ft	$EPA_{T(1"\ Ice)}$	= 57.81(38.54) sq-Ft
Weight	= 3265 lb	$Weight_{(0.5"\ Ice)}$	=3657 lb	$Weight_{(1"\ Ice)}$	= 4180 lb

Classification Rating:

Heavy 10

Design Standards

ANSI/TIA-222-G-2012
ANSI/TIA-222-H-2018
ASCE 7-16
ATT-002-291-373
International Building Code 2018
TIA-5053

Analysis and Modeling Technique

An elastic, three-dimensional, frame, truss model was developed to examine the structural behavior of the mount. All orientations in the engineering model correspond with the assembly drawing constraints. The mount was analyzed with twelve (12) mounting locations (antenna, mount pipe, radio, dish, and any other appurtenance) evenly spaced across the face of the mount, with a zero inch (0) vertical eccentricity on the mast pipe. Wind directions considered were perpendicular (normal) to the face of the frame and at 30 degree increments up to 90 degrees (tangential) to the face of the frame. Wind, dead weight and ice weight on the mount was also included in the model.

Modeling Software

Autodesk Inventor
RISA-3D

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Section 1 - Site Information

Site ID: CT11832C
Status: Final
Version: 4
Project Type: L600
Approved: 03/08/2023 3:04:21 PM
Approved By: Michael.Lucey@T-Mobile.com
Last Modified: 03/08/2023 3:04:21 PM
Last Modified By: Michael.Lucey@T-Mobile.com

Site Name: CT832/CL&P Middletown
Site Class: Utility Pole
Site Type: Structure Non Building
Plan Year:
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Northeast Utilities

Latitude: 41.52074953
Longitude: -72.6083121
Address: 701 Bartholomew Street
City, State: Middletown, CT
Region: NORTHEAST

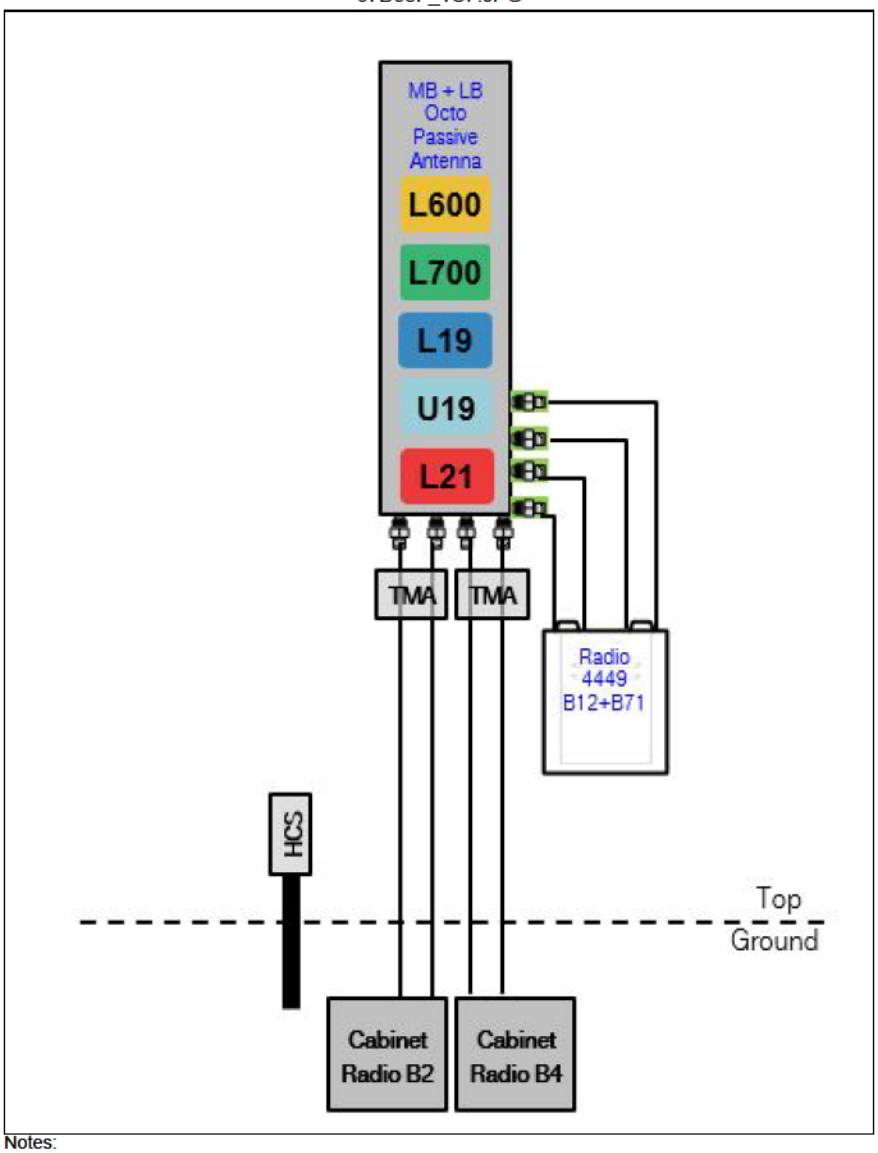
RAN Template: 67E95F ODE+6160			AL Template: 67D95F_1OP	
Sector Count: 3	**Antenna Count:** 3	**Coax Line Count:** 24	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

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

Section 3 - Proposed Template Images

67D95F_1OP.JPG



Notes:

Section 4 - Siteplan Images

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

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 704G

Enclosure	1
Enclosure Type	RBS 6201
Radio	RUS01 B12 (x6) L700; RUS01 B2 (x3) L1900 G1900; RUS01 B2 (x3) L1900
Baseband	BB 6630 L700 L1900; DUG20 G1900

Proposed RAN Equipment

Template: 67E95F ODE+6160

Enclosure	1
Enclosure Type	RBS 6201 ODE
Baseband	DUG20 G1900; RP 6651 N600 N1900 L600 L700 L1900 L2100
Multiplexer	XMU

RAN Scope of Work:

Replace (1) DUS41 with (1) BB6648 for LTE.
Install (1) BB6648 for future 5G N600.

Remove all (6) RUS01 B12 for L700 from cabinet.

Existing: (12) Coaxial Lines
Add (12) Coaxial Lines for new total of (24).

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Section 6 - A&L Equipment

Existing Template: 704G
Proposed Template: 67D95F_1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1	2	3	4
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	90			90
M. Tilt	0			0
Height (ft)	83			83
Ports	P1			P2
Active Tech	L1900 G1900			L700
Dark Tech				
Restricted Tech				
Decomm. Tech				
E. Tilt	2			2
Cables	1-5/8" Coax (At Antenna) **(x2)**			1-5/8" Coax (At Antenna) **(x2)**
TMAs	Generic Twin Style 1A - PCS (At Antenna)			
Diplexer / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

*** Existing Position 1 EMS; Empty Position 2; Empty Position 3; LNX in Position 4 ***
*** TMAs are Ground Mounted ***

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1	2				3	4
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAALL18_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)
Azimuth		90					
M. Tilt		0					
Height (ft)		83					
Ports		P1	P2	P3	P4		
Active Tech		L700 L600 N600	L700 L600 N600	G1900 L2100 L1900 N1900	G1900 L2100 L1900 N1900		
Dark Tech							
Restricted Tech							
Decomm. Tech							
E. Tilt		2	2	2	2		
Cables		1-5/8" Coax (x2)	1-5/8" Coax (x2)	1-5/8" Coax (x2)	1-5/8" Coax (x2)		
TMAs							
Diplexer / Combiners							
Radio		Radio 4480 B71+B85 (At Cabinet)	— Radio 4480 B71+B85 (At Cabinet)	Radio 4460 B25+B66 (At Cabinet)	— Radio 4460 B25+B66 (At Cabinet)		
Sector Equipment		Andrew Smart Bias T (Ericsson) (At Antenna)					

Unconnected Equipment:

Scope of Work:

*** Existing Position 1 EMS; Empty Position 2; Empty Position 3; LNX in Position 4 ***
*** TMAs are Ground Mounted ***

Remove EMS Antenna in Position 1.
Replace LB Dual in Position 4 with (1) LB/MB Octo in Position 2.
Add (1) Radio 4480 B71+B12 to Position 2 for L600 and L700. Radio 4460 will be mounted at Ground Level.
Add (4) Coaxial Lines to Position 2, and connect them to Low-Band ports of LB/MB Octo.
Move Coaxial Lines and PCS TMA in Position 1 to two Mid-Band Ports of LB/MB Octo in Position 2.
Add (1) AWS TMA to Position 2 at Ground Level.
Move Coaxial Lines from Position 4 to Position 2 and connect them and AWS TMA to other two Mid-Band Ports of LB/MB Octo.
Add Smart Bias-Ts for RET control. Daisy Chain all RETs.

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

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Sector 2 (Existing) view from behind				
Coverage Type	A - Outdoor Macro			
Antenna	**1**	**2**	**3**	**4**
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	210			210
M. Tilt	0			0
Height (ft)	83			83
Ports	**P1**			**P2**
Active Tech	L1900 G1900			L700
Dark Tech				
Restricted Tech				
Decomm. Tech				
E. Tilt	2			2
Cables	1-5/8" Coax (At Antenna) **(x2)**			1-5/8" Coax (At Antenna) **(x2)**
TMAs	Generic Twin Style 1A - PCS (At Antenna)			
Diplexer / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

*** Existing Position 1 EMS; Empty Position 2; Empty Position 3; LNX in Position 4 ***
*** TMAs are Ground Mounted ***

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1	2				3	4
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAALL18_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)
Azimuth		210					
M. Tilt		0					
Height (ft)		83					
Ports		P1	P2	P3	P4		
Active Tech		L700 L600 N600	L700 L600 N600	G1900 N1900 L1900 L2100	L2100 N1900 L1900 G1900		
Dark Tech							
Restricted Tech							
Decomm. Tech							
E. Tilt		2	2	2	2		
Cables		1-5/8" Coax (x2)	1-5/8" Coax (x2)	1-5/8" Coax (x2)	1-5/8" Coax (x2)		
TMAs							
Diplexer / Combiners							
Radio		Radio 4480 B71+B85 (At Cabinet)	— Radio 4480 B71+B85 (At Cabinet)	Radio 4460 B25+B66 (At Cabinet)	— Radio 4460 B25+B66 (At Cabinet)		
Sector Equipment		Andrew Smart Bias T (Ericsson) (At Antenna)					

Unconnected Equipment:

Scope of Work:

*** Existing Position 1 EMS; Empty Position 2; Empty Position 3; LNX in Position 4 ***
*** TMAs are Ground Mounted ***

Remove EMS Antenna in Position 1.
Replace LB Dual in Position 4 with (1) LB/MB Octo in Position 2.
Add (1) Radio 4480 B71+B12 to Position 2 for L600 and L700. Radio 4460 will be mounted at Ground Level.
Add (4) Coaxial Lines to Position 2, and connect them to Low-Band ports of LB/MB Octo.
Move Coaxial Lines and PCS TMA in Position 1 to two Mid-Band Ports of LB/MB Octo in Position 2.
Add (1) AWS TMA to Position 2 at Ground Level.
Move Coaxial Lines from Position 4 to Position 2 and connect them and AWS TMA to other two Mid-Band Ports of LB/MB Octo.
Add Smart Bias-Ts for RET control. Daisy Chain all RETs.

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

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro			
Antenna	1	2	3	4
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)	Andrew - LNX-6515DS-A1M (Dual)
Azimuth	330			330
M. Tilt	0			0
Height (ft)	83			83
Ports	P1			P2
Active Tech	L1900 G1900			L700
Dark Tech				
Restricted Tech				
Decomm. Tech				
E. Tilt	2			2
Cables	1-5/8" Coax (At Antenna) **(x2)**			1-5/8" Coax (At Antenna) **(x2)**
TMAs	Generic Twin Style 1A - PCS (At Antenna)			
Diplexer / Combiners				
Radio				
Sector Equipment				

Unconnected Equipment:

Scope of Work:

*** Existing Position 1 EMS; Empty Position 2; Empty Position 3; LNX in Position 4 ***
*** TMAs are Ground Mounted ***

RAN Template:	A&L Template:
67E95F ODE+6160	67D95F_1OP

CT11832C_L600_4

Print Name: Standard (2)
PORs: L600_5G POPs

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1	2				3	4
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAALL18_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	Empty Antenna Mount (Empty mount)
Azimuth		330					
M. Tilt		0					
Height (ft)		83					
Ports		P1	P2	P3	P4		
Active Tech		L700 L600 N600	L700 L600 N600	N1900 L1900 G1900 L2100	L2100 N1900 L1900 G1900		
Dark Tech							
Restricted Tech							
Decomm. Tech							
E. Tilt		2	2	2	2		
Cables		1-5/8" Coax (x2)	1-5/8" Coax (x2)	1-5/8" Coax (x2)	1-5/8" Coax (x2)		
TMAs							
Diplexer / Combiners							
Radio		Radio 4480 B71+B85 (At Cabinet)	— Radio 4480 B71+B85 (At Cabinet)	Radio 4460 B25+B66 (At Cabinet)	— Radio 4460 B25+B66 (At Cabinet)		
Sector Equipment		Andrew Smart Bias T (Ericsson) (At Antenna)					

Unconnected Equipment:

Scope of Work:

*** Existing Position 1 EMS; Empty Position 2; Empty Position 3; LNX in Position 4 ***
*** TMAs are Ground Mounted ***

Remove EMS Antenna in Position 1.
Replace LB Dual in Position 4 with (1) LB/MB Octo in Position 2.
Add (1) Radio 4480 B71+B12 to Position 2 for L600 and L700. Radio 4460 will be mounted at Ground Level.
Add (4) Coaxial Lines to Position 2, and connect them to Low-Band ports of LB/MB Octo.
Move Coaxial Lines and PCS TMA in Position 1 to two Mid-Band Ports of LB/MB Octo in Position 2.
Add (1) AWS TMA to Position 2 at Ground Level.
Move Coaxial Lines from Position 4 to Position 2 and connect them and AWS TMA to other two Mid-Band Ports of LB/MB Octo.
Add Smart Bias-Ts for RET control. Daisy Chain all RETs.

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

RADIO FREQUENCY SYSTEMS

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-894/617-894/1695-2690/1695-2690MHz, 65deg, 15.0/14.6/18.4/18.3dBi, 1.8m (6ft), RET, 2-12°/2-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600, 700, 800, AWS, PCS & BRS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional daisy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-894 MHZ) [R1]

Frequency Band	MHz	617-698	698-746	746-806	806-894
Gain Typical	dBi	14.3	15.0	14.8	15.0
Gain Over All Tilts	dBi	13.8+/-.5	14.5+/-.5	14.3+/-.5	14.6+/.4
Horizontal Beamwidth @3dB	Deg	65+/-2	64+/-2	66+/-2	62+/-5
Vertical Beamwidth @3dB	Deg	14+/-1	13+/-.9	12+/-.7	11+/-.9
Electrical Downtilt Range	Deg	2 to 12			
Upper Side Lobe Suppression Peak to +20	dB	15	15	15	14
Front-to-Back, at +/-30°, Copolar	dB	22	22	24	27
Cross Polar Discrimination (XPD) @ Boresight	dB	18	18	16	15
Cross Polar Discrimination (XPD) @ +/-60	dB	4	3	7	5
3rd Order PIM 2 x 43dBm	dBc	-153			
VSWR	-	1.5:1			
Cross Polar Isolation	dB	25			
Maximum Effective Power per Port	Watt	400			

All information contained in the present datasheet is subject to confirmation at time of ordering

RADIO FREQUENCY SYSTEMS

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-894/617-894/1695-2690/1695-2690MHz, 65deg, 15.0/14.6/18.4/18.3dBi, 1.8m (6ft), RET, 2-12°/2-12°/2-12°/2-12°

HIGH BAND RIGHT ARRAY (1695-2690 MHZ) [Y2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200	2200-2490	2490-2690
Gain Typical	dBi	17.5	17.8	18.3	18.1	17.9
Gain Over All Tilts	dBi	17+/-.5	17.3+/-.5	17.6+/-.7	17.4+/-.7	17.1+/-.8
Horizontal Beamwidth @3dB	Deg	66+/-6	64+/-5	64+/-7	62+/-4	61+/-7
Vertical Beamwidth @3dB	Deg	5.5+/-.3	5.1+/-.2	4.9+/-.3	4.4+/-.3	4+/-.3
Electrical Downtilt Range	Deg	2 to 12				
Upper Side Lobe Suppression Peak to +20	dB	14	16	15	14	13
Front-to-Back, at +/-30°, Copolar	dB	25	23	23	23	20
Cross Polar Discrimination (XPD) @ Boresight	dB	22	17	16	17	17
Cross Polar Discrimination (XPD) @ +/-60	dB	8	8	9	4	1
3rd Order PIM 2 x 43dBm	dBc	-153				
VSWR	-	1.5:1				
Cross Polar Isolation	dB	25				
Maximum Effective Power per Port	Watt	300				

ELECTRICAL SPECIFICATIONS

Impedance	Ohm	50.0
Polarization	Deg	±45°

MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	1829 x 609 x 215 (72 x 24 x 8.5)
Weight (Antenna Only)	kg (lb)	42 (92.6)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	63 (138.9)
Connector type		8 x 4.3-10 female at bottom
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	240 (150)
Wind Load @Rated Wind Front	N	1072.0
Wind Load @Rated Wind Side	N	326.0
Wind Load @Rated Wind Rear	N	1160.0

All information contained in the present datasheet is subject to confirmation at time of ordering

ATSBT-TOP-MF-4G

Top Smart Bias Tee

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

Product Classification

Product Type	RET bias tee

General Specifications

AISG Input Connector	8-pin DIN Female
Antenna Interface	7-16 DIN Female
Antenna Interface Signal	RF | dc Blocked
BTS Interface	7-16 DIN Male
BTS Interface Signal	AISG data | RF | dc
Color	Silver
EU Certification	CE
Grounding Lug Thread Size	M8
Smart Bias Tee Type	10–30 V Top

Dimensions

Height	143 mm | 5.63 in
Width	94 mm | 3.701 in
Depth	50 mm | 1.969 in

Electrical Specifications

3rd Order IMD	-158 dBc
3rd Order IMD Test Method	Two +43 dBm carriers
Insertion Loss, typical	0.1 dB
Electromagnetic Compatibility (EMC)	CFR 47 Part 15, Subpart B, Class B | EN 55022, Class B | ICES-003 Issue 4 CAN

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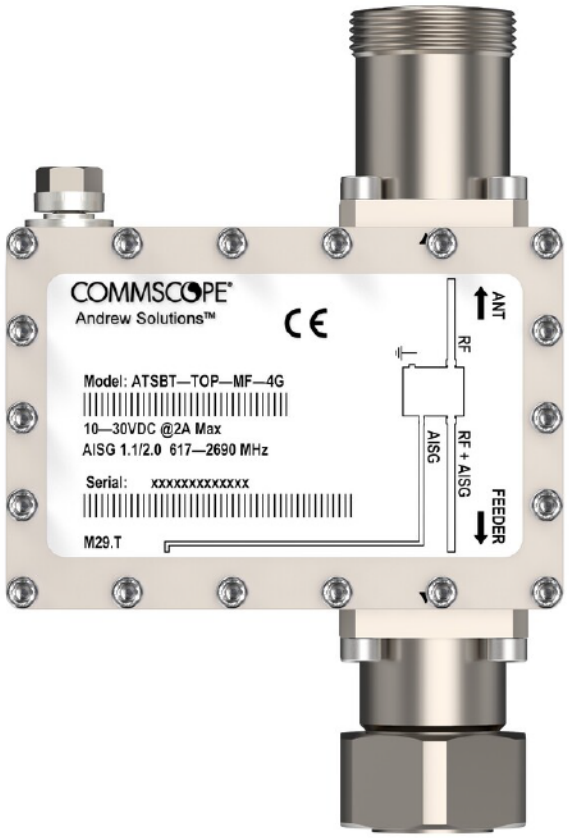
ATSBT-TOP-MF-4G



Material Specifications

Material Type	Aluminum

Environmental Specifications

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

Packaging and Weights

Weight, net	0.8 kg | 1.764 lb

Regulatory Compliance/Certifications

Agency	**Classification**

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SITE PRO 1
A valmont COMPANY

1545 Pidco Drive
Plymouth, IN 46563
Phone: 574.936.4221
Fax: 574.936.8925
Email: SP1Engineering@valmont.com
www.sitepro1.com

June 15, 2020

Site Pro 1 / Valmont Mounting System:

Part Number = RMQLP-xxx-HK / RMQLP-xxx + PRK-1245L + HRK14
Part Description = 14' Low Pro-Platform with Reinforcement and Handrail System

Mount EPA (no antenna pipes, walkway included, (0.67*EPA)):

EPA_N	= 39.24(26.29) sq-Ft	$EPA_{N\ (0.5"\ Ice)}$	= 48.14(32.25) sq-Ft	$EPA_{N\ (1"\ Ice)}$	= 56.69(37.98) sq-Ft
EPA_T	= 38.48(25.78) sq-Ft	$EPA_{T\ (0.5"\ Ice)}$	= 47.60(31.89) sq-Ft	$EPA_{T(1"\ Ice)}$	= 56.46(37.82) sq-Ft
Weight	= 2130 lb	$Weight_{(0.5"\ Ice)}$	=2580 lb	$Weight_{(1"\ Ice)}$	= 3165 lb

Classification Rating:

Heavy 10

Design Standards

ANSI/TIA-222-G-2012
ANSI/TIA-222-H-2018
ASCE 7-16
AT&T Mount Classification
International Building Code 2018
TIA-5053

Analysis and Modeling Technique

An elastic, three-dimensional, frame, truss model was developed to examine the structural behavior of the mount. All orientations in the engineering model correspond with the assembly drawing constraints. The mount was analyzed with four (4) mounting locations (antenna, mount pipe, radio, dish, and any other appurtenance) evenly spaced across the face of the mount, with no vertical eccentricity. Wind directions considered were perpendicular (normal) to the face of the frame and at 30 degree increments up to 90 degrees (tangential) to the face of the frame. Wind, dead weight and ice weight on the mount was also included in the model.

Modeling Software

Autodesk Inventor
RISA-3D
ANSYS Workbench

March 22, 2023
August 31, 2023 (Rev.1)

SAI Communications
12 Industrial Way
Salem NH, 03079

RE:	AT&T Site Number:	CT5436
	FA Number:	10071126
	PACE Number:	MRCTB067607
	PT Number:	2051A175Q2
	TEP Project Number:	326520.879751
	AT&T Site Name:	MIDDLETOWN SOUTH
	Site Address:	1114 Bartholomew Road Middletown, CT 06457

To Whom It May Concern:

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

- **(6) TPA65R-BU6DA-K Antennas (71.2"x20.7"x7.7" – Wt. = 69 lbs. /each)**
- **(12) TMAT192123B68-31 TMA's (9.4"x11.1"x3.8" – Wt. = 21 lbs. /each)**

**Proposed equipment shown in bold*

Mount fabrication drawings prepared by SitePro1, P/N RMQLP-4120-H10, dated October 18, 2019, were used to perform this analysis.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2021 with 2022 Connecticut State Building Code, and AT&T Mount Technical Directive – R22.
- TEP NE considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix P of the Connecticut State Building Code, the max basic wind speed for this site is equal to 130 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.28 in was used for this analysis.
- TEP NE considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- TEP NE considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- TEP NE considers this site to have a spectral response acceleration parameter at short periods, S_S, of 0.209 and a spectral response acceleration parameter at a period of 1 second, S_1, of 0.056.
- The mount has been analyzed with load combinations consisting of 500 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 2 & 4.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.
- The proposed mount is secured to the proposed transmission tower with ring mounts and threaded rods. TEP NE considers the threaded rods to be the governing connection member

Based on our evaluation, we have determined that the Proposed SitePro1 RMQLP-4120-H10 mount **IS CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Proposed Mount Rating	34	LC2	72%	**PASS**

Reference Documents:

- Fabrication drawings prepared by SitePro1, P/N RMQLP-4120-H10, dated October 18, 2019.

This determination was based on the following limitations and assumptions:

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

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

Respectfully Submitted,
TEP Northeast

Michael Cabral
Director

Daniel P. Hamm, PE
Vice President

Wind & Ice
Calculations

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM **Checked By:** MSC

TEP NORTHEAST

2.6.5.2 Velocity Pressure Coeff:

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

z=	93	(ft)
z_g=	900	(ft)
α=	9.5	

K_z= 1.246

$K_{zmin} \le K_z \le 2.01$

Table 2-4

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

2.6.6.2 Topographic Factor:

Table 2-5

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

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

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

K_{zt}= 1

(If Category 1 then K_{zt}=1.0)

Category= 1

K_h=	1.0	
K_c=	1.0	(from Table 2-4)
K_t=	0	(from Table 2-5)
f=	0	(from Table 2-5)
z=	93	
z_s=	501	(Mean elevation of base of structure above sea level)
H=	0	(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	(from 2.6.6.2.1)
K_e=	0.98	(from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness = t_i = 1.00 in
Importance Factor = I= 1.15 (from Table 2-3)
K_{iz} = 1.11 (from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$

t_{iz} = 1.28 in

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM Checked By: MSC

2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	95	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures

(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

G_h=	1.35	**Gh=**	**1.00**

2.6.11.2 Design Wind Force on Appurtenances

F= q_z*G_h*$(EPA)_A$

q_z= 0.00256*K_z*K_{zt}*K_s*K_e*K_d*V_{max}^2

		K_z=	1.246	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	**50.31**	K_e=	0.98	(from 2.6.8)
$q_{z\ (ice)}$=	**7.44**	K_d=	0.95	(from Table 2-2)
$q_{z\ (30)}$=	**2.68**	V_{max}=	130	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

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Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r_s) ≥ 0.85	1.4 - 4.0(r_s) ≥ 0.90	2.0 - 6.0(r_s) ≥ 1.25
Round	C < 39 (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = 1.28 in | **Angle =** 0 (deg) | **Equivalent Angle =** 180 (deg)

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.44	1.24	639	110	34
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.85	1.20	44	10	2
TMAT192123B68-31 TMA (Shielded)	9.4	0.0	3.8	0.00	0.00	1.20	0	2	0
2-1/2" Pipe	2.9	12.0	-	0.24	0.24	1.20	15		
3" Pipe	3.5	12.0	-	0.29	0.29	1.20	18		
L 2x2 Angles	2.0	12.0	-	0.17	0.17	2.00	17		
L 2-1/2x2-1/2 Angles	2.5	12.0	-	0.21	0.21	2.00	21		
PL 6x3/8	6.0	12.0	-	0.50	0.50	2.00	50		
HSS 4x4	4.0	12.0	-	0.33	0.33	1.25	21		

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WIND LOADS

Angle = 30 (deg)

Ice Thickness = 1.28 in.

Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	639	282	550
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	44	15	37
TMAT192123B68-31 TMA (Shielded)	9.4	8.3	3.8	0.54	0.25	1.13	2.47	1.20	1.20	33	15	28

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.8	23.3	10.3	11.91	5.25	3.17	7.19	1.23	1.41	109	55	95
TMAT192123B68-31 TMA	12.0	13.7	6.4	1.13	0.53	0.88	1.88	1.20	1.20	10	5	9
TMAT192123B68-31 TMA (Shielded)	12.0	10.2	6.4	0.85	0.53	1.17	1.88	1.20	1.20	8	5	7

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	34	15	29
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	2	1	2
TMAT192123B68-31 TMA (Shielded)	9.4	8.3	3.8	0.54	0.25	1.13	2.47	1.20	1.20	2	1	2

Date: 8/31/2023
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WIND LOADS

Angle = 60 (deg)

Ice Thickness = 1.28 in.

Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	639	282	372
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	44	15	22
TMAT192123B68-31 TMA (Shielded)	9.4	5.6	3.8	0.36	0.25	1.69	2.47	1.20	1.20	22	15	17

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.8	23.3	10.3	11.91	5.25	3.17	7.19	1.23	1.41	109	55	68
TMAT192123B68-31 TMA	12.0	13.7	6.4	1.13	0.53	0.88	1.88	1.20	1.20	10	5	6
TMAT192123B68-31 TMA (Shielded)	12.0	6.8	6.4	0.57	0.53	1.75	1.88	1.20	1.20	5	5	5

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	34	15	20
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	2	1	1
TMAT192123B68-31 TMA (Shielded)	9.4	5.6	3.8	0.36	0.25	1.69	2.47	1.20	1.20	1	1	1

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
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Designed By: KM Checked By: MSC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	1.28	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	639	282	282
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	44	15	15
TMAT192123B68-31 TMA (Shielded)	9.4	0.0	3.8	0.00	0.25	0.00	2.47	1.20	1.20	0	15	15

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.8	23.3	10.3	11.91	5.25	3.17	7.19	1.23	1.41	109	55	55
TMAT192123B68-31 TMA	12.0	13.7	6.4	1.13	0.53	0.88	1.88	1.20	1.20	10	5	5
TMAT192123B68-31 TMA (Shielded)	12.0	2.6	6.4	0.21	0.53	0.00	1.88	1.20	1.20	2	5	5

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	34	15	15
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	2	1	1
TMAT192123B68-31 TMA (Shielded)	9.4	0.0	3.8	0.00	0.25	0.00	2.47	1.20	1.20	0	1	1

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	120	(deg)	Ice Thickness =	1.28	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	639	282	372
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	44	15	22
TMAT192123B68-31 TMA (Shielded)	9.4	5.6	3.8	0.36	0.25	1.69	2.47	1.20	1.20	22	15	17

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.8	23.3	10.3	11.91	5.25	3.17	7.19	1.23	1.41	109	55	68
TMAT192123B68-31 TMA	12.0	13.7	6.4	1.13	0.53	0.88	1.88	1.20	1.20	10	5	6
TMAT192123B68-31 TMA (Shielded)	12.0	6.8	6.4	0.57	0.53	1.75	1.88	1.20	1.20	5	5	5

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	34	15	20
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	2	1	1
TMAT192123B68-31 TMA (Shielded)	9.4	5.6	3.8	0.36	0.25	1.69	2.47	1.20	1.20	1	1	1

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	1.28	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	639	282	550
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	44	15	37
TMAT192123B68-31 TMA (Shielded)	9.4	8.3	3.8	0.54	0.25	1.13	2.47	1.20	1.20	33	15	28

WIND LOADS WITH ICE:

TPA65R-BU6DA-K Antenna	73.8	23.3	10.3	11.91	5.25	3.17	7.19	1.23	1.41	109	55	95
TMAT192123B68-31 TMA	12.0	13.7	6.4	1.13	0.53	0.88	1.88	1.20	1.20	10	5	9
TMAT192123B68-31 TMA (Shielded)	12.0	10.2	6.4	0.85	0.53	1.17	1.88	1.20	1.20	8	5	7

WIND LOADS AT 30 MPH:

TPA65R-BU6DA-K Antenna	71.2	20.7	7.7	10.24	3.81	3.44	9.25	1.24	1.47	34	15	29
TMAT192123B68-31 TMA	9.4	11.1	3.8	0.72	0.25	0.85	2.47	1.20	1.20	2	1	2
TMAT192123B68-31 TMA (Shielded)	9.4	8.3	3.8	0.54	0.25	1.13	2.47	1.20	1.20	2	1	2

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM **Checked By:** MSC

ICE WEIGHT CALCULATIONS

Thickness of ice:	1.28	in.
Density of ice:	56	pcf

TPA65R-BU6DA-K Antenna

Weight of ice based on total radial SF area:

Height (in):	71.2	
Width (in):	20.7	
Depth (in):	7.7	
Total weight of ice on object:	217	lbs
Weight of object:	69.0	lbs
Combined weight of ice and object:	286	lbs

TMAT192123B68-31 TMA

Weight of ice based on total radial SF area:

Height (in):	9.4	
Width (in):	11.1	
Depth (in):	3.8	
Total weight of ice on object:	16	lbs
Weight of object:	21.0	lbs
Combined weight of ice and object:	37	lbs

PL 6x3/8

Weight of ice based on total radial SF area:

Height (in):	6	
Width (in):	0.375	
Per foot weight of ice on object:	11	plf

HSS 4x4

Weight of ice based on total radial SF area:

Height (in):	4	
Width (in):	4	
Per foot weight of ice on object:	11	plf

L 2-1/2x2-1/2 Angles

Weight of ice based on total radial SF area:

Height (in):	2.5	
Width (in):	2.5	
Per foot weight of ice on object:	8	plf

L 2x2 Angles

Weight of ice based on total radial SF area:

Height (in):	2	
Width (in):	2	
Per foot weight of ice on object:	6	plf

3" Pipe

Per foot weight of ice:

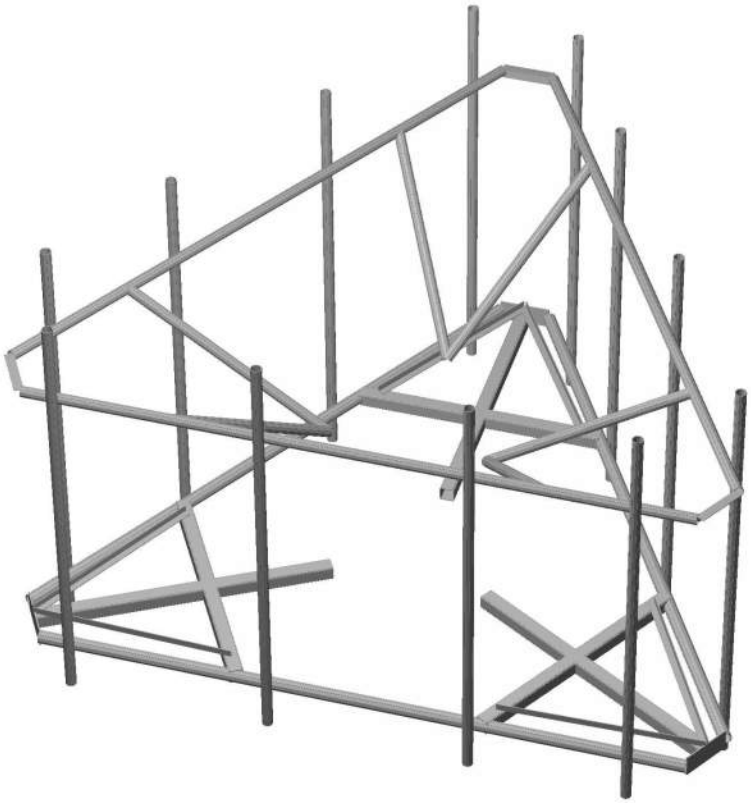
diameter (in):	3.5	
Per foot weight of ice on object:	7	plf

2-1/2" Pipe

Per foot weight of ice:

diameter (in):	2.88	
Per foot weight of ice on object:	7	plf

Mount Calculations
(Proposed Conditions)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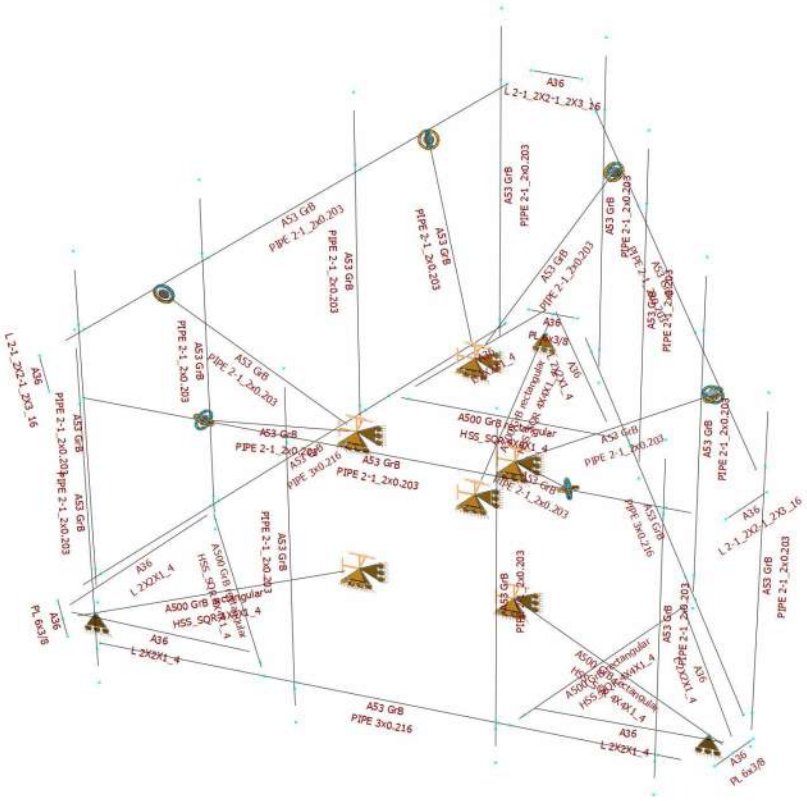
X
Z


A36
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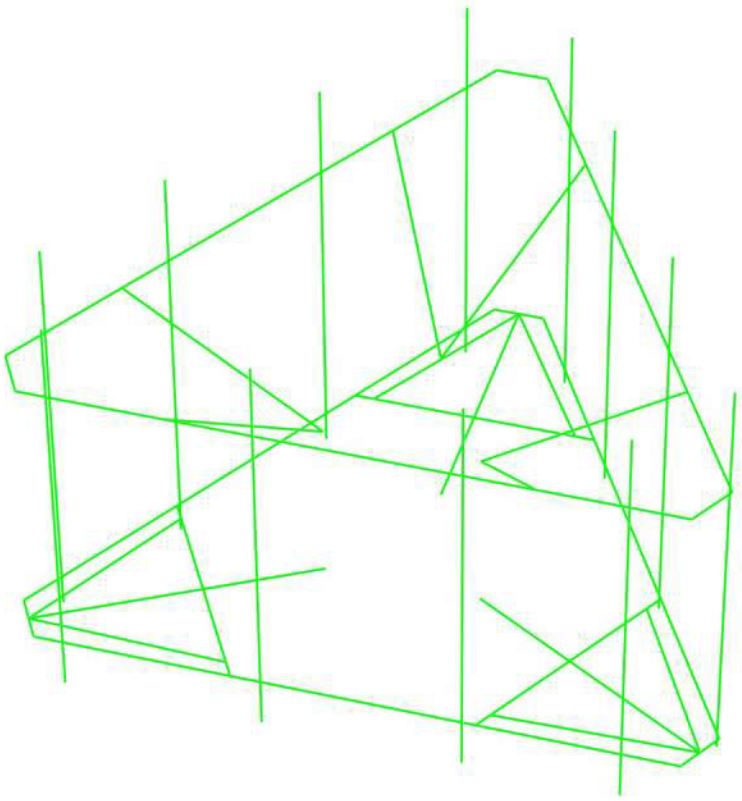
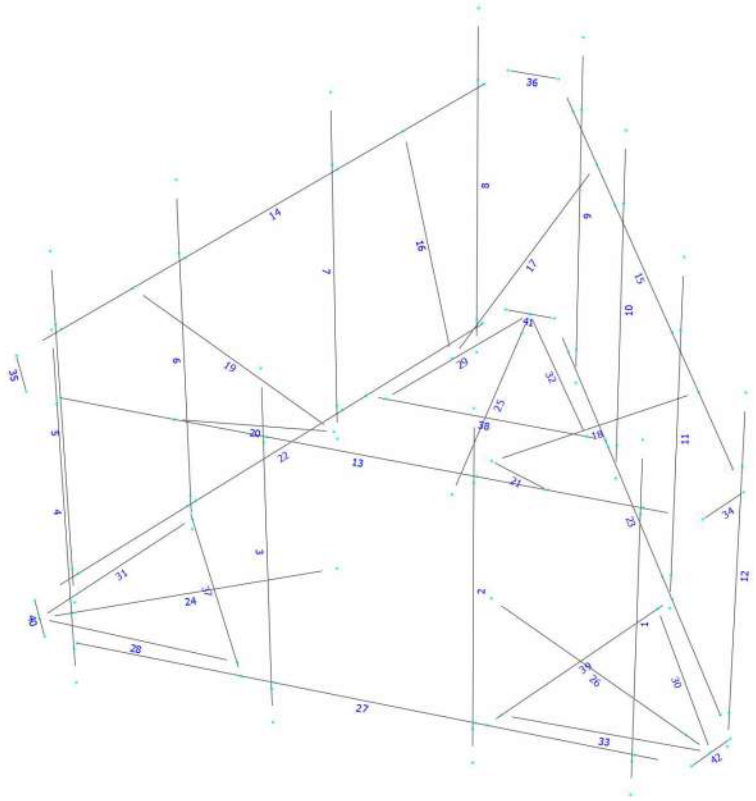
A53 GrB
PIPE 2-1_2x0.203
A500 GrB Rectangular
HSS_SQR3X3X1_4
A36
L 2X2X1_4
A53 GrB
PIPE 3x0.216
A36
PL 6x3/8


Y
X
Z

Current Date: 8/31/2023 12:22 PM
Units system: English

Design status
- Not designed
- Error on design
- Design O.K.
- With warnings

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Y
X
Z

RAM® Elements
CONNECT Edition

Current Date: 8/31/2023 12:23 PM
Units system: English

Load data

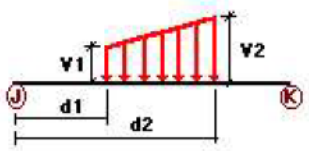
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	500 lb Live Load on Antenna 1	No	LL
LLa2	500 lb Live Load on Antenna 2	No	LL
LLa3	500 lb Live Load on Antenna 3	No	LL
LLa4	500 lb Live Load on Antenna 4	No	LL

Distributed force on members

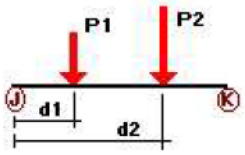


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	24	y	-0.01	-0.01	0.00	No	59.00	Yes
	25	y	-0.01	-0.01	0.00	No	59.00	Yes
	26	y	-0.01	-0.01	0.00	No	59.00	Yes
	28	y	-0.01	-0.01	0.00	No	100.00	Yes
	29	y	-0.01	-0.01	0.00	No	100.00	Yes
	30	y	-0.01	-0.01	0.00	No	100.00	Yes
	31	y	-0.01	-0.01	0.00	No	100.00	Yes
	32	y	-0.01	-0.01	0.00	No	100.00	Yes
	33	y	-0.01	-0.01	0.00	No	100.00	Yes
	37	y	-0.01	-0.01	0.00	No	100.00	Yes
	38	y	-0.01	-0.01	0.00	No	100.00	Yes
	39	y	-0.01	-0.01	0.00	No	100.00	Yes
W0	1	z	-0.015	-0.015	0.00	No	100.00	Yes
	3	z	-0.015	-0.015	0.00	No	100.00	Yes
	5	z	-0.015	-0.015	0.00	No	100.00	Yes
	6	z	-0.015	-0.015	0.00	No	100.00	Yes

	7	z	-0.015	-0.015	0.00	No	100.00	Yes
	8	z	-0.015	-0.015	0.00	No	100.00	Yes
	9	z	-0.015	-0.015	0.00	No	100.00	Yes
	10	z	-0.015	-0.015	0.00	No	100.00	Yes
	11	z	-0.015	-0.015	0.00	No	100.00	Yes
	12	z	-0.015	-0.015	0.00	No	100.00	Yes
	13	z	-0.015	-0.015	0.00	No	100.00	Yes
	14	z	-0.015	-0.015	0.00	No	100.00	Yes
	15	z	-0.015	-0.015	0.00	No	100.00	Yes
	16	z	-0.015	-0.015	0.00	No	100.00	Yes
	17	z	-0.015	-0.015	0.00	No	100.00	Yes
	18	z	-0.015	-0.015	0.00	No	100.00	Yes
	19	z	-0.015	-0.015	0.00	No	100.00	Yes
	20	z	-0.015	-0.015	0.00	No	100.00	Yes
	21	z	-0.015	-0.015	0.00	No	100.00	Yes
	22	z	-0.018	-0.018	0.00	No	100.00	Yes
	23	z	-0.018	-0.018	0.00	No	100.00	Yes
	24	z	-0.021	-0.021	0.00	No	100.00	Yes
	26	z	-0.021	-0.021	0.00	No	100.00	Yes
	27	z	-0.018	-0.018	0.00	No	100.00	Yes
	28	z	-0.017	-0.017	0.00	No	100.00	Yes
	29	z	-0.017	-0.017	0.00	No	100.00	Yes
	30	z	-0.017	-0.017	0.00	No	100.00	Yes
	31	z	-0.017	-0.017	0.00	No	100.00	Yes
	32	z	-0.017	-0.017	0.00	No	100.00	Yes
	33	z	-0.017	-0.017	0.00	No	100.00	Yes
	34	z	-0.021	-0.021	0.00	No	100.00	Yes
	35	z	-0.021	-0.021	0.00	No	100.00	Yes
	36	z	-0.021	-0.021	0.00	No	100.00	Yes
	37	z	-0.021	-0.021	0.00	No	100.00	Yes
	38	z	-0.021	-0.021	0.00	No	100.00	Yes
	39	z	-0.021	-0.021	0.00	No	100.00	Yes
	40	z	-0.05	-0.05	0.00	No	100.00	Yes
	41	z	-0.05	-0.05	0.00	No	100.00	Yes
	42	z	-0.05	-0.05	0.00	No	100.00	Yes
W30	1	x	-0.015	-0.015	0.00	No	100.00	Yes
	2	x	-0.015	-0.015	0.00	No	100.00	Yes
	3	x	-0.015	-0.015	0.00	No	100.00	Yes
	4	x	-0.015	-0.015	0.00	No	100.00	Yes
	5	x	-0.015	-0.015	0.00	No	100.00	Yes
	6	x	-0.015	-0.015	0.00	No	100.00	Yes
	7	x	-0.015	-0.015	0.00	No	100.00	Yes
	8	x	-0.015	-0.015	0.00	No	100.00	Yes
	9	x	-0.015	-0.015	0.00	No	100.00	Yes
	11	x	-0.015	-0.015	0.00	No	100.00	Yes
	14	x	-0.015	-0.015	0.00	No	100.00	Yes
	15	x	-0.015	-0.015	0.00	No	100.00	Yes
	16	x	-0.015	-0.015	0.00	No	100.00	Yes
	17	x	-0.015	-0.015	0.00	No	100.00	Yes
	18	x	-0.015	-0.015	0.00	No	100.00	Yes
	19	x	-0.015	-0.015	0.00	No	100.00	Yes
	20	x	-0.015	-0.015	0.00	No	100.00	Yes
	21	x	-0.015	-0.015	0.00	No	100.00	Yes
	22	x	-0.018	-0.018	0.00	No	100.00	Yes
	23	x	-0.018	-0.018	0.00	No	100.00	Yes
	24	x	-0.021	-0.021	0.00	No	100.00	Yes
	25	x	-0.021	-0.021	0.00	No	100.00	Yes
	26	x	-0.021	-0.021	0.00	No	100.00	Yes
	28	x	-0.017	-0.017	0.00	No	100.00	Yes
	29	x	-0.017	-0.017	0.00	No	100.00	Yes

	30	x	-0.017	-0.017	0.00	No	100.00	Yes
	31	x	-0.017	-0.017	0.00	No	100.00	Yes
	32	x	-0.017	-0.017	0.00	No	100.00	Yes
	33	x	-0.017	-0.017	0.00	No	100.00	Yes
	34	x	-0.021	-0.021	0.00	No	100.00	Yes
	35	x	-0.021	-0.021	0.00	No	100.00	Yes
	37	x	-0.021	-0.021	0.00	No	100.00	Yes
	39	x	-0.021	-0.021	0.00	No	100.00	Yes
	40	x	-0.05	-0.05	0.00	No	100.00	Yes
	42	x	-0.05	-0.05	0.00	No	100.00	Yes
Di	1	y	-0.007	-0.007	0.00	No	100.00	Yes
	2	y	-0.007	-0.007	0.00	No	100.00	Yes
	3	y	-0.007	-0.007	0.00	No	100.00	Yes
	4	y	-0.007	-0.007	0.00	No	100.00	Yes
	5	y	-0.007	-0.007	0.00	No	100.00	Yes
	6	y	-0.007	-0.007	0.00	No	100.00	Yes
	7	y	-0.007	-0.007	0.00	No	100.00	Yes
	8	y	-0.007	-0.007	0.00	No	100.00	Yes
	9	y	-0.007	-0.007	0.00	No	100.00	Yes
	10	y	-0.007	-0.007	0.00	No	100.00	Yes
	11	y	-0.007	-0.007	0.00	No	100.00	Yes
	12	y	-0.007	-0.007	0.00	No	100.00	Yes
	13	y	-0.007	-0.007	0.00	No	100.00	Yes
	14	y	-0.007	-0.007	0.00	No	100.00	Yes
	15	y	-0.007	-0.007	0.00	No	100.00	Yes
	16	y	-0.007	-0.007	0.00	No	100.00	Yes
	17	y	-0.007	-0.007	0.00	No	100.00	Yes
	18	y	-0.007	-0.007	0.00	No	100.00	Yes
	19	y	-0.007	-0.007	0.00	No	100.00	Yes
	20	y	-0.007	-0.007	0.00	No	100.00	Yes
	21	y	-0.007	-0.007	0.00	No	100.00	Yes
	22	y	-0.007	-0.007	0.00	No	100.00	Yes
	23	y	-0.007	-0.007	0.00	No	100.00	Yes
	24	y	-0.011	-0.011	0.00	No	100.00	Yes
	25	y	-0.011	-0.011	0.00	No	100.00	Yes
	26	y	-0.011	-0.011	0.00	No	100.00	Yes
	27	y	-0.007	-0.007	0.00	No	100.00	Yes
	28	y	-0.006	-0.006	0.00	No	100.00	Yes
	29	y	-0.006	-0.006	0.00	No	100.00	Yes
	30	y	-0.006	-0.006	0.00	No	100.00	Yes
	31	y	-0.006	-0.006	0.00	No	100.00	Yes
	32	y	-0.006	-0.006	0.00	No	100.00	Yes
	33	y	-0.006	-0.006	0.00	No	100.00	Yes
	34	y	-0.008	-0.008	0.00	No	100.00	Yes
	35	y	-0.008	-0.008	0.00	No	100.00	Yes
	36	y	-0.008	-0.008	0.00	No	100.00	Yes
	37	y	-0.011	-0.011	0.00	No	100.00	Yes
	38	y	-0.011	-0.011	0.00	No	100.00	Yes
	39	y	-0.011	-0.011	0.00	No	100.00	Yes
	40	y	-0.011	-0.011	0.00	No	100.00	Yes
	41	y	-0.011	-0.011	0.00	No	100.00	Yes
	42	y	-0.011	-0.011	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	2	y	-0.035	2.50	No
		y	-0.035	7.50	No
		y	-0.021	4.00	No
		y	-0.021	5.00	No
	4	y	-0.035	2.50	No
		y	-0.035	7.50	No
		y	-0.021	4.00	No
		y	-0.021	5.00	No
	6	y	-0.035	2.50	No
		y	-0.035	7.50	No
		y	-0.021	4.00	No
		y	-0.021	5.00	No
	8	y	-0.035	2.50	No
		y	-0.035	7.50	No
		y	-0.021	4.00	No
		y	-0.021	5.00	No
	10	y	-0.035	2.50	No
		y	-0.035	7.50	No
		y	-0.021	4.00	No
		y	-0.021	5.00	No
	12	y	-0.035	2.50	No
		y	-0.035	7.50	No
		y	-0.021	4.00	No
		y	-0.021	5.00	No
W0	2	z	-0.32	2.50	No
		z	-0.32	7.50	No
	4	z	-0.32	2.50	No
		z	-0.32	7.50	No
	6	z	-0.186	2.50	No
		z	-0.186	7.50	No
		z	-0.017	4.00	No
		z	-0.017	5.00	No
	8	z	-0.186	2.50	No
		z	-0.186	7.50	No
		z	-0.017	4.00	No
		z	-0.017	5.00	No
	10	z	-0.186	2.50	No
		z	-0.186	7.50	No
		z	-0.017	4.00	No
		z	-0.017	5.00	No
	12	z	-0.186	2.50	No
		z	-0.186	7.50	No
		z	-0.017	4.00	No
		z	-0.017	5.00	No
W30	2	x	-0.142	2.50	No
		x	-0.142	7.50	No
		x	-0.015	4.00	No
		x	-0.015	5.00	No
	4	x	-0.142	2.50	No
		x	-0.142	7.50	No
		x	-0.015	4.00	No
		x	-0.015	5.00	No
	6	x	-0.276	2.50	No
		x	-0.276	7.50	No

		x	-0.028	4.00	No
		x	-0.028	5.00	No
	8	x	-0.276	2.50	No
		x	-0.276	7.50	No
		x	-0.028	4.00	No
		x	-0.028	5.00	No
	10	x	-0.276	2.50	No
		x	-0.276	7.50	No
		x	-0.028	4.00	No
		x	-0.028	5.00	No
	12	x	-0.276	2.50	No
		x	-0.276	7.50	No
		x	-0.028	4.00	No
		x	-0.028	5.00	No
Di	2	y	-0.108	2.50	No
		y	-0.108	7.50	No
		y	-0.016	4.00	No
		y	-0.016	5.00	No
	4	y	-0.108	2.50	No
		y	-0.108	7.50	No
		y	-0.016	4.00	No
		y	-0.016	5.00	No
	6	y	-0.108	2.50	No
		y	-0.108	7.50	No
		y	-0.016	4.00	No
		y	-0.016	5.00	No
	8	y	-0.108	2.50	No
		y	-0.108	7.50	No
		y	-0.016	4.00	No
		y	-0.016	5.00	No
	10	y	-0.108	2.50	No
		y	-0.108	7.50	No
		y	-0.016	4.00	No
		y	-0.016	5.00	No
	12	y	-0.108	2.50	No
		y	-0.108	7.50	No
		y	-0.016	4.00	No
		y	-0.016	5.00	No
Wi0	2	z	-0.056	2.50	No
		z	-0.056	7.50	No
	4	z	-0.056	2.50	No
		z	-0.056	7.50	No
	6	z	-0.035	2.50	No
		z	-0.035	7.50	No
		z	-0.005	4.00	No
		z	-0.005	5.00	No
	8	z	-0.035	2.50	No
		z	-0.035	7.50	No
		z	-0.005	4.00	No
		z	-0.005	5.00	No
	10	z	-0.035	2.50	No
		z	-0.035	7.50	No
		z	-0.005	4.00	No
		z	-0.005	5.00	No
	12	z	-0.035	2.50	No
		z	-0.035	7.50	No
		z	-0.005	4.00	No
		z	-0.005	5.00	No
Wi30	2	x	-0.028	2.50	No
		x	-0.028	7.50	No

		x	-0.005	4.00	No
		x	-0.005	5.00	No
	4	x	-0.028	2.50	No
		x	-0.028	7.50	No
		x	-0.005	4.00	No
		x	-0.005	5.00	No
	6	x	-0.048	2.50	No
		x	-0.048	7.50	No
		x	-0.007	4.00	No
		x	-0.007	5.00	No
	8	x	-0.048	2.50	No
		x	-0.048	7.50	No
		x	-0.007	4.00	No
		x	-0.007	5.00	No
	10	x	-0.048	2.50	No
		x	-0.048	7.50	No
		x	-0.007	4.00	No
		x	-0.007	5.00	No
	12	x	-0.048	2.50	No
		x	-0.048	7.50	No
		x	-0.007	4.00	No
		x	-0.007	5.00	No
WL0	2	z	-0.018	2.50	No
		z	-0.018	7.50	No
	4	z	-0.018	2.50	No
		z	-0.018	7.50	No
	6	z	-0.01	2.50	No
		z	-0.01	7.50	No
		z	-0.001	4.00	No
		z	-0.001	5.00	No
	8	z	-0.01	2.50	No
		z	-0.01	7.50	No
		z	-0.001	5.50	No
		z	-0.001	5.00	No
	9		0.00	0.00	No
			0.00	4.00	No
	10	z	-0.01	2.50	No
		z	-0.01	7.50	No
		z	-0.001	4.00	No
		z	-0.001	5.00	No
	12	z	-0.01	2.50	No
		z	-0.01	7.50	No
		z	-0.001	5.50	No
		z	-0.001	5.00	No
WL30	2	x	-0.008	2.50	No
		x	-0.008	7.50	No
		x	-0.001	4.00	No
		x	-0.001	5.00	No
	4	x	-0.008	2.50	No
		x	-0.008	7.50	No
		x	-0.001	4.00	No
		x	-0.001	5.00	No
	6	x	-0.015	2.50	No
		x	-0.015	7.50	No
		x	-0.002	4.00	No
		x	-0.002	5.00	No
	8	x	-0.015	2.50	No
		x	-0.015	7.50	No
		x	-0.002	4.00	No
		x	-0.002	5.00	No

	10	x	-0.015	2.50	No
		x	-0.015	7.50	No
		x	-0.002	4.00	No
		x	-0.002	5.00	No
	12	x	-0.015	2.50	No
		x	-0.015	7.50	No
		x	-0.002	4.00	No
		x	-0.002	5.00	No
LL1	27	y	-0.25	50.00	Yes
LL2	27	y	-0.25	0.00	Yes
LLa1	1	y	-0.50	50.00	Yes
LLa2	2	y	-0.50	50.00	Yes
LLa3	3	y	-0.50	50.00	Yes
LLa4	4	y	-0.50	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	500 lb Live Load on Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load on Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load on Antenna 3	No	0.00	0.00	0.00
LLa4	500 lb Live Load on Antenna 4	No	0.00	0.00	0.00

RAM® Elements
CONNECT Edition

Current Date: 8/31/2023 12:23 PM
Units system: English

Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

W180=-W0
W210=-W30
Wi180=-Wi0
Wi210=-Wi30
WL180=-WL0
WL210=-WL30
LC1=1.2DL+1.6W0
LC2=1.2DL+1.6W30
LC3=1.2DL-1.6W0
LC4=1.2DL-1.6W30
LC5=0.9DL+1.6W0
LC6=0.9DL+1.6W30
LC7=0.9DL-1.6W0
LC8=0.9DL-1.6W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC14=0.9DL
LC15=1.2DL+1.6LL1
LC16=1.2DL+1.6LL2
LC17=1.2DL+WL0+LLa1
LC18=1.2DL+WL30+LLa1
LC19=1.2DL-WL0+LLa1
LC20=1.2DL-WL30+LLa1
LC21=1.2DL+WL0+LLa2
LC22=1.2DL+WL30+LLa2
LC23=1.2DL-WL0+LLa2
LC24=1.2DL-WL30+LLa2
LC25=1.2DL+WL0+LLa3
LC26=1.2DL+WL30+LLa3
LC27=1.2DL-WL0+LLa3
LC28=1.2DL-WL30+LLa3
LC29=1.2DL+WL0+LLa4
LC30=1.2DL+WL30+LLa4
LC31=1.2DL-WL0+LLa4
LC32=1.2DL-WL30+LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	**24**	LC3 at 100.00%	0.16	OK	
		25	LC2 at 100.00%	**0.21**	**OK**	
		26	LC3 at 100.00%	0.15	OK	
		37	LC2 at 50.00%	0.20	OK	
		38	LC1 at 50.00%	0.17	OK	
		39	LC3 at 50.00%	0.17	OK	
	L 2-1_2X2-1_2X3_16	**34**	LC2 at 100.00%	**0.72**	**OK**	
		35	LC4 at 100.00%	0.55	OK	
		36	LC3 at 0.00%	0.69	OK	
	L 2X2X1_4	**28**	LC3 at 100.00%	0.19	OK	

	29	LC1 at 100.00%	0.20	OK
	30	LC4 at 100.00%	0.21	OK
	31	LC2 at 0.00%	**0.24**	**OK**
	32	LC1 at 0.00%	0.22	OK
	33	LC3 at 0.00%	0.21	OK
PIPE 2-1_2x0.203	**1**	LC4 at 89.58%	0.12	OK
	2	LC4 at 89.58%	0.17	OK
	3	LC2 at 89.58%	0.12	OK
	4	LC3 at 89.58%	0.17	OK
	5	LC2 at 20.83%	0.18	OK
	6	LC2 at 89.58%	0.21	OK
	7	LC1 at 89.58%	0.18	OK
	8	LC1 at 89.58%	0.22	OK
	9	LC1 at 89.58%	0.15	OK
	10	LC1 at 89.58%	0.22	OK
	11	LC4 at 89.58%	0.14	OK
	12	LC4 at 89.58%	0.24	OK
	13	LC7 at 76.79%	0.40	OK
	14	LC5 at 76.79%	0.46	OK
	15	LC8 at 76.79%	**0.46**	**OK**
	16	LC2 at 0.00%	0.31	OK
	17	LC4 at 0.00%	0.35	OK
	18	LC4 at 0.00%	0.28	OK
	19	LC1 at 0.00%	0.30	OK
	20	LC2 at 0.00%	0.17	OK
	21	LC3 at 0.00%	0.20	OK
PIPE 3x0.216	**22**	LC2 at 32.14%	**0.17**	**OK**
	23	LC4 at 33.04%	0.16	OK
	27	LC4 at 32.14%	0.12	OK
PL 6x3/8	**40**	LC2 at 50.00%	0.20	OK
	41	LC1 at 46.88%	0.22	OK
	42	LC4 at 50.00%	**0.22**	**OK**

RAM® Elements
CONNECT Edition

Current Date: 8/31/2023 12:23 PM
Units system: English

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
7	0.596	0.00	-8.7157	0
8	7.846	0.00	3.8417	0
9	-7.846	0.00	3.8417	0
10	-0.596	0.00	-8.7157	0
11	7.25	0.00	4.874	0
12	-7.25	0.00	4.874	0
13	7.548	0.00	4.3578	0
1	0.00	0.00	-2.0457	0
2	-1.7716	0.00	1.0228	0
3	1.7716	0.00	1.0228	0
14	-7.548	0.00	4.3578	0
15	0.00	0.00	-8.7157	0
16	2.846	0.00	-4.8186	0
17	5.596	0.00	-0.0554	0
18	-2.846	0.00	-4.8186	0
19	-5.596	0.00	-0.0554	0
20	-2.75	0.00	4.874	0
21	2.75	0.00	4.874	0
22	5.3725	0.00	0.3317	0
23	2.9735	0.00	4.4869	0
24	-2.9735	0.00	4.4869	0
25	-5.3725	0.00	0.3317	0
26	-2.399	0.00	-4.8186	0

27	2.399	0.00	-4.8186	0
28	6.00	0.00	4.874	0
29	6.00	0.00	5.074	0
30	2.50	0.00	4.874	0
31	2.50	0.00	5.074	0
32	-2.00	0.00	4.874	0
33	-2.00	0.00	5.074	0
34	-6.50	0.00	4.874	0
35	-6.50	0.00	5.074	0
36	6.00	9.00	5.074	0
37	2.50	9.00	5.074	0
38	-2.00	9.00	5.074	0
39	-6.50	9.00	5.074	0
40	6.00	-1.00	5.074	0
41	2.50	-1.00	5.074	0
42	-2.00	-1.00	5.074	0
43	-6.50	-1.00	5.074	0
44	-7.25	7.00	4.874	0
45	-7.846	7.00	3.8417	0
46	-0.596	7.00	-8.7157	0
47	0.596	7.00	-8.7157	0
48	7.25	7.00	4.874	0
49	7.846	7.00	3.8417	0
4	0.00	4.00	-2.0457	0
5	-1.7716	4.00	1.0228	0
6	1.7716	4.00	1.0228	0
50	-6.50	7.00	4.874	0
51	-6.50	7.00	5.074	0
52	-2.00	7.00	4.874	0
53	-2.00	7.00	5.074	0
54	2.50	7.00	4.874	0
55	2.50	7.00	5.074	0
56	6.00	7.00	4.874	0
57	6.00	7.00	5.074	0
58	-0.971	0.00	-8.0662	0
59	-1.1442	0.00	-8.1662	0
60	-1.1442	9.00	-8.1662	0
61	-1.1442	-1.00	-8.1662	0
62	-0.971	7.00	-8.0662	0
63	-1.1442	7.00	-8.1662	0
64	-3.221	0.00	-4.1691	0
65	-3.3942	0.00	-4.2691	0
66	-3.3942	9.00	-4.2691	0
67	-3.3942	-1.00	-4.2691	0
68	-3.221	7.00	-4.1691	0
69	-3.3942	7.00	-4.2691	0
70	-5.471	0.00	-0.2719	0
71	-5.6442	0.00	-0.3719	0
72	-5.6442	9.00	-0.3719	0
73	-5.6442	-1.00	-0.3719	0
74	-5.471	7.00	-0.2719	0
75	-5.6442	7.00	-0.3719	0
76	-7.221	0.00	2.7592	0
77	-7.3942	0.00	2.6592	0
78	-7.3942	9.00	2.6592	0
79	-7.3942	-1.00	2.6592	0
80	-7.221	7.00	2.7592	0
81	-7.3942	7.00	2.6592	0
82	7.471	0.00	3.1922	0
83	7.6442	0.00	3.0922	0

84	7.6442	9.00	3.0922	0
85	7.6442	-1.00	3.0922	0
86	7.471	7.00	3.1922	0
87	7.6442	7.00	3.0922	0
88	5.221	0.00	-0.7049	0
89	5.3942	0.00	-0.8049	0
90	5.3942	9.00	-0.8049	0
91	5.3942	-1.00	-0.8049	0
92	5.221	7.00	-0.7049	0
93	5.3942	7.00	-0.8049	0
94	2.971	0.00	-4.6021	0
95	3.1442	0.00	-4.7021	0
96	3.1442	9.00	-4.7021	0
97	3.1442	-1.00	-4.7021	0
98	2.971	7.00	-4.6021	0
99	3.1442	7.00	-4.7021	0
100	1.221	0.00	-7.6332	0
101	1.3942	0.00	-7.7332	0
102	1.3942	9.00	-7.7332	0
103	1.3942	-1.00	-7.7332	0
104	1.221	7.00	-7.6332	0
105	1.3942	7.00	-7.7332	0
106	6.221	7.00	1.0271	0
107	-4.00	7.00	4.874	0
108	-2.221	7.00	-5.9011	0
109	4.00	7.00	4.874	0
110	-6.221	7.00	1.0271	0
111	2.221	7.00	-5.9011	0
113	6.9062	0.00	3.9873	0
114	-6.9062	0.00	3.9873	0
118	0.00	0.00	-7.9746	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
1	1	1	1	1	1	1
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	1	1	1	1	1	1
5	1	1	1	1	1	1
6	1	1	1	1	1	1
113	0	1	0	0	0	0
114	0	1	0	0	0	0
118	0	1	0	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
1	36	40		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
2	37	41		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
3	38	42		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
4	39	43		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
5	78	79		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
6	72	73		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
7	66	67		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
8	60	61		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
9	102	103		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
10	96	97		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
11	90	91		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
12	84	85		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
13	48	44		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
14	45	46		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
15	47	49		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
16	4	108		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
17	4	111		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
18	6	106		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
19	5	110		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
20	5	107		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
21	6	109		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
22	9	10		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
23	7	8		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
24	14	2		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
25	15	1		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
26	13	3		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
27	11	12		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
28	24	14		L 2X2X1_4	A36	0.00	0.00	0.00
29	26	15		L 2X2X1_4	A36	0.00	0.00	0.00
30	22	13		L 2X2X1_4	A36	0.00	0.00	0.00
31	14	25		L 2X2X1_4	A36	0.00	0.00	0.00
32	15	27		L 2X2X1_4	A36	0.00	0.00	0.00
33	13	23		L 2X2X1_4	A36	0.00	0.00	0.00
34	48	49		L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
35	44	45		L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
36	46	47		L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
37	20	19		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
38	18	16		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
39	17	21		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
40	12	9		PL 6x3/8	A36	0.00	0.00	0.00
41	10	7		PL 6x3/8	A36	0.00	0.00	0.00
42	11	8		PL 6x3/8	A36	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
34	90.00	0	0.00	0.00	0.00
35	180.00	0	0.00	0.00	0.00
36	180.00	0	0.00	0.00	0.00

Rigid end offsets

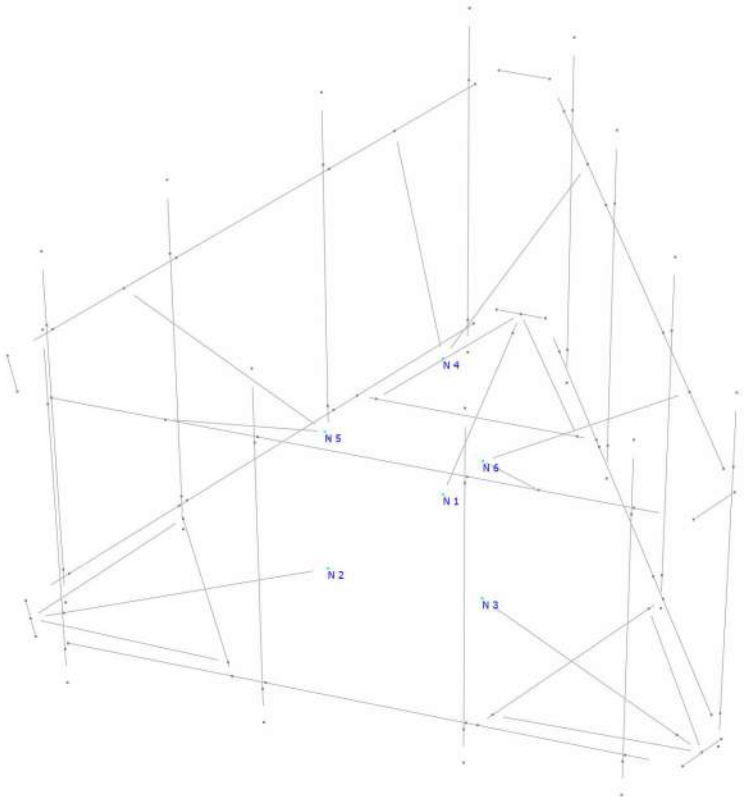
Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
28	0.00	3.00	0.00	0.00	3.00	0.00
29	0.00	3.00	0.00	0.00	3.00	0.00
30	0.00	3.00	0.00	0.00	3.00	0.00
31	0.00	3.00	0.00	0.00	3.00	0.00
32	0.00	3.00	0.00	0.00	3.00	0.00
33	0.00	3.00	0.00	0.00	3.00	0.00

Hinges

Member	Node-J				Node-K				TOR	AXL	Axial rigidity
	M33	M22	V3	V2	M33	M22	V3	V2			
16	0	0	0	0	1	1	0	0	0	0	Full
17	0	0	0	0	1	1	0	0	0	0	Full
18	0	0	0	0	1	1	0	0	0	0	Full
19	0	0	0	0	1	1	0	0	0	0	Full
20	0	0	0	0	1	1	0	0	0	0	Full
21	0	0	0	0	1	1	0	0	0	0	Full

Connection Check

Current Date: 8/31/2023 12:24 PM
Units system: English

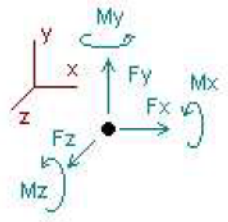


RAM® Elements
CONNECT Edition

Current Date: 8/31/2023 12:23 PM
Units system: English

Analysis result

Reactions



Direction of positive forces and moments

Node	Forces [Kip] FX	FY	FZ	Moments [Kip*ft] MX	MY	MZ
Condition **W180=-W0**						
1	0.06597	-0.30801	-1.73551	-0.39907	-0.11649	0.00828
2	0.43664	0.16385	-0.96897	-0.49587	-0.94254	0.03898
3	-0.49353	0.17048	-1.02168	-0.49306	0.90758	-0.02429
4	0.02267	0.95775	-1.42791	-0.46804	-0.05035	-0.00704
5	0.45005	-0.50599	-0.75956	-0.51322	-0.47294	-0.02006
6	-0.48179	-0.54941	-0.79445	-0.46968	0.45522	-0.01151
113	0.00000	0.46893	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.46244	0.00000	0.00000	0.00000	0.00000
118	0.00000	-0.86013	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	-0.00007	-6.70809	-2.83894	-0.21951	-0.01565
Condition **W210=-W30**						
1	-0.97228	-0.00786	0.07064	-0.01229	1.72108	0.56628
2	-1.41027	-0.28768	0.59071	-0.04200	0.01780	0.46571
3	-1.27359	0.28104	-0.66396	0.03207	0.19406	0.44196
4	-0.60473	-0.01528	0.01396	-0.02713	0.80766	0.63953
5	-1.27536	0.89939	0.44810	0.09297	-0.00265	0.40230
6	-1.14311	-0.80623	-0.45945	-0.11732	0.03938	0.41437
113	0.00000	0.72991	0.00000	0.00000	0.00000	0.00000
114	0.00000	-0.78892	0.00000	0.00000	0.00000	0.00000
118	0.00000	-0.00436	0.00000	0.00000	0.00000	0.00000
SUM	-6.67933	0.00000	0.00000	-0.07370	2.77734	2.93016
Condition **Wi180=-Wi0**						
1	0.01626	-0.03001	-0.13210	-0.03953	-0.03244	0.00133
2	0.02617	0.01761	-0.06890	-0.05301	-0.08120	0.00314
3	-0.03965	0.01589	-0.07418	-0.04989	0.05679	-0.00424
4	0.00377	0.09143	-0.13060	-0.04295	-0.01369	-0.00511
5	0.04477	-0.05014	-0.06712	-0.04929	-0.04730	-0.00257
6	-0.05131	-0.05718	-0.07111	-0.04045	0.03487	-0.00103
113	0.00000	0.04882	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.04694	0.00000	0.00000	0.00000	0.00000
118	0.00000	-0.08337	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	0.00000	-0.54400	-0.27513	-0.08296	-0.00848

Condition **Wi210=-Wi30**

1	-0.07929	-0.00137	0.00723	-0.00218	0.14577	0.06054
2	-0.11361	-0.02826	0.04881	-0.00371	0.00546	0.04594
3	-0.09402	0.02965	-0.05920	0.00542	0.03051	0.04847
4	-0.05128	-0.00435	0.00481	-0.00449	0.07949	0.06205
5	-0.12041	0.09030	0.04697	0.00891	-0.00038	0.03784
6	-0.11338	-0.08521	-0.04863	-0.01466	0.00932	0.04121
113	0.00000	0.07855	0.00000	0.00000	0.00000	0.00000
114	0.00000	-0.08043	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.00112	0.00000	0.00000	0.00000	0.00000
SUM	-0.57200	0.00000	0.00000	-0.01072	0.27018	0.29605

Condition **WL180=-WL0**

1	0.00579	-0.00874	-0.03860	-0.01149	-0.01233	0.00023
2	0.00656	0.00540	-0.02117	-0.01625	-0.02718	0.00093
3	-0.01142	0.00483	-0.02157	-0.01530	0.01519	-0.00127
4	0.00139	0.02544	-0.03637	-0.01201	-0.00559	-0.00228
5	0.01317	-0.01508	-0.02067	-0.01513	-0.01490	-0.00050
6	-0.01549	-0.01737	-0.02161	-0.01151	0.00849	-0.00021
113	0.00000	0.01477	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.01412	0.00000	0.00000	0.00000	0.00000
118	0.00000	-0.02337	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	0.00000	-0.16000	-0.08168	-0.03632	-0.00310

Condition **WL210=-WL30**

1	-0.02570	-0.00042	0.00214	-0.00066	0.04821	0.01871
2	-0.03344	-0.00857	0.01555	-0.00113	0.00498	0.01399
3	-0.02718	0.00899	-0.01871	0.00162	0.01280	0.01468
4	-0.01621	-0.00136	0.00150	-0.00139	0.02559	0.01970
5	-0.03584	0.02693	0.01407	0.00324	0.00183	0.01077
6	-0.03362	-0.02530	-0.01455	-0.00517	0.00488	0.01182
113	0.00000	0.02337	0.00000	0.00000	0.00000	0.00000
114	0.00000	-0.02399	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.00034	0.00000	0.00000	0.00000	0.00000
SUM	-0.17200	0.00000	0.00000	-0.00350	0.09829	0.08967

Condition **LC1=1.2DL+1.6W0**

1	-0.10598	0.91126	2.70579	1.24161	0.18582	0.00617
2	-0.75557	0.15622	1.58381	0.51141	1.50973	-0.59862
3	0.84655	0.14551	1.66785	0.47399	-1.45496	0.55579
4	-0.03453	-1.42729	2.24830	0.84693	0.08372	0.02148
5	-0.75713	0.91004	1.23459	0.78205	0.75661	-0.05521
6	0.80666	0.97888	1.29259	0.69479	-0.72356	0.09594
113	0.00000	-0.00099	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.00877	0.00000	0.00000	0.00000	0.00000
118	0.00000	2.12307	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	3.80547	10.73294	4.55078	0.35736	0.02556

Condition **LC2=1.2DL+1.6W30**

1	1.55487	0.43342	-0.17443	0.62847	-2.75356	-0.88761
2	2.19426	0.87819	-0.90987	-0.21990	-0.02887	-1.27534
3	2.09916	-0.03311	1.09651	-0.37201	-0.31088	-0.19679
4	0.96881	0.11998	-0.06213	0.13993	-1.29082	-1.01384
5	2.00321	-1.33309	-0.70324	-0.18868	0.00742	-0.73285
6	1.86663	1.39538	0.75316	0.13126	-0.06212	-0.58557
113	0.00000	-0.42174	0.00000	0.00000	0.00000	0.00000

114	0.00000	2.00746	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.75898	0.00000	0.00000	0.00000	0.00000
SUM	10.68694	3.80547	0.00000	0.11907	-4.43884	-4.69199

Condition **LC3=1.2DL-1.6W0**

1	0.10499	-0.07533	-2.84454	-0.03415	-0.18589	0.03244
2	0.63956	0.68037	-1.51517	-1.07859	-1.50656	-0.47094
3	-0.73027	0.69126	-1.60058	-1.10716	1.45178	0.47573
4	0.03855	1.63048	-2.32769	-0.65562	-0.07785	-0.00128
5	0.68243	-0.71269	-1.19641	-0.85988	-0.75512	-0.11824
6	-0.73526	-0.78209	-1.24855	-0.80760	0.73211	0.05776
113	0.00000	1.50349	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.49310	0.00000	0.00000	0.00000	0.00000
118	0.00000	-0.62311	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	3.80547	-10.73294	-4.54299	-0.34153	-0.02454

Condition **LC4=1.2DL-1.6W30**

1	-1.55577	0.40629	0.04623	0.58615	2.75366	0.92557
2	-2.31526	-0.04293	0.97958	-0.35334	0.02906	0.21272
3	-1.97659	0.86773	-1.02800	-0.26755	0.31114	1.22028
4	-0.96594	0.07146	-0.02009	0.05035	1.29614	1.03408
5	-2.07992	1.53715	0.73563	0.11090	-0.00096	0.55794
6	-1.79345	-1.19196	-0.71333	-0.24363	0.06593	0.73947
113	0.00000	1.92032	0.00000	0.00000	0.00000	0.00000
114	0.00000	-0.50952	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.74693	0.00000	0.00000	0.00000	0.00000
SUM	-10.68694	3.80547	0.00000	-0.11711	4.45498	4.69006

Condition **LC5=0.9DL+1.6W0**

1	-0.10582	0.80664	2.72321	1.09049	0.18561	0.00142
2	-0.74092	0.05175	1.57525	0.58280	1.50962	-0.46524
3	0.83171	0.04110	1.65953	0.55360	-1.45524	0.42725
4	-0.03512	-1.45125	2.25880	0.82351	0.08299	0.01896
5	-0.74737	0.88606	1.22959	0.79137	0.75581	-0.03387
6	0.79752	0.95494	1.28656	0.70845	-0.72415	0.07710
113	0.00000	-0.18970	0.00000	0.00000	0.00000	0.00000
114	0.00000	-0.17991	0.00000	0.00000	0.00000	0.00000
118	0.00000	1.93446	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	2.85410	10.73294	4.55023	0.35464	0.02564

Condition **LC6=0.9DL+1.6W30**

1	1.55514	0.32897	-0.15727	0.47738	-2.75395	-0.89224
2	2.20921	0.77358	-0.91869	-0.14846	-0.02911	-1.14206
3	2.08446	-0.13752	1.08820	-0.29224	-0.31112	-0.32531
4	0.96811	0.09603	-0.05135	0.11669	-1.29123	-1.01614
5	2.01265	-1.35708	-0.70801	-0.17913	0.00682	-0.71135
6	1.85737	1.37140	0.74711	0.14494	-0.06269	-0.60432
113	0.00000	-0.61044	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.81886	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.57030	0.00000	0.00000	0.00000	0.00000
SUM	10.68694	2.85410	0.00000	0.11918	-4.44128	-4.69144

Condition **LC7=0.9DL-1.6W0**

1	0.10514	-0.17970	-2.82770	-0.18532	-0.18609	0.02766
2	0.65442	0.57585	-1.52401	-1.00708	-1.50686	-0.33778
3	-0.74526	0.58668	-1.60912	-1.02739	1.45164	0.34724
4	0.03794	1.60650	-2.31661	-0.67867	-0.07852	-0.00377
5	0.69196	-0.73664	-1.20117	-0.85030	-0.75571	-0.09683
6	-0.74421	-0.80608	-1.25434	-0.79368	0.73131	0.03886
113	0.00000	1.31487	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.30445	0.00000	0.00000	0.00000	0.00000
118	0.00000	-0.81183	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	2.85410	-10.73294	-4.54244	-0.34422	-0.02462

Condition **LC8=0.9DL-1.6W30**

1	-1.55573	0.30175	0.06334	0.43495	2.75364	0.92068
2	-2.30069	-0.14731	0.97099	-0.28188	0.02890	0.34599
3	-1.99173	0.76315	-1.03656	-0.18793	0.31096	1.09178
4	-0.96644	0.04748	-0.00930	0.02712	1.29515	1.03139
5	-2.07006	1.51321	0.73063	0.12025	-0.00175	0.57919
6	-1.80229	-1.21591	-0.71911	-0.22974	0.06511	0.72049
113	0.00000	1.73170	0.00000	0.00000	0.00000	0.00000
114	0.00000	-0.69825	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.55828	0.00000	0.00000	0.00000	0.00000
SUM	-10.68694	2.85410	0.00000	-0.11723	4.45201	4.68951

Condition **LC9=1.2DL+Di+Wi0**

1	-0.01949	0.74586	-0.03523	1.07049	0.03870	0.04699
2	-0.16927	0.69820	0.15522	-0.42055	0.08743	-0.92022
3	0.18602	0.69987	0.15492	-0.50738	-0.05050	0.87292
4	0.00349	0.08602	0.05253	0.21462	0.01575	0.02791
5	-0.11621	0.22760	0.10000	-0.01670	0.04938	-0.15739
6	0.11546	0.23461	0.11657	-0.06502	-0.03288	0.13821
113	0.00000	1.30128	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.30311	0.00000	0.00000	0.00000	0.00000
118	0.00000	1.43344	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	6.72998	0.54400	0.27546	0.10788	0.00843

Condition **LC10=1.2DL+Di+Wi30**

1	0.07599	0.71716	-0.17440	1.03313	-0.13940	-0.01228
2	-0.02966	0.74412	0.03764	-0.46993	0.00083	-0.96294
3	0.24032	0.68612	0.13992	-0.56280	-0.02423	0.82017
4	0.05860	0.18174	-0.08302	0.17608	-0.07764	-0.03938
5	0.04912	0.08718	-0.01425	-0.07503	0.00236	-0.19788
6	0.17762	0.26271	0.09409	-0.09079	-0.00739	0.09593
113	0.00000	1.27149	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.43047	0.00000	0.00000	0.00000	0.00000
118	0.00000	1.34899	0.00000	0.00000	0.00000	0.00000
SUM	0.57200	6.72998	0.00000	0.01066	-0.24546	-0.29638

Condition **LC11=1.2DL+Di-Wi0**

1	0.01301	0.68575	-0.29914	0.99141	-0.02614	0.04967
2	-0.11705	0.73341	0.01758	-0.52666	-0.07485	-0.91379
3	0.10678	0.73173	0.00666	-0.60727	0.06306	0.86442
4	0.01106	0.26887	-0.20899	0.12852	-0.01170	0.01764
5	-0.02658	0.12727	-0.03437	-0.11542	-0.04534	-0.16255
6	0.01277	0.12027	-0.02573	-0.14600	0.03694	0.13618
113	0.00000	1.39890	0.00000	0.00000	0.00000	0.00000

114	0.00000	1.39706	0.00000	0.00000	0.00000	0.00000
118	0.00000	1.26673	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	6.72998	-0.54400	-0.27542	-0.05804	-0.00843

Condition **LC12=1.2DL+Di-Wi30**

1	-0.08246	0.71446	-0.15993	1.02880	0.15195	0.10894
2	-0.25668	0.68749	0.13515	-0.47732	0.01172	-0.87104
3	0.05250	0.74548	0.02166	-0.55188	0.03678	0.91713
4	-0.04405	0.17310	-0.07344	0.16706	0.08168	0.08493
5	-0.19192	0.26772	0.07984	-0.05709	0.00169	-0.12206
6	-0.04939	0.09220	-0.00327	-0.12023	0.01143	0.17846
113	0.00000	1.42866	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.26968	0.00000	0.00000	0.00000	0.00000
118	0.00000	1.35120	0.00000	0.00000	0.00000	0.00000
SUM	-0.57200	6.72998	0.00000	-0.01066	0.29526	0.29636

Condition **LC13=1.2DL**

1	-0.00063	0.41798	-0.06854	0.60457	0.00083	0.01904
2	-0.05905	0.41798	0.03481	-0.28580	0.00083	-0.53309
3	0.05967	0.41798	0.03373	-0.31877	0.00083	0.51405
4	0.00238	0.09590	-0.04319	0.09293	0.00278	0.01001
5	-0.03859	0.09590	0.01953	-0.03780	0.00278	-0.08549
6	0.03621	0.09590	0.02366	-0.05513	0.00278	0.07548
113	0.00000	0.75461	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.75461	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.75461	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	3.80547	0.00000	0.00000	0.01081	0.00000

Condition **LC14=0.9DL**

1	-0.00047	0.31349	-0.05141	0.45342	0.00062	0.01428
2	-0.04429	0.31349	0.02611	-0.21435	0.00062	-0.39981
3	0.04476	0.31349	0.02530	-0.23908	0.00062	0.38554
4	0.00179	0.07193	-0.03240	0.06970	0.00208	0.00751
5	-0.02895	0.07193	0.01465	-0.02835	0.00208	-0.06412
6	0.02716	0.07193	0.01775	-0.04135	0.00208	0.05661
113	0.00000	0.56595	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.56595	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.56595	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	2.85410	0.00000	0.00000	0.00810	0.00000

Condition **LC15=1.2DL+1.6LL1**

1	-0.00057	0.36480	-0.11384	0.53003	0.00050	0.01911
2	-0.11118	0.58256	0.06613	-0.56241	-0.00036	-0.64604
3	0.11037	0.58151	0.06504	-0.59384	0.00027	0.62528
4	0.00241	0.10849	-0.06427	0.08070	0.00150	0.01024
5	-0.04276	0.10850	0.02187	-0.12695	-0.01306	-0.06476
6	0.04174	0.10790	0.02507	-0.14001	0.02055	0.05240
113	0.00000	0.81090	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.80913	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.73167	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.20547	0.00000	-0.81249	0.00940	-0.00378

Condition **LC16=1.2DL+1.6LL2**

1	-0.00415	0.40544	-0.11424	0.58806	0.00784	0.00609
2	-0.10569	0.42587	0.05734	-0.29669	-0.00786	-0.54153
3	0.10758	0.36820	0.06825	-0.31355	-0.00877	0.41211
4	0.00268	0.09856	-0.04768	0.09036	0.00673	0.00623
5	-0.03508	0.09314	0.01710	-0.03963	0.00623	-0.08623
6	0.03467	0.09315	0.01923	-0.07563	0.01443	0.06555
113	0.00000	1.21383	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.75787	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.74941	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.20547	0.00000	-0.04708	0.01860	-0.13778

Condition **LC17=1.2DL+WL0+LLa1**

1	-0.00715	0.39666	-0.04202	0.57368	0.01281	-0.00311
2	-0.09328	0.44411	0.07036	-0.32109	0.02249	-0.55733
3	0.08540	0.44363	0.07943	-0.44310	-0.03746	0.48418
4	0.00085	0.07963	-0.02140	0.09785	0.02199	0.00884
5	-0.04334	0.10377	0.03155	-0.03618	0.02453	-0.08246
6	0.05752	0.12154	0.04207	-0.11652	0.02708	0.05996
113	0.00000	1.20211	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.75045	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.76358	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	0.16000	-0.24536	0.07143	-0.08992

Condition **LC18=1.2DL+WL30+LLa1**

1	0.02433	0.38832	-0.08273	0.56285	-0.04771	-0.02160
2	-0.05331	0.45809	0.03366	-0.33621	-0.00966	-0.57039
3	0.10115	0.43947	0.07656	-0.46004	-0.03508	0.46824
4	0.01847	0.10642	-0.05929	0.08722	-0.00922	-0.01315
5	0.00570	0.06177	-0.00321	-0.05457	0.00778	-0.09375
6	0.07566	0.12949	0.03502	-0.12286	0.03068	0.04792
113	0.00000	1.19349	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.78855	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.73987	0.00000	0.00000	0.00000	0.00000
SUM	0.17200	4.30547	0.00000	-0.32360	-0.06321	-0.18273

Condition **LC19=1.2DL-WL0+LLa1**

1	0.00443	0.37915	-0.11917	0.55070	-0.01184	-0.00264
2	-0.08019	0.45491	0.02803	-0.35359	-0.03186	-0.55545
3	0.06257	0.45331	0.03631	-0.47371	-0.00711	0.48165
4	0.00364	0.13051	-0.09419	0.07380	0.01080	0.00428
5	-0.01698	0.07361	-0.00981	-0.06645	-0.00529	-0.08348
6	0.02653	0.08682	-0.00117	-0.13957	0.04408	0.05955
113	0.00000	1.23163	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.77869	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.71684	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	-0.16000	-0.40882	-0.00123	-0.09608

Condition **LC20=1.2DL-WL30+LLa1**

1	-0.02705	0.38749	-0.07845	0.56153	0.04867	0.01585
2	-0.12016	0.44093	0.06473	-0.33847	0.00029	-0.54239
3	0.04682	0.45746	0.03918	-0.45677	-0.00949	0.49759
4	-0.01397	0.10372	-0.05630	0.08443	0.04200	0.02628
5	-0.06601	0.11562	0.02495	-0.04807	0.01146	-0.07219
6	0.00838	0.07887	0.00589	-0.13323	0.04048	0.07159
113	0.00000	1.24025	0.00000	0.00000	0.00000	0.00000

114	0.00000	0.74059	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.74055	0.00000	0.00000	0.00000	0.00000
SUM	-0.17200	4.30547	0.00000	-0.33058	0.13340	-0.00328

Condition **LC21=1.2DL+WL0+LLa2**

1	-0.00664	0.36592	-0.04150	0.52973	0.01214	-0.00632
2	-0.09690	0.52919	0.07710	-0.46716	0.02960	-0.61354
3	0.08129	0.63413	0.07355	-0.71532	-0.02993	0.66239
4	0.00117	0.08425	-0.02983	0.09187	0.02075	0.00733
5	-0.04440	0.10688	0.02771	-0.08160	0.01490	-0.06854
6	0.06548	0.13855	0.05296	-0.18148	0.03029	0.04398
113	0.00000	0.92475	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.76958	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.75221	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	0.16000	-0.82396	0.07775	0.02530

Condition **LC22=1.2DL+WL30+LLa2**

1	0.02484	0.35759	-0.08221	0.51890	-0.04837	-0.02482
2	-0.05692	0.54318	0.04040	-0.48228	-0.00254	-0.62660
3	0.09704	0.62998	0.07068	-0.73228	-0.02755	0.64646
4	0.01878	0.11104	-0.06771	0.08124	-0.01045	-0.01467
5	0.00463	0.06488	-0.00706	-0.09998	-0.00185	-0.07983
6	0.08363	0.14651	0.04590	-0.18782	0.03389	0.03195
113	0.00000	0.91612	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.80768	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.72850	0.00000	0.00000	0.00000	0.00000
SUM	0.17200	4.30547	0.00000	-0.90222	-0.05687	-0.06750

Condition **LC23=1.2DL-WL0+LLa2**

1	0.00493	0.34842	-0.11865	0.50675	-0.01251	-0.00585
2	-0.08380	0.54000	0.03477	-0.49966	-0.02474	-0.61167
3	0.05845	0.64382	0.03043	-0.74594	0.00042	0.65987
4	0.00396	0.13513	-0.10261	0.06782	0.00956	0.00277
5	-0.01805	0.07673	-0.01366	-0.11187	-0.01493	-0.06955
6	0.03450	0.10386	0.00971	-0.20453	0.04728	0.04358
113	0.00000	0.95424	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.79781	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.70547	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	-0.16000	-0.98742	0.00508	0.01914

Condition **LC24=1.2DL-WL30+LLa2**

1	-0.02655	0.35676	-0.07793	0.51758	0.04800	0.01264
2	-0.12378	0.52602	0.07147	-0.48454	0.00740	-0.59861
3	0.04271	0.64797	0.03330	-0.72898	-0.00196	0.67580
4	-0.01365	0.10833	-0.06473	0.07845	0.04077	0.02477
5	-0.06708	0.11873	0.02112	-0.09349	0.00182	-0.05826
6	0.01635	0.09590	0.01677	-0.19818	0.04368	0.05561
113	0.00000	0.96287	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.75971	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.72918	0.00000	0.00000	0.00000	0.00000
SUM	-0.17200	4.30547	0.00000	-0.90916	0.13970	0.11195

Condition **LC25=1.2DL+WL0+LLa3**

1	-0.00540	0.36179	-0.05369	0.52415	0.01173	0.04161
2	-0.09247	0.64582	0.08175	-0.69318	0.03917	-0.69060
3	0.11018	0.54587	0.08161	-0.53021	-0.01744	0.60447
4	0.00062	0.08508	-0.03147	0.09042	-0.00375	0.01803
5	-0.06186	0.13402	0.04697	-0.16247	-0.01373	-0.05389
6	0.04893	0.11317	0.03484	-0.11082	0.00363	0.05423
113	0.00000	0.77556	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.89271	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.75144	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	0.16000	-0.88211	0.01960	-0.02615

Condition **LC26=1.2DL+WL30+LLa3**

1	0.02608	0.35346	-0.09440	0.51332	-0.04878	0.02311
2	-0.05250	0.65981	0.04506	-0.70830	0.00704	-0.70366
3	0.12594	0.54171	0.07873	-0.54714	-0.01505	0.58853
4	0.01823	0.11187	-0.06935	0.07979	-0.03496	-0.00396
5	-0.01283	0.09203	0.01218	-0.18087	-0.03049	-0.06518
6	0.06708	0.12112	0.02778	-0.11715	0.00723	0.04220
113	0.00000	0.76693	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.93080	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.72773	0.00000	0.00000	0.00000	0.00000
SUM	0.17200	4.30547	0.00000	-0.96035	-0.11502	-0.11897

Condition **LC27=1.2DL-WL0+LLa3**

1	0.00618	0.34429	-0.13084	0.50117	-0.01292	0.04208
2	-0.07937	0.65665	0.03943	-0.72571	-0.01516	-0.68875
3	0.08735	0.55555	0.03848	-0.56080	0.01293	0.60194
4	0.00340	0.13597	-0.10425	0.06637	-0.01495	0.01347
5	-0.03550	0.10388	0.00558	-0.19276	-0.04358	-0.05490
6	0.01794	0.07846	-0.00839	-0.13385	0.02061	0.05383
113	0.00000	0.80506	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.92093	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.70469	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	-0.16000	-1.04558	-0.05307	-0.03234

Condition **LC28=1.2DL-WL30+LLa3**

1	-0.02530	0.35262	-0.09013	0.51200	0.04759	0.06057
2	-0.11935	0.64266	0.07612	-0.71059	0.01696	-0.67568
3	0.07160	0.55971	0.04135	-0.54387	0.01054	0.61788
4	-0.01421	0.10917	-0.06637	0.07700	0.01626	0.03546
5	-0.08453	0.14587	0.04037	-0.17437	-0.02682	-0.04362
6	-0.00021	0.07051	-0.00134	-0.12752	0.01701	0.06586
113	0.00000	0.81369	0.00000	0.00000	0.00000	0.00000
114	0.00000	0.88284	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.72840	0.00000	0.00000	0.00000	0.00000
SUM	-0.17200	4.30547	0.00000	-0.96734	0.08154	0.06048

Condition **LC29=1.2DL+WL0+LLa4**

1	-0.00527	0.40044	-0.05441	0.57939	0.01227	0.03954
2	-0.09367	0.40307	0.08652	-0.35343	0.04931	-0.45970
3	0.10835	0.43600	0.07342	-0.33971	-0.00594	0.53348
4	0.00145	0.07890	-0.02035	0.09799	-0.00489	0.01610
5	-0.05528	0.11468	0.03571	-0.07831	-0.01116	-0.06808
6	0.04442	0.10725	0.03912	-0.05154	-0.01245	0.07485
113	0.00000	0.74849	0.00000	0.00000	0.00000	0.00000

114	0.00000	1.25076	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.76587	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	0.16000	-0.14561	0.02714	0.13619

Condition **LC30=1.2DL+WL30+LLa4**

1	0.02621	0.39211	-0.09512	0.56856	-0.04824	0.02105
2	-0.05369	0.41706	0.04983	-0.36856	0.01718	-0.47276
3	0.12410	0.43184	0.07055	-0.35664	-0.00355	0.51753
4	0.01906	0.10569	-0.05825	0.08736	-0.03611	-0.00590
5	-0.00625	0.07267	0.00093	-0.09670	-0.02793	-0.07936
6	0.06257	0.11520	0.03207	-0.05787	-0.00885	0.06281
113	0.00000	0.73987	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.28887	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.74217	0.00000	0.00000	0.00000	0.00000
SUM	0.17200	4.30547	0.00000	-0.22385	-0.10750	0.04337

Condition **LC31=1.2DL-WL0+LLa4**

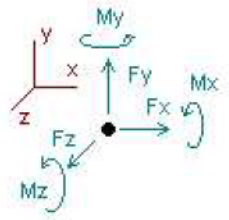
1	0.00630	0.38294	-0.13156	0.55640	-0.01237	0.04001
2	-0.08057	0.41388	0.04420	-0.38595	-0.00501	-0.45783
3	0.08552	0.44567	0.03029	-0.37030	0.02444	0.53094
4	0.00424	0.12979	-0.09315	0.07393	-0.01610	0.01153
5	-0.02892	0.08452	-0.00567	-0.10860	-0.04101	-0.06909
6	0.01343	0.07253	-0.00410	-0.07456	0.00453	0.07444
113	0.00000	0.77801	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.27901	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.71913	0.00000	0.00000	0.00000	0.00000
SUM	0.00000	4.30547	-0.16000	-0.30907	-0.04552	0.13000

Condition **LC32=1.2DL-WL30+LLa4**

1	-0.02518	0.39127	-0.09085	0.56724	0.04814	0.05850
2	-0.12054	0.39990	0.08089	-0.37082	0.02712	-0.44477
3	0.06977	0.44983	0.03316	-0.35338	0.02205	0.54689
4	-0.01338	0.10299	-0.05526	0.08457	0.01511	0.03353
5	-0.07795	0.12653	0.02911	-0.09021	-0.02424	-0.05780
6	-0.00472	0.06458	0.00295	-0.06823	0.00094	0.08648
113	0.00000	0.78663	0.00000	0.00000	0.00000	0.00000
114	0.00000	1.24090	0.00000	0.00000	0.00000	0.00000
118	0.00000	0.74283	0.00000	0.00000	0.00000	0.00000
SUM	-0.17200	4.30547	0.00000	-0.23083	0.08911	0.22281

Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

W180=-W0
W210=-W30
Wi180=-Wi0
Wi210=-Wi30
WL180=-WL0
WL210=-WL30
LC1=1.2DL+1.6W0
LC2=1.2DL+1.6W30
LC3=1.2DL-1.6W0
LC4=1.2DL-1.6W30
LC5=0.9DL+1.6W0
LC6=0.9DL+1.6W30
LC7=0.9DL-1.6W0
LC8=0.9DL-1.6W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC14=0.9DL
LC15=1.2DL+1.6LL1
LC16=1.2DL+1.6LL2
LC17=1.2DL+WL0+LLa1
LC18=1.2DL+WL30+LLa1
LC19=1.2DL-WL0+LLa1
LC20=1.2DL-WL30+LLa1
LC21=1.2DL+WL0+LLa2
LC22=1.2DL+WL30+LLa2
LC23=1.2DL-WL0+LLa2
LC24=1.2DL-WL30+LLa2
LC25=1.2DL+WL0+LLa3
LC26=1.2DL+WL30+LLa3
LC27=1.2DL-WL0+LLa3
LC28=1.2DL-WL30+LLa3
LC29=1.2DL+WL0+LLa4
LC30=1.2DL+WL30+LLa4
LC31=1.2DL-WL0+LLa4
LC32=1.2DL-WL30+LLa4

		Forces						Moments					
Node		**Fx** [Kip]	**Ic**	**Fy** [Kip]	**Ic**	**Fz** [Kip]	**Ic**	**Mx** [Kip*ft]	**Ic**	**My** [Kip*ft]	**Ic**	**Mz** [Kip*ft]	**Ic**
1	Max	1.555	LC6	0.911	LC1	2.723	LC5	1.24161	LC1	2.75366	LC4	0.92557	LC4
	Min	-1.556	LC4	-0.308	W180	-2.845	LC3	-0.39907	W180	-2.75395	LC6	-0.89224	LC6
2	Max	2.209	LC6	0.878	LC2	1.584	LC1	0.58280	LC5	1.50973	LC1	0.46571	W210
	Min	-2.315	LC4	-0.288	W210	-1.524	LC7	-1.07859	LC3	-1.50686	LC7	-1.27534	LC2
3	Max	2.099	LC2	0.868	LC4	1.668	LC1	0.55360	LC5	1.45178	LC3	1.22028	LC4
	Min	-1.992	LC8	-0.138	LC6	-1.609	LC7	-1.10716	LC3	-1.45524	LC5	-0.32531	LC6

4	Max	0.969	LC2	1.630	LC3	2.259	LC5	0.84693	LC1	1.29614	LC4	1.03408	LC4
	Min	-0.966	LC8	-1.451	LC5	-2.328	LC3	-0.67867	LC7	-1.29123	LC6	-1.01614	LC6
5	Max	2.013	LC6	1.537	LC4	1.235	LC1	0.79137	LC5	0.75661	LC1	0.57919	LC8
	Min	-2.080	LC4	-1.357	LC6	-1.201	LC7	-0.85988	LC3	-0.75571	LC7	-0.73285	LC2
6	Max	1.867	LC2	1.395	LC2	1.293	LC1	0.70845	LC5	0.73211	LC3	0.73947	LC4
	Min	-1.802	LC8	-1.216	LC8	-1.254	LC7	-0.80760	LC3	-0.72415	LC5	-0.60432	LC6
113	Max	0.000	W180	1.920	LC4	0.000	W180	0.00000	W180	0.00000	W180	0.00000	W180
	Min	0.000	W180	-0.610	LC6	0.000	W180	0.00000	W180	0.00000	W180	0.00000	W180
114	Max	0.000	W180	2.007	LC2	0.000	W180	0.00000	W180	0.00000	W180	0.00000	W180
	Min	0.000	W180	-0.789	W210	0.000	W180	0.00000	W180	0.00000	W180	0.00000	W180
118	Max	0.000	W180	2.123	LC1	0.000	W180	0.00000	W180	0.00000	W180	0.00000	W180
	Min	0.000	W180	-0.860	W180	0.000	W180	0.00000	W180	0.00000	W180	0.00000	W180

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM **Checked By:** MSC

CHECK CONNECTION CAPACITY (Worst Case) - Proposed Thru Bolts at Standoff

Reference: AISC Steel Construction Manual 14th Edition (ASD)

Bolt Type = A325 5/8" Thru Bolt

Allowable Tensile Load =

F_{Tall} = 13806 lbs.

Allowable Shear Load =

F_{vall} = 8283 lbs.

CONNECTION PLATE CONFIGURATION (4-BOLTS)

$N_{BOLT\ ROWS}$	=	2 rows	d_Y	=	6 in	(Min.)
N_{BOLTS}	=	2 bolts/row	d_X	=	6 in	(Min.)

TENSILE FORCES

Moment in X axis:	1242 lb-ft.	(See Bentley Output)
Couple Reaction from M_X:	2484 lbs.	
Moment in Y axis:	2754 lb-ft.	(See Bentley Output)
Couple Reaction from M_Y:	5508 lbs.	
Reaction in Z direction:	2845 lbs.	(See Bentley Output)
Resultant:	10837 lbs.	

SHEAR FORCES

Moment in Z axis:	926 lb-ft.	(See Bentley Output)
Couple Reaction from M_Z:	1852 lbs.	
Reaction in X direction:	1556 lbs.	(See Bentley Output)
Reaction in Y direction:	911 lbs.	(See Bentley Output)
Resultant:	4319 lbs.	

Tension Design Load /Bolts =

f_t= 4707 lbs. < 13806 lbs. **Therefore, OK !**

Shear Design Load / Bolts=

f_v= 1097 lbs. < 8283 lbs. **Therefore, OK !**

CHECK COMBINED TENSION AND SHEAR

f_t / F_T	+	f_v / F_V	≤	1.0			
0.341	+	0.132	=	0.473	<	1.0	**Therefore, OK !**

Date: 8/31/2023
Project Name: MIDDLETOWN SOUTH
Project No.: CT5436
Designed By: KM **Checked By:** MSC

CHECK CONNECTION CAPACITY (Worst Case) - Proposed Threaded Rods at Ring Mount

Reference: AISC Steel Construction Manual 14th Edition (ASD)

Bolt Type = A36 5/8" Threaded Rod

Allowable Tensile Load =

F_{Tall} = 6673 lbs.

Allowable Shear Load =

F_{vall} = 4004 lbs.

TENSILE FORCES

Reaction F = 2845 lbs. (See Bentley Output)

SHEAR FORCES

Reactions in X direction: 1556 lbs. (See Bentley Output)
Reactions in Y direction: 911 lbs. (See Bentley Output)

Resultant: 1803 lbs.

No. of Supports = 1
No. of Rods / Support = 3

Tension Design Load /Rods =

f_t= 948 lbs. < 6673 lbs. **Therefore, OK !**

Shear Design Load / Rods=

f_v= 601 lbs. < 4004 lbs. **Therefore, OK !**

CHECK COMBINED TENSION AND SHEAR

f_t / F_T	+	f_v / F_V	≤	1.0			
0.142	+	0.150	=	0.292	<	1.0	**Therefore, OK !**

Property Location BARTHOLOMEW RD | Map ID 49/ / 0088/ / | Bldg Name | State Use 610
Vision ID 543 | Account # R02256 | Bldg # 1 | Sec # 1 of 1 | Card # 1 of 1 | Print Date 3/16/2022 5:50:02 PM

CURRENT OWNER

CONN LIGHT & POWER CO

PO BOX 270

HARTFORD CT 06141

TOPO	UTILITIES	STRT / ROAD	LOCATION
		1 Paved	
			1 Light Traf

SUPPLEMENTAL DATA

Alt Prcl ID	49 42-1 8XX U	Class	Com - U
		State Clas	423
		Supl Info	
Color	0	Unsold	U: 3.6
Census	5419		
District	2:South Farms		
GIS ID	R02256	Assoc Pid#	

CURRENT ASSESSMENT

Description	Code	Appraised	Assessed
FOREST	6-2	82,150	600
	Total	82,150	600

6083

MIDDLETOWN, CT

VISION

RECORD OF OWNERSHIP

RECORD OF OWNERSHIP	BK-VOL/PAGE		SALE DATE	Q/U	V/I	SALE PRICE	VC
CONN LIGHT & POWER CO	0624	0211	07-02-1982	U	V	0	29
THE CONNECTICUT POWER COMPANY	0247	0563	09-03-1952	U	V	0	
CROWELL LULU & WATSON	0190	0382	12-02-1935	U	V	0	

PREVIOUS ASSESSMENTS (HISTORY)

Year	Code	Assessed	Year	Code	Assessed V	Year	Code	Assessed
2021	6-2	600	2020	6-2	600	2020	6-2	600
	Total	600		Total	600		Total	600

EXEMPTIONS

Year	Code	Description	Amount
		Total	0.00

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm Int

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

Nbhd	Nbhd Name	B	Tracing	Batch
0001				

NOTES

CHG TO FOREST AS PER CERTF. ACCT WITH 67.6 ACRES / JH
10-1-01
PL THRU LAND-LOT SPANS BOTH SIDES OF RD
3/1/17 CREATE LOT PER DEED AND MAP
WATSON & LULU CROWELL TO BE DEEDED TO
THE CONN POWER CO/ THIS WAS ORIGINAL

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	0
Appraised Xf (B) Value (Bldg)	0
Appraised Ob (B) Value (Bldg)	0
Appraised Land Value (Bldg)	82,150
Special Land Value	600
Total Appraised Parcel Value	82,150
Valuation Method	C
Total Appraised Parcel Value	82,150

BUILDING PERMIT RECORD

Permit Id	Issue Date	Type	Description	Amount	Insp Date	% Comp	Date Comp	Comments
20168334	10-03-2016	EL	Electric	40,000		100	10-01-2017	REPLACE 3 ANTENNAS & IN

VISIT / CHANGE HISTORY

Date	Id	Type	Is	Cd	Purpost/Result
07-01-2013	AJ			41	Field Review
05-12-2013	KL			99	Vacant Land
05-06-2013	ES			99	Vacant Land

LAND LINE VALUATION SECTION

B	Use Code	Description	Zone	Land Type	Land Units		Unit Price	Size Adj	Site Index	Cond.	Nbhd.	Nbhd. Adj	Notes	Location Adjustment	Adj Unit P	Land Value
1	610	Forest	R-60	Forest	3.600	AC	68,080	0.33518	5	1.00	12	1.000	PL OVER	1.0000	22,820.42	82,150
				Total Card Land Units	3.60	AC	Parcel Total Land Area			3.60					Total Land Value	82,150

Property Location	BARTHOLOMEW RD		Map ID	49/ / 0088/ /		Bldg Name	State Use 610
Vision ID 543		Account # R02256		Bldg # 1		Sec # 1 of 1	Card # 1 of 1	Print Date 3/16/2022 5:50:02 PM

CONSTRUCTION DETAIL

Element	Cd	Description
Style	99	Vacant Land
Model	00	Vacant
Grade		
Stories		
Occupancy		
Exterior Wall 1		
Exterior Wall 2		
Roof Structure		
Roof Cover		
Interior Wall 1		
Interior Wall 2		
Interior Floor 1		
Interior Floor 2		
Heat Fuel		
Heat Type		
Bedrooms		
Full Baths		
Half Baths		
Extra Fixtures		
Total Rooms		
Bath Remodel		
Kitchen Remod		
Extra Kitchens		
Fireplaces		
Extra Openings		
Gas Fireplace		
Int vs Ext		
A/C Type		
A/C %		
Fin Bsmt Area		
FBM grade		
Bsmt Garage		
In Law		

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd	Description
Bsmt Garage		
In Law		

MIXED USE

Code	Description	Percentage
610	Forest	100
		0
		0

COST / MARKET VALUATION

Building Value New	
Year Built	
Effective Year Built	0
Depreciation Code	
Remodel Rating	
Year Remodeled	
Depreciation %	
Functional Obsol	
External Obsol	
Trend Factor	1
Condition	
Condition %	
Percent Good	
Cns Sect Rcnld	
Dep % Ovr	
Dep Ovr Comment	
Misc Imp Ovr	
Misc Imp Ovr Comment	
Cost to Cure Ovr	
Cost to Cure Ovr Comment	

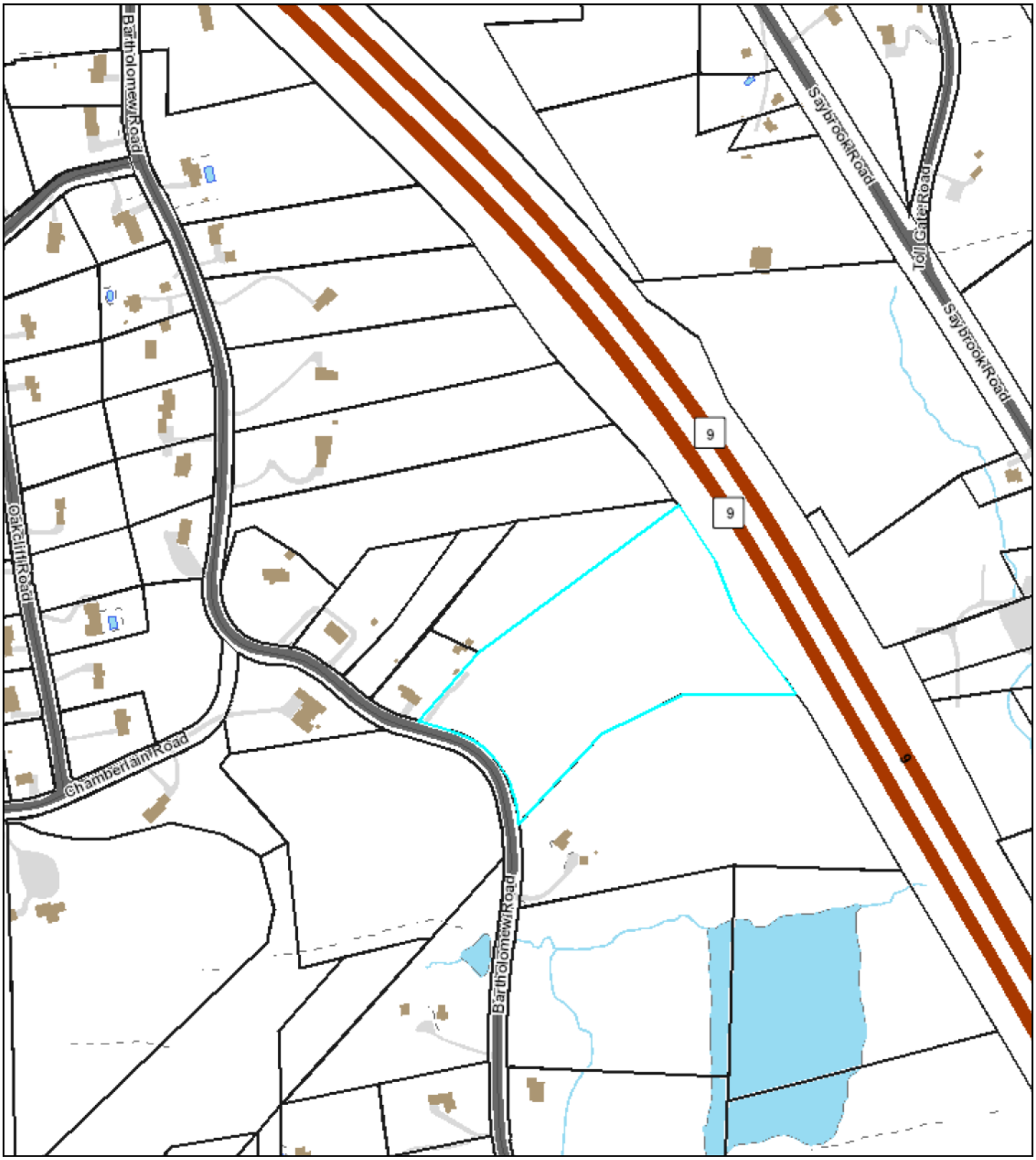
No Sketch

OB - OUTBUILDING & YARD ITEMS(L) / XF - BUILDING EXTRA FEATURES(B)

Code	Description	L/B	Units	Unit Price	Yr Blt	Cond. Cd	% Gd	Grade	Grade Adj.	Appr. Value

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Floor Area	Eff Area	Unit Cost	Undeprec Value
	Ttl Gross Liv / Lease Area	0	0	0		0



ɔmew Rd, Middletown CT Light & Power

Map generated 2/24/2023

Map Legend: http://gis.cityofmiddletown.com/middletownct/legend.pdf

<vision link>

N

0 0.03 0.06 0.12 0.18 0.24 mi

1 in = 500 ft

MAP FOR REFERENCE ONLY - NOT A LEGAL DOCUMENT

Because of different update schedules, current property assessments may not reflect recent changes to property boundaries. Check with the Board of Assessors to confirm boundaries uses at the time of assessment.

Mayor & Director of Planning & Zoning copies

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Tracking number 9405503699300601148988

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September 13, 08:00PM

- Tracking number created
  September 11, 12:00AM
- In transit
  September 12, 02:36PM
  Meriden, CT
- Out for delivery
- Delivered

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Founded: July 1, 1971, Washington, D.C.

Headquarters: Washington, D.C.

Agency executives: Louis DeJoy, Postmaster General; Douglas Tulino, Deputy Postmaster General;

Employees: 653,167 (516,636 career personnel, 136,561 non-career personnel) as of 2021

Key document: Postal Clause of the United States Constitution

From: auto-reply@usps.com
Sent: Tuesday, September 12, 2023 2:47 PM
To: Hollis Redding
Subject: USPS® Expected Delivery by Wednesday, September 13, 2023 arriving by 9:00pm 9405503699300601149008

UNITED STATES POSTAL SERVICE®

Hello **HOLLIS M REDDING**,

USPS is now in possession of your item as of 2:36 pm on September 12, 2023 in MERIDEN, CT 06450.

Tracking Number: **9405503699300601149008**

Expected Delivery By

Wed
13
Sept

By 9:00pm