November 12, 2021

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 CT5235
126 Old Colchester Road, Waterford, CT 06375 (the "Property")
Latitude: 41-24-43.78 N Longitude: 72-07-36.96 W

Dear Ms. Bachman:

AT&T currently maintains (6) antennas at the 109' level on the existing 111' laminated wood utility structure pole # 6020 ("Tower") at 126 Old Colchester Road, in Waterford, CT. The Tower is owned by Connecticut Light & Power ("Eversource") and the property is owned by Charles R. Mascarella, Jr. Eversource received CT Siting Council ("Council") approval on November 2, 2021 under Sub-Petition 1293-W-01 to replace the existing Tower with a 115' light duty steel monopole ("Structure'). AT&T intends to modify its facility by removing all its equipment from the existing Tower by relocating the (6) existing antennas and (9) existing TMAs on new mounts to the new Structure. The height of AT&T's relocated antennas is 109' on the new Structure.

This modification includes B2, B5, and B12 hardware that is both 4G (LTE) and 5GNR capable through remote software configuration and either or both services may be turned on or off at various times.

AT&T's original facility received Council approval in Petition 607T on March 11, 2003. The new Eversource Structure approval contained no conditions that could feasibly be violated by AT&T's proposed equipment relocation, including facility height or mounting restrictions. AT&Ts equipment relocation complies with the Council's approval of the new Structure.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies ("R.C.S.A") §16-50j-73 for construction that constitutes an exempt modification pursuant to R.C.S.A §16-50j-72(b)(2). In accordance with to R.C.S.A §16-50j-73, a copy of this letter is being sent to the Hon. Robert J. Brule, First Selectman, Town of Waterford, Ms. Abby Piersall, AICP, Town Planner, Town of Waterford, Mr. Charles R. Muscarella, Jr., the property owner and Eversource, the structure 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 equipment relocation will not result in an increase in the height of the new structure.

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

3. The proposed equipment 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 equipment relocation will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The new structure and foundation can support the proposed loading.

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

Sincerely,

Hollis M. Redding

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

Enclosures

Cc: Hon. Robert J. Brule, First Selectman, chief elected official, Town of Waterford
Ms. Abby Piersall, AICP, Planner Director, Town of Waterford
Charles R. Muscarella, Jr, the property owner
Eversource, the structure owner

Power Density

Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							0%
AT&T	2	565	109	0.0383	880	0.5867	0.65%
AT&T	2	875	109	0.0593	1900	1.0000	0.59%
AT&T	1	283	109	0.0096	880	0.5867	0.16%
AT&T	4	525	109	0.0712	1900	1.0000	0.71%
AT&T	1	1615	109	0.0547	734	0.4893	1.12%
Site Total							3.24%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

Proposed Loading on new Structure
(no equipment changes proposed)

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							0%
AT&T	2	565	109	0.0383	880	0.5867	0.65%
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Site Total							3.24%

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SITE ID: CT5235
SITE NAME: WATERFORD NE
PACE #: MRCTB057465 / FA #: 10071308
EVERSOURCE STRUCT. NO. 6020
126 OLD COLCHESTER ROAD
WATERFORD, CT 06375

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE 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.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH 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.

SITE DIRECTIONS

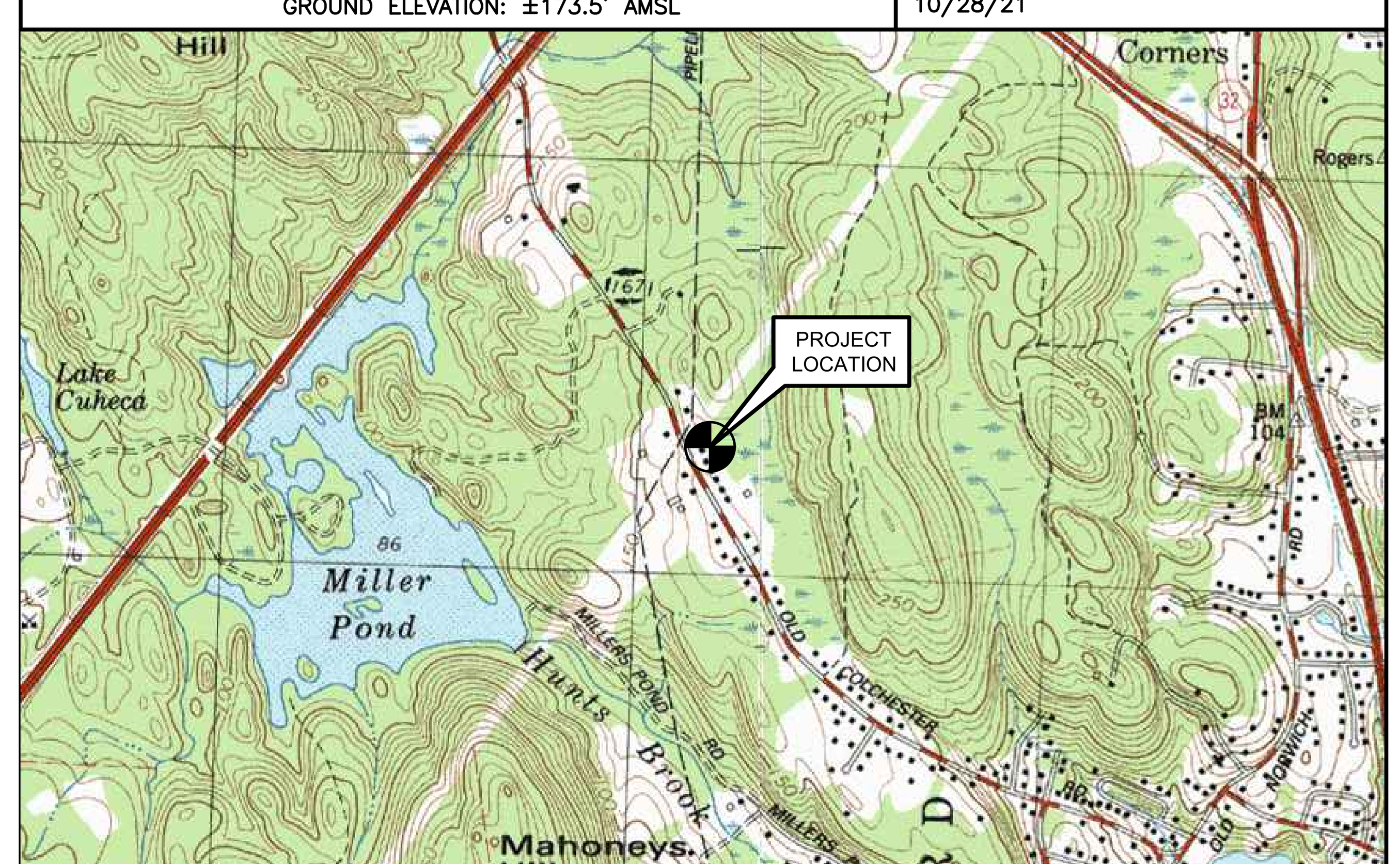
FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

TO: 126 OLD COLCHESTER
WATERFORD, CT 06375

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITOL BLVD	0.40 MI.
2.	TURN LEFT ONTO CAPTIOL BLVD.	0.20 MI.
3.	TURN LEFT ONTO WEST ST..	0.20 MI.
4.	TAKE RAMP ON LEFT FOR I-91N .	4.50 MI.
5.	TAKE RAMP RIGHT FOR CT-3 NORTH TOWARD GLASTONBURY	2.40 MI.
6.	TAKE RAMP RIGHT FOR CT-2 EAST TOWARD NORWICH.	31.90 MI.
7.	KEEP STRAIGHT ONTO CT-2 E/ CT-32 S. AT EXIT 28S	0.60 MI.
8.	TAKE RAMP RIGHT FOR I-395 SOUTH TOWARD NEW HAVEN.	8.30 MI.
9.	BEAR LEFT ONTO MONTVILLE CONNECTOR	1.20 MI.
10.	KEEP STRAIGHT NTO CT-32/ MOHEGAN AVE.	0.70 MI.
11.	TURN RIGHT ONOT HARDWICK RD.	0.10 MI.
12.	TURN LEFT ONTO OLD NORWICH RD	0.40 MI.
13.	TURN RIGHT ONTO OLD COLCHESTER RD. ARRIVE 126 OLD COLCHESTER RD, WATERFORD CT 06375	

SITE COORDINATES: LATITUDE: 41°-24'-43.78"N
LONGITUDE: 72°-7'-36.96"W
GROUND ELEVATION: ±173.5' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM FAA-1A DATED 10/28/21



VICINITY MAP

NORTH

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF THE FOLLOWING MODIFICATIONS TO THE EXISTING UNMANNED TELECOMMUNICATIONS:
   - A. REMOVE ALL REMAINING AT&T EQUIPMENT FROM EXISTING TRANSMISSION TOWER.
   - B. RELOCATE (6) EXISTING AT&T ANTENNAS AND (9) EXISTING AT&T TMAs TO PROPOSED TRANSMISSION TOWER.
   - C. EXISTING TRANSMISSION TOWER TO BE REMOVED (BY OTHERS).
   - D. PROPOSED TRANSMISSION TOWER TO BE INSTALLED (BY OTHERS).
   - E. INSTALL NEW ANTENNA MOUNT ON PROPOSED TRANSMISSION.
   - F. INSTALL AN ICE-BRIDGE TO CONNECT THE EXISTING EQUIPMENT TO THE PROPOSED TRANSMISSION TOWER.
   - G. INSTALL (12) 1-5/8" COAX CABLES.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5235
AT&T SITE NAME:	WATERFORD NE
SITE ADDRESS:	EVERSOURCE STRUCT. NO. 6020 126 OLD COLCHESTER ROAD WATERFORD, CT 06375
AT&T FA LOCATION CODE:	10071308
LESSEE/APPLICANT:	AT&T MOBILITY 84 DEERFIELD LANE, MERIDEN, CT 06450
CONTACT PERSON:	TIM BURKS SAI COMMUNICATIONS (860) 989-0001
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-24'-43.78"N LONGITUDE: 72°-7'-36.96"W GROUND ELEVATION: ±173.5' AMSL

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E-2	TYPICAL ELECTRICAL DETAILS	1
E-3	ELECTRICAL SPECIFICATIONS	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	11/09/21	ANC	TJR	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
0	11/03/21	ASC	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT+T MOBILITY
SITE ID: CT5235
SITE NAME: WATERFORD NE
EVERSOURCE STRUCT. NO. 6020
126 COLCHESTER ROAD
WATERFORD, CT 06375

DATE: 10/28/21
SCALE: AS NOTED
JOB NO. 21136.00

TITLE SHEET

T-1

Sheet No. 1 of 10

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- RISK CATEGORY III (BASED ON IBC TABLE 1604.5)
- NOMINAL/ULTIMATE DESIGN SPEED: 112 MPH (Vasd) (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

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

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18. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

STRUCTURAL STEEL

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

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

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/03/21	ASC	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
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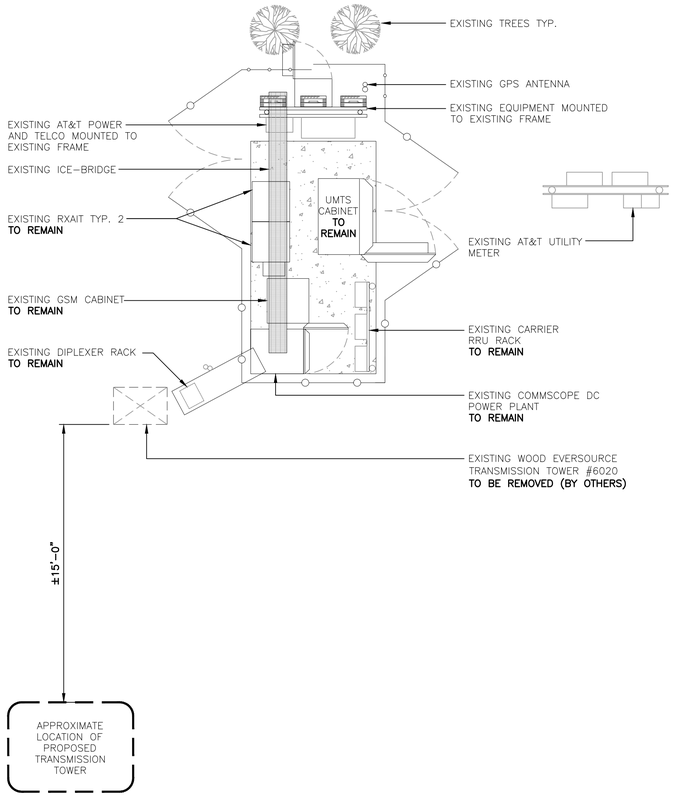
SCALE: AS NOTED
JOB NO. 21136.00

GENERAL NOTES AND SPECIFICATIONS

N-1

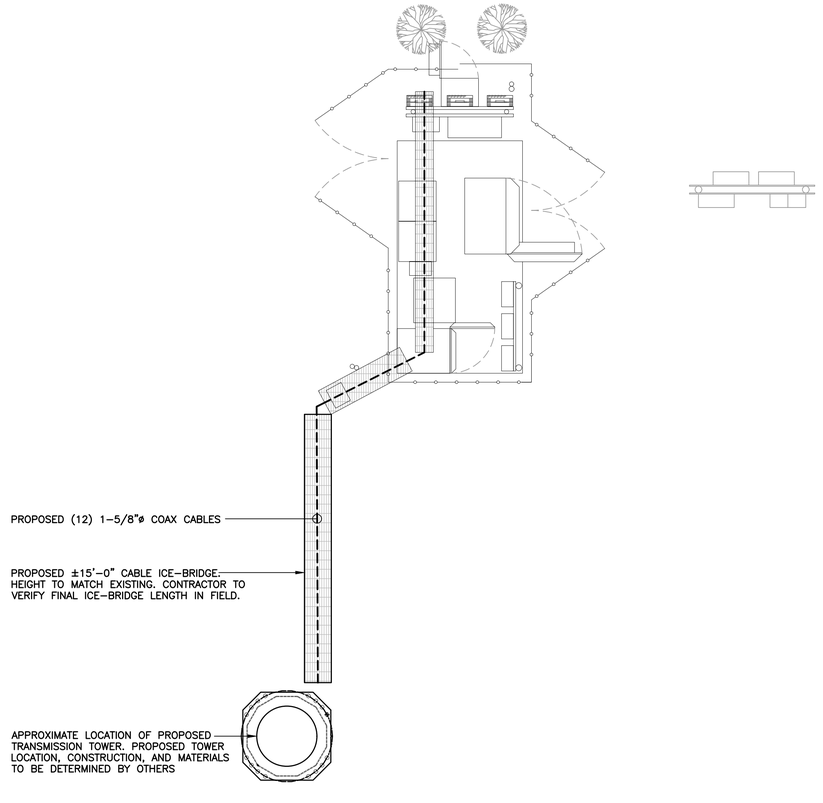
EQUIPMENT GROUNDING NOTE:

ALL (E/P) EQUIPMENT IS TO BE BONDED TO THE EXISTING GROUNDING SYSTEM. IF AN EXISTING GROUNDING SYSTEM IS NOT PRESENT OR IS NOT OPERATIONAL, THE CONTRACTOR IS TO CONTACT THE ENGINEER OF RECORD.



1 C-1 **COMPOUND PLAN - EXISTING**
SCALE: 3/8" = 1'

TRUE NORTH



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

TRUE NORTH

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EXISTING AND PROPOSED COMPOUND PLANS

C-1

Sheet No. 3 of 10

EQUIPMENT GROUNDING NOTE:

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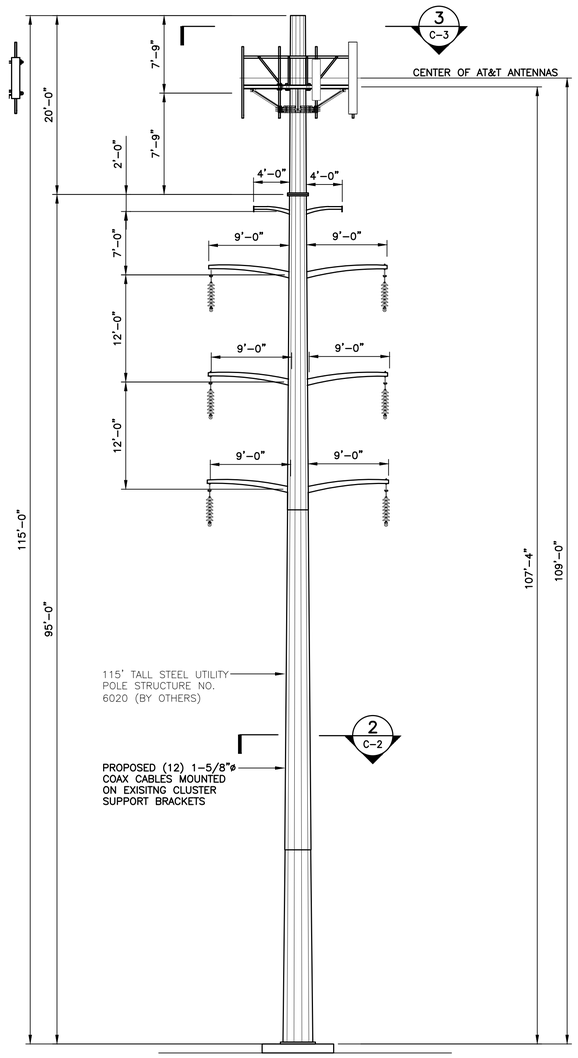
STRUCTURAL COMPLIANCE

TOWER AND TOWER FOUNDATION

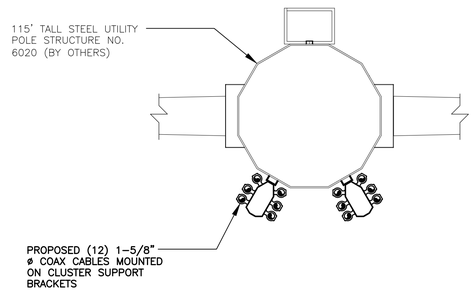
A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21136.00) DATED 11/09/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

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



1 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 3/8" = 1'



2 C-2 **PROPOSED COAX CABLE ROUTING PLAN**
SCALE: NOT TO SCALE

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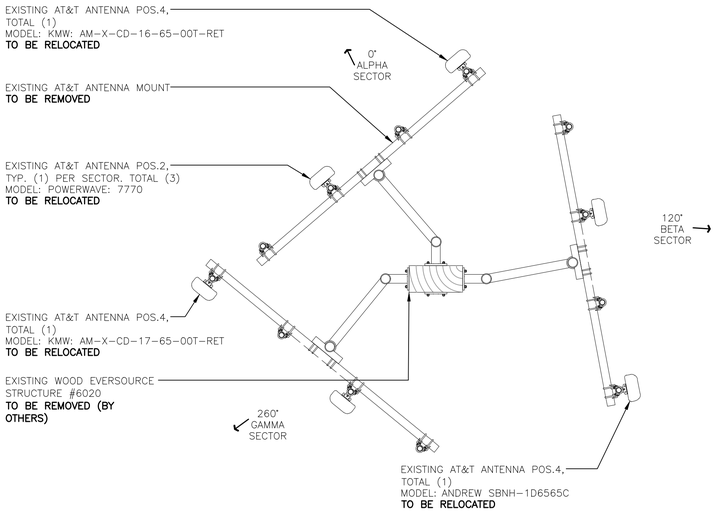
TOWER ELEVATION AND COAX ROUTING PLAN

C-2

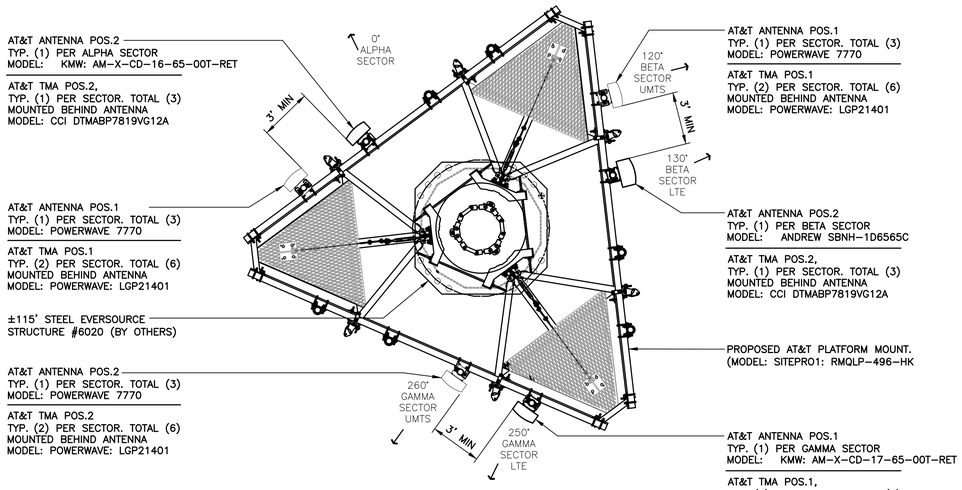
Sheet No. 4 of 10

EQUIPMENT GROUNDING NOTE:

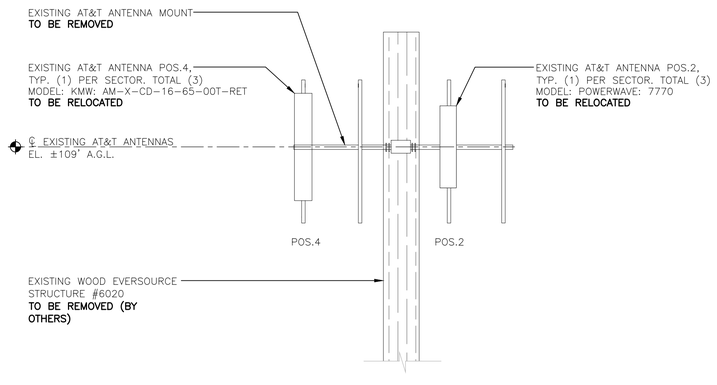
ALL (E/P) EQUIPMENT IS TO BE BONDED TO THE EXISTING GROUNDING SYSTEM. IF AN EXISTING GROUNDING SYSTEM IS NOT PRESENT OR IS NOT OPERATIONAL, THE CONTRACTOR IS TO CONTACT THE ENGINEER OF RECORD.



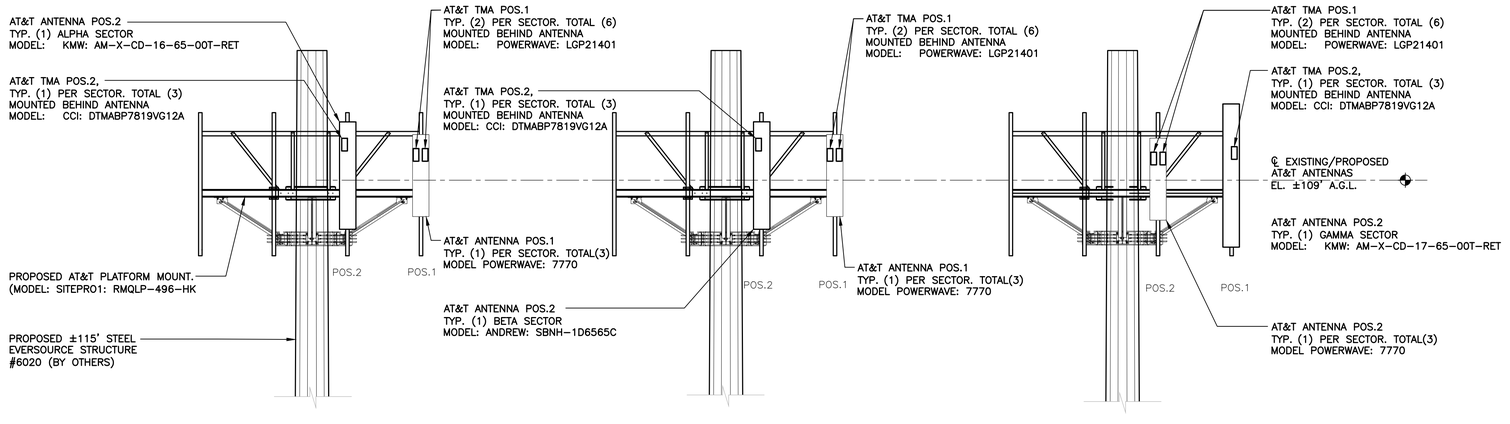
1 / C-3 **ANTENNA PLAN - EXISTING**
SCALE: 3/8" = 1'
TRUE NORTH



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



2 / C-3 **EXISTING ELEVATION - TYPICAL SECTOR**
SCALE: 1/4" = 1'



4 / C-3 **PROPOSED ELEVATION - ALPHA**
SCALE: 1/4" = 1'

5 / C-3 **PROPOSED ELEVATION - BETA**
SCALE: 1/4" = 1'

6 / C-3 **PROPOSED ELEVATION - GAMMA**
SCALE: 1/4" = 1'

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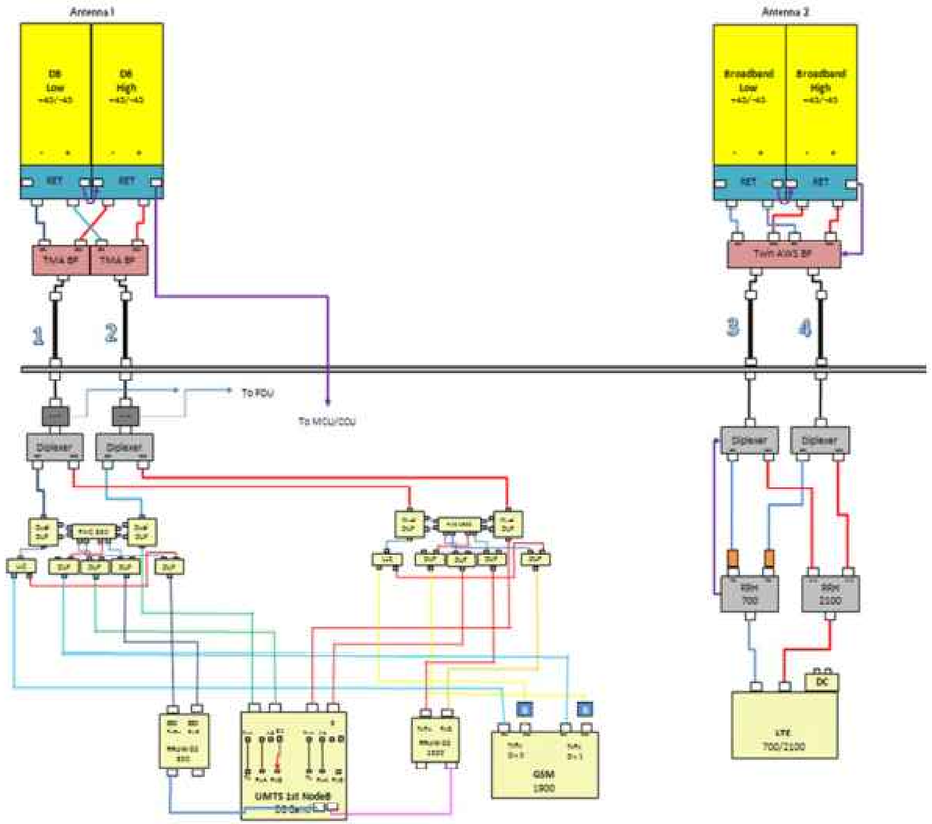
ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 10

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	TMA/DIPLEXER/PENTAPLEXER (QTY)	(E/P) RRU, AT GROUND LEVEL (QTY)	FEEDER/LENGTH (QTY)	(E/P) SURGE ARRESTOR (QTY)
A1	EXISTING	POWERWAVE 7770	55 x 11 x 5	109'	0°	TMA: LGP21401 (2)		1-5⁄8"ø COAX (4)	(E) APTDC-BDFDM-DBW (1)
A2	EXISTING	KMW AM-X-CD-16-65-00T	72 x 11.8 x 5.9	109'	0°	TMA: DTMABP7819VG12A (1)	(E) RRUS-11 (1)		
B1	EXISTING	POWERWAVE 7770	55 x 11 x 5	109'	120°	TMA: LGP21401 (2)		1-5⁄8"ø COAX (4)	(E) APTDC-BDFDM-DBW (1)
B2	EXISTING	ANDREW SBNH-1D6565C	96.4 x 11.9 x 7.1	109'	130°	TMA: DTMABP7819VG12A (1)	(E) RRUS-11 (1)		
C1	EXISTING	KMW AM-X-CD-17-65-00T	96 x 11.8 x 6	109'	250°	TMA: DTMABP7819VG12A (1)	(E) RRUS-11 (1)	1-5⁄8"ø COAX (4)	(E) APTDC-BDFDM-DBW (1)
C2	EXISTING	POWERWAVE 7770	55 x 11 x 5	109'	260°	TMA: LGP21401 (2)			



ALPHA AND BETA SECTOR ONLY

1 / C-4 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE

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ANTENNA SCHEDULE AND PLUMBING

C-4

Sheet No. 6 of 10

AM-X-CD-17-65-00T-RET | AM-X-CD-16-65-00T-RET | SBNH-1D6565C | 7770

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: KMW MODEL: AM-X-CD-16-65-00T-RET	72"L x 11.8"W x 5.9"D	±65 LBS.
MAKE: ANDREW MODEL: SBNH-1D6565C	96.4"L x 11.4"W x 7.1"D	±60 LBS.
MAKE: KMW MODEL: AM-X-CD-17-65-00T-RET	96"L x 11.8"W x 6"D	±65 LBS.
MAKE: POWERWAVE MODEL: 7770	55"L x 11"W x 5"D	±39 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

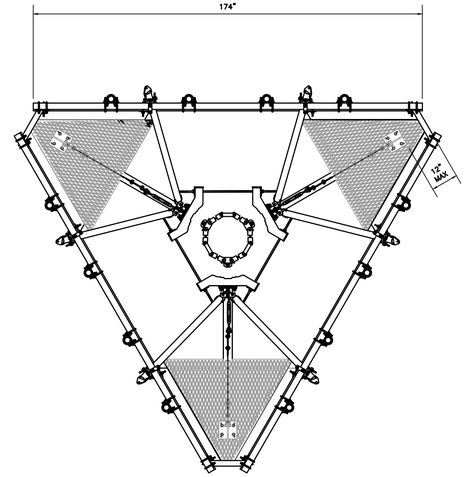
1 / C-5 ANTENNA DETAIL
SCALE: NOT TO SCALE

LGP21401

DTMABP7819VG12A

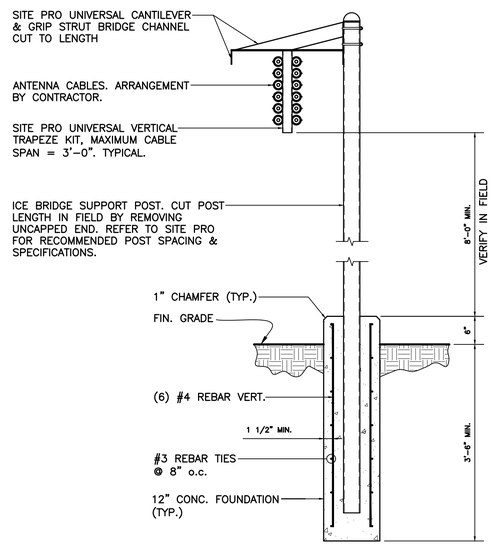
TMA		
EQUIPMENT	DIMENSIONS	WEIGHT
MODEL: LGP21401	7"L x 14"W x 4"D	±20 LBS.
MODEL: DTMABP7819VG12A	14.2"L x 11.4"W x 4.1"D	±19 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 / C-5 TMA DETAILS
SCALE: NOT TO SCALE



SITEPRO1:
RMQLP-496-HK

3 / C-5 PLATFORM ANTENNA MOUNT DETAIL
SCALE: NOT TO SCALE



4 / C-5 TYPICAL ICE-BRIDGE DETAIL
SCALE: NOT TO SCALE

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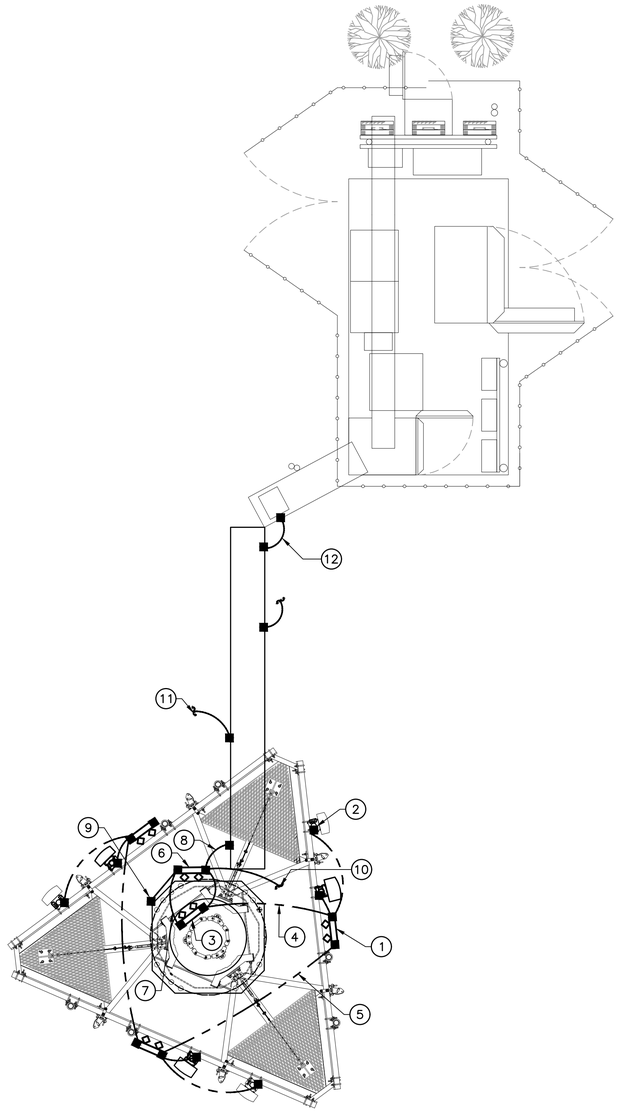
TYPICAL EQUIPMENT DETAILS

C-5

Sheet No. 7 of 10



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

GROUNDING PLAN NOTES

1. SECTOR GROUND BAR.
2. BOND ANTENNA MOUNTING PIPES TO SECTOR GROUND BAR. (TYPICAL)
3. UPPER TOWER MOUNTED GROUND BAR
4. BOND SECTOR GROUND BAR TO UPPER TOWER MOUNTED GROUND BAR
5. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
6. LOWER TOWER MOUNTED GROUND BAR
7. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2 GROUND LEADS)
8. BOND LOWER MOBUNTED GROUND BAR TO ICE BRIDGE.
9. BOND LOWER TOWER MOUNTED GROUND BAR TO TOWER STEEL.
10. BOND LOWER TOWER MOUNTED GROUND BAR TO TOWER GROUND RING (BY OTHERS). TYP. OF 2.
11. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO COMPOUND GROUND RING TYP.
12. BOND NEW ICE-BRIDGE SECTION TO EXISTING ICE-BRIDGE SECTION.

GENERAL GROUNDING NOTES

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

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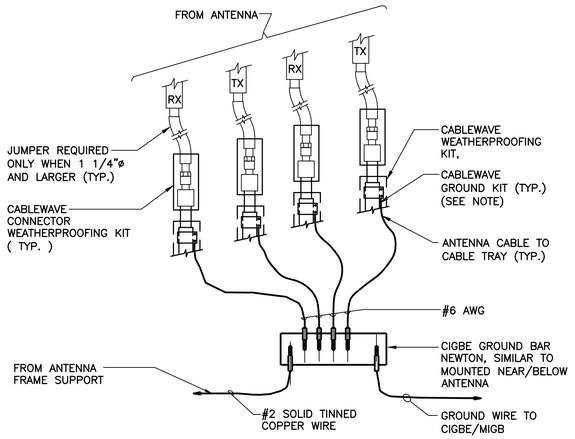
ELECTRICAL GROUNDING PLAN

E-1

Sheet No. 8 of 10

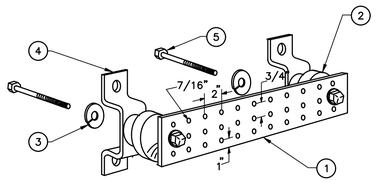


NOTES:

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

1 E-2 CONNECTION OF GROUND WIRES TO GROUND BAR

SCALE: NOT TO SCALE

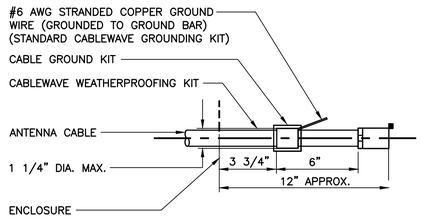


NOTES

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-2 GROUND BAR DETAIL

SCALE: NOT TO SCALE

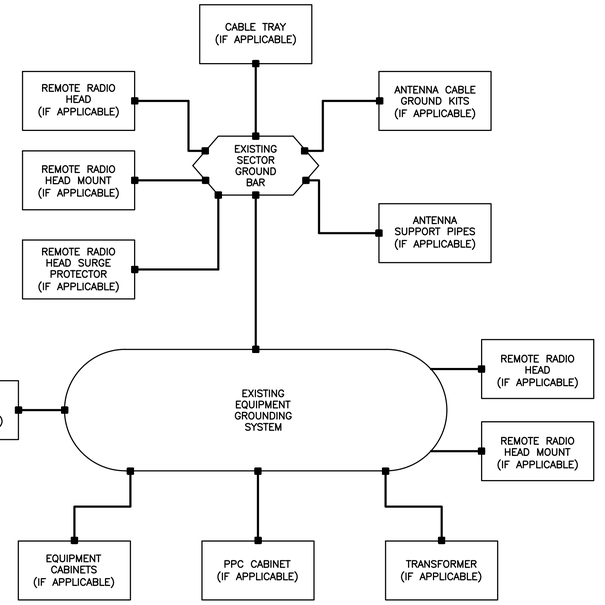


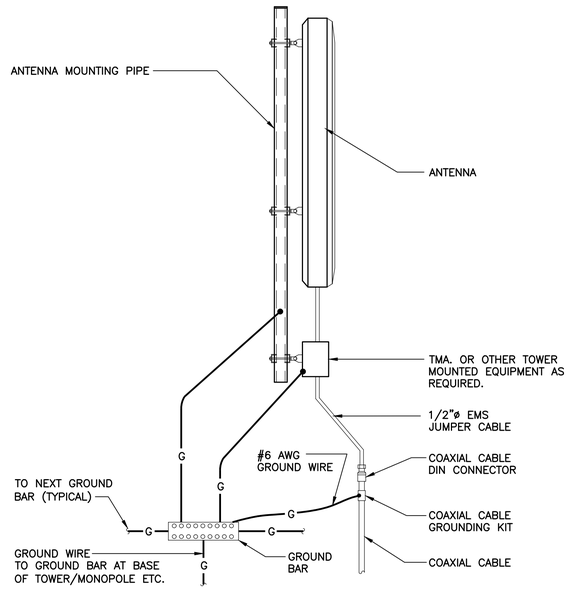
NOTES:

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

3 E-2 ANTENNA CABLE GROUNDING DETAIL

SCALE: NOT TO SCALE

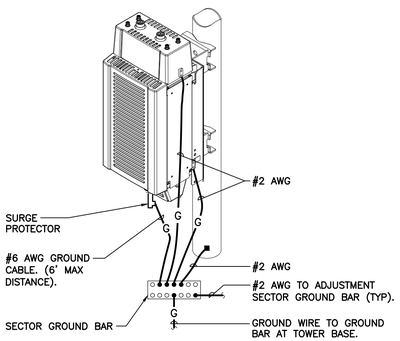




4 E-2 TYPICAL ANTENNA GROUNDING DETAIL

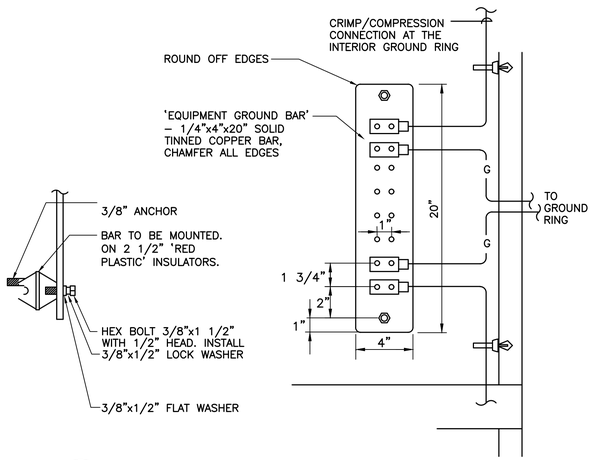
SCALE: NOT TO SCALE

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



5 E-2 RRH POLE MOUNT GROUNDING

SCALE: NOT TO SCALE



6 E-2 EQUIPMENT GROUND BAR DETAIL

SCALE: NOT TO SCALE

GROUNDING SCHEMATIC NOTES

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 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. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
7. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
8. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
9. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

7 E-2 ELECTRICAL SCHEMATIC DIAGRAM

SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-2

Sheet No. 9 of 10

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	11/03/21	ASC	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
A	11/09/21	ANC	TJR	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS

PROFESSIONAL ENGINEER SEAL

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AT+T MOBILITY
SITE ID: CT5235
SITE NAME: WATERFORD NE
EVERSOURCE STRUCT. NO. 6020
126 COLCHESTER ROAD
WATERFORD, CT 06375

DATE: 10/28/21
SCALE: AS NOTED
JOB NO. 21136.00

ELECTRICAL SPECIFICATIONS

E-3

Sheet No. 10 of 10

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Utility Pole

AT&T Site Ref: CT5235

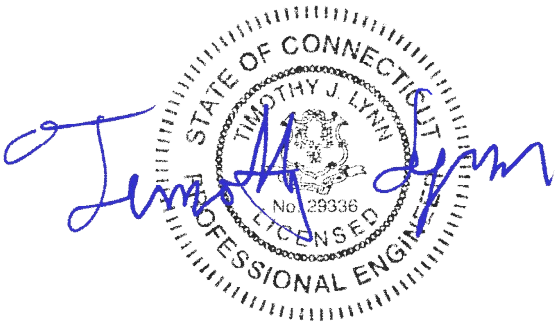
Eversource Structure No. 6020
115' Electric Transmission Pole

126 Old Colchester Road
Waterford, CT

CENTEK Project No. 21136.00

~~Date: October 26, 2021~~
Rev 1: November 9, 2021

Max Stress Ratio = 86%



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 115' utility pole located in Waterford, CT for the proposed antenna and equipment installation by AT&T.

The proposed loads consist of the following:

- **AT&T (Proposed):**
  Antennas: Three (3) Powerwave 7770 panel antennas, one (1) KMW AM-X-CD-16-65 panel antenna, one (1) KMW AM-X-CD-17-65 panel antenna, one (1) Commscope SBNH-1D6565C panel antenna, six (6) Powerwave LGP21401 TMAs and three (3) CCI DTMABP7819VG12A TMAs mounted on platform with handrail kit p/n RMQLP-496-HK to the utility pole with a RAD center elevation of 109-ft above grade.
  Coax Cables: Twelve (12) 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. 48-05, "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 TIA-222-G, ASCE 48-05, "Design of Steel Transmission Pole Structures", NESC C2-2017 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 C2-2017 ~ Construction Grade B, and ASCE Manual No. 48-05.

  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..... 120 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 C2-2017, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

R e s u l t s

- 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. 48-05, "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 85.48**%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Section 3	0.00' -53.25' (AGL)	85.48%	**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	60.73%	**PASS**

- FOUNDATION AND ANCHORS

The base of the tower is connected to the foundation by means of (16) 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	33.38 kips	96.59 kips	2531.45 ft-kips
NESC Extreme Wind	64.55 kips	47.72 kips	4652.01 ft-kips
NESC Extreme Ice w/ Wind	23.76 kips	91.16 kips	1816.50 ft-kips

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

FLANGE BOLTS AND ANCHOR BOLTS:

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

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Flange Bolts	Tension	38.5%	**PASS**
Flange Plate	Bending	32.8%	**PASS**
Anchor Bolts	Tension	83.9%	**PASS**

FOUNDATION:

Force	Original Design Loading	Proposed Loading	Result
Moment	5360 ft-kips	4652.01 ft-kips	**PASS**
Shear	69.7 kips	64.55 kips	**PASS**

Note 1: Taken from Eversource drawing 01048-60003p001 dated 7/14/21.

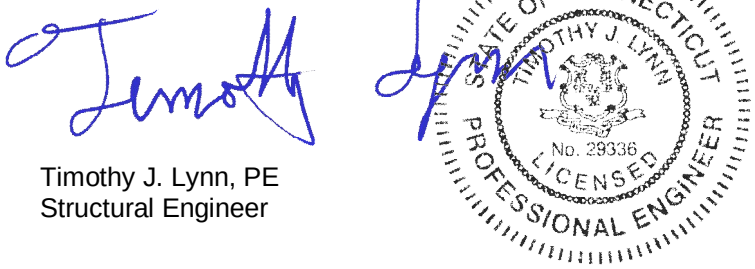
C o n c l u s i o n

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

P C S M a s t

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

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

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

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

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

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

Attachment A
Eversource Design Criteria

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

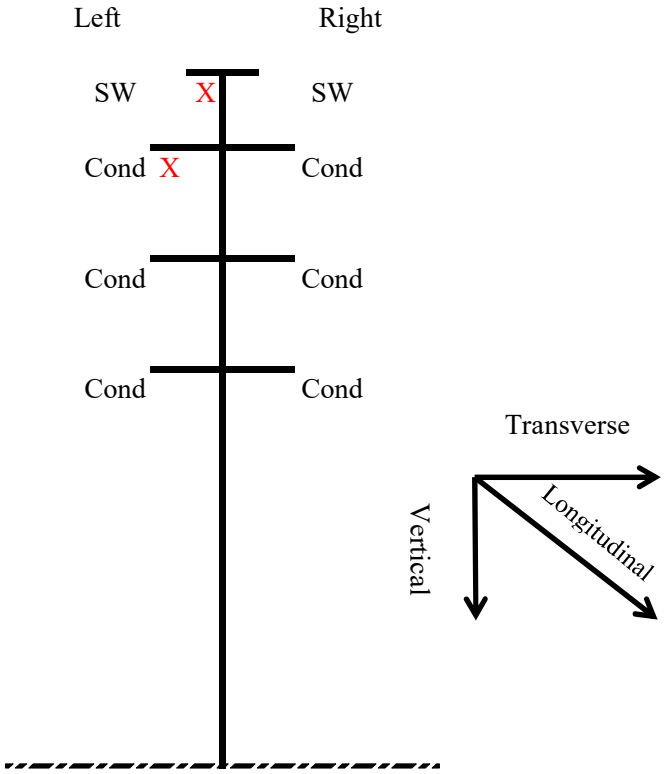
Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

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

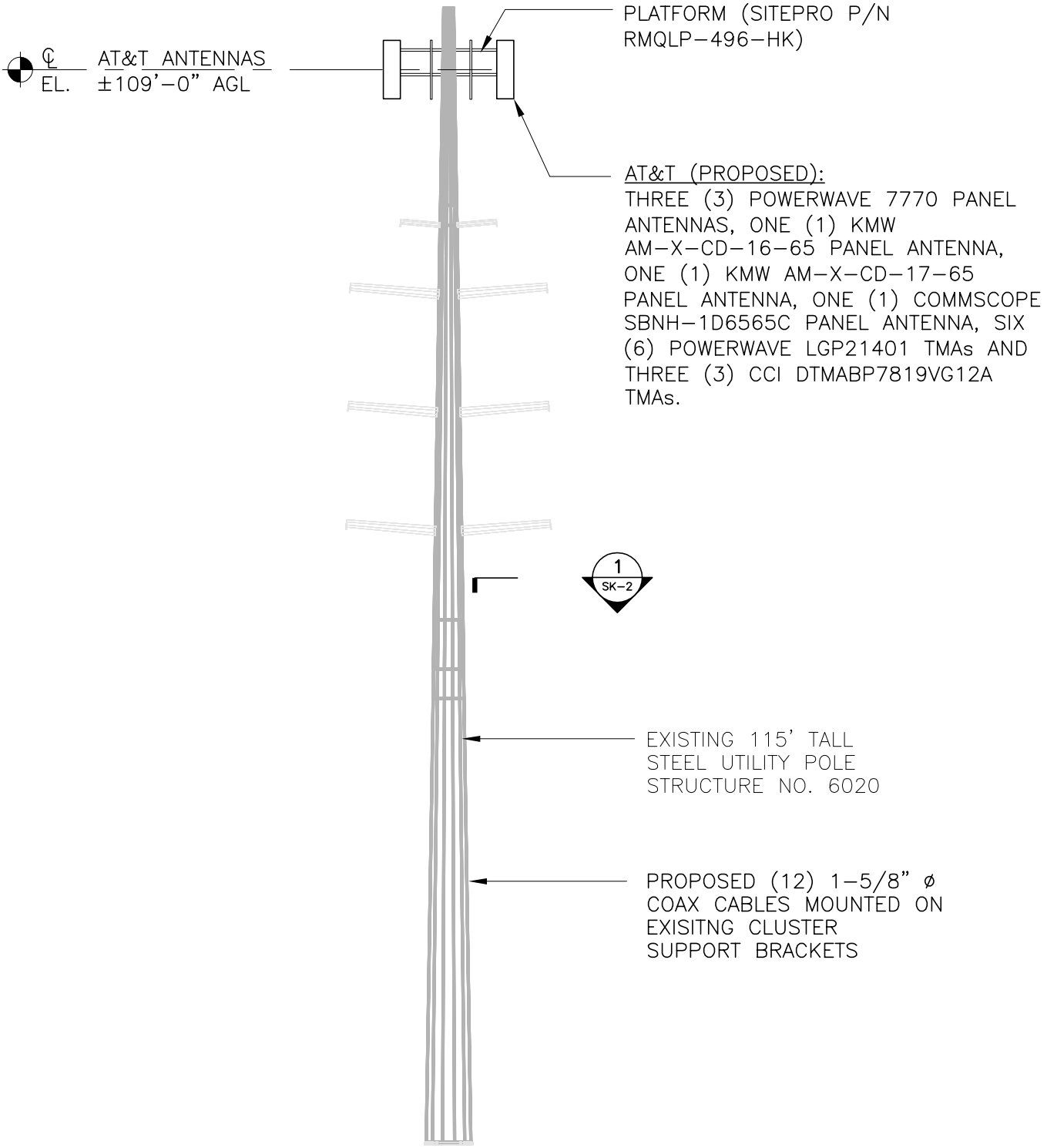
Wire Loads
Load Tree

Project Number
(Cohanzie JCT - Montvi
Structure Number
#6020
Line Number
1500/1605



Double Circuit Steel Pole Configuration
X Denotes Broken Wire Location. This attachment receives case 7 loads. All others receive Case 1 Loads for Case 7

	Left Circuit				Right Circuit			
Conductor	Case	Vertical	Transverse	Longitudinal	Case	Vertical	Transverse	Longitudinal
	1	8055.1275	3533.4191	0	1	8055.1275	3533.4191	0
	2	3462.1	6209.1942	0	2	3462.1	6219.6614	0
	3	3462.1	722.2362	0	3	3462.1	722.2362	0
	4	8211.07	2530.0656	0	4	8211.07	2530.0656	0
	5	5370.085	2081.5931	0	5	5370.085	2081.5931	0
	6	3462.1	722.2362	0	6	3462.1	722.2362	0
	7a	5270.085	1766.7096	12540	7a	5270.085	1766.7096	12540
	7b	5270.085	1766.7096	12540	7b	5270.085	1766.7096	12540
Shield Wire	Case	Vertical	Transverse	Longitudinal	Case	Vertical	Transverse	Longitudinal
	1	2422.3455	1890.7651	0	1	2422.3455	1890.7651	0
	2	673.5	2029.4252	0	2	673.5	2029.4252	0
	3	673.5	251.21259	0	3	673.5	251.21259	0
	4	3489.294	1495.7664	0	4	3489.294	1495.7664	0
	5	1614.897	1078.6955	0	5	1614.897	1078.6955	0
	6	673.5	251.21259	0	6	673.5	251.21259	0
	7a	1614.897	945.38254	6050	7a	1614.897	945.38254	6050
	7b	1614.897	945.38254	6050	7b	1614.897	945.38254	6050



1
SK-1

TOWER + MAST ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	10/26/21	ISSUED FOR REVIEW
01	11/9/21	CONSTRUCTION

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CT5235
STRUCTURE 6020

126 OLD COLCHESTER ROAD
WATERFORD, CT

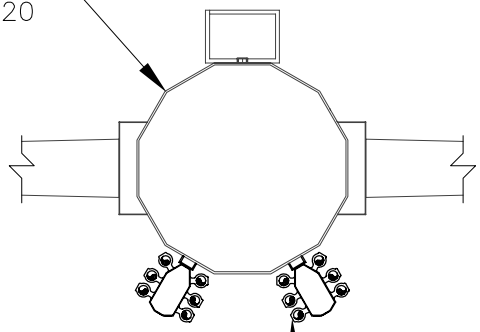
PROJECT NO:	21136.00
DRAWN BY:	TJL
CHECKED BY:	CAG
SCALE:	AS NOTED
DATE:	10/26/21

TOWER AND MAST ELEVATION

SK-1

DWG. 1 OF 2

EXISTING 115' TALL
STEEL UTILITY POLE
STRUCTURE NO. 6020



PROPOSED (12) 1–5/8"
ø COAX CABLES MOUNTED
ON EXISITNG CLUSTER
SUPPORT BRACKETS

1 / SK–2 COAX CABLE PLAN

SCALE: NOT TO SCALE

REVISIONS		
00	10/26/21	ISSUED FOR REVIEW
01	11/9/21	CONSTRUCTION

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CT5235
STRUCTURE 6020

126 OLD COLCHESTER ROAD
WATERFORD, CT

PROJECT NO:	21136.00
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	10/26/21

FEEDLINE PLAN

SK-2

DWG. 2 OF 2

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Subject: Loads - Structure #6020

Location: Waterford, CT

Rev. 1: 11/9/21

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21136.00

Basic Components

Heavy Wind Pressure =	p := 4.00	psf	(User Input NESC 2017 Figure 250-1 & Table 250-1)
Basic Windspeed =	V := 120	mph	(User Input NESC 2017 Figure 250-2(e))
Radial Ice Thickness =	Ir := 0.50	in	(User Input)
Radial Ice Density =	Id := 56.0	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	TME := 115	ft	(User Input)
Multiplier Gust Response Factor =	m := 1.00		(User Input - Only for NESC Extreme wind case)
NESC Factor =	kv := 1.43		(User Input from NESC 2017 Table 250-3 equation)
Importance Factor =	I := 1.0		(User Input from NESC 2017 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.303$ (NESC 2017 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.307$ (NESC 2017 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.836$ (NESC 2017 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.859$ (NESC 2017 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 41.3$ psf (NESC 2017 Section 250.C.2)

NESC Extreme Ice w/ Wind Components

Heavy Wind Pressure =	$p_{ex} := 6.4$	psf	(User Input NESC 2017 Figure 250-3 & Table 250-4)
Radial Ice Thickness =	$Ir_{ex} := 0.75$	in	(User Input NESC 2017 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 Open Lattice =	$Cd_{OL} := 3.2$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

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Subject: Loads - Structure #6020

Location: Waterford, CT

Rev. 1: 11/9/21

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21136.00

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Powerwave 7770		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55$	in	(User Input)
Antenna Width =	$W_{ant} := 11$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 35$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 105$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3025$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1007$ cu in

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

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 98$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 1566$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 51$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant1} := W_{ICE.exant} \cdot N_{ant} = 152$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 4.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 14$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 90$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 12.6$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 832$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 4.9$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 14.7$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant1} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 151$ lbs

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Subject: Loads - Structure #6020

Location: Waterford, CT

Rev. 1: 11/9/21

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21136.00

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	KMW AM-X-CD-16-65-00T		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 55$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 55$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1435$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 46$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 46$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 2221$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 72$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant2} := W_{ICE.exant} \cdot N_{ant} = 72$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 42$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 5.9$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 390$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 6.8$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 6.8$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant2} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 70$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	KMW AM-X-CD-17-65-00T		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 96$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 65$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 65$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6797$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1894$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 61$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 61$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 2929$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 95$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant3} := W_{ICE.exant} \cdot N_{ant} = 95$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 8.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 55$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 7.9$ sf

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 520$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 9$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 9$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant3} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 92$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope SBNH-1D6565C		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 96.4$	in	(User Input)
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 52$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant4} := WT_{ant} \cdot N_{ant} = 52$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8145$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 2032$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 66$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant4} := W_{ICEant} \cdot N_{ant} = 66$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 3137$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 102$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant4} := W_{ICE.exant} \cdot N_{ant} = 102$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 8.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.7$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant4} := p \cdot Cd_F \cdot A_{ICEant} = 56$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 8$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 8$ sf

Total Antenna Wind Force = $F_{ant4} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 526$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 9.1$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 9.1$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant4} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 93$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Powerwave LGP21401 TMA		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 14.4$	in	(User Input)
Antenna Width =	$W_{ant} := 9.2$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 15$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant5} := WT_{ant} \cdot N_{ant} = 90$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 344$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 221$ cu in

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

Weight of Ice on All Antennas = $Wt_{ice.ant5} := W_{ICEant} \cdot N_{ant} = 43$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := \left(L_{ant} + 2 \cdot Ir_{ex}\right)\left(W_{ant} + 2 \cdot Ir_{ex}\right)\left(T_{ant} + 2 \cdot Ir_{ex}\right) - V_{ant} = 353$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 11$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant5} := W_{ICE.exant} \cdot N_{ant} = 69$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 1.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant5} := p \cdot Cd_F \cdot A_{ICEant} = 42$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 5.5$ sf

Total Antenna Wind Force = $F_{ant5} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 365$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{\left(L_{ant} + 2 \cdot Ir_{ex}\right) \cdot \left(W_{ant} + 2 \cdot Ir_{ex}\right)}{144} = 1.2$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 7.1$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant5} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 73$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI DTMABP7819VG12ATMA		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 14.25$	in	(User Input)
Antenna Width =	$W_{ant} := 11.46$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.17$	in	(User Input)
Antenna Weight =	$WT_{ant} := 20$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant6} := WT_{ant} \cdot N_{ant} = 60$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 681$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 301$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant6} := W_{ICEant} \cdot N_{ant} = 29$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := \left(L_{ant} + 2 \cdot Ir_{ex}\right)\left(W_{ant} + 2 \cdot Ir_{ex}\right)\left(T_{ant} + 2 \cdot Ir_{ex}\right) - V_{ant} = 476$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 15$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant6} := W_{ICE.exant} \cdot N_{ant} = 46$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 1.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant6} := p \cdot Cd_F \cdot A_{ICEant} = 25$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 3.4$ sf

Total Antenna Wind Force = $F_{ant6} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 225$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{\left(L_{ant} + 2 \cdot Ir_{ex}\right) \cdot \left(W_{ant} + 2 \cdot Ir_{ex}\right)}{144} = 1.4$ sf

Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 4.3$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant6} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 44$ lbs

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	RMQLP-496-HK		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 42$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 50$	sf	(User Input)
Mount Projected Surface Area w/ Extreme Ice =	$CdAa_{ice.ex} := 56$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 2700$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 3100$	lbs	(User Input)
Mount Weight w/ Extreme Ice =	$WT_{mnt.ice.ex} := 3750$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 2700$ lbs

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 400$ lbs

Gravity Load (extreme ice only)

Weight of Ice on All Mounts = $Wt_{ice.ex.mnt1} := \left(WT_{mnt.ice.ex} - WT_{mnt}\right) = 1.05 \times 10^{3}$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 200$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 1734$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Total Mount Wind Force w/ Extreme Ice = $Fi_{ex.mnt1} := p_{ex} \cdot CdAa_{ice.ex} = 358$ lbs

Total Equipment Loads:

NESC Heavy Wind Vertical =

$$Wt_{250B} := \left(Wt_{ant1} + Wt_{ice.ant1} + Wt_{ant2} + Wt_{ice.ant2} + Wt_{ant3} + Wt_{ice.ant3} + Wt_{ant4} + Wt_{ice.ant4} + Wt_{ant5} + Wt_{ice.ant5} + Wt_{ant6} + Wt_{ice.ant6} + Wt_{}\right.$$

$$Wt_{250B} = 5806$$

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant1} + Fi_{ant2} + Fi_{ant3} + Fi_{ant4} + Fi_{ant5} + Fi_{ant6} + Fi_{mnt1}\right) \cdot 2.5 = 1273$

NESC Extreme Wind Vertical = $\left(Wt_{ant1} + Wt_{ant2} + Wt_{ant3} + Wt_{ant4} + Wt_{ant5} + Wt_{ant6} + Wt_{mnt1}\right) = 3127$

NESC Extreme Wind Trasnsverse = $\left(F_{ant1} + F_{ant2} + F_{ant3} + F_{ant4} + F_{ant5} + F_{ant6} + F_{mnt1}\right) = 4591$

NESC Extreme Ice w/ Wind Vertical =

$$Wt_{250D} := Wt_{ant1} + Wt_{ice.ex.ant1} + Wt_{ant2} + Wt_{ice.ex.ant2} + Wt_{ant3} + Wt_{ice.ex.ant3} + Wt_{ant4} + Wt_{ice.ex.ant4} + Wt_{ant5} + Wt_{ice.ex.ant5} + Wt_{ant6} + Wt$$

$$Wt_{250D} = 4713$$

NESC Extreme Ice w/ Wind Trasnsverse = $\left(Fi_{ex.ant1} + Fi_{ex.ant2} + Fi_{ex.ant3} + Fi_{ex.ant4} + Fi_{ex.ant5} + Fi_{ex.ant6} + Fi_{ex.mnt1}\right) = 880$

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Subject:	Coax Cable on Pole #6020
Location:	Waterford, CT
Rev. 1: 11/9/21	Prepared by: T.J.L Checked by: C.F.C. Job No. 21136.00

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 = $V := 120$ mph (User Input NESC 2017 Figure 250-2(e))

Height to Top of Coax Above Grade = $TC := 115$ ft (User Input)

NESC Factor = $kv := 1.43$ (User Input from NESC 2017 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2017 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.198$ (NESC 2017 Table 250-2)

Exposure Factor = $Es := 0.346\left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.307$ (NESC 2017 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.836$ (NESC 2017 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.859$ (NESC 2017 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 37.9$ psf (NESC 2017 Section 250.C.2)

Diameter of Coax Cable =	$D_{coax} := 1.98 \cdot in$	*(User Input)*
Weight of Coax Cable =	$W_{coax} := 1.04 \cdot plf$	*(User Input)*
Number of Coax Cables =	$N_{coax} := 12$	*(User Input)*
Number of Projected Coax Cables =	$NP_{coax} := 6$	*(User Input)*

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

Subject:	Coax Cable on Pole #6020
Location:	Waterford, CT
Rev. 1: 11/9/21	Prepared by: T.J.L Checked by: C.F.C. Job No. 21136.00

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 = $A := \left(NP_{coax} \cdot D_{coax}\right) = 11.88 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 12.88 \cdot in$

Wind Area with Extreme Ice = $A_{ice.ex} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir_{ex}\right) = 13.38 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 18.179 \cdot plf$

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

Weight of Extreme Ice on All Coax Cables = $W_{ice.ex} := Ai_{coax.ex} \cdot Id \cdot N_{coax} = 30.018 \cdot plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$Heavy\_WInd_{Vert} = 460\,lb$ $Heavy\_Wind_{Trans} = 172\,lb$

Extreme Wind Vertical Load =

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

Extreme Wind Transverse Load =

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

$Extreme\_Wind_{Vert} = 125\,lb$ $Extreme\_Wind_{Trans} = 601\,lb$

Extreme Ice w/ Wind Vertical Load =

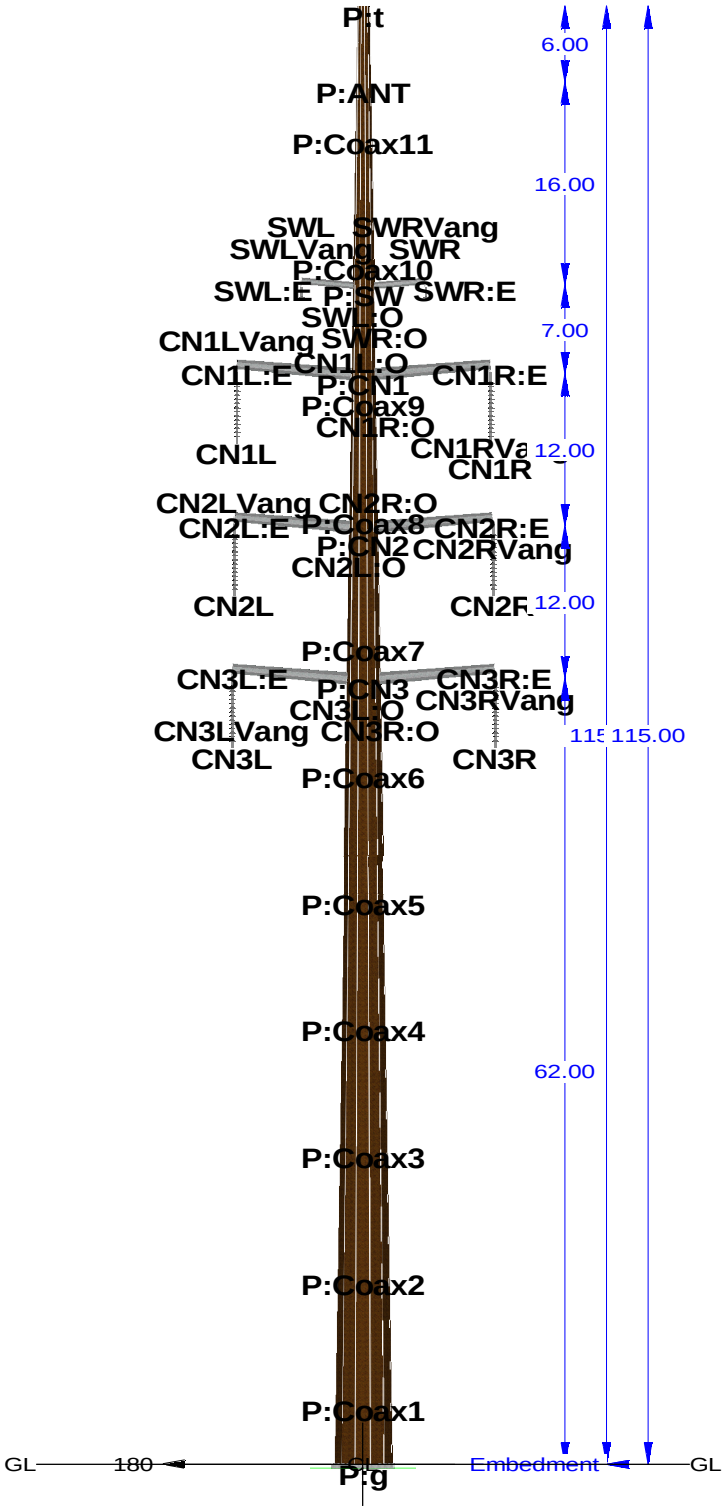
$$Extreme\_Ice_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice.ex}\right) \cdot Coax_{Span} \cdot OF_{EIV}\right]}$$

Extreme Ice w/ Wind Transverse Load =

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

$Extreme\_Ice_{Vert} = 425\,lb$ $Extreme\_Ice_{Trans} = 114\,lb$

Centek Engineering Inc, Project: "Str#6020_115FT_R1"
PLS-POLE Version 16.81, 3:09:06 PM Tuesday, October 26, 2021
Undeformed geometry displayed



Z
X Y

10 (ft)

Project Name :
Project Notes:
Project File : J:\Jobs\2113600.WI\05_Structural\Tower Analysis\Backup Documentation\Rev (1)\Calcs\PLS-Pole\Str#6020_115FT_R1.pol
Date run : 3:54:50 PM Tuesday, November 09, 2021
by : PLS-POLE Version 16.81
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: J:\Jobs\2113600.WI\05_Structural\Tower Analysis\Backup Documentation\Rev (1)\Calcs\PLS-Pole\Str#6020-R1.lca

*** Analysis Results:

Maximum element usage is 85.48% for Steel Pole "P" in load case "NESC 250C"

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 250B	P:g	-0.17	-33.38	-96.59	33.38	2531.42	-10.39	2531.45	-0.01	0.00
NESC 250C	P:g	-0.07	-64.55	-47.72	64.55	4652.00	-5.89	4652.01	-0.01	0.00
NESC 250D	P:g	-0.09	-23.76	-91.16	23.76	1816.49	-6.49	1816.50	-0.00	0.00

Summary of Tip Deflections For All Load Cases:

Note: positive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC 250B	P:t	0.19	39.65	-0.79	39.66	0.02	-2.74	-0.00
NESC 250C	P:t	0.13	73.10	-2.55	73.15	0.01	-5.25	-0.00
NESC 250D	P:t	0.13	28.56	-0.44	28.56	0.01	-1.97	-0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
P	1	636	NESC 250C	27.95	83.62
P	2	5405	NESC 250C	74.76	1477.41
P	3	11112	NESC 250C	85.48	4652.01

*** 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)
P	85.48	NESC 250C	2.5	29	18988.8

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
SWL	49.75	NESC 250D	93.2	1	49.3
SWR	47.84	NESC 250D	93.2	1	49.3
CN1L	51.27	NESC 250D	86.2	1	254.6
CN1R	51.46	NESC 250D	86.2	1	254.6
CN2L	51.33	NESC 250D	74.2	1	254.6
CN2R	51.50	NESC 250D	74.2	1	254.6
CN3L	51.41	NESC 250D	62.2	1	254.6
CN3R	51.55	NESC 250D	62.2	1	254.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC 250B	50.84	CN3R	Tubular Davit
NESC 250C	85.48	P	Steel Pole
NESC 250D	51.55	CN3R	Tubular Davit

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Height AGL (ft)	Segment Number
NESC 250B	47.97	P	2.5	29
NESC 250C	85.48	P	2.5	29
NESC 250D	34.86	P	2.5	29

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 250B	P	11	35.380	94.755	2531.425	-10.394	17.282	76.427	3	115.136	1.764	34.56
NESC 250C	P	11	35.380	45.882	4652.002	-5.886	30.363	134.278	3	203.266	2.338	60.73
NESC 250D	P	11	35.380	89.323	1816.490	-6.489	12.618	55.802	3	83.930	1.507	25.24

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Height AGL (ft)	Segment Number
NESC 250B	50.84	CN3R	62.2	1
NESC 250C	21.26	CN3R	62.2	1
NESC 250D	51.55	CN3R	62.2	1

Summary of Insulator Usages:

Insulator	Insulator	Maximum	Load Case	Weight

Label	Type	Usage %		(lbs)
ANT1LOAD	Clamp	0.00	NESC 250B	0.0
Coax1	Clamp	0.00	NESC 250B	0.0
Coax2	Clamp	0.00	NESC 250B	0.0
Coax3	Clamp	0.00	NESC 250B	0.0
Coax4	Clamp	0.00	NESC 250B	0.0
Coax5	Clamp	0.00	NESC 250B	0.0
Coax6	Clamp	0.00	NESC 250B	0.0
Coax7	Clamp	0.00	NESC 250B	0.0
Coax8	Clamp	0.00	NESC 250B	0.0
Coax9	Clamp	0.00	NESC 250B	0.0
Coax10	Clamp	0.00	NESC 250B	0.0
Coax11	Clamp	0.00	NESC 250B	0.0
swl	Suspension	0.00	NESC 250B	50.0
swr	Suspension	0.00	NESC 250B	50.0
cn1l	Suspension	0.00	NESC 250B	1000.0
cn1r	Suspension	0.00	NESC 250B	1000.0
cn2l	Suspension	0.00	NESC 250B	1000.0
cn2r	Suspension	0.00	NESC 250B	1000.0
cn3l	Suspension	0.00	NESC 250B	1000.0
cn3r	Suspension	0.00	NESC 250B	1000.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	1626.2
Weight of Steel Poles:	18988.8
Weight of Suspensions:	6100.0
Total:	26715.0

*** End of Report

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**************************************************************************
*                                                                        *
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*                                                                        *
**************************************************************************

Project Name :
Project Notes:
Project File : J:\Jobs\2113600.WI\05_Structural\Tower Analysis\Backup Documentation\Rev (1)\Calcs\PLS-Pole\Str#6020_115FT_R1.pol
Date run     : 3:54:49 PM Tuesday, November 09, 2021
by           : PLS-POLE Version 16.81
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.
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Modeling options:
  Offset Arms from Pole/Mast:   Yes
  Offset Braces from Pole/Mast: Yes
  Offset Guys from Pole/Mast:   Yes
  Offset Posts from Pole/Mast:  Yes
  Offset Strains from Pole/Mast:  Yes
  Use Alternate Convergence Process: No
  Steel poles and tubular arms checked with ASCE/SEI 48-05
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Vang Connectivity:

Vang Label	Attach Label	Tip Label	Azimuth (deg)	Length (ft)	Measured Relative To
SWLvang	SWL:E	SWLVang	0	0.25	Face
SWRvang	SWR:E	SWRVang	0	0.25	Face
CN1Lvang	CN1L:E	CN1LVang	0	0.25	Face

CN1Rvang	CN1R:E	CN1RVang	0	0.25	Face
CN2Lvang	CN2L:E	CN2LVang	0	0.25	Face
CN2Rvang	CN2R:E	CN2RVang	0	0.25	Face
CN3Lvang	CN3L:E	CN3LVang	0	0.25	Face
CN3Rvang	CN3R:E	CN3RVang	0	0.25	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
Str#6020_115FT		115.00	0	Yes	12F	12	54	0	1.6	3 tubes	0	0		Calculated	0.000	0.0000	0.0000	Corten Steel

Steel Tubes Properties:

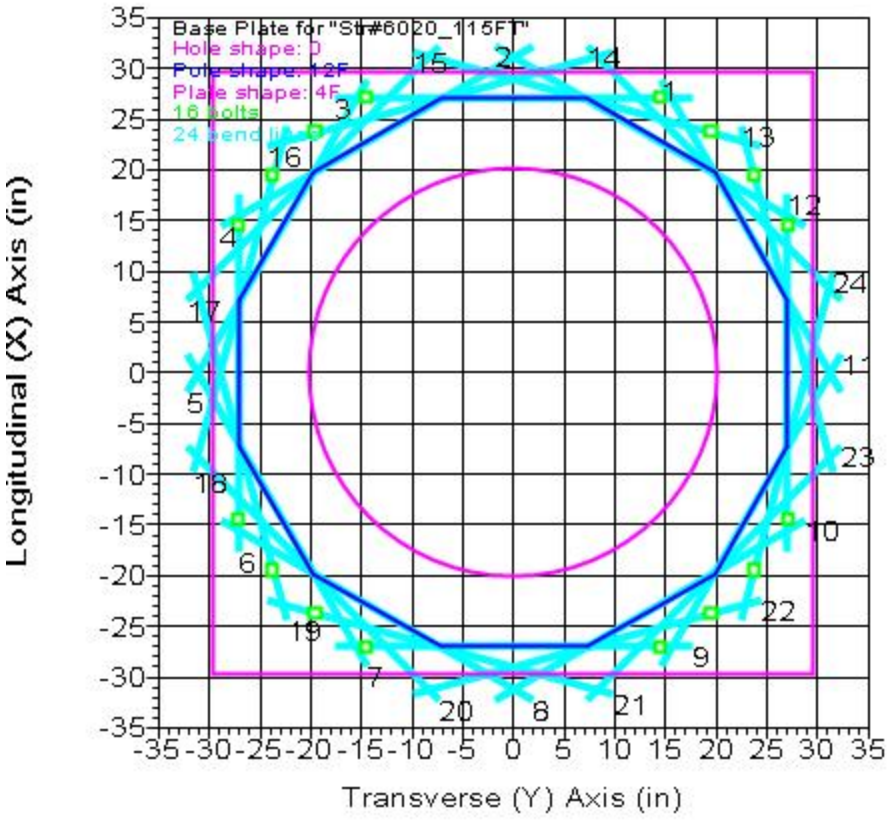
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap or Butt Offset (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
Str#6020_115FT	1	20	0.1875	0.000	0.000	0.000	65.000	0.000	636	10.79	0.36848	12.00	19.37	2.374	0.000
Str#6020_115FT	2	47	0.375	5.000	0.000	0.000	65.000	0.000	5405	25.92	0.36848	19.74	37.06	4.539	5.000
Str#6020_115FT	3	53	0.4375	0.000	0.000	0.000	65.000	0.000	11112	28.47	0.36848	34.47	54.00	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)
Str#6020_115FT	59.250	4F	3.000	1836	35.380	40.500	0	490.00	50.000	2.250	61.500	16	30063.47	30063.47

Base Plate Bolt Coordinates for Property "Str#6020_115FT":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.4715	0.8821	0
0.6341	0.7724	0
0.7724	0.6341	0
0.8821	0.4715	0



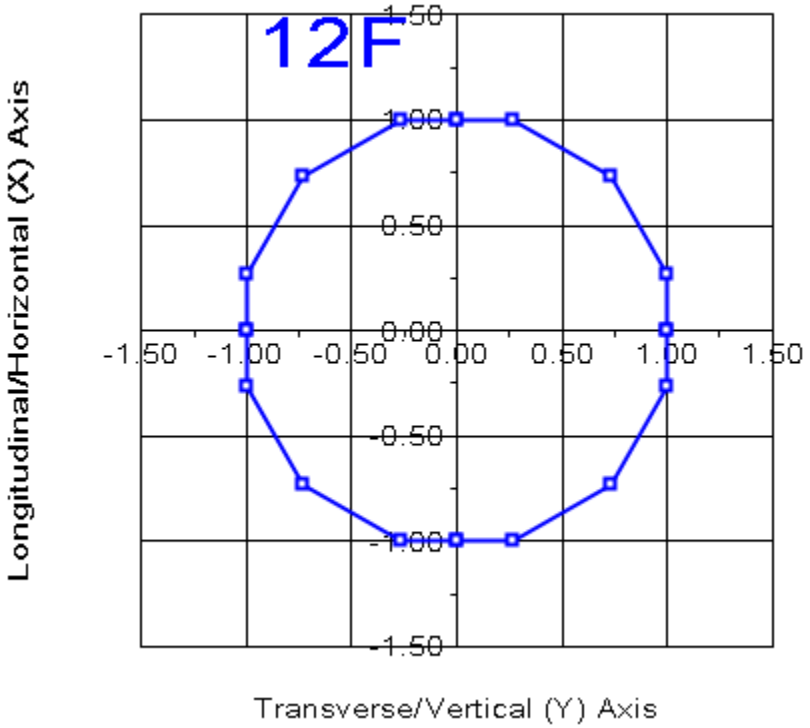
Steel Pole Connectivity:

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)
P			0	0	0	0	0	Str#6020_115FT	16 labels		0.00	0

Relative Attachment Labels for Steel Pole "P":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
P:ANT	6.00	0.00
P:SW	22.00	0.00
P:CN1	29.00	0.00
P:CN2	41.00	0.00
P:CN3	53.00	0.00

P:Coax1	0.00	5.00
P:Coax2	0.00	15.00
P:Coax3	0.00	25.00
P:Coax4	0.00	35.00
P:Coax5	0.00	45.00
P:Coax6	0.00	55.00
P:Coax7	0.00	65.00
P:Coax8	0.00	75.00
P:Coax9	0.00	85.00
P:Coax10	0.00	95.00
P:Coax11	0.00	105.00



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)
P	P:t	P:t Ori	0.00	12.00	7.12	127.22	127.22	0.00	14.5	65.00	65.00	114.85	114.85
P	#P:0	Tube 1 End	3.00	13.11	7.79	166.37	166.37	0.00	16.0	65.00	65.00	137.53	137.53
P	#P:0	Tube 1 Ori	3.00	13.11	7.79	166.37	166.37	0.00	16.0	65.00	65.00	137.53	137.53
P	P:ANT	P:ANT End	6.00	14.21	8.45	212.84	212.84	0.00	17.6	65.00	65.00	162.25	162.25
P	P:ANT	P:ANT Ori	6.00	14.21	8.45	212.84	212.84	0.00	17.6	65.00	65.00	162.25	162.25
P	P:Coax11	P:Coax11 End	10.00	15.68	9.34	287.24	287.24	0.00	19.7	65.00	65.00	198.39	198.39

P	P:Coax11	P:Coax11	Ori	10.00	15.68	9.34	287.24	287.24	0.00	19.7	65.00	65.00	198.39	198.39
P	#P:1	Tube 1	End	15.00	17.53	10.45	402.34	402.34	0.00	22.4	65.00	65.00	248.68	248.68
P	#P:1	Tube 1	Ori	15.00	17.53	10.45	402.34	402.34	0.00	22.4	65.00	65.00	248.68	248.68
P	P:Coax10	P:Coax10	End	20.00	19.37	11.56	544.68	544.68	0.00	25.0	65.00	65.00	304.64	304.64
P	P:Coax10	P:Coax10	Ori	20.00	19.74	23.36	1121.92	1121.92	0.00	11.4	65.00	65.00	615.57	615.57
P	P:SW	P:SW	End	22.00	20.48	24.24	1254.88	1254.88	0.00	12.0	65.00	65.00	663.75	663.75
P	P:SW	P:SW	Ori	22.00	20.48	24.24	1254.88	1254.88	0.00	12.0	65.00	65.00	663.75	663.75
P	#P:2	Tube 2	End	25.50	21.77	25.80	1512.12	1512.12	0.00	12.9	65.00	65.00	752.43	752.43
P	#P:2	Tube 2	Ori	25.50	21.77	25.80	1512.12	1512.12	0.00	12.9	65.00	65.00	752.43	752.43
P	P:CN1	P:CN1	End	29.00	23.06	27.35	1802.30	1802.30	0.00	13.8	65.00	65.00	846.67	846.67
P	P:CN1	P:CN1	Ori	29.00	23.06	27.35	1802.30	1802.30	0.00	13.8	65.00	65.00	846.67	846.67
P	P:Coax9	P:Coax9	End	30.00	23.43	27.80	1891.54	1891.54	0.00	14.1	65.00	65.00	874.62	874.62
P	P:Coax9	P:Coax9	Ori	30.00	23.43	27.80	1891.54	1891.54	0.00	14.1	65.00	65.00	874.62	874.62
P	#P:3	Tube 2	End	35.00	25.27	30.02	2382.15	2382.15	0.00	15.4	65.00	65.00	1021.16	1021.16
P	#P:3	Tube 2	Ori	35.00	25.27	30.02	2382.15	2382.15	0.00	15.4	65.00	65.00	1021.16	1021.16
P	P:Coax8	P:Coax8	End	40.00	27.11	32.24	2951.01	2951.01	0.00	16.7	65.00	65.00	1179.06	1179.06
P	P:Coax8	P:Coax8	Ori	40.00	27.11	32.24	2951.01	2951.01	0.00	16.7	65.00	65.00	1179.06	1179.06
P	P:CN2	P:CN2	End	41.00	27.48	32.69	3074.69	3074.69	0.00	17.0	65.00	65.00	1212.00	1212.00
P	P:CN2	P:CN2	Ori	41.00	27.48	32.69	3074.69	3074.69	0.00	17.0	65.00	65.00	1212.00	1212.00
P	#P:4	Tube 2	End	45.50	29.14	34.68	3674.06	3674.06	0.00	18.1	65.00	65.00	1365.86	1365.86
P	#P:4	Tube 2	Ori	45.50	29.14	34.68	3674.06	3674.06	0.00	18.1	65.00	65.00	1365.86	1365.86
P	P:Coax7	P:Coax7	End	50.00	30.80	36.68	4346.66	4346.66	0.00	19.3	65.00	65.00	1528.91	1528.91
P	P:Coax7	P:Coax7	Ori	50.00	30.80	36.68	4346.66	4346.66	0.00	19.3	65.00	65.00	1528.91	1528.91
P	P:CN3	P:CN3	End	53.00	31.90	38.02	4837.84	4837.84	0.00	20.1	65.00	65.00	1642.72	1642.72
P	P:CN3	P:CN3	Ori	53.00	31.90	38.02	4837.84	4837.84	0.00	20.1	65.00	65.00	1642.72	1642.72
P	#P:5	Tube 2	End	56.50	33.19	39.57	5456.05	5456.05	0.00	21.0	65.00	65.00	1780.66	1780.66
P	#P:5	Tube 2	Ori	56.50	33.19	39.57	5456.05	5456.05	0.00	21.0	65.00	65.00	1780.66	1780.66
P	P:Coax6	P:Coax6	End	60.00	34.48	41.13	6124.81	6124.81	0.00	22.0	65.00	65.00	1924.16	1924.16
P	P:Coax6	P:Coax6	Ori	60.00	34.48	41.13	6124.81	6124.81	0.00	22.0	65.00	65.00	1924.16	1924.16
P	#P:6	SpliceT	End	62.00	35.22	42.02	6530.42	6530.42	0.00	22.5	65.00	65.00	2008.65	2008.65
P	#P:6	SpliceT	Ori	62.00	35.22	42.02	6530.42	6530.42	0.00	22.5	65.00	65.00	2008.65	2008.65
P	#P:7	SpliceB	End	67.00	36.31	50.47	8314.79	8314.79	0.00	19.6	65.00	65.00	2480.56	2480.56
P	#P:7	SpliceB	Ori	67.00	36.31	50.47	8314.79	8314.79	0.00	19.6	65.00	65.00	2480.56	2480.56
P	P:Coax5	P:Coax5	End	70.00	37.42	52.02	9107.25	9107.25	0.00	20.2	65.00	65.00	2636.71	2636.71
P	P:Coax5	P:Coax5	Ori	70.00	37.42	52.02	9107.26	9107.26	0.00	20.2	65.00	65.00	2636.71	2636.71
P	#P:8	Tube 3	End	75.00	39.26	54.61	10537.23	10537.23	0.00	21.4	65.00	65.00	2907.56	2907.56
P	#P:8	Tube 3	Ori	75.00	39.26	54.61	10537.23	10537.23	0.00	21.4	65.00	65.00	2907.56	2907.56
P	P:Coax4	P:Coax4	End	80.00	41.10	57.21	12109.57	12109.57	0.00	22.5	65.00	65.00	3191.64	3191.64
P	P:Coax4	P:Coax4	Ori	80.00	41.10	57.21	12109.57	12109.57	0.00	22.5	65.00	65.00	3191.64	3191.64
P	#P:9	Tube 3	End	85.00	42.95	59.80	13831.03	13831.03	0.00	23.6	65.00	65.00	3488.97	3488.97
P	#P:9	Tube 3	Ori	85.00	42.95	59.80	13831.03	13831.03	0.00	23.6	65.00	65.00	3488.97	3488.97
P	P:Coax3	P:Coax3	End	90.00	44.79	62.39	15708.37	15708.37	0.00	24.8	65.00	65.00	3799.53	3799.53
P	P:Coax3	P:Coax3	Ori	90.00	44.79	62.39	15708.37	15708.37	0.00	24.8	65.00	65.00	3799.54	3799.54
P	#P:10	Tube 3	End	95.00	46.63	64.98	17748.34	17748.34	0.00	25.9	65.00	65.00	4123.34	4123.34
P	#P:10	Tube 3	Ori	95.00	46.63	64.98	17748.34	17748.34	0.00	25.9	65.00	65.00	4123.35	4123.35
P	P:Coax2	P:Coax2	End	100.00	48.47	67.57	19957.69	19957.69	0.00	27.0	65.00	65.00	4460.40	4460.40
P	P:Coax2	P:Coax2	Ori	100.00	48.47	67.57	19957.70	19957.70	0.00	27.0	65.00	65.00	4460.40	4460.40
P	#P:11	Tube 3	End	105.00	50.32	70.16	22343.20	22343.20	0.00	28.1	65.00	65.00	4810.69	4810.69
P	#P:11	Tube 3	Ori	105.00	50.32	70.16	22343.20	22343.20	0.00	28.1	65.00	65.00	4810.69	4810.69
P	P:Coax1	P:Coax1	End	110.00	52.16	72.76	24911.60	24911.60	0.00	29.3	65.00	65.00	5174.23	5174.23
P	P:Coax1	P:Coax1	Ori	110.00	52.16	72.76	24911.60	24911.60	0.00	29.3	65.00	65.00	5174.23	5174.23
P	P:g	P:g	End	115.00	54.00	75.35	27669.66	27669.66	0.00	30.4	65.00	64.46	5504.69	5504.69

Tubular Davit Properties:

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

Label		(in)	or Depth (in)	or Depth (in)	(in/ft)		Elasticity (ksi)		Type	(lbs)	(lbs)	(lbs)	(lbs)	(ksi)	(lbs/ft^3) Density Override	Shape At End
4FT_SW_ARM	8F	0.1875	6	6	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
9FT_CON_ARM	8F	0.25	11.5	9	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	

Intermediate Joints for Davit Property "4FT_SW_ARM":

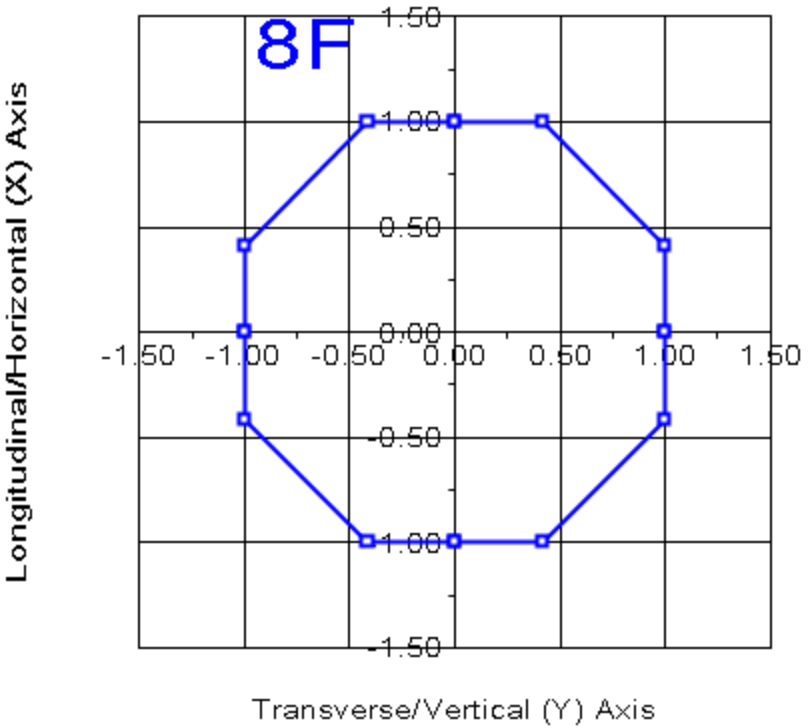
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
E	4	-0.33333

Intermediate Joints for Davit Property "9FT_CON_ARM":

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

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
SWL	P:SW	4FT_SW_ARM	180
SWR	P:SW	4FT_SW_ARM	0
CN1L	P:CN1	9FT_CON_ARM	180
CN1R	P:CN1	9FT_CON_ARM	0
CN2L	P:CN2	9FT_CON_ARM	180
CN2R	P:CN2	9FT_CON_ARM	0
CN3L	P:CN3	9FT_CON_ARM	180
CN3R	P:CN3	9FT_CON_ARM	0



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
SWL	SWL:O	Origin	0.00	6.00	3.61	16.14	16.14	0.00	9.1	65.00	65.00	29.14	29.14
SWL	SWL:E	End	4.01	6.00	3.61	16.14	16.14	0.00	9.1	65.00	65.00	29.14	29.14
SWR	SWR:O	Origin	0.00	6.00	3.61	16.14	16.14	0.00	9.1	65.00	65.00	29.14	29.14
SWR	SWR:E	End	4.01	6.00	3.61	16.14	16.14	0.00	9.1	65.00	65.00	29.14	29.14
CN1L	CN1L:O	Origin	0.00	11.50	9.32	155.95	155.95	0.00	14.9	65.00	65.00	146.91	146.91
CN1L	#CN1L:0	End	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN1L	#CN1L:0	Origin	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN1L	CN1L:E	End	9.03	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	88.35	88.35
CN1R	CN1R:O	Origin	0.00	11.50	9.32	155.95	155.95	0.00	14.9	65.00	65.00	146.91	146.91
CN1R	#CN1R:0	End	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN1R	#CN1R:0	Origin	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN1R	CN1R:E	End	9.03	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	88.35	88.35
CN2L	CN2L:O	Origin	0.00	11.50	9.32	155.95	155.95	0.00	14.9	65.00	65.00	146.91	146.91

CN2L	#CN2L:0	End	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN2L	#CN2L:0	Origin	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN2L	CN2L:E	End	9.03	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	88.35	88.35
CN2R	CN2R:O	Origin	0.00	11.50	9.32	155.95	155.95	0.00	14.9	65.00	65.00	146.91	146.91
CN2R	#CN2R:0	End	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN2R	#CN2R:0	Origin	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN2R	CN2R:E	End	9.03	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	88.35	88.35
CN3L	CN3L:O	Origin	0.00	11.50	9.32	155.95	155.95	0.00	14.9	65.00	65.00	146.91	146.91
CN3L	#CN3L:0	End	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN3L	#CN3L:0	Origin	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN3L	CN3L:E	End	9.03	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	88.35	88.35
CN3R	CN3R:O	Origin	0.00	11.50	9.32	155.95	155.95	0.00	14.9	65.00	65.00	146.91	146.91
CN3R	#CN3R:0	End	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN3R	#CN3R:0	Origin	4.52	10.25	8.28	109.54	109.54	0.00	12.8	65.00	65.00	115.78	115.78
CN3R	CN3R:E	End	9.03	9.00	7.25	73.40	73.40	0.00	10.8	65.00	65.00	88.35	88.35

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)	Hardware Capacity (lbs)	Notes
clamp		1e+05	0	

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
ANT1LOAD	P:ANT	clamp	No Limit
Coax1	P:Coax1	clamp	No Limit
Coax2	P:Coax2	clamp	No Limit
Coax3	P:Coax3	clamp	No Limit
Coax4	P:Coax4	clamp	No Limit
Coax5	P:Coax5	clamp	No Limit
Coax6	P:Coax6	clamp	No Limit
Coax7	P:Coax7	clamp	No Limit
Coax8	P:Coax8	clamp	No Limit
Coax9	P:Coax9	clamp	No Limit
Coax10	P:Coax10	clamp	No Limit
Coax11	P:Coax11	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
SL-Assumed		1	50	10	5e+06	0	0	0	0	0	0	0	Sheds	No
SUSP-Assumed		5.617	1000	10	5e+06	0	0	0	0	0	0	0	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)
swl	SWLVang	SWL	SL-Assumed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	No Limit
swr	SWRVang	SWR	SL-Assumed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	No Limit
cn1l	CN1LVang	CN1L	SUSP-Assumed	-90.00	77.00	-90.00	63.00	-90.00	38.00	0.00	0.00	No Limit
cn1r	CN1RVang	CN1R	SUSP-Assumed	-77.00	90.00	-63.00	90.00	-38.00	90.00	0.00	0.00	No Limit
cn2l	CN2LVang	CN2L	SUSP-Assumed	-90.00	77.00	-90.00	63.00	-90.00	38.00	0.00	0.00	No Limit
cn2r	CN2RVang	CN2R	SUSP-Assumed	-77.00	90.00	-63.00	90.00	-38.00	90.00	0.00	0.00	No Limit
cn3l	CN3LVang	CN3L	SUSP-Assumed	-90.00	77.00	-90.00	63.00	-90.00	38.00	0.00	0.00	No Limit
cn3r	CN3RVang	CN3R	SUSP-Assumed	-77.00	90.00	-63.00	90.00	-38.00	90.00	0.00	0.00	No Limit

*** Loads Data

Loads from file: J:\Jobs\2113600.WI\05_Structural\Tower Analysis\Backup Documentation\Rev (1)\Calcs\PLS-Pole\Str#6020-R1.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)   115.00 (ft)
  Structure height   115.00 (ft)
  Structure height above ground   115.00 (ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF for Hardware	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC 250B	1.5000	2.5000	1.00000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	20 loads	Wind on All	4	0	0.500	57.000	0.0	No Limit	0
NESC 250C	1.0000	1.0000	1.00000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	20 loads	NESC 2017	36.86	0	0.000	57.000	0.0	No Limit	0
NESC 250D	1.0000	1.0000	1.00000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	20 loads	Wind on All	6.4	0	1.000	57.000	15.0	No Limit	0

Point Loads for Load Case "NESC 250B":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
P:ANT	5806	1273	32	
SWL	2422.35	1890.77	0	
CN1L	8055.13	3533.42	0	
CN2L	8055.13	3533.42	0	
CN3L	8055.13	3533.42	0	
SWR	2422.35	1890.77	0	
CN1R	8055.13	3533.42	0	
CN2R	8055.13	3533.42	0	
CN3R	8055.13	3533.42	0	
P:Coax1	460	172	0	
P:Coax2	460	172	0	
P:Coax3	460	172	0	
P:Coax4	460	172	0	
P:Coax5	460	172	0	

P:Coax6	460	172	0
P:Coax7	460	172	0
P:Coax8	460	172	0
P:Coax9	460	172	0
P:Coax10	460	172	0
P:Coax11	460	172	0

Detailed Pole Loading Data for Load Case "NESC 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)
P	P:t		115.00	112.00	113.50	12.553	5.94e+05	1.600	10.00	0.50	114.15	50.21	23.96	4.00	54.21	0.00
P		P:ANT	112.00	109.00	110.50	13.658	6.47e+05	1.600	10.00	0.50	124.36	54.64	26.08	4.00	58.64	0.00
P	P:ANT	P:Coax11	109.00	105.00	107.00	14.948	7.08e+05	1.600	10.00	0.50	181.68	79.73	38.05	5.33	85.06	0.00
P	P:Coax11		105.00	100.00	102.50	16.606	7.86e+05	1.600	10.00	0.50	252.62	110.71	52.84	6.67	117.38	0.00
P		P:Coax10	100.00	95.00	97.50	18.448	8.73e+05	1.600	10.00	0.50	281.00	123.00	58.70	6.67	129.66	0.00
P	P:Coax10	P:SW	95.00	93.00	94.00	20.113	9.52e+05	1.600	10.00	0.50	242.88	53.64	25.60	2.67	56.30	0.00
P	P:SW		93.00	89.50	91.25	21.126	1e+06	1.600	10.00	0.50	447.00	98.59	47.06	4.67	103.26	0.00
P		P:CN1	89.50	86.00	87.75	22.416	1.06e+06	1.600	10.00	0.50	474.78	104.61	49.93	4.67	109.28	0.00
P	P:CN1	P:Coax9	86.00	85.00	85.50	23.245	1.1e+06	1.600	10.00	0.50	140.75	31.00	14.79	1.33	32.33	0.00
P	P:Coax9		85.00	80.00	82.50	24.351	1.15e+06	1.600	10.00	0.50	737.78	162.35	77.48	6.67	169.01	0.00
P		P:Coax8	80.00	75.00	77.50	26.193	1.24e+06	1.600	10.00	0.50	794.48	174.63	83.34	6.67	181.30	0.00
P	P:Coax8	P:CN2	75.00	74.00	74.50	27.298	1.29e+06	1.600	10.00	0.50	165.70	36.40	17.37	1.33	37.73	0.00
P	P:CN2		74.00	69.50	71.75	28.312	1.34e+06	1.600	10.00	0.50	773.71	169.88	81.08	6.00	175.88	0.00
P		P:Coax7	69.50	65.00	67.25	29.970	1.42e+06	1.600	10.00	0.50	819.63	179.83	85.82	6.00	185.83	0.00
P	P:Coax7	P:CN3	65.00	62.00	63.50	31.352	1.48e+06	1.600	10.00	0.50	571.93	125.41	59.85	4.00	129.41	0.00
P	P:CN3		62.00	58.50	60.25	32.549	1.54e+06	1.600	10.00	0.50	693.05	151.90	72.50	4.67	156.57	0.00
P		P:Coax6	58.50	55.00	56.75	33.839	1.6e+06	1.600	10.00	0.50	720.83	157.92	75.37	4.67	162.59	0.00
P	P:Coax6		55.00	53.00	54.00	34.852	1.65e+06	1.600	10.00	0.50	424.38	92.94	44.36	2.67	95.61	0.00
P			53.00	48.00	50.50	35.767	1.69e+06	1.600	10.00	0.50	2355.52	238.46	113.81	6.67	245.13	0.00
P		P:Coax5	48.00	45.00	46.50	36.866	1.75e+06	1.600	10.00	0.50	784.69	147.47	70.38	4.00	151.47	0.00
P	P:Coax5		45.00	40.00	42.50	38.340	1.82e+06	1.600	10.00	0.50	1360.73	255.61	121.99	6.67	262.28	0.00
P		P:Coax4	40.00	35.00	37.50	40.182	1.9e+06	1.600	10.00	0.50	1426.87	267.89	127.86	6.67	274.56	0.00
P	P:Coax4		35.00	30.00	32.50	42.024	1.99e+06	1.600	10.00	0.50	1493.01	280.18	133.72	6.67	286.84	0.00
P		P:Coax3	30.00	25.00	27.50	43.867	2.08e+06	1.600	10.00	0.50	1559.16	292.46	139.58	6.67	299.13	0.00
P	P:Coax3		25.00	20.00	22.50	45.709	2.16e+06	1.600	10.00	0.50	1625.30	304.74	145.44	6.67	311.41	0.00
P		P:Coax2	20.00	15.00	17.50	47.552	2.25e+06	1.600	10.00	0.50	1691.44	317.03	151.30	6.67	323.69	0.00
P	P:Coax2		15.00	10.00	12.50	49.394	2.34e+06	1.600	10.00	0.50	1757.59	329.31	157.17	6.67	335.98	0.00
P		P:Coax1	10.00	5.00	7.50	51.236	2.43e+06	1.600	10.00	0.50	1823.73	341.59	163.03	6.67	348.26	0.00
P	P:Coax1	P:g	5.00	0.00	2.50	53.079	2.51e+06	1.600	10.00	0.50	1889.88	353.88	168.89	6.67	360.54	0.00

Point Loads for Load Case "NESC 250C":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
P:ANT	3127	4591	38	
SWL	673.5	2029.43	0	
CN1L	3462.1	6209.19	0	
CN2L	3462.1	6209.19	0	
CN3L	3462.1	6209.19	0	
SWR	673.5	2029.43	0	

CN1R	3462.1	6219.66	0
CN2R	3462.1	6219.66	0
CN3R	3462.1	6219.66	0
P:Coax1	125	601	0
P:Coax2	125	601	0
P:Coax3	125	601	0
P:Coax4	125	601	0
P:Coax5	125	601	0
P:Coax6	125	601	0
P:Coax7	125	601	0
P:Coax8	125	601	0
P:Coax9	125	601	0
P:Coax10	125	601	0
P:Coax11	125	601	0

Detailed Pole Loading Data for Load Case "NESC 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)
P	P:t		115.00	112.00	113.50	12.553	1.16e+06	1.000	37.90	0.00	76.10	118.95	0.00	0.00	118.95	0.00
P		P:ANT	112.00	109.00	110.50	13.658	1.26e+06	1.000	37.90	0.00	82.90	129.42	0.00	0.00	129.42	0.00
P	P:ANT	P:Coax11	109.00	105.00	107.00	14.948	1.38e+06	1.000	37.90	0.00	121.12	188.85	0.00	0.00	188.85	0.00
P	P:Coax11		105.00	100.00	102.50	16.606	1.53e+06	1.000	37.90	0.00	168.41	262.25	0.00	0.00	262.25	0.00
P		P:Coax10	100.00	95.00	97.50	18.448	1.7e+06	1.000	37.90	0.00	187.33	291.35	0.00	0.00	291.35	0.00
P	P:Coax10	P:SW	95.00	93.00	94.00	20.113	1.85e+06	1.000	37.90	0.00	161.92	127.06	0.00	0.00	127.06	0.00
P	P:SW		93.00	89.50	91.25	21.126	1.95e+06	1.000	37.90	0.00	298.00	233.55	0.00	0.00	233.55	0.00
P		P:CN1	89.50	86.00	87.75	22.416	2.07e+06	1.000	37.90	0.00	316.52	247.81	0.00	0.00	247.81	0.00
P	P:CN1	P:Coax9	86.00	85.00	85.50	23.245	2.14e+06	1.000	37.90	0.00	93.84	73.42	0.00	0.00	73.42	0.00
P	P:Coax9		85.00	80.00	82.50	24.351	2.24e+06	1.000	37.90	0.00	491.85	384.56	0.00	0.00	384.56	0.00
P		P:Coax8	80.00	75.00	77.50	26.193	2.41e+06	1.000	37.90	0.00	529.65	413.66	0.00	0.00	413.66	0.00
P	P:Coax8	P:CN2	75.00	74.00	74.50	27.298	2.52e+06	1.000	37.90	0.00	110.47	86.22	0.00	0.00	86.22	0.00
P	P:CN2		74.00	69.50	71.75	28.312	2.61e+06	1.000	37.90	0.00	515.81	402.41	0.00	0.00	402.41	0.00
P		P:Coax7	69.50	65.00	67.25	29.970	2.76e+06	1.000	37.90	0.00	546.42	425.98	0.00	0.00	425.98	0.00
P	P:Coax7	P:CN3	65.00	62.00	63.50	31.352	2.89e+06	1.000	37.90	0.00	381.29	297.08	0.00	0.00	297.08	0.00
P	P:CN3		62.00	58.50	60.25	32.549	3e+06	1.000	37.90	0.00	462.03	359.83	0.00	0.00	359.83	0.00
P		P:Coax6	58.50	55.00	56.75	33.839	3.12e+06	1.000	37.90	0.00	480.55	374.09	0.00	0.00	374.09	0.00
P	P:Coax6		55.00	53.00	54.00	34.852	3.21e+06	1.000	37.90	0.00	282.92	220.17	0.00	0.00	220.17	0.00
P			53.00	48.00	50.50	35.767	3.3e+06	1.000	37.90	0.00	1570.35	564.86	0.00	0.00	564.86	0.00
P		P:Coax5	48.00	45.00	46.50	36.866	3.4e+06	1.000	37.90	0.00	523.12	349.33	0.00	0.00	349.33	0.00
P	P:Coax5		45.00	40.00	42.50	38.340	3.53e+06	1.000	37.90	0.00	907.15	605.49	0.00	0.00	605.49	0.00
P		P:Coax4	40.00	35.00	37.50	40.182	3.7e+06	1.000	37.90	0.00	951.25	634.59	0.00	0.00	634.59	0.00
P	P:Coax4		35.00	30.00	32.50	42.024	3.87e+06	1.000	37.90	0.00	995.34	663.68	0.00	0.00	663.68	0.00
P		P:Coax3	30.00	25.00	27.50	43.867	4.04e+06	1.000	37.90	0.00	1039.44	692.78	0.00	0.00	692.78	0.00
P	P:Coax3		25.00	20.00	22.50	45.709	4.21e+06	1.000	37.90	0.00	1083.53	721.88	0.00	0.00	721.88	0.00
P		P:Coax2	20.00	15.00	17.50	47.552	4.38e+06	1.000	37.90	0.00	1127.63	750.97	0.00	0.00	750.97	0.00
P	P:Coax2		15.00	10.00	12.50	49.394	4.55e+06	1.000	37.90	0.00	1171.73	780.07	0.00	0.00	780.07	0.00
P		P:Coax1	10.00	5.00	7.50	51.236	4.72e+06	1.000	37.90	0.00	1215.82	809.17	0.00	0.00	809.17	0.00
P	P:Coax1	P:g	5.00	0.00	2.50	53.079	4.89e+06	1.000	37.90	0.00	1259.92	838.26	0.00	0.00	838.26	0.00

Point Loads for Load Case "NESC 250D":

Joint Label	Vertical Load	Transverse Load	Longitudinal Load	Comment

	(lbs)	(lbs)	(lbs)
P:ANT	4713	880	32
SWL	3489.29	1495.77	0
CN1L	8211.07	2530.07	0
CN2L	8211.07	2530.07	0
CN3L	8211.07	2530.07	0
SWR	3489.29	1495.77	0
CN1R	8211.07	2530.07	0
CN2R	8211.07	2530.07	0
CN3R	8211.07	2530.07	0
P:Coax1	425	114	0
P:Coax2	425	114	0
P:Coax3	425	114	0
P:Coax4	425	114	0
P:Coax5	425	114	0
P:Coax6	425	114	0
P:Coax7	425	114	0
P:Coax8	425	114	0
P:Coax9	425	114	0
P:Coax10	425	114	0
P:Coax11	425	114	0

Detailed Pole Loading Data for Load Case "NESC 250D":

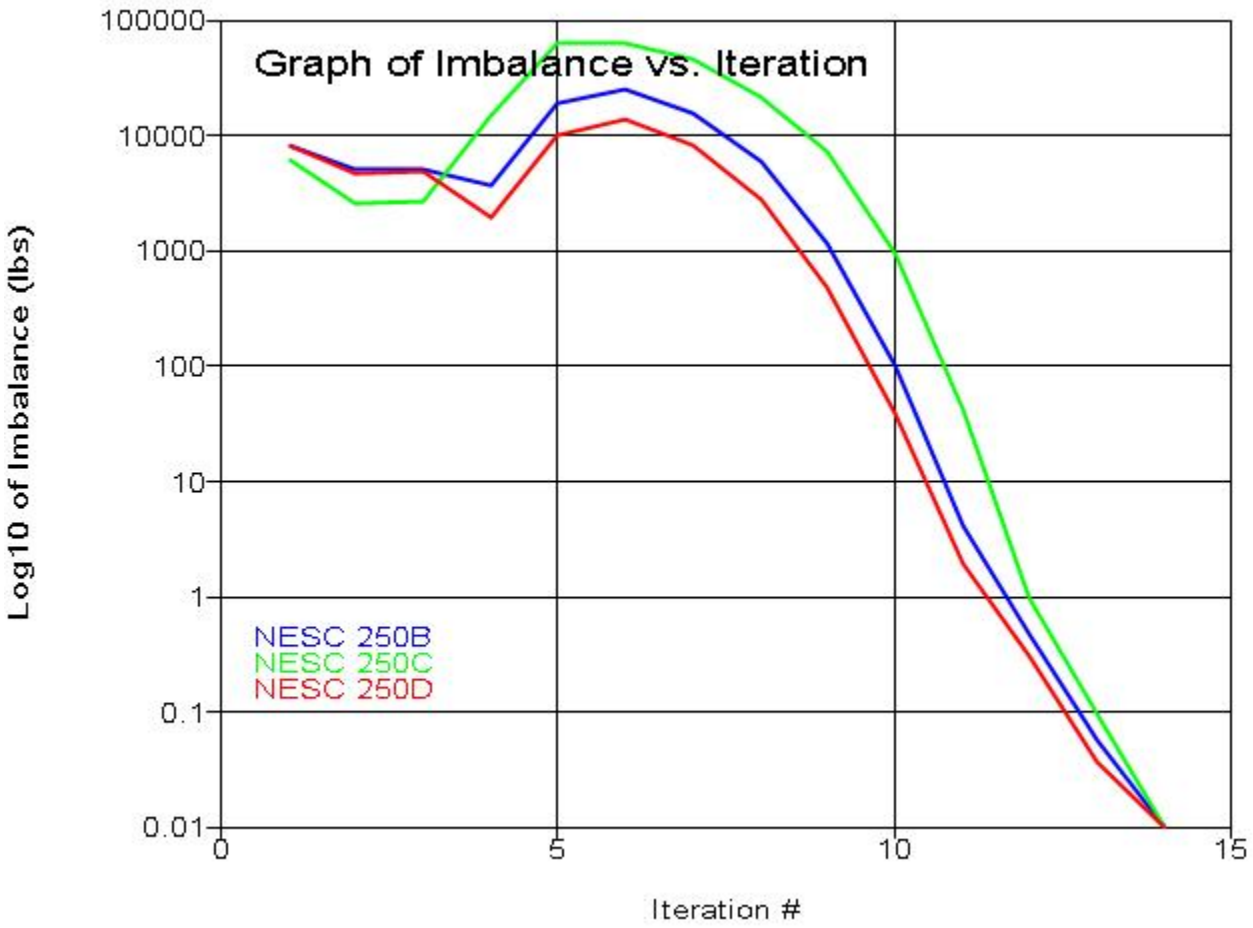
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (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)
P	P:t		115.00	112.00	113.50	12.553	4.75e+05	1.600	6.40	1.00	76.10	32.14	47.93	5.12	37.26	0.00
P		P:ANT	112.00	109.00	110.50	13.658	5.17e+05	1.600	6.40	1.00	82.90	34.97	52.15	5.12	40.09	0.00
P	P:ANT	P:Coax11	109.00	105.00	107.00	14.948	5.66e+05	1.600	6.40	1.00	121.12	51.03	76.10	6.83	57.86	0.00
P	P:Coax11		105.00	100.00	102.50	16.606	6.29e+05	1.600	6.40	1.00	168.41	70.86	105.68	8.53	79.40	0.00
P		P:Coax10	100.00	95.00	97.50	18.448	6.99e+05	1.600	6.40	1.00	187.33	78.72	117.40	8.53	87.26	0.00
P	P:Coax10	P:SW	95.00	93.00	94.00	20.113	7.62e+05	1.600	6.40	1.00	161.92	34.33	51.20	3.41	37.74	0.00
P	P:SW		93.00	89.50	91.25	21.126	8e+05	1.600	6.40	1.00	298.00	63.11	94.11	5.97	69.08	0.00
P		P:CN1	89.50	86.00	87.75	22.416	8.49e+05	1.600	6.40	1.00	316.52	66.96	99.86	5.97	72.93	0.00
P	P:CN1	P:Coax9	86.00	85.00	85.50	23.245	8.8e+05	1.600	6.40	1.00	93.84	19.84	29.59	1.71	21.55	0.00
P	P:Coax9		85.00	80.00	82.50	24.351	9.22e+05	1.600	6.40	1.00	491.85	103.91	154.96	8.53	112.44	0.00
P		P:Coax8	80.00	75.00	77.50	26.193	9.92e+05	1.600	6.40	1.00	529.65	111.77	166.69	8.53	120.31	0.00
P	P:Coax8	P:CN2	75.00	74.00	74.50	27.298	1.03e+06	1.600	6.40	1.00	110.47	23.30	34.74	1.71	25.00	0.00
P	P:CN2		74.00	69.50	71.75	28.312	1.07e+06	1.600	6.40	1.00	515.81	108.73	162.15	7.68	116.41	0.00
P		P:Coax7	69.50	65.00	67.25	29.970	1.14e+06	1.600	6.40	1.00	546.42	115.10	171.65	7.68	122.78	0.00
P	P:Coax7	P:CN3	65.00	62.00	63.50	31.352	1.19e+06	1.600	6.40	1.00	381.29	80.27	119.71	5.12	85.39	0.00
P	P:CN3		62.00	58.50	60.25	32.549	1.23e+06	1.600	6.40	1.00	462.03	97.23	145.00	5.97	103.20	0.00
P		P:Coax6	58.50	55.00	56.75	33.839	1.28e+06	1.600	6.40	1.00	480.55	101.08	150.74	5.97	107.05	0.00
P	P:Coax6		55.00	53.00	54.00	34.852	1.32e+06	1.600	6.40	1.00	282.92	59.49	88.72	3.41	62.90	0.00
P			53.00	48.00	50.50	35.767	1.35e+06	1.600	6.40	1.00	1570.35	152.63	227.61	8.53	161.16	0.00
P		P:Coax5	48.00	45.00	46.50	36.866	1.4e+06	1.600	6.40	1.00	523.12	94.39	140.76	5.12	99.51	0.00
P	P:Coax5		45.00	40.00	42.50	38.340	1.45e+06	1.600	6.40	1.00	907.15	163.60	243.99	8.53	172.14	0.00
P		P:Coax4	40.00	35.00	37.50	40.182	1.52e+06	1.600	6.40	1.00	951.25	171.47	255.71	8.53	180.00	0.00
P	P:Coax4		35.00	30.00	32.50	42.024	1.59e+06	1.600	6.40	1.00	995.34	179.33	267.43	8.53	187.86	0.00
P		P:Coax3	30.00	25.00	27.50	43.867	1.66e+06	1.600	6.40	1.00	1039.44	187.19	279.16	8.53	195.72	0.00
P	P:Coax3		25.00	20.00	22.50	45.709	1.73e+06	1.600	6.40	1.00	1083.53	195.05	290.88	8.53	203.59	0.00
P		P:Coax2	20.00	15.00	17.50	47.552	1.8e+06	1.600	6.40	1.00	1127.63	202.91	302.61	8.53	211.45	0.00

P	P:Coax2		15.00	10.00	12.50	49.394	1.87e+06	1.600	6.40	1.00	1171.73	210.78	314.33	8.53	219.31	0.00
P		P:Coax1	10.00	5.00	7.50	51.236	1.94e+06	1.600	6.40	1.00	1215.82	218.64	326.06	8.53	227.17	0.00
P	P:Coax1	P:g	5.00	0.00	2.50	53.079	2.01e+06	1.600	6.40	1.00	1259.92	226.50	337.78	8.53	235.03	0.00

*** Analysis Results:

Maximum element usage is 85.48% for Steel Pole "P" in load case "NESC 250C"



*** Analysis Results for Load Case No. 1 "NESC 250B" - Number of iterations in SAPS 14

Equilibrium Joint Positions and Rotations for Load Case "NESC 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)
P:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
P:t	0.0155	3.304	-0.06604	-2.7428	0.0162	-0.0002	0.0155	3.304	114.9
P:ANT	0.01381	3.017	-0.05917	-2.7415	0.0161	-0.0002	0.01381	3.017	108.9
P:Coax11	0.01269	2.826	-0.05451	-2.7241	0.0158	-0.0002	0.01269	2.826	104.9

P:Coax10	0.01013	2.36	-0.0434	-2.6048	0.0133	-0.0001	0.01013	2.36	94.96
P:SW	0.009669	2.269	-0.04132	-2.5902	0.0130	-0.0001	0.009669	2.269	92.96
P:CN1	0.008151	1.957	-0.03421	-2.5183	0.0118	-0.0000	0.008151	1.957	85.97
P:Coax9	0.007945	1.913	-0.03321	-2.5049	0.0117	-0.0000	0.007945	1.913	84.97
P:Coax8	0.006046	1.491	-0.02394	-2.3078	0.0100	-0.0000	0.006046	1.491	74.98
P:CN2	0.005872	1.451	-0.0231	-2.2841	0.0099	-0.0000	0.005872	1.451	73.98
P:Coax7	0.004435	1.11	-0.01619	-2.0335	0.0084	0.0000	0.004435	1.11	64.98
P:CN3	0.004007	1.006	-0.01423	-1.9401	0.0079	0.0000	0.004007	1.006	61.99
P:Coax6	0.003106	0.7825	-0.01023	-1.7046	0.0068	0.0000	0.003106	0.7825	54.99
P:Coax5	0.002043	0.5145	-0.006076	-1.3614	0.0054	0.0000	0.002043	0.5145	44.99
P:Coax4	0.001216	0.3051	-0.003381	-1.0302	0.0041	0.0000	0.001216	0.3051	35
P:Coax3	0.0006124	0.1525	-0.001736	-0.7121	0.0028	0.0000	0.0006124	0.1525	25
P:Coax2	0.0002187	0.05394	-0.0007869	-0.4123	0.0017	0.0000	0.0002187	0.05394	15
P:Coax1	2.489e-05	0.006047	-0.0002218	-0.1325	0.0005	0.0000	2.489e-05	0.006047	5
SWL:O	0.009677	2.27	-0.002753	-2.5902	0.0130	-0.0001	0.009677	1.417	93
SWL:E	0.009784	2.287	0.1604	-2.2031	0.0130	-0.0001	0.009784	-2.566	93.49
SWR:O	0.009661	2.268	-0.07989	-2.5902	0.0130	-0.0001	0.009661	3.122	92.92
SWR:E	0.009698	2.28	-0.2759	-2.8888	0.0130	-0.0001	0.009698	7.133	93.06
CN1L:O	0.008159	1.958	0.008005	-2.5183	0.0118	-0.0000	0.008159	0.9968	86.01
CN1L:E	0.008374	1.99	0.3231	-1.7051	0.0119	-0.0000	0.008374	-7.971	87.07
CN1R:O	0.008143	1.956	-0.07643	-2.5183	0.0118	-0.0000	0.008143	2.917	85.92
CN1R:E	0.008207	1.983	-0.5509	-3.2818	0.0119	-0.0000	0.008207	11.94	86.2
CN2L:O	0.00588	1.452	0.02254	-2.2841	0.0099	-0.0000	0.00588	0.3066	74.02
CN2L:E	0.006057	1.48	0.3008	-1.4692	0.0099	0.0000	0.006057	-8.666	75.05
CN2R:O	0.005864	1.45	-0.06873	-2.2841	0.0099	-0.0000	0.005864	2.595	73.93
CN2R:E	0.005919	1.476	-0.5064	-3.0490	0.0099	-0.0000	0.005919	11.62	74.24
CN3L:O	0.004014	1.007	0.03077	-1.9401	0.0079	0.0000	0.004014	-0.3226	62.03
CN3L:E	0.004151	1.028	0.2548	-1.1225	0.0079	0.0000	0.004151	-9.301	63
CN3R:O	0.004001	1.005	-0.05923	-1.9401	0.0079	0.0000	0.004001	2.335	61.94
CN3R:E	0.004051	1.029	-0.4429	-2.7068	0.0079	0.0000	0.004051	11.36	62.31
SWLVang	0.009672	2.268	0.1623	-2.2031	0.0130	-0.0001	0.009672	-2.627	93
SWRVang	0.009585	2.255	-0.2773	-2.8888	0.0130	-0.0001	0.009585	7.15	92.56
CN1LVang	0.008246	1.971	0.3249	-1.7051	0.0119	-0.0000	0.008246	-8.042	86.45
CN1RVang	0.008077	1.947	-0.5528	-3.2818	0.0119	-0.0000	0.008077	11.96	85.57
CN2LVang	0.00595	1.464	0.3023	-1.4692	0.0099	0.0000	0.00595	-8.733	74.43
CN2RVang	0.005812	1.443	-0.5083	-3.0490	0.0099	-0.0000	0.005812	11.64	73.62
CN3LVang	0.004065	1.016	0.256	-1.1225	0.0079	0.0000	0.004065	-9.365	62.38
CN3RVang	0.003965	0.9996	-0.4447	-2.7068	0.0079	0.0000	0.003965	11.38	61.68

Joint Support Reactions for Load Case "NESC 250B":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	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 %
P:g	-0.17	0.0	-33.38	0.0	0.0	-96.59	0.0	0.0	0.00	0.0	2531.42	0.0	-10.4	0.0	0.0	-0.01	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC 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.
P	P:t	Origin	0.00	39.65	0.19	-0.79	-0.00	-0.00	0.0	-0.07	0.03	-0.00	-0.01	0.00	0.01	0.00	0.02	0.0	5
P	Tube 1	End	3.00	37.93	0.18	-0.75	0.09	-0.00	0.0	-0.07	0.03	-0.00	-0.01	0.04	0.00	0.00	0.05	0.1	2
P	Tube 1	Origin	3.00	37.93	0.18	-0.75	0.09	-0.00	0.0	-0.21	0.09	-0.00	-0.03	0.04	0.01	0.00	0.07	0.1	2
P	P:ANT	End	6.00	36.21	0.17	-0.71	0.37	-0.01	0.0	-0.21	0.09	-0.00	-0.03	0.15	0.01	0.00	0.18	0.3	2
P	P:ANT	Origin	6.00	36.21	0.17	-0.71	0.37	-0.01	-0.0	-6.14	1.72	-0.04	-0.73	0.04	0.40	0.00	1.04	1.6	4

P	P:Coax11	End	10.00	33.92	0.15	-0.65	7.26	-0.16	-0.0	-6.14	1.72	-0.04	-0.66	2.39	0.10	0.00	3.06	4.7	2
P	P:Coax11	Origin	10.00	33.92	0.15	-0.65	7.26	-0.16	-0.0	-6.85	2.03	-0.04	-0.73	2.39	0.12	0.00	3.13	4.8	2
P	Tube 1	End	15.00	31.09	0.14	-0.59	17.39	-0.36	-0.0	-6.85	2.03	-0.04	-0.66	4.57	0.10	0.00	5.23	8.0	2
P	Tube 1	Origin	15.00	31.09	0.14	-0.59	17.39	-0.36	-0.0	-7.18	2.16	-0.04	-0.69	4.57	0.11	0.00	5.26	8.1	2
P	P:Coax10	End	20.00	28.32	0.12	-0.52	28.18	-0.58	-0.0	-7.18	2.16	-0.04	-0.62	6.05	0.10	0.00	6.67	10.3	2
P	P:Coax10	Origin	20.00	28.32	0.12	-0.52	28.18	-0.58	0.0	-7.93	2.45	-0.05	-0.34	2.99	0.06	0.00	3.33	5.1	2
P	P:SW	End	22.00	27.23	0.12	-0.50	33.08	-0.67	0.0	-7.93	2.45	-0.05	-0.33	3.26	0.05	0.00	3.59	5.5	2
P	P:SW	Origin	22.00	27.23	0.12	-0.50	32.46	-0.67	0.0	-13.13	6.55	-0.05	-0.54	3.20	0.14	0.00	3.75	5.8	2
P	Tube 2	End	25.50	25.34	0.11	-0.45	55.38	-0.85	0.0	-13.13	6.55	-0.05	-0.51	4.80	0.14	0.00	5.32	8.2	2
P	Tube 2	Origin	25.50	25.34	0.11	-0.45	55.38	-0.85	0.0	-13.65	6.67	-0.05	-0.53	4.80	0.14	0.00	5.34	8.2	2
P	P:CN1	End	29.00	23.48	0.10	-0.41	78.71	-1.03	0.0	-13.65	6.67	-0.05	-0.50	6.06	0.13	0.00	6.57	10.1	2
P	P:CN1	Origin	29.00	23.48	0.10	-0.41	79.54	-1.03	0.0	-30.53	14.55	-0.06	-1.12	6.13	0.28	0.00	7.26	11.2	2
P	P:Coax9	End	30.00	22.95	0.10	-0.40	94.09	-1.09	0.0	-30.53	14.55	-0.06	-1.10	7.01	0.28	0.00	8.13	12.5	2
P	P:Coax9	Origin	30.00	22.95	0.10	-0.40	94.09	-1.09	0.0	-31.48	14.84	-0.06	-1.13	7.01	0.28	0.00	8.16	12.6	2
P	Tube 2	End	35.00	20.37	0.08	-0.34	168.26	-1.39	0.0	-31.48	14.84	-0.06	-1.05	10.73	0.26	0.00	11.79	18.1	2
P	Tube 2	Origin	35.00	20.37	0.08	-0.34	168.26	-1.39	0.0	-32.35	14.99	-0.06	-1.08	10.73	0.27	0.00	11.82	18.2	2
P	P:Coax8	End	40.00	17.89	0.07	-0.29	243.21	-1.72	0.0	-32.35	14.99	-0.06	-1.00	13.43	0.25	0.00	14.44	22.2	2
P	P:Coax8	Origin	40.00	17.89	0.07	-0.29	243.21	-1.72	0.0	-33.36	15.27	-0.07	-1.03	13.43	0.25	0.00	14.47	22.3	2
P	P:CN2	End	41.00	17.41	0.07	-0.28	258.48	-1.78	0.0	-33.36	15.27	-0.07	-1.02	13.89	0.25	0.00	14.91	22.9	2
P	P:CN2	Origin	41.00	17.41	0.07	-0.28	259.27	-1.79	0.0	-50.48	23.08	-0.07	-1.54	13.93	0.37	0.00	15.49	23.8	2
P	Tube 2	End	45.50	15.31	0.06	-0.23	363.11	-2.12	0.0	-50.48	23.08	-0.07	-1.46	17.31	0.35	0.00	18.77	28.9	2
P	Tube 2	Origin	45.50	15.31	0.06	-0.23	363.11	-2.12	0.0	-51.41	23.18	-0.08	-1.48	17.31	0.35	0.00	18.80	28.9	2
P	P:Coax7	End	50.00	13.32	0.05	-0.19	467.42	-2.46	0.0	-51.41	23.18	-0.08	-1.40	19.90	0.33	0.00	21.31	32.8	2
P	P:Coax7	Origin	50.00	13.32	0.05	-0.19	467.42	-2.46	0.0	-52.68	23.45	-0.08	-1.44	19.90	0.34	0.00	21.34	32.8	2
P	P:CN3	End	53.00	12.07	0.05	-0.17	537.76	-2.71	0.0	-52.68	23.45	-0.08	-1.39	21.31	0.33	0.00	22.70	34.9	2
P	P:CN3	Origin	53.00	12.07	0.05	-0.17	538.48	-2.71	0.0	-70.05	31.14	-0.09	-1.84	21.34	0.43	0.00	23.19	35.7	2
P	Tube 2	End	56.50	10.69	0.04	-0.15	647.46	-3.02	0.0	-70.05	31.14	-0.09	-1.77	23.66	0.42	0.00	25.44	39.1	2
P	Tube 2	Origin	56.50	10.69	0.04	-0.15	647.46	-3.02	0.0	-70.89	31.18	-0.09	-1.79	23.66	0.42	0.00	25.47	39.2	2
P	P:Coax6	End	60.00	9.39	0.04	-0.12	756.58	-3.33	0.0	-70.89	31.18	-0.09	-1.72	25.59	0.40	0.00	27.32	42.0	2
P	P:Coax6	Origin	60.00	9.39	0.04	-0.12	756.58	-3.33	0.0	-72.03	31.39	-0.09	-1.75	25.59	0.40	0.00	27.35	42.1	2
P	SpliceT	End	62.00	8.69	0.03	-0.11	819.36	-3.52	0.0	-72.03	31.39	-0.09	-1.71	26.55	0.40	0.00	28.27	43.5	2
P	SpliceT	Origin	62.00	8.69	0.03	-0.11	819.36	-3.52	0.0	-73.57	31.45	-0.10	-1.75	26.55	0.40	0.00	28.30	43.5	2
P	SpliceB	End	67.00	7.06	0.03	-0.09	976.61	-4.01	0.0	-73.57	31.45	-0.10	-1.46	25.62	0.33	0.00	27.08	41.7	2
P	SpliceB	Origin	67.00	7.06	0.03	-0.09	976.61	-4.01	0.0	-75.30	31.51	-0.10	-1.49	25.62	0.33	0.00	27.12	41.7	2
P	P:Coax5	End	70.00	6.17	0.02	-0.07	1071.14	-4.32	0.0	-75.30	31.51	-0.10	-1.45	26.43	0.32	0.00	27.89	42.9	2
P	P:Coax5	Origin	70.00	6.17	0.02	-0.07	1071.14	-4.32	0.0	-77.00	31.75	-0.11	-1.48	26.43	0.32	0.00	27.92	43.0	2
P	Tube 3	End	75.00	4.83	0.02	-0.05	1229.90	-4.85	0.0	-77.00	31.75	-0.11	-1.41	27.52	0.31	0.00	28.94	44.5	2
P	Tube 3	Origin	75.00	4.83	0.02	-0.05	1229.90	-4.85	0.0	-78.61	31.83	-0.11	-1.44	27.52	0.31	0.00	28.97	44.6	2
P	P:Coax4	End	80.00	3.66	0.01	-0.04	1389.04	-5.42	0.0	-78.61	31.83	-0.11	-1.37	28.32	0.29	0.00	29.70	45.7	2
P	P:Coax4	Origin	80.00	3.66	0.01	-0.04	1389.04	-5.42	0.0	-80.75	32.09	-0.12	-1.41	28.32	0.30	0.00	29.73	45.7	2
P	Tube 3	End	85.00	2.66	0.01	-0.03	1549.49	-6.02	0.0	-80.75	32.09	-0.12	-1.35	28.90	0.28	0.00	30.25	46.5	2
P	Tube 3	Origin	85.00	2.66	0.01	-0.03	1549.49	-6.02	0.0	-82.50	32.18	-0.13	-1.38	28.90	0.28	0.00	30.28	46.6	2
P	P:Coax3	End	90.00	1.83	0.01	-0.02	1710.39	-6.65	0.0	-82.50	32.18	-0.13	-1.32	29.29	0.27	0.00	30.62	47.1	2
P	P:Coax3	Origin	90.00	1.83	0.01	-0.02	1710.39	-6.65	0.0	-84.78	32.46	-0.13	-1.36	29.29	0.28	0.00	30.65	47.2	2
P	Tube 3	End	95.00	1.16	0.00	-0.01	1872.69	-7.32	0.0	-84.78	32.46	-0.13	-1.30	29.55	0.26	0.00	30.86	47.5	2
P	Tube 3	Origin	95.00	1.16	0.00	-0.01	1872.69	-7.32	0.0	-86.67	32.57	-0.14	-1.33	29.55	0.26	0.00	30.89	47.5	2
P	P:Coax2	End	100.00	0.65	0.00	-0.01	2035.54	-8.03	0.0	-86.67	32.57	-0.14	-1.28	29.69	0.25	0.00	30.98	47.7	2
P	P:Coax2	Origin	100.00	0.65	0.00	-0.01	2035.54	-8.03	0.0	-89.09	32.87	-0.15	-1.32	29.69	0.26	0.00	31.02	47.7	2
P	Tube 3	End	105.00	0.29	0.00	-0.01	2199.88	-8.78	0.0	-89.09	32.87	-0.15	-1.27	29.76	0.25	0.00	31.03	47.7	2
P	Tube 3	Origin	105.00	0.29	0.00	-0.01	2199.88	-8.78	0.0	-91.12	33.00	-0.16	-1.30	29.76	0.25	0.00	31.06	47.8	2
P	P:Coax1	End	110.00	0.07	0.00	-0.00	2364.86	-9.56	0.0	-91.12	33.00	-0.16	-1.25	29.74	0.24	0.00	31.00	47.7	2
P	P:Coax1	Origin	110.00	0.07	0.00	-0.00	2364.86	-9.56	0.0	-93.69	33.31	-0.17	-1.29	29.74	0.24	0.00	31.03	47.7	2
P	P:g	End	115.00	0.00	0.00	0.00	2531.42	-10.39	0.0	-93.69	33.31	-0.17	-1.24	29.67	0.23	0.00	30.92	48.0	2

Detailed Tubular Davit Arm Usages for Load Case "NESC 250B":

Element Label	Joint Label	Joint Position	Rel. Dist.	Trans. Defl.	Long. Defl.	Vert. Defl.	Vert. Mom.	Horz. Mom.	Tors. Mom.	Axial Force	Vert. Shear	Horz. Shear	P/A	M/S.	V/Q.	T/R.	Res.	Max. Usage	At Pt.

			(ft)	(in)	(in)	(in)	(ft-k)	(ft-k)	(ft-k)	(kips)	(kips)	(kips)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	%	
SWL	SWL:O	Origin	0.00	27.24	0.12	-0.03	-9.90	0.00	0.0	-2.18	2.21	-0.00	-0.60	22.08	0.49	0.00	22.70	34.9	2
SWL	SWL:E	End	4.01	27.45	0.12	1.92	-1.04	0.00	0.0	-2.18	2.21	-0.00	-0.60	2.33	0.49	0.00	3.05	4.7	2
SWR	SWR:O	Origin	0.00	27.22	0.12	-0.96	-9.28	-0.00	0.0	1.81	2.52	0.00	0.50	20.71	0.56	0.00	21.23	32.7	2
SWR	SWR:E	End	4.01	27.36	0.12	-3.31	0.84	0.00	0.0	1.81	2.52	0.00	0.50	0.78	1.35	0.00	2.67	4.1	3
CN1L	CN1L:O	Origin	0.00	23.49	0.10	0.10	-72.75	0.02	0.0	-4.52	7.84	-0.00	-0.49	32.19	0.67	0.00	32.70	50.3	2
CN1L	#CN1L:0	End	4.52	23.71	0.10	2.18	-37.33	0.01	0.0	-4.52	7.84	-0.00	-0.55	20.96	0.76	0.00	21.55	33.1	2
CN1L	#CN1L:0	Origin	4.52	23.71	0.10	2.18	-37.33	0.01	0.0	-4.44	7.69	-0.00	-0.54	20.96	0.74	0.00	21.53	33.1	2
CN1L	CN1L:E	End	9.03	23.88	0.10	3.88	-2.62	0.00	0.0	-4.44	7.69	-0.00	-0.61	0.00	2.21	0.00	3.87	6.0	4
CN1R	CN1R:O	Origin	0.00	23.47	0.10	-0.92	-73.58	-0.02	-0.0	3.25	8.45	0.00	0.35	32.56	0.73	0.00	32.93	50.7	2
CN1R	#CN1R:0	End	4.52	23.63	0.10	-3.58	-35.41	-0.01	-0.0	3.25	8.45	0.00	0.39	19.88	0.82	0.00	20.33	31.3	2
CN1R	#CN1R:0	Origin	4.52	23.63	0.10	-3.58	-35.41	-0.01	0.0	3.31	8.24	0.00	0.40	19.88	0.80	0.00	20.33	31.3	2
CN1R	CN1R:E	End	9.03	23.79	0.10	-6.61	1.78	0.00	0.0	3.31	8.24	0.00	0.46	0.00	2.36	0.00	4.12	6.3	4
CN2L	CN2L:O	Origin	0.00	17.42	0.07	0.27	-72.91	0.01	0.0	-4.49	7.86	-0.00	-0.48	32.26	0.68	0.00	32.76	50.4	2
CN2L	#CN2L:0	End	4.52	17.61	0.07	2.14	-37.41	0.01	0.0	-4.49	7.86	-0.00	-0.54	21.01	0.76	0.00	21.59	33.2	2
CN2L	#CN2L:0	Origin	4.52	17.61	0.07	2.14	-37.41	0.01	0.0	-4.41	7.71	-0.00	-0.53	21.01	0.75	0.00	21.58	33.2	2
CN2L	CN2L:E	End	9.03	17.75	0.07	3.61	-2.62	0.00	0.0	-4.41	7.71	-0.00	-0.61	0.00	2.21	0.00	3.88	6.0	4
CN2R	CN2R:O	Origin	0.00	17.40	0.07	-0.82	-73.70	-0.01	-0.0	3.21	8.46	0.00	0.34	32.61	0.73	0.00	32.98	50.7	2
CN2R	#CN2R:0	End	4.52	17.55	0.07	-3.26	-35.47	-0.01	-0.0	3.21	8.46	0.00	0.39	19.92	0.82	0.00	20.36	31.3	2
CN2R	#CN2R:0	Origin	4.52	17.55	0.07	-3.26	-35.47	-0.01	0.0	3.28	8.25	0.00	0.40	19.92	0.80	0.00	20.36	31.3	2
CN2R	CN2R:E	End	9.03	17.71	0.07	-6.08	1.78	0.00	0.0	3.28	8.25	0.00	0.45	0.00	2.37	0.00	4.12	6.3	4
CN3L	CN3L:O	Origin	0.00	12.08	0.05	0.37	-73.15	0.01	0.0	-4.44	7.89	-0.00	-0.48	32.37	0.68	0.00	32.87	50.6	2
CN3L	#CN3L:0	End	4.52	12.23	0.05	1.91	-37.53	0.01	0.0	-4.44	7.89	-0.00	-0.54	21.07	0.76	0.00	21.65	33.3	2
CN3L	#CN3L:0	Origin	4.52	12.23	0.05	1.91	-37.53	0.01	0.0	-4.36	7.73	-0.00	-0.53	21.07	0.75	0.00	21.64	33.3	2
CN3L	CN3L:E	End	9.03	12.34	0.05	3.06	-2.62	0.00	0.0	-4.36	7.73	-0.00	-0.60	0.00	2.22	0.00	3.89	6.0	4
CN3R	CN3R:O	Origin	0.00	12.06	0.05	-0.71	-73.87	-0.01	-0.0	3.16	8.48	0.00	0.34	32.69	0.73	0.00	33.05	50.8	2
CN3R	#CN3R:0	End	4.52	12.20	0.05	-2.83	-35.56	-0.00	-0.0	3.16	8.48	0.00	0.38	19.97	0.82	0.00	20.40	31.4	2
CN3R	#CN3R:0	Origin	4.52	12.20	0.05	-2.83	-35.56	-0.00	0.0	3.23	8.27	0.00	0.39	19.97	0.80	0.00	20.40	31.4	2
CN3R	CN3R:E	End	9.03	12.35	0.05	-5.32	1.78	0.00	0.0	3.23	8.27	0.00	0.45	0.00	2.37	0.00	4.13	6.4	4

Summary of Clamp Capacities and Usages for Load Case "NESC 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 %
ANT1LOAD	5.944	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax1	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax2	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax3	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax4	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax5	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax6	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax7	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax8	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax9	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax10	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax11	0.491	100.00	0.00	0.00	0.00	0.00	0.00	0.00

Summary of Suspension Capacities and Usages for Load Case "NESC 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 %
swl	3.073	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
swr	3.073	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn1l	8.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn1r	8.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn2l	8.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn2r	8.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn3l	8.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn3r	8.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00

*** Analysis Results for Load Case No. 2 "NESC 250C" - Number of iterations in SAPS 14

Equilibrium Joint Positions and Rotations for Load Case "NESC 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)
P:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
P:t	0.01103	6.092	-0.2128	-5.2506	0.0127	-0.0004	0.01103	6.092	114.8
P:ANT	0.009689	5.543	-0.1877	-5.2479	0.0127	-0.0004	0.009689	5.543	108.8
P:Coax11	0.008805	5.178	-0.1709	-5.1969	0.0124	-0.0003	0.008805	5.178	104.8
P:Coax10	0.006832	4.299	-0.1321	-4.8416	0.0099	-0.0002	0.006832	4.299	94.87
P:SW	0.006491	4.131	-0.125	-4.7981	0.0096	-0.0002	0.006491	4.131	92.88
P:CN1	0.00538	3.555	-0.1012	-4.6185	0.0085	-0.0001	0.00538	3.555	85.9
P:Coax9	0.005231	3.475	-0.098	-4.5887	0.0084	-0.0001	0.005231	3.475	84.9
P:Coax8	0.003889	2.706	-0.06821	-4.1959	0.0070	-0.0001	0.003889	2.706	74.93
P:CN2	0.003768	2.633	-0.06554	-4.1507	0.0068	-0.0000	0.003768	2.633	73.93
P:Coax7	0.002791	2.015	-0.04413	-3.6846	0.0056	-0.0000	0.002791	2.015	64.96
P:CN3	0.002506	1.826	-0.03812	-3.5138	0.0052	-0.0000	0.002506	1.826	61.96
P:Coax6	0.001916	1.422	-0.02624	-3.0867	0.0044	-0.0000	0.001916	1.422	54.97
P:Coax5	0.001237	0.9364	-0.01417	-2.4684	0.0034	0.0000	0.001237	0.9364	44.99
P:Coax4	0.0007242	0.5564	-0.006694	-1.8723	0.0025	0.0000	0.0007242	0.5564	34.99
P:Coax3	0.0003587	0.2787	-0.002594	-1.2979	0.0017	0.0000	0.0003587	0.2787	25
P:Coax2	0.000126	0.09884	-0.0007371	-0.7539	0.0010	0.0000	0.000126	0.09884	15
P:Coax1	1.405e-05	0.01112	-0.0001174	-0.2430	0.0003	0.0000	1.405e-05	0.01112	5
SWL:O	0.006501	4.134	-0.05361	-4.7981	0.0096	-0.0002	0.006501	3.28	92.95
SWL:E	0.006601	4.175	0.2749	-4.6745	0.0096	-0.0002	0.006601	-0.6787	93.61
SWR:O	0.006482	4.128	-0.1964	-4.7981	0.0096	-0.0002	0.006482	4.981	92.8
SWR:E	0.006493	4.142	-0.5344	-4.8273	0.0096	-0.0002	0.006493	8.995	92.8
CN1L:O	0.005389	3.558	-0.02388	-4.6185	0.0085	-0.0001	0.005389	2.597	85.98
CN1L:E	0.005589	3.643	0.6671	-4.2777	0.0086	-0.0001	0.005589	-6.318	87.42
CN1R:O	0.00537	3.552	-0.1786	-4.6185	0.0085	-0.0001	0.00537	4.513	85.82
CN1R:E	0.005387	3.583	-0.9343	-4.8754	0.0086	-0.0001	0.005387	13.54	85.82
CN2L:O	0.003777	2.636	0.01734	-4.1507	0.0068	-0.0000	0.003777	1.491	74.02
CN2L:E	0.003934	2.709	0.635	-3.8045	0.0068	-0.0000	0.003934	-7.436	75.38
CN2R:O	0.003759	2.63	-0.1484	-4.1507	0.0068	-0.0000	0.003759	3.775	73.85
CN2R:E	0.003775	2.661	-0.8308	-4.4125	0.0068	-0.0000	0.003775	12.81	73.92
CN3L:O	0.002513	1.829	0.04335	-3.5138	0.0052	-0.0000	0.002513	0.4996	62.04
CN3L:E	0.002629	1.887	0.5609	-3.1603	0.0052	-0.0000	0.002629	-8.442	63.31
CN3R:O	0.002499	1.824	-0.1196	-3.5138	0.0052	-0.0000	0.002499	3.153	61.88
CN3R:E	0.002516	1.854	-0.7023	-3.7822	0.0052	-0.0000	0.002516	12.18	62.05
SWLVang	0.006518	4.134	0.2799	-4.6745	0.0096	-0.0002	0.006518	-0.7607	93.12
SWRVang	0.00641	4.099	-0.5361	-4.8273	0.0096	-0.0002	0.00641	8.994	92.3
CN1LVang	0.005497	3.597	0.6727	-4.2777	0.0086	-0.0001	0.005497	-6.416	86.8
CN1RVang	0.005294	3.53	-0.9364	-4.8754	0.0086	-0.0001	0.005294	13.54	85.19
CN2LVang	0.003861	2.668	0.6398	-3.8045	0.0068	-0.0000	0.003861	-7.529	74.77
CN2RVang	0.003701	2.613	-0.833	-4.4125	0.0068	-0.0000	0.003701	12.81	73.29
CN3LVang	0.002572	1.853	0.5648	-3.1603	0.0052	-0.0000	0.002572	-8.528	62.69
CN3RVang	0.002459	1.813	-0.7044	-3.7822	0.0052	-0.0000	0.002459	12.19	61.42

Joint Support Reactions for Load Case "NESC 250C":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	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 %
P:g	-0.07	0.0	-64.55	0.0	0.0	-47.72	0.0	0.0	0.00	0.0	4652.00	0.0	-5.9	0.0	0.0	-0.01	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC 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.
P	P:t	Origin	0.00	73.10	0.13	-2.55	-0.00	-0.00	0.0	-0.04	0.06	-0.00	-0.01	0.00	0.02	0.00	0.03	0.0	5
P	Tube 1	End	3.00	69.81	0.12	-2.40	0.19	-0.00	0.0	-0.04	0.06	-0.00	-0.00	0.09	0.00	0.00	0.09	0.1	2
P	Tube 1	Origin	3.00	69.81	0.12	-2.40	0.19	-0.00	0.0	-0.12	0.19	-0.00	-0.02	0.09	0.01	0.00	0.11	0.2	2
P	P:ANT	End	6.00	66.51	0.12	-2.25	0.77	-0.00	0.0	-0.12	0.19	-0.00	-0.01	0.31	0.01	0.00	0.32	0.5	2
P	P:ANT	Origin	6.00	66.51	0.12	-2.25	0.77	-0.00	0.0	-2.91	5.22	-0.04	-0.34	0.00	1.26	0.00	2.20	3.4	5
P	P:Coax11	End	10.00	62.14	0.11	-2.05	21.63	-0.16	0.0	-2.91	5.22	-0.04	-0.31	7.10	0.30	0.00	7.43	11.4	2
P	P:Coax11	Origin	10.00	62.14	0.11	-2.05	21.63	-0.16	-0.0	-3.14	6.06	-0.04	-0.34	7.10	0.34	0.00	7.46	11.5	2
P	Tube 1	End	15.00	56.77	0.09	-1.81	51.93	-0.36	-0.0	-3.14	6.06	-0.04	-0.30	13.60	0.31	0.00	13.91	21.4	2
P	Tube 1	Origin	15.00	56.77	0.09	-1.81	51.93	-0.36	0.0	-3.33	6.34	-0.04	-0.32	13.60	0.32	0.00	13.93	21.4	2
P	P:Coax10	End	20.00	51.58	0.08	-1.58	83.62	-0.57	0.0	-3.33	6.34	-0.04	-0.29	17.87	0.29	0.00	18.17	28.0	2
P	P:Coax10	Origin	20.00	51.58	0.08	-1.58	83.62	-0.57	0.0	-3.60	7.16	-0.04	-0.15	8.85	0.16	0.00	9.00	13.9	2
P	P:SW	End	22.00	49.57	0.08	-1.50	97.94	-0.65	0.0	-3.60	7.16	-0.04	-0.15	9.61	0.16	0.00	9.76	15.0	2
P	P:SW	Origin	22.00	49.57	0.08	-1.50	97.30	-0.65	0.0	-4.94	11.52	-0.04	-0.20	9.55	0.25	0.00	9.76	15.0	2
P	Tube 2	End	25.50	46.08	0.07	-1.35	137.63	-0.80	0.0	-4.94	11.52	-0.04	-0.19	11.91	0.24	0.00	12.11	18.6	2
P	Tube 2	Origin	25.50	46.08	0.07	-1.35	137.63	-0.80	0.0	-5.26	11.78	-0.04	-0.20	11.91	0.24	0.00	12.12	18.6	2
P	P:CN1	End	29.00	42.66	0.06	-1.21	178.85	-0.95	0.0	-5.26	11.78	-0.04	-0.19	13.75	0.23	0.00	13.95	21.5	2
P	P:CN1	Origin	29.00	42.66	0.06	-1.21	180.49	-0.95	0.0	-11.88	24.94	-0.04	-0.43	13.88	0.48	0.00	14.33	22.1	2
P	P:Coax9	End	30.00	41.70	0.06	-1.18	205.42	-1.00	0.0	-11.88	24.94	-0.04	-0.43	15.29	0.48	0.00	15.74	24.2	2
P	P:Coax9	Origin	30.00	41.70	0.06	-1.18	205.42	-1.00	0.0	-12.29	25.77	-0.05	-0.44	15.29	0.49	0.00	15.75	24.2	2
P	Tube 2	End	35.00	36.98	0.05	-0.99	334.29	-1.22	0.0	-12.29	25.77	-0.05	-0.41	21.30	0.46	0.00	21.72	33.4	2
P	Tube 2	Origin	35.00	36.98	0.05	-0.99	334.29	-1.22	0.0	-12.89	26.17	-0.05	-0.43	21.30	0.46	0.00	21.74	33.5	2
P	P:Coax8	End	40.00	32.47	0.05	-0.82	465.13	-1.46	0.0	-12.89	26.17	-0.05	-0.40	25.66	0.43	0.00	26.07	40.1	2
P	P:Coax8	Origin	40.00	32.47	0.05	-0.82	465.13	-1.46	0.0	-13.35	27.02	-0.05	-0.41	25.66	0.44	0.00	26.09	40.1	2
P	P:CN2	End	41.00	31.59	0.05	-0.79	492.14	-1.50	0.0	-13.35	27.02	-0.05	-0.41	26.42	0.44	0.00	26.83	41.3	2
P	P:CN2	Origin	41.00	31.59	0.05	-0.79	493.74	-1.50	0.0	-20.25	40.18	-0.05	-0.62	26.50	0.65	0.00	27.14	41.8	2
P	Tube 2	End	45.50	27.78	0.04	-0.65	674.53	-1.72	0.0	-20.25	40.18	-0.05	-0.58	32.12	0.61	0.00	32.72	50.3	2
P	Tube 2	Origin	45.50	27.78	0.04	-0.65	674.53	-1.72	0.0	-20.95	40.54	-0.05	-0.60	32.12	0.62	0.00	32.74	50.4	2
P	P:Coax7	End	50.00	24.18	0.03	-0.53	856.96	-1.95	0.0	-20.95	40.54	-0.05	-0.57	36.45	0.59	0.00	37.04	57.0	2
P	P:Coax7	Origin	50.00	24.18	0.03	-0.53	856.96	-1.95	0.0	-21.65	41.46	-0.05	-0.59	36.45	0.60	0.00	37.06	57.0	2
P	P:CN3	End	53.00	21.92	0.03	-0.46	981.34	-2.10	0.0	-21.65	41.46	-0.05	-0.57	38.85	0.58	0.00	39.43	60.7	2
P	P:CN3	Origin	53.00	21.92	0.03	-0.46	982.86	-2.10	0.0	-28.87	54.59	-0.05	-0.76	38.91	0.76	0.00	39.69	61.1	2
P	Tube 2	End	56.50	19.41	0.03	-0.38	1173.93	-2.28	0.0	-28.87	54.59	-0.05	-0.73	42.87	0.73	0.00	43.62	67.1	2
P	Tube 2	Origin	56.50	19.41	0.03	-0.38	1173.93	-2.28	0.0	-29.55	54.88	-0.05	-0.75	42.87	0.73	0.00	43.64	67.1	2
P	P:Coax6	End	60.00	17.06	0.02	-0.31	1366.00	-2.47	0.0	-29.55	54.88	-0.05	-0.72	46.17	0.71	0.00	46.90	72.2	2
P	P:Coax6	Origin	60.00	17.06	0.02	-0.31	1366.00	-2.47	0.0	-30.19	55.71	-0.05	-0.73	46.17	0.72	0.00	46.92	72.2	2
P	SpliceT	End	62.00	15.79	0.02	-0.28	1477.41	-2.57	0.0	-30.19	55.71	-0.05	-0.72	47.83	0.70	0.00	48.57	74.7	2
P	SpliceT	Origin	62.00	15.79	0.02	-0.28	1477.41	-2.57	0.0	-31.33	56.03	-0.05	-0.75	47.83	0.71	0.00	48.59	74.8	2
P	SpliceB	End	67.00	12.85	0.02	-0.21	1757.57	-2.85	0.0	-31.33	56.03	-0.05	-0.62	46.07	0.59	0.00	46.71	71.9	2
P	SpliceB	Origin	67.00	12.85	0.02	-0.21	1757.57	-2.85	0.0	-32.62	56.40	-0.06	-0.65	46.07	0.59	0.00	46.73	71.9	2
P	P:Coax5	End	70.00	11.24	0.01	-0.17	1926.76	-3.01	0.0	-32.62	56.40	-0.06	-0.63	47.52	0.57	0.00	48.16	74.1	2
P	P:Coax5	Origin	70.00	11.24	0.01	-0.17	1926.76	-3.01	0.0	-33.67	57.37	-0.06	-0.65	47.52	0.58	0.00	48.18	74.1	2
P	Tube 3	End	75.00	8.80	0.01	-0.12	2213.62	-3.30	0.0	-33.67	57.37	-0.06	-0.62	49.51	0.56	0.00	50.13	77.1	2
P	Tube 3	Origin	75.00	8.80	0.01	-0.12	2213.62	-3.30	0.0	-34.90	57.85	-0.06	-0.64	49.51	0.56	0.00	50.15	77.2	2
P	P:Coax4	End	80.00	6.68	0.01	-0.08	2502.86	-3.59	0.0	-34.90	57.85	-0.06	-0.61	50.99	0.53	0.00	51.61	79.4	2
P	P:Coax4	Origin	80.00	6.68	0.01	-0.08	2502.86	-3.59	0.0	-36.27	58.95	-0.06	-0.63	50.99	0.55	0.00	51.63	79.4	2
P	Tube 3	End	85.00	4.86	0.01	-0.05	2797.61	-3.89	0.0	-36.27	58.95	-0.06	-0.61	52.14	0.52	0.00	52.75	81.2	2
P	Tube 3	Origin	85.00	4.86	0.01	-0.05	2797.61	-3.89	0.0	-37.59	59.47	-0.06	-0.63	52.14	0.53	0.00	52.78	81.2	2
P	P:Coax3	End	90.00	3.34	0.00	-0.03	3094.96	-4.20	0.0	-37.59	59.47	-0.06	-0.60	52.97	0.50	0.00	53.58	82.4	2
P	P:Coax3	Origin	90.00	3.34	0.00	-0.03	3094.96	-4.20	0.0	-39.05	60.62	-0.06	-0.63	52.97	0.51	0.00	53.60	82.5	2
P	Tube 3	End	95.00	2.12	0.00	-0.02	3398.05	-4.52	0.0	-39.05	60.62	-0.06	-0.60	53.59	0.49	0.00	54.19	83.4	2
P	Tube 3	Origin	95.00	2.12	0.00	-0.02	3398.05	-4.52	0.0	-40.45	61.19	-0.07	-0.62	53.59	0.50	0.00	54.21	83.4	2

P	P:Coax2	End	100.00	1.19	0.00	-0.01	3703.98	-4.84	0.0	-40.45	61.19	-0.07	-0.60	54.00	0.48	0.00	54.60	84.0	2
P	P:Coax2	Origin	100.00	1.19	0.00	-0.01	3703.98	-4.84	0.0	-42.00	62.38	-0.07	-0.62	54.00	0.49	0.00	54.62	84.0	2
P	Tube 3	End	105.00	0.53	0.00	-0.00	4015.88	-5.18	0.0	-42.00	62.38	-0.07	-0.60	54.28	0.47	0.00	54.88	84.4	2
P	Tube 3	Origin	105.00	0.53	0.00	-0.00	4015.88	-5.18	0.0	-43.47	62.99	-0.07	-0.62	54.28	0.47	0.00	54.91	84.5	2
P	P:Coax1	End	110.00	0.13	0.00	-0.00	4330.84	-5.53	0.0	-43.47	62.99	-0.07	-0.60	54.42	0.46	0.00	55.03	84.7	2
P	P:Coax1	Origin	110.00	0.13	0.00	-0.00	4330.84	-5.53	0.0	-45.11	64.23	-0.07	-0.62	54.42	0.47	0.00	55.05	84.7	2
P	P:g	End	115.00	0.00	0.00	0.00	4652.00	-5.89	0.0	-45.11	64.23	-0.07	-0.60	54.49	0.45	0.00	55.10	85.5	2

Detailed Tubular Davit Arm Usages for Load Case "NESC 250C":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
SWL	SWL:O	Origin	0.00	49.60	0.08	-0.64	-2.45	0.00	0.0	-2.12	0.35	-0.00	-0.59	5.48	0.08	0.00	6.06	9.3	2
SWL	SWL:E	End	4.01	50.10	0.08	3.30	-1.04	0.00	0.0	-2.12	0.35	-0.00	-0.59	2.32	0.08	0.00	2.91	4.5	2
SWR	SWR:O	Origin	0.00	49.53	0.08	-2.36	-1.81	-0.00	0.0	2.03	0.70	0.00	0.56	4.04	0.16	0.00	4.61	7.1	2
SWR	SWR:E	End	4.01	49.70	0.08	-6.41	0.98	0.00	0.0	2.03	0.70	0.00	0.56	2.19	0.16	0.00	2.77	4.3	2
CN1L	CN1L:O	Origin	0.00	42.70	0.06	-0.29	-27.02	0.01	0.0	-6.72	2.59	-0.00	-0.72	11.96	0.22	0.00	12.68	19.5	2
CN1L	#CN1L:0	End	4.52	43.22	0.07	3.94	-15.31	0.00	0.0	-6.72	2.59	-0.00	-0.81	8.59	0.25	0.00	9.42	14.5	2
CN1L	#CN1L:0	Origin	4.52	43.22	0.07	3.94	-15.31	0.00	0.0	-6.69	2.49	-0.00	-0.81	8.59	0.24	0.00	9.41	14.5	2
CN1L	CN1L:E	End	9.03	43.72	0.07	8.01	-4.05	0.00	0.0	-6.69	2.49	-0.00	-0.92	2.98	0.28	0.00	3.93	6.0	2
CN1R	CN1R:O	Origin	0.00	42.62	0.06	-2.14	-28.65	-0.00	0.0	6.22	3.65	0.00	0.67	12.68	0.31	0.00	13.36	20.5	2
CN1R	#CN1R:0	End	4.52	42.81	0.06	-6.61	-12.16	-0.00	0.0	6.22	3.65	0.00	0.75	6.83	0.35	0.00	7.60	11.7	2
CN1R	#CN1R:0	Origin	4.52	42.81	0.06	-6.61	-12.16	-0.00	0.0	6.23	3.51	0.00	0.75	6.83	0.34	0.00	7.60	11.7	2
CN1R	CN1R:E	End	9.03	43.00	0.06	-11.21	3.69	0.00	0.0	6.23	3.51	0.00	0.86	2.72	0.39	0.00	3.64	5.6	2
CN2L	CN2L:O	Origin	0.00	31.63	0.05	0.21	-27.52	0.00	0.0	-6.69	2.65	-0.00	-0.72	12.18	0.23	0.00	12.90	19.9	2
CN2L	#CN2L:0	End	4.52	32.08	0.05	4.00	-15.56	0.00	0.0	-6.69	2.65	-0.00	-0.81	8.73	0.26	0.00	9.55	14.7	2
CN2L	#CN2L:0	Origin	4.52	32.08	0.05	4.00	-15.56	0.00	0.0	-6.67	2.55	-0.00	-0.80	8.73	0.25	0.00	9.55	14.7	2
CN2L	CN2L:E	End	9.03	32.51	0.05	7.62	-4.05	0.00	0.0	-6.67	2.55	-0.00	-0.92	2.98	0.28	0.00	3.93	6.0	2
CN2R	CN2R:O	Origin	0.00	31.56	0.05	-1.78	-29.11	-0.00	0.0	6.19	3.70	0.00	0.66	12.88	0.32	0.00	13.55	20.9	2
CN2R	#CN2R:0	End	4.52	31.74	0.05	-5.81	-12.39	-0.00	0.0	6.19	3.70	0.00	0.75	6.95	0.36	0.00	7.73	11.9	2
CN2R	#CN2R:0	Origin	4.52	31.74	0.05	-5.81	-12.39	-0.00	0.0	6.20	3.56	0.00	0.75	6.95	0.35	0.00	7.73	11.9	2
CN2R	CN2R:E	End	9.03	31.93	0.05	-9.97	3.69	0.00	0.0	6.20	3.56	0.00	0.85	2.72	0.40	0.00	3.64	5.6	2
CN3L	CN3L:O	Origin	0.00	21.95	0.03	0.52	-28.20	0.00	0.0	-6.66	2.73	-0.00	-0.72	12.48	0.23	0.00	13.20	20.3	2
CN3L	#CN3L:0	End	4.52	22.31	0.03	3.71	-15.90	0.00	0.0	-6.66	2.73	-0.00	-0.80	8.92	0.26	0.00	9.74	15.0	2
CN3L	#CN3L:0	Origin	4.52	22.31	0.03	3.71	-15.90	0.00	0.0	-6.64	2.62	-0.00	-0.80	8.92	0.25	0.00	9.74	15.0	2
CN3L	CN3L:E	End	9.03	22.65	0.03	6.73	-4.05	0.00	0.0	-6.64	2.62	-0.00	-0.92	2.98	0.29	0.00	3.93	6.0	2
CN3R	CN3R:O	Origin	0.00	21.89	0.03	-1.44	-29.72	-0.00	0.0	6.15	3.77	0.00	0.66	13.15	0.32	0.00	13.82	21.3	2
CN3R	#CN3R:0	End	4.52	22.07	0.03	-4.87	-12.69	-0.00	0.0	6.15	3.77	0.00	0.74	7.13	0.37	0.00	7.89	12.1	2
CN3R	#CN3R:0	Origin	4.52	22.07	0.03	-4.87	-12.69	-0.00	0.0	6.16	3.63	0.00	0.74	7.13	0.35	0.00	7.89	12.1	2
CN3R	CN3R:E	End	9.03	22.25	0.03	-8.43	3.69	0.00	0.0	6.16	3.63	0.00	0.85	2.72	0.40	0.00	3.64	5.6	2

Summary of Clamp Capacities and Usages for Load Case "NESC 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 %

ANT1LOAD	5.555	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax1	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax2	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax3	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax4	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax5	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax6	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax7	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax8	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax9	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax10	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax11	0.614	100.00	0.00	0.00	0.00	0.00	0.00	0.00

Summary of Suspension Capacities and Usages for Load Case "NESC 250C":

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 %
swl	2.138	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
swr	2.138	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn1l	7.109	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn1r	7.118	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn2l	7.109	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn2r	7.118	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn3l	7.109	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn3r	7.118	5000.00	0.00	0.00	0.00	0.00	0.00	0.00

*** Analysis Results for Load Case No. 3 "NESC 250D" - Number of iterations in SAPS 14

Equilibrium Joint Positions and Rotations for Load Case "NESC 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)
P:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
P:t	0.01118	2.38	-0.03634	-1.9706	0.0124	-0.0001	0.01118	2.38	115
P:ANT	0.009882	2.174	-0.03279	-1.9697	0.0124	-0.0001	0.009882	2.174	109
P:Coax11	0.009022	2.036	-0.03036	-1.9580	0.0121	-0.0001	0.009022	2.036	105
P:Coax10	0.007081	1.701	-0.02453	-1.8777	0.0099	-0.0001	0.007081	1.701	94.98
P:SW	0.006741	1.635	-0.02344	-1.8679	0.0096	-0.0001	0.006741	1.635	92.98
P:CN1	0.005623	1.41	-0.01967	-1.8173	0.0086	-0.0000	0.005623	1.41	85.98
P:Coax9	0.005473	1.378	-0.01913	-1.8077	0.0085	-0.0000	0.005473	1.378	84.98
P:Coax8	0.004104	1.074	-0.01412	-1.6649	0.0071	-0.0000	0.004104	1.074	74.99
P:CN2	0.003981	1.045	-0.01366	-1.6477	0.0070	-0.0000	0.003981	1.045	73.99
P:Coax7	0.002969	0.799	-0.009848	-1.4658	0.0058	-0.0000	0.002969	0.799	64.99
P:CN3	0.002672	0.7239	-0.008761	-1.3981	0.0055	-0.0000	0.002672	0.7239	61.99
P:Coax6	0.002052	0.5629	-0.006477	-1.2277	0.0046	0.0000	0.002052	0.5629	54.99
P:Coax5	0.001333	0.3699	-0.004067	-0.9797	0.0036	0.0000	0.001333	0.3699	45
P:Coax4	0.0007851	0.2192	-0.002446	-0.7409	0.0027	0.0000	0.0007851	0.2192	35
P:Coax3	0.000391	0.1095	-0.001384	-0.5117	0.0018	0.0000	0.000391	0.1095	25
P:Coax2	0.0001381	0.03872	-0.0006921	-0.2961	0.0011	0.0000	0.0001381	0.03872	15
P:Coax1	1.55e-05	0.004339	-0.0002079	-0.0951	0.0003	0.0000	1.55e-05	0.004339	5
SWL:O	0.006744	1.636	0.004378	-1.8679	0.0096	-0.0001	0.006744	0.7823	93
SWL:E	0.006814	1.646	0.1101	-1.3322	0.0096	-0.0001	0.006814	-3.207	93.44
SWR:O	0.006737	1.635	-0.05125	-1.8679	0.0096	-0.0001	0.006737	2.488	92.95
SWR:E	0.006771	1.645	-0.2044	-2.3334	0.0096	-0.0001	0.006771	6.498	93.13
CN1L:O	0.005627	1.41	0.0108	-1.8173	0.0086	-0.0000	0.005627	0.4494	86.01
CN1L:E	0.005766	1.43	0.2145	-0.9925	0.0087	-0.0000	0.005766	-8.531	86.96
CN1R:O	0.005619	1.409	-0.05014	-1.8173	0.0086	-0.0000	0.005619	2.37	85.95
CN1R:E	0.005684	1.432	-0.4163	-2.6066	0.0087	-0.0000	0.005684	11.39	86.33
CN2L:O	0.003984	1.045	0.01926	-1.6477	0.0070	-0.0000	0.003984	-0.09999	74.02
CN2L:E	0.004096	1.062	0.1963	-0.8219	0.0070	-0.0000	0.004096	-9.083	74.95
CN2R:O	0.003977	1.044	-0.04659	-1.6477	0.0070	-0.0000	0.003977	2.189	73.95
CN2R:E	0.00403	1.066	-0.3861	-2.4376	0.0070	-0.0000	0.00403	11.21	74.36
CN3L:O	0.002675	0.7243	0.02367	-1.3981	0.0055	-0.0000	0.002675	-0.6051	62.02
CN3L:E	0.00276	0.737	0.1614	-0.5709	0.0055	0.0000	0.00276	-9.592	62.91
CN3R:O	0.002669	0.7235	-0.0412	-1.3981	0.0055	-0.0000	0.002669	2.053	61.96
CN3R:E	0.002712	0.7435	-0.3415	-2.1889	0.0055	-0.0000	0.002712	11.07	62.41
SWLVang	0.006731	1.634	0.1112	-1.3322	0.0096	-0.0001	0.006731	-3.26	92.95
SWRVang	0.006688	1.624	-0.2057	-2.3334	0.0096	-0.0001	0.006688	6.519	92.63
CN1LVang	0.005672	1.419	0.2155	-0.9925	0.0087	-0.0000	0.005672	-8.594	86.34
CN1RVang	0.005589	1.404	-0.418	-2.6066	0.0087	-0.0000	0.005589	11.42	85.71
CN2LVang	0.00402	1.053	0.1971	-0.8219	0.0070	-0.0000	0.00402	-9.144	74.32
CN2RVang	0.003953	1.04	-0.3877	-2.4376	0.0070	-0.0000	0.003953	11.24	73.74
CN3LVang	0.002701	0.7308	0.162	-0.5709	0.0055	0.0000	0.002701	-9.65	62.29
CN3RVang	0.002653	0.7197	-0.343	-2.1889	0.0055	-0.0000	0.002653	11.1	61.78

Joint Support Reactions for Load Case "NESC 250D":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	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 %
P:g	-0.09	0.0	-23.76	0.0	0.0	-91.16	0.0	0.0	0.00	0.0	1816.49	0.0	-6.5	0.0	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC 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.
P	P:t	Origin	0.00	28.56	0.13	-0.44	-0.00	-0.00	0.0	-0.06	0.02	-0.00	-0.01	0.00	0.01	0.00	0.01	0.0	5
P	Tube 1	End	3.00	27.32	0.13	-0.41	0.06	-0.00	0.0	-0.06	0.02	-0.00	-0.01	0.03	0.00	0.00	0.04	0.1	2
P	Tube 1	Origin	3.00	27.32	0.13	-0.41	0.06	-0.00	0.0	-0.19	0.06	-0.00	-0.02	0.03	0.00	0.00	0.05	0.1	2
P	P:ANT	End	6.00	26.08	0.12	-0.39	0.25	-0.00	0.0	-0.19	0.06	-0.00	-0.02	0.10	0.00	0.00	0.12	0.2	2
P	P:ANT	Origin	6.00	26.08	0.12	-0.39	0.25	-0.00	0.0	-5.04	1.16	-0.03	-0.60	0.03	0.27	0.00	0.78	1.2	4
P	P:Coax11	End	10.00	24.44	0.11	-0.36	4.89	-0.14	0.0	-5.04	1.16	-0.03	-0.54	1.62	0.07	0.00	2.16	3.3	2
P	P:Coax11	Origin	10.00	24.44	0.11	-0.36	4.89	-0.14	-0.0	-5.69	1.36	-0.04	-0.61	1.62	0.08	0.00	2.23	3.4	2
P	Tube 1	End	15.00	22.40	0.10	-0.33	11.70	-0.32	-0.0	-5.69	1.36	-0.04	-0.54	3.08	0.07	0.00	3.63	5.6	2
P	Tube 1	Origin	15.00	22.40	0.10	-0.33	11.70	-0.32	-0.0	-5.98	1.45	-0.04	-0.57	3.08	0.07	0.00	3.66	5.6	2
P	P:Coax10	End	20.00	20.41	0.08	-0.29	18.96	-0.51	-0.0	-5.98	1.45	-0.04	-0.52	4.07	0.07	0.00	4.59	7.1	2
P	P:Coax10	Origin	20.00	20.41	0.08	-0.29	18.96	-0.51	0.0	-6.67	1.65	-0.04	-0.29	2.02	0.04	0.00	2.30	3.5	2
P	P:SW	End	22.00	19.62	0.08	-0.28	22.25	-0.59	0.0	-6.67	1.65	-0.04	-0.27	2.19	0.04	0.00	2.47	3.8	2
P	P:SW	Origin	22.00	19.62	0.08	-0.28	21.76	-0.59	0.0	-13.94	4.93	-0.04	-0.58	2.15	0.11	0.00	2.73	4.2	2
P	Tube 2	End	25.50	18.26	0.07	-0.26	39.01	-0.73	0.0	-13.94	4.93	-0.04	-0.54	3.39	0.10	0.00	3.93	6.0	2
P	Tube 2	Origin	25.50	18.26	0.07	-0.26	39.01	-0.73	0.0	-14.35	5.01	-0.04	-0.56	3.39	0.10	0.00	3.95	6.1	2
P	P:CN1	End	29.00	16.92	0.07	-0.24	56.53	-0.87	0.0	-14.35	5.01	-0.04	-0.52	4.36	0.10	0.00	4.89	7.5	2
P	P:CN1	Origin	29.00	16.92	0.07	-0.24	57.12	-0.88	0.0	-31.38	10.65	-0.04	-1.15	4.40	0.21	0.00	5.56	8.6	2
P	P:Coax9	End	30.00	16.54	0.07	-0.23	67.77	-0.92	0.0	-31.38	10.65	-0.04	-1.13	5.05	0.20	0.00	6.19	9.5	2
P	P:Coax9	Origin	30.00	16.54	0.07	-0.23	67.77	-0.92	0.0	-32.20	10.84	-0.05	-1.16	5.05	0.21	0.00	6.22	9.6	2
P	Tube 2	End	35.00	14.67	0.06	-0.20	121.96	-1.15	0.0	-32.20	10.84	-0.05	-1.07	7.78	0.19	0.00	8.86	13.6	2
P	Tube 2	Origin	35.00	14.67	0.06	-0.20	121.96	-1.15	0.0	-32.88	10.93	-0.05	-1.10	7.78	0.19	0.00	8.88	13.7	2
P	P:Coax8	End	40.00	12.88	0.05	-0.17	176.63	-1.39	0.0	-32.88	10.93	-0.05	-1.02	9.76	0.18	0.00	10.78	16.6	2
P	P:Coax8	Origin	40.00	12.88	0.05	-0.17	176.63	-1.39	0.0	-33.73	11.12	-0.05	-1.05	9.76	0.18	0.00	10.81	16.6	2
P	P:CN2	End	41.00	12.54	0.05	-0.16	187.74	-1.44	0.0	-33.73	11.12	-0.05	-1.03	10.09	0.18	0.00	11.13	17.1	2
P	P:CN2	Origin	41.00	12.54	0.05	-0.16	188.30	-1.44	0.0	-50.94	16.70	-0.05	-1.56	10.12	0.27	0.00	11.69	18.0	2
P	Tube 2	End	45.50	11.02	0.04	-0.14	263.46	-1.67	0.0	-50.94	16.70	-0.05	-1.47	12.56	0.26	0.00	14.03	21.6	2
P	Tube 2	Origin	45.50	11.02	0.04	-0.14	263.46	-1.67	0.0	-51.66	16.76	-0.05	-1.49	12.56	0.26	0.00	14.06	21.6	2
P	P:Coax7	End	50.00	9.59	0.04	-0.12	338.88	-1.91	0.0	-51.66	16.76	-0.05	-1.41	14.43	0.24	0.00	15.84	24.4	2
P	P:Coax7	Origin	50.00	9.59	0.04	-0.12	338.88	-1.91	0.0	-52.72	16.93	-0.05	-1.44	14.43	0.24	0.00	15.87	24.4	2
P	P:CN3	End	53.00	8.69	0.03	-0.11	389.66	-2.07	0.0	-52.72	16.93	-0.05	-1.39	15.44	0.24	0.00	16.83	25.9	2
P	P:CN3	Origin	53.00	8.69	0.03	-0.11	390.17	-2.08	0.0	-70.10	22.43	-0.06	-1.84	15.46	0.31	0.00	17.31	26.6	2
P	Tube 2	End	56.50	7.69	0.03	-0.09	468.66	-2.28	0.0	-70.10	22.43	-0.06	-1.77	17.13	0.30	0.00	18.91	29.1	2
P	Tube 2	Origin	56.50	7.69	0.03	-0.09	468.66	-2.28	0.0	-70.75	22.44	-0.06	-1.79	17.13	0.30	0.00	18.93	29.1	2
P	P:Coax6	End	60.00	6.75	0.02	-0.08	547.21	-2.48	0.0	-70.75	22.44	-0.06	-1.72	18.51	0.29	0.00	20.23	31.1	2
P	P:Coax6	Origin	60.00	6.75	0.02	-0.08	547.21	-2.48	0.0	-71.70	22.57	-0.06	-1.74	18.51	0.29	0.00	20.26	31.2	2
P	SpliceT	End	62.00	6.25	0.02	-0.07	592.36	-2.60	0.0	-71.70	22.57	-0.06	-1.71	19.19	0.28	0.00	20.90	32.2	2
P	SpliceT	Origin	62.00	6.25	0.02	-0.07	592.36	-2.60	0.0	-72.82	22.60	-0.06	-1.73	19.19	0.28	0.00	20.93	32.2	2
P	SpliceB	End	67.00	5.08	0.02	-0.06	705.35	-2.91	0.0	-72.82	22.60	-0.06	-1.44	18.50	0.24	0.00	19.95	30.7	2
P	SpliceB	Origin	67.00	5.08	0.02	-0.06	705.35	-2.91	0.0	-74.09	22.62	-0.06	-1.47	18.50	0.24	0.00	19.98	30.7	2
P	P:Coax5	End	70.00	4.44	0.02	-0.05	773.22	-3.10	0.0	-74.09	22.62	-0.06	-1.42	19.08	0.23	0.00	20.51	31.6	2
P	P:Coax5	Origin	70.00	4.44	0.02	-0.05	773.22	-3.10	0.0	-75.46	22.77	-0.06	-1.45	19.08	0.23	0.00	20.54	31.6	2
P	Tube 3	End	75.00	3.47	0.01	-0.04	887.07	-3.42	0.0	-75.46	22.77	-0.06	-1.38	19.85	0.22	0.00	21.24	32.7	2
P	Tube 3	Origin	75.00	3.47	0.01	-0.04	887.07	-3.42	0.0	-76.69	22.81	-0.07	-1.40	19.85	0.22	0.00	21.26	32.7	2
P	P:Coax4	End	80.00	2.63	0.01	-0.03	1001.10	-3.76	0.0	-76.69	22.81	-0.07	-1.34	20.41	0.21	0.00	21.75	33.5	2
P	P:Coax4	Origin	80.00	2.63	0.01	-0.03	1001.10	-3.76	0.0	-78.39	22.97	-0.07	-1.37	20.41	0.21	0.00	21.78	33.5	2
P	Tube 3	End	85.00	1.91	0.01	-0.02	1115.93	-4.11	0.0	-78.39	22.97	-0.07	-1.31	20.81	0.20	0.00	22.12	34.0	2
P	Tube 3	Origin	85.00	1.91	0.01	-0.02	1115.93	-4.11	0.0	-79.73	23.01	-0.07	-1.33	20.81	0.20	0.00	22.15	34.1	2
P	P:Coax3	End	90.00	1.31	0.00	-0.02	1231.00	-4.47	0.0	-79.73	23.01	-0.07	-1.28	21.08	0.19	0.00	22.36	34.4	2
P	P:Coax3	Origin	90.00	1.31	0.00	-0.02	1231.00	-4.47	0.0	-81.54	23.19	-0.07	-1.31	21.08	0.20	0.00	22.39	34.4	2
P	Tube 3	End	95.00	0.83	0.00	-0.01	1346.94	-4.84	0.0	-81.54	23.19	-0.07	-1.25	21.25	0.19	0.00	22.51	34.6	2
P	Tube 3	Origin	95.00	0.83	0.00	-0.01	1346.94	-4.84	0.0	-82.99	23.25	-0.08	-1.28	21.25	0.19	0.00	22.53	34.7	2

P	P:Coax2	End	100.00	0.46	0.00	-0.01	1463.18	-5.23	0.0	-82.99	23.25	-0.08	-1.23	21.34	0.18	0.00	22.57	34.7	2
P	P:Coax2	Origin	100.00	0.46	0.00	-0.01	1463.18	-5.23	0.0	-84.91	23.44	-0.08	-1.26	21.34	0.18	0.00	22.60	34.8	2
P	Tube 3	End	105.00	0.21	0.00	-0.01	1580.36	-5.63	0.0	-84.91	23.44	-0.08	-1.21	21.37	0.18	0.00	22.59	34.7	2
P	Tube 3	Origin	105.00	0.21	0.00	-0.01	1580.36	-5.63	0.0	-86.47	23.51	-0.08	-1.23	21.37	0.18	0.00	22.61	34.8	2
P	P:Coax1	End	110.00	0.05	0.00	-0.00	1697.92	-6.05	0.0	-86.47	23.51	-0.08	-1.19	21.35	0.17	0.00	22.54	34.7	2
P	P:Coax1	Origin	110.00	0.05	0.00	-0.00	1697.92	-6.05	0.0	-88.50	23.71	-0.09	-1.22	21.35	0.17	0.00	22.57	34.7	2
P	P:g	End	115.00	0.00	0.00	0.00	1816.49	-6.49	0.0	-88.50	23.71	-0.09	-1.17	21.29	0.17	0.00	22.47	34.9	2

Detailed Tubular Davit Arm Usages for Load Case "NESC 250D":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
SWL	SWL:O	Origin	0.00	19.63	0.08	0.05	-14.25	0.00	0.0	-1.87	3.33	-0.00	-0.52	31.79	0.74	0.00	32.34	49.7	2
SWL	SWL:E	End	4.01	19.75	0.08	1.32	-0.89	0.00	0.0	-1.87	3.33	-0.00	-0.52	0.82	1.78	0.00	3.37	5.2	3
SWR	SWR:O	Origin	0.00	19.62	0.08	-0.62	-13.76	-0.00	0.0	1.34	3.58	0.00	0.37	30.69	0.80	0.00	31.09	47.8	2
SWR	SWR:E	End	4.01	19.74	0.08	-2.45	0.60	0.00	0.0	1.34	3.58	0.00	0.37	0.00	2.06	0.00	3.59	5.5	4
CN1L	CN1L:O	Origin	0.00	16.92	0.07	0.13	-74.43	0.01	0.0	-3.43	8.07	-0.00	-0.37	32.93	0.69	0.00	33.32	51.3	2
CN1L	#CN1L:0	End	4.52	17.06	0.07	1.55	-37.99	0.01	0.0	-3.43	8.07	-0.00	-0.41	21.33	0.78	0.00	21.79	33.5	2
CN1L	#CN1L:0	Origin	4.52	17.06	0.07	1.55	-37.99	0.01	0.0	-3.36	7.97	-0.00	-0.41	21.33	0.77	0.00	21.78	33.5	2
CN1L	CN1L:E	End	9.03	17.16	0.07	2.57	-2.00	0.00	0.0	-3.36	7.97	-0.00	-0.46	0.00	2.29	0.00	3.99	6.1	4
CN1R	CN1R:O	Origin	0.00	16.91	0.07	-0.60	-75.02	-0.01	-0.0	2.14	8.51	0.00	0.23	33.20	0.73	0.00	33.45	51.5	2
CN1R	#CN1R:0	End	4.52	17.04	0.07	-2.61	-36.61	-0.01	-0.0	2.14	8.51	0.00	0.26	20.56	0.82	0.00	20.86	32.1	2
CN1R	#CN1R:0	Origin	4.52	17.04	0.07	-2.61	-36.61	-0.01	0.0	2.21	8.36	0.00	0.27	20.56	0.81	0.00	20.87	32.1	2
CN1R	CN1R:E	End	9.03	17.19	0.07	-5.00	1.15	0.00	0.0	2.21	8.36	0.00	0.30	0.00	2.40	0.00	4.17	6.4	4
CN2L	CN2L:O	Origin	0.00	12.54	0.05	0.23	-74.52	0.01	0.0	-3.41	8.08	-0.00	-0.37	32.97	0.69	0.00	33.36	51.3	2
CN2L	#CN2L:0	End	4.52	12.66	0.05	1.49	-38.03	0.00	0.0	-3.41	8.08	-0.00	-0.41	21.35	0.78	0.00	21.81	33.6	2
CN2L	#CN2L:0	Origin	4.52	12.66	0.05	1.49	-38.03	0.00	0.0	-3.34	7.98	-0.00	-0.40	21.35	0.77	0.00	21.80	33.5	2
CN2L	CN2L:E	End	9.03	12.74	0.05	2.36	-2.00	0.00	0.0	-3.34	7.98	-0.00	-0.46	0.00	2.29	0.00	3.99	6.1	4
CN2R	CN2R:O	Origin	0.00	12.53	0.05	-0.56	-75.08	-0.01	-0.0	2.12	8.51	0.00	0.23	33.22	0.73	0.00	33.47	51.5	2
CN2R	#CN2R:0	End	4.52	12.65	0.05	-2.40	-36.64	-0.00	-0.0	2.12	8.51	0.00	0.26	20.57	0.82	0.00	20.88	32.1	2
CN2R	#CN2R:0	Origin	4.52	12.65	0.05	-2.40	-36.64	-0.00	0.0	2.18	8.37	0.00	0.26	20.57	0.81	0.00	20.88	32.1	2
CN2R	CN2R:E	End	9.03	12.79	0.05	-4.63	1.15	0.00	0.0	2.18	8.37	0.00	0.30	0.00	2.40	0.00	4.17	6.4	4
CN3L	CN3L:O	Origin	0.00	8.69	0.03	0.28	-74.66	0.01	0.0	-3.37	8.10	-0.00	-0.36	33.03	0.70	0.00	33.42	51.4	2
CN3L	#CN3L:0	End	4.52	8.79	0.03	1.31	-38.10	0.00	0.0	-3.37	8.10	-0.00	-0.41	21.39	0.78	0.00	21.84	33.6	2
CN3L	#CN3L:0	Origin	4.52	8.79	0.03	1.31	-38.10	0.00	0.0	-3.30	7.99	-0.00	-0.40	21.39	0.77	0.00	21.83	33.6	2
CN3L	CN3L:E	End	9.03	8.84	0.03	1.94	-2.00	0.00	0.0	-3.30	7.99	-0.00	-0.46	0.00	2.29	0.00	4.00	6.2	4
CN3R	CN3R:O	Origin	0.00	8.68	0.03	-0.49	-75.17	-0.01	-0.0	2.08	8.52	0.00	0.22	33.26	0.73	0.00	33.50	51.5	2
CN3R	#CN3R:0	End	4.52	8.79	0.03	-2.10	-36.69	-0.00	-0.0	2.08	8.52	0.00	0.25	20.60	0.83	0.00	20.90	32.1	2
CN3R	#CN3R:0	Origin	4.52	8.79	0.03	-2.10	-36.69	-0.00	0.0	2.15	8.38	0.00	0.26	20.60	0.81	0.00	20.90	32.2	2
CN3R	CN3R:E	End	9.03	8.92	0.03	-4.10	1.15	0.00	0.0	2.15	8.38	0.00	0.30	0.00	2.40	0.00	4.17	6.4	4

Summary of Clamp Capacities and Usages for Load Case "NESC 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 %

ANT1LOAD	4.795	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax1	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax2	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax3	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax4	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax5	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax6	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax7	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax8	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax9	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax10	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Coax11	0.440	100.00	0.00	0.00	0.00	0.00	0.00	0.00

Summary of Suspension Capacities and Usages for Load Case "NESC 250D":

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 %
swl	3.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
swr	3.796	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn1l	8.592	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn1r	8.592	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn2l	8.592	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn2r	8.592	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn3l	8.592	5000.00	0.00	0.00	0.00	0.00	0.00	0.00
cn3r	8.592	5000.00	0.00	0.00	0.00	0.00	0.00	0.00

*** 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)
P	85.48	NESC 250C	2.5	29	18988.8

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
P	NESC 250B	1	2.402	1.211	-0.152	2.686	35.380	17.182	75.985	3	114.658	1.759	3.000	34.36
P	NESC 250B	2	2.686	-0.152	1.211	2.402	35.380	13.089	57.886	3	101.023	1.535	3.000	26.18
P	NESC 250B	3	2.250	-1.474	2.250	1.474	35.380	0.273	1.209	2	63.724	0.222	3.000	0.55
P	NESC 250B	4	1.211	-2.402	2.686	0.152	35.380	11.254	49.770	3	-89.822	1.423	3.000	22.51
P	NESC 250B	5	-0.152	-2.686	2.402	-1.211	35.380	15.313	67.721	3	-103.292	1.660	3.000	30.63
P	NESC 250B	6	-1.474	-2.250	1.474	-2.250	35.380	0.484	2.140	2	-103.292	0.295	3.000	0.97
P	NESC 250B	7	-2.402	-1.211	0.152	-2.686	35.380	15.213	67.279	3	-102.813	1.655	3.000	30.43
P	NESC 250B	8	-2.686	0.152	-1.211	-2.402	35.380	11.120	49.180	3	-89.178	1.415	3.000	22.24
P	NESC 250B	9	-2.250	1.474	-2.250	-1.474	35.380	0.273	1.209	2	64.619	0.222	3.000	0.55
P	NESC 250B	10	-1.211	2.402	-2.686	-0.152	35.380	13.222	58.476	3	101.666	1.543	3.000	26.44
P	NESC 250B	11	0.152	2.686	-2.402	1.211	35.380	17.282	76.427	3	115.136	1.764	3.000	34.56
P	NESC 250B	12	1.474	2.250	-1.474	2.250	35.380	0.539	2.386	2	115.136	0.312	3.000	1.08
P	NESC 250B	13	2.027	1.868	-0.821	2.632	35.380	4.391	19.418	2	114.658	0.889	3.000	8.78
P	NESC 250B	14	2.690	0.605	0.605	2.690	35.380	14.136	62.514	4	114.658	1.595	3.000	28.27
P	NESC 250B	15	2.632	-0.821	1.868	2.027	35.380	2.459	10.875	2	83.867	0.665	3.000	4.92
P	NESC 250B	16	1.868	-2.027	2.632	0.821	35.380	2.039	9.017	2	-72.806	0.606	3.000	4.08
P	NESC 250B	17	0.605	-2.690	2.690	-0.605	35.380	12.410	54.884	4	-103.292	1.495	3.000	24.82
P	NESC 250B	18	-0.821	-2.632	2.027	-1.868	35.380	3.955	17.489	2	-103.292	0.844	3.000	7.91
P	NESC 250B	19	-2.027	-1.868	0.821	-2.632	35.380	3.936	17.408	2	-102.813	0.842	3.000	7.87
P	NESC 250B	20	-2.690	-0.605	-0.605	-2.690	35.380	12.301	54.402	4	-102.813	1.488	3.000	24.60
P	NESC 250B	21	-2.632	0.821	-1.868	-2.027	35.380	2.005	8.865	2	-72.023	0.601	3.000	4.01
P	NESC 250B	22	-1.868	2.027	-2.632	-0.821	35.380	2.493	11.027	2	84.651	0.670	3.000	4.99
P	NESC 250B	23	-0.605	2.690	-2.690	0.605	35.380	14.244	62.996	4	115.136	1.601	3.000	28.49
P	NESC 250B	24	0.821	2.632	-2.027	1.868	35.380	4.409	19.499	2	115.136	0.891	3.000	8.82
P	NESC 250C	1	2.402	1.211	-0.152	2.686	35.380	30.306	134.028	3	202.995	2.336	3.000	60.61
P	NESC 250C	2	2.686	-0.152	1.211	2.402	35.380	22.806	100.861	3	178.043	2.026	3.000	45.61
P	NESC 250C	3	2.250	-1.474	2.250	1.474	35.380	0.503	2.223	2	109.659	0.301	3.000	1.01
P	NESC 250C	4	1.211	-2.402	2.686	0.152	35.380	21.929	96.979	3	-172.672	1.987	3.000	43.86
P	NESC 250C	5	-0.152	-2.686	2.402	-1.211	35.380	29.409	130.062	3	-197.530	2.301	3.000	58.82
P	NESC 250C	6	-1.474	-2.250	1.474	-2.250	35.380	0.927	4.098	2	-197.530	0.408	3.000	1.85
P	NESC 250C	7	-2.402	-1.211	0.152	-2.686	35.380	29.353	129.812	3	-197.260	2.299	3.000	58.71
P	NESC 250C	8	-2.686	0.152	-1.211	-2.402	35.380	21.853	96.645	3	-172.308	1.983	3.000	43.71
P	NESC 250C	9	-2.250	1.474	-2.250	-1.474	35.380	0.503	2.223	2	110.165	0.301	3.000	1.01
P	NESC 250C	10	-1.211	2.402	-2.686	-0.152	35.380	22.882	101.195	3	178.407	2.029	3.000	45.76
P	NESC 250C	11	0.152	2.686	-2.402	1.211	35.380	30.363	134.278	3	203.266	2.338	3.000	60.73
P	NESC 250C	12	1.474	2.250	-1.474	2.250	35.380	0.954	4.217	2	203.266	0.414	3.000	1.91
P	NESC 250C	13	2.027	1.868	-0.821	2.632	35.380	7.773	34.376	2	202.995	1.183	3.000	15.55
P	NESC 250C	14	2.690	0.605	0.605	2.690	35.380	24.805	109.699	4	202.995	2.113	3.000	49.61
P	NESC 250C	15	2.632	-0.821	1.868	2.027	35.380	4.233	18.722	2	146.605	0.873	3.000	8.47
P	NESC 250C	16	1.868	-2.027	2.632	0.821	35.380	4.033	17.834	2	-141.314	0.852	3.000	8.07
P	NESC 250C	17	0.605	-2.690	2.690	-0.605	35.380	23.978	106.044	4	-197.530	2.078	3.000	47.96

P	NESC 250C	18	-0.821	-2.632	2.027	-1.868	35.380	7.563	33.448	2	-197.530	1.167	3.000	15.13
P	NESC 250C	19	-2.027	-1.868	0.821	-2.632	35.380	7.553	33.402	2	-197.260	1.166	3.000	15.11
P	NESC 250C	20	-2.690	-0.605	-0.605	-2.690	35.380	23.917	105.771	4	-197.260	2.075	3.000	47.83
P	NESC 250C	21	-2.632	0.821	-1.868	-2.027	35.380	4.013	17.748	2	-140.870	0.850	3.000	8.03
P	NESC 250C	22	-1.868	2.027	-2.632	-0.821	35.380	4.253	18.808	2	147.049	0.875	3.000	8.51
P	NESC 250C	23	-0.605	2.690	-2.690	0.605	35.380	24.866	109.972	4	203.266	2.116	3.000	49.73
P	NESC 250C	24	0.821	2.632	-2.027	1.868	35.380	7.783	34.422	2	203.266	1.184	3.000	15.57
P	NESC 250D	1	2.402	1.211	-0.152	2.686	35.380	12.555	55.526	3	83.631	1.503	3.000	25.11
P	NESC 250D	2	2.686	-0.152	1.211	2.402	35.380	9.620	42.545	3	73.855	1.316	3.000	19.24
P	NESC 250D	3	2.250	-1.474	2.250	1.474	35.380	0.196	0.868	2	47.101	0.188	3.000	0.39
P	NESC 250D	4	1.211	-2.402	2.686	0.152	35.380	7.848	34.707	3	-63.091	1.189	3.000	15.70
P	NESC 250D	5	-0.152	-2.686	2.402	-1.211	35.380	10.762	47.595	3	-72.764	1.392	3.000	21.52
P	NESC 250D	6	-1.474	-2.250	1.474	-2.250	35.380	0.341	1.508	2	-72.764	0.248	3.000	0.68
P	NESC 250D	7	-2.402	-1.211	0.152	-2.686	35.380	10.700	47.319	3	-72.466	1.388	3.000	21.40
P	NESC 250D	8	-2.686	0.152	-1.211	-2.402	35.380	7.764	34.338	3	-62.689	1.182	3.000	15.53
P	NESC 250D	9	-2.250	1.474	-2.250	-1.474	35.380	0.196	0.868	2	47.660	0.188	3.000	0.39
P	NESC 250D	10	-1.211	2.402	-2.686	-0.152	35.380	9.703	42.913	3	74.256	1.322	3.000	19.41
P	NESC 250D	11	0.152	2.686	-2.402	1.211	35.380	12.618	55.802	3	83.930	1.507	3.000	25.24
P	NESC 250D	12	1.474	2.250	-1.474	2.250	35.380	0.393	1.739	2	83.930	0.266	3.000	0.79
P	NESC 250D	13	2.027	1.868	-0.821	2.632	35.380	3.203	14.164	2	83.631	0.759	3.000	6.41
P	NESC 250D	14	2.690	0.605	0.605	2.690	35.380	10.355	45.794	4	83.631	1.365	3.000	20.71
P	NESC 250D	15	2.632	-0.821	1.868	2.027	35.380	1.817	8.037	2	61.551	0.572	3.000	3.63
P	NESC 250D	16	1.868	-2.027	2.632	0.821	35.380	1.410	6.237	2	-50.874	0.504	3.000	2.82
P	NESC 250D	17	0.605	-2.690	2.690	-0.605	35.380	8.694	38.448	4	-72.764	1.251	3.000	17.39
P	NESC 250D	18	-0.821	-2.632	2.027	-1.868	35.380	2.786	12.320	2	-72.764	0.708	3.000	5.57
P	NESC 250D	19	-2.027	-1.868	0.821	-2.632	35.380	2.774	12.269	2	-72.466	0.707	3.000	5.55
P	NESC 250D	20	-2.690	-0.605	-0.605	-2.690	35.380	8.626	38.147	4	-72.466	1.246	3.000	17.25
P	NESC 250D	21	-2.632	0.821	-1.868	-2.027	35.380	1.389	6.142	2	-50.385	0.500	3.000	2.78
P	NESC 250D	22	-1.868	2.027	-2.632	-0.821	35.380	1.839	8.132	2	62.040	0.575	3.000	3.68
P	NESC 250D	23	-0.605	2.690	-2.690	0.605	35.380	10.423	46.095	4	83.930	1.370	3.000	20.85
P	NESC 250D	24	0.821	2.632	-2.027	1.868	35.380	3.214	14.215	2	83.930	0.761	3.000	6.43

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Height AGL (ft)	Segment Number	Weight (lbs)
SWL	49.75	NESC 250D	93.2	1	49.3
SWR	47.84	NESC 250D	93.2	1	49.3
CN1L	51.27	NESC 250D	86.2	1	254.6
CN1R	51.46	NESC 250D	86.2	1	254.6
CN2L	51.33	NESC 250D	74.2	1	254.6
CN2R	51.50	NESC 250D	74.2	1	254.6
CN3L	51.41	NESC 250D	62.2	1	254.6
CN3R	51.55	NESC 250D	62.2	1	254.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC 250B	50.84	CN3R	Tubular Davit
NESC 250C	85.48	P	Steel Pole
NESC 250D	51.55	CN3R	Tubular Davit

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Steel Pole Usage %	Pole Label	Height AGL (ft)	Segment Number
NESC 250B	47.97	P	2.5	29
NESC 250C	85.48	P	2.5	29
NESC 250D	34.86	P	2.5	29

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 250B	P	11	35.380	94.755	2531.425	-10.394	17.282	76.427	3	115.136	1.764	34.56
NESC 250C	P	11	35.380	45.882	4652.002	-5.886	30.363	134.278	3	203.266	2.338	60.73
NESC 250D	P	11	35.380	89.323	1816.490	-6.489	12.618	55.802	3	83.930	1.507	25.24

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Tubular Davit Usage %	Davit Label	Height AGL (ft)	Segment Number
NESC 250B	50.84	CN3R	62.2	1
NESC 250C	21.26	CN3R	62.2	1
NESC 250D	51.55	CN3R	62.2	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
ANT1LOAD	Clamp	0.00	NESC 250B	0.0
Coax1	Clamp	0.00	NESC 250B	0.0
Coax2	Clamp	0.00	NESC 250B	0.0
Coax3	Clamp	0.00	NESC 250B	0.0
Coax4	Clamp	0.00	NESC 250B	0.0
Coax5	Clamp	0.00	NESC 250B	0.0
Coax6	Clamp	0.00	NESC 250B	0.0
Coax7	Clamp	0.00	NESC 250B	0.0
Coax8	Clamp	0.00	NESC 250B	0.0
Coax9	Clamp	0.00	NESC 250B	0.0
Coax10	Clamp	0.00	NESC 250B	0.0
Coax11	Clamp	0.00	NESC 250B	0.0
swl	Suspension	0.00	NESC 250B	50.0
swr	Suspension	0.00	NESC 250B	50.0
cn1l	Suspension	0.00	NESC 250B	1000.0
cn1r	Suspension	0.00	NESC 250B	1000.0
cn2l	Suspension	0.00	NESC 250B	1000.0
cn2r	Suspension	0.00	NESC 250B	1000.0
cn3l	Suspension	0.00	NESC 250B	1000.0
cn3r	Suspension	0.00	NESC 250B	1000.0

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 250B	ANT1LOAD	Clamp	P:ANT	0.032	1.273	5.806	5.944
NESC 250B	Coax1	Clamp	P:Coax1	0.000	0.172	0.460	0.491
NESC 250B	Coax2	Clamp	P:Coax2	0.000	0.172	0.460	0.491
NESC 250B	Coax3	Clamp	P:Coax3	0.000	0.172	0.460	0.491
NESC 250B	Coax4	Clamp	P:Coax4	0.000	0.172	0.460	0.491
NESC 250B	Coax5	Clamp	P:Coax5	0.000	0.172	0.460	0.491
NESC 250B	Coax6	Clamp	P:Coax6	0.000	0.172	0.460	0.491
NESC 250B	Coax7	Clamp	P:Coax7	0.000	0.172	0.460	0.491
NESC 250B	Coax8	Clamp	P:Coax8	0.000	0.172	0.460	0.491
NESC 250B	Coax9	Clamp	P:Coax9	0.000	0.172	0.460	0.491
NESC 250B	Coax10	Clamp	P:Coax10	0.000	0.172	0.460	0.491
NESC 250B	Coax11	Clamp	P:Coax11	0.000	0.172	0.460	0.491
NESC 250B	swl	Suspension	SWLVang	0.000	1.891	2.422	3.073
NESC 250B	swr	Suspension	SWRVang	0.000	1.891	2.422	3.073
NESC 250B	cn1l	Suspension	CN1LVang	0.000	3.533	8.055	8.796
NESC 250B	cn1r	Suspension	CN1RVang	0.000	3.533	8.055	8.796
NESC 250B	cn2l	Suspension	CN2LVang	0.000	3.533	8.055	8.796
NESC 250B	cn2r	Suspension	CN2RVang	0.000	3.533	8.055	8.796
NESC 250B	cn3l	Suspension	CN3LVang	0.000	3.533	8.055	8.796
NESC 250B	cn3r	Suspension	CN3RVang	0.000	3.533	8.055	8.796
NESC 250C	ANT1LOAD	Clamp	P:ANT	0.038	4.591	3.127	5.555
NESC 250C	Coax1	Clamp	P:Coax1	0.000	0.601	0.125	0.614
NESC 250C	Coax2	Clamp	P:Coax2	0.000	0.601	0.125	0.614
NESC 250C	Coax3	Clamp	P:Coax3	0.000	0.601	0.125	0.614
NESC 250C	Coax4	Clamp	P:Coax4	0.000	0.601	0.125	0.614
NESC 250C	Coax5	Clamp	P:Coax5	0.000	0.601	0.125	0.614
NESC 250C	Coax6	Clamp	P:Coax6	0.000	0.601	0.125	0.614
NESC 250C	Coax7	Clamp	P:Coax7	0.000	0.601	0.125	0.614
NESC 250C	Coax8	Clamp	P:Coax8	0.000	0.601	0.125	0.614
NESC 250C	Coax9	Clamp	P:Coax9	0.000	0.601	0.125	0.614
NESC 250C	Coax10	Clamp	P:Coax10	0.000	0.601	0.125	0.614
NESC 250C	Coax11	Clamp	P:Coax11	0.000	0.601	0.125	0.614
NESC 250C	swl	Suspension	SWLVang	0.000	2.029	0.673	2.138
NESC 250C	swr	Suspension	SWRVang	0.000	2.029	0.673	2.138
NESC 250C	cn1l	Suspension	CN1LVang	0.000	6.209	3.462	7.109
NESC 250C	cn1r	Suspension	CN1RVang	0.000	6.220	3.462	7.118
NESC 250C	cn2l	Suspension	CN2LVang	0.000	6.209	3.462	7.109
NESC 250C	cn2r	Suspension	CN2RVang	0.000	6.220	3.462	7.118
NESC 250C	cn3l	Suspension	CN3LVang	0.000	6.209	3.462	7.109
NESC 250C	cn3r	Suspension	CN3RVang	0.000	6.220	3.462	7.118
NESC 250D	ANT1LOAD	Clamp	P:ANT	0.032	0.880	4.713	4.795
NESC 250D	Coax1	Clamp	P:Coax1	0.000	0.114	0.425	0.440
NESC 250D	Coax2	Clamp	P:Coax2	0.000	0.114	0.425	0.440
NESC 250D	Coax3	Clamp	P:Coax3	0.000	0.114	0.425	0.440
NESC 250D	Coax4	Clamp	P:Coax4	0.000	0.114	0.425	0.440
NESC 250D	Coax5	Clamp	P:Coax5	0.000	0.114	0.425	0.440
NESC 250D	Coax6	Clamp	P:Coax6	0.000	0.114	0.425	0.440
NESC 250D	Coax7	Clamp	P:Coax7	0.000	0.114	0.425	0.440
NESC 250D	Coax8	Clamp	P:Coax8	0.000	0.114	0.425	0.440
NESC 250D	Coax9	Clamp	P:Coax9	0.000	0.114	0.425	0.440
NESC 250D	Coax10	Clamp	P:Coax10	0.000	0.114	0.425	0.440
NESC 250D	Coax11	Clamp	P:Coax11	0.000	0.114	0.425	0.440
NESC 250D	swl	Suspension	SWLVang	0.000	1.496	3.489	3.796
NESC 250D	swr	Suspension	SWRVang	0.000	1.496	3.489	3.796

NESC 250D	cn1l	Suspension	CN1LVang	0.000	2.530	8.211	8.592
NESC 250D	cn1r	Suspension	CN1RVang	0.000	2.530	8.211	8.592
NESC 250D	cn2l	Suspension	CN2LVang	0.000	2.530	8.211	8.592
NESC 250D	cn2r	Suspension	CN2RVang	0.000	2.530	8.211	8.592
NESC 250D	cn3l	Suspension	CN3LVang	0.000	2.530	8.211	8.592
NESC 250D	cn3r	Suspension	CN3RVang	0.000	2.530	8.211	8.592

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 250B	28.147	0.032	64.041	2165.411	-3.488	0.000
NESC 250C	52.547	0.038	26.622	4004.775	-4.142	0.000
NESC 250D	20.306	0.032	65.633	1567.891	-3.488	0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 1626.2
Weight of Steel Poles: 18988.8
Weight of Suspensions: 6100.0
Total: 26715.0

*** 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 #6020

Location: Waterford, CT

Rev. 1: 11/9/21

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21136.00

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 204 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 65 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use AST MA615 Grade 75

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

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

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

Bolt 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 = $V_{Max} := \frac{V_{base}}{N} = 4.1 \times 10^3 lbf$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 1.3 \times 10^3 psi$

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

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

Permitted Axial Tensile Stress in Conjuction with Shear = $F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 74.91 \cdot ksi$

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 83.85 \cdot \%$

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

Condition1 = "OK"

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Subject:	Flange Bolts and Flangeplate Analysis
Location:	Structure 6020 Waterford, CT
Rev. 0: 11/9/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21136.00

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 84·ft·kips	(User Input)
Shear Force =	Shear := 7.5·kips	(User Input)
Axial Force =	Axial := 4·kips	(User Input)

Flange Bolt Data:

Use AST MA325

Number of Flange Bolts =	N := 8	(User Input)
Diameter of Bolt Circle =	D_{bc} := 23.5·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} := 1.00·in	(User Input)
Flange Plate Diameter =	D_{bp} := 26.25·in	(User Input)
Outer Pole Diameter =	D_{pole} := 19.37·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 11.75 \cdot in$

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

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

$d_1 = 8.31 \cdot in$ $d_7 = -8.31 \cdot in$
$d_2 = 11.75 \cdot in$ $d_8 = -0.00 \cdot in$
$d_3 = 8.31 \cdot in$ $d_9 = \blacksquare \cdot in$
$d_4 = 0.00 \cdot in$ $d_{10} = \blacksquare \cdot in$
$d_5 = -8.31 \cdot in$ $d_{11} = \blacksquare \cdot in$
$d_6 = -11.75 \cdot in$ $d_{12} = \blacksquare \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 9.685 \cdot in$

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

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$
$MA_2 = 2.07 \cdot in$ $MA_8 = 0.00 \cdot in$
$MA_3 = 0.00 \cdot in$ $MA_9 = \blacksquare \cdot in$
$MA_4 = 0.00 \cdot in$ $MA_{10} = \blacksquare \cdot in$
$MA_5 = 0.00 \cdot in$ $MA_{11} = \blacksquare \cdot in$
$MA_6 = 0.00 \cdot in$ $MA_{12} = \blacksquare \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 14.2 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 552.25 \cdot in^2$

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 = $V_{Max} := \frac{Shear}{N \cdot A_g} = 1.2 \cdot ksi$

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

Condition1 = $Condition1 := if\left(V_{Max} \le F_v, "OK", "Overstressed"\right)$ $\frac{V_{Max}}{F_v} = 2.84 \cdot \%$

Condition1 = "OK"

Maximum Tensile Stress = $T_{Max} := \frac{\left(OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N}\right)}{A_n} = 34.6 \cdot ksi$

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

Condition2 = $Condition2 := if\left(\frac{T_{Max}}{F_t} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_t} = 38.42 \cdot \%$

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 = $Condition3 := if\left(\frac{T_{Max}}{F_{t.v}} \le 1.00, "OK", "Overstressed"\right)$ $\frac{T_{Max}}{F_{t.v}} = 38.44 \cdot \%$

Condition3 = "OK"

Flange Plate Analysis:

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

$C_1 = 15.7 \cdot kips$ $C_7 = -14.7 \cdot kips$

$C_2 = 21.9 \cdot kips$ $C_8 = 0.5 \cdot kips$

$C_3 = 15.7 \cdot kips$ $C_9 = \blacksquare \cdot kips$

$C_4 = 0.5 \cdot kips$ $C_{10} = \blacksquare \cdot kips$

$C_5 = -14.7 \cdot kips$ $C_{11} = \blacksquare \cdot kips$

$C_6 = -20.9 \cdot kips$ $C_{12} = \blacksquare \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \, t_{bp}^{\,2}\right)} = 19.2 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 58.5 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 32.8 \cdot \%$

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

Condition1 = "Ok"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CT5235	DATE:	1/11/2013	RF DESIGN ENG:	Radu Alecsandru	RF PERF ENG:	Neil Alejandro	RFDS PROGRAM TYPE:	2013 eNode B
ISSUE:	Final	Approved? (Y/N):	Yes	RF DESIGN PHONE:	(860) 513-7598	RF PERF PHONE:		RFDS TECHNOLOGY:	LTE Wave 4
REVISION:	0.1	RF MANAGER:	Cameron Syme	RF DESIGN EMAIL:	ra9161@att.com	RF PERF EMAIL:	na3839@att.com	STATE/STATUS:	As Built/Construction Complete
						ADDITIONAL WORKFLOW NOTIFICATIONS:		RFDS ID:	24087
						RFDS VERSION:	1.00	Created By:	cb6561 / Updated By: kb2322
						UMTS FREQUENCY:	850/1900	Created:	11/5/2012 / Updated: 7/10/2013
						LTE FREQUENCY:	700	EXPIRATION DATE:	
						5G FREQUENCY:		ESTIMATED SQIN:	5,209 / Calculation ID:
	LTE Wave 4					IPLAN JOB # 1:	NER-RCTB-11-06448	PRD || SUB GRP #1:	
						IPLAN JOB # 2:	TBD	PRD || SUB GRP #2:	
						IPLAN JOB # 3:	TBD	PRD || SUB GRP #3:	
						IPLAN JOB # 4:	TBD	PRD || SUB GRP #4:	
						IPLAN JOB # 5:		PRD || SUB GRP #5:	
						IPLAN JOB # 6:		PRD || SUB GRP #6:	
						IPLAN JOB # 7:		PRD || SUB GRP #7:	
						IPLAN JOB # 8:		PRD || SUB GRP #8:	

Section 2 - LOCATION INFORMATION

USID:	25905	FA LOCATION CODE:	10071308	LOCATION NAME:	WATERFORD NE	ORACLE PRJT # 1:	2051319960	PACE JOB #1:	
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PRJT # 2:		PACE JOB #2:	
ADDRESS:	126 OLD COLCHESTER ROAD	CITY:	WATERFORD	STATE:	CT	ORACLE PRJT # 3:		PACE JOB #3:	
ZIP CODE:	6385	COUNTY:	NEW LONDON	LONG (DEC. DEG.):	-72.1268900	ORACLE PRJT # 4:		PACE JOB #4:	
LATITUDE (D-M-S):	41° 24' 43.9"	LONGITUDE (D-M-S):	-72° 7' 36.8"	LAT (DEC. DEG.):	41.4121900	ORACLE PRJT # 5:		PACE JOB #5:	
						ORACLE PRJT # 6:		PACE JOB #6:	
						ORACLE PRJT # 7:		PACE JOB #7:	
						ORACLE PRJT # 8:		PACE JOB #8:	
						BORDER CELL WITH CONTOUR COORD:	TBD	SEARCH RING NAME:	N/A
						AM STUDY REQ'D (Y/N):	No	SEARCH RING ID:	N/A
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	TBD					FREQ COORD:	TBD	BTA: 319	MSA / RSA: 154
								LAC(UMTS):	
						RF DISTRICT:	NPO TRIAGE		
						RF ZONE:	HOTSEAT	RNC(UMTS):	
								MME POOL ID(LTE):	FF01
						PARENT NAME(UMTS):			

Section 3 - LICENSE COVERAGE/FILING INFORMATION

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

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	No	GROUND ELEVATION (ft):	0	STRUCTURE TYPE:	POWER POLE	MARKET LOCATION 700 MHz Band:	TBD
ADDITIONAL REGULATORY?:	No	HEIGHT OVERALL (ft):	TBD	FCC ASR NUMBER:	TBD	MARKET LOCATION 850 MHz Band:	TBD
SUB-LEASE RIGHTS?:	No	STRUCTURE HEIGHT (ft):	0.00			MARKET LOCATION 1900 MHz Band:	TBD
LIGHTING TYPE:	TBD					MARKET LOCATION AWS Band:	TBD
						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	TBD	TBD	TBD	TBD	TBD			
SECTOR B	TBD	TBD	TBD	TBD	TBD			
SECTOR C	TBD	TBD	TBD	TBD	TBD			
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	CT-WATERFORD EMERGENCY COMMUNICATIONS CENTER	1410		INTRADO				
SECTOR B	CT-WATERFORD EMERGENCY COMMUNICATIONS CENTER	1410		INTRADO				
SECTOR C	CT-WATERFORD EMERGENCY COMMUNICATIONS CENTER	1410		INTRADO				
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 6/7 - BBU INFORMATION - existing

	BBU 1	BBU 2	BBU 3	BBU 4	BBU 5
BBU ID:	0	0	0	0	0
TECHNOLOGY:	GSM	GSM	UMTS	UMTS	UMTS
BBU NAME:	319DS23S	319PS23S	CTUS23S	CTVS23S	N/A
BBU USID:	25905	25905	25905	25905	25905
CELL ID / BCF:	319GS23S	319PS23S	CTVS23S	CTVS23S	N/A
BTA/TID:					
4-9 DIGIT SITE ID:	523S	523S	523S	523S	523S
COW OR TOY?:	No	No	No	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO	MACRO	MACRO	MACRO	MACRO
BTS LOCATION ID:					
BASE STATION TYPE:					
EQUIPMENT NAME:					
DISASTER PRIORITY:	TBD	TBD	TBD	TBD	TBD
EQUIPMENT VENDOR:	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON
EQUIPMENT TYPE (Model):	ULTRASITE	ULTRASITE	1900 Radio Kit	RBS3106	RBS3106
BASEBAND CONFIGURATION :					
MARKET STATE CODE:					
NODE B NUMBER:					
SIDEHAUL SWITCH VENDOR:					
SIDEHAUL SWITCH MODEL:					
SIDEHAUL SWITCH NAME:					
CSS - CTS COMMON ID:					
CSS - SECONDARY FUNCTION ID:					

Section 6/7 - BBU INFORMATION - final

	BBU 1
BBU ID:	0
TECHNOLOGY:	LTE
BBU NAME:	CTL0523S
BBU USID:	25905
CELL ID / BCF:	CTL0523S
BTA/TID:	0TBD
4-9 DIGIT SITE ID:	05235
COW OR TOY?:	No
CELL SITE TYPE:	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL
BTS LOCATION ID:	
BASE STATION TYPE:	BASE
EQUIPMENT NAME:	WATERFORD NE LTE
DISASTER PRIORITY:	
EQUIPMENT VENDOR:	ERICSSON
EQUIPMENT TYPE (Model):	6601 INDOOR MU
BASEBAND CONFIGURATION :	
MARKET STATE CODE:	CT
NODE B NUMBER:	523S
SIDEHAUL SWITCH VENDOR:	
SIDEHAUL SWITCH MODEL:	
SIDEHAUL SWITCH NAME:	
CSS - CTS COMMON ID:	
CSS - SECONDARY FUNCTION ID:	

Section 7b - Radio INFORMATION - existing

Section 7b - Radio INFORMATION - final

Section 8 - RBS/SECTOR ASSOCIATION - existing

	BBU 1	BBU 2	BBU 3	BBU 4	BBU 5
CTS Common ID	319DS23S	319PS23S	CTUS23S	CTVS23S	N/A
Soft Sector IDs	319GS23S1	319PS23S4	CTUS2354	CTVS23S1	N/A
	319GS2352	319PS23S5	CTUS23S5	CTVS2352	N/A
	319GS2353	319PS2356	CTUS2356	CTVS2353	N/A
			CTUS2357	CTVS235A	N/A
			CTUS2358	CTVS235B	N/A
			CTUS2359	CTVS235C	N/A
					N/A
					N/A
					N/A
					N/A
					N/A
					N/A

Section 8 - RBS/SECTOR ASSOCIATION - final

	BBU 1
CTS Common ID	CTL05235
Soft Sector IDs	CTL05235_7A_1
	CTL05235_7B_1
	CTL05235_7C_1

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	LTE 1ST 700
USEID (excluding Hard Sector)	25905.850.25G.0	25905.1900.25G.0	25905.850.3G.1	25905.1900.3G.1	25905.850.3G.2	25905.1900.3G.2	25905.850.3G.3	25905.1900.3G.3	25905.850.3G.4	25905.1900.3G.4	
SECTOR A SOFT SECTOR ID	319G52351	319P52354	CTVS2351	N/A	N/A	CTUS2357	N/A	CTUS2354	CTVS235A	N/A	
SECTOR B	319G52352	319P52355	CTVS2352	N/A	N/A	CTUS2358	N/A	CTUS2355	CTVS235B	N/A	
SECTOR C	319G52353	319P52356	CTVS2353	N/A	N/A	CTUS2359	N/A	CTUS2356	CTVS235C	N/A	
SECTOR D											
SECTOR E											
SECTOR F											
OMNI											

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	LTE 1ST 700
USEID (excluding Hard Sector)											
SECTOR A SOFT SECTOR ID											CTL05235_7A_1
SECTOR B											CTL05235_7B_1
SECTOR C											CTL05235_7C_1
SECTOR D											
SECTOR E											
SECTOR F											
OMNI											

Section 9 - Cell Number - existing

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	LTE 1ST 700
USEID (excluding Hard Sector)	25905.850.25G.0	25905.1900.25G.0	25905.850.3G.1	25905.1900.3G.1	25905.850.3G.2	25905.1900.3G.2	25905.850.3G.3	25905.1900.3G.3	25905.850.3G.4	25905.1900.3G.4	
SECTOR A CELL NUMBER											
SECTOR B											
SECTOR C											
SECTOR D											
SECTOR E											
SECTOR F											
OMNI											

Section 9 - Cell Number - final

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	LTE 1ST 700
USEID (excluding Hard Sector)											
SECTOR A CELL NUMBER											15
SECTOR B											16
SECTOR C											17
SECTOR D											
SECTOR E											
SECTOR F											
OMNI											

Section 10 - CID/SAC - existing

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	LTE 1ST 700
SECTOR A CID/SAC	52351	52354	52351	N/A	N/A	52357	N/A	52354	42351	N/A	
SECTOR B	52352	52355	52352	N/A	N/A	52358	N/A	52355	42352	N/A	
SECTOR C	52353	52356	52353	N/A	N/A	52359	N/A	52356	42353	N/A	
SECTOR D											
SECTOR E											
SECTOR F											
OMNI											

Section 10 - CID/SAC - final

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	LTE 1ST 700
SECTOR A CID/SAC											
SECTOR B											
SECTOR C											
SECTOR D											
SECTOR E											
SECTOR F											
OMNI											

Section 11 - CURRENT RADIO COUNTS existing

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST AWS
SECTOR A RADIO COUNTS	2	2	1	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SECTOR B	2	1	1	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SECTOR C	2	1	1	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SECTOR D																
SECTOR E																
SECTOR F																
OMNI																

Section 12 - CURRENT T1 COUNTS existing

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST AWS
SECTOR A RADIO COUNTS	2	2	1	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SECTOR B	2	1	1	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SECTOR C	2	1	1	N/A	N/A	1	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SECTOR D																
SECTOR E																
SECTOR F																
OMNI																

Section 14 - NEW/PROPOSED T1 COUNTS

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

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL		7770					
ANTENNA VENDOR		Powerwave					
ANTENNA SIZE (H x W x D)		55X11X5					
ANTENNA WEIGHT		35					
AZIMUTH		0					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		109					
ANTENNA TIP HEIGHT		111					
MECHANICAL DOWNTILT		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)		1 / Powerwave / 7020 (DB)					
SURGE ARRESTOR (QTY/MODEL)		N/A					
DIPLEXER (QTY/MODEL)		Powerwave / LGP 21903					
DUPLEXER (QTY/MODEL)		N/A					
Antenna RET CONTROL UNIT (QTY/MODEL)		1 / Powerwave / 7070					
DC BLOCK (QTY/MODEL)		N/A					
TMA/LNA (QTY/MODEL)		LGP 21401 (Dual Band - 850					
CURRENT INJECTORS FOR TMA (QTY/MODEL)		Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)		(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)		N/A					
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)		N/A					
Additional Component 2 (QTY/MODEL)		N/A					
Additional Component 3 (QTY/MODEL)		N/A					
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1					TxRx-TxRx	GSM 850, UMTS 850	7770	14		10	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx-TxRx	GSM 1900, UMTS 1900	7770	17		4	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	Yes					

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					
ANTENNA VENDOR		Powerwave					
ANTENNA SIZE (H x W x D)		55X11X5					
ANTENNA WEIGHT		35					
AZIMUTH		120					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		109					
ANTENNA TIP HEIGHT		111					
MECHANICAL DOWNTILT		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)		1 / Powerwave / 7020 (DB)					
SURGE ARRESTOR (QTY/MODEL)		N/A					
DIPLEXER (QTY/MODEL)		Powerwave / LGP 21903					
DUPLEXER (QTY/MODEL)		N/A					
Antenna RET CONTROL UNIT (QTY/MODEL)		1 / Powerwave / 7070					
DC BLOCK (QTY/MODEL)		N/A					
TMA/LNA (QTY/MODEL)		LGP 21401 (Dual Band - 850					
CURRENT INJECTORS FOR TMA (QTY/MODEL)		Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)		(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)		N/A					
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)		N/A					
Additional Component 2 (QTY/MODEL)		N/A					
Additional Component 3 (QTY/MODEL)		N/A					
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1					TxRx-TxRx	GSM 850, UMTS 850	7770	14		6	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx-TxRx	GSM 1900, UMTS 1900	7770	17		4	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					

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					
ANTENNA VENDOR		Powerwave					
ANTENNA SIZE (H x W x D)		55X11X5					
ANTENNA WEIGHT		35					
AZIMUTH		260					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		109					
ANTENNA TIP HEIGHT		111					
MECHANICAL DOWNTILT		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)		1 / Powerwave / 7020 (DB)					
SURGE ARRESTOR (QTY/MODEL)		N/A					
DIPLEXER (QTY/MODEL)		Powerwave / LGP 21903					
DUPLEXER (QTY/MODEL)		N/A					
Antenna RET CONTROL UNIT (QTY/MODEL)		1 / Powerwave / 7070					
DC BLOCK (QTY/MODEL)		N/A					
TMA/LNA (QTY/MODEL)		LGP 21401 (Dual Band - 850					
CURRENT INJECTORS FOR TMA (QTY/MODEL)		Polyphaser 1000860					
PDU FOR TMAS (QTY/MODEL)		(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)		N/A					
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)		N/A					
Additional Component 2 (QTY/MODEL)		N/A					
Additional Component 3 (QTY/MODEL)		N/A					
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 2	PORT 1					TxRx-TxRx	GSM 850, UMTS 850	7770	14		3	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx-TxRx	GSM 1900, UMTS 1900	7770	17		5	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					

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	7770	AM-X-CD-16-65-00T-RET					
ANTENNA VENDOR	Powerwave	KMW					
ANTENNA SIZE (H x W x D)	55X11X5	72X11.8X5.9					
ANTENNA WEIGHT	35	48.5					
AZIMUTH	0	0					
MAGNETIC DECLINATION	TBD	TBD					
RADIATION CENTER (feet)	109	109					
ANTENNA TIP HEIGHT	111	112					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)	in RET Equipment					
SURGE ARRESTOR (QTY/MODEL)	N/A	APTDC-BDFDM-DBW					
DIPLEXER (QTY/MODEL)	Powerwave / LGP 21903	Powerwave / CM1007-					
DUPLEXER (QTY/MODEL)	N/A						
Antenna RET CONTROL UNIT (QTY/MODEL)	1 / Powerwave / 7070						
DC BLOCK (QTY/MODEL)	N/A						
TMA/LNA (QTY/MODEL)	LGP 21401 (Dual Band - 850	DTMABP7819VG12A					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser 1000860	Kathrein / 782 11055					
PDU FOR TMAS (QTY/MODEL)	(1900 AND 850 Bypass TMA)	(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)	N/A						
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)	N/A	RRUS 11					
Additional Component 2 (QTY/MODEL)	N/A	No CSRF					
Additional Component 3 (QTY/MODEL)	N/A						
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1					TxRx TxRx	GSM 850, UMTS 850	7770	14		10	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx TxRx	GSM 1900, UMTS 1900	7770	17		4	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	Yes					
ANTENNA POSITION 2	PORT 1					TxRx Rx	LTE 700	AM-X-CD-16-65-00T-RET	16		3	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					
	PORT 2					N/A	LTE	AM-X-CD-16-65-00T-RET			0	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					

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	7770		SBNH-1D6565C											
ANTENNA VENDOR	Powerwave		Andrew											
ANTENNA SIZE (H x W x D)	55X11X5		96.4X11.9X7.1											
ANTENNA WEIGHT	35		60.8											
AZIMUTH	120		130											
MAGNETIC DECLINATION	TBD		TBD											
RADIATION CENTER (feet)	109		109											
ANTENNA TIP HEIGHT	111		113											
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		2											
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		1 / Powerwave / 7020 (DB)		Built-in RET Equipment										
SURGE ARRESTOR (QTY/MODEL)		N/A		APTDC-8DFDM-DBW										
DIPLEXER (QTY/MODEL)		Powerwave / LGP 21903		Powerwave / CM1007-										
DUPLEXER (QTY/MODEL)		N/A												
Antenna RET CONTROL UNIT (QTY/MODEL)		1 / Powerwave / 7070												
DC BLOCK (QTY/MODEL)		N/A												
TMA/LNA (QTY/MODEL)		LGP 21401 (Dual Band - 850		DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)		Polyphaser 1000860		Kathrein / 782 11055										
PDU FOR TMAS (QTY/MODEL)		(1900 AND 850 Bypass TMA)		(1900 AND 850 Bypass TMA)										
FILTER (QTY/MODEL)		N/A												
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)														
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
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)		N/A		RRUS 11										
Additional Component 2 (QTY/MODEL)		N/A		No CSRF										
Additional Component 3 (QTY/MODEL)		N/A												
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1					TxRx TxRx	GSM 850, UMTS 850	7770	14		6	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx TxRx	GSM 1900, UMTS 1900	7770	17		4	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
ANTENNA POSITION 2	PORT 1					TxRx Rx	LTE 700	SBNH-1D6565C	16		5	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					
	PORT 2					N/A	LTE	SBNH-1D6565C			0	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					

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	7770	AM-X-CD-17-65-00T-RET					
ANTENNA VENDOR	Powerwave	KMW					
ANTENNA SIZE (H x W x D)	55X11X5	96X11.8X6					
ANTENNA WEIGHT	35	60					
AZIMUTH	260	250					
MAGNETIC DECLINATION	TBD	TBD					
RADIATION CENTER (feet)	109	109					
ANTENNA TIP HEIGHT	111	113					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)	in RET Equipment					
SURGE ARRESTOR (QTY/MODEL)	N/A	APTDC-BDFDM-DBW					
DIPLEXER (QTY/MODEL)	Powerwave / LGP 21903	Powerwave / CM1007-					
DUPLEXER (QTY/MODEL)	N/A						
Antenna RET CONTROL UNIT (QTY/MODEL)	1 / Powerwave / 7070						
DC BLOCK (QTY/MODEL)	N/A						
TMA/LNA (QTY/MODEL)	LGP 21401 (Dual Band - 850	DTMABP7819VG12A					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser 1000860	Kathrein / 782 11055					
PDU FOR TMAS (QTY/MODEL)	(1900 AND 850 Bypass TMA)	(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)	N/A						
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)	N/A	RRUS 11					
Additional Component 2 (QTY/MODEL)	N/A	No CSRF					
Additional Component 3 (QTY/MODEL)	N/A						
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1					TxRx TxRx	GSM 850, UMTS 850	7770	14		3	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx TxRx	GSM 1900, UMTS 1900	7770	17		5	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
ANTENNA POSITION 2	PORT 1					TxRx Rx	LTE 700	AM-X-CD-17-65-00T-RET			1	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					
	PORT 2					N/A	LTE	AM-X-CD-17-65-00T-RET			0	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					

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	7770	AM-X-CD-16-65-00T-RET					
ANTENNA VENDOR	Powerwave	KMW					
ANTENNA SIZE (H x W x D)	55X11X5	72X11.8X5.9					
ANTENNA WEIGHT	35	48.5					
AZIMUTH	0	0					
MAGNETIC DECLINATION	TBD	TBD					
RADIATION CENTER (feet)	109	109					
ANTENNA TIP HEIGHT	111	112					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)	in RET Equipment					
SURGE ARRESTOR (QTY/MODEL)	N/A	APTDC-BDFDM-DBW					
DIPLEXER (QTY/MODEL)	Powerwave / LGP 21903	Powerwave / CM1007-					
DUPLEXER (QTY/MODEL)	N/A						
Antenna RET CONTROL UNIT (QTY/MODEL)	1 / Powerwave / 7070						
DC BLOCK (QTY/MODEL)	N/A						
TMA/LNA (QTY/MODEL)	LGP 21401 (Dual Band - 850	DTMABP7819VG12A					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser 1000860	Kathrein / 782 11055					
PDU FOR TMAS (QTY/MODEL)	(1900 AND 850 Bypass TMA)	(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)	N/A						
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)	N/A	RRUS 11					
Additional Component 2 (QTY/MODEL)	N/A	No CSRF					
Additional Component 3 (QTY/MODEL)	N/A						
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1					TxRx TxRx	GSM 850, UMTS 850	7770	14		10	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx TxRx	GSM 1900, UMTS 1900	7770	17		4	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	Yes					
ANTENNA POSITION 2	PORT 1					TxRx Rx	LTE 700	AM-X-CD-16-65-00T-RET	16		3	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					
	PORT 2					N/A	LTE	AM-X-CD-16-65-00T-RET			0	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					

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	7770	SBNH-1D6565C					
ANTENNA VENDOR	Powerwave	Andrew					
ANTENNA SIZE (H x W x D)	55X11X5	96.4X11.9X7.1					
ANTENNA WEIGHT	35	60.8					
AZIMUTH	120	130					
MAGNETIC DECLINATION	TBD	TBD					
RADIATION CENTER (feet)	109	109					
ANTENNA TIP HEIGHT	111	113					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)	Built-in RET Equipment					
SURGE ARRESTOR (QTY/MODEL)	N/A	APTDC-BDFDM-DBW					
DIPLEXER (QTY/MODEL)	Powerwave / LGP 21903	Powerwave / CM1007-					
DUPLEXER (QTY/MODEL)	N/A						
Antenna RET CONTROL UNIT (QTY/MODEL)	1 / Powerwave / 7070						
DC BLOCK (QTY/MODEL)	N/A						
TMA/LNA (QTY/MODEL)	LGP 21401 (Dual Band - 850	DTMABP7819VG12A					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser 1000860	Kathrein / 782 11055					
PDU FOR TMAS (QTY/MODEL)	(1900 AND 850 Bypass TMA)	(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)	N/A						
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)	N/A	RRUS 11					
Additional Component 2 (QTY/MODEL)	N/A	No CSRF					
Additional Component 3 (QTY/MODEL)	N/A						
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1					TxRx-TxRx	GSM 850, UMTS 850	7770	14		6	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx-TxRx	GSM 1900, UMTS 1900	7770	17		4	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
ANTENNA POSITION 2	PORT 1					TxRx-Rx	LTE 700	SBNH-1D6565C	16		5	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					
	PORT 2					N/A	LTE	SBNH-1D6565C			0	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					

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	7770	AM-X-CD-17-65-00T-RET					
ANTENNA VENDOR	Powerwave	KMW					
ANTENNA SIZE (H x W x D)	55X11X5	96X11.8X6					
ANTENNA WEIGHT	35	60					
AZIMUTH	260	250					
MAGNETIC DECLINATION	TBD	TBD					
RADIATION CENTER (feet)	109	109					
ANTENNA TIP HEIGHT	111	113					
MECHANICAL DOWNTILT	0	0					
FEEDER AMOUNT	2	2					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)	in RET Equipment					
SURGE ARRESTOR (QTY/MODEL)	N/A	APTDC-BDFDM-DBW					
DIPLEXER (QTY/MODEL)	Powerwave / LGP 21903	Powerwave / CM1007-					
DUPLEXER (QTY/MODEL)	N/A						
Antenna RET CONTROL UNIT (QTY/MODEL)	1 / Powerwave / 7070						
DC BLOCK (QTY/MODEL)	N/A						
TMA/LNA (QTY/MODEL)	LGP 21401 (Dual Band - 850	DTMABP7819VG12A					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser 1000860	Kathrein / 782 11055					
PDU FOR TMAS (QTY/MODEL)	(1900 AND 850 Bypass TMA)	(1900 AND 850 Bypass TMA)					
FILTER (QTY/MODEL)	N/A						
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
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)	N/A	RRUS 11					
Additional Component 2 (QTY/MODEL)	N/A	No CSRF					
Additional Component 3 (QTY/MODEL)	N/A						
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1					TxRx-TxRx	GSM 850, UMTS 850	7770	14		3	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
	PORT 2					TxRx-TxRx	GSM 1900, UMTS 1900	7770	17		5	N/A	1 1/4" - Andrew	165	RxAIT - DualBand		1 / LLC - DualBand	No					
ANTENNA POSITION 2	PORT 1					TxRx-Rx	LTE 700	AM-X-CD-17-65-00T-RET			1	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					
	PORT 2					N/A	LTE	AM-X-CD-17-65-00T-RET			0	BOTTOM	1 5/8" - Andrew	165	No RxAIT		N/A / No LLC	No					

Dual Broadband Antenna

90° 1.4 m MET Antenna

806-960/1710-2170 MHz

Part Number: 7770.00

Horizontal Beamwidth: 90°
Gain: 13.5/16 dBi

Electrical Downtilt: Adjustable
Connector Type: 7/16 female

The Powerwave dual band dual polarized broadband antenna has individual adjustable electrical downtilt per band (upgradeable to Remote Electrical Tilt (RET). Four connector ports allow separate tilts on each frequency band and ensure the use of diversity concepts. The phase shifter technology, based on a patented sliding dielectric, minimizes intermodulation distortion and maximizes efficiency. The slant +/- 45° dual polarization system provides the independent fading signals needed for achieving top-quality coverage via diversity concepts. The Powerwave Broadband antenna design is based on a patented stacked aperture-coupled patch technology, which provides high isolation performance and a wide VSWR bandwidth. The antennas have superior radiation patterns due to a unique reflector design which provides a very small variation of the –3dB horizontal beam width over the frequency band as well as a high front-to-back ratio.

Key Benefits

- Excellent broad- and multi-band capabilities
- Polarization purity makes good diversity gain
- Excellent pattern performance and high gain over frequency
- High passive intermodulation performance
- Light, slim and robust design

Preliminary

ANTENNA SYSTEMS

BASE STATION SYSTEMS

COVERAGE SYSTEMS

806-960/1710-2170 MHz

Dual Broadband Antenna

Electrical Specifications (Preliminary)

Frequency band (MHz)	806-960		1710-2170
Gain, ± 0.5dB (dBi)	13.5		16.0
Polarization		Dual linear ±45°	
Nominal Impedance (Ohm)		50	
VSWR	1.5:1		
VSWR			1.5:1
Isolation between inputs (dB)	30		
Isolation between inputs (dB)			30
Inter band isolation (dB)		40	
Horizontal -3 dB beamwidth	85 ± 5°		85 ± 5°
Tracking, Horizontal plane, ±60° (dB)	<2.0		
Tracking, Horizontal plane, ±60° (dB)			<2.0
Electrical downtilt range (adjustable)	0° to 10°		0° to 8°
Vertical -3 dB beamwidth	14.3 ± 2.0°		6.6 ± 1°
Sidelobe suppression, Vertical 1 st upper (dB)	>17,16,15 x=0, 5, 10° MET		> 17, 16,15 x=0, 4, 8° MET
Vertical beam squint	<0.8°		<0.5°
First null-fill (dB)	<-25		<-25
Front-to-back ratio (dB)	>25		>27
Front-to-back ratio, total power (dB)	>20		>23
IM3, 2Tx@43dBm (dBc)	<-153		
IM3, 2Tx@43dBm (dBc)			<-153
IM7, 2Tx@43dBm (dBc)			<-160
Power Handling, Average per input (W)	400		250
Power Handling, Average total (W)	800		500

All specifications are subject to change without notice.
Contact your Powerwave representative for complete performance data.

Mechanical Specifications

Connector Type	4 x 7/16 DIN female
Connector Position	Bottom
Dimensions, HxWxD	1408mm x 280mm x 125mm (55”x11”x5”)
Weight Including Brackets	15.8 kg (35 lbs)
Wind Load, Frontal, 42m/s Cd=1	435N (98 lbf)
Survival Wind Speed (m/s)	70 (156mph)
Lightning Protection	DC grounded
Radome Material	GRP
Radome Color	Light Gray
Mounting	Pre-mounted Standard Brackets
Packing Size	1550mm x 355mm x 255mm (61”x14”x10”)

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Powerwave technologies

COVERAGE AND CAPACITY | TECHNOLOGY LEADERSHIP | GLOBAL PARTNER | INTEGRATED SOLUTIONS | QUALITY AND RELIABILITY

D031-08208 Rev A

AM-X-CD-16-65-00T-RET(6' 65° Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V12°

1710 ~ 2170MHz, X-pol., H65° / V6.0°

Electrical Specification

Frequency Range		698~894MHz	1710~2170MHz
Impedance		50Ω	
Polarization		Dual, Slant ±45°	
Gain		15.5dBi / 13.35dBd @ 698-806MHz 16.0dBi / 13.85dBd @ 824-894MHz	17.3dBi / 15.15dBd @ 1710-1755MHz 17.4dBi / 15.25dBd @ 1850-1900MHz 17.1dBi / 14.95dBd @ 2110-2155MHz
Beamwidth	Horizontal	65° @ 698-806MHz 63° @ 824-894MHz	65° @ 1710-1755MHz 67° @ 1850-1900MHz 69° @ 2110-2155MHz
	Vertical	12.3° @ 698-806MHz 11.5° @ 824-894MHz	6.5° @ 1710-1755MHz 6.0° @ 1850-1900MHz 5.7° @ 2110-2155MHz
VSWR		≤1.5:1	
Front-to-Back Ratio		≥27 dB	
Electrical Downtilt Range		2° ~ 16°	0° ~ 10°
Isolation Between Ports		≥30 dB	
Isolation Between Ports of Different Frequency Elements		≥35 dB	
Cross Pole Discrimination		10.0 dB @ ±60° 15.0 dBi @ 0°	
First Upper Side Lobe Suppression		16dB	
Side Lobe Suppression		> 16 dB @ 0-6° Tilt > 18 dB @ 7-12° Tilt (Up to 10° from Boresight)	> 16 dB @ 0-6° Tilt > 18 dB @ 7-10° Tilt (Up to 10° from Boresight)
Passive Intermodulation		≤ -150 dBc @ 2x20w	
Input Maximum CW Power		500 W	300 W
Environmental Compliance		IP65 for Radome IP67 for Connectors	
RET Motor Configuration		Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0		AISG 1.1 and 2.0	

Mechanical Specification

Dimension (W×D×H)	11.8×5.9×72 inches (300×150×1829mm)
Weight (Without clamp)	48.5 lbs (22.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	1891 N

300

AM-X-CD-17-65-00T-RET(8' 65° Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V8.0°

1710 ~ 2170MHz, X-pol., H65° / V7.0°

Electrical Specification

Frequency Range		698~894MHz	1710~2170MHz
Impedance		50Ω	
Polarization		Dual, Slant ±45°	
Gain		16.8dBi / 14.65dBd @ 698-806MHz 17.5dBi / 15.35dBd @ 824-894MHz	17.0dBi / 14.85dBd @ 1710-1755MHz 17.3dBi / 15.15dBd @ 1850-1900MHz 17.5dBi / 15.35dBd @ 2110-2155MHz
Beamwidth	Horizontal	68° @ 698-806MHz 63° @ 824-894MHz	67° @ 1710-1755MHz 65° @ 1850-1900MHz 62° @ 2110-2155MHz
	Vertical	9.2° @ 698-806MHz 8.0° @ 824-894MHz	7.3° @ 1710-1755MHz 7.0° @ 1850-1900MHz 6.7° @ 2110-2155MHz
VSWR		≤1.5:1	
Front-to-Back Ratio		≥27 dB	
Electrical Downtilt Range		2° ~ 16°	0° ~ 10°
Isolation Between Ports		≥30 dB	
Isolation Between Ports of Different Frequency Elements		≥35 dB	
Cross Pole Discrimination		10.0 dB @ ±60° 15.0 dBi @ 0°	
First Upper Side Lobe Suppression		16dB	
Side Lobe Suppression		> 16 dB @ 0-6° Tilt > 18 dB @ 7-12° Tilt (Up to 10° from Boresight)	> 16 dB @ 0-6° Tilt > 18 dB @ 7-10° Tilt (Up to 10° from Boresight)
Passive Intermodulation		≤ -150 dBc @ 2x20w	
Input Maximum CW Power		500 W	300 W
Environmental Compliance		IP65 for Radome IP67 for Connectors	
RET Motor Configuration		Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0		AISG 1.1 and 2.0	

Mechanical Specification

Dimension (W×D×H)	11.8×6.0×96 inches
Weight (Without clamp)	59.5 lbs (27.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	2521 N

Product Specifications

SBNH-1D6565C

Andrew® Dual Band Antenna, 698–896 MHz and 1710–2180 MHz, 65° horizontal beamwidth, internal RET

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Internal next generation actuator eliminates field installation and defines new standards for reliability

OBSOLETE
This product was discontinued on: December 31, 2014

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180
Gain, dBi	15.8	16.6	18.0	18.0	18.5
Beamwidth, Horizontal, degrees	72	67	60	59	60
Beamwidth, Vertical, degrees	8.6	7.8	5.6	5.2	4.9
Beam Tilt, degrees	0–11	0–11	0–7	0–7	0–7
USLS, dB	15	15	18	16	16
Front-to-Back Ratio at 180°, dB	25	28	34	31	31
CPR at Boresight, dB	26	20	18	18	18
CPR at Sector, dB	13	8	9	8	9
Isolation, dB	30	30	30	30	30
Isolation, Intersystem, dB	35	35	35	35	35
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	400	400	300	300	300
Polarization	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	15.6	16.3	17.8	17.9	18.2
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.4	±0.3	±0.2	±0.5
	0 ° | 15.6	0 ° | 16.2	0 ° | 18.0	0 ° | 17.8	0 ° | 18.0
Gain by Beam Tilt, average, dBi	6 ° | 15.7	6 ° | 16.4	4 ° | 17.9	4 ° | 17.9	4 ° | 18.2
	11 ° | 15.3	11 ° | 16.1	7 ° | 17.6	7 ° | 17.8	7 ° | 18.1
Beamwidth, Horizontal Tolerance, degrees	±3	±3.1	±3.2	±2	±3.3
Beamwidth, Vertical Tolerance, degrees	±0.4	±0.4	±0.3	±0.2	±0.4
USLS, dB	17	17	18	18	18
Front-to-Back Total Power at 180° ± 30°, dB	23	21	30	29	27
CPR at Boresight, dB	26	20	18	18	18
CPR at Sector, dB	13	8	9	8	9

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET

Product Specifications

SBNH-1D6565C

Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz | 698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	879.0 N @ 150 km/h 197.6 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	2449.0 mm | 96.4 in
Width	301.0 mm | 11.9 in
Net Weight	23.5 kg | 51.8 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	11.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)

Included Products

DB380-5083 — Standard two point mounting system to secure BSA panels to pipes with an OD measuring 2.4-4.5" (60-115mm). Includes locking downtilt brackets and heavy guage pipe brackets to provide superior windload performance.

Tower Mounted Amplifier

Dual Band 1900 MHz with 850 MHz Bypass

1900/850 MHz

Part Number:
LGP 214nn

Up-link: 1850-1910 MHz
Down-link: 1930-1990 MHz
Bypass: 824-894 MHz

Gain: 12 dB
Noise Figure: < 1.7 dB

The Powerwave® TMA-DD 1900/850 is a dual band Tower Mounted Amplifier (TMA) to be installed near the antenna. Deployed in an AMPS, GSM, GPRS, EDGE and CDMA network it will increase capacity and coverage as well as extend the battery life time for the handsets. The TMA System will provide enhanced coverage and improved up-link signal quality. Appropriate for new rollouts by optimizing coverage with a reduced number of BTSs or as an upgrade to existing BTSs for enhancing the existing coverage.

Extended band TMA facilitates simplified logistics, especially when the frequency bands are scattered. The unit comprises of high Q band-pass filters, dual balanced low noise amplifiers with circuits for active bias, supervision, alarms and lightning protection circuit. The Powerwave patented design with all active components integrated within the filter body provides an extremely reliable, compact and lightweight TMA solution. The vented enclosure design is employed to prevent the effect of condensation, thereby guaranteeing long, reliable, maintenance-free service in all environmental conditions. These TMAs offer an easy to install, maintenance free, cost effective solution for coverage enhancement and increased quality in mobile communication networks.

Key Benefits:

- 850 MHz Bypass
- Improved Network Quality
- Increased Coverage
- State of the Art Performance
- Excellent Power Handling
- Low Tx Loss
- Exceptional Reliability

ANTENNA SYSTEMS

BASE STATION SYSTEMS

COVERAGE SYSTEMS

Powerwave technologies

Tower Mounted Amplifier

1900/850 MHz

Technical Specifications

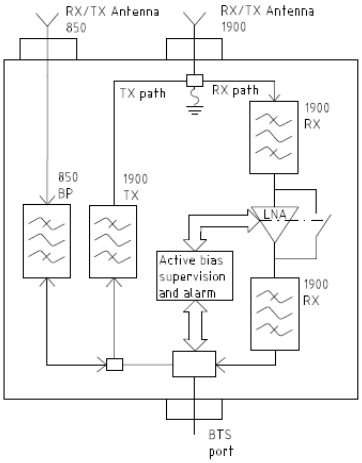
Product Number	LGP214nn	
850 MHz	Bypass (MHz)	824-894
	Return loss* (dB)	> 20
	Insertion loss* (dB)	< 0.3
1900 MHz		
Up-link	Frequency range, full band (60 MHz)	1850-1910
	Nominal gain (dB)	12
	Return loss* (dB)	> 20
	Noise figure* (dB)	< 1.7
	Output 3rd order Intercept Point* (dBm)	> +23
Down-link	Frequency range, full band (60 MHz)	1930-1990
	Insertion loss* (dB)	< 0.6
	Return loss* (dB)	> 20
Intermodulation	2 Tx@x43 dBm (dBc)	<-158
Alarm Functionality	Two levels,individually supervised LNAs	
Power Consumption	@12 VDC	1.2 W

* Typical

All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

Mechanical Specifications

Size,W x H x D (without mounting plate)	235 x 366 x 66 mm (9.2 x 14.4 x 2.6 in)
Weight	6.4 kg (14.1 lbs)
Color	Off white (NCS 1502-R)
Housing	Aluminum
RF-connectors	DIN 7/16 female.
Mounting kit	Mounting kit for pole and wall is included
Temperature range	-40 °C to +65 °C (-40 °F to +149 °F)
MTBF	>1 million hours
Safety	UL 60 950
Ingress protection, IP 65	EN 60 529
Environmental	ETS 300 019
EMC	FCC Part 15



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Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information

CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Diplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Model
DTMABP7819VG12A

Contents:

Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

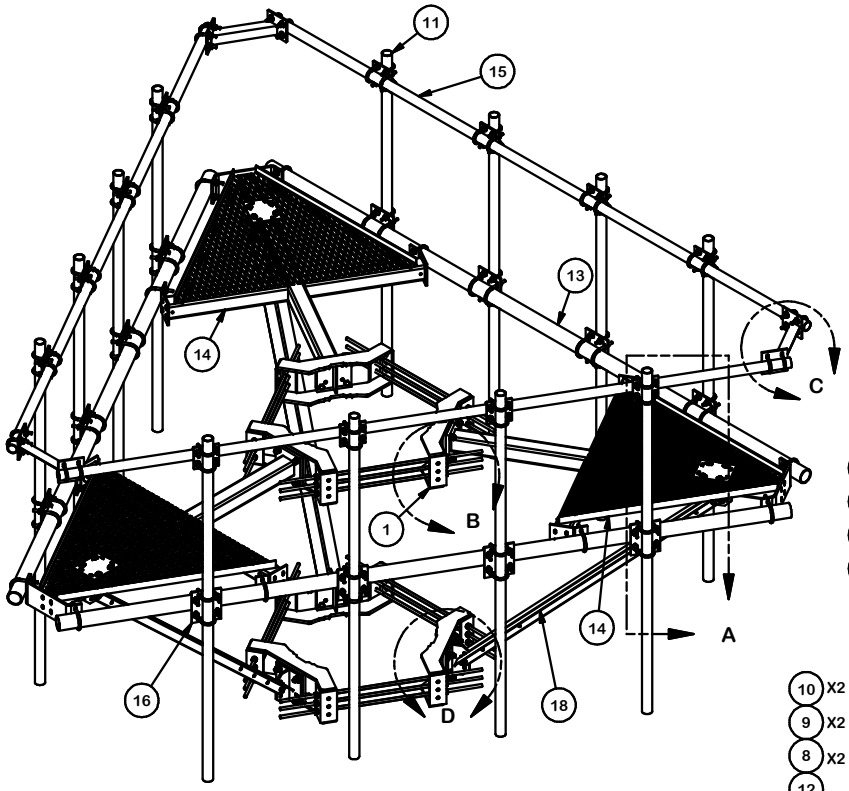
The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are diplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

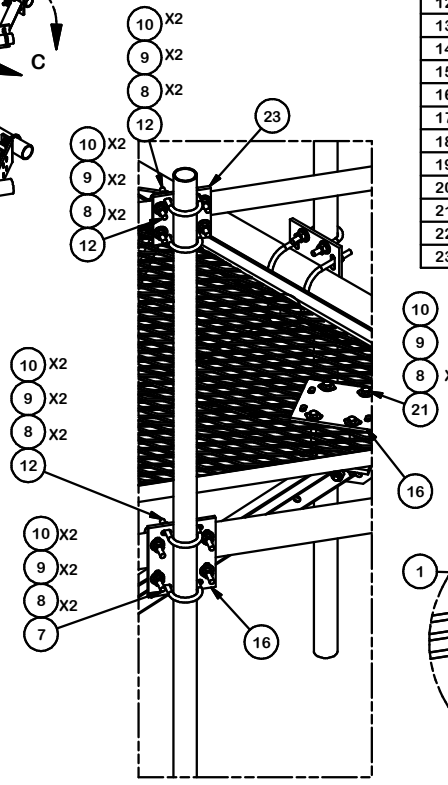
An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications

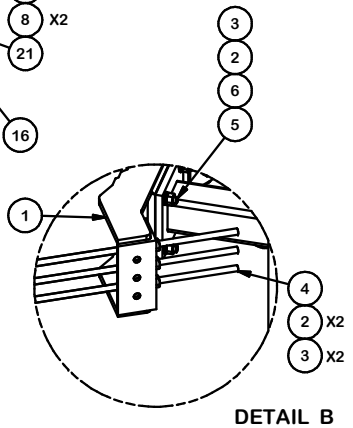
Description	Typical Specifications
Electrical Specifications	
700 Band & Cellular Frequency Range	698 to 894 MHz
PCS Receive Frequency Range	1850 – 1910 MHz
PCS Transmit Frequency Range	1930 - 1990 MHz
PCS Amplifier Gain	6 to 12 dB Adjustable in 0.25 dB steps via AISG
PCS Gain Variation	±1.0 dB
PCS System Noise Figure	1.4 dB (@ +25°C),1.6 dB (@ +65°C), At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C)
PCS Input Third Order Intercept Point	+12 dBm Min @ Max. Gain
Input/Output Return Loss	18 dB Min. all ports, 15 dB Min. Bypass Mode
Insertion Loss	
700 Band & Cellular Passband	< 0.2 dB, 0.1 dB typical
PCS Transmit Passband	0.4 dB Typical
PCS Transmit Passband Ripple	±0.2 dB
PCS Bypass Mode, Rx Passband	1.6 dB (@ +25°C),1.8 dB (@ +65°C), At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C)
PCS Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
700 Band & Cellular Path Rejection	70 dB @ 1850 - 1990 MHz
PCS Path Rejection	80 dB @ 698 - 894 MHz
Continuous Average Power	200 Watts max
Peak Envelope Power	2 kW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-112 dBm Min. (2 x +43 dBm tones)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	≤ 2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female (Long Neck) x 6, AISG x 1
Dimensions (Body Only)	10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)
Dimensions (with Bracket)	14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)
Weight (w/o Bracket)	19.18 Lbs. (8.7 Kg)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40˚ C to +65˚C
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
Enclosure	IP65 (Unit Body), IP68 (Connector)
MTBF	>500,000 hours

All specifications are subject to change. The latest specifications are available at www.cciproducts.com

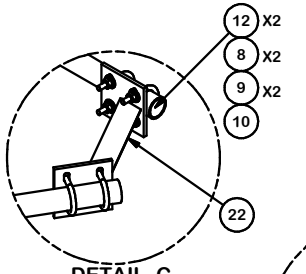




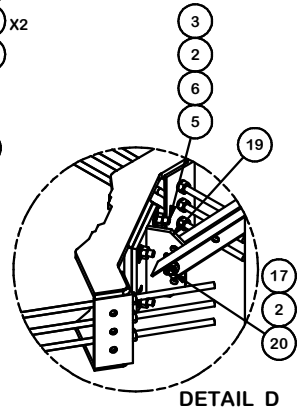
DETAIL A



DETAIL B



DETAIL C



DETAIL D

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	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
8	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
9	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	52.51
13	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
14	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
15	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
16	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
17	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
18	6	X-254923	PLATFORM REINFORCEMENT KIT ANGLE	84 in	22.83	137.00
19	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
20	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
21	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
22	3	X-AHCP	ANGLE SUPPORT RAIL CORNER PLATE		12.92	38.76
23	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
					TOTAL WT. #	2615.70

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 ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
B	CENTERED ANTENNA ON PLATFORM		KC8	5-25-21
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

REVISION HISTORY

DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUNTING
PIPES AND SUPPORT RAIL

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/15/2014		RMQLP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/23/2014	RMQLP-496-HK

November 5, 2021

SAI Communications
12 Industrial Way
Salem NH, 03079

RE:	Site Number:	CT5235
	FA Number:	10071308
	PACE Number:	MRCTB057465
	PT Number:	2051A12GNV
	Site Name:	WATERFORD NE
	Site Address:	126 Old Colchester Road Waterford, CT 06385

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by SAI Communications to perform a mount analysis on the proposed AT&T antenna/RRH mount to determine their capability of supporting the following additional loading:

- (3) 7770 Antennas (55.0"x11.0"x5.0" - Wt. = 35 lbs. /each)
- (1) AM-X-CD-16-65-00T-RET Antenna (72.0"x11.8"x5.9" – Wt. = 49 lbs.)
- (1) SBNH-1D6565C Antenna (96.4"x11.9"x7.1" – Wt. = 61 lbs.)
- (1) AM-X-CD-17-65-00T-RET Antenna (96.0"x11.8"x6.0" – Wt. = 60 lbs.)
- (6) LGP21401 TMA's (14.4"x9.0"x2.7" – Wt. = 19 lbs. /each)
- (3) DTMABP7819VG12A TMA's (10.7"x11.1"x3.8" - Wt. = 20 lbs. /each)

Mount fabrication drawings prepared by SitePro1 P/N RMQLP-496-HK, dated July 23, 2014, 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 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R13.
- HDG 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 N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 135 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 1.41 in was used for this analysis.
- HDG considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- HDG considers this site to have a spectral response acceleration parameter at short periods, S_S, of 0.164 and a spectral response acceleration parameter at a period of 1 second, S_1, of 0.059.
- 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.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

Based on our evaluation, we have determined that the Proposed SitePro1 RMQLP-496-HK mount **IS CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Proposed (LTE Wave 4) Mount Rating	10	LC2	51%	**PASS**

Reference Documents:

- Fabrication drawings prepared by SitePro1 P/N RMQLP-496-HK, dated July 23, 2014.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG 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 mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG 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,
Hudson Design Group LLC

Michael Cabral
Vice President

Daniel P. Hamm, PE
Principal

HUDSON
Design Group LLC

Wind & Ice
Calculations

Date: 11/5/2021
Project Name: WATERFORD NE
Project No.: CT5235
Designed By: LBW **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

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

z=	109 (ft)
z_g=	900 (ft)
α=	9.5
K_z=	**1.289**

Kzmin ≤ Kz ≤ 2.01

Table 2-4

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

2.6.6.2 Topographic Factor:

Table 2-5

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

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

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

K_{zt}=	**1**
K_h=	1
K_c=	1.0 (from Table 2-4)
K_t=	0 (from Table 2-5)
f=	0 (from Table 2-5)
z=	109
z_s=	180 (Mean elevation of base of structure above sea level)
H=	0 (Ht. of the crest above surrounding terrain)
K_{zt}=	1.00 (from 2.6.6.2.1)
K_e=	0.99 (from 2.6.8)

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

Category= **1**

2.6.10 Design Ice Thickness

Max Ice Thickness =	t_i = 1.00 in
Importance Factor =	I= 1.25 (from Table 2-3)
	K_{iz} = 1.13 (from Sec. 2.6.10)

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

t_{iz} = 1.41 in

Date: 11/5/2021
Project Name: WATERFORD NE
Project No.: CT5235
Designed By: LBW Checked By: MSC

HUDSON Design Group LLC

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=	115	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=	1.289	(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=	**65.47**	K_e=	0.99	(from 2.6.8)
$q_{z\ (ice)}$=	**7.78**	K_d=	0.95	(from Table 2-2)
$q_{z\ (30)}$=	**2.80**	V_{max}=	135	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 = **1.41** **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)
7770 Antenna	55.0	11.0	5.0	4.20	5.00	1.31	**361**	**57**	**15**
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	6.10	1.36	**525**	**80**	**22**
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	8.10	1.44	**749**	**113**	**32**
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	8.14	1.44	**741**	**112**	**32**
LGP21401 TMA	14.4	2.7	9.0	0.27	5.33	1.33	**23**	**7**	**1**
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.96	1.20	**65**	**12**	**3**
2" Pipe	2.4	12.0	-	0.20	0.20	1.20	**16**		
3" Pipe	3.5	12.0	-	0.29	0.29	1.20	**23**		
HSS 4x4	4.0	12.0	-	0.33	0.33	1.25	**27**		
PL 6x1/2	0.5	12.0	-	0.04	0.04	2.00	**5**		
L 2x2 Angles	2.0	12.0	-	0.17	0.17	2.00	**22**		
2-1/2" pipe	2.9	12.0	-	0.24	0.24	1.20	**19**		
L 2-1/2x2-1/2 Angles	2.5	12.0	-	0.21	0.21	2.00	**27**		

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WIND LOADS

Angle = 30 (deg) | Ice Thickness = 1.41 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)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	361	192	318
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	525	304	470
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	749	504	688
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	741	445	667
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	23	71	35
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	65	22	54

WIND LOADS WITH ICE:

7770 Antenna	57.8	13.8	7.8	5.55	3.14	4.18	7.40	1.27	1.41	55	35	50
AM-X-CD-16-65-00T-RET Antenna	74.8	14.6	8.7	7.59	4.53	5.12	8.58	1.32	1.45	78	51	71
SBNH-1D6565C Antenna	99.2	14.7	9.9	10.14	6.83	6.74	10.00	1.39	1.50	110	80	102
AM-X-CD-17-65-00T-RET Antenna	98.8	14.6	8.8	10.03	6.05	6.76	11.21	1.39	1.54	108	73	100
LGP21401 TMA	17.2	5.5	11.8	0.66	1.41	3.12	1.46	1.23	1.20	6	13	8
DTMABP7819VG12A TMA	13.5	13.9	6.6	1.31	0.62	0.97	2.04	1.20	1.20	12	6	11

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	15	8	14
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	22	13	20
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	32	22	29
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	32	19	29
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	2

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WIND LOADS

Angle =	60	(deg)	Ice Thickness =	1.41	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)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	361	192	234
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	525	304	359
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	749	504	565
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	741	445	519
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	23	71	59
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	65	22	33
WIND LOADS WITH ICE:												
7770 Antenna	57.8	13.8	7.8	5.55	3.14	4.18	7.40	1.27	1.41	55	35	40
AM-X-CD-16-65-00T-RET Antenna	74.8	14.6	8.7	7.59	4.53	5.12	8.58	1.32	1.45	78	51	58
SBNH-1D6565C Antenna	99.2	14.7	9.9	10.14	6.83	6.74	10.00	1.39	1.50	110	80	87
AM-X-CD-17-65-00T-RET Antenna	98.8	14.6	8.8	10.03	6.05	6.76	11.21	1.39	1.54	108	73	82
LGP21401 TMA	17.2	5.5	11.8	0.66	1.41	3.12	1.46	1.23	1.20	6	13	11
DTMABP7819VG12A TMA	13.5	13.9	6.6	1.31	0.62	0.97	2.04	1.20	1.20	12	6	7
WIND LOADS AT 30 MPH:												
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	15	8	10
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	22	13	15
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	32	22	24
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	32	19	22
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	3
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	1

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WIND LOADS

Angle =	90	(deg)	Ice Thickness =	1.41	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)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	361	192	192
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	525	304	304
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	749	504	504
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	741	445	445
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	23	71	71
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	65	22	22

WIND LOADS WITH ICE:

7770 Antenna	57.8	13.8	7.8	5.55	3.14	4.18	7.40	1.27	1.41	55	35	35
AM-X-CD-16-65-00T-RET Antenna	74.8	14.6	8.7	7.59	4.53	5.12	8.58	1.32	1.45	78	51	51
SBNH-1D6565C Antenna	99.2	14.7	9.9	10.14	6.83	6.74	10.00	1.39	1.50	110	80	80
AM-X-CD-17-65-00T-RET Antenna	98.8	14.6	8.8	10.03	6.05	6.76	11.21	1.39	1.54	108	73	73
LGP21401 TMA	17.2	5.5	11.8	0.66	1.41	3.12	1.46	1.23	1.20	6	13	13
DTMABP7819VG12A TMA	13.5	13.9	6.6	1.31	0.62	0.97	2.04	1.20	1.20	12	6	6

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	15	8	8
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	22	13	13
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	32	22	22
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	32	19	19
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	3
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	1

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WIND LOADS

Angle =	120	(deg)	Ice Thickness =	1.41	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)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	361	192	234
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	525	304	359
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	749	504	565
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	741	445	519
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	23	71	59
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	65	22	33

WIND LOADS WITH ICE:

7770 Antenna	57.8	13.8	7.8	5.55	3.14	4.18	7.40	1.27	1.41	55	35	40
AM-X-CD-16-65-00T-RET Antenna	74.8	14.6	8.7	7.59	4.53	5.12	8.58	1.32	1.45	78	51	58
SBNH-1D6565C Antenna	99.2	14.7	9.9	10.14	6.83	6.74	10.00	1.39	1.50	110	80	87
AM-X-CD-17-65-00T-RET Antenna	98.8	14.6	8.8	10.03	6.05	6.76	11.21	1.39	1.54	108	73	82
LGP21401 TMA	17.2	5.5	11.8	0.66	1.41	3.12	1.46	1.23	1.20	6	13	11
DTMABP7819VG12A TMA	13.5	13.9	6.6	1.31	0.62	0.97	2.04	1.20	1.20	12	6	7

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	15	8	10
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	22	13	15
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	32	22	24
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	32	19	22
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	3
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	1

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WIND LOADS

Angle =	150	(deg)	Ice Thickness =	1.41	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)
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	361	192	318
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	525	304	470
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	749	504	688
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	741	445	667
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	23	71	35
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	65	22	54

WIND LOADS WITH ICE:

7770 Antenna	57.8	13.8	7.8	5.55	3.14	4.18	7.40	1.27	1.41	55	35	50
AM-X-CD-16-65-00T-RET Antenna	74.8	14.6	8.7	7.59	4.53	5.12	8.58	1.32	1.45	78	51	71
SBNH-1D6565C Antenna	99.2	14.7	9.9	10.14	6.83	6.74	10.00	1.39	1.50	110	80	102
AM-X-CD-17-65-00T-RET Antenna	98.8	14.6	8.8	10.03	6.05	6.76	11.21	1.39	1.54	108	73	100
LGP21401 TMA	17.2	5.5	11.8	0.66	1.41	3.12	1.46	1.23	1.20	6	13	8
DTMABP7819VG12A TMA	13.5	13.9	6.6	1.31	0.62	0.97	2.04	1.20	1.20	12	6	11

WIND LOADS AT 30 MPH:

7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	15	8	14
AM-X-CD-16-65-00T-RET Antenna	72.0	11.8	5.9	5.90	2.95	6.10	12.20	1.36	1.57	22	13	20
SBNH-1D6565C Antenna	96.4	11.9	7.1	7.97	4.75	8.10	13.58	1.44	1.62	32	22	29
AM-X-CD-17-65-00T-RET Antenna	96.0	11.8	6.0	7.87	4.00	8.14	16.00	1.44	1.70	32	19	29
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	2

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Project Name: WATERFORD NE
Project No.: CT5235
Designed By: LBW **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 1.41 in.
Density of ice: 56 pcf

7770 Antenna

Weight of ice based on total radial SF area:

Height (in):	55.0	
Width (in):	11.0	
Depth (in):	5.0	
Total weight of ice on object:		107 lbs
Weight of object:	35.0 lbs	
Combined weight of ice and object:		142 lbs

AM-X-CD-16-65-00T-RET Antenna

Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	11.8	
Depth (in):	5.9	
Total weight of ice on object:		151 lbs
Weight of object:	49.0 lbs	
Combined weight of ice and object:		200 lbs

SBNH-1D6565C Antenna

Weight of ice based on total radial SF area:

Height (in):	96.4	
Width (in):	11.9	
Depth (in):	7.1	
Total weight of ice on object:		211 lbs
Weight of object:	61.0 lbs	
Combined weight of ice and object:		272 lbs

AM-X-CD-17-65-00T-RET Antenna

Weight of ice based on total radial SF area:

Height (in):	96.0	
Width (in):	11.8	
Depth (in):	6.0	
Total weight of ice on object:		202 lbs
Weight of object:	60.0 lbs	
Combined weight of ice and object:		262 lbs

LGP21401 TMA

Weight of ice based on total radial SF area:

Height (in):	14.4	
Width (in):	2.7	
Depth (in):	9.0	
Total weight of ice on object:		22 lbs
Weight of object:	19.0 lbs	
Combined weight of ice and object:		41 lbs

DTMABP7819VG12A TMA

Weight of ice based on total radial SF area:

Height (in):	10.7	
Width (in):	11.1	
Depth (in):	3.8	
Total weight of ice on object:		20 lbs
Weight of object:	20.0 lbs	
Combined weight of ice and object:		40 lbs

2" Pipe

Per foot weight of ice:

diameter (in):	2.38	
Per foot weight of ice on object:		7 plf

3" Pipe

Per foot weight of ice:

diameter (in):	3.5	
Per foot weight of ice on object:		8 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:		12 plf

PL 6x1/2

Weight of ice based on total radial SF area:

Height (in):	6	
Width (in):	0.5	
Per foot weight of ice on object:		13 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:		7 plf

2-1/2" pipe

Per foot weight of ice:

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

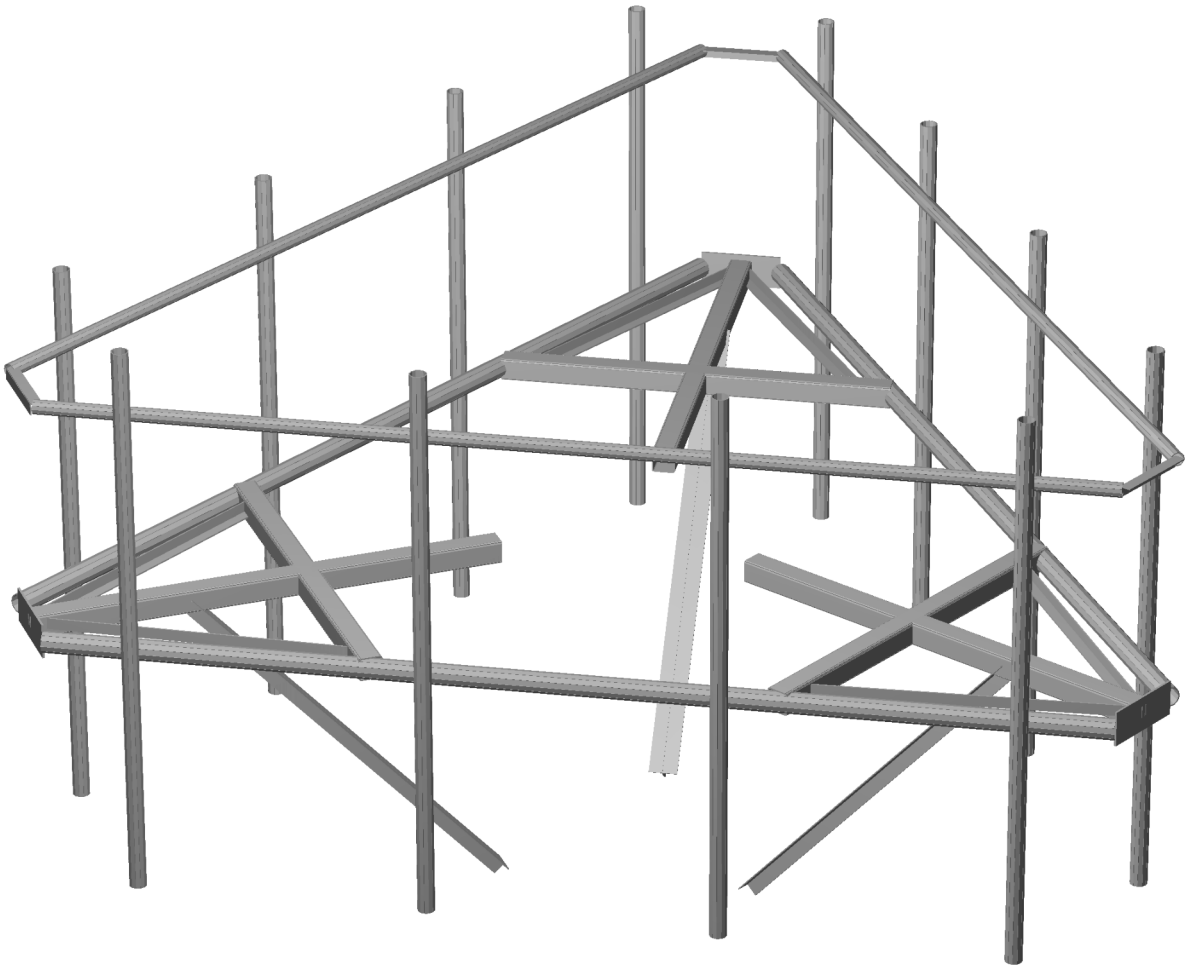
L 2-1/2x2-1/2 Angles

Weight of ice based on total radial SF area:

Height (in):	2.5	
Width (in):	2.5	
Per foot weight of ice on object:		9 plf

HUDSON
Design Group LLC

Proposed Mount Calculations


Y
X
Z

RAM® Elements
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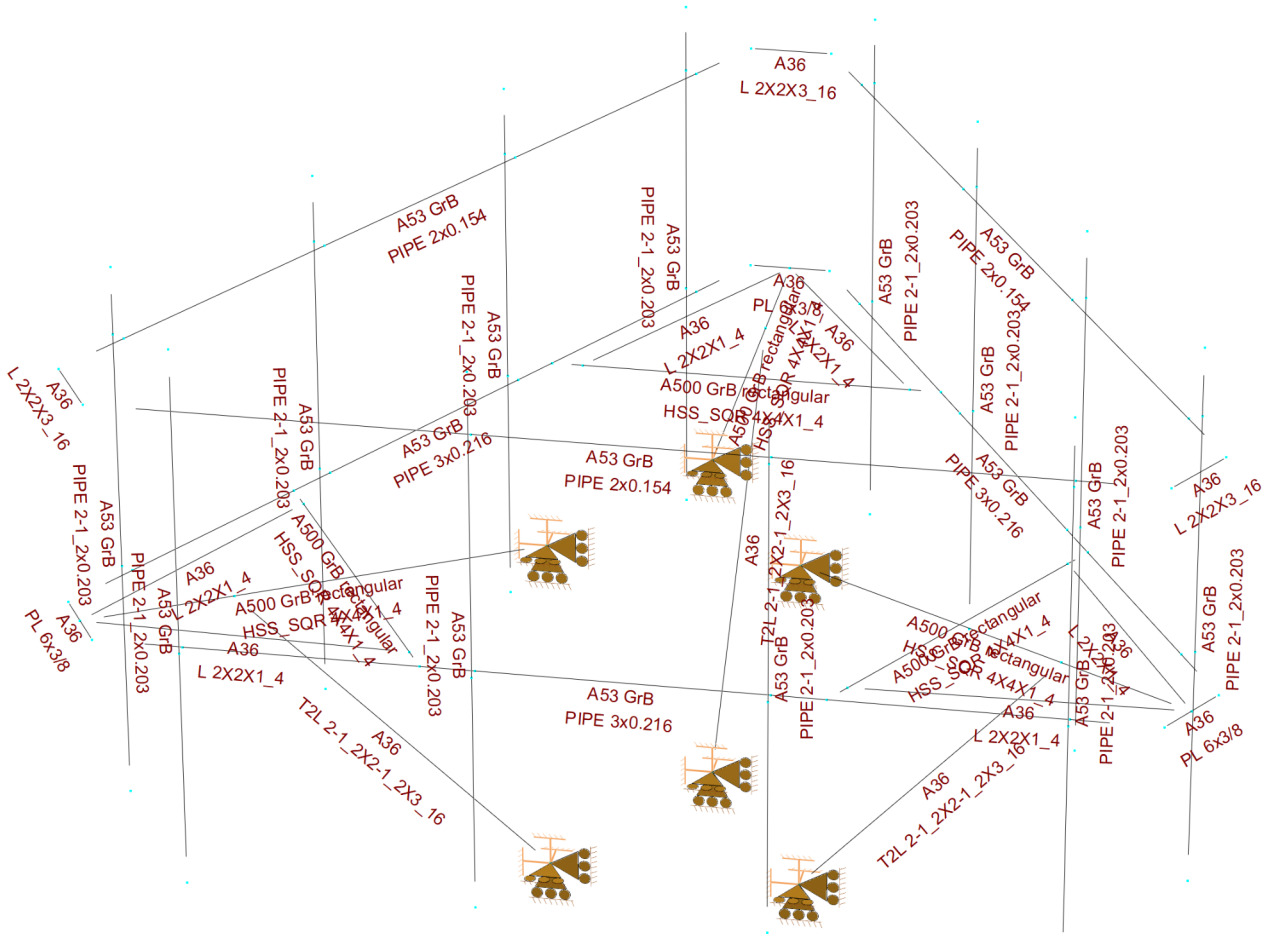

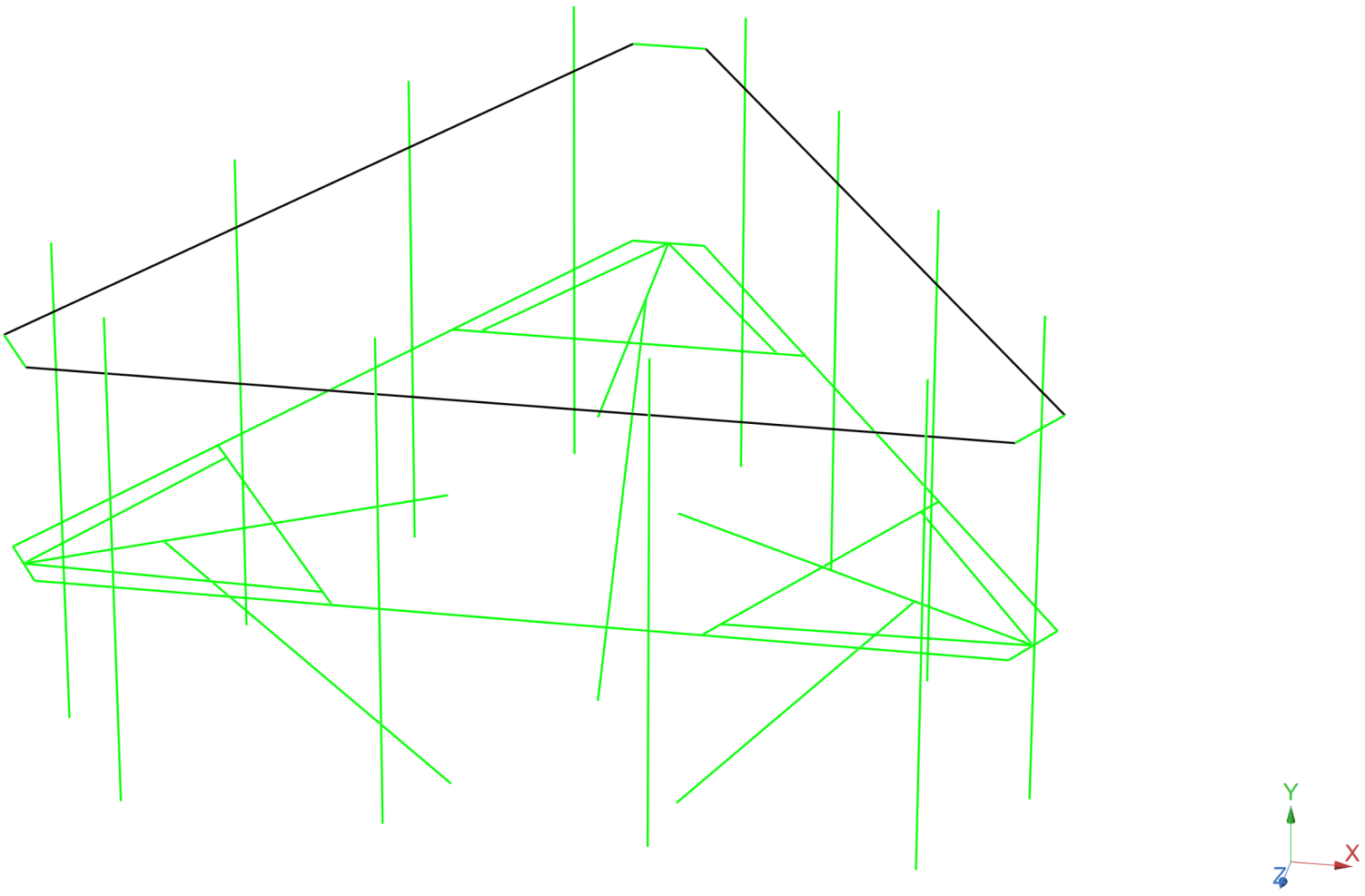
Design status
Not designed
Error on design
Design O.K.
With warnings
Y
X
Z

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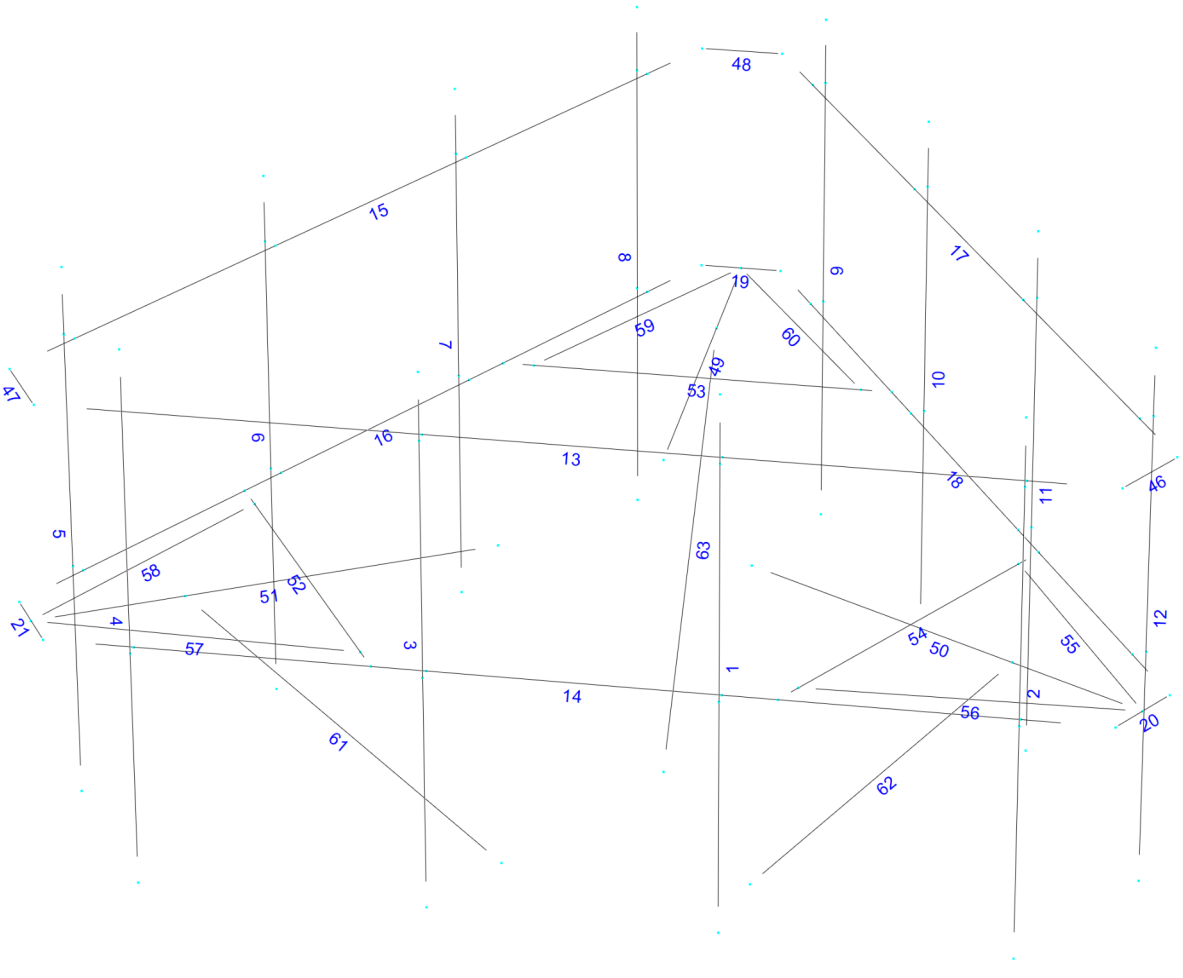

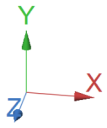

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Load data

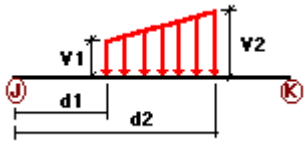
GLOSSARY

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 Antenna 1	No	LL
LLa2	500 lb Live Load Antenna 2	No	LL
LLa3	500 lb Live Load Antenna 3	No	LL
LLa4	500 lb Live Load Antenna 4	No	LL

Distributed force on members

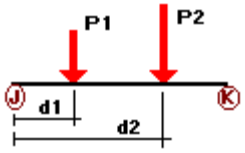


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	55	y	-0.01	0.00	0.00	No	0.00	No
	56	y	-0.01	0.00	0.00	No	0.00	No
	57	y	-0.01	0.00	0.00	No	0.00	No
	58	y	-0.01	0.00	0.00	No	0.00	No
	59	y	-0.01	0.00	0.00	No	0.00	No
	60	y	-0.01	0.00	0.00	No	0.00	No
W0	3	z	-0.019	0.00	0.00	No	0.00	No
	4	z	-0.019	0.00	0.00	No	0.00	No
	5	z	-0.019	0.00	0.00	No	0.00	No
	6	z	-0.019	0.00	0.00	No	0.00	No
	7	z	-0.019	0.00	0.00	No	0.00	No
	8	z	-0.019	0.00	0.00	No	0.00	No
	9	z	-0.019	0.00	0.00	No	0.00	No
	10	z	-0.019	0.00	0.00	No	0.00	No
	11	z	-0.019	0.00	0.00	No	0.00	No

	12	z	-0.019	0.00	0.00	No	0.00	No
	13	z	-0.016	0.00	0.00	No	0.00	No
	14	z	-0.023	0.00	0.00	No	0.00	No
	15	z	-0.016	0.00	0.00	No	0.00	No
	16	z	-0.023	0.00	0.00	No	0.00	No
	17	z	-0.016	0.00	0.00	No	0.00	No
	18	z	-0.023	0.00	0.00	No	0.00	No
	46	z	-0.022	0.00	0.00	No	0.00	No
	47	z	-0.022	0.00	0.00	No	0.00	No
	48	z	-0.022	0.00	0.00	No	0.00	No
	50	z	-0.027	0.00	0.00	No	0.00	No
	51	z	-0.027	0.00	0.00	No	0.00	No
	52	z	-0.027	0.00	0.00	No	0.00	No
	53	z	-0.027	0.00	0.00	No	0.00	No
	54	z	-0.027	0.00	0.00	No	0.00	No
	55	z	-0.022	0.00	0.00	No	0.00	No
	56	z	-0.022	0.00	0.00	No	0.00	No
	57	z	-0.022	0.00	0.00	No	0.00	No
	58	z	-0.022	0.00	0.00	No	0.00	No
	59	z	-0.022	0.00	0.00	No	0.00	No
	60	z	-0.022	0.00	0.00	No	0.00	No
	61	z	-0.027	0.00	0.00	No	0.00	No
	62	z	-0.027	0.00	0.00	No	0.00	No
	63	z	-0.027	0.00	0.00	No	0.00	No
W30	1	x	-0.019	0.00	0.00	No	0.00	No
	2	x	-0.019	0.00	0.00	No	0.00	No
	3	x	-0.019	0.00	0.00	No	0.00	No
	4	x	-0.019	0.00	0.00	No	0.00	No
	5	x	-0.019	0.00	0.00	No	0.00	No
	6	x	-0.019	0.00	0.00	No	0.00	No
	7	x	-0.019	0.00	0.00	No	0.00	No
	8	x	-0.019	0.00	0.00	No	0.00	No
	11	x	-0.019	0.00	0.00	No	0.00	No
	12	x	-0.019	0.00	0.00	No	0.00	No
	15	x	-0.016	0.00	0.00	No	0.00	No
	16	x	-0.023	0.00	0.00	No	0.00	No
	17	x	-0.016	0.00	0.00	No	0.00	No
	18	x	-0.023	0.00	0.00	No	0.00	No
	46	x	-0.022	0.00	0.00	No	0.00	No
	47	x	-0.022	0.00	0.00	No	0.00	No
	48	x	-0.022	0.00	0.00	No	0.00	No
	49	x	-0.027	0.00	0.00	No	0.00	No
	50	x	-0.027	0.00	0.00	No	0.00	No
	51	x	-0.027	0.00	0.00	No	0.00	No
	52	x	-0.027	0.00	0.00	No	0.00	No
	54	x	-0.027	0.00	0.00	No	0.00	No
	55	x	-0.022	0.00	0.00	No	0.00	No
	56	x	-0.022	0.00	0.00	No	0.00	No
	57	x	-0.022	0.00	0.00	No	0.00	No
	58	x	-0.022	0.00	0.00	No	0.00	No
	59	x	-0.022	0.00	0.00	No	0.00	No
	60	x	-0.022	0.00	0.00	No	0.00	No
	61	x	-0.027	0.00	0.00	No	0.00	No
	62	x	-0.027	0.00	0.00	No	0.00	No
	63	x	-0.027	0.00	0.00	No	0.00	No
Di	1	y	-0.007	0.00	0.00	No	0.00	No
	2	y	-0.007	0.00	0.00	No	0.00	No
	3	y	-0.007	0.00	0.00	No	0.00	No
	4	y	-0.007	0.00	0.00	No	0.00	No
	5	y	-0.007	0.00	0.00	No	0.00	No

6	y	-0.007	0.00	0.00	No	0.00	No
7	y	-0.007	0.00	0.00	No	0.00	No
8	y	-0.007	0.00	0.00	No	0.00	No
9	y	-0.007	0.00	0.00	No	0.00	No
10	y	-0.007	0.00	0.00	No	0.00	No
11	y	-0.007	0.00	0.00	No	0.00	No
12	y	-0.007	0.00	0.00	No	0.00	No
13	y	-0.007	0.00	0.00	No	0.00	No
14	y	-0.008	0.00	0.00	No	0.00	No
15	y	-0.007	0.00	0.00	No	0.00	No
16	y	-0.008	0.00	0.00	No	0.00	No
17	y	-0.007	0.00	0.00	No	0.00	No
18	y	-0.008	0.00	0.00	No	0.00	No
19	y	-0.013	0.00	0.00	No	0.00	No
20	y	-0.013	0.00	0.00	No	0.00	No
21	y	-0.013	0.00	0.00	No	0.00	No
46	y	-0.007	0.00	0.00	No	0.00	No
47	y	-0.007	0.00	0.00	No	0.00	No
48	y	-0.007	0.00	0.00	No	0.00	No
49	y	-0.012	0.00	0.00	No	0.00	No
50	y	-0.012	0.00	0.00	No	0.00	No
51	y	-0.012	0.00	0.00	No	0.00	No
52	y	-0.012	0.00	0.00	No	0.00	No
53	y	-0.012	0.00	0.00	No	0.00	No
54	y	-0.012	0.00	0.00	No	0.00	No
55	y	-0.007	0.00	0.00	No	0.00	No
56	y	-0.007	0.00	0.00	No	0.00	No
57	y	-0.007	0.00	0.00	No	0.00	No
58	y	-0.007	0.00	0.00	No	0.00	No
59	y	-0.007	0.00	0.00	No	0.00	No
60	y	-0.007	0.00	0.00	No	0.00	No
61	y	-0.009	0.00	0.00	No	0.00	No
62	y	-0.009	0.00	0.00	No	0.00	No
63	y	-0.009	0.00	0.00	No	0.00	No

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	1	y	-0.018	1.50	No
		y	-0.018	6.00	No
		y	-0.019	3.50	No
		y	-0.019	3.50	No
	2	y	-0.03	0.50	No
		y	-0.03	7.50	No
		y	-0.02	3.50	No
	5	y	-0.018	1.50	No
		y	-0.018	6.00	No
		y	-0.019	3.50	No
		y	-0.019	3.50	No

	6	y	-0.025	0.75	No
		y	-0.025	6.75	No
		y	-0.02	3.50	No
	9	y	-0.018	1.50	No
		y	-0.018	6.00	No
		y	-0.019	3.50	No
		y	-0.019	3.50	No
	10	y	-0.031	0.50	No
		y	-0.031	7.50	No
		y	-0.02	3.50	No
W0	1	z	-0.181	1.50	No
		z	-0.181	6.00	No
	2	z	-0.371	0.50	No
		z	-0.371	7.50	No
	5	z	-0.117	1.50	No
		z	-0.117	6.00	No
		z	-0.059	3.50	No
	6	z	-0.18	0.75	No
		z	-0.18	6.75	No
		z	-0.033	3.50	No
	9	z	-0.117	1.50	No
		z	-0.117	6.00	No
		z	-0.059	3.50	No
	10	z	-0.283	0.50	No
		z	-0.283	7.50	No
		z	-0.033	3.50	No
W30	1	x	-0.096	1.50	No
		x	-0.096	6.00	No
		x	-0.071	3.50	No
	2	x	-0.223	0.50	No
		x	-0.223	7.50	No
		x	-0.022	3.50	No
	5	x	-0.16	1.50	No
		x	-0.16	6.00	No
		x	-0.035	3.50	No
	6	x	-0.236	0.75	No
		x	-0.236	6.75	No
		x	-0.054	3.50	No
	9	x	-0.16	1.50	No
		x	-0.16	6.00	No
		x	-0.035	3.50	No
	10	x	-0.344	0.50	No
		x	-0.344	7.50	No
		x	-0.054	3.50	No
Di	1	y	-0.053	1.50	No
		y	-0.053	6.00	No
		y	-0.022	3.50	No
		y	-0.022	3.50	No
	2	y	-0.101	0.50	No
		y	-0.101	7.50	No
		y	-0.02	3.50	No
	5	y	-0.053	1.50	No
		y	-0.053	6.00	No
		y	-0.022	3.50	No
		y	-0.022	3.50	No
	6	y	-0.075	0.75	No
		y	-0.075	6.75	No
		y	-0.02	3.50	No
	9	y	-0.053	1.50	No
		y	-0.053	6.00	No

		y	-0.022	3.50	No
		y	-0.022	3.50	No
	10	y	-0.106	0.50	No
		y	-0.106	7.50	No
		y	-0.02	3.50	No
Wi0	1	z	-0.029	1.50	No
		z	-0.029	6.00	No
	2	z	-0.057	0.50	No
		z	-0.057	7.50	No
	5	z	-0.02	1.50	No
		z	-0.02	6.00	No
		z	-0.011	3.50	No
	6	z	-0.029	0.75	No
		z	-0.029	6.75	No
		z	-0.007	3.50	No
	9	z	-0.02	1.50	No
		z	-0.02	6.00	No
		z	-0.011	3.50	No
	10	z	-0.044	0.50	No
		z	-0.044	7.50	No
		z	-0.007	3.50	No
Wi30	1	x	-0.018	1.50	No
		x	-0.018	6.00	No
		x	-0.013	3.50	No
	2	x	-0.037	0.50	No
		x	-0.037	7.50	No
		x	-0.006	3.50	No
	5	x	-0.025	1.50	No
		x	-0.025	6.00	No
		x	-0.008	3.50	No
	6	x	-0.036	0.75	No
		x	-0.036	6.75	No
		x	-0.011	3.50	No
	9	x	-0.025	1.50	No
		x	-0.025	6.00	No
		x	-0.008	3.50	No
	10	x	-0.052	0.50	No
		x	-0.052	7.50	No
		x	-0.011	3.50	No
WL0	1	z	-0.008	1.50	No
		z	-0.008	6.00	No
	2	z	-0.016	0.50	No
		z	-0.016	7.50	No
	5	z	-0.006	1.50	No
		z	-0.006	6.00	No
		z	-0.003	3.50	No
	6	z	-0.008	0.75	No
		z	-0.008	6.75	No
		z	-0.001	3.50	No
	9	z	-0.006	1.50	No
		z	-0.006	6.00	No
		z	-0.003	3.50	No
	10	z	-0.013	0.50	No
		z	-0.013	7.50	No
		z	-0.001	3.50	No
WL30	1	x	-0.005	1.50	No
		x	-0.005	6.00	No
		x	-0.003	3.50	No
	2	x	-0.01	0.50	No
		x	-0.01	7.50	No

		x	-0.001	3.50	No
	5	x	-0.007	1.50	No
		x	-0.007	6.00	No
		x	-0.002	3.50	No
	6	x	-0.011	0.75	No
		x	-0.011	6.75	No
		x	-0.002	3.50	No
	9	x	-0.007	1.50	No
		x	-0.007	6.00	No
		x	-0.002	3.50	No
	10	x	-0.015	0.50	No
		x	-0.015	7.50	No
		x	-0.002	3.50	No
LL1	14	y	-0.25	50.00	Yes
LL2	14	y	-0.25	0.00	No
LLa1	2	y	-0.50	50.00	Yes
LLa2	1	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 Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	500 lb Live Load Antenna 4	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00

LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

RAM® Elements
CONNECT Edition

Current Date: 11/5/2021 2:22 PM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT5235\LTE Wave 4\CT5235..retx

Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.4DL
LC14=1.2DL+1.6LL1
LC15=1.2DL+1.6LL2
LC16=1.2DL+WL0+1.6LLa1
LC17=1.2DL+WL30+1.6LLa1
LC18=1.2DL-WL0+1.6LLa1
LC19=1.2DL-WL30+1.6LLa1
LC20=1.2DL+WL0+1.6LLa2
LC21=1.2DL+WL30+1.6LLa2
LC22=1.2DL-WL0+1.6LLa2
LC23=1.2DL-WL30+1.6LLa2
LC24=1.2DL+WL0+1.6LLa3
LC25=1.2DL+WL30+1.6LLa3
LC26=1.2DL-WL0+1.6LLa3
LC27=1.2DL-WL30+1.6LLa3
LC28=1.2DL+WL0+1.6LLa4
LC29=1.2DL+WL30+1.6LLa4
LC30=1.2DL-WL0+1.6LLa4
LC31=1.2DL-WL30+1.6LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	**49**	LC4 at 100.00%	**0.26**	**OK**	Eq. H1-1b
		50	LC3 at 100.00%	0.24	OK	Eq. H1-1b
		51	LC4 at 60.42%	0.14	OK	Eq. H1-1b
		52	LC2 at 50.00%	0.16	OK	Eq. H1-1b
		53	LC2 at 50.00%	0.14	OK	Eq. H1-1b
		54	LC22 at 51.56%	0.16	OK	Eq. H1-1b
	L 2X2X1_4	**55**	LC4 at 100.00%	0.30	OK	Eq. H2-1
		56	LC3 at 100.00%	**0.34**	**OK**	Eq. H2-1
		57	LC3 at 0.00%	0.28	OK	Eq. H2-1
		58	LC2 at 100.00%	0.33	OK	Eq. H2-1
		59	LC1 at 100.00%	0.31	OK	Eq. H2-1
		60	LC1 at 0.00%	0.32	OK	Eq. H2-1
	L 2X2X3_16	**46**	LC3 at 100.00%	**0.42**	**OK**	Eq. H2-1
		47	LC2 at 0.00%	0.37	OK	Sec. F1
		48	LC4 at 0.00%	0.27	OK	Eq. H2-1

PIPE 2-1_2x0.203	**1**	LC1 at 54.17%	0.29	OK	Eq. H1-1b
	2	LC3 at 56.25%	0.47	OK	Eq. H1-1b
	3	LC1 at 54.17%	0.20	OK	Eq. H1-1b
	4	LC1 at 54.17%	0.13	OK	Eq. H1-1b
	5	LC2 at 54.17%	0.24	OK	Eq. H1-1b
	6	LC4 at 54.17%	0.41	OK	Eq. H1-1b
	7	LC4 at 54.17%	0.24	OK	Eq. H1-1b
	8	LC1 at 54.17%	0.13	OK	Eq. H1-1b
	9	LC1 at 54.17%	0.21	OK	Eq. H1-1b
	10	LC2 at 54.17%	**0.51**	**OK**	Eq. H1-1b
	11	LC3 at 54.17%	0.23	OK	Eq. H1-1b
	12	LC3 at 54.17%	0.16	OK	Eq. H1-1b
PIPE 2x0.154	**13**	LC3 at 92.50%	**0.27**	**With warnings**	Eq. H1-1b
	15	LC1 at 63.75%	0.21	With warnings	Eq. H1-1b
	17	LC4 at 63.75%	0.23	With warnings	Eq. H1-1b
PIPE 3x0.216	**14**	LC1 at 69.64%	**0.19**	**OK**	Eq. H1-1b
	16	LC4 at 69.64%	0.17	OK	Eq. H1-1b
	18	LC2 at 69.64%	0.14	OK	Eq. H1-1b
PL 6x3/8	**19**	LC1 at 50.00%	**0.16**	**OK**	Eq. H1-1b
	20	LC4 at 50.00%	0.15	OK	Eq. H1-1b
	21	LC2 at 50.00%	0.15	OK	Eq. H1-1b
T2L 2-1_2X2-1_2X3_16	**61**	LC30 at 0.00%	0.44	OK	Eq. H2-1
	62	LC19 at 0.00%	**0.46**	**OK**	Eq. H2-1
	63	LC9 at 0.00%	0.34	OK	Eq. H2-1

RAM® Elements
CONNECT Edition

Current Date: 11/5/2021 10:22 AM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT5235\LTE Wave 4\CT5235..retx

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
34	-7.3942	4.50	2.6592	0
35	-1.3942	4.50	-7.7332	0
36	-7.3942	-3.50	2.6592	0
37	-1.3942	-3.50	-7.7332	0
42	1.3942	4.50	-7.7332	0
43	7.3942	4.50	2.6592	0
44	1.3942	-3.50	-7.7332	0
45	7.3942	-3.50	2.6592	0
50	6.00	4.50	5.074	0
51	-6.00	4.50	5.074	0
52	6.00	-3.50	5.074	0
53	-6.00	-3.50	5.074	0
54	2.00	4.50	5.074	0
55	-2.00	4.50	5.074	0
56	2.00	-3.50	5.074	0
57	-2.00	-3.50	5.074	0
102	3.3942	-3.50	-4.2691	0
103	-5.3942	-3.50	-0.8049	0
104	3.3942	4.50	-4.2691	0
105	-5.3942	4.50	-0.8049	0
114	5.3942	4.50	-0.8049	0
115	-3.3942	4.50	-4.2691	0

116	5.3942	-3.50	-0.8049	0
117	-3.3942	-3.50	-4.2691	0
119	0.596	0.00	-8.7157	0
120	7.846	0.00	3.8417	0
121	-7.846	0.00	3.8417	0
122	-0.596	0.00	-8.7157	0
123	7.25	0.00	4.874	0
124	-7.25	0.00	4.874	0
125	7.548	0.00	4.3578	0
126	1.7716	0.00	1.0228	0
127	-7.548	0.00	4.3578	0
128	-1.7716	0.00	1.0228	0
129	0.00	0.00	-8.7157	0
130	0.00	0.00	-2.0457	0
131	2.846	0.00	-4.8186	0
132	5.596	0.00	-0.0554	0
133	-2.846	0.00	-4.8186	0
134	-5.596	0.00	-0.0554	0
135	-2.75	0.00	4.874	0
136	2.75	0.00	4.874	0
137	5.3725	0.00	0.3317	0
138	2.9735	0.00	4.4869	0
139	-2.9735	0.00	4.4869	0
140	-5.3725	0.00	0.3317	0
141	-2.399	0.00	-4.8186	0
142	2.399	0.00	-4.8186	0
143	6.00	0.00	4.874	0
144	6.00	0.00	5.074	0
145	2.00	0.00	4.874	0
146	2.00	0.00	5.074	0
147	-2.00	0.00	4.874	0
148	-2.00	0.00	5.074	0
149	-6.00	0.00	4.874	0
150	-6.00	0.00	5.074	0
159	-7.25	3.50	4.874	0
160	-7.846	3.50	3.8417	0
161	-0.596	3.50	-8.7157	0
162	0.596	3.50	-8.7157	0
163	7.25	3.50	4.874	0
164	7.846	3.50	3.8417	0
167	-2.00	3.50	4.874	0
168	-2.00	3.50	5.074	0
169	2.00	3.50	4.874	0
170	2.00	3.50	5.074	0
171	6.00	3.50	4.874	0
172	6.00	3.50	5.074	0
173	-1.221	0.00	-7.6332	0
174	-1.3942	0.00	-7.7332	0
177	-1.221	3.50	-7.6332	0
178	-1.3942	3.50	-7.7332	0
179	-3.221	0.00	-4.1691	0
180	-3.3942	0.00	-4.2691	0
183	-3.221	3.50	-4.1691	0
184	-3.3942	3.50	-4.2691	0
185	-5.221	0.00	-0.7049	0
186	-5.3942	0.00	-0.8049	0
189	-5.221	3.50	-0.7049	0
190	-5.3942	3.50	-0.8049	0
191	-7.221	0.00	2.7592	0
192	-7.3942	0.00	2.6592	0

195	-7.221	3.50	2.7592	0
196	-7.3942	3.50	2.6592	0
197	7.221	0.00	2.7592	0
198	7.3942	0.00	2.6592	0
201	7.221	3.50	2.7592	0
202	7.3942	3.50	2.6592	0
203	5.221	0.00	-0.7049	0
204	5.3942	0.00	-0.8049	0
207	5.221	3.50	-0.7049	0
208	5.3942	3.50	-0.8049	0
209	3.221	0.00	-4.1691	0
210	3.3942	0.00	-4.2691	0
213	3.221	3.50	-4.1691	0
214	3.3942	3.50	-4.2691	0
215	1.221	0.00	-7.6332	0
216	1.3942	0.00	-7.7332	0
219	1.221	3.50	-7.6332	0
220	1.3942	3.50	-7.7332	0
221	0.00	0.00	-6.5457	0
222	0.00	-5.00	-2.0457	0
223	-1.7716	-5.00	1.0228	0
224	1.7716	-5.00	1.0228	0
225	5.6687	0.00	3.2728	0
226	-5.6687	0.00	3.2728	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
126	1	1	1	1	1	1
128	1	1	1	1	1	1
130	1	1	1	1	1	1
222	1	1	1	1	1	1
223	1	1	1	1	1	1
224	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
1	54	56		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
2	50	52		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
3	55	57		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
4	51	53		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
5	34	36		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
6	105	103		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
7	115	117		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
8	35	37		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
9	42	44		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
10	104	102		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
11	114	116		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
12	43	45		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00

13	159	163	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
14	124	123	PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
15	161	160	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
16	122	121	PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
17	164	162	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
18	120	119	PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
19	119	122	PL 6x3/8	A36	0.00	0.00	0.00
20	120	123	PL 6x3/8	A36	0.00	0.00	0.00
21	124	121	PL 6x3/8	A36	0.00	0.00	0.00
46	163	164	L 2X2X3_16	A36	0.00	0.00	0.00
47	159	160	L 2X2X3_16	A36	0.00	0.00	0.00
48	161	162	L 2X2X3_16	A36	0.00	0.00	0.00
49	129	130	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
50	125	126	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
51	127	128	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
52	135	134	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
53	133	131	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
54	132	136	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
55	137	125	L 2X2X1_4	A36	0.00	0.00	0.00
56	125	138	L 2X2X1_4	A36	0.00	0.00	0.00
57	139	127	L 2X2X1_4	A36	0.00	0.00	0.00
58	127	140	L 2X2X1_4	A36	0.00	0.00	0.00
59	141	129	L 2X2X1_4	A36	0.00	0.00	0.00
60	129	142	L 2X2X1_4	A36	0.00	0.00	0.00
61	226	223	T2L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
62	225	224	T2L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00
63	221	222	T2L 2-1_2X2-1_2X3_16	A36	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
1	0.00	2	1.00	0.00	0.00
2	0.00	2	1.00	0.00	0.00
3	0.00	2	1.00	0.00	0.00
4	0.00	2	1.00	0.00	0.00
5	0.00	2	1.00	0.00	0.00
6	0.00	2	1.00	0.00	0.00
7	0.00	2	1.00	0.00	0.00
8	0.00	2	1.00	0.00	0.00
9	0.00	2	1.00	0.00	0.00
10	0.00	2	1.00	0.00	0.00
11	0.00	2	1.00	0.00	0.00
12	0.00	2	1.00	0.00	0.00
46	90.00	0	0.00	0.00	0.00
47	90.00	0	0.00	0.00	0.00
48	90.00	0	0.00	0.00	0.00

130 OLD COLCHESTER ROAD

Location	130 OLD COLCHESTER ROAD	**Mblu**	31/ / 5616/ /
Acct#	00516900	**Owner**	MUSCARELLA CHARLES R JR
Assessment	$174,940	**Appraisal**	$249,910
PID	5616	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$136,870	$113,040	$249,910

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$95,810	$79,130	$174,940

Parcel Addreses

Additional Addresses
No Additional Addresses available for this parcel

Owner of Record

Owner	MUSCARELLA CHARLES R JR	**Sale Price**	$0
Co-Owner		**Certificate**	
		Book & Page	1616/0193
		Sale Date	10/01/2019
		Instrument	01

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MUSCARELLA CHARLES R JR	$0		1616/0193	01	10/01/2019
MUSCARELLA CHARLES R JR & CAROLYN IRENE	$0		1602/0351	29	06/24/2019
MUSCARELLA CHARLES R JR&CAROLYN I L/US	$0		1088/0299	00	08/03/2009
MUSCARELLA CHARLES R JR & CAROLY	$0		0577/0889	26	04/03/2003
MUSCARELLA CHARLES R JR & CAROLY	$0		0312/0916	25	09/05/1986

Building Information

Building 1 : Section 1

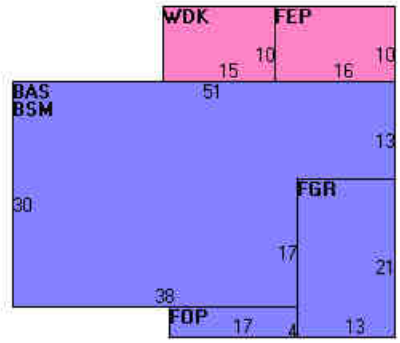
Year Built: 1966
Living Area: 1,309
Replacement Cost: $170,175
Building Percent Good: 72

Building Attributes	
Field	**Description**
Style	Ranch
Model	Residential
Grade:	C+
Stories	1
Occupancy	1
Exterior Wall 1	Vinyl Shakes
Exterior Wall 2	Brick Veneer
Roof Structure	Gable
Roof Cover	Arch Shingles
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Hardwood
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Hot Water
AC Percent	0
Total Bedrooms:	3
Full Bthrms:	1
Half Baths:	1
Extra Fixtures	0
Total Rooms:	7
Bath Style:	Average
Kitchen Style:	Average
Num Kitchens	1
Fireplace(s)	0
Extra Opening(s)	0
Gas Fireplace(s)	0
% Attic Fin	0
LF Dormer	0
Foundation	Poured Conc
Bsmt Gar(s)	0

Building Photo

(http://images.vgsi.com/photos/WaterfordCTPhotos//\00\01\16\91.JPG)

Building Layout



(http://images.vgsi.com/photos/WaterfordCTPhotos//Sketches/5616_5616.j

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,309	1,309
BSM	Basement	1,309	0
FEP	Finished Enclosed Porch	160	0
FGR	Garage	273	0
FOP	Open Porch	68	0
WDK	Deck	150	0
		3,269	1,309

Bsmt %	100
SF FBM	160.00
SF Rec Rm	0
Fin Bsmt Qual	Low Quality
Bsmt Access	Walkout
Usrfld 300	
Usrfld 301	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	101
Description	Res Dwelling
Zone	R-40
Neighborhood	400
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	5.36
Frontage	0
Depth	0
Assessed Value	$79,130
Appraised Value	$113,040

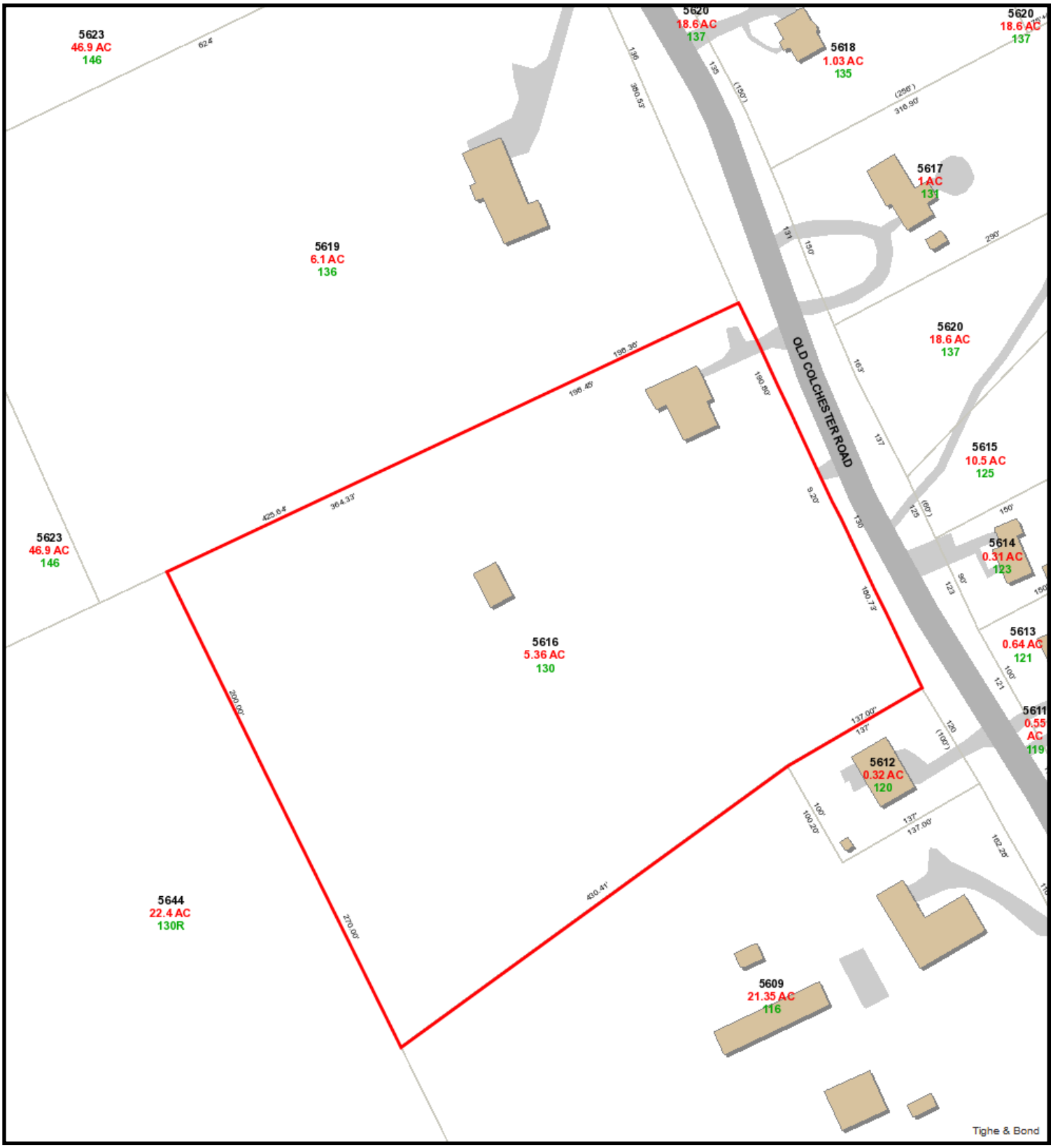
Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
BRN1	1 Story Barn	FR	Frame	720.00 S.F.	$13,140	1
SHD1	Shed	FR	Frame	160.00 S.F.	$1,200	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$136,870	$113,040	$249,910
4000	$136,870	$113,040	$249,910

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$95,810	$79,130	$174,940
4000	$95,810	$79,130	$174,940



130 Old Colchester Rd

11/1/2021 10:18:49 AM

Scale: 1"=120'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 14, 2003

Christopher B. Fisher, Esq.
Cuddy & Feder & Worby LLP
90 Maple Avenue
White Plains, NY 10601-5196

RE: **PETITION NO. 607T** - AT&T Wireless PCS, LLC petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed replacement of an existing transmission line tower located at 126 Old Colchester Road, Waterford, Connecticut.

Dear Attorney Fisher:

At a public meeting held on March 11, 2003, the Connecticut Siting Council (Council) considered and ruled that this proposal would not have a substantial adverse environmental effect, and pursuant to General Statutes § 16-50k would not require a Certificate of Environmental Compatibility and Public Need. This petition is approved with the following conditions:

1) that evergreen trees of a sufficient size and number are planted to screen the base equipment from the property at 123 Old Colchester Road,
2) that AT&T comply with local permitting requirements, and
3) that underground utilities to be installed will be sufficient to provide service for two carriers on the replacement pole.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the petition, dated January 30, 2003.

Enclosed for your information is a copy of the staff report on this project.

Very truly yours,

Pamela B. Katz
Chairman

PBK/laf

Enclosure: Staff Report dated March 11, 2003

c: Honorable Paul B. Eccard, First Selectman, Town of Waterford
Thomas V. Wagner, Planning Director, Town of Waterford

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

Petition 607
AT&T
126 Old Colchester Road
Waterford, Connecticut
Staff Report
March 11, 2003

On Monday, February 10, 2003, Council member Gerry Heffernan and staff member David Martin met representatives of AT&T, Tom Wagner — Town Planner of Waterford — and the property owner at 126 Old Colchester Road in Waterford. At this location, AT&T is petitioning to replace an existing, laminated wood CL&P transmission line pole with a new, higher one on which it would place its antennas. The existing pole is 89 feet high. The new pole would be approximately 109 feet high. The top of the antennas AT&T would place on the pole would be approximately 110 feet high. The new pole would be supplied by an approved CL&P vendor and would also be a laminated wood pole. The new pole would be approximately 10 feet from the existing pole and would be high enough to locate a second set of antennas below the proposed AT&T antennas. A concrete pad for up to four equipment cabinets would be installed at the base of the new pole.

The area in which the proposed replacement pole would be located is scattered, low density, single-family residential. The nearest home is 90 feet southeasterly of the proposed pole. Another home is 150 feet across the street to the east. There are several other homes within a radius of 250 feet. There is existing vegetation between the pole and the nearest road that will help screen the ground equipment. This vegetation should not be disturbed by site development activities.

The town planner did not express any concerns about the tower's location. It is the town's policy, he said, to encourage antennas to go on such existing towers where possible. He did, however, want to be sure that AT&T would take out a town excavation permit for the site work. Council member Heffernan requested that AT&T notify the nearest neighbors of its pending petition.

Staff calculates that the power density of the proposed facility would be 3.03% of the regulatory limit. From the field review, it appears that AT&T's proposed pole replacement would not create any significant adverse environmental impacts.

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

November 2, 2021

Kathleen M. Shanley
Manager – Transmission Siting
Eversource Energy
P.O. Box 270
Hartford, CT 06141
kathleen.shanley@eversource.com

RE: **SUB-PETITION NO. 1293 - W-01 (Waterford)** – Eversource Energy declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for all transmission facility asset condition maintenance improvements statewide to comply with the updated National Electrical Safety Code clearance requirements.

Dear Ms. Shanley:

The Connecticut Siting Council (Council) hereby acknowledges your notice to replace one transmission line structure within an Eversource transmission line right-of-way in the Town of Waterford pursuant to National Electrical Safety Code standards, with the following conditions:

1. Any deviation from the proposed transmission line maintenance activity as specified in this notice and supporting materials filed with the Council shall render this acknowledgement invalid;
2. Any material changes to this transmission line maintenance activity as proposed shall require the filing of a new notice with the Council;
3. Not less than 45 days after completion of the transmission line maintenance activity, the Council shall be notified in writing that construction has been completed;
4. The validity of this action shall expire one year from the date of this letter; and
5. The petitioner may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed transmission line maintenance activity is to be implemented as specified here and in your notice dated September 7, 2021. This decision is under the exclusive jurisdiction of the Council.

Thank you for your attention and cooperation.

Sincerely,

Melanie Bachman
Executive Director

c: Honorable Robert J. Brule, First Selectman, Town of Waterford (firstsel@waterfordct.org)

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

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

November 12, 2021

Mr. Tim Burks
SAI Communications
12 Industrial Way
Salem, NH 03079

RE: AT&T Antenna Site CT5235, Old Colchester Road, Waterford CT, Eversource Structure 6020

Dear Mr. Burks:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at (203) 623-0409.

Sincerely,

Richard Badon

Richard Badon
Transmission Line Engineering

Ref: 2021-1109 - CT5235 Structural Analysis Rev1 (21136.00)
2021-1109_21136.00 - Rev1 CDs (S&S)

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

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SHIP TO: MR. CHARLES R MUSCARELLA, JR
130 OLD COLCHESTER RD
QUAKER HILL CT 06375-1025

USPS TRACKING #

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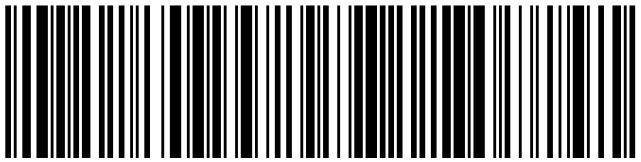
Expected Delivery Date: 11/15/21
Ref#: CT5235
0006

C010

SHIP TO: HON. ROBERT J BRULE 1ST SELECTMAN TOWN HALL
MS ABBY PIERSALL PLANNING DIRECTOR
15 ROPE FERRY RD
WATERFORD CT 06385-2806

USPS TRACKING #



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From: auto-reply@usps.com
To: Hollis Redding
Subject: USPS® Expected Delivery by Monday, November 15, 2021 arriving by 9:00pm 9405503699300060624085
Date: Saturday, November 13, 2021 9:30:31 AM

Hello **HOLLIS M REDDING**,

USPS is now in possession of your item as of 9:09 am on November 13, 2021 in BRANFORD, CT 06405.

Tracking Number:
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By 9:00pm

By 9:00pm

From: auto-reply@usps.com
To: Hollis Redding
Subject: USPS® Expected Delivery by Monday, November 15, 2021 arriving by 9:00pm 9405503699300060624108
Date: Saturday, November 13, 2021 9:30:43 AM

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By 9:00pm

By 9:00pm

From: auto-reply@usps.com
To: Hollis Redding
Subject: USPS® Expected Delivery by Monday, November 15, 2021 arriving by 9:00pm 9405503699300060624092
Date: Saturday, November 13, 2021 9:30:31 AM

Hello **HOLLIS M REDDING**,

USPS is now in possession of your item as of 9:09 am on November 13, 2021 in BRANFORD, CT 06405.

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