NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

July 15, 2015

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

RE: Notice of Exempt Modification
72 Notch Hill Road Route 22, North Branford, CT 06471
Longitude: -72.74974800
Latitude: 41.315123
T-Mobile Site#: CT11026C_VOLTE

Members of the Siting Council:

On behalf of T-Mobile, Northeast Site Solutions (NSS) is submitting an exempt modification application to the Connecticut Siting Council for modification of existing equipment at a tower facility located at 72 Notch Hill Road Route 22, North Branford, CT 06471.

The 72 Notch Hill Road Route 22, North Branford, CT 06471 facility consists of a 91.5' Monopole Tower owned and operated by Eversource Energy. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16- 50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

As part of T-Mobile's VOLTE Project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of $625.

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The changes to the facility do not constitute modifications as defined in Connecticut General Statutes significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The overall height of the structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than the new equipment cabinet.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, Northeast Site Solutions (NSS) on behalf of T-Mobile, respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at 860.209.4690 with any questions you may have concerning this matter.

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

cc: Eversource Energy
Cambridge-Guilford Realty LLC
Town of North Branford Planning and Zoning Department

Exhibit A

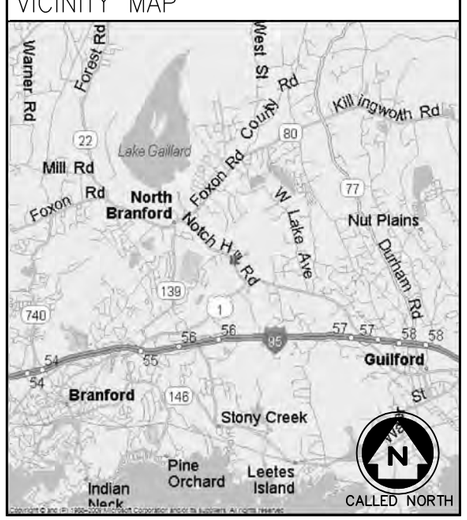
T-MOBILE NORTHEAST LLC

CT11026A
GUILFORD/ROUTE 1

72 NOTCH HILL ROAD ROUTE 22
TOWER #: 4955, LINE #: 150
NORTH BRANFORD, CT

(4E-GU19 CONFIGURATION)

VICINITY MAP



DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL:
"CALL BEFORE YOU DIG"
CALL 811
WWW.CBYD.COM

CALL THREE WORKING DAYS PRIOR TO DIGGING

SAFETY PRECAUTIONS SHALL BE IMPLEMENTED BY CONTRACTOR(S) AT ALL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS.

COLOR CODE FOR UTILITY LOCATIONS

ELECTRIC	– RED	SEWER	– GREEN
GAS/OIL	– YELLOW	SURVEY	– PINK
TEL/CATV	– ORANGE	PROPOSED EXCAVATION	– WHITE
WATER	– BLUE	RECLAIMED WATER	– PURPLE

GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES. RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONSTRUCT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE T–MOBILE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXPENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING OF ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUM OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND INSPECTIONS WHICH ARE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC., DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS, AS WELL AS THE LATEST EDITIONS OF ANY PERTINENT STATE SAFETY REGULATIONS.
14. THE CONTRACTOR SHALL NOTIFY THE T–MOBILE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE T–MOBILE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC., ON THE JOB.
16. THE CONTRACTOR SHALL RETURN ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION AT THE COMPLETION OF WORK.

PROJECT SUMMARY

SITE NUMBER:	CT11026A	APPLICANT:	T–MOBILE NORTHEAST LLC 35 GRIFFIN RD BLOOMFIELD, CT 06002 (860) 692–7100
SITE NAME:	GUILFORD/ROUTE 1		
SITE ADDRESS:	72 NOTCH HILL ROAD ROUTE 22 NORTH BRANFORD, CT		
PROPERTY OWNER:	EVERSOURCE 56 PROSPECT ST., FIRST FLOOR HARTFORD, CT 06103 ROBERT GRAY (860) 728–6125	PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 199 BRICKYARD RD FARMINGTON, CT 06032
		CONTACT:	JOE CARBONELL (860) 463–3175
PARCEL:	TBD		
CURRENT ZONING:	TBD	ARCHITECT/ENGINEER:	INFINIGY ENGINEERING 1033 WATERVLIET SHAKER ROAD ALBANY, NY 12205
JURISDICTION:	NORTH BRANFORD		
LAT./LONG.:	N 41.31512277° / W –72.7497477°	CONTACT:	MIKE LANE 518–690–0790
CONSTRUCTION TYPE:	CONSTRUCTION TYPE 2B		
USE GROUP:	–		

PROJECT DESCRIPTION

- ☒ EXISTING MONOPOLE
- ☐ EXISTING LATTICE TOWER
- ☐ EXISTING TRANSMISSION TOWER
- ☐ EXISTING WATER TANK
- ☐ EXISTING BUILDING
- ☐ EXISTING FLAGPOLE
- ☐ EXISTING FORT WORTH
- ☒ EXISTING CABINET(S)
- ☐ EXISTING RBS 2106
- ☐ EXISTING RBS 3106
- ☒ PROPOSED RBS 6102
- ☐ SITE SUPPORT KIT
- ☒ PROPOSED 6201 BBU CABINET
- ☒ GPS
- ☒ OUTDOOR
- ☐ INDOOR
- ☒ EXISTING CONCRETE PAD
- ☐ EXISTING STEEL PLATFORM
- ☒ EXISTING PPC
- ☐ PANELBOARD

T–MOBILE NORTHEAST LLC PROPOSES THE MODIFICATION OF AN UNMANNED WIRELESS BROADBAND FACILITY. REPLACEMENT OF EXISTING PANEL ANTENNAS & TMA'S WITH PROPOSED PANEL ANTENNAS AND ASSOCIATED CABLING. REUSE EXISTING GPS ANTENNA AND REMOVE AND REPLACE EXISTING EQUIPMENT CABINETS.

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T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD
SOUTH BLOOMFIELD, CT 06002

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1033 WATERVLIET SHAKER ROAD
ALBANY, NY 12205
OFFICE: (518) 690–0790
FAX: (518) 690–0793

SUBMITTALS

DATE	DESCRIPTION	REVISION
3/23/15	ISSUED FOR REVIEW	A
3/30/15	REVISED PER COMMENTS	B
4/1/15	REVISED PER COMMENTS	C
6/9/15	REVISED PER COMMENTS	D
6/12/15	REVISED PER COMMENTS	E

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	379-000
DRAWN BY:	SKB
CHECKED BY:	AJD

PROFESSIONAL SEAL

NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE.

SITE NAME
CT11026A
72 NOTCH HILL ROAD
TOWER #4955, LINE #150
NORTH BRANFORD, CT

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1
SHEET 1 OF 6 SHEETS

ELECTRICAL NOTES:

WORK INCLUDED
1. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PLANT SERVICES AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE THE ELECTRICAL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A. PREPARE AND SUBMIT SHOP DRAWINGS, DIAGRAMS AND ILLUSTRATIONS.
   B. PROCURE ALL NECESSARY PERMITS AND APPROVALS AND PAY ALL REQUIRED FEES AND CHARGES IN CONNECTION WITH THE WORK OF THIS CONTRACT.
   C. SUBMIT AS-BUILT DRAWINGS, OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS.
   D. EXECUTE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING OF EXISTING OR NEWLY INSTALLED CONSTRUCTION REQUIRED FOR THE WORK OF THIS CONTRACT. FOR SLAB PENETRATIONS THROUGH POST TENSION SLABS, X-RAY EXACT AREA OF PENETRATION PRIOR TO PERFORMING WORK. COORDINATE ALL X-RAY WORK WITH BUILDING ENGINEER.
   E. PROVIDE HANGERS, SUPPORTS, FOUNDATIONS, STRUCTURAL FRAMING SUPPORTS, AND BASES FOR CONDUIT AND EQUIPMENT PROVIDED OR INSTALLED UNDER THE WORK OF HIS CONTRACT. PROVIDE COUNTER FLASHING, SLEEVES AND SEALS FOR FLOOR AND WALL PENETRATIONS.
   F. MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATION DURING THE PROGRESS OF THE WORK INCLUDING PROVIDING ALL TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES, CONNECTIONS AND EQUIPMENT REQUIRED. PROVIDE TEMPORARY LIGHT AND POWER FOR CONSTRUCTION PURPOSES.
2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IT IS NOT THE INTENT TO GIVE EVERY DETAIL ON THE DRAWINGS AND IN THE SPECIFICATIONS. IF AN ITEM OF WORK IS INDICATED IN THE DRAWINGS, IT IS CONSIDERED SUFFICIENT FOR INCLUSION IN THE CONTRACT. FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION WHETHER OR NOT SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS.

GENERAL REQUIREMENTS
1. PROVIDE ALL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE ELECTRICAL CODES.
2. THE ELECTRICAL PLANS ARE DIAGRAMMATIC ONLY. REFER TO THE ARCHITECTURAL PLANS FOR THE EXACT DIMENSIONS OF THE BUILDING.
3. LOAD CALCULATIONS ARE BASED ON EXISTING BUILDING INFORMATION/DRAWINGS PROVIDED TO ENGINEERING. CONTRACTOR IS TO VERIFY ALL EXISTING RATINGS AND LOADS PRIOR TO PURCHASING OF SPECIFIED EQUIPMENT FOR COMPLIANCE TO NEC. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES AND REQUEST FURTHER DIRECTION BY ENGINEER.
4. EXISTING BUILDING EQUIPMENT IS NOTED ON THE DRAWINGS. NEW OR RELOCATED EQUIPMENT IS SHOWN WITH SOLID LINES. FUTURE EQUIPMENT (NOT IN THIS CONTRACT) IS DEPICTED WITH SHADED LINES. REQUEST CLARIFICATION OF DRAWINGS OR OF SPECIFICATIONS PRIOR TO PRICING OR INSTALLATION.
5. GENERAL
   A. AFTER CAREFULLY STUDYING THE DRAWINGS AND SPECIFICATIONS, AND BEFORE SUBMITTING THE PROPOSAL, MAKE A MANDATORY SITE VISIT TO ASCERTAIN CONDITIONS OF THE SITE, AND THE NATURE AND EXACT QUANTITY OF WORK TO BE PERFORMED. NO EXTRA COMPENSATION WILL BE ALLOWED FOR FAILURE TO NOTIFY THE OWNER, IN WRITING, OF ANY DISCREPANCIES THAT MAY HAVE BEEN NOTED BETWEEN THE EXISTING CONDITIONS AND THE DRAWINGS AND SPECIFICATIONS.
   B. VERIFY ALL MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR CORRECTNESS OF SAME.
6. QUALITY, WORKMANSHIP, MATERIALS AND SAFETY
   A. PROVIDE NEW MATERIALS AND EQUIPMENT OF A DOMESTIC MANUFACTURER BY THOSE REGULARLY ENGAGED IN THE PRODUCTION AND MANUFACTURE OF SPECIFIED MATERIALS AND EQUIPMENT. WHERE UL, OR OTHER AGENCY, HAS ESTABLISHED STANDARDS FOR MATERIALS, PROVIDE MATERIALS WHICH ARE LISTED AND LABELED ACCORDINGLY. THE COMMERCIALLY STANDARD ITEMS OF EQUIPMENT AND THE SPECIFIC NAMES MENTIONED HEREIN ARE INTENDED FOR THE PROPER FUNCTIONING OF THE WORK.
   B. WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE REQUIRED FOR THE WORK. INSTALL MATERIALS AND EQUIPMENT TO PRESENT A NEAT APPEARANCE WHEN COMPLETED AND IN ACCORDANCE WITH THE APPROVED RECOMMENDATIONS OF THE MANUFACTURER AND IN ACCORDANCE WITH CONTRACT DOCUMENTS.
   C. PROVIDE LABOR, MATERIALS, APPARATUS AND APPLIANCES ESSENTIAL TO THE FUNCTIONING OF THE SYSTEMS DESCRIBED OR INDICATED HEREIN, OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL WHENEVER MENTIONED IN THE CONTRACT DOCUMENT OR NOT.
   D. MAKE WRITTEN REQUESTS FOR SUPPLEMENTARY INSTRUCTIONS TO ARCHITECT/ENGINEER IN CASE OF DOUBT AS TO WORK INTENDED OR IN EVENT OF NEED FOR EXPLANATION THEREOF.
   E. PERFORMANCE AND MATERIAL REQUIREMENTS SCHEDULED OR SPECIFIED ARE MINIMUM STANDARD ACCEPTABLE. THE RIGHT TO JUDGE THE QUALITY OF EQUIPMENT THAT DEVIATES FROM THE CONTRACT DOCUMENT REMAINS SOLELY WITH ARCHITECT/ENGINEER. CONTRACT DOCUMENT OR NOT.

GUARANTEE
1. GUARANTEE MATERIALS, PARTS AND LABOR FOR WORK FOR ONE YEAR FROM THE DATE OF ISSUANCE OF OCCUPANCY PERMIT. DURING THAT PERIOD, MAKE GOOD FAULTS OR IMPERFECTIONS THAT MAY ARISE DUE TO DEFECTS OR OMISSIONS IN MATERIALS OR WORKMANSHIP WITH NO ADDITIONAL COMPENSATION AND AS DIRECTED BY ARCHITECT.

CLEANING
1. REMOVE ALL CONSTRUCTION DEBRIS RESULTING FROM THE WORK.
2. CLEAN EQUIPMENT AND SYSTEMS FOLLOWING THE COMPLETION OF THE PROJECT TO THE SATISFACTION OF THE ENGINEER.

COORDINATION AND SUPERVISION
1. CAREFULLY LAY OUT ALL WORK IN ADVANCE TO AVOID UNNECESSARY CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS OR OTHER SURFACES. WHERE SUCH WORK IS NECESSARY, HOWEVER, PATCH AND REPAIR THE WORK IN AN APPROVED MANNER BY SKILLED MECHANICS AT NO ADDITIONAL COST TO THE OWNER. RENDER FULL COOPERATION TO OTHER TRADES WHERE WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES. ASSIST IN WORKING OUT SPACE CONDITIONS. IF WORK IS INSTALLED BEFORE COORDINATION WITH OTHER TRADES, OR CAUSES INTERFERENCE, MAKE CHANGES NECESSARY TO CORRECT CONDITIONS WITHOUT EXTRA CHARGE.

SUBMITTALS
1. AS-BUILT DRAWINGS:
   A. UPON COMPLETION OF THE WORK, FURNISH TO THE OWNER "AS-BUILT" DRAWINGS.
2. SERVICE MANUALS:
   A. UPON COMPLETION OF THE WORK, FULLY INSTRUCT T-MOBILE AS TO THE OPERATION AND MAINTENANCE OF ALL MATERIAL, EQUIPMENT AND SYSTEMS.
   B. PROVIDE 3 COMPLETE BOUND SETS OF INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT.

CUTTING AND PATCHING
1. PROVIDE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING REQUIRED TO COMPLETE THE WORK.
2. OBTAIN OWNER APPROVAL PRIOR TO CUTTING THROUGH FLOORS OR WALLS FOR PIPING OR CONDUIT.

TESTS, INSPECTION AND APPROVAL
1. BEFORE ENERGIZING ANY ELECTRICAL INSTALLATION, INSPECT EACH UNIT IN DETAIL. TIGHTEN ALL BOLTS AND CONNECTIONS (TORQUE-TIGHTEN WHERE REQUIRED) AND DETERMINE THAT ALL COMPONENTS ARE ALIGNED, AND THE EQUIPMENT IS IN SAFE, OPERATIONAL CONDITION.
2. PROVIDE THE COMPLETE ELECTRICAL SYSTEM FREE OF GROUND FAULTS AND SHORT CIRCUITS SUCH THAT THE SYSTEM WILL OPERATE SATISFACTORILY UNDER FULL LOAD CONDITIONS, WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

SPECIAL REQUIREMENTS
1. DO NOT LEAVE ANY WORK INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS. DO NOT INTERFERE WITH OR CUTOFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S WRITTEN PERMISSION.
2. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BUILDING UTILITIES AND SERVICE SYSTEMS, INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE OWNER AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON. SHUTDOWN NOTE: SCHEDULE AND NOTIFY OWNER 48 HOURS PRIOR TO SHUTDOWN. ALL SHUTDOWN WORK TO BE SCHEDULED AT A TIME CONVENIENT TO OWNER.

GROUNDING
1. ROUTE ALL GROUNDING CONDUCTORS AS SHOWN ON CONDUIT/GROUNDING RISER.
2. ROUTE 500 KCMIL CU. THHN CONDUCTOR FROM THE MGB LOCATION TO BUILDING STEEL. VERIFY BUILDING STEEL IS EFFECTIVELY GROUNDED PER NEC TO THE MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR (GEC).
3. MAKE ALL GROUND CONNECTIONS FROM MGB TO ELECTRICAL EQUIPMENT WITH 2 HOLE, CRIMP TYPE, BURNDY COMPRESSION TERMINATIONS, SIZED AS REQUIRED.
4. USE 1 HOLE, CRIMP TYPE, BURNDY COMPRESSIONS TERMINATIONS, SIZED AS REQUIRED, AT EQUIPMENT GROUND CONNECTIONS.
5. HIRE AN INDEPENDENT LAB TO PERFORM THE SPECIFIED OHMS TESTING. PROVIDE 4 SETS OF THE CERTIFIED DOCUMENTS TO THE OWNER FOR VERIFICATION PRIOR TO THE PROJECT COMPLETION.

RACEWAYS
1. ALL WIRING TO BE INSTALLED IN CONDUIT SYSTEMS IN ACCORDANCE WITH THE FOLLOWING:
   A. EXTERIOR FEEDERS AND CONTROL, WHERE UNDERGROUND, TO BE IN SCH 40 PVC.
   B. EXTERIOR, ABOVE GROUND POWER CONDUITS TO BE GALVANIZED RIGID STEEL (RGS).
   C. ALL TELECOMMUNICATION CONDUITS, INTERIOR/EXTERIOR, TO BE EMT.
   D. INSTALL PULL ROPES IN ALL NEW EMPTY CONDUITS INSTALLED ON THIS PROJECT.
   E. ALL TELECOM CONDUITS AND PULL BOXES INSTALLED ON THIS PROJECT TO BE LABELED "T-MOBILE". OWNER WILL PROVIDE LABELS FOR CONTRACTOR TO INSTALL.
   F. INTERIOR FEEDERS TO BE INSTALLED IN E.M.T. WITH STEEL COMPRESSION FITTINGS.
   G. MINIMUM SIZE CONDUIT TO BE ¾" TRADE SIZE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   H. FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT TO BE INSTALLED IN LIQUID-TIGHT FLEXIBLE METAL CONDUIT.
   I. CONDUIT TO BE RUN CONCEALED IN CEILINGS, FINISHED AREAS OR DRYWALL PARTITIONS, UNLESS OTHERWISE NOTED.
   J. THE ROUTING OF CONDUITS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC. BEFORE INSTALLING ANY WORK, EXAMINE THE WORKING LAYOUTS AND SHOP DRAWINGS OF THE OTHER TRADES TO DETERMINE THE EXACT LOCATIONS AND CLEARANCES.
   K. ALL EXTERIOR MOUNTING HARDWARE TO BE GALVANIZED STEEL. COORDINATE WITH BUILDING ENGINEER PRIOR TO ATTACHING TO BUILDING STRUCTURE.

RACEWAYS CONT'D
   L. PENETRATIONS OF WALLS, FLOORS AND ROOFS, FOR THE PASSAGE OF ELECTRICAL RACEWAYS, TO BE PROPERLY SEALED AFTER INSTALLATION OF RACEWAYS SO AS TO MAINTAIN THE STRUCTURAL OR WATERPROOF INTEGRITY OF THE WALL, FLOOR OR ROOF SYSTEM TO BE PENETRATED. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE OR SMOKE RATED WALLS, CEILINGS OR SMOKE TIGHT CORRIDOR PARTITIONS TO MAINTAIN PROPER RATING OF WALL OR CEILING.
   M. PROVIDE ALL CONDUIT ENDS WITH INSULATED METALLIC GROUNDING BUSHINGS.
   N. CONDUIT TO BE SUPPORTED AT MAXIMUM DISTANCE OF 8'-0", OR AS REQUIRED BY NEC, IN HORIZONTAL AND VERTICAL DIRECTIONS.
   O. PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR ALL JUNCTION BOXES AND/OR OUTLET BOXES NOT USED IN EXPOSED AREAS. PROVIDE ALL OTHER UNUSED BOXES WITH STANDARD STEEL COVER PLATES.
   P. WHERE APPLICABLE, PROVIDE ROOFTOP CONDUIT SUPPORT SYSTEM, CONFORMING TO ROOFTOP WARRANTY REQUIREMENTS, PER BUILDING.

WIRES AND CABLES
1. CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER AND VENDOR FOR EXACT EQUIPMENT OVER-CURRENT PROTECTION VOLTAGE, WIRE SIZE AND PLUG CONFIGURATION, IF APPLICABLE, PRIOR TO BID.
2. ALL EQUIPMENT/DEVICES TO BE PROVIDED WITH INSULATED GROUND CONDUCTOR.
3. ALL WIRE AND CABLE TO BE 600VOLT, COPPER, WITH THWN/THHN INSULATION, EXCEPT AS NOTED.
4. WIRE FOR POWER AND LIGHTING WILL NOT BE LESS THAN NO. 12AWG. ALL WIRE NO. 8 AND LARGER TO BE STRANDED.
5. CONTROL WIRING IS NOT TO BE LESS THAN NO. 14AWG, FLEXIBLE IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING WILL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES TO BE PROVIDED WITH AN OVERALL FLAME-RETARDANT, EXTRUDED JACKET AND RATED FOR PLENUM USE. ALL CONTROL WIRE TO BE 600VOLT RATED.
6. WIRE PREVIOUSLY PULLED INTO CONDUIT IS CONSIDERED USED AND IS NOT TO BE RE-PULLED.
7. HOME RUNS AND BRANCH CIRCUIT WIRING FOR 20A, 120V CIRCUITS:

LENGTH (FT.)	HOME RUN WIRE SIZE
0 TO 50	NO. 12
51 TO 100	NO. 10
101 TO 150	NO. 8

8. VOLTAGE DROP IS NOT TO EXCEED 3%.
9. MAKE ALL CONNECTIONS WITH UL APPROVED, SOLDERLESS, PRESSURE TYPE INSULATED CONNECTORS: SCOTCHLOK OR AND APPROVED EQUAL.

WIRING DEVICES
1. ALL RECEPTACLES INSTALLED IN THIS PROJECT TO BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION.

DISCONNECT SWITCHES AND FUSES
1. DISCONNECT SWITCHES TO BE VOLTAGE-RATED TO SUIT THE CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE SUPPLIED.
2. PROVIDE HEAVY-DUTY, METAL-ENCLOSED, EXTERNALLY-OPERATED DISCONNECT SWITCHES, FUSED OR UNFUSED, OF SUCH TYPE AND SIZE AS REQUIRED TO PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY ARE INTENDED.
3. PROVIDE NEMA 1 DISCONNECT SWITCHES FOR INTERIOR INSTALLATION, NEMA 3R FOR EXTERIOR INSTALLATION.
4. DISCONNECT SWITCHES TO BE MANUFACTURED BY:
   A. GENERAL ELECTRIC COMPANY
   B. SQUARE-D
5. PROVIDE RK-1 TYPE FUSES, UNLESS NOTED OTHERWISE.

INSTALLATION
1. INSTALL DISCONNECT SWITCHES WHERE INDICATED ON DRAWINGS.
2. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES MUST MATCH IN TYPE AND RATING.
3. FUSES TO BE MOUNTED SO THAT THE LABELS SHOWING THEIR RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.
4. FURNISH AND DEPOSIT SPARE FUSES AT THE JOB SITE AS FOLLOWS:
   A. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF 60A, USED FOR INITIAL FUSING.
   B. TEN PERCENT SPARES FOR EACH TYPE AND SIZE, UP TO AND INCLUDING 60A, USED FOR INITIAL FUSING. IN NO CASE WILL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND SIZE BE FURNISHED.

GENERAL NOTES:

INTENT
1. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.
2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY. HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH
3. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.
4. THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK.
5. MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A CHANGE ORDER.

CONFLICTS
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATIONS OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
2. THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING CONCERNING SUCH BIDDER MIGHT HAVE FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING.
3. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS GOVERNING THE WORK.

CONTRACTS AND WARRANTIES
1. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.
2. SEE MASTER CONTRACTION SERVICES AGREEMENT FOR ADDITIONAL DETAILS.

STORAGE
1. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

CLEANUP
1. THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK. THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY TO USE.
2. EXTERIOR
   A. VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. IF NECESSARY, TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
3. INTERIOR
   A. VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS, FLOOR, AND CEILING.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. REMOVE PAINT DROPPINGS, SPOTS, STAINS, AND DIRT FROM FINISHED SURFACES.

CHANGE ORDER PROCEDURE:
1. REFER TO SECTION 17 OF SIGNED MCSA: SEE PROFESSIONAL SERVICE AGREEMENT FOR MCSA.

RELATED DOCUMENTS AND COORDINATION
1. GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

SHOP DRAWINGS
1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR APPROVAL.
2. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE OWNER.

PRODUCTS AND SUBSTITUTIONS
1. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST, IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION. INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.
2. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT SHEETS.

QUALITY ASSURANCE
1. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THESE SHALL INCLUDE, BUT NOT BE LIMITED TO THE APPLICABLE CODES SET FORTH BY THE LOCAL GOVERNING BODY. SEE "CODE COMPLIANCE" T-1.

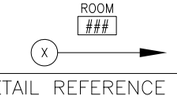
ADMINISTRATION
1. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. SUBMIT A BAR TYPE PROGRESS CHART, NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.
3. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE, BUT NOT LIMITED TO, THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED).
4. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.
5. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL WPCS SAFETY REQUIREMENTS IN THEIR AGREEMENT.
6. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE OWNER.
7. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.
8. NOTIFY THE OWNER/PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS, AND EQUIPMENT CABINET PLACEMENTS.

INSURANCE AND BONDS
1. CONTRACTOR, AT THEIR OWN EXPENSE, SHALL CARRY AND MAINTAIN, FOR THE DURATION OF THE PROJECT, ALL INSURANCE, AS REQUIRED AND LISTED, AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER. REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.
2. THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON ALL POLICIES.
3. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

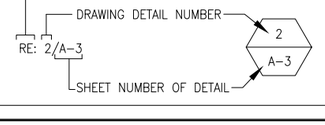
ABBREVIATIONS

ADJ	ADJUSTABLE
AGL	ABOVE GROUND LINE
&	AND
APPROX	APPROXIMATE
@	AT
BTS	BASE TRANSMISSION STATION
CAB	CABINET
CLG	CEILING
CONC	CONCRETE
CONT	CONTINUOUS
DIA OR ø	DIAMETER
DWG	DRAWING
EA	EACH
ELEC	ELECTRICAL
ELEV	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
EGB	EQUIPMENT GROUND BAR
(E)	EXISTING
EXT	EXTERIOR
FF	FINISHED FLOOR
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GRND	GROUND
LG	LONG
MAX	MAXIMUM
MECH	MECHANICAL
MW	MICROWAVE DISH
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTL	METAL
(N)	NEW
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
(P)	PROPOSED
PCS	PERSONAL COMMUNICATION SYSTEM
PPC	POWER PROTECTION CABINET
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SS	STAINLESS STEEL
STL	STEEL
TOC	TOP OF CONCRETE
TOM	TOP OF MASONRY
TYP	TYPICAL
VIF	VERIFY IN FIELD
UON	UNLESS OTHERWISE NOTED
WWF	WELDED WIRE FABRIC
W/	WITH

ARCHITECTURAL SYMBOLS



DETAIL REFERENCE KEY



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SUBMITTALS		
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6/12/15	REVISED PER COMMENTS	E

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	379-000
DRAWN BY:	SKB
CHECKED BY:	AJD

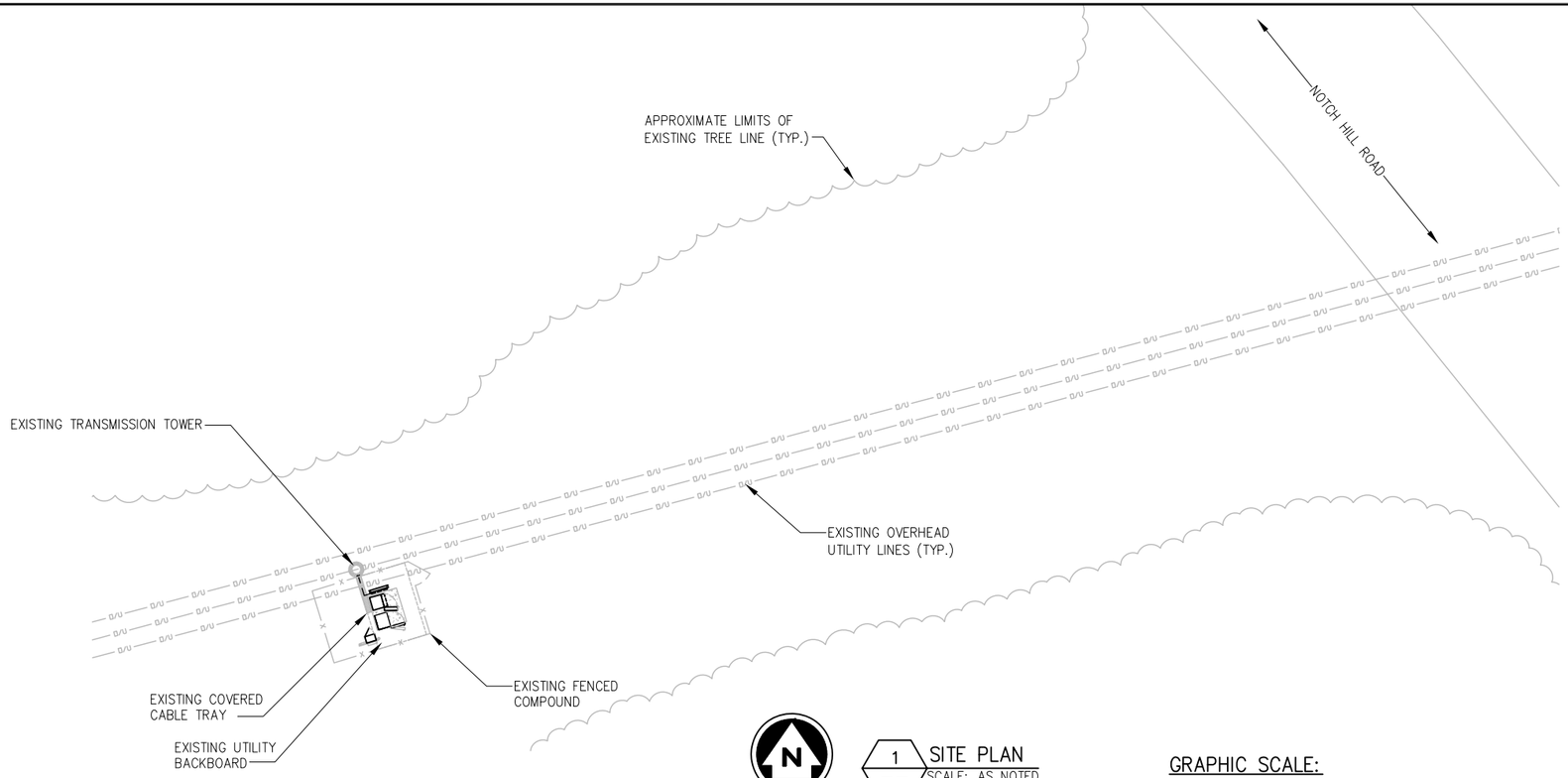
PROFESSIONAL SEAL

NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE.

SITE NAME
CT11026A
72 NOTCH HILL ROAD
TOWER #4955, LINE #150
NORTH BRANFORD, CT

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
N-1
SHEET 8 OF 6 SHEETS



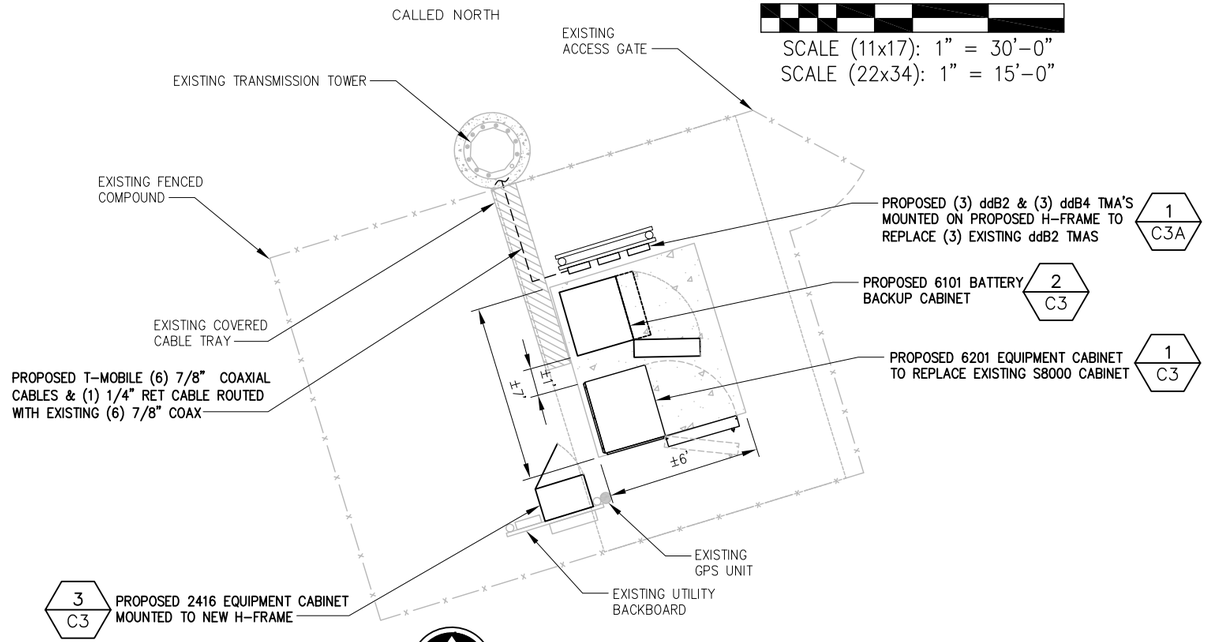
CALLED NORTH

1 SITE PLAN
SCALE: AS NOTED

GRAPHIC SCALE:

30' 15' 0 15' 30'

SCALE (11x17): 1" = 30'-0"
SCALE (22x34): 1" = 15'-0"



CALLED NORTH

2 COMPOUND PLAN
SCALE: AS NOTED

GRAPHIC SCALE:

6' 3' 0 3' 6'

SCALE (11x17): 1" = 6'-0"
SCALE (22x34): 1" = 3'-0"

BASEMAPPING PREPARED FROM A SITE VISIT PERFORMED BY INFINIGY ON MARCH 3, 2015, AND INFORMATION PROVIDED BY SPRINT, AND DOES NOT REPRESENT AN ACTUAL FIELD SURVEY.

GENERAL SITE NOTES:

1. A COMPLETE BOUNDARY SURVEY OF THE HOST PARCEL HAS NOT BEEN PERFORMED BY INFINIGY ENGINEERING. BOUNDARY INFORMATION WAS OBTAINED FROM INFORMATION PROVIDED BY OTHERS. PROPERTY IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.
2. BASEMAPPING INFORMATION BASED ON PROVIDED INFORMATION.
3. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.
4. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.
5. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.
6. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.
7. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.
8. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT MISS UTILITY AT LEAST 48 HOURS PRIOR TO COMMENCING WORK.
9. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

SITE LEGEND

- SITE PROPERTY LINE
- STREET OR ROAD
- CHAIN LINK FENCE
- OPAQUE WOODEN FENCE
- BOARD ON BOARD FENCE
- DECIDUOUS TREES/SHRUBS
- EVERGREEN TREES/SHRUBS
- TREE LINE
- UTILITY POLE
- (E) EXISTING
- (N) NEW
- (P) PROPOSED
- (F) FUTURE
- PROP. GSM ANTENNA
- PROP. UMTS ANTENNA
- EX. GSM ANTENNA
- EX. UMTS ANTENNA

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DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	379-000
DRAWN BY:	SKB
CHECKED BY:	AJD

PROFESSIONAL SEAL

NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE.

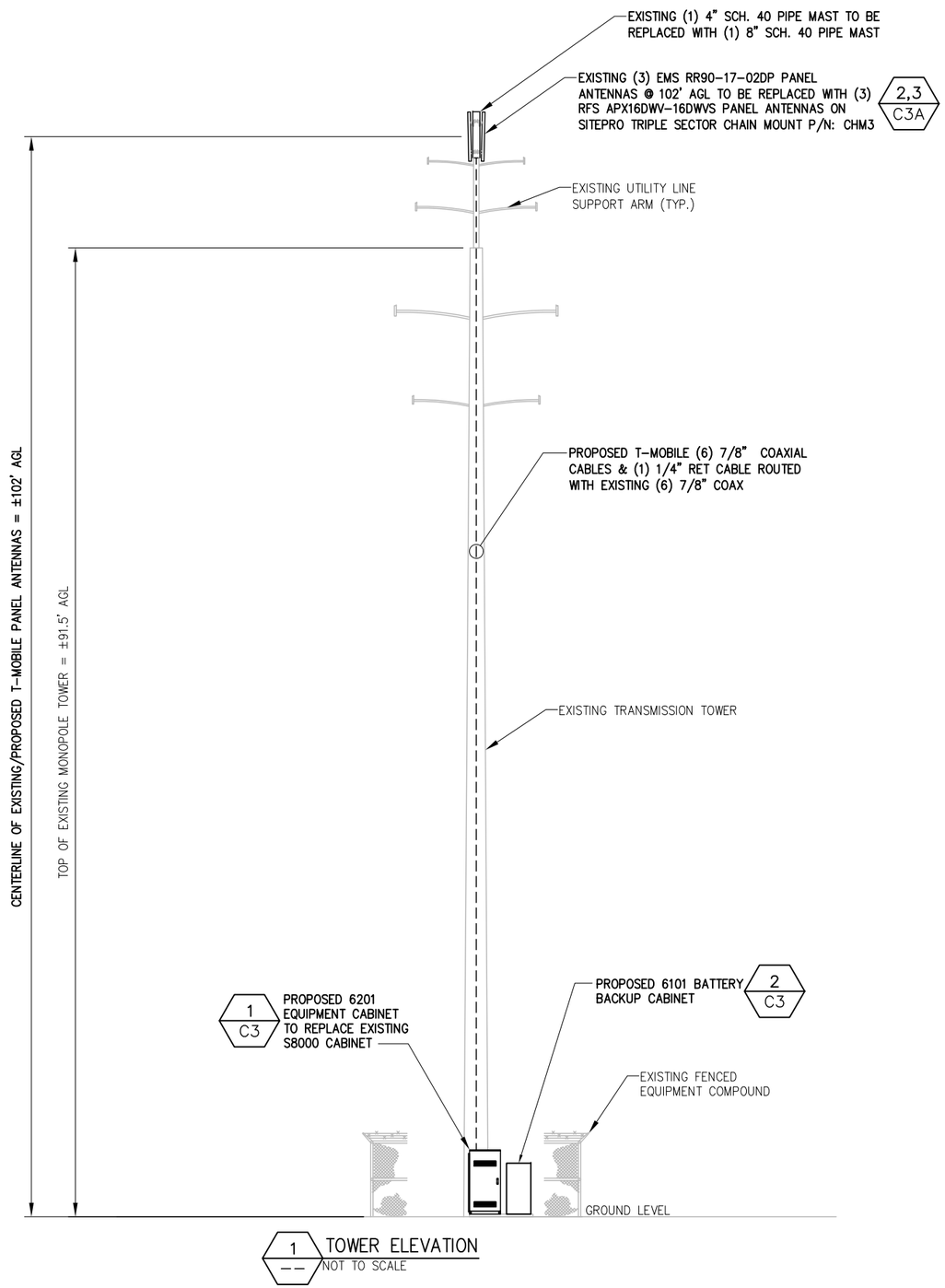
SITE NAME
CT11026A
72 NOTCH HILL ROAD
TOWER #4955, LINE #150
NORTH BRANFORD, CT

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1
SHEET 2 OF **6** SHEETS

NOTE:
INFINIGY ENGINEERING HAS NOT EVALUATED THE TOWER OR LOADING FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY REGARDING ITS EXISTING OR PROPOSED LOADING. FINAL INSTALLATION TO COMPLY WITH RESULTS OF PASSING STRUCTURAL ANALYSIS.

STRUCTURAL ANALYSIS COMPLETED BY CL&P. FOR ADDITIONAL INFORMATION, SEE REPORT: TITLED: STRUCTURAL ANALYSIS OF CL&P POLE AND ANTENNA MAST DESIGN, SITE NUMBER: CT11026C DATED: 5/26/15.



1 TOWER ELEVATION
NOT TO SCALE

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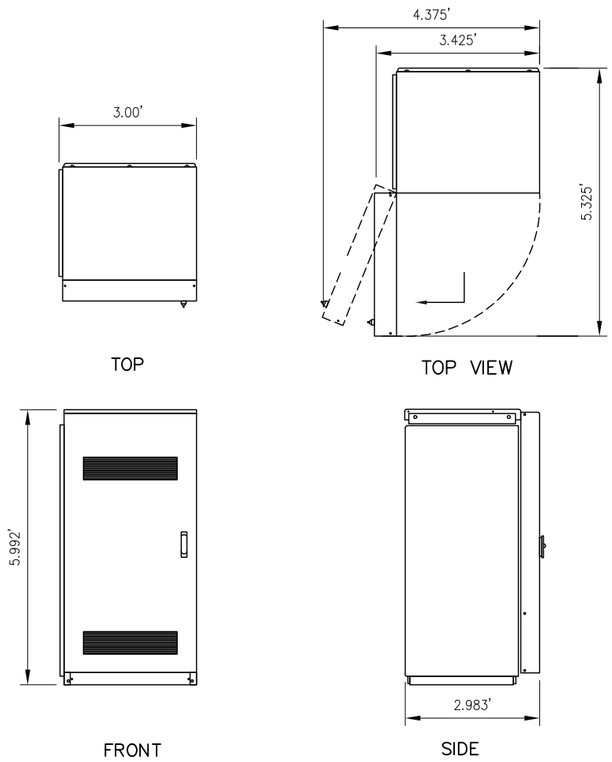
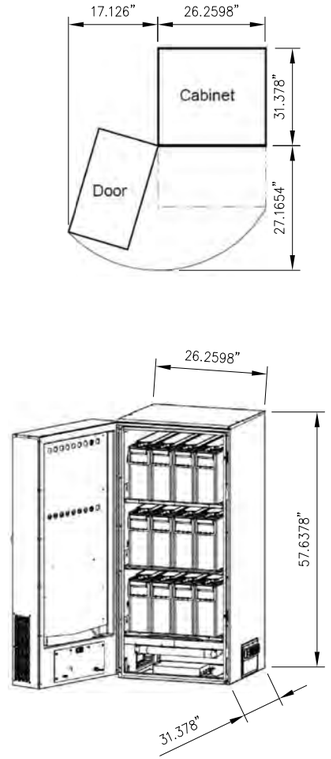
SITE NAME
CT11026A
72 NOTCH HILL ROAD
TOWER #4955, LINE #150
NORTH BRANFORD, CT

SHEET TITLE
ELEVATION

SHEET NUMBER
C-2



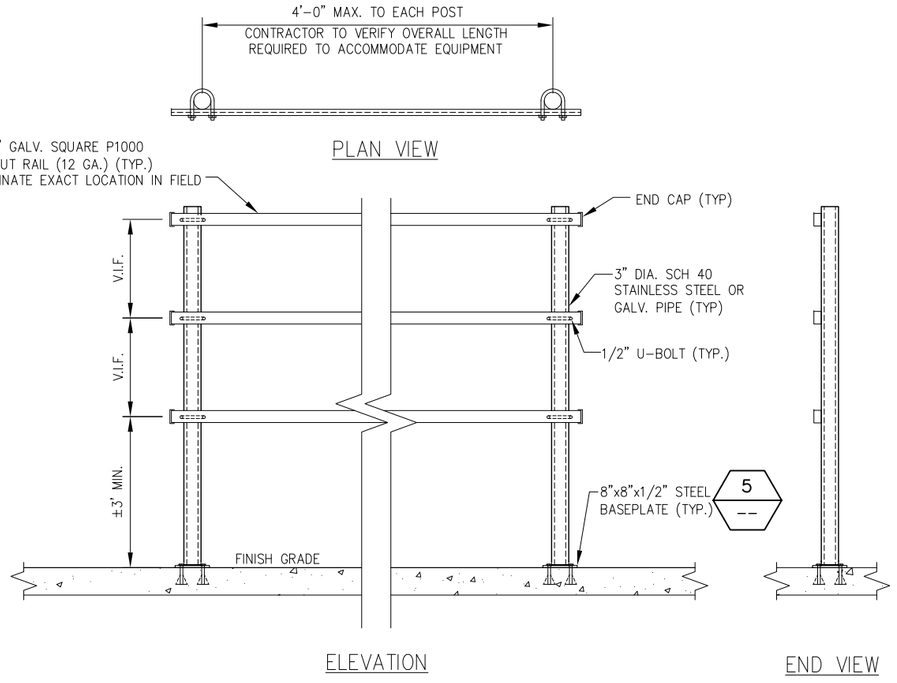
1 ERICSSON 6201 EQUIPMENT CABINET
NOT TO SCALE



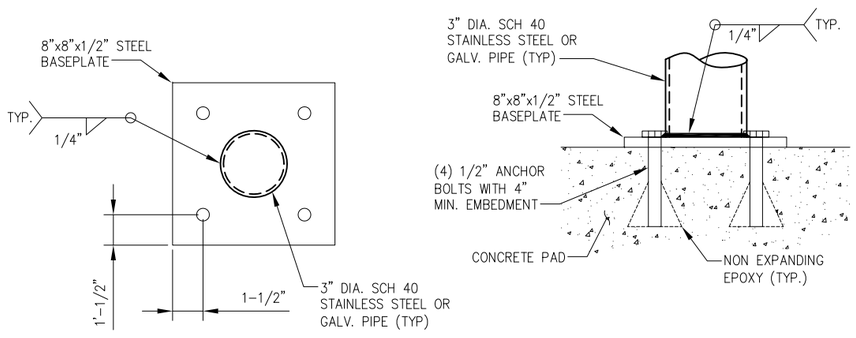
2 BBS 6101 BATTERY BACKUP CABINET
NOT TO SCALE

Physical Characteristics	
Framework Type	NetXtend™ Compact Enclosure
Available Space	Up to 14 RU, 19" W
Dimensions (H x W x D)	Enclosure: 24" x 24" x 16" Battery tray: 22" W x 13" D
Mounting	Wall or H-frame, pole mount (wall-mount kit included)
Weight, Equipped	Enclosure: 64 lb., w/out batteries Four (4) batteries: 36 lb. total
Access	Front

3 ERICSSON 2416 EQUIPMENT CABINET
NOT TO SCALE



4 H-FRAME FABRICATION DETAIL
NOT TO SCALE



5 SUPPORT POST MOUNTING DETAIL
NOT TO SCALE

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DEPT.	DATE	APP'D	REVISIONS
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RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	379-000
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CHECKED BY:	AJD

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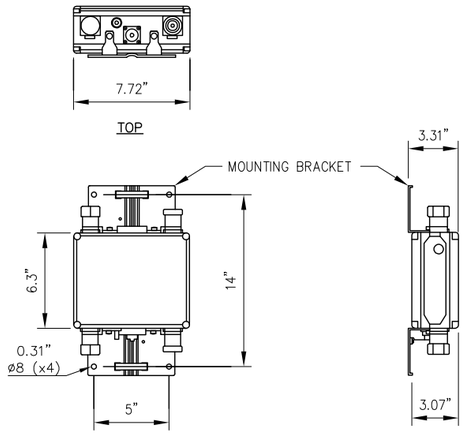
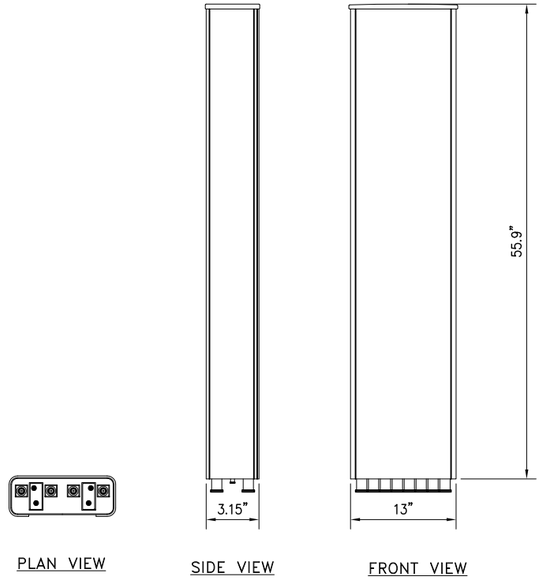
72 NOTCH HILL ROAD
TOWER #4955, LINE #150
NORTH BRANFORD, CT

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
C-3
SHEET 4 OF 6 SHEETS

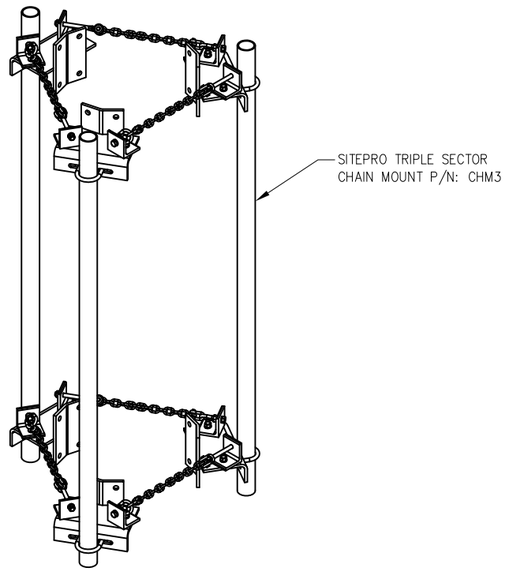


1 TMA DETAIL
NOT TO SCALE



ANTENNA: APX16DWV 16DWVS

2 ANTENNA DETAIL
NOT TO SCALE



3 CHAIN MOUNT DETAIL
NOT TO SCALE

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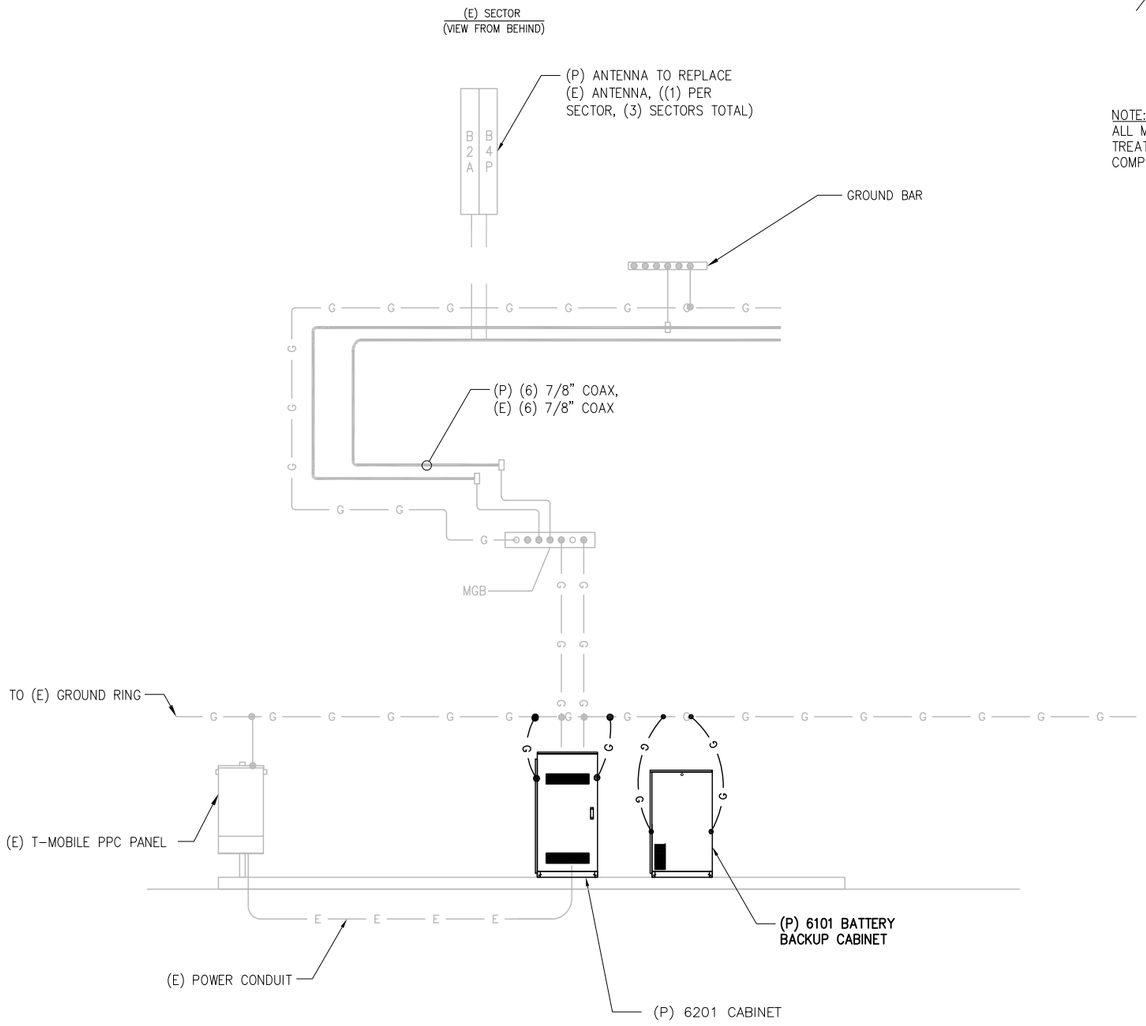
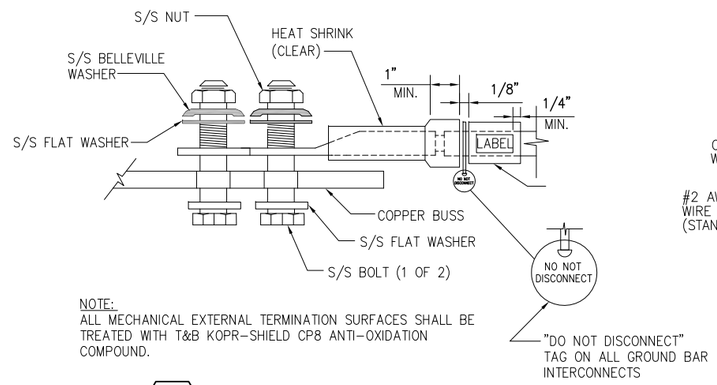
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
C-3A
SHEET 4 OF 6 SHEETS

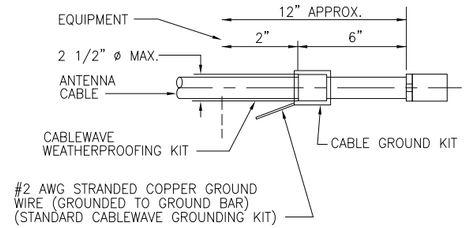


1 GROUDING DIAGRAM
NOT TO SCALE



NOTE:
ALL MECHANICAL EXTERNAL TERMINATION SURFACES SHALL BE TREATED WITH T&B KOPR-SHIELD CP8 ANTI-OXIDATION COMPOUND.

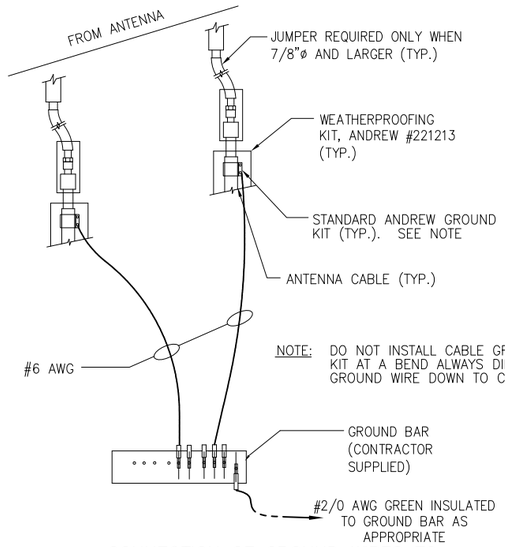
2 EQUIPMENT GROUND CONNECTION
NOT TO SCALE



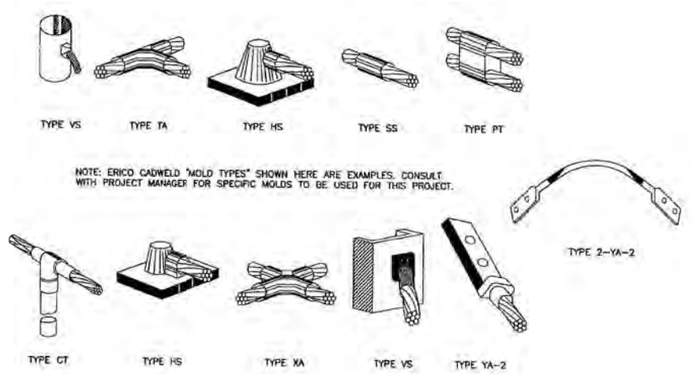
TO ANTENNA CABLE

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

3 CABLE GROUND KIT CONNECTION
NOT TO SCALE



4 CONNECTION OF GROUND WIRES TO GROUNDING BARS @ ANTENNAS
NOT TO SCALE



5 EQUIPMENT GROUND CONNECTION
NOT TO SCALE

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD
SOUTH BLOOMFIELD, CT 06002

INFINIGY
FROM ZERO TO INFINIGY
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SUBMITTALS		
DATE	DESCRIPTION	REVISION
3/23/15	ISSUED FOR REVIEW	A
3/30/15	REVISED PER COMMENTS	B
4/1/15	REVISED PER COMMENTS	C
6/9/15	REVISED PER COMMENTS	D
6/12/15	REVISED PER COMMENTS	E

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	379-000
DRAWN BY:	SKB
CHECKED BY:	AJD

PROFESSIONAL SEAL

NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE.

SITE NAME
CT11026A
72 NOTCH HILL ROAD
TOWER #4955, LINE #150
NORTH BRANFORD, CT

SHEET TITLE
GROUNDING DIAGRAM & DETAILS

SHEET NUMBER
E-1
SHEET 6 OF **6** SHEETS

Exhibit B

CENTEK engineering

Centered on Solutions℠

Structural Analysis of CL&P Pole and Antenna Mast Design

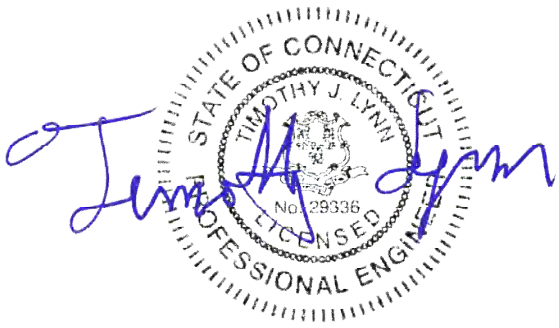
T-Mobile Site Ref: CT11026C

CL&P Structure No. 4955
91.5' Electric Transmission Pole

52 Notch Hill Road
North Branford, CT

CENTEK Project No. 15019.005

~~Date: May 12, 2015~~
Rev 1: May 26, 2015



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

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Introduction

The purpose of this report is to analyze the existing antenna mast and 91.5' (above grade) CL&P tower located at 52 Notch Hill Road in North Branford, CT for the proposed T-Mobile antenna upgrade.

The existing/proposed loads consist of the following:

- T-MOBILE (Existing to be Removed):
  Antennas: Three (3) EMS RR90-17-02DP panel antennas mounted on a antenna mast with a RAD center elevation of 102-ft above grade.
  Mast: One (1) 4" Sch. 40 pipe mast (O.D. = 4.5").
- T-MOBILE (Existing to remain):
  Coax Cables: Six (6) 7/8" ∅ coax cables running on the outside of the tower.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas mounted on a SitePro triple sector chain mount p/n CHM3 to the proposed antenna mast with a RAD center elevation of 102-ft above grade.
  Coax Cables: Six (6) 7/8" ∅ coax cables running on the outside of the tower.
  Mast: One (1) 8" SCH. 40 pipe mast x 28-ft long (O.D. = 8.625")

Primary assumptions used in the analysis

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

Analysis

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

The existing mast consisting of a 4-in SCH. 40 pipe (O.D. = 4.5") connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast structure in order to obtain reactions needed for analyzing the CL&P tower structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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

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

Design Basis

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

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

- UTILITY POLE ANALYSIS

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

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure…….. 4.0 psf
  Radial Ice Thickness…… 0.5"
  Vertical Overload Capacity Factor…… 1.50
  Wind Overload Capacity Factor…….. 2.50
  Wire Tension Overload Capacity Factor…… 1.65

  Load Case 2: NESC Extreme
  Wind Speed…… 120 mph [(1)]
  Radial Ice Thickness…… 0"

- MAST ASSEMBLY ANALYSIS

  Mast, appurtenances and connections to the utility pole were analyzed and designed in accordance with the NU Design Criteria Table, TIA/EIA-222-F, and AISC-ASD standards.

  Load cases considered:

  Load Case 1:
  Wind Speed…….. 85 mph [2]
  Radial Ice Thickness…… 0”

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

  Note 2: Per NU Mast Design Criteria Exception 1.

R e s u l t s

- MAST ASSEMBLY

  The existing pipe mast was determined to be structurally **inadequate**. Replacement of the existing antenna mast with a **8 SCH. 40 Pipe x 28-ft long (O.D. = 8.625”)**, conforming to ASTM A53, Grade B, F_y = 35 ksi specifications will be required.

Member	Stress Ratio (% of capacity)	Result
8” Sch. 40 Mast	47.1%	**PASS**
Mast Connection to CL&P Tower	19.7% [1]	**PASS**

Note 1 – 1/3 increase in allowable stress not used for connection to tower per OTRM 059.

- UTILITY POLE

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

  A maximum usage of **98.20%** occurs in the utility pole base plate under the **NESC Extreme Wind** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 2	45.5’ -68.5’ (AGL)	98.20%	**PASS**

- FOUNDATION AND ANCHORS

  The existing tower is directly embedded 13.5-ft into existing subgrade. Additionally there are two (2) 19 No. 8 alumoweld guy wires attached to the tower at approximately 51.5-ft above grade level.

  BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	3.19 kips	33.19 kips	31.13 ft-kips
NESC Extreme Wind	2.92 kips	35.13 kips	15.96 ft-kips

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

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Direct Embedment	Overturning	1.0 FS (1)	8.61 FS (1)	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.
Note 3: Based on Hansen Method.

Conclusions and Recommendations

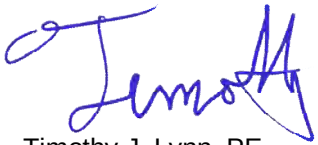
This analysis shows that the subject utility tower **with the replacement of the existing pipe mast as detailed in section 4 of this report is adequate** to support the proposed T-Mobile equipment upgrade.

The utility tower was analyzed using a one circuit configuration, per the existing conditions. The tower is structurally inadequate to support a second circuit with the T-Mobile equipment configuration. If a second circuit is planned to be added the tower will need to be replaced or the T-Mobile equipment will need to be removed.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

G E N E R A L D E S C R I P T I O N O F S T R U C T U R A L A N A L Y S I S P R O G R A M ~ P L S - P O L E

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

Modeling Features:

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

Analysis Features:

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

Results Features:

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

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

Introduction

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

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

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/EIA Standard 222 with two exceptions:

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

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 "NU Design Criteria". This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

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

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

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

Attachment A

NU Design Criteria

			Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (.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	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
High Wind Condtion	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	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor loads provided by NU					
		* Only for Structures Installed after 2007						

Shape Factor Criteria shall be per TIA Shape Factors.

2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "NU 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 NU).

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

iii) When Coaxial Cables are mounted along side 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	1.3

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

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

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

EVERSOURCE

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INPUT DATA

TOWER ID: 4955

Structure Height (ft) : 92

Wind Zone : SE Coastal CT (red)

Wind Speed : 120 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*3/8 AW*	*3/8 AW*
DESCRIPTION =	3/8	3/8
STRANDING =	7 #8 Al Weld	7 #8 Al Weld
DIAMETER =	0.385 in	0.385 in
WEIGHT =	0.262 lb/ft	0.262 lb/ft

Conductor Properties:

	BACK	AHEAD		
NAME =	*TERN*	*TERN*		
Number of Conductors per phase: 1	795.000 45/7 ACSR	795.000 45/7 ACSR	1	Number of Conductors per phase
DIAMETER =	1.063 in	1.063 in		
WEIGHT =	0.895 lb/ft	0.895 lb/ft		

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	4,000	7,000	4,000	7,000
EXTREME WIND =	3,755	8,036	3,755	8,036
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,710	2,732	1,710	2,732

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	214	AHEAD:	250	**464**
WEIGHT SPAN (ft) =	BACK:	204	AHEAD:	292	**496**

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WIRE LOADING AT ATTACHMENTS

TOWER ID: 4955

Wind Span =	464 ft	Broken Wire Span =	AHEAD SPAN
Weight Span =	496 ft	Type of Insulator Attachment =	SUSPENSION
Total Angle =	0 degrees		

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	536 lb	0 lb	604 lb	247 lb	6,600 lb	248 lb
Conductor =	798 lb	0 lb	1,989 lb	368 lb	11,550 lb	871 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	536 lb	0 lb	130 lb
Conductor =	1,479 lb	0 lb	844 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	130 lb
Conductor =	#VALUE!	#VALUE!	844 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	984 lb
Conductor =	#VALUE!	#VALUE!	2,116 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	403 lb
Conductor =	#VALUE!	#VALUE!	1,326 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	130 lb
Conductor =	0 lb	0 lb	844 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	130 lb
Conductor =	0 lb	0 lb	844 lb

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NOTE: All loads include required overload factors (OLF's).

LC 1		HORIZONTAL	LONGITUDINAL	VERTICAL
NESC Heavy	shield - back	246.9916667	6600	248.493294
	shield - ahead	288.5416667	-6600	355.6864796
	SHIELD - SUM	**535.5333333**	**0**	**604.1797736**
	conductor - back	367.9016667	11550	871.250608
	conductor - ahead	429.7916667	-11550	1117.672439
	CONDUCTOR - SUM	**797.6933333**	**0**	**1988.923047**
LC 2		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Extreme Wind	shield - back	247.0644852	3755	53.4072
	shield - ahead	288.626735	-3755	76.4456
	SHIELD - SUM	**535.6912202**	**0**	**129.8528**
	conductor - back	682.1546695	8036	382.58
	conductor - ahead	796.9096606	-8036	461.34
	CONDUCTOR - SUM	**1479.06433**	**0**	**843.92**
LC 3		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Long. Wind	shield - back	#VALUE!	#VALUE!	53.4072
	shield - ahead	#VALUE!	#VALUE!	76.4456
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**129.8528**
	conductor - back	#VALUE!	#VALUE!	382.58
	conductor - ahead	#VALUE!	#VALUE!	461.34
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**843.92**
LC 4		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
RULE 250D	shield - back	#VALUE!	#VALUE!	404.7589954
	shield - ahead	#VALUE!	#VALUE!	579.360915
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**984.1199104**
	conductor - back	#VALUE!	#VALUE!	905.9292808
	conductor - ahead	#VALUE!	#VALUE!	1210.447794
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**2116.377075**
LC 5		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
NESC w/o OLF's	shield - back	#VALUE!	#VALUE!	165.662196
	shield - ahead	#VALUE!	#VALUE!	237.1243198
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**402.7865158**
	conductor - back	#VALUE!	#VALUE!	580.8337387
	conductor - ahead	#VALUE!	#VALUE!	745.1149593
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**1325.948698**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Raking	shield - back	0	1710	53.4072
	shield - ahead	0	-1710	76.4456
	SHIELD - SUM	**0**	**0**	**129.8528**
	conductor - back	0	2732	382.58
	conductor - ahead	0	-2732	461.34
	CONDUCTOR - SUM	**0**	**0**	**843.92**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
60 DEG F NO WIND	shield - back	0	1710	53.4072
	shield - ahead	0	-1710	76.4456
	SHIELD - SUM	**0**	**0**	**129.8528**
	conductor - back	0	2732	382.58
	conductor - ahead	0	-2732	461.34
	CONDUCTOR - SUM	**0**	**0**	**843.92**

EVERSOURCE

ANTENNA MAST DESIGN

STRUCT. NO. 4955
52 NOTCH HILL ROAD
NORTH BRANFORD, CT 06471

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	52 NOTCH HILL ROAD NORTH BRANFORD, CT 06471
PROJECT COORDINATES:	LAT: 41°–18'–54.24N LON: 72°–44'–59.84W ELEV:±117' AMSL
STRUCT NO:	4955
EVERSOURCE CONTACT:	ROBERT GRAY 860.665.3175
T–MOBILE SITE REF.:	CT11026C
T–MOBILE CONTACT:	SHELDON FREINCLE 201.776.8521
ANTENNA CL HEIGHT:	102'–0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	CARLO F. CENTORE, PE 203.488.0580 ext. 122

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CARLO F. CENTORE
No. 19316
REGISTERED PROFESSIONAL ENGINEER

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

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ANTENNA MAST DESIGN

CT11026C
EVERSOURCE STRUCTURE 4955

52 NOTCH HILL ROAD
NORTH BRANFORD, CT 06471

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TITLE SHEET

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DESIGN BASIS

1. GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

2. TIA/EIA-222-F-1996, ASCE MANUAL NO. 72 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2007 AND EVERSOURCE DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (MAST)
   BASIC WIND SPEED (V) =85 MPH (FASTEST MILE); BASED ON TIA/EIA-222F AND EVERSOURCE MAST DESIGN CRITERIA EXCEPTION 1.

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =120 MPH (3-SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS PREPARED BY CENTEK ENGINEERING, INC., FOR T-MOBILE, DATED 5/26/15.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DOCUMENTS PREPARED BY MEYER INDUSTRIES JOB NO. 995400, CIRCA 1979.

3. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE & SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, UNDERPINNING, TEMPORARY ANCHORS, GUYING, BARRICADES, ETC. AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY. MAINTAIN EXISTING SITE OPERATIONS AND COORDINATE WORK WITH TOWER OWNER.

4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.

5. 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 SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

6. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

7. MAST INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

8. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH MAST INSTALLATION.

9. 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.

10. 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.

11. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

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DESIGN BASIS AND GENERAL NOTES

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STRUCTURAL STEEL

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

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL STEEL (TOWER REINF. SOLID ROUND BAR)--- ASTM A572_GR50 (50 KSI)
   D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
   E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (FU=120 KSI).

4. 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.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. 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.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. 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.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. 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.

16. ALL BOLTS SHALL BE INSTALLED PER THE REQUIREMENTS OF AISC 14TH EDITION & RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS".

17. ALL BOLTS SHALL BE INSTALLED AS SNUG-TIGHT CONNECTIONS UNLESS OTHERWISE INDICATED. CONNECTIONS SPECIFIED AS PRETENSIONED OR SLIP-CRITICAL SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.

18. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

19. LOAD INDICATOR WASHERS SHALL BE UTILIZED ON ALL PRETENSIONED OR SLIP-CRITICAL CONNECTIONS.

20. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

21. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

22. FABRICATE BEAMS WITH MILL CAMBER UP.

23. 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.

24. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

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STRUCTURAL STEEL NOTES

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MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	–	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	–	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL–OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	–	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	–	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "–" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR – ENGINEER OF RECORD
4. MPII – "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	6/8/15	TJL	CFC	ISSUED FOR CONSTRUCTION
1	5/26/15	TJL	CFC	ISSUED FOR CONSTRUCTION
0	5/12/15	TJL	CFC	ISSUED FOR EVERSOURCE REVIEW

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CT11026C
EVERSOURCE STRUCTURE 4955
82 NOTCH HILL ROAD
NORTH BRANFORD, CT 06471

DATE:	5/12/15
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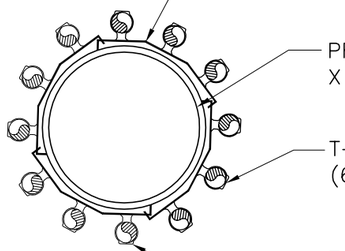
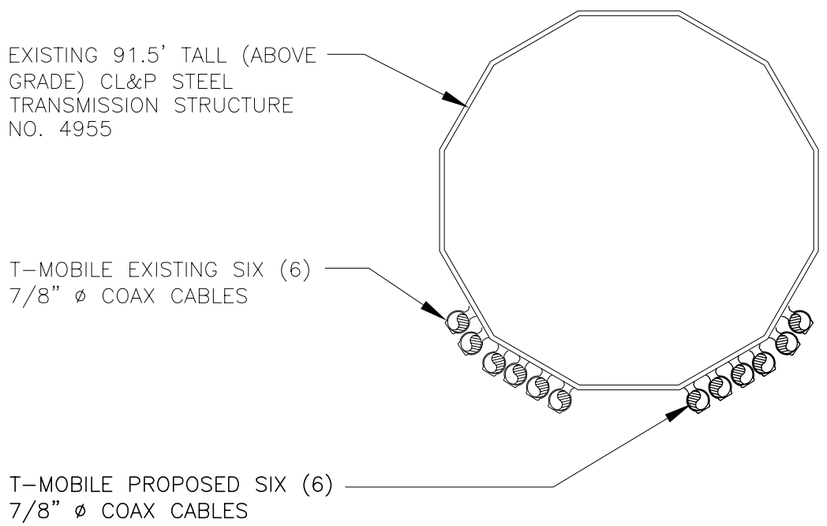
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI-1
Sheet No. 4 of 7



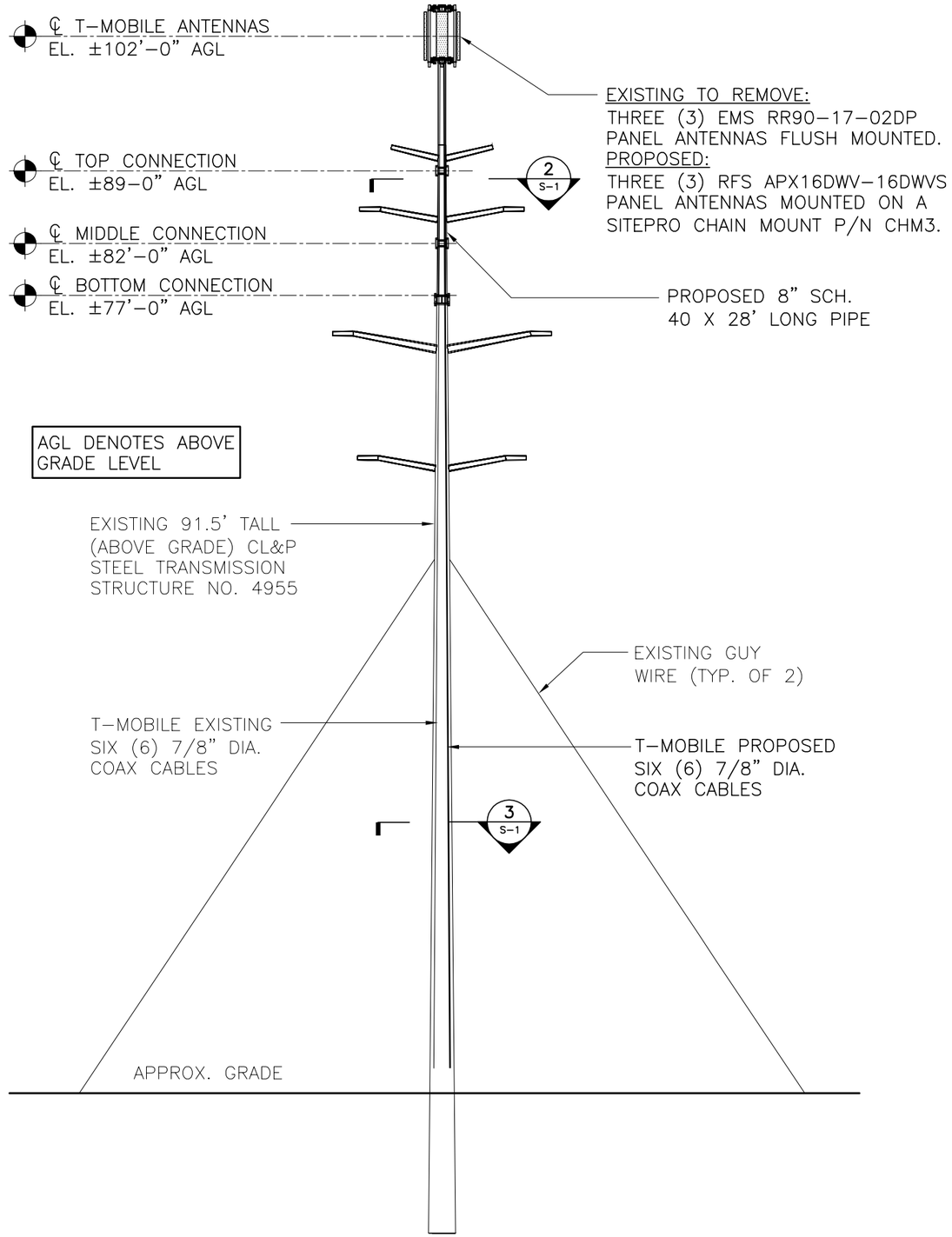
2 S-1 COAX CABLE PLAN ANTENNA MAST

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



3 S-1 COAX CABLE PLAN TOWER

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



1 S-1 TOWER AND MAST ELEVATION

SCALE: NTS

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2	6/8/15	TJL	CFC	ISSUED FOR CONSTRUCTION
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0	5/12/15	TJL	CFC	ISSUED FOR EVERSOURCE REVIEW

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Centered on Solutions
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(203) 488-8587 Fax
63-2 North Branford Road
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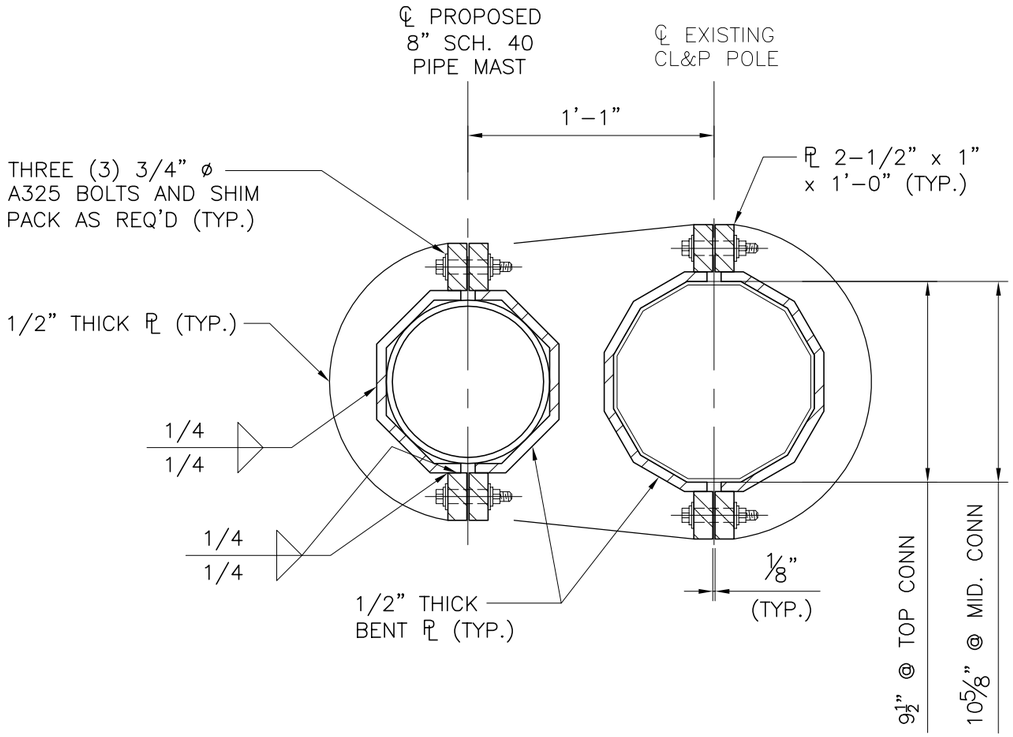
TOWER ELEVATION AND FEEDLINE PLAN

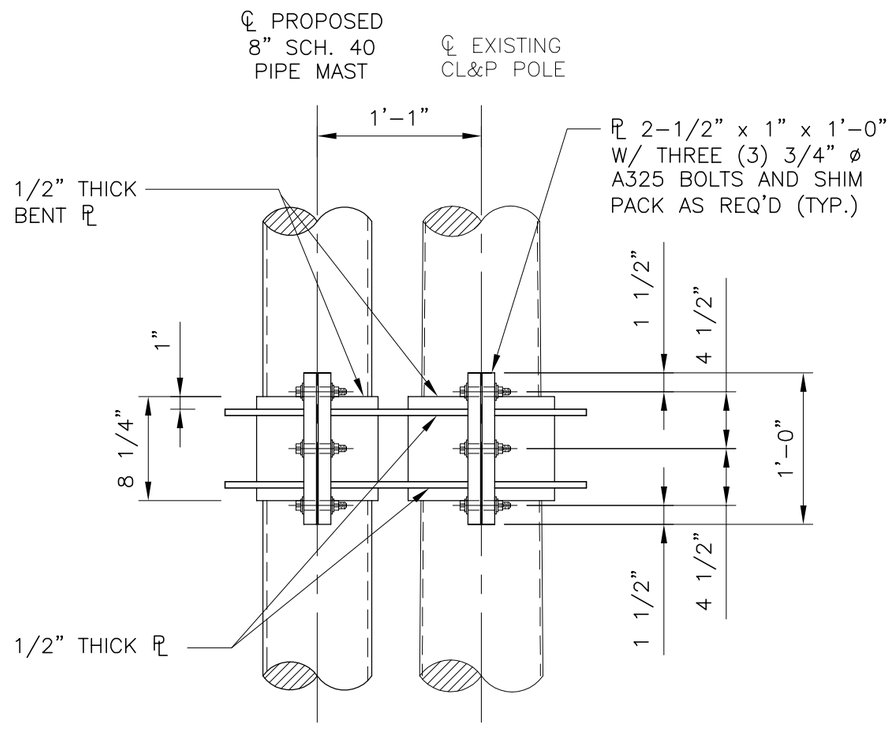
SHEET NO.
S-1
Sheet No. 5 of 7



2 / S–2 BRACKET PLAN VIEW

SCALE: 1–1/2" = 1'–0"

(EL. ±89'–0" AGL)
(EL. ±82'–0" AGL)



1 / S–2 BRACKET DETAIL

SCALE: 1" = 1'–0"

(EL. ±89'–0" AGL)
(EL. ±82'–0" AGL)

NOTE:

1. CL&P POLE TAPER = 0.1633"/FT (V.I.F.)

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0	5/12/15	TJL	CFC	ISSUED FOR EVERSOURCE REVIEW

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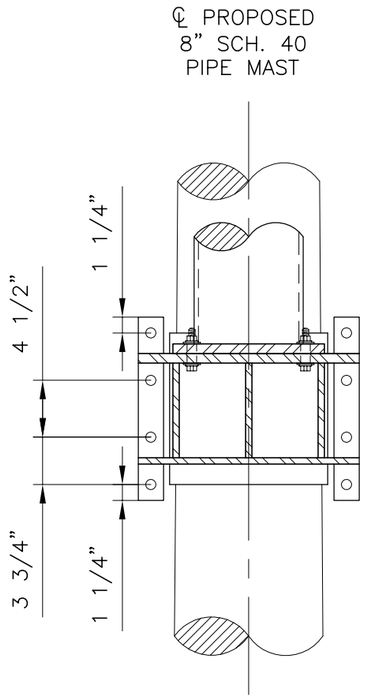
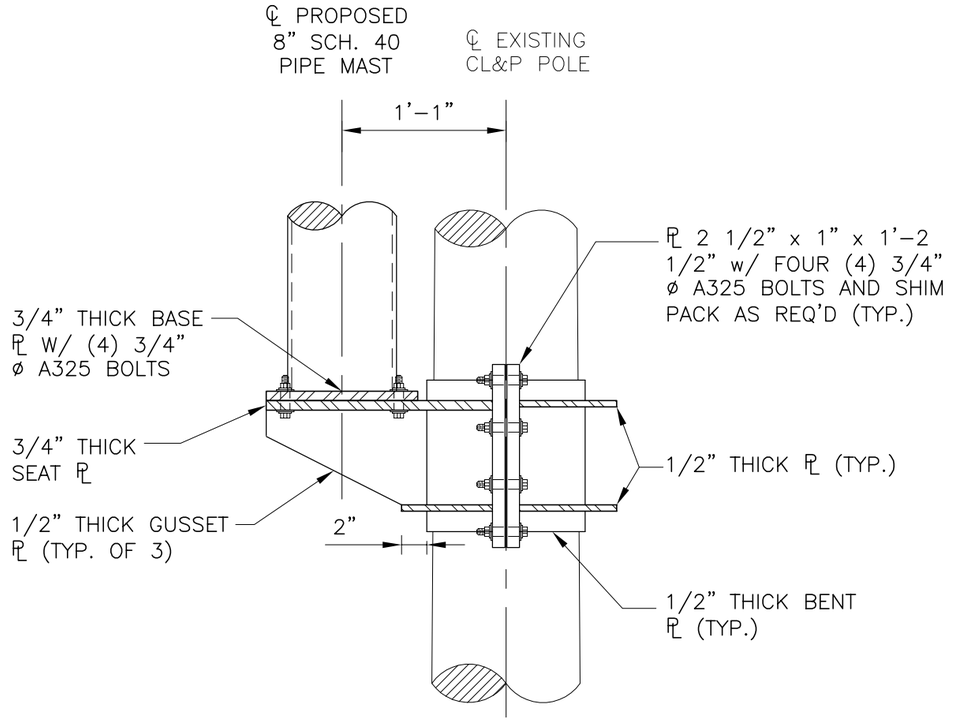
CONNECTION DETAILS

SHEET NO.
S-2
Sheet No. 6 of 7

NOTE:

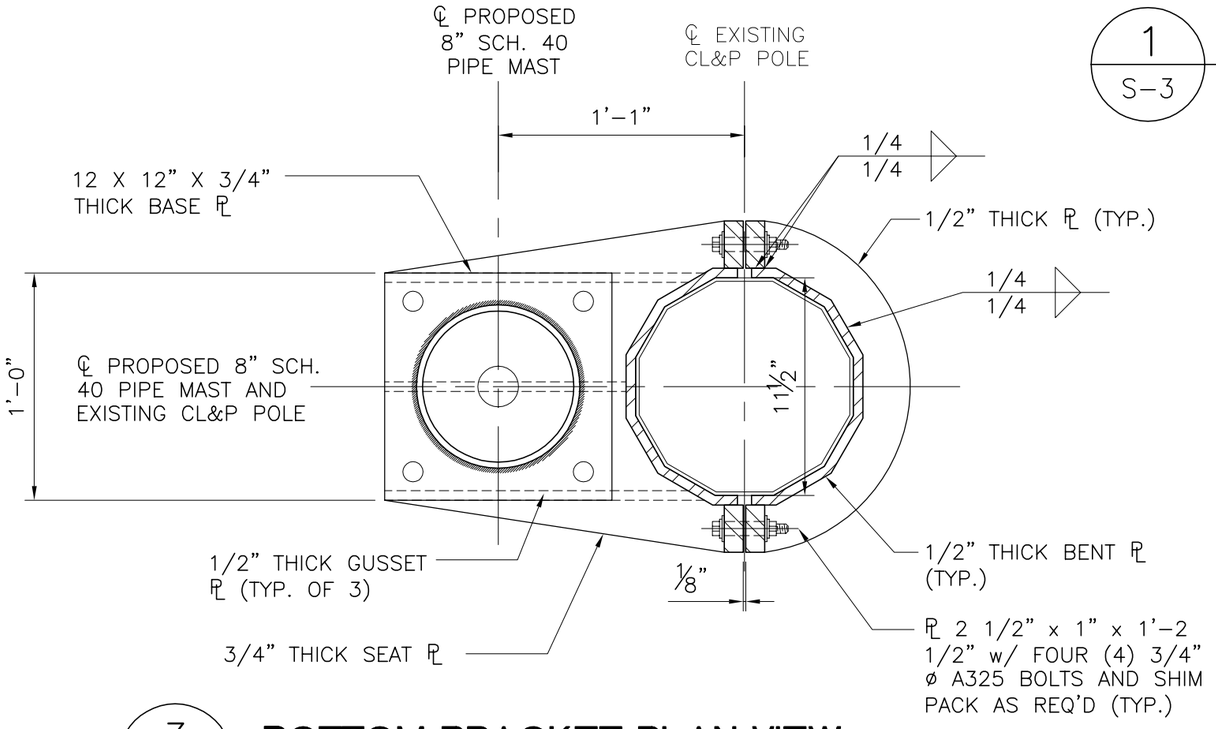
1. CL&P POLE TAPER = 0.1633"/FT (V.I.F.)





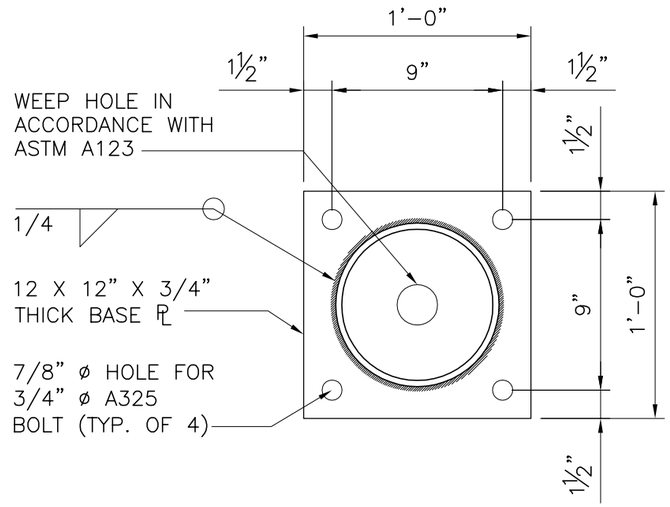
1 / S-3 **BOTTOM BRACKET DETAIL**

SCALE: 3/4" = 1'-0"



3 / S-3 **BOTTOM BRACKET PLAN VIEW**

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



2 / S-3 **BASE PLATE DETAIL**

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

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BOTTOM CONNECTION DETAILS

SHEET NO.
S-3
Sheet No. 7 of 7

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Branford, CT 06405
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P: (203) 488-0580
F: (203) 488-8587

Subject:	Load Analysis of Antenna Mast and T-Mobile Equipment on Pole # 4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA/EIA

Wind Speeds

Basic Wind Speed	$V := 85$	mph	(User Input per NU Mast Design Criteria Exception 1)
Basic Wind Speed with Ice	$V_i := 74$	mph	(User Input per TIA/EIA-222-F Section 2.3.16)

Heights above ground level, z

Mast	$z_{mast} := 94$	ft	(User Input)
T-Mobile	$z_{TMo} := 102$	ft	(User Input)
Coax	$z_{coax} := 94$	ft	(User Input)

Exposure Coefficients, kz

(per TIA/EIA-222-F Section 2.3.3)

Mast: $Kz_{mast} := \left(\frac{z_{mast}}{33}\right)^{\frac{2}{7}} = 1.349$

T-Mobile: $Kz_{TMo} := \left(\frac{z_{TMo}}{33}\right)^{\frac{2}{7}} = 1.38$

Coax: $Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.349$

Velocity Pressure without ice, qz

(per TIA/EIA-222-F Section 2.3.3)

Mast: $qz_{mast} := 0.00256 \cdot Kz_{mast} \cdot V^2 = 24.944$

T-Mobile: $qz_{TMo} := 0.00256 \cdot Kz_{TMo} \cdot V^2 = 25.533$

Coax: $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 24.944$

Velocity Pressure with ice, qzICE

(per TIA/EIA-222-F Section 2.3.3)

Mast: $qzICE_{mast} := 0.00256 \cdot Kz_{mast} \cdot V_i^2 = 18.906$

T-Mobile: $qzICE_{TMo} := 0.00256 \cdot Kz_{TMo} \cdot V_i^2 = 19.352$

Coax: $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 18.906$

TIA/EIA Common Factors:

Gust Response Factor =	$G_H := 1.69$		(User Input per TIA/EIA-222-F Section 2.3.4)
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input per TIA/EIA-222-F Section 2.3.1)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)

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Subject:	Load Analysis of Antenna Mast and T-Mobile Equipment on Pole # 4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Development of Wind & Ice Load on Antenna Mast (per TIA/EIA-222-F-1996 Criteria)

Mast Data: (8" Sch. 40) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 8.63$ in (User Input)

Mast Length = $L_{mast} := 28$ ft (User Input)

Mast Thickness = $t_{mast} := 0.3$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 38.9$

Mast Force Coefficient = $Ca_{mast} = 1.2$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force = $qz_{mast} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 36$ plf **BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.803$ sf/ft

Total Mast Wind Force w/ Ice = $qzICE_{mast} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 31$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 14.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 6$ plf **BLC 3**

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Subject: Load Analysis of Antenna Mast and T-Mobile Equipment on Pole # 4955

Location: North Branford, CT

Rev. 1: 5/26/15

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 15019.005

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)	
Antenna Width =	$W_{ant} := 13$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$			
Antenna Force Coefficient =	$Ca_{ant} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)	

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{TMo} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 915$	lbs	**BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{TMo} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 760$	lbs	**BLC 4**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1)(T_{ant} + 1) - V_{ant} = 1017$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 99$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts (per TIA/EIA-222-F-1996 Criteria)

Mount Data:

Mount Type: SitePro Chain Mount p/n CHM3

Mount Shape = Round (User Input)

Pipe Mount Length = $L_{mnt} := 60$ in (User Input)

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

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

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

Chain Mount Weight = $W_{CHM.mnt} := 145$ lbs (User Input)

Mount Aspect Ratio = $Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 25$

Mount Force Coefficient = $Ca_{mnt} = 1.2$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Mount is Shielded by Antenna

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

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

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Mount is Shielded by Antenna

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

Total Mount Wind Force = $Fi_{mnt} := qzICE_{TMo} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICEmnt} = 0$ lbs **BLC 4**

Gravity Loads (without ice) (per TIA/EIA-222-F-1996)

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

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{CHM.mnt} = 200$ lbs **BLC 2**

Gravity Loads (ice only) (per TIA/EIA-222-F-1996)

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

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[(D_{mnt} + 1)^2\right] \cdot (L_{mnt} + 1)\right] - V_{mnt} = 280$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 9$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 32$ lbs **BLC 3**

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Centered on Solutions
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Subject:	Load Analysis of Antenna Mast and T-Mobile Equipment on Pole # 4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Development of Wind & Ice Load on Coax Cables — per TIA/EIA-222-F-96 Criteria

Coax Cable Data:

Coax Type =	HELIAX 7/8"			
Shape =	Round		(User Input)	
Coax Outside Diameter =	$D_{coax} := 1.11$	in	(User Input)	
Coax Cable Length =	$L_{coax} := 23$	ft	(User Input)	
Weight of Coax per foot =	$Wt_{coax} := 0.54$	plf	(User Input)	
Total Number of Coax =	$N_{coax} := 12$		(User Input)	
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 2$		(User Input)	
Coax aspect ratio,	$Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 248.6$			
Coax Cable Force Factor Coefficient =	$Ca_{coax} = 1.2$		TIA/EIA-222-F-96 Table 3	

Wind Load (without ice) — per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area =	$A_{coax} := \frac{NP_{coax} \cdot D_{coax}}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := qz_{coax} \cdot G_H \cdot Ca_{coax} \cdot A_{coax} = 9$	plf	**BLC 5**

Wind Load (with ice) — per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{NP_{coax} \cdot D_{coax} + 2 \cdot Ir}{12} = 0.3$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := qzICE_{coax} \cdot G_H \cdot Ca_{coax} \cdot AICE_{coax} = 10$	plf	**BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice	$WT_{coax} := Wt_{coax} \cdot N_{coax} = 6$	plf	**BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2\right] = 2.5$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Id \cdot \left(N_{coax} \cdot \frac{Ai_{coax}}{144}\right) = 12$	plf	**BLC 3**

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Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of TIA/EIA Wind and Ice Loads for Design of Antenna Mast Only**
Tabulated Load Cases
Location: **North Branford, CT**
Date: 5/12/15 Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Load Case	Description
1	Self Weight (Antenna Mast)
2	Weight of Appurtenances
3	Weight of Ice Only on Antenna Structure
4	TIA/EIA Wind with Ice on Antenna Structure
5	TIA/EIA Wind on Antenna Structure

Footnotes:
(1) Antenna Structure includes: Mast and Appurtenances

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Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of TIA/EIA Wind and Ice Loads for Design of Antenna Structure Only**
Load Combinations Table

Location: **North Branford, CT**

Date: 5/12/15 Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	TIA/EIA Wind + Ice on Antenna Structure		1		1	1	2	1	3	1	4	1		
2	TIA/EIA Wind on Antenna Structure		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case
(2) Antenna Structure includes: Mast and Appurtenances

Global

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

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

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

Global, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp t...	Lcomp b...	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	28									Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_8.0	Beam	Pipe	A53 Gr. B	Typical	7.85	68.1	68.1	136

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOTMA...	TOPMA...			Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From D...
1	BOTMAST	0	0	0	0	
2	TOPCONNECTION	0	12	0	0	
3	TOPMAST	0	28	0	0	
4	MIDCONN	0	5	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	TOPCONNECTION	Reaction		Reaction				
2	BOTMAST	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
3	MIDCONN	Reaction		Reaction				

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.135	25
2	M1	Y	-.2	25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.099	25
2	M1	Y	-.032	25

Member Point Loads (BLC 4 : TIA/EIA Wind with Ice on Antenna)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.76	25

Member Point Loads (BLC 5 : TIA/EIA Wind on Antenna Structur)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.915	25

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	22

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	0
2	M1	Y	-.012	-.012	0	22

Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice on Antenna)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.031	.031	0	0
2	M1	X	.01	.01	0	22

Member Distributed Loads (BLC 5 : TIA/EIA Wind on Antenna Structur)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.036	.036	0	0
2	M1	X	.009	.009	0	22

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	Self Weight (Antenna Mast)	None		-1						
2	Weight of Appurtenances	None					2	1		
3	Weight of Ice Only on Antenna St	None					2	2		
4	TIA/EIA Wind with Ice on Antenna	None					1	2		
5	TIA/EIA Wind on Antenna Structur	None					1	2		

Load Combinations

	Description	Solve	PD...	SR...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	TIA/EIA Wind + Ice ...	Yes	Y		1	1	2	1	3	1	4	1								
2	TIA/EIA Wind on P...	Yes	Y		1	1	2	1	5	1										
3	Self Weight		Y																	

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
1	M1	1	max	1.778	1	1.595	2	0	1	0	1	0	1	2.425	2
2			min	1.215	2	1.359	1	0	1	0	1	0	1	2.061	1
3		2	max	1.423	1	-2.609	1	0	1	0	1	0	1	1.086	2
4			min	.986	2	-3.082	2	0	1	0	1	0	1	.917	1
5		3	max	1.068	1	1.498	2	0	1	0	1	0	1	13.974	2
6			min	.757	2	1.282	1	0	1	0	1	0	1	11.83	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
7		4	max	.713	1	1.183	2	0	1	0	1	0	1	4.593	2
8			min	.528	2	.995	1	0	1	0	1	0	1	3.861	1
9		5	max	0	1	.008	1	0	1	0	1	0	1	0	1
10			min	0	1	.007	2	0	1	0	1	0	1	0	1

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	.226	1	.406	2	0	1	-1.567	1	1.844	2	0	1	0	1
2			min	.155	2	.346	1	0	1	-1.844	2	1.567	1	0	1	0	1
3		2	max	.181	1	-.665	1	0	1	-.697	1	.826	2	0	1	0	1
4			min	.126	2	-.785	2	0	1	-.826	2	.697	1	0	1	0	1
5		3	max	.136	1	.382	2	0	1	-8.995	1	10.625	2	0	1	0	1
6			min	.096	2	.327	1	0	1	-10.625	2	8.995	1	0	1	0	1
7		4	max	.091	1	.301	2	0	1	-2.935	1	3.492	2	0	1	0	1
8			min	.067	2	.254	1	0	1	-3.492	2	2.935	1	0	1	0	1
9		5	max	0	1	.002	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	.002	2	0	1	0	1	0	1	0	1	0	1

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	TOPCONNE...	max	-4.17	1	0	1	0	1	0	1	0	1	0	1
2		min	-4.888	2	0	1	0	1	0	1	0	1	0	1
3	BOTMAST	max	-1.359	1	1.778	1	0	1	0	1	0	1	2.425	2
4		min	-1.595	2	1.215	2	0	1	0	1	0	1	2.061	1
5	MIDCONN	max	4.363	2	0	1	0	1	0	1	0	1	0	1
6		min	3.681	1	0	1	0	1	0	1	0	1	0	1
7	Totals:	max	-1.848	1	1.778	1	0	1						
8		min	-2.121	2	1.215	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation...	LC	Y Rotation...	LC	Z Rotation...	LC
1	BOTMAST	max	0	2	0	2	0	1	0	1	0	1	0	1
2		min	0	1	0	1	0	1	0	1	0	1	0	2
3	TOPCONNEC...	max	0	2	0	2	0	1	0	1	0	1	-2.634e-3	1
4		min	0	1	0	1	0	1	0	1	0	1	-3.107e-3	2
5	TOPMAST	max	1.942	2	-.001	2	0	1	0	1	0	1	-1.066e-2	1
6		min	1.643	1	-.002	1	0	1	0	1	0	1	-1.261e-2	2
7	MIDCONN	max	0	1	0	2	0	1	0	1	0	1	6.268e-4	2
8		min	0	2	0	1	0	1	0	1	0	1	5.31e-4	1

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

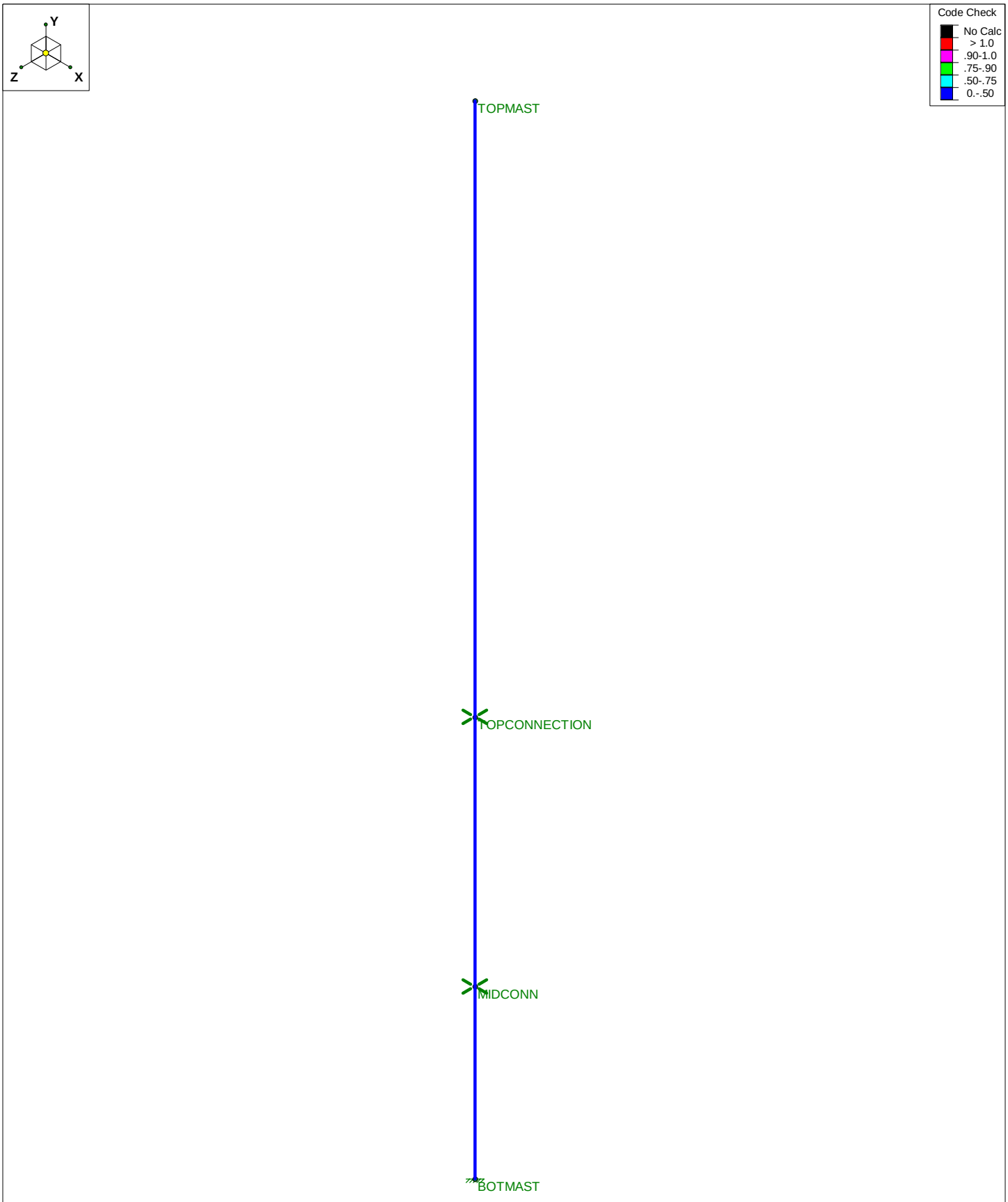
	Member	Shape	Code Check	Loc[...	LC	Sh...	Loc[ft]	...	LC	Pnc/o...	Pnt/...	Mny...	Mnz...	...	Eqn
1	M1	PIPE_8.0	.471	11.9...	2	.067	11.958		2	84.518	164...	36.3...	36.3...	...	H1-...

Joint Reactions

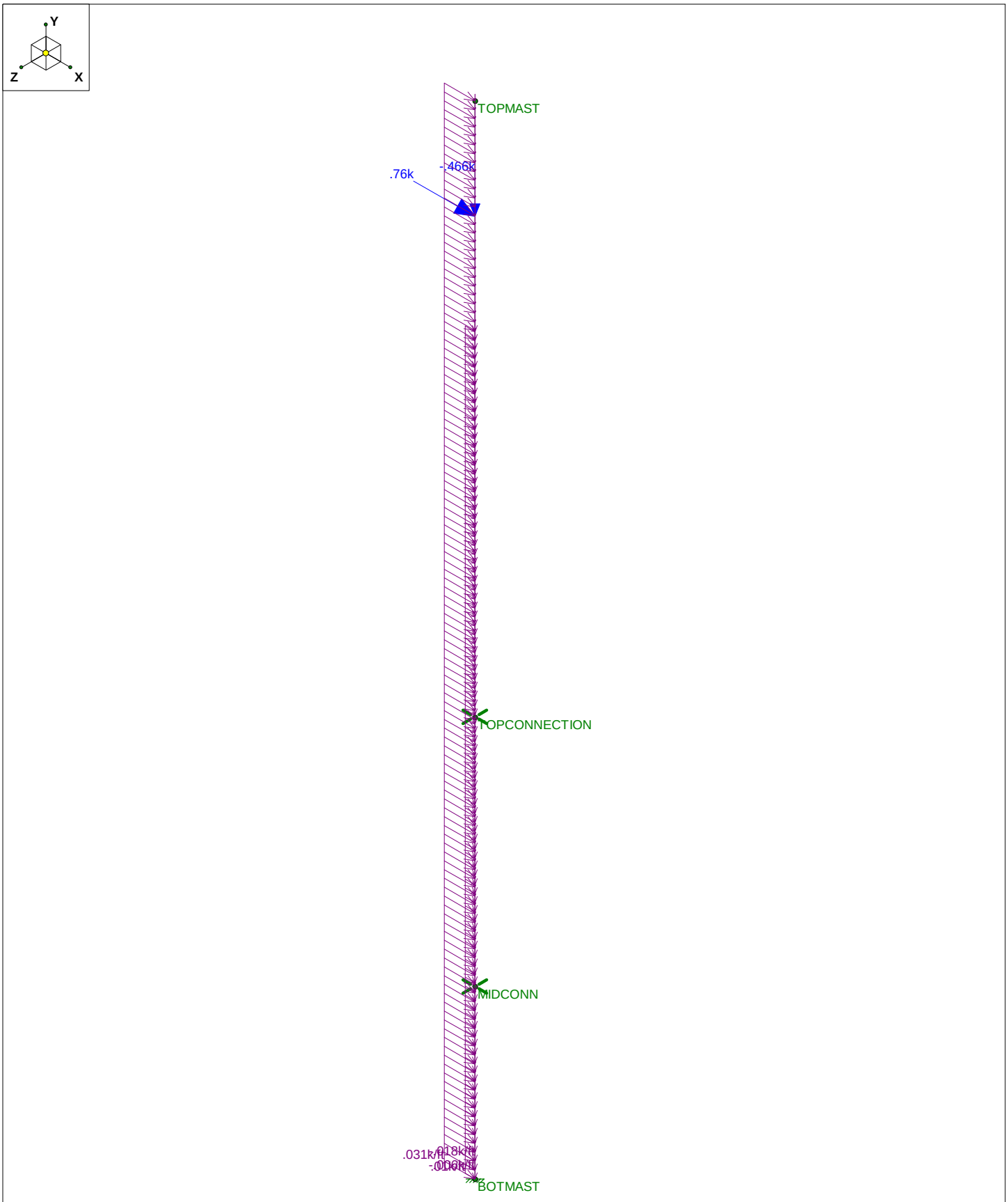
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-4.17	0	0	0	0	0
2	1	BOTMAST	-1.359	1.778	0	0	0	2.061
3	1	MIDCONN	3.681	0	0	0	0	0
4	1	Totals:	-1.848	1.778	0			
5	1	COG (ft):	X: 0	Y: 16.215	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-4.888	0	0	0	0	0
2	2	BOTMAST	-1.595	1.215	0	0	0	2.425
3	2	MIDCONN	4.363	0	0	0	0	0
4	2	Totals:	-2.121	1.215	0			
5	2	COG (ft):	X: 0	Y: 16.707	Z: 0			

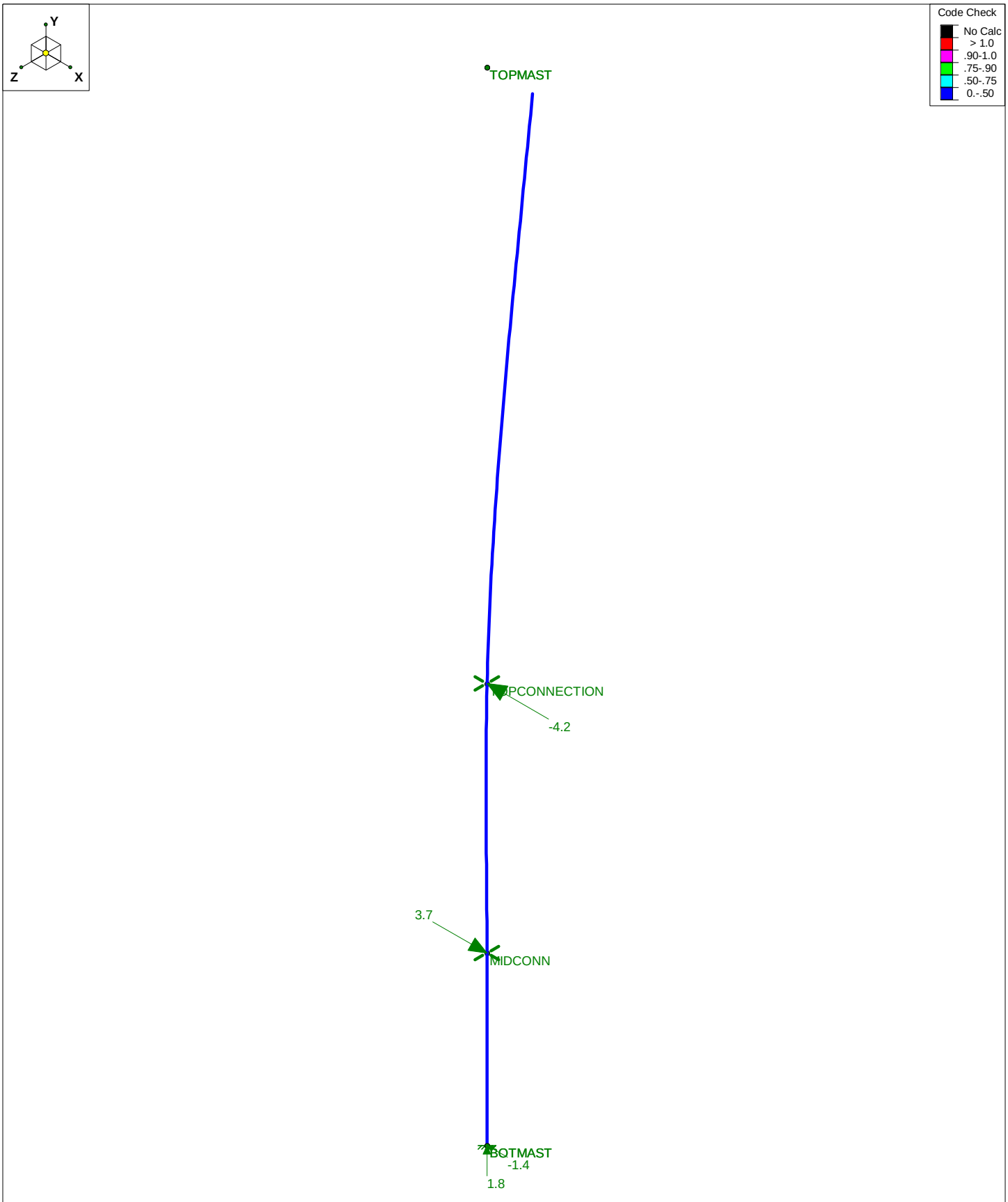


CENTEK engineering, INC.		
TJL	Pole # 4955	May 26, 2015 at 9:37 AM
15019.005 - CT11026C	Unity Check	EIA-TIA.r3d

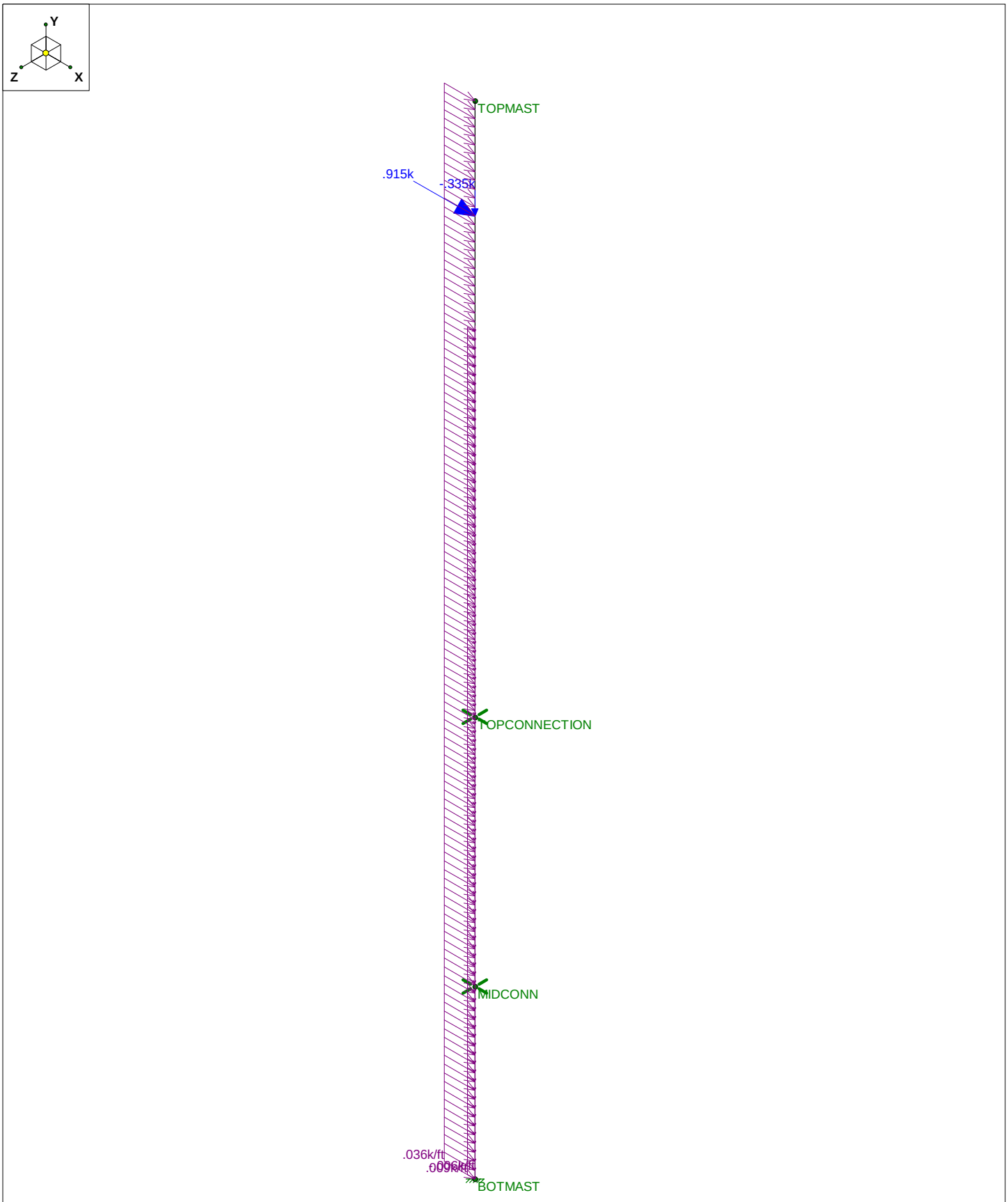


Loads: LC 1, TIA/EIA Wind + Ice on PCS Structure

CENTEK engineering, INC.		
TJL	Pole # 4955	May 26, 2015 at 9:36 AM
15019.005 - CT11026C	LC #1 Loads	EIA-TIA.r3d

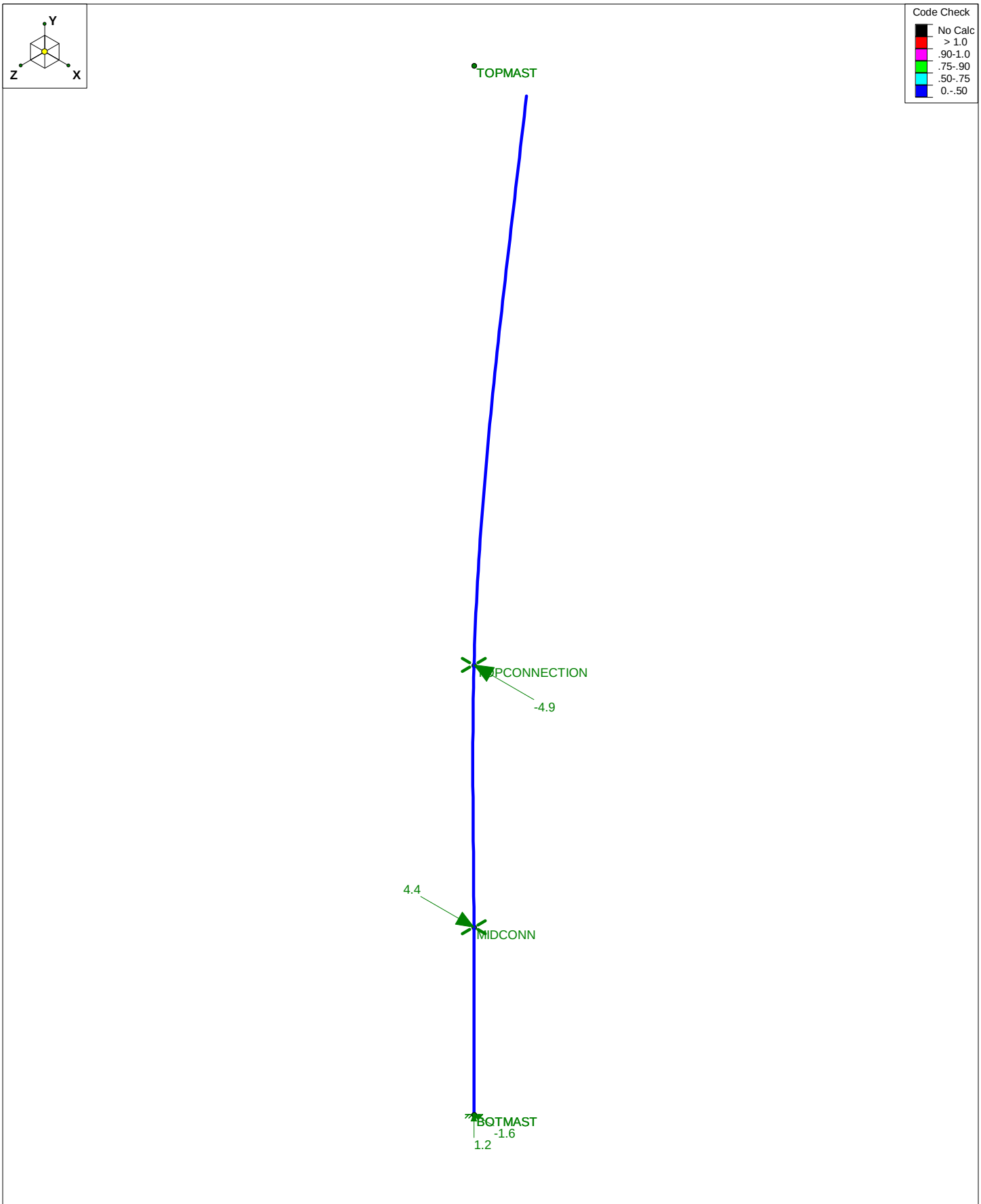


CENTEK engineering, INC.		
TJL	Pole # 4955	May 26, 2015 at 9:39 AM
15019.005 - CT11026C	LC #1 Reactions and Deflected Shape	EIA-TIA.r3d



Loads: LC 2, TIA/EIA Wind on PCS Structure

CENTEK engineering, INC.		
TJL	Pole # 4955	May 26, 2015 at 9:36 AM
15019.005 - CT11026C	LC #2 Loads	EIA-TIA.r3d



CENTEK engineering, INC.		
TJL	Pole # 4955	May 26, 2015 at 9:40 AM
15019.005 - CT11026C	LC #2 Reactions and Deflected Shape	EIA-TIA.r3d

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

Subject:	Mast Connection to CL&P Pole # 4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Mast Connection:

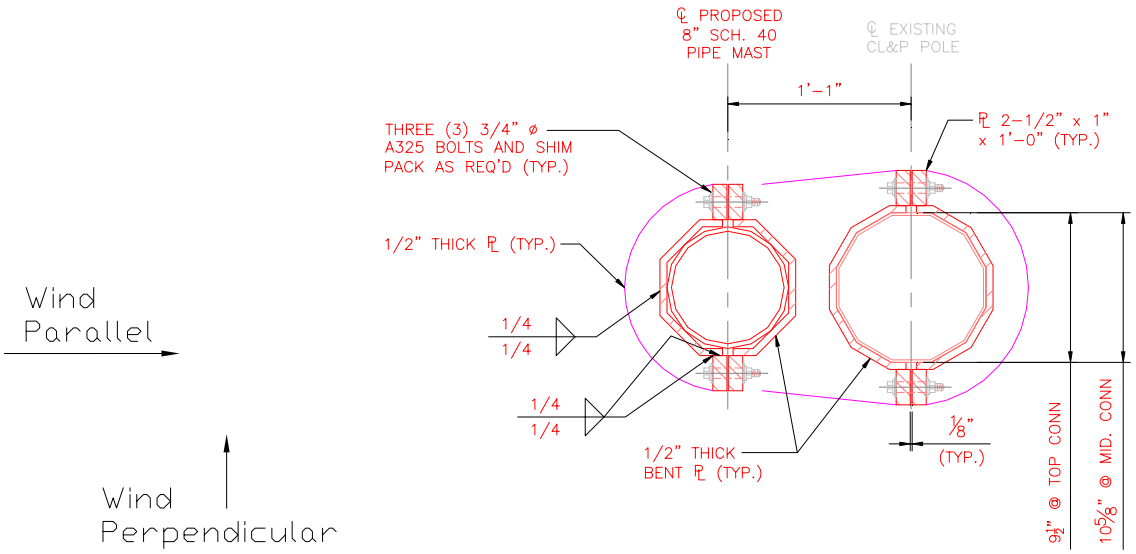
Maximum Design Reactions at Brace:

Vertical =	Vert := 0·kips	(User Input)
Horizontal =	Horz := 5.0·kips	(User Input)
Moment =	Moment := 0	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Allowable Tensile Stress =	$F_{t.all} := 45 \cdot ksi$	(User Input)
Allowable Shear Stress =	$F_{v.all} := 27 \cdot ksi$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 13 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 14.125 \cdot in$	(User Input)

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



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{Vert}{n_b} = 0 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 0 \cdot ksi$

$Condition1 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

$Condition1 = "OK"$

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 45 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment From Mast Eccentricity = $M_{par} := Vert \cdot e = 0 \cdot kips \cdot in$

Tension Force = $F_{tension} := Horz = 5 \cdot kips$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{F_{tension}}{n_b} + \frac{M_{par}}{S_{vert} \cdot 2} = 0.833 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 1.9 \cdot ksi$

$Condition2 := if(F_{t.act} < F_{t.adj}, "OK", "Overstressed")$

$Condition2 = "OK"$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{\sqrt{Vert^2 + Horz^2}}{n_b} = 0.833 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 1.886 \cdot ksi$

$Condition3 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

$Condition3 = "OK"$

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44.83 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment from Mast Eccentricity = $M_{perp} := Horz \cdot e = 65 \cdot kips \cdot in$

Tension Force per Bolt = $F_{tension.conn} := \frac{M_{perp}}{S_{horz} \cdot 3} + \frac{M_{par}}{S_{vert} \cdot 2} = 1.534 \cdot kips$

Tension Stress Each Bolt = $F_{tension.act} := \frac{F_{tension.conn}}{a_b} = 3.472 \cdot ksi$

$Condition4 := if(F_{tension.act} < F_{t.adj}, "OK", "Overstressed")$

$Condition4 = "OK"$

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

Subject:	Mast Connection to Bottom Bracket
Location:	North Branford, CT
Rev. 0: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Mast Connection to Bottom Bracket:

Design Reactions:

Axial =	Axial := 1.3·kips	(User Input)
Shear =	Shear := 1.6·kips	(User Input)
Moment =	Moment := 2.5·kips·ft	(User Input)

Bolt Data:

Use ASTM A325

Number of Bolts =	N := 4	(User Input)
Distance Between Bolts x-dir=	$S_x := 9 \cdot in$	(User Input)
Distance Between Bolts x-dir=	$S_y := 9 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 120 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 92 \cdot ksi$	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 0.75·in	(User Input)
Threads per Inch =	n := 10	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 12 \cdot in$	(User Input)
Base Plate Length =	$Pl_L := 12 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 0.75 \cdot in$	(User Input)
Pole Diameter =	$D_p := 8.625 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	sw := 0.25·in	(User Input)

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Subject:	Mast Connection to Bottom Bracket
Location:	North Branford, CT
Rev. 0: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Bolt Analysis:

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

Tensile Force Horizontal = $T_x := \frac{Moment}{S_x \cdot \frac{N}{2}} - \frac{Axial}{N} = 1.3 \cdot kips$

Tensile Force Horizontal = $T_y := \frac{Moment}{S_y \cdot \frac{N}{2}} - \frac{Axial}{N} = 1.3 \cdot kips$

Spacing Diagonal = $S_d := \sqrt{S_x^2 + S_y^2} = 12.7 \cdot in$

Tensile Force Diagonal = $T_D := \frac{Moment}{S_d} - \frac{Axial}{N} = 2 \cdot kips$

Maximum Tensile Force = $T_{Max} := \max(T_x, T_y, T_D) = 2 \cdot kips$

Allowable Tensile Force = $T_{ALL} := 0.75(0.75 \cdot F_u \cdot A_g) = 29.8 \cdot kips$

Bolt % of Capacity = $\frac{T_{Max}}{T_{ALL}} = 7 \cdot \%$

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

Condition1 = "OK"

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Location:	North Branford, CT
Rev. 0: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Base Plate Check:

Allowable Bending Stress = $F_b := 0.75 \cdot F_y = 27 \cdot ksi$

Moment Arm = $K := \frac{\left(S_d - D_p\right)}{2} = 2.05 \cdot in$

Moment in Base Plate = $M := K \cdot T_{Max} = 4.17 \cdot kips \cdot in$

Plate Bending Width = $Z := \left(Pl_w \cdot \sqrt{2} - D_p\right) = 8.35 \cdot in$

Section Modulus = $S_Z := \frac{1}{6} \cdot Z \cdot Pl_t^{\,2} = 0.78 \cdot in^3$

Bending Stress = $f_b := \frac{M}{S_Z} = 5.33 \cdot ksi$

$Condition2 := if\left(f_b < F_b, "OK", "Overstressed"\right)$

Condition2 = "OK"

Base Plate to Mast Weld Check:

Allowable Weld Stress = $F_w := 0.3 \cdot F_{yw} = 21 \cdot ksi$

Weld Area = $A_w := \frac{\pi}{4} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^2 - D_p^{\,2}\right] = 4.89 \cdot in^2$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^4 - D_p^{\,4}\right] = 47.35 \cdot in^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 4.49 \cdot in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 10.55 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Shear}{A_w} = 3.17 \cdot ksi$

$Condition3 := if\left(f_w < F_w, "OK", "Overstressed"\right)$

Condition3 = "OK"

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

Subject:	Mast Connection to Pole # 4955
Location:	North Branford, CT
Rev. 0: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

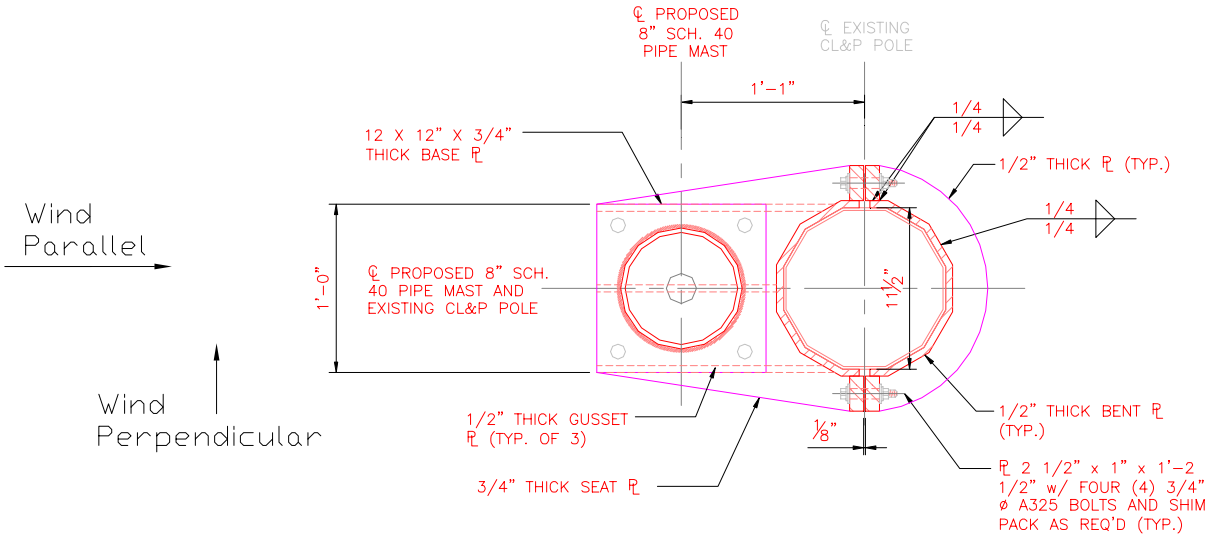
Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical =	Vert := 1.3·kips	(User Input)
Horizontal =	Horz := 1.6·kips	(User Input)
Moment =	Moment := 2.5·ft·kips	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 8$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Allowable Tensile Stress =	$F_{t.all} := 45 \cdot ksi$	(User Input)
Allowable Shear Stress =	$F_{v.all} := 27 \cdot ksi$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 13 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 15 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 1 =	$S_{vert1} := 2 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 2 =	$S_{vert2} := 6 \cdot in$	(User Input)
Bolt Polar Moment of Inertia =	$I_p := 4 \cdot S_{vert1}^2 + 4 \cdot S_{vert2}^2 = 160 \cdot in^2$	
Bolt Area =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442 \cdot in^2$	



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{Vert}{n_b} = 0.163 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 0.368 \cdot ksi$

$Condition1 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

Condition1 = "OK"

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44.99 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment From Mast Eccentricity = $M_{par} := Vert \cdot e + Moment = 46.9 \cdot kips \cdot in$

Tension Force = $F_{tension} := Horz = 1.6 \cdot kips$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{F_{tension}}{n_b} + \frac{M_{par} \cdot S_{vert2}}{I_p} = 1.959 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 4.4 \cdot ksi$

$Condition2 := if(F_{t.act} < F_{t.adj}, "OK", "Overstressed")$

Condition2 = "OK"

Wind Acting Perpendicular to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \sqrt{\left(\frac{Vert}{n_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b}\right)^2 + \left(\frac{Horz}{n_b}\right)^2} = 0.692 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 1.566 \cdot ksi$

$Condition3 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

Condition3 = "OK"

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44.88 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment from Mast Eccentricity = $M_{perp} := Horz \cdot e = 21 \cdot kips \cdot in$

Tension Force per Bolt = $F_{tension.conn} := \frac{M_{perp} \cdot 2}{S_{horz} \cdot n_b} + \frac{Vert \cdot e \cdot S_{vert2}}{I_p} = 0.98 \cdot kips$

Tension Stress Each Bolt = $F_{tension.act} := \frac{F_{tension.conn}}{a_b} = 2.219 \cdot ksi$

$Condition4 := if(F_{tension.act} < F_{t.adj}, "OK", "Overstressed")$

Condition4 = "OK"

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

Subject:	Load Analysis of Antenna Mast and T-Mobile Equipment on Struct #4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L Checked by: C.F.C. Job No. 15019.005

Basic Components

Heavy Wind Pressure =	p := 4.00	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	V := 120	mph	(User Input NESC 2007 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 := 105	ft	(User Input)
Multiplier Gust Response Factor =	m := 1.25		(User Input - Only for NESC Extreme wind case)
NESC Factor =	kv := 1.43		(User Input from NESC 2007 Table 250-3 equation)
Importance Factor =	I := 1.0		(User Input from NESC 2007 Section 250.C.2)
Velocity Pressure Coefficient =	$Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.279$		(NESC 2007 Table 250-2)
Exposure Factor =	$Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.311$		(NESC 2007 Table 250-3)
Response Term =	$Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.848$		(NESC 2007 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.867$		(NESC 2007 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 40.9$	psf	(NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.45$	(User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

CENTEK engineering
Centered on Solutions
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Branford, CT 06405
www.centekeng.com
P: (203) 488-0580
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Subject:	Load Analysis of Antenna Mast and T-Mobile Equipment on Struct #4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L Checked by: C.F.C. Job No. 15019.005

Development of Wind & Ice Load on Antenna Mast

Antenna Mast Data: (8" Sch. 40)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 8.63$	in	(User Input)
Mast Length =	$L_{mast} := 28$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.3$	in	(User Input)

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^2\right] = 14.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 6$ plf **BLC 3**

Wind Load (NESC Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 0.803$ sf/ft

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

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force (Above NU Structure) = $F_{mast} := qz \cdot Cd_R \cdot A_{mast} \cdot m = 48$ plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $F_{mast} := qz \cdot Cd_R \cdot A_{mast} = 38$ plf **BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

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

Gravity Load (ice only)

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

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

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

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

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

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

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1237$ lbs **BLC 5**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	SitePro Chain Mount p/n CHM3		
Mount Shape =	Round		(User Input)
Pipe Mount Length =	$L_{mnt} := 60$	in	(User Input)
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	(User Input)
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	(User Input)
Number of Mounting Pipes =	$N_{mnt} := 3$		(User Input)
Chain Mount Weight =	$W_{CHM.mnt} := 145$	lbs	(User Input)

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

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

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

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

Gravity Loads (without ice)

(per TIA/EIA-222-F-1996)

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 18$	lbs	
Weight of All Mounts =	$WT_{mnt} \cdot N_{mnt} + W_{CHM.mnt} = 200$	lbs	**BLC 2**

Gravity Load (ice only)

(per TIA/EIA-222-F-1996)

Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^2 \cdot L_{mnt} = 266$	cu in	
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 280$	cu in	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 9$	lbs	
Weight of Ice on All Mounts =	$W_{ICEmnt} \cdot N_{mnt} + 5 = 32$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 7/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.11$	in	(User Input)
Coax Cable Length =	$L_{coax} := 23$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 0.54$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of Antenna Mast =	$NP_{coax} := 2$		(User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 6$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 2.5$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 12$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot D_{coax} + 2 \cdot Ir}{12} = 0.3$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 2$ plf **BLC 4**

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax}\right)}{12} = 0.2$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 14$ plf **BLC 5**

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 11$ plf **BLC 5**

CENTEK engineering, INC.	Subject:	**Analysis of NESC Heavy Wind and NESC Extreme Wind**			
Consulting Engineers		**for Obtaining Antenna Structure Reactions Applied to CL&P Pole**			
63-2 North Branford Road		**Tabulated Load Cases**			
Branford, CT 06405	Location:	**North Branford, CT**			
Ph. 203-488-0580 / Fax. 203-488-8587	Date:5/12/15	Prepared by: T.J.L.	Checked by: C.F.C.	Job No. 15019.005	

Load Case	Description
1	Self Weight (Antenna Mast)
2	Weight of Appurtenances
3	Weight of Ice Only on Antenna Structure
4	NESC Heavy Wind on Antenna Structure
5	NESC Extreme Wind on Antenna Structure

Footnotes:
(1) Antenna Structure includes: Mast and Appurtenances

CENTEK engineering, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Antenna Mast Reactions Applied to CL&P Pole Load Combinations Table**

Location: **North Branford, CT**

Date: 5/12/15 Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	NESC Heavy Wind on Antenna Structure		1		1	1.5	2	1.5	3	1.5	4	2.5		
2	NESC Extreme Wind on Antenna Structure		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: Mast and Appurtenances

Global

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

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

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

Global, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Design Parameters

	Label	Shape	Leng...	Lbyy[ft]	Lbzz[ft]	Lcomp ...	Lcomp ...	Kyy	Kzz	Cm...	Cm...	Cb	y s...	z s...	Functi...
1	M1	Antenna Mast	28												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Antenna Mast	PIPE_8.0	Beam	Pipe	A53 Gr. B	Typical	7.85	68.1	68.1	136

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOTCO...	TOPMA...			Antenna Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From D...
1	BOTCONNECTION	0	0	0	0	
2	TOPCONNECTION	0	12	0	0	
3	TOPMAST	0	28	0	0	
4	MIDCONN	0	5	0	0	

Joint Boundary Conditions

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

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.135	25
2	M1	Y	-.2	25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.099	25
2	M1	Y	-.032	25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.106	25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.237	25

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	22

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	22
2	M1	Y	-.012	-.012	0	22

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	22
2	M1	X	.002	.002	0	22

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.038	.038	0	15
2	M1	X	.048	.048	15	22
3	M1	X	.011	.011	0	15
4	M1	X	.014	.014	15	22

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	Self Weight (Antenna Mast)	None		-1						
2	Weight of Appurtenances	None					2	1		
3	Weight of Ice Only on Antenna St	None					2	2		
4	NESC Heavy Wind on Antenna ...	None					1	2		
5	NESC Extreme Wind on Antenn...	None					1	4		

Load Combinations

	Description	Solve	PD...	SR...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	NESC Heavy Wind ...	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Win...	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	TOPCONNE...	max	-1.237	1	0	1	0	1	0	1	0	1	0	1
2		min	-5.508	2	0	1	0	1	0	1	0	1	0	1
3	BOTCONNE...	max	-.391	1	2.613	1	0	1	0	1	0	1	2.619	2
4		min	-1.747	2	1.215	2	0	1	0	1	0	1	.579	1

Envelope Joint Reactions (Continued)

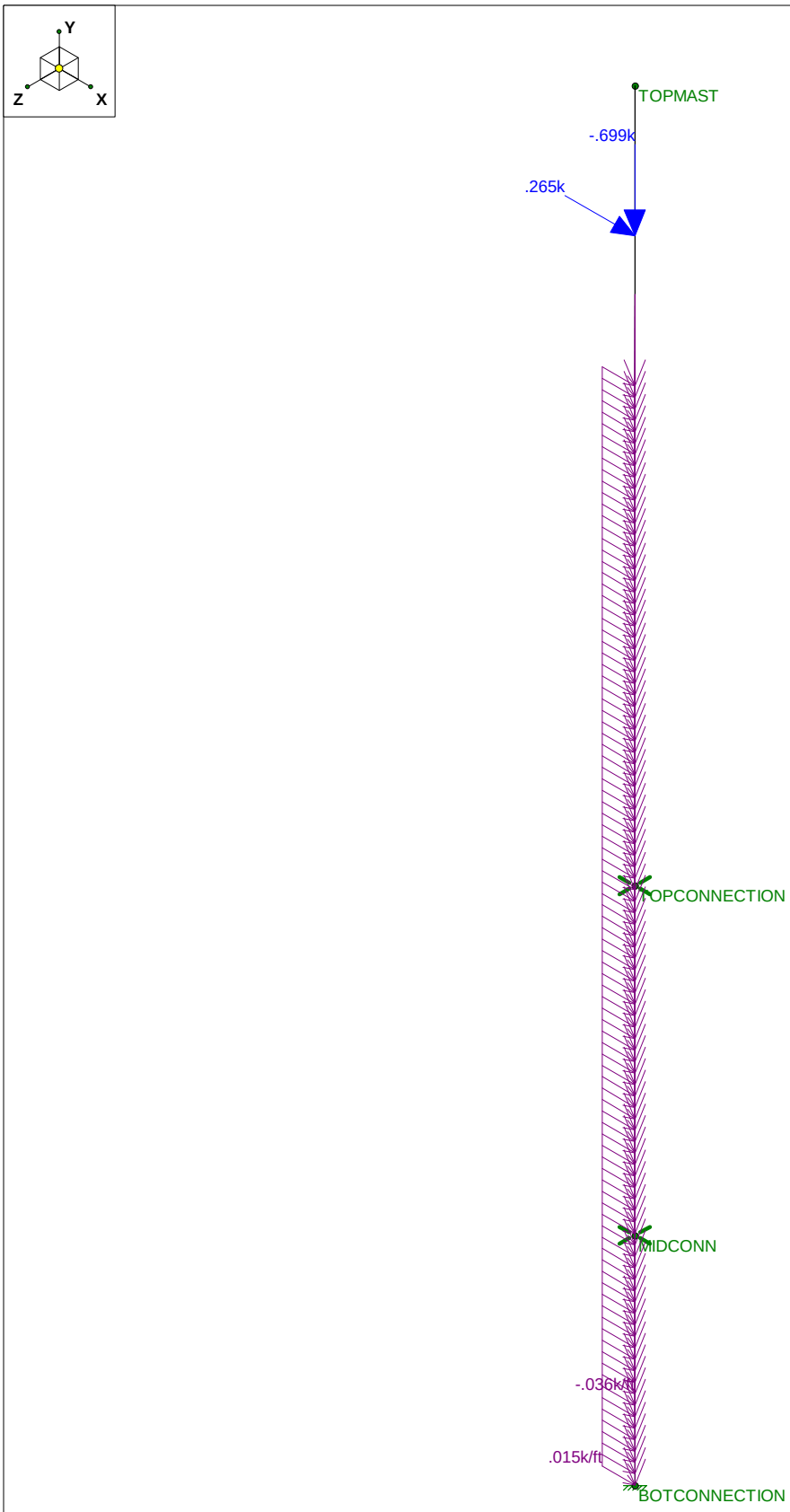
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
5	MIDCONN	max	4.849	2	0	1	0	1	0	1	0	1	0	1
6		min	1.032	1	0	1	0	1	0	1	0	1	0	1
7	Totals:	max	-.595	1	2.613	1	0	1						
8		min	-2.406	2	1.215	2	0	1						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	TOPCONNECTION	-1.237	0	0	0	0	0
2	1	BOTCONNECTION	-.391	2.613	0	0	0	.579
3	1	MIDCONN	1.032	0	0	0	0	0
4	1	Totals:	-.595	2.613	0			
5	1	COG (ft):	X: 0	Y: 16.033	Z: 0			

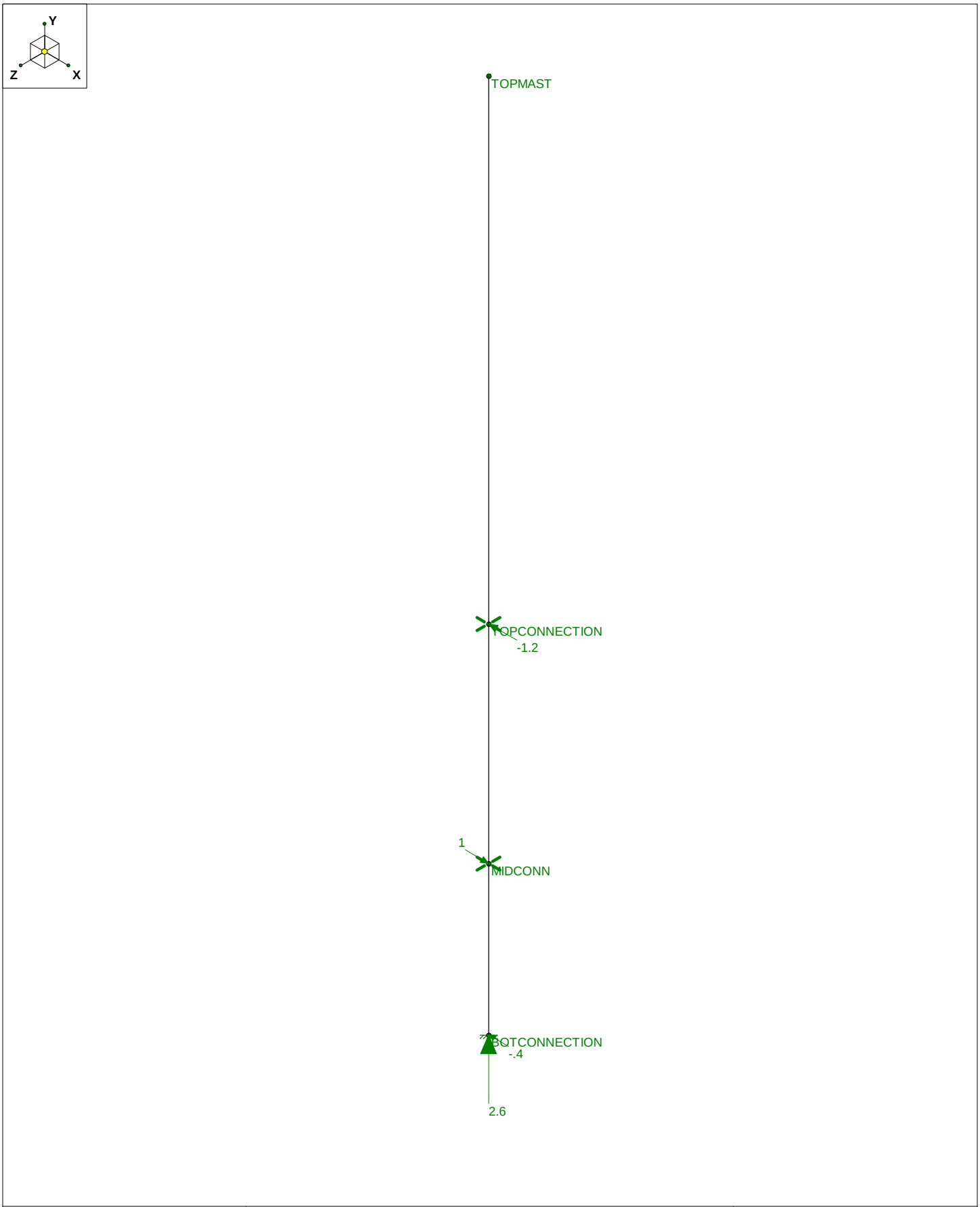
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	TOPCONNECTION	-5.508	0	0	0	0	0
2	2	BOTCONNECTION	-1.747	1.215	0	0	0	2.619
3	2	MIDCONN	4.849	0	0	0	0	0
4	2	Totals:	-2.406	1.215	0			
5	2	COG (ft):	X: 0	Y: 16.707	Z: 0			

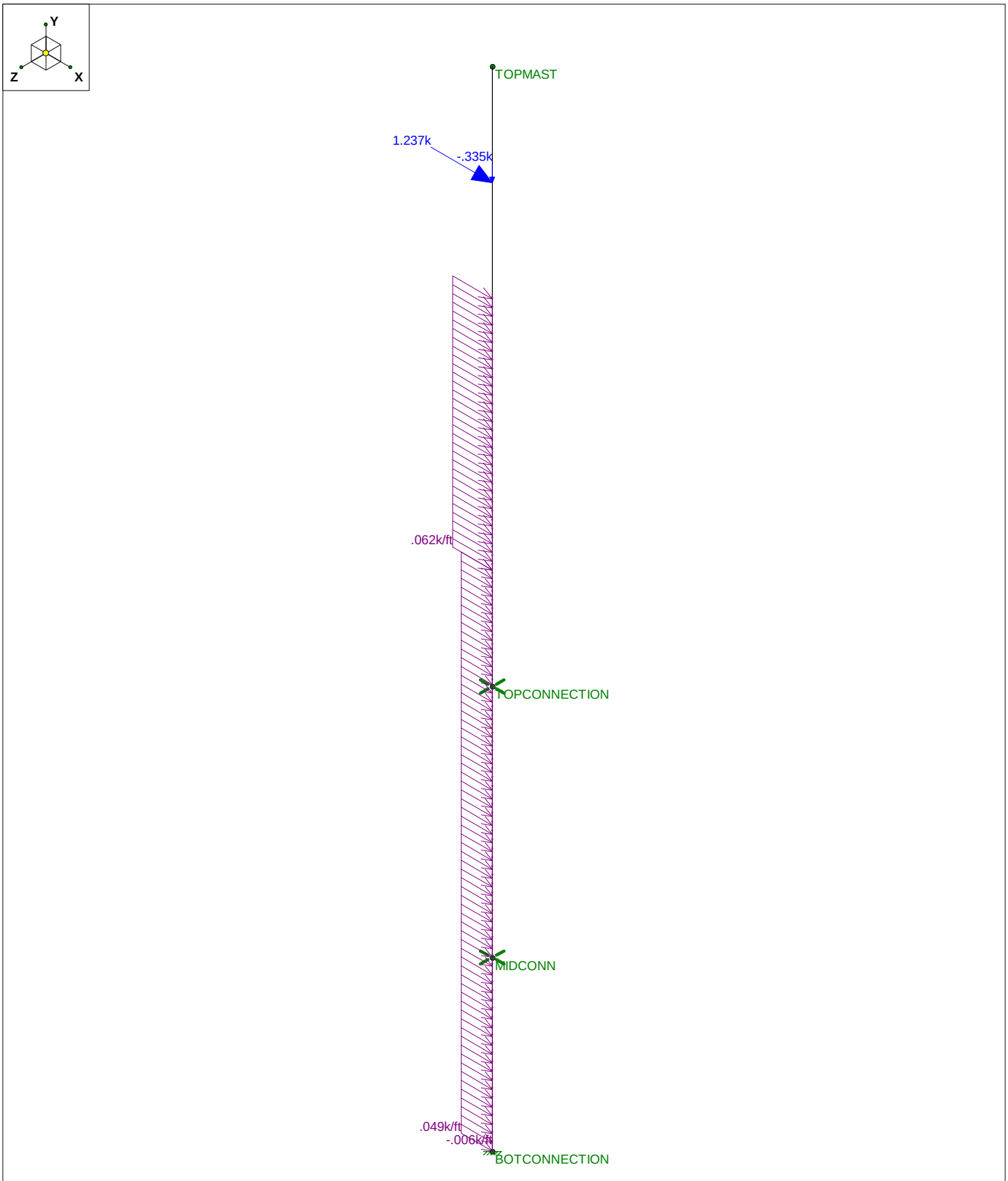


Loads: LC 1, NESC Heavy Wind on Antenna Structure

CENTEK Engineering		
tjl, cfc	Struct # 4955	May 26, 2015 at 9:20 AM
15019.005 - CT11026C	LC #1 Loads	NESC.r3d

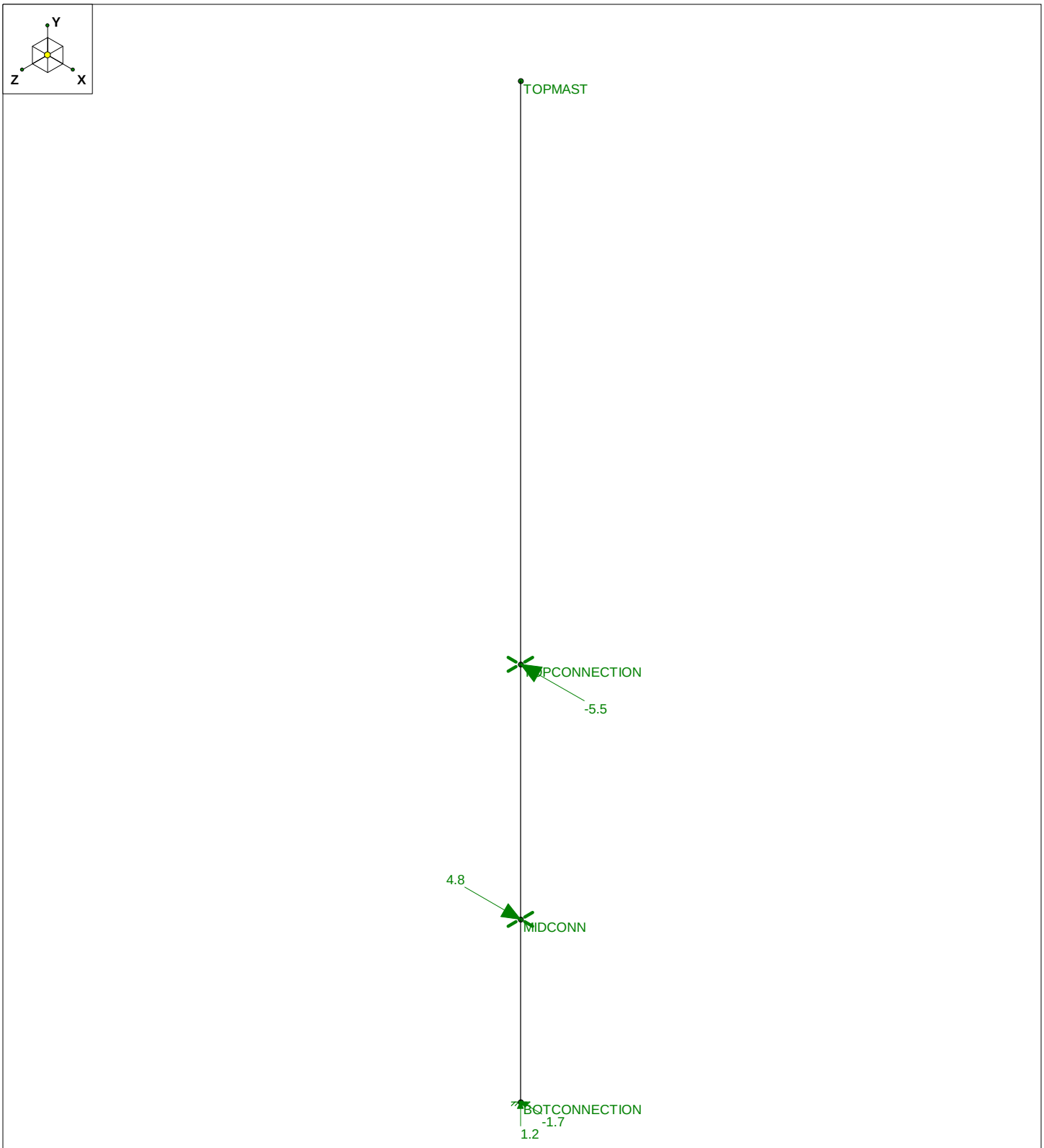


CENTEK Engineering		
tjl, cfc	Struct # 4955	May 26, 2015 at 9:21 AM
15019.005 - CT11026C	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on Antenna Structure

CENTEK Engineering		
tjl, cfc	Struct # 4955	May 26, 2015 at 9:20 AM
15019.005 - CT11026C	LC #2 Loads	NESC.r3d



CENTEK Engineering		
tjl, cfc	Struct # 4955	May 26, 2015 at 9:22 AM
15019.005 - CT11026C	LC #2 Reactions	NESC.r3d

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

Subject:	Coax Cable on Struct #4955
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L Checked by: C.F.C. Job No. 15019.005

Coax Cable on CL&P Pole

Distance Between Coax Cable Attach Points =

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

Diameter of Coax Cable = $D_{coax} := 1.11 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.54 \cdot plf$ *(User Input)*

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

Number of Projected Coax Cables = $NP_{coax} := 2$ *(User Input)*

Extreme Wind Pressure = $qz := 40.9 \cdot psf$ *(User Input)*

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

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

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

Shape Factor = $Cd_{coax} := 1.45$ *(User Input)*

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

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

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

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

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 2.22 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 3.22 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 0.018\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 11.802 \cdot plf$

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 =

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

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 274 \\ 274 \\ 274 \\ 274 \\ 274 \\ 274 \\ 274 \\ 274 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 39 \\ 39 \\ 39 \\ 39 \\ 39 \\ 39 \\ 39 \\ 39 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

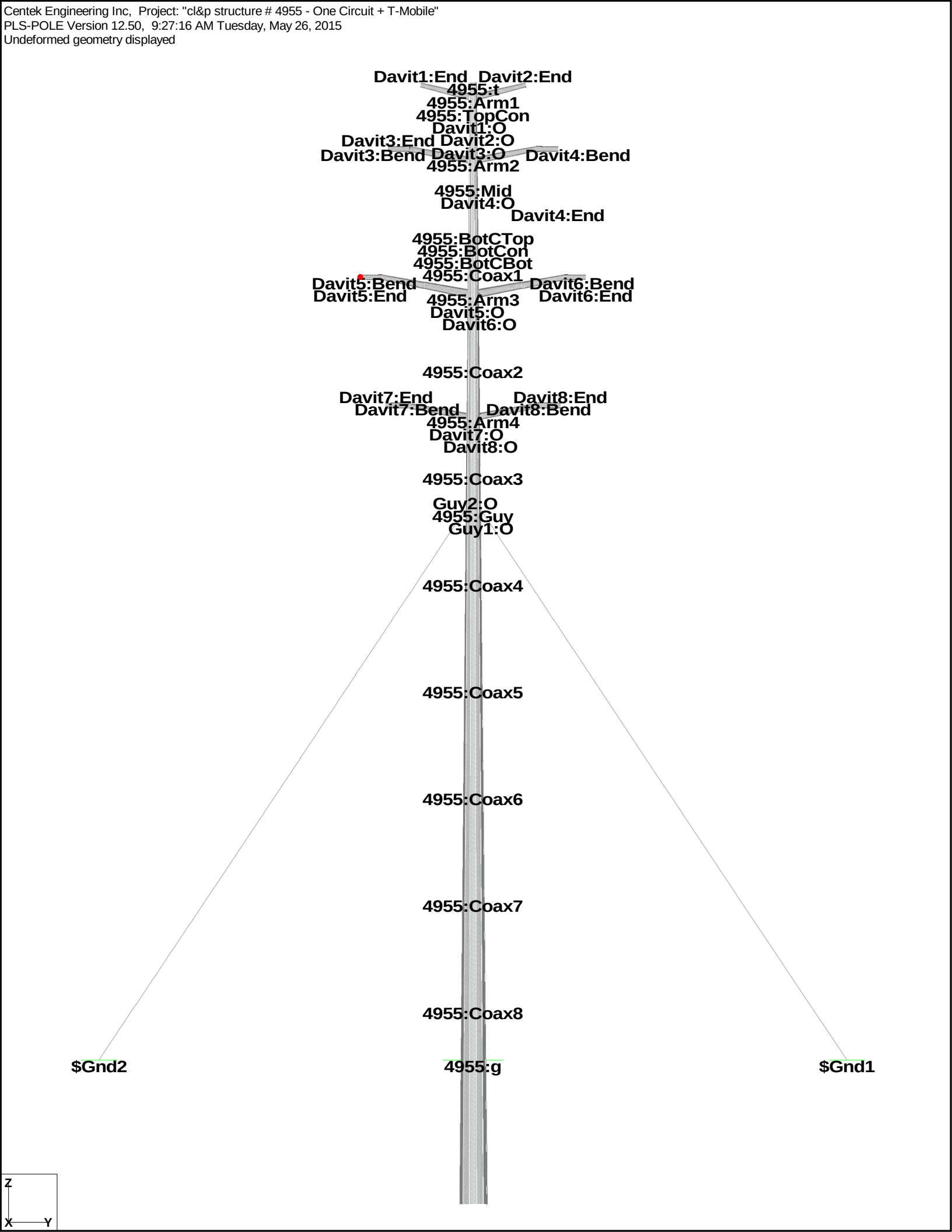
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

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

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 65 \\ 65 \\ 65 \\ 65 \\ 65 \\ 65 \\ 65 \\ 65 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 110 \\ 110 \\ 110 \\ 110 \\ 110 \\ 110 \\ 110 \\ 110 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "cl&p structure # 4955 - One Circuit + T-Mobile"
PLS-POLE Version 12.50, 9:27:16 AM Tuesday, May 26, 2015
Undeformed geometry displayed



Project Name : 15019.005 - North Branford, CT
Project Notes: Str # 4955/ T-Mobile - CT11026C
Project File : J:\Jobs\1501900.WI\005 - CT11026A\04_Structural\Backup Documentation\Rev (1)\Calcs\PLS-Pole\cl&p structure # 4955 - One Circuit + T-Mobile.pol
Date run : 9:26:22 AM Tuesday, May 26, 2015
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1501900.wi\005 - ct11026a\04_structural\backup documentation\rev (1)\calcs\pls-pole\cl&p #4955 - one circuit + t-mobile.lca

*** Analysis Results:

Maximum element usage is 98.20% for Steel Pole "4955" in load case "NESC Extreme - One Circuit"
Maximum insulator usage is 6.88% for Clamp "Clamp17" in load case "NESC Extreme - One Circuit"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy - One Circuit	4955:g	-0.05	3.19	-33.19	3.19	-31.05	-2.19	31.13	0.01	0.00
NESC Heavy - One Circuit	$Gnd1	-0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
NESC Heavy - One Circuit	$Gnd2	-0.00	-8.98	13.37	8.98	0.00	0.00	0.00	0.00	0.00
NESC Extreme - One Circuit	4955:g	-0.02	2.92	-35.13	2.92	15.95	-0.66	15.96	0.00	0.00
NESC Extreme - One Circuit	$Gnd1	-0.00	0.11	0.24	0.11	0.00	0.00	0.00	0.00	0.00
NESC Extreme - One Circuit	$Gnd2	-0.00	-16.76	24.74	16.76	0.00	0.00	0.00	0.00	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive deflection

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy - One Circuit	4955:t	0.20	30.86	-1.00	30.88	0.02	-4.96	0.00
NESC Extreme - One Circuit	4955:t	0.06	51.56	-2.54	51.63	0.01	-7.94	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
4955	1	532	NESC Extreme - One Circuit	87.33	135.22
4955	2	895	NESC Extreme - One Circuit	98.20	285.58
4955	3	1336	NESC Extreme - One Circuit	62.92	231.06
4955	4	1765	NESC Extreme - One Circuit	20.88	116.61
4955	5	1458	NESC Heavy - One Circuit	5.26	31.13

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %		Load Case Number	Segment Weight (lbs)
4955	98.20	NESC Extreme - One Circuit	15	5986.6

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %		Load Case Number	Segment Weight (lbs)
Davit1	0.49	NESC Heavy - One Circuit	1	56.9
Davit2	9.12	NESC Heavy - One Circuit	1	56.9
Davit3	1.30	NESC Heavy - One Circuit	1	93.3
Davit4	42.68	NESC Heavy - One Circuit	1	93.3
Davit5	1.57	NESC Heavy - One Circuit	1	146.0
Davit6	34.83	NESC Heavy - One Circuit	1	146.0
Davit7	1.32	NESC Heavy - One Circuit	1	93.3
Davit8	43.26	NESC Heavy - One Circuit	1	93.3

Summary of Guy Usages:

Guy Label	Maximum Usage %		Load Case Weight (lbs)	Unstressed Length (ft)
Guy1	0.70	NESC Extreme - One Circuit	44.1	61.81
Guy2	69.18	NESC Extreme - One Circuit	44.1	61.81

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy - One Circuit	62.65	4955	Steel Pole
NESC Extreme - One Circuit	98.20	4955	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy - One Circuit	62.65	4955	15
NESC Extreme - One Circuit	98.20	4955	15

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy - One Circuit	43.26	Davit8	1
NESC Extreme - One Circuit	20.48	Davit8	1

Summary of Guy Usages by Load Case:

Load Case	Maximum	Guy

	Usage %	Label
NESC Heavy - One Circuit	37.33	Guy2
NESC Extreme - One Circuit	69.18	Guy2

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp2	Clamp	1.01	NESC Heavy - One Circuit	0.0
Clamp3	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp4	Clamp	2.68	NESC Heavy - One Circuit	0.0
Clamp5	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp6	Clamp	2.68	NESC Heavy - One Circuit	0.0
Clamp7	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp8	Clamp	2.68	NESC Heavy - One Circuit	0.0
Clamp9	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp10	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp11	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp12	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp13	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp14	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp15	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp16	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp17	Clamp	6.88	NESC Extreme - One Circuit	0.0
Clamp18	Clamp	3.30	NESC Heavy - One Circuit	0.0
Clamp19	Clamp	3.27	NESC Extreme - One Circuit	0.0
Clamp20	Clamp	3.27	NESC Extreme - One Circuit	0.0
Clamp21	Clamp	6.06	NESC Extreme - One Circuit	0.0

*** Weight of structure (lbs):

Weight of Guys:	88.3
Weight of Tubular Davit Arms:	778.9
Weight of Steel Poles:	5986.6
Total:	6853.8

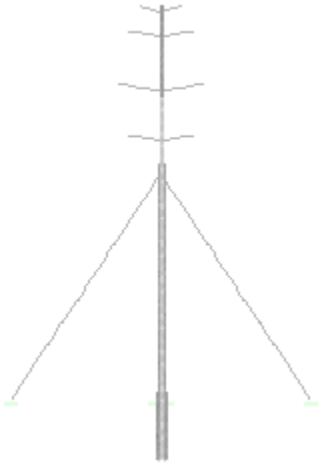
*** End of Report

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

Project Name : 15019.005 - North Branford, CT
Project Notes: Str # 4955/ T-Mobile - CT11026C
Project File : J:\Jobs\1501900.WI\005 - CT11026A\04_Structural\Backup Documentation\Rev (1)\Calcs\PLS-Pole\cl&p structure # 4955 - One Circuit + T-
Mobile.pol
Date run     : 9:26:22 AM Tuesday, May 26, 2015
by           : PLS-POLE Version 12.50
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.
```



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


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

Steel Pole Properties:

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

Property Label	Number	Embedded Length (ft)	Plate Length (ft)	Diameter (in)	Diameter (in)	Drag Coef. (in/ft)	Elasticity Override (ksi)	Density Override (lbs/ft^3)	At Base	Check Type	From Tip (ft)	Trans. Load (kips)	Long. Load (kips)
4955	4955	105.00	13.5	No	12F	9	31.19	0	1.3	5 tubes	0	0	Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

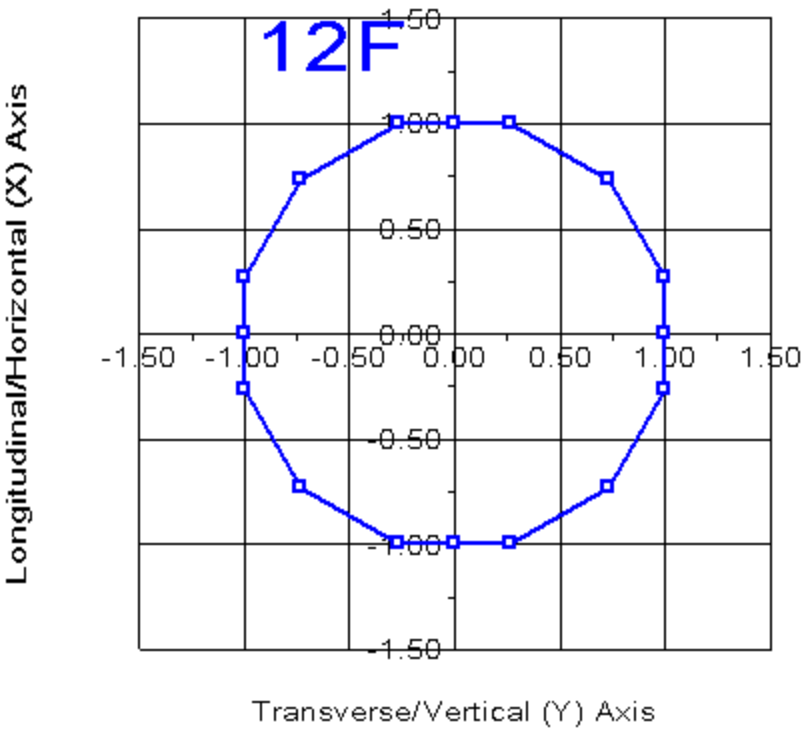
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
4955	1	23	0.1875	0.000	0.000	0.000	65.000	0.000	532	12.34	0.21488	9.00	13.94	1.696	0.000
4955	2	23	0.21875	0.000	0.000	0.000	65.000	0.000	895	12.08	0.21488	14.00	18.95	2.314	0.000
4955	3	23	0.25	3.250	0.000	0.000	65.000	0.000	1336	11.95	0.21488	19.01	23.95	2.931	3.250
4955	4	23	0.28125	0.000	0.000	0.000	65.000	0.000	1765	11.88	0.21488	22.75	27.70	3.392	0.000
4955	5	16.25	0.28125	0.000	0.000	0.000	65.000	0.000	1458	8.29	0.21488	27.70	31.19	0.000	0.000

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)
4955			0	0	0	0	0	4955	18 labels		0.00	0

Relative Attachment Labels for Steel Pole "4955":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
4955:Arm1	1.29	0.00
4955:Arm2	7.21	0.00
4955:Arm3	19.71	0.00
4955:Arm4	31.21	0.00
4955:Guy	40.00	0.00
4955:Coax1	0.00	75.00
4955:Coax2	0.00	65.00
4955:Coax3	0.00	55.00
4955:Coax4	0.00	45.00
4955:Coax5	0.00	35.00
4955:Coax6	0.00	25.00
4955:Coax7	0.00	15.00
4955:Coax8	0.00	5.00
4955:TopCon	0.00	89.00
4955:BotCon	0.00	77.00
4955:BotCTop	0.00	77.50
4955:BotCBot	0.00	76.50
4955:Mid	0.00	82.00



Pole Steel Properties:

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
4955	4955:t	4955:t Ori	0.00	9.00	5.31	52.83	52.83	0.00	10.2	65.00	65.00	63.59	63.59
4955	4955:Arm1	4955:Arm1 End	1.29	9.28	5.48	57.98	57.98	0.00	10.6	65.00	65.00	67.71	67.71
4955	4955:Arm1	4955:Arm1 Ori	1.29	9.28	5.48	57.98	57.98	0.00	10.6	65.00	65.00	67.71	67.71
4955	4955:TopCon	4955:TopCon End	2.50	9.54	5.64	63.09	63.09	0.00	10.9	65.00	65.00	71.67	71.67
4955	4955:TopCon	4955:TopCon Ori	2.50	9.54	5.64	63.09	63.09	0.00	10.9	65.00	65.00	71.67	71.67
4955	4955:Arm2	4955:Arm2 End	7.21	10.55	6.25	85.86	85.86	0.00	12.4	65.00	65.00	88.18	88.18
4955	4955:Arm2	4955:Arm2 Ori	7.21	10.55	6.25	85.86	85.86	0.00	12.4	65.00	65.00	88.18	88.18
4955	4955:Mid	4955:Mid End	9.50	11.04	6.54	98.70	98.70	0.00	13.1	65.00	65.00	96.84	96.84
4955	4955:Mid	4955:Mid Ori	9.50	11.04	6.54	98.70	98.70	0.00	13.1	65.00	65.00	96.84	96.84
4955	4955:BotCTop	4955:BotCTop End	14.00	12.01	7.13	127.49	127.49	0.00	14.5	65.00	65.00	115.01	115.01
4955	4955:BotCTop	4955:BotCTop Ori	14.00	12.01	7.13	127.49	127.49	0.00	14.5	65.00	65.00	115.01	115.01
4955	4955:BotCon	4955:BotCon End	14.50	12.12	7.19	130.99	130.99	0.00	14.6	65.00	65.00	117.13	117.13
4955	4955:BotCon	4955:BotCon Ori	14.50	12.12	7.19	130.99	130.99	0.00	14.6	65.00	65.00	117.13	117.13
4955	4955:BotCBot	4955:BotCBot End	15.00	12.22	7.26	134.57	134.57	0.00	14.8	65.00	65.00	119.26	119.26
4955	4955:BotCBot	4955:BotCBot Ori	15.00	12.22	7.26	134.57	134.57	0.00	14.8	65.00	65.00	119.26	119.26

4955	4955:Coax1	4955:Coax1 End	16.50	12.55	7.45	145.67	145.67	0.00	15.2	65.00	65.00	125.79	125.79
4955	4955:Coax1	4955:Coax1 Ori	16.50	12.55	7.45	145.67	145.67	0.00	15.2	65.00	65.00	125.79	125.79
4955	4955:Arm3	4955:Arm3 End	19.71	13.23	7.87	171.43	171.43	0.00	16.2	65.00	65.00	140.32	140.32
4955	4955:Arm3	4955:Arm3 Ori	19.71	13.23	7.87	171.43	171.43	0.00	16.2	65.00	65.00	140.32	140.32
4955	#4955:0	SpliceT End	23.00	13.94	8.29	200.84	200.84	0.00	17.2	65.00	65.00	156.06	156.06
4955	#4955:0	SpliceT Ori	23.00	14.00	9.70	235.93	235.93	0.00	14.5	65.00	65.00	182.50	182.50
4955	4955:Coax2	4955:Coax2 End	26.50	14.76	10.23	276.68	276.68	0.00	15.4	65.00	65.00	203.12	203.12
4955	4955:Coax2	4955:Coax2 Ori	26.50	14.76	10.23	276.68	276.68	0.00	15.4	65.00	65.00	203.12	203.12
4955	4955:Arm4	4955:Arm4 End	31.21	15.77	10.94	338.55	338.55	0.00	16.6	65.00	65.00	232.59	232.59
4955	4955:Arm4	4955:Arm4 Ori	31.21	15.77	10.94	338.55	338.55	0.00	16.6	65.00	65.00	232.59	232.59
4955	#4955:1	Tube 2 End	33.85	16.34	11.34	377.05	377.05	0.00	17.3	65.00	65.00	250.03	250.03
4955	#4955:1	Tube 2 Ori	33.85	16.34	11.34	377.05	377.05	0.00	17.3	65.00	65.00	250.03	250.03
4955	4955:Coax3	4955:Coax3 End	36.50	16.91	11.74	418.37	418.37	0.00	18.0	65.00	65.00	268.10	268.10
4955	4955:Coax3	4955:Coax3 Ori	36.50	16.91	11.74	418.37	418.37	0.00	18.0	65.00	65.00	268.10	268.10
4955	4955:Guy	4955:Guy End	40.00	17.66	12.27	477.52	477.52	0.00	18.9	65.00	65.00	292.97	292.97
4955	4955:Guy	4955:Guy Ori	40.00	17.66	12.27	477.52	477.52	0.00	18.9	65.00	65.00	292.97	292.97
4955	#4955:2	Tube 2 End	43.00	18.30	12.72	532.45	532.45	0.00	19.7	65.00	65.00	315.16	315.16
4955	#4955:2	Tube 2 Ori	43.00	18.30	12.72	532.45	532.45	0.00	19.7	65.00	65.00	315.16	315.16
4955	#4955:3	SpliceT End	46.00	18.95	13.17	591.44	591.44	0.00	20.5	65.00	65.00	338.17	338.17
4955	#4955:3	SpliceT Ori	46.00	19.01	15.08	679.35	679.35	0.00	17.7	65.00	65.00	387.16	387.16
4955	4955:Coax4	4955:Coax4 End	46.50	19.12	15.17	691.09	691.09	0.00	17.8	65.00	65.00	391.63	391.63
4955	4955:Coax4	4955:Coax4 Ori	46.50	19.12	15.17	691.09	691.09	0.00	17.8	65.00	65.00	391.63	391.63
4955	#4955:4	Tube 3 End	51.50	20.19	16.03	815.99	815.99	0.00	19.0	65.00	65.00	437.81	437.81
4955	#4955:4	Tube 3 Ori	51.50	20.19	16.03	815.99	815.99	0.00	19.0	65.00	65.00	437.81	437.81
4955	4955:Coax5	4955:Coax5 End	56.50	21.27	16.89	955.10	955.10	0.00	20.1	65.00	65.00	486.55	486.55
4955	4955:Coax5	4955:Coax5 Ori	56.50	21.27	16.89	955.10	955.10	0.00	20.1	65.00	65.00	486.55	486.55
4955	#4955:5	Tube 3 End	61.12	22.26	17.69	1097.10	1097.10	0.00	21.2	65.00	65.00	533.94	533.94
4955	#4955:5	Tube 3 Ori	61.12	22.26	17.69	1097.10	1097.10	0.00	21.2	65.00	65.00	533.94	533.94
4955	#4955:6	SpliceT End	65.75	23.25	18.49	1252.51	1252.51	0.00	22.2	65.00	65.00	583.52	583.52
4955	#4955:6	SpliceT Ori	65.75	23.25	18.49	1252.51	1252.51	0.00	22.2	65.00	65.00	583.52	583.52
4955	4955:Coax6	4955:Coax6 End	66.50	22.91	20.47	1342.20	1342.20	0.00	19.2	65.00	65.00	634.55	634.55
4955	4955:Coax6	4955:Coax6 Ori	66.50	22.91	20.47	1342.20	1342.20	0.00	19.2	65.00	65.00	634.55	634.55
4955	#4955:7	SpliceB End	69.00	23.45	20.95	1440.05	1440.05	0.00	19.7	65.00	65.00	665.22	665.22
4955	#4955:7	SpliceB Ori	69.00	23.45	20.95	1440.05	1440.05	0.00	19.7	65.00	65.00	665.22	665.22
4955	#4955:8	Tube 4 End	72.75	24.26	21.68	1595.56	1595.56	0.00	20.4	65.00	65.00	712.57	712.57
4955	#4955:8	Tube 4 Ori	72.75	24.26	21.68	1595.56	1595.56	0.00	20.4	65.00	65.00	712.57	712.57
4955	4955:Coax7	4955:Coax7 End	76.50	25.06	22.41	1761.89	1761.89	0.00	21.2	65.00	65.00	761.55	761.55
4955	4955:Coax7	4955:Coax7 Ori	76.50	25.06	22.41	1761.89	1761.89	0.00	21.2	65.00	65.00	761.55	761.55
4955	#4955:9	Tube 4 End	81.50	26.14	23.38	2001.10	2001.10	0.00	22.2	65.00	65.00	829.40	829.40
4955	#4955:9	Tube 4 Ori	81.50	26.14	23.38	2001.10	2001.10	0.00	22.2	65.00	65.00	829.40	829.40
4955	4955:Coax8	4955:Coax8 End	86.50	27.21	24.35	2261.04	2261.04	0.00	23.2	65.00	65.00	900.13	900.13
4955	4955:Coax8	4955:Coax8 Ori	86.50	27.21	24.35	2261.04	2261.04	0.00	23.2	65.00	65.00	900.13	900.13
4955	#4955:10	SpliceT End	88.75	27.70	24.79	2385.01	2385.01	0.00	23.7	65.00	65.00	932.91	932.91
4955	#4955:10	SpliceT Ori	88.75	27.70	24.79	2385.01	2385.01	0.00	23.7	65.00	65.00	932.91	932.91
4955	4955:g	4955:g End	91.50	28.29	25.33	2542.57	2542.57	0.00	24.3	65.00	65.00	973.76	973.76

Cable Properties:

Label	Stock Number	Area (in^2)	Modulus of Elasticity (psi)	Diameter (in)	Unit Weight (lbs/ft)	Drag Coef.	Thermal Expansion Coeff. (/deg F)	Ultimate Tension (kips)	Allowable % of Ultimate
19 No.8 Alumoweld	19 No.8 Alumoweld	0.2464	2.3e+007	0.642	0.714	1.3	0	43.24	100

Guy Connectivity:

Guy	Attach	Property	Anchor	Anchor	Anchor	Anchor	Anchor	Azimuth	Slope	Reference	Installed	Design Ultimate

Label	Label	Set	Type	X or Offset (ft)	Y (ft)	Z (ft)	Lead Length (ft)	(deg)	(deg)	Anchor	Tension At Top (% of Ult.)	Tension Capacity (kips)	Tension Capacity (kips)
Guy1	4955:Guy 19 No.8 Alumoweld		XYZ	0.00	35.00	0.00	34.26	0	56.36		10	43.24	43.24
Guy2	4955:Guy 19 No.8 Alumoweld		XYZ	0.00	-35.00	0.00	34.26	180	56.36		10	43.24	43.24

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Steel Weight Density (lbs/ft^3)	Shape Override At End
AMAD		8T	0.1875	7	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
AMAE		8T	0.1875	7	5	0	1.3	29000	2 points	Calculated	0	0	0	0	65	0	
AMAF		8T	0.1875	9	5	0	1.3	29000	2 points	Calculated	0	0	0	0	65	0	

Intermediate Joints for Davit Property "AMAD":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	4.5	-1.0833

Intermediate Joints for Davit Property "AMAE":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
Bend	5.5	-1
End	7.5	-1

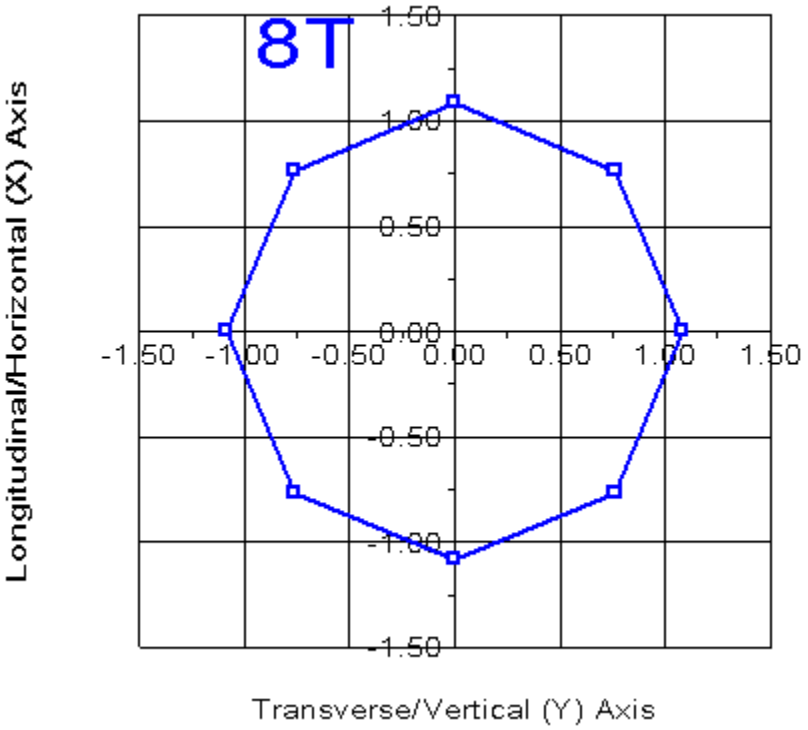
Intermediate Joints for Davit Property "AMAF":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
Bend	8	-1.5
End	10	-1.5

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	4955:Arm1	AMAD	180
Davit2	4955:Arm1	AMAD	0
Davit3	4955:Arm2	AMAE	180
Davit4	4955:Arm2	AMAE	0

Davit5	4955:Arm3	AMAF	180
Davit6	4955:Arm3	AMAF	0
Davit7	4955:Arm4	AMAE	180
Davit8	4955:Arm4	AMAE	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	Fy Max. (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Davit1	Davit1:O	Origin	0.00	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit1	Davit1:End	End	4.63	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35
Davit2	Davit2:O	Origin	0.00	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit2	Davit2:End	End	4.63	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35
Davit3	Davit3:O	Origin	0.00	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit3	#Davit3:0	End	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit3	#Davit3:0	Origin	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit3	Davit3:Bend	End	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit3	Davit3:Bend	Origin	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit3	Davit3:End	End	7.59	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35

Davit4	Davit4:O	Origin	0.00	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit4	#Davit4:0	End	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit4	#Davit4:0	Origin	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit4	Davit4:Bend	End	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit4	Davit4:Bend	Origin	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit4	Davit4:End	End	7.59	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35
Davit5	Davit5:O	Origin	0.00	9.00	5.48	56.22	56.22	0.00	15.7	65.00	65.00	62.52	62.52
Davit5	#Davit5:0	End	4.07	7.39	4.48	30.76	30.76	0.00	12.2	65.00	65.00	41.63	41.63
Davit5	#Davit5:0	Origin	4.07	7.39	4.48	30.76	30.76	0.00	12.2	65.00	65.00	41.63	41.63
Davit5	Davit5:Bend	End	8.14	5.79	3.48	14.45	14.45	0.00	8.6	65.00	65.00	24.98	24.98
Davit5	Davit5:Bend	Origin	8.14	5.79	3.48	14.45	14.45	0.00	8.6	65.00	65.00	24.98	24.98
Davit5	Davit5:End	End	10.14	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35
Davit6	Davit6:O	Origin	0.00	9.00	5.48	56.22	56.22	0.00	15.7	65.00	65.00	62.52	62.52
Davit6	#Davit6:0	End	4.07	7.39	4.48	30.76	30.76	0.00	12.2	65.00	65.00	41.63	41.63
Davit6	#Davit6:0	Origin	4.07	7.39	4.48	30.76	30.76	0.00	12.2	65.00	65.00	41.63	41.63
Davit6	Davit6:Bend	End	8.14	5.79	3.48	14.45	14.45	0.00	8.6	65.00	65.00	24.98	24.98
Davit6	Davit6:Bend	Origin	8.14	5.79	3.48	14.45	14.45	0.00	8.6	65.00	65.00	24.98	24.98
Davit6	Davit6:End	End	10.14	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35
Davit7	Davit7:O	Origin	0.00	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit7	#Davit7:0	End	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit7	#Davit7:0	Origin	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit7	Davit7:Bend	End	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit7	Davit7:Bend	Origin	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit7	Davit7:End	End	7.59	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35
Davit8	Davit8:O	Origin	0.00	7.00	4.23	25.98	25.98	0.00	11.3	65.00	65.00	37.15	37.15
Davit8	#Davit8:0	End	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit8	#Davit8:0	Origin	2.80	6.26	3.78	18.43	18.43	0.00	9.7	65.00	65.00	29.46	29.46
Davit8	Davit8:Bend	End	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit8	Davit8:Bend	Origin	5.59	5.53	3.32	12.51	12.51	0.00	8.1	65.00	65.00	22.66	22.66
Davit8	Davit8:End	End	7.59	5.00	2.99	9.16	9.16	0.00	6.9	65.00	65.00	18.35	18.35

*** Insulator Data

Clamp Properties:

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

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp1	Davit1:End	clamp	No Limit
Clamp2	Davit2:End	clamp	No Limit
Clamp3	Davit3:End	clamp	No Limit
Clamp4	Davit4:End	clamp	No Limit
Clamp5	Davit5:End	clamp	No Limit
Clamp6	Davit6:End	clamp	No Limit
Clamp7	Davit7:End	clamp	No Limit

Clamp8	Davit8:End	clamp	No Limit
Clamp9	4955:Coax1	clamp	No Limit
Clamp10	4955:Coax2	clamp	No Limit
Clamp11	4955:Coax3	clamp	No Limit
Clamp12	4955:Coax4	clamp	No Limit
Clamp13	4955:Coax5	clamp	No Limit
Clamp14	4955:Coax6	clamp	No Limit
Clamp15	4955:Coax7	clamp	No Limit
Clamp16	4955:Coax8	clamp	No Limit
Clamp17	4955:TopCon	clamp	No Limit
Clamp18	4955:BotCon	clamp	No Limit
Clamp19	4955:BotCTop	clamp	No Limit
Clamp20	4955:BotCBot	clamp	No Limit
Clamp21	4955:Mid	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1501900.wi\005 - ct11026a\04_structural\backup documentation\rev (1)\calcs\pls-pole\cl&p #4955 - one circuit + t-mobile.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) 91.50 (ft)
  Structure height 91.50 (ft)
  Structure height above ground 91.50 (ft)

Vector Load Cases:

Load Case Description	Dead Load	Wind Ice Thick. (in)	Ice Density (lbs/ft^3)	Wind Temperature (deg F)	SF for Steel Poles	SF for Wood Poles	SF for Conc. Poles	SF for Conc. Poles	SF for Guys and Towers	SF for Tubular Arms	SF for Ult. Check	SF For First Zero Crack %	Point Loads Tens. Cables	Wind/Ice Loads Arms	Model
Trans. Longit.	Ice Area (psf)	Ice Pressure (psf)			Deflection Factor	Deflection Factor	Tubular Poles	Arms	Poles and Towers	Tubular Poles	Ult. Check	First Zero Crack %	and Tubular Cables		
											Limit				
											or (ft)				
NESC Heavy - One Circuit	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	Wind on All	
4 0	0.000	0.000	0.0	No Limit	0										
NESC Extreme - One Circuit	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	21 loads	NESC 2012	
36.9 0	0.000	0.000	0.0	No Limit	0										

Point Loads for Load Case "NESC Heavy - One Circuit":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	0	0	0	Shield Wire
Davit2:End	604	536	0	Shield Wire
Davit3:End	0	0	0	Conductor
Davit4:End	1989	798	0	Conductor
Davit5:End	0	0	0	Conductor
Davit6:End	1989	798	0	Conductor
Davit7:End	0	0	0	Conductor
Davit8:End	1989	798	0	Conductor
4955:Coax1	274	43	0	Coax Cables
4955:Coax2	274	43	0	Coax Cables
4955:Coax3	274	43	0	Coax Cables
4955:Coax4	274	43	0	Coax Cables
4955:Coax5	274	43	0	Coax Cables
4955:Coax6	274	43	0	Coax Cables
4955:Coax7	274	43	0	Coax Cables
4955:Coax8	274	43	0	Coax Cables

4955:TopCon	0	1237	0	Top Connection
4955:BotCon	2613	391	0	Bottom Connection
4955:BotCTop	0	579	0	Bottom Connection
4955:BotCBot	0	-579	0	Bottom Connection
4955:Mid	0	-1032	0	Mid Connection

Point Loads for Load Case "NESC Extreme - One Circuit":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	0	0	0	Shield Wire
Davit2:End	130	536	0	Shield Wire
Davit3:End	0	0	0	Conductor
Davit4:End	844	1479	0	Conductor
Davit5:End	0	0	0	Conductor
Davit6:End	844	1479	0	Conductor
Davit7:End	0	0	0	Conductor
Davit8:End	844	1479	0	Conductor
4955:Coax1	65	110	0	Coax Cables
4955:Coax2	65	110	0	Coax Cables
4955:Coax3	65	110	0	Coax Cables
4955:Coax4	65	110	0	Coax Cables
4955:Coax5	65	110	0	Coax Cables
4955:Coax6	65	110	0	Coax Cables
4955:Coax7	65	110	0	Coax Cables
4955:Coax8	65	110	0	Coax Cables
4955:TopCon	0	5508	0	Top Connection
4955:BotCon	1215	1747	0	Bottom Connection
4955:BotCTop	0	2619	0	Bottom Connection
4955:BotCBot	0	-2619	0	Bottom Connection
4955:Mid	0	-4849	0	Mid Connection

Detailed Pole Loading Data for Load Case "NESC Extreme - One Circuit":

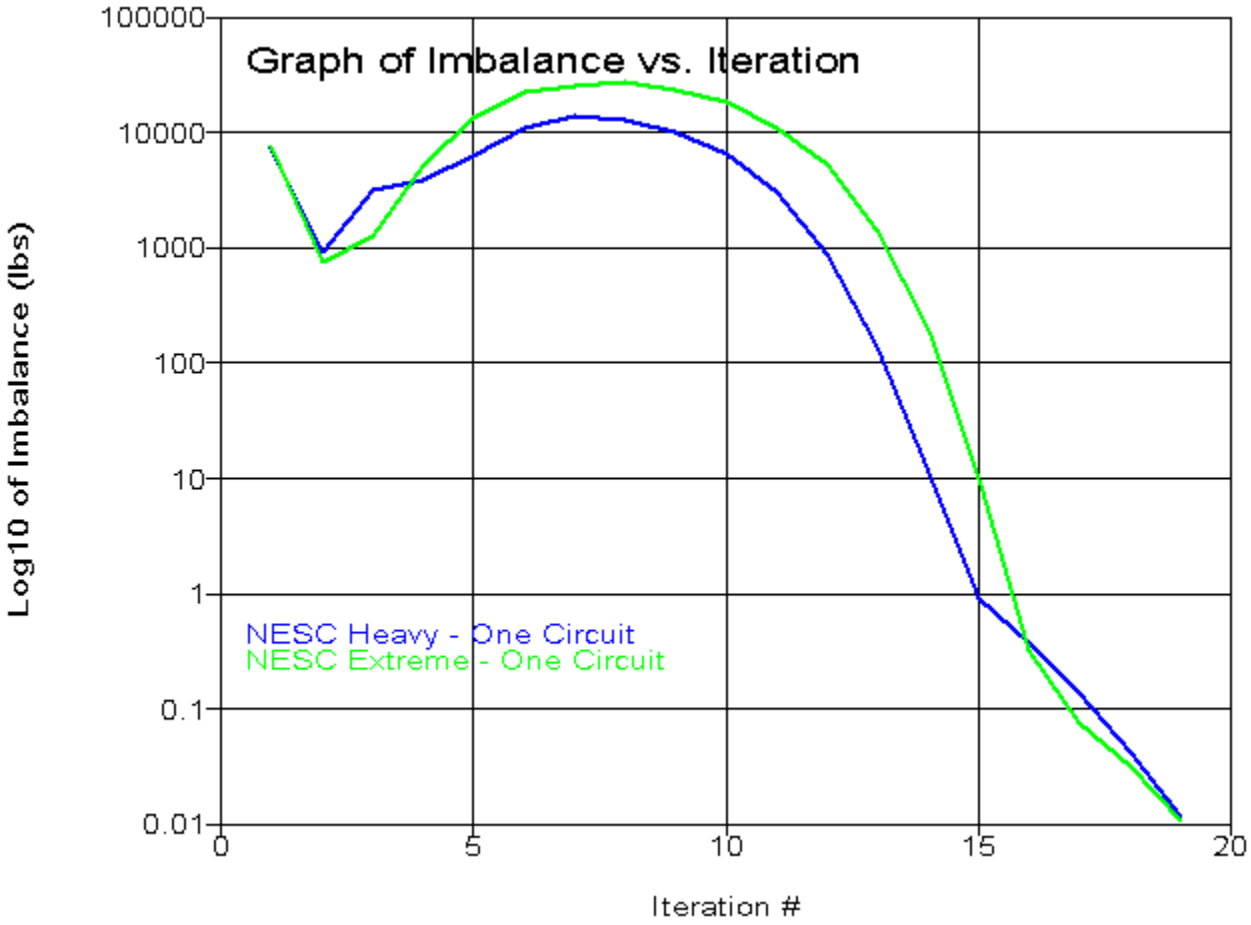
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

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)
4955	4955:t	4955:Arm1	91.50	90.21	90.85	9.139	8.32e+005	1.000	36.95	0.00	23.73	36.36	0.00	0.00	36.36	0.00
4955	4955:Arm1	4955:TopCon	90.21	89.00	89.60	9.407	8.56e+005	1.000	36.95	0.00	22.85	35.00	0.00	0.00	35.00	0.00
4955	4955:TopCon	4955:Arm2	89.00	84.29	86.65	10.043	9.14e+005	1.000	36.95	0.00	95.19	145.62	0.00	0.00	145.62	0.00
4955	4955:Arm2	4955:Mid	84.29	82.00	83.15	10.795	9.82e+005	1.000	36.95	0.00	49.87	76.19	0.00	0.00	76.19	0.00
4955	4955:Mid	4955:BotCTop	82.00	77.50	79.75	11.525	1.05e+006	1.000	36.95	0.00	104.66	159.71	0.00	0.00	159.71	0.00
4955	4955:BotCTop	4955:BotCon	77.50	77.00	77.25	12.062	1.1e+006	1.000	36.95	0.00	12.18	18.57	0.00	0.00	18.57	0.00
4955	4955:BotCon	4955:BotCBot	77.00	76.50	76.75	12.169	1.11e+006	1.000	36.95	0.00	12.29	18.74	0.00	0.00	18.74	0.00
4955	4955:BotCBot	4955:Coax1	76.50	75.00	75.75	12.384	1.13e+006	1.000	36.95	0.00	37.53	57.21	0.00	0.00	57.21	0.00
4955	4955:Coax1	4955:Arm3	75.00	71.79	73.40	12.890	1.17e+006	1.000	36.95	0.00	83.61	127.36	0.00	0.00	127.36	0.00
4955	4955:Arm3		71.79	68.50	70.15	13.589	1.24e+006	1.000	36.95	0.00	90.50	137.75	0.00	0.00	137.75	0.00
4955		4955:Coax2	68.50	65.00	66.75	14.381	1.31e+006	1.000	36.95	0.00	118.63	155.00	0.00	0.00	155.00	0.00
4955	4955:Coax2	4955:Arm4	65.00	60.29	62.65	15.263	1.39e+006	1.000	36.95	0.00	169.53	221.30	0.00	0.00	221.30	0.00
4955	4955:Arm4		60.29	57.65	58.97	16.053	1.46e+006	1.000	36.95	0.00	100.27	130.80	0.00	0.00	130.80	0.00
4955		4955:Coax3	57.65	55.00	56.32	16.621	1.51e+006	1.000	36.95	0.00	103.87	135.43	0.00	0.00	135.43	0.00
4955	4955:Coax3	4955:Guy	55.00	51.50	53.25	17.282	1.57e+006	1.000	36.95	0.00	142.93	186.27	0.00	0.00	186.27	0.00

4955	4955:Guy		51.50	48.50	50.00	17.980	1.64e+006	1.000	36.95	0.00	127.53	166.11	0.00	0.00	166.11	0.00
4955			48.50	45.50	47.00	18.625	1.7e+006	1.000	36.95	0.00	132.16	172.07	0.00	0.00	172.07	0.00
4955		4955:Coax4	45.50	45.00	45.25	19.063	1.73e+006	1.000	36.95	0.00	25.73	29.35	0.00	0.00	29.35	0.00
4955	4955:Coax4		45.00	40.00	42.50	19.654	1.79e+006	1.000	36.95	0.00	265.38	302.63	0.00	0.00	302.63	0.00
4955		4955:Coax5	40.00	35.00	37.50	20.729	1.89e+006	1.000	36.95	0.00	280.08	319.17	0.00	0.00	319.17	0.00
4955	4955:Coax5		35.00	30.38	32.69	21.763	1.98e+006	1.000	36.95	0.00	272.15	309.96	0.00	0.00	309.96	0.00
4955			30.38	25.75	28.06	22.757	2.07e+006	1.000	36.95	0.00	284.73	324.12	0.00	0.00	324.12	0.00
4955		4955:Coax6	25.75	25.00	25.38	23.084	2.1e+006	1.000	36.95	0.00	99.41	53.32	0.00	0.00	53.32	0.00
4955	4955:Coax6		25.00	22.50	23.75	23.183	2.11e+006	1.000	36.95	0.00	336.34	178.48	0.00	0.00	178.48	0.00
4955			22.50	18.75	20.63	23.855	2.17e+006	1.000	36.95	0.00	272.08	275.48	0.00	0.00	275.48	0.00
4955		4955:Coax7	18.75	15.00	16.88	24.660	2.24e+006	1.000	36.95	0.00	281.33	284.79	0.00	0.00	284.79	0.00
4955	4955:Coax7		15.00	10.00	12.50	25.601	2.33e+006	1.000	36.95	0.00	389.57	394.19	0.00	0.00	394.19	0.00
4955		4955:Coax8	10.00	5.00	7.50	26.675	2.43e+006	1.000	36.95	0.00	406.10	410.73	0.00	0.00	410.73	0.00
4955	4955:Coax8		5.00	2.75	3.88	27.454	2.5e+006	1.000	36.95	0.00	188.14	190.23	0.00	0.00	190.23	0.00
4955		4955:g	2.75	0.00	1.38	27.991	2.55e+006	1.000	36.95	0.00	234.49	237.05	0.00	0.00	237.05	0.00

*** Analysis Results:

Maximum element usage is 98.20% for Steel Pole "4955" in load case "NESC Extreme - One Circuit"
Maximum insulator usage is 6.88% for Clamp "Clamp17" in load case "NESC Extreme - One Circuit"



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

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

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)
4955:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
4955:t	0.0168	2.572	-0.08307	-4.9595	0.0177	0.0002	0.0168	2.572	91.42
4955:Arm1	0.01641	2.46	-0.07823	-4.9594	0.0177	0.0002	0.01641	2.46	90.13

4955:TopCon	0.01603	2.356	-0.07372	-4.9381	0.0177	0.0002	0.01603	2.356	88.93	
4955:Arm2	0.01458	1.956	-0.05666	-4.7836	0.0176	0.0002	0.01458	1.956	84.24	
4955:Mid	0.01388	1.769	-0.049	-4.5537	0.0175	0.0002	0.01388	1.769	81.95	
4955:BotCTop	0.01252	1.429	-0.03605	-4.0985	0.0171	0.0001	0.01252	1.429	77.46	
4955:BotCon	0.01237	1.393	-0.03478	-4.0487	0.0170	0.0001	0.01237	1.393	76.97	
4955:BotCBot	0.01222	1.358	-0.03353	-3.9988	0.0170	0.0001	0.01222	1.358	76.47	
4955:Coax1	0.01178	1.255	-0.02997	-3.8488	0.0168	0.0001	0.01178	1.255	74.97	
4955:Arm3	0.01085	1.048	-0.0232	-3.5303	0.0164	0.0001	0.01085	1.048	71.77	
4955:Coax2	0.008968	0.6805	-0.01295	-2.7064	0.0153	0.0000	0.008968	0.6805	64.99	
4955:Arm4	0.007745	0.4779	-0.008442	-2.2104	0.0144	0.0000	0.007745	0.4779	60.28	
4955:Coax3	0.006464	0.3014	-0.005285	-1.6078	0.0133	-0.0000	0.006464	0.3014	54.99	
4955:Guy	0.005674	0.2145	-0.004078	-1.2280	0.0125	-0.0001	0.005674	0.2145	51.5	
4955:Coax4	0.004343	0.1077	-0.002715	-0.6959	0.0109	-0.0001	0.004343	0.1077	45	
4955:Coax5	0.002632	0.02708	-0.00178	-0.2717	0.0086	-0.0001	0.002632	0.02708	35	
4955:Coax6	0.001344	2.71e-005	-0.001184	-0.0662	0.0061	-0.0001	0.001344	2.71e-005	25	
4955:Coax7	0.0004868	-0.003531	-0.0006959	0.0087	0.0037	-0.0000	0.0004868	-0.003531	15	
4955:Coax8	5.467e-005	-0.0007112	-0.0002282	0.0135	0.0012	-0.0000	5.467e-005	-0.0007112	5	
Davit1:O	0.01642	2.461	-0.04481	-4.9594	0.0177	0.0002	0.01642	2.075	90.16	
Davit1:End	0.01689	2.572	0.3398	-4.9527	0.0177	0.0002	0.01689	-2.315	91.63	
Davit2:O	0.01639	2.458	-0.1117	-4.9594	0.0177	0.0002	0.01639	2.845	90.1	
Davit2:End	0.01659	2.536	-0.5115	-5.0841	0.0177	0.0002	0.01659	7.423	90.78	
Davit3:O	0.01459	1.957	-0.02001	-4.7836	0.0176	0.0002	0.01459	1.517	84.27	
Davit3:Bend	0.01506	2.059	0.4341	-4.7661	0.0176	0.0002	0.01506	-3.88	85.73	
Davit3:End	0.01512	2.066	0.6003	-4.7653	0.0176	0.0002	0.01512	-5.873	85.89	
Davit4:O	0.01457	1.954	-0.09332	-4.7836	0.0176	0.0002	0.01457	2.394	84.2	
Davit4:Bend	0.0147	2.022	-0.5996	-5.5884	0.0176	0.0002	0.0147	7.962	84.69	
Davit4:End	0.01464	2.013	-0.7968	-5.6890	0.0176	0.0002	0.01464	9.952	84.49	
Davit5:O	0.01086	1.049	0.01075	-3.5303	0.0164	0.0001	0.01086	0.498	71.8	
Davit5:Bend	0.01144	1.156	0.4982	-3.5039	0.0164	0.0001	0.01144	-7.395	73.79	
Davit5:End	0.01148	1.16	0.6204	-3.5031	0.0164	0.0001	0.01148	-9.391	73.91	
Davit6:O	0.01084	1.047	-0.05716	-3.5303	0.0164	0.0001	0.01084	1.599	71.73	
Davit6:Bend	0.01109	1.133	-0.6201	-4.4079	0.0164	0.0001	0.01109	9.684	72.67	
Davit6:End	0.01105	1.127	-0.7761	-4.5013	0.0164	0.0001	0.01105	11.68	72.52	
Davit7:O	0.007752	0.4784	0.0169	-2.2104	0.0144	0.0000	0.007752	-0.1786	60.31	
Davit7:Bend	0.008058	0.5208	0.2272	-2.1926	0.0144	0.0000	0.008058	-5.636	61.52	
Davit7:End	0.008078	0.5223	0.3037	-2.1918	0.0144	0.0000	0.008078	-7.635	61.6	
Davit8:O	0.007739	0.4774	-0.03378	-2.2104	0.0144	0.0000	0.007739	1.134	60.26	
Davit8:Bend	0.007926	0.518	-0.2912	-3.0282	0.0144	-0.0000	0.007926	6.675	61	
Davit8:End	0.007899	0.5151	-0.3994	-3.1311	0.0144	-0.0000	0.007899	8.672	60.89	
Guy1:O	0.005672	0.2144	-0.01985	-1.2280	0.0125	-0.0001	0.005672	0.9501	51.48	
$Gnd1	0	0	0	0.0000	0.0000	0.0000	0	35	0	
Guy2:O	0.005677	0.2147	0.01169	-1.2280	0.0125	-0.0001	0.005677	-0.521	51.51	
$Gnd2	0	0	0	0.0000	0.0000	0.0000	0	-35	0	

Joint Support Reactions for Load Case "NESC Heavy - One Circuit":

Joint Label	X Force (kips)	X Usage %(kips)	Y Force	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Uplift Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
4955:g	-0.05	0.0	3.19	0.0	0.0	-33.19	0.0	0.0	33.34	0.0	-31.05	0.0	-2.2	0.0	0.0	0.01	0.0	0.0
$Gnd1	-0.00	0.0	0.01	0.0	0.0	0.01	0.0	0.0	0.02	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.0
$Gnd2	-0.00	0.0	-8.98	0.0	0.0	13.37	0.0	0.0	16.11	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Heavy - One Circuit":

Element Label	Joint Label	Joint Position	Rel. Dist.	Trans. Defl.	Long. Defl.	Vert. Defl.	Trans. Mom. (Local Mx)	Long. Mom. (Local My)	Tors. Mom.	Axial Force	Tran. Shear	Long. 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)	%	
4955	4955:t	Origin	0.00	30.86	0.20	-1.00	0.00	-0.00	-0.0	-0.02	0.01	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	5
4955	4955:Arm1	End	1.29	29.52	0.20	-0.94	0.01	-0.00	-0.0	-0.02	0.01	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
4955	4955:Arm1	Origin	1.29	29.52	0.20	-0.94	3.37	-0.00	-0.0	-0.78	0.63	-0.00	-0.14	3.24	0.06	0.00	3.38	5.2	2
4955	4955:TopCon	End	2.50	28.27	0.19	-0.88	4.13	-0.00	-0.0	-0.78	0.63	-0.00	-0.14	3.75	0.06	0.00	3.88	6.0	2
4955	4955:TopCon	Origin	2.50	28.27	0.19	-0.88	4.13	-0.00	-0.0	-0.76	1.90	-0.00	-0.13	3.75	0.18	0.00	3.89	6.0	2
4955	4955:Arm2	End	7.21	23.47	0.17	-0.68	13.05	-0.01	-0.0	-0.76	1.90	-0.00	-0.12	9.63	0.16	0.00	9.75	15.0	2
4955	4955:Arm2	Origin	7.21	23.47	0.17	-0.68	29.19	-0.01	-0.0	-3.07	2.92	-0.00	-0.49	21.52	0.25	0.00	22.02	33.9	2
4955	4955:Mid	End	9.50	21.22	0.17	-0.59	35.89	-0.02	-0.0	-3.07	2.92	-0.00	-0.47	24.09	0.24	0.00	24.56	37.8	2
4955	4955:Mid	Origin	9.50	21.22	0.17	-0.59	35.89	-0.02	-0.0	-3.28	1.92	-0.01	-0.50	24.09	0.16	0.00	24.59	37.8	2
4955	4955:BotCTop	End	14.00	17.14	0.15	-0.43	44.54	-0.05	-0.0	-3.28	1.92	-0.01	-0.46	25.18	0.14	0.00	25.64	39.4	2
4955	4955:BotCTop	Origin	14.00	17.14	0.15	-0.43	44.54	-0.05	-0.0	-3.33	2.52	-0.01	-0.47	25.18	0.19	0.00	25.65	39.5	2
4955	4955:BotCon	End	14.50	16.72	0.15	-0.42	45.81	-0.05	-0.0	-3.33	2.52	-0.01	-0.46	25.43	0.19	0.00	25.89	39.8	2
4955	4955:BotCon	Origin	14.50	16.72	0.15	-0.42	45.81	-0.05	-0.0	-5.93	3.10	-0.01	-0.83	25.43	0.23	0.00	26.25	40.4	2
4955	4955:BotCBot	End	15.00	16.29	0.15	-0.40	47.36	-0.05	-0.0	-5.93	3.10	-0.01	-0.82	25.82	0.23	0.00	26.64	41.0	2
4955	4955:BotCBot	Origin	15.00	16.29	0.15	-0.40	47.36	-0.05	-0.0	-6.02	2.53	-0.01	-0.83	25.82	0.19	0.00	26.65	41.0	2
4955	4955:Coax1	End	16.50	15.06	0.14	-0.36	51.15	-0.06	-0.0	-6.02	2.53	-0.01	-0.81	26.44	0.18	0.00	27.25	41.9	2
4955	4955:Coax1	Origin	16.50	15.06	0.14	-0.36	51.15	-0.06	-0.0	-6.39	2.60	-0.01	-0.86	26.44	0.19	0.00	27.30	42.0	2
4955	4955:Arm3	End	19.71	12.58	0.13	-0.28	59.51	-0.09	-0.0	-6.39	2.60	-0.01	-0.81	27.58	0.18	0.00	28.39	43.7	2
4955	4955:Arm3	Origin	19.71	12.58	0.13	-0.28	81.29	-0.09	-0.0	-8.91	3.55	-0.01	-1.13	37.67	0.24	0.00	38.80	59.7	2
4955	SpliceT	End	23.00	10.29	0.12	-0.21	92.99	-0.13	-0.0	-8.91	3.55	-0.01	-1.07	38.75	0.23	0.00	39.82	61.3	2
4955	SpliceT	Origin	23.00	10.29	0.12	-0.21	92.99	-0.13	-0.0	-9.09	3.55	-0.01	-0.94	33.13	0.19	0.00	34.07	52.4	2
4955	4955:Coax2	End	26.50	8.17	0.11	-0.16	105.42	-0.17	-0.0	-9.09	3.55	-0.01	-0.89	33.75	0.18	0.00	34.64	53.3	2
4955	4955:Coax2	Origin	26.50	8.17	0.11	-0.16	105.42	-0.17	-0.0	-9.61	3.61	-0.01	-0.94	33.75	0.19	0.00	34.69	53.4	2
4955	4955:Arm4	End	31.21	5.73	0.09	-0.10	122.41	-0.23	-0.0	-9.61	3.61	-0.01	-0.88	34.23	0.18	0.00	35.11	54.0	2
4955	4955:Arm4	Origin	31.21	5.73	0.09	-0.10	139.21	-0.23	-0.0	-12.07	4.49	-0.02	-1.10	38.92	0.22	0.00	40.03	61.6	2
4955	Tube 2	End	33.85	4.59	0.09	-0.08	151.10	-0.28	-0.0	-12.07	4.49	-0.02	-1.06	39.30	0.21	0.00	40.37	62.1	2
4955	Tube 2	Origin	33.85	4.59	0.09	-0.08	151.10	-0.28	-0.0	-12.25	4.48	-0.02	-1.08	39.30	0.21	0.00	40.38	62.1	2
4955	4955:Coax3	End	36.50	3.62	0.08	-0.06	162.95	-0.32	-0.0	-12.25	4.48	-0.02	-1.04	39.53	0.20	0.00	40.57	62.4	2
4955	4955:Coax3	Origin	36.50	3.62	0.08	-0.06	162.95	-0.32	-0.0	-12.73	4.52	-0.02	-1.08	39.53	0.20	0.00	40.61	62.5	2
4955	4955:Guy	End	40.00	2.57	0.07	-0.05	178.76	-0.39	-0.0	-12.73	4.52	-0.02	-1.04	39.68	0.20	0.00	40.72	62.7	2
4955	4955:Guy	Origin	40.00	2.57	0.07	-0.05	168.77	-0.39	-0.0	-26.60	-4.16	-0.02	-2.17	37.47	0.18	0.00	39.64	61.0	2
4955	Tube 2	End	43.00	1.89	0.06	-0.04	156.29	-0.46	-0.0	-26.60	-4.16	-0.02	-2.09	32.26	0.17	0.00	34.35	52.8	2
4955	Tube 2	Origin	43.00	1.89	0.06	-0.04	156.29	-0.46	-0.0	-26.78	-4.21	-0.02	-2.11	32.26	0.18	0.00	34.37	52.9	2
4955	SpliceT	End	46.00	1.37	0.05	-0.03	143.66	-0.53	-0.0	-26.78	-4.21	-0.02	-2.03	27.64	0.17	0.00	29.67	45.7	2
4955	SpliceT	Origin	46.00	1.37	0.05	-0.03	143.66	-0.53	-0.0	-26.89	-4.24	-0.02	-1.78	24.14	0.15	0.00	25.93	39.9	2
4955	4955:Coax4	End	46.50	1.29	0.05	-0.03	141.54	-0.54	-0.0	-26.89	-4.24	-0.02	-1.77	23.52	0.15	0.00	25.29	38.9	2
4955	4955:Coax4	Origin	46.50	1.29	0.05	-0.03	141.54	-0.54	-0.0	-27.37	-4.20	-0.03	-1.80	23.52	0.15	0.00	25.32	39.0	2
4955	Tube 3	End	51.50	0.70	0.04	-0.03	120.56	-0.67	-0.0	-27.37	-4.20	-0.03	-1.71	17.93	0.14	0.00	19.64	30.2	2
4955	Tube 3	Origin	51.50	0.70	0.04	-0.03	120.56	-0.67	-0.0	-27.76	-4.18	-0.03	-1.73	17.93	0.14	0.00	19.66	30.2	2
4955	4955:Coax5	End	56.50	0.32	0.03	-0.02	99.64	-0.81	-0.0	-27.76	-4.18	-0.03	-1.64	13.34	0.13	0.00	14.99	23.1	2
4955	4955:Coax5	Origin	56.50	0.32	0.03	-0.02	99.64	-0.81	-0.0	-28.44	-4.10	-0.03	-1.68	13.34	0.13	0.00	15.03	23.1	2
4955	Tube 3	End	61.12	0.12	0.02	-0.02	80.69	-0.96	-0.0	-28.44	-4.10	-0.03	-1.61	9.85	0.12	0.00	11.46	17.6	2
4955	Tube 3	Origin	61.12	0.12	0.02	-0.02	80.69	-0.96	-0.0	-28.85	-4.03	-0.03	-1.63	9.85	0.12	0.00	11.49	17.7	2
4955	SpliceT	End	65.75	0.01	0.02	-0.01	62.03	-1.11	-0.0	-28.85	-4.03	-0.03	-1.56	6.94	0.12	0.00	8.51	13.1	2
4955	SpliceT	Origin	65.75	0.01	0.02	-0.01	62.03	-1.11	-0.0	-29.13	-3.99	-0.03	-1.58	6.94	0.11	0.00	8.52	13.1	2
4955	4955:Coax6	End	66.50	0.00	0.02	-0.01	59.04	-1.14	-0.0	-29.13	-3.99	-0.03	-1.42	6.08	0.10	0.00	7.50	11.5	2
4955	4955:Coax6	Origin	66.50	0.00	0.02	-0.01	59.04	-1.14	-0.0	-29.73	-3.91	-0.04	-1.45	6.08	0.10	0.00	7.53	11.6	2
4955	SpliceB	End	69.00	-0.03	0.01	-0.01	49.25	-1.23	-0.0	-29.73	-3.91	-0.04	-1.42	4.84	0.10	0.00	6.27	9.6	2
4955	SpliceB	Origin	69.00	-0.03	0.01	-0.01	49.25	-1.23	-0.0	-30.19	-3.85	-0.04	-1.44	4.84	0.10	0.00	6.29	9.7	2
4955	Tube 4	End	72.75	-0.04	0.01	-0.01	34.81	-1.37	-0.0	-30.19	-3.85	-0.04	-1.39	3.21	0.09	0.00	4.60	7.1	2
4955	Tube 4	Origin	72.75	-0.04	0.01	-0.01	34.81	-1.37	-0.0	-30.60	-3.76	-0.04	-1.41	3.21	0.09	0.00	4.62	7.1	2
4955	4955:Coax7	End	76.50	-0.04	0.01	-0.01	20.70	-1.51	-0.0	-30.60	-3.76	-0.04	-1.37	1.80	0.09	0.00	3.17	4.9	2
4955	4955:Coax7	Origin	76.50	-0.04	0.01	-0.01	20.70	-1.51	-0.0	-31.38	-3.61	-0.04	-1.40	1.80	0.09	0.00	3.20	4.9	2
4955	Tube 4	End	81.50	-0.03	0.00	-0.01	2.66	-1.73	-0.0	-31.38	-3.61	-0.04	-1.34	0.25	0.22	0.00	1.64	2.5	3
4955	Tube 4	Origin	81.50	-0.03	0.00	-0.01	2.66	-1.73	-0.0	-31.97	-3.47	-0.05	-1.37	0.25	0.21	0.00	1.66	2.6	3
4955	4955:Coax8	End	86.50	-0.01	0.00	-0.00	-14.69	-1.95	-0.0	-31.97	-3.47	-0.05	-1.31	1.10	0.08	0.00	2.41	3.7	2
4955	4955:Coax8	Origin	86.50	-0.01	0.00	-0.00	-14.69	-1.95	-0.0	-32.69	-3.32	-0.05	-1.34	1.10	0.07	0.00	2.44	3.8	2

4955	SpliceT	End	88.75	-0.00	0.00	-0.00	-22.15	-2.06	-0.0	-32.69	-3.32	-0.05	-1.32	1.58	0.07	0.00	2.90	4.5	2
4955	SpliceT	Origin	88.75	-0.00	0.00	-0.00	-22.15	-2.06	-0.0	-33.01	-3.24	-0.05	-1.33	1.58	0.07	0.00	2.92	4.5	2
4955	4955:g	End	91.50	0.00	0.00	0.00	-31.05	-2.19	-0.0	-33.01	-3.24	-0.05	-1.30	2.11	0.07	0.00	3.42	5.3	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	29.54	0.20	-0.54	-0.18	0.00	0.0	-0.01	0.04	-0.00	-0.00	0.32	0.00	0.00	0.32	0.5	1
Davit1	Davit1:End	End	4.63	30.86	0.20	4.08	-0.00	0.00	0.0	-0.01	0.04	-0.00	-0.00	0.00	0.03	0.00	0.05	0.1	3
Davit2	Davit2:O	Origin	0.00	29.50	0.20	-1.34	-3.33	-0.00	-0.0	0.43	0.72	0.00	0.10	5.82	0.00	0.00	5.93	9.1	1
Davit2	Davit2:End	End	4.63	30.44	0.20	-6.14	0.00	0.00	-0.0	0.43	0.72	0.00	0.15	0.00	0.50	0.00	0.88	1.4	3
Davit3	Davit3:O	Origin	0.00	23.48	0.18	-0.24	-0.48	0.00	0.0	-0.03	0.11	-0.00	-0.01	0.84	0.00	0.00	0.85	1.3	1
Davit3	#Davit3:0	End	2.80	24.10	0.18	2.49	-0.19	0.00	0.0	-0.03	0.11	-0.00	-0.01	0.41	0.00	0.00	0.42	0.6	1
Davit3	#Davit3:0	Origin	2.80	24.10	0.18	2.49	-0.19	0.00	0.0	-0.01	0.05	-0.00	-0.00	0.41	0.00	0.00	0.41	0.6	1
Davit3	Davit3:Bend	End	5.59	24.71	0.18	5.21	-0.03	0.00	0.0	-0.01	0.05	-0.00	-0.00	0.09	0.00	0.00	0.10	0.1	1
Davit3	Davit3:Bend	Origin	5.59	24.71	0.18	5.21	-0.03	0.00	0.0	-0.00	0.02	-0.00	-0.00	0.09	0.00	0.00	0.09	0.1	1
Davit3	Davit3:End	End	7.59	24.79	0.18	7.20	-0.00	0.00	0.0	-0.00	0.02	-0.00	-0.00	0.00	0.01	0.00	0.02	0.0	3
Davit4	Davit4:O	Origin	0.00	23.45	0.17	-1.12	-15.77	-0.01	-0.0	0.60	2.16	0.00	0.14	27.60	0.00	0.00	27.74	42.7	1
Davit4	#Davit4:0	End	2.80	23.85	0.18	-4.04	-9.72	-0.00	-0.0	0.60	2.16	0.00	0.16	21.45	0.00	0.00	21.61	33.2	1
Davit4	#Davit4:0	Origin	2.80	23.85	0.18	-4.04	-9.72	-0.00	-0.0	0.62	2.11	0.00	0.16	21.45	0.00	0.00	21.62	33.3	1
Davit4	Davit4:Bend	End	5.59	24.27	0.18	-7.19	-3.83	-0.00	-0.0	0.62	2.11	0.00	0.19	10.99	0.00	0.00	11.18	17.2	1
Davit4	Davit4:Bend	Origin	5.59	24.27	0.18	-7.19	-3.83	-0.00	0.0	0.99	1.92	0.00	0.30	10.99	0.00	0.00	11.29	17.4	1
Davit4	Davit4:End	End	7.59	24.15	0.18	-9.56	0.00	0.00	0.0	0.99	1.92	0.00	0.33	0.00	1.33	0.00	2.33	3.6	3
Davit5	Davit5:O	Origin	0.00	12.59	0.13	0.13	-0.97	0.00	0.0	-0.04	0.16	-0.00	-0.01	1.01	0.00	0.00	1.02	1.6	1
Davit5	#Davit5:0	End	4.07	13.24	0.13	3.06	-0.32	0.00	0.0	-0.04	0.16	-0.00	-0.01	0.50	0.00	0.00	0.51	0.8	1
Davit5	#Davit5:0	Origin	4.07	13.24	0.13	3.06	-0.32	0.00	0.0	-0.02	0.07	-0.00	-0.00	0.50	0.00	0.00	0.51	0.8	1
Davit5	Davit5:Bend	End	8.14	13.88	0.14	5.98	-0.03	0.00	0.0	-0.02	0.07	-0.00	-0.01	0.09	0.00	0.00	0.09	0.1	1
Davit5	Davit5:Bend	Origin	8.14	13.88	0.14	5.98	-0.03	0.00	0.0	-0.00	0.02	-0.00	-0.00	0.09	0.00	0.00	0.09	0.1	1
Davit5	Davit5:End	End	10.14	13.92	0.14	7.45	-0.00	0.00	0.0	-0.00	0.02	-0.00	-0.00	0.00	0.01	0.00	0.02	0.0	3
Davit6	Davit6:O	Origin	0.00	12.57	0.13	-0.69	-21.68	-0.01	-0.0	0.54	2.24	0.00	0.10	22.54	0.00	0.00	22.64	34.8	1
Davit6	#Davit6:0	End	4.07	13.06	0.13	-3.87	-12.58	-0.00	-0.0	0.54	2.24	0.00	0.12	19.64	0.00	0.00	19.76	30.4	1
Davit6	#Davit6:0	Origin	4.07	13.06	0.13	-3.87	-12.58	-0.00	-0.0	0.56	2.14	0.00	0.13	19.64	0.00	0.00	19.77	30.4	1
Davit6	Davit6:Bend	End	8.14	13.59	0.13	-7.44	-3.87	-0.00	-0.0	0.56	2.14	0.00	0.16	10.08	0.00	0.00	10.24	15.8	1
Davit6	Davit6:Bend	Origin	8.14	13.59	0.13	-7.44	-3.87	-0.00	0.0	0.95	1.94	0.00	0.27	10.08	0.00	0.00	10.36	15.9	1
Davit6	Davit6:End	End	10.14	13.52	0.13	-9.31	0.00	0.00	0.0	0.95	1.94	0.00	0.32	0.00	1.35	0.00	2.36	3.6	3
Davit7	Davit7:O	Origin	0.00	5.74	0.09	0.20	-0.49	0.00	0.0	-0.02	0.11	-0.00	-0.01	0.85	0.00	0.00	0.86	1.3	1
Davit7	#Davit7:0	End	2.80	6.00	0.09	1.47	-0.19	0.00	0.0	-0.02	0.11	-0.00	-0.01	0.41	0.00	0.00	0.42	0.6	1
Davit7	#Davit7:0	Origin	2.80	6.00	0.09	1.47	-0.19	0.00	0.0	-0.01	0.06	-0.00	-0.00	0.41	0.00	0.00	0.42	0.6	1
Davit7	Davit7:Bend	End	5.59	6.25	0.10	2.73	-0.03	0.00	0.0	-0.01	0.06	-0.00	-0.00	0.09	0.00	0.00	0.10	0.1	1
Davit7	Davit7:Bend	Origin	5.59	6.25	0.10	2.73	-0.03	0.00	0.0	-0.00	0.02	-0.00	-0.00	0.09	0.00	0.00	0.09	0.1	1
Davit7	Davit7:End	End	7.59	6.27	0.10	3.64	-0.00	0.00	0.0	-0.00	0.02	-0.00	-0.00	0.00	0.01	0.00	0.02	0.0	3
Davit8	Davit8:O	Origin	0.00	5.73	0.09	-0.41	-16.00	-0.00	-0.0	0.50	2.19	0.00	0.12	28.00	0.00	0.00	28.12	43.3	1
Davit8	#Davit8:0	End	2.80	5.96	0.09	-1.83	-9.88	-0.00	-0.0	0.50	2.19	0.00	0.13	21.80	0.00	0.00	21.93	33.7	1
Davit8	#Davit8:0	Origin	2.80	5.96	0.09	-1.83	-9.88	-0.00	-0.0	0.53	2.13	0.00	0.14	21.80	0.00	0.00	21.94	33.8	1
Davit8	Davit8:Bend	End	5.59	6.22	0.10	-3.49	-3.92	-0.00	-0.0	0.53	2.13	0.00	0.16	11.24	0.00	0.00	11.40	17.5	1
Davit8	Davit8:Bend	Origin	5.59	6.22	0.10	-3.49	-3.92	-0.00	0.0	0.91	1.96	0.00	0.27	11.24	0.00	0.00	11.51	17.7	1
Davit8	Davit8:End	End	7.59	6.18	0.09	-4.79	0.00	0.00	0.0	0.91	1.96	0.00	0.30	0.00	1.36	0.00	2.38	3.7	3

Summary of Guy Tensions and Usages for Load Case "NESC Heavy - One Circuit":

Guy Label	Max. Tension (kips)	Allowable Tension (kips)	Factored Allowable (kips)	Usage %
Guy1	0.05	43.24	43.24	0.12
Guy2	16.14	43.24	43.24	37.33

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	0.000	80.00	80.00	0.00
Clamp2	0.808	80.00	80.00	1.01
Clamp3	0.000	80.00	80.00	0.00
Clamp4	2.143	80.00	80.00	2.68
Clamp5	0.000	80.00	80.00	0.00
Clamp6	2.143	80.00	80.00	2.68
Clamp7	0.000	80.00	80.00	0.00
Clamp8	2.143	80.00	80.00	2.68
Clamp9	0.277	80.00	80.00	0.35
Clamp10	0.277	80.00	80.00	0.35
Clamp11	0.277	80.00	80.00	0.35
Clamp12	0.277	80.00	80.00	0.35
Clamp13	0.277	80.00	80.00	0.35
Clamp14	0.277	80.00	80.00	0.35
Clamp15	0.277	80.00	80.00	0.35
Clamp16	0.277	80.00	80.00	0.35
Clamp17	1.237	80.00	80.00	1.55
Clamp18	2.642	80.00	80.00	3.30
Clamp19	0.579	80.00	80.00	0.72
Clamp20	0.579	80.00	80.00	0.72
Clamp21	1.032	80.00	80.00	1.29

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

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

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)
4955:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
4955:t	0.004979	4.297	-0.2119	-7.9367	0.0052	0.0004	0.004979	4.297	91.29
4955:Arm1	0.004863	4.119	-0.1995	-7.9366	0.0052	0.0004	0.004863	4.119	90.01
4955:TopCon	0.004754	3.952	-0.188	-7.9291	0.0052	0.0004	0.004754	3.952	88.81
4955:Arm2	0.004332	3.31	-0.1441	-7.6370	0.0052	0.0004	0.004332	3.31	84.15
4955:Mid	0.004127	3.012	-0.1245	-7.3084	0.0051	0.0004	0.004127	3.012	81.88
4955:BotCTop	0.00373	2.466	-0.09124	-6.5975	0.0050	0.0003	0.00373	2.466	77.41
4955:BotCon	0.003687	2.408	-0.08796	-6.5188	0.0050	0.0003	0.003687	2.408	76.91
4955:BotCBot	0.003643	2.352	-0.08476	-6.4386	0.0050	0.0003	0.003643	2.352	76.42
4955:Coax1	0.003513	2.187	-0.07562	-6.1925	0.0050	0.0003	0.003513	2.187	74.92
4955:Arm3	0.003241	1.855	-0.05838	-5.6548	0.0048	0.0002	0.003241	1.855	71.73
4955:Coax2	0.002687	1.257	-0.03184	-4.4589	0.0045	0.0002	0.002687	1.257	64.97
4955:Arm4	0.002326	0.9217	-0.0198	-3.6829	0.0043	0.0001	0.002326	0.9217	60.27
4955:Coax3	0.001945	0.6229	-0.01123	-2.7750	0.0040	0.0001	0.001945	0.6229	54.99
4955:Guy	0.00171	0.471	-0.007882	-2.1771	0.0037	0.0001	0.00171	0.471	51.49
4955:Coax4	0.001311	0.2756	-0.004347	-1.3287	0.0033	0.0000	0.001311	0.2756	45
4955:Coax5	0.0007959	0.1105	-0.002249	-0.6298	0.0026	0.0000	0.0007959	0.1105	35
4955:Coax6	0.000407	0.03634	-0.001332	-0.2601	0.0018	0.0000	0.000407	0.03634	25
4955:Coax7	0.0001475	0.008135	-0.000751	-0.0866	0.0011	-0.0000	0.0001475	0.008135	15
4955:Coax8	1.658e-005	0.0004819	-0.0002424	-0.0141	0.0004	-0.0000	1.658e-005	0.0004819	5
Davit1:O	0.004871	4.122	-0.1462	-7.9366	0.0052	0.0004	0.004871	3.736	90.06
Davit1:End	0.005057	4.315	0.4646	-7.9333	0.0052	0.0004	0.005057	-0.5717	91.76
Davit2:O	0.004855	4.115	-0.2529	-7.9366	0.0052	0.0004	0.004855	4.501	89.96
Davit2:End	0.004865	4.222	-0.8866	-7.9731	0.0052	0.0004	0.004865	9.108	90.4
Davit3:O	0.00434	3.314	-0.08565	-7.6370	0.0052	0.0004	0.00434	2.875	84.21
Davit3:Bend	0.004533	3.496	0.6358	-7.6266	0.0052	0.0004	0.004533	-2.444	85.93
Davit3:End	0.00457	3.513	0.9012	-7.6261	0.0052	0.0004	0.00457	-4.426	86.19
Davit4:O	0.004324	3.306	-0.2025	-7.6370	0.0052	0.0004	0.004324	3.746	84.09
Davit4:Bend	0.00431	3.391	-0.9605	-7.9600	0.0052	0.0004	0.00431	9.331	84.33
Davit4:End	0.004272	3.372	-1.238	-7.9936	0.0052	0.0004	0.004272	11.31	84.05
Davit5:O	0.003247	1.858	-0.004046	-5.6548	0.0048	0.0002	0.003247	1.306	71.79
Davit5:Bend	0.003476	2.044	0.7756	-5.6390	0.0048	0.0003	0.003476	-6.507	74.07
Davit5:End	0.003502	2.054	0.9721	-5.6385	0.0048	0.0003	0.003502	-8.498	74.26
Davit6:O	0.003234	1.852	-0.1127	-5.6548	0.0048	0.0002	0.003234	2.404	71.68
Davit6:Bend	0.003257	1.964	-0.9384	-6.0361	0.0048	0.0002	0.003257	10.52	72.35
Davit6:End	0.003231	1.953	-1.15	-6.0696	0.0048	0.0002	0.003231	12.5	72.14
Davit7:O	0.002331	0.9231	0.0224	-3.6829	0.0043	0.0001	0.002331	0.266	60.31
Davit7:Bend	0.002446	0.9985	0.373	-3.6717	0.0043	0.0002	0.002446	-5.159	61.66
Davit7:End	0.002461	1.003	0.501	-3.6712	0.0043	0.0002	0.002461	-7.154	61.79
Davit8:O	0.002321	0.9203	-0.06201	-3.6829	0.0043	0.0001	0.002321	1.577	60.23
Davit8:Bend	0.002355	0.9756	-0.4376	-4.0461	0.0043	0.0001	0.002355	7.133	60.85
Davit8:End	0.002339	0.9706	-0.5797	-4.0854	0.0043	0.0001	0.002339	9.128	60.71
Guy1:O	0.001707	0.4705	-0.03583	-2.1771	0.0037	0.0001	0.001707	1.206	51.46
$Gnd1	0	0	0	0.0000	0.0000	0.0000	0	35	0
Guy2:O	0.001713	0.4716	0.02007	-2.1771	0.0037	0.0001	0.001713	-0.2642	51.52
$Gnd2	0	0	0	0.0000	0.0000	0.0000	0	-35	0

Joint Support Reactions for Load Case "NESC Extreme - One Circuit":

Joint	X	X	Y	Y H-Shear	Z Comp.	Uplift	Result.	Result.	X	X-M.	Y	Y-M.	H-Bend-M	Z	Z-M.	Max.

Label	Force (kips)	Usage %	Force (kips)	Usage %	Usage %	Force (kips)	Usage %	Usage %	Force (kips)	Usage %	Moment (ft-k)	Usage %	Moment (ft-k)	Usage %	Usage %	Moment (ft-k)	Usage %	Usage %
4955:g	-0.02	0.0	2.92	0.0	0.0	-35.13	0.0	0.0	35.25	0.0	15.95	0.0	-0.7	0.0	0.0	0.00	0.0	0.0
$Gnd1	-0.00	0.0	0.11	0.0	0.0	0.24	0.0	0.0	0.27	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.0
$Gnd2	-0.00	0.0	-16.76	0.0	0.0	24.74	0.0	0.0	29.88	0.0	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme - One Circuit":

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.
4955	4955:t	Origin	0.00	51.56	0.06	-2.54	-0.00	-0.00	-0.0	-0.01	0.02	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	5
4955	4955:Arm1	End	1.29	49.42	0.06	-2.39	0.03	-0.00	-0.0	-0.01	0.02	-0.00	-0.00	0.02	0.00	0.00	0.03	0.0	2
4955	4955:Arm1	Origin	1.29	49.42	0.06	-2.39	0.94	-0.00	0.0	-0.19	0.63	-0.00	-0.03	0.90	0.06	0.00	0.94	1.4	2
4955	4955:TopCon	End	2.50	47.42	0.06	-2.26	1.69	-0.00	0.0	-0.19	0.63	-0.00	-0.03	1.54	0.06	0.00	1.57	2.4	2
4955	4955:TopCon	Origin	2.50	47.42	0.06	-2.26	1.69	-0.00	0.0	0.50	6.18	-0.00	0.09	0.00	2.24	0.00	3.87	6.0	5
4955	4955:Arm2	End	7.21	39.72	0.05	-1.73	30.79	-0.00	0.0	0.50	6.18	-0.00	0.08	22.69	0.53	0.00	22.79	35.1	2
4955	4955:Arm2	Origin	7.21	39.72	0.05	-1.73	37.46	-0.00	-0.0	-0.42	7.90	-0.00	-0.07	27.61	0.67	0.00	27.70	42.6	2
4955	4955:Mid	End	9.50	36.14	0.05	-1.49	55.57	-0.01	-0.0	-0.42	7.90	-0.00	-0.06	37.30	0.64	0.00	37.38	57.5	2
4955	4955:Mid	Origin	9.50	36.14	0.05	-1.49	55.57	-0.01	-0.0	-1.16	3.21	-0.00	-0.18	37.30	0.26	0.00	37.48	57.7	2
4955	4955:BotCTop	End	14.00	29.59	0.04	-1.09	70.02	-0.01	-0.0	-1.16	3.21	-0.00	-0.16	39.57	0.24	0.00	39.74	61.1	2
4955	4955:BotCTop	Origin	14.00	29.59	0.04	-1.09	70.02	-0.01	-0.0	-0.94	5.90	-0.00	-0.13	39.57	0.44	0.00	39.71	61.1	2
4955	4955:BotCon	End	14.50	28.90	0.04	-1.06	72.97	-0.01	-0.0	-0.94	5.90	-0.00	-0.13	40.50	0.44	0.00	40.63	62.5	2
4955	4955:BotCon	Origin	14.50	28.90	0.04	-1.06	72.97	-0.01	-0.0	-1.97	7.79	-0.00	-0.27	40.50	0.58	0.00	40.78	62.7	2
4955	4955:BotCBot	End	15.00	28.22	0.04	-1.02	76.87	-0.02	-0.0	-1.97	7.79	-0.00	-0.27	41.89	0.57	0.00	42.18	64.9	2
4955	4955:BotCBot	Origin	15.00	28.22	0.04	-1.02	76.87	-0.02	-0.0	-2.31	5.22	-0.00	-0.32	41.89	0.38	0.00	42.22	65.0	2
4955	4955:Coax1	End	16.50	26.24	0.04	-0.91	84.70	-0.02	-0.0	-2.31	5.22	-0.00	-0.31	43.77	0.37	0.00	44.08	67.8	2
4955	4955:Coax1	Origin	16.50	26.24	0.04	-0.91	84.70	-0.02	-0.0	-2.46	5.42	-0.00	-0.33	43.77	0.39	0.00	44.11	67.9	2
4955	4955:Arm3	End	19.71	22.26	0.04	-0.70	102.09	-0.03	-0.0	-2.46	5.42	-0.00	-0.31	47.29	0.37	0.00	47.61	73.2	2
4955	4955:Arm3	Origin	19.71	22.26	0.04	-0.70	111.80	-0.03	-0.0	-3.57	7.12	-0.00	-0.45	51.79	0.48	0.00	52.25	80.4	2
4955	SpliceT	End	23.00	18.57	0.04	-0.53	135.22	-0.04	-0.0	-3.57	7.12	-0.00	-0.43	56.33	0.46	0.00	56.76	87.3	2
4955	SpliceT	Origin	23.00	18.57	0.04	-0.53	135.22	-0.04	-0.0	-3.75	7.23	-0.00	-0.39	48.16	0.40	0.00	48.56	74.7	2
4955	4955:Coax2	End	26.50	15.09	0.03	-0.38	160.54	-0.05	-0.0	-3.75	7.23	-0.00	-0.37	51.38	0.38	0.00	51.75	79.6	2
4955	4955:Coax2	Origin	26.50	15.09	0.03	-0.38	160.54	-0.05	-0.0	-4.04	7.50	-0.00	-0.39	51.38	0.39	0.00	51.78	79.7	2
4955	4955:Arm4	End	31.21	11.06	0.03	-0.24	195.86	-0.07	-0.0	-4.04	7.50	-0.00	-0.37	54.74	0.36	0.00	55.11	84.8	2
4955	4955:Arm4	Origin	31.21	11.06	0.03	-0.24	203.47	-0.07	-0.0	-5.19	9.18	-0.00	-0.47	56.87	0.45	0.00	57.35	88.2	2
4955	Tube 2	End	33.85	9.14	0.03	-0.18	227.76	-0.08	-0.0	-5.19	9.18	-0.00	-0.46	59.22	0.43	0.00	59.68	91.8	2
4955	Tube 2	Origin	33.85	9.14	0.03	-0.18	227.76	-0.08	-0.0	-5.36	9.28	-0.01	-0.47	59.22	0.43	0.00	59.69	91.8	2
4955	4955:Coax3	End	36.50	7.47	0.02	-0.13	252.31	-0.09	-0.0	-5.36	9.28	-0.01	-0.46	61.18	0.42	0.00	61.64	94.8	2
4955	4955:Coax3	Origin	36.50	7.47	0.02	-0.13	252.31	-0.09	-0.0	-5.63	9.51	-0.01	-0.48	61.18	0.43	0.00	61.66	94.9	2
4955	4955:Guy	End	40.00	5.65	0.02	-0.09	285.58	-0.11	-0.0	-5.63	9.51	-0.01	-0.46	63.37	0.41	0.00	63.83	98.2	2
4955	4955:Guy	Origin	40.00	5.65	0.02	-0.09	267.01	-0.11	-0.0	-31.47	-5.97	-0.01	-2.57	59.25	0.26	0.00	61.81	95.1	2
4955	Tube 2	End	43.00	4.43	0.02	-0.07	249.10	-0.13	-0.0	-31.47	-5.97	-0.01	-2.47	51.38	0.25	0.00	53.86	82.9	2
4955	Tube 2	Origin	43.00	4.43	0.02	-0.07	249.10	-0.13	-0.0	-31.56	-6.02	-0.01	-2.48	51.38	0.25	0.00	53.87	82.9	2
4955	SpliceT	End	46.00	3.45	0.02	-0.05	231.06	-0.15	-0.0	-31.56	-6.02	-0.01	-2.40	44.42	0.24	0.00	46.82	72.0	2
4955	SpliceT	Origin	46.00	3.45	0.02	-0.05	231.06	-0.15	-0.0	-31.61	-6.03	-0.01	-2.10	38.80	0.21	0.00	40.90	62.9	2
4955	4955:Coax4	End	46.50	3.31	0.02	-0.05	228.05	-0.16	-0.0	-31.61	-6.03	-0.01	-2.08	37.86	0.21	0.00	39.94	61.5	2
4955	4955:Coax4	Origin	46.50	3.31	0.02	-0.05	228.05	-0.16	-0.0	-31.80	-5.87	-0.01	-2.10	37.86	0.21	0.00	39.95	61.5	2
4955	Tube 3	End	51.50	2.13	0.01	-0.04	198.69	-0.20	-0.0	-31.80	-5.87	-0.01	-1.98	29.51	0.19	0.00	31.49	48.4	2
4955	Tube 3	Origin	51.50	2.13	0.01	-0.04	198.69	-0.20	-0.0	-32.04	-5.75	-0.01	-2.00	29.51	0.19	0.00	31.51	48.5	2
4955	4955:Coax5	End	56.50	1.33	0.01	-0.03	169.93	-0.24	-0.0	-32.04	-5.75	-0.01	-1.90	22.71	0.18	0.00	24.61	37.9	2
4955	4955:Coax5	Origin	56.50	1.33	0.01	-0.03	169.93	-0.24	-0.0	-32.35	-5.46	-0.01	-1.92	22.71	0.17	0.00	24.63	37.9	2
4955	Tube 3	End	61.12	0.82	0.01	-0.02	144.68	-0.29	-0.0	-32.35	-5.46	-0.01	-1.83	17.62	0.16	0.00	19.45	29.9	2
4955	Tube 3	Origin	61.12	0.82	0.01	-0.02	144.68	-0.29	-0.0	-32.61	-5.24	-0.01	-1.84	17.62	0.16	0.00	19.47	29.9	2
4955	SpliceT	End	65.75	0.48	0.01	-0.02	120.43	-0.33	-0.0	-32.61	-5.24	-0.01	-1.76	13.43	0.15	0.00	15.19	23.4	2
4955	SpliceT	Origin	65.75	0.48	0.01	-0.02	120.43	-0.33	-0.0	-32.80	-5.10	-0.01	-1.77	13.43	0.15	0.00	15.20	23.4	2

4955	4955:Coax6	End	66.50	0.44	0.00	-0.02	116.61	-0.34	-0.0	-32.80	-5.10	-0.01	-1.60	11.95	0.13	0.00	13.56	20.9	2
4955	4955:Coax6	Origin	66.50	0.44	0.00	-0.02	116.61	-0.34	-0.0	-33.08	-4.89	-0.01	-1.62	11.95	0.13	0.00	13.57	20.9	2
4955	SpliceB	End	69.00	0.32	0.00	-0.01	104.38	-0.37	-0.0	-33.08	-4.89	-0.01	-1.58	10.21	0.12	0.00	11.79	18.1	2
4955	SpliceB	Origin	69.00	0.32	0.00	-0.01	104.38	-0.37	-0.0	-33.38	-4.70	-0.01	-1.59	10.21	0.12	0.00	11.80	18.2	2
4955	Tube 4	End	72.75	0.18	0.00	-0.01	86.75	-0.41	-0.0	-33.38	-4.70	-0.01	-1.54	7.92	0.11	0.00	9.46	14.6	2
4955	Tube 4	Origin	72.75	0.18	0.00	-0.01	86.75	-0.41	-0.0	-33.65	-4.45	-0.01	-1.55	7.92	0.11	0.00	9.48	14.6	2
4955	4955:Coax7	End	76.50	0.10	0.00	-0.01	70.05	-0.46	-0.0	-33.65	-4.45	-0.01	-1.50	5.99	0.11	0.00	7.49	11.5	2
4955	4955:Coax7	Origin	76.50	0.10	0.00	-0.01	70.05	-0.46	-0.0	-34.04	-4.03	-0.01	-1.52	5.99	0.10	0.00	7.51	11.6	2
4955	Tube 4	End	81.50	0.03	0.00	-0.01	49.88	-0.52	-0.0	-34.04	-4.03	-0.01	-1.46	3.92	0.09	0.00	5.38	8.3	2
4955	Tube 4	Origin	81.50	0.03	0.00	-0.01	49.88	-0.52	-0.0	-34.44	-3.65	-0.01	-1.47	3.92	0.08	0.00	5.40	8.3	2
4955	4955:Coax8	End	86.50	0.01	0.00	-0.00	31.63	-0.59	-0.0	-34.44	-3.65	-0.01	-1.41	2.30	0.08	0.00	3.71	5.7	2
4955	4955:Coax8	Origin	86.50	0.01	0.00	-0.00	31.63	-0.59	-0.0	-34.80	-3.25	-0.01	-1.43	2.30	0.07	0.00	3.73	5.7	2
4955	SpliceT	End	88.75	0.00	0.00	-0.00	24.31	-0.62	-0.0	-34.80	-3.25	-0.01	-1.40	1.71	0.07	0.00	3.11	4.8	2
4955	SpliceT	Origin	88.75	0.00	0.00	-0.00	24.31	-0.62	-0.0	-35.01	-3.04	-0.01	-1.41	1.71	0.06	0.00	3.12	4.8	2
4955	4955:g	End	91.50	0.00	0.00	0.00	15.95	-0.66	-0.0	-35.01	-3.04	-0.01	-1.38	1.08	0.06	0.00	2.46	3.8	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme - One Circuit":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	49.47	0.06	-1.75	-0.09	0.00	0.0	-0.01	0.02	-0.00	-0.00	0.15	0.00	0.00	0.16	0.2	1
Davit1	Davit1:End	End	4.63	51.78	0.06	5.58	-0.00	0.00	0.0	-0.01	0.02	-0.00	-0.00	0.00	0.01	0.00	0.02	0.0	3
Davit2	Davit2:O	Origin	0.00	49.38	0.06	-3.03	-0.97	-0.00	-0.0	0.52	0.21	0.00	0.12	1.70	0.00	0.00	1.83	2.8	1
Davit2	Davit2:End	End	4.63	50.66	0.06	-10.64	0.00	0.00	-0.0	0.52	0.21	0.00	0.17	0.00	0.15	0.00	0.31	0.5	3
Davit3	Davit3:O	Origin	0.00	39.77	0.05	-1.03	-0.28	0.00	0.0	-0.02	0.06	-0.00	-0.01	0.49	0.00	0.00	0.49	0.8	1
Davit3	#Davit3:0	End	2.80	40.86	0.05	3.30	-0.11	0.00	0.0	-0.02	0.06	-0.00	-0.01	0.25	0.00	0.00	0.25	0.4	1
Davit3	#Davit3:0	Origin	2.80	40.86	0.05	3.30	-0.11	0.00	0.0	-0.01	0.03	-0.00	-0.00	0.25	0.00	0.00	0.25	0.4	1
Davit3	Davit3:Bend	End	5.59	41.95	0.05	7.63	-0.02	0.00	0.0	-0.01	0.03	-0.00	-0.00	0.06	0.00	0.00	0.06	0.1	1
Davit3	Davit3:Bend	Origin	5.59	41.95	0.05	7.63	-0.02	0.00	0.0	-0.00	0.01	-0.00	-0.00	0.06	0.00	0.00	0.06	0.1	1
Davit3	Davit3:End	End	7.59	42.16	0.05	10.81	-0.00	0.00	0.0	-0.00	0.01	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	3
Davit4	Davit4:O	Origin	0.00	39.68	0.05	-2.43	-6.66	-0.00	-0.0	1.44	0.98	0.00	0.34	11.66	0.00	0.00	12.00	18.5	1
Davit4	#Davit4:0	End	2.80	40.18	0.05	-6.93	-3.92	-0.00	-0.0	1.44	0.98	0.00	0.38	8.64	0.00	0.00	9.02	13.9	1
Davit4	#Davit4:0	Origin	2.80	40.18	0.05	-6.93	-3.92	-0.00	-0.0	1.44	0.94	0.00	0.38	8.64	0.00	0.00	9.02	13.9	1
Davit4	Davit4:Bend	End	5.59	40.70	0.05	-11.53	-1.28	-0.00	-0.0	1.44	0.94	0.00	0.43	3.68	0.00	0.00	4.11	6.3	1
Davit4	Davit4:Bend	Origin	5.59	40.70	0.05	-11.53	-1.28	-0.00	0.0	1.58	0.64	0.00	0.48	3.68	0.00	0.00	4.15	6.4	1
Davit4	Davit4:End	End	7.59	40.46	0.05	-14.86	0.00	0.00	0.0	1.58	0.64	0.00	0.53	0.00	0.45	0.00	0.94	1.4	3
Davit5	Davit5:O	Origin	0.00	22.29	0.04	-0.05	-0.58	0.00	0.0	-0.03	0.09	-0.00	-0.01	0.60	0.00	0.00	0.60	0.9	1
Davit5	#Davit5:0	End	4.07	23.41	0.04	4.63	-0.20	0.00	0.0	-0.03	0.09	-0.00	-0.01	0.31	0.00	0.00	0.31	0.5	1
Davit5	#Davit5:0	Origin	4.07	23.41	0.04	4.63	-0.20	0.00	0.0	-0.01	0.04	-0.00	-0.00	0.31	0.00	0.00	0.31	0.5	1
Davit5	Davit5:Bend	End	8.14	24.53	0.04	9.31	-0.02	0.00	0.0	-0.01	0.04	-0.00	-0.00	0.06	0.00	0.00	0.06	0.1	1
Davit5	Davit5:Bend	Origin	8.14	24.53	0.04	9.31	-0.02	0.00	0.0	-0.00	0.01	-0.00	-0.00	0.06	0.00	0.00	0.06	0.1	1
Davit5	Davit5:End	End	10.14	24.64	0.04	11.67	-0.00	0.00	0.0	-0.00	0.01	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	3
Davit6	Davit6:O	Origin	0.00	22.23	0.04	-1.35	-9.89	-0.00	-0.0	1.39	1.08	0.00	0.25	10.28	0.00	0.00	10.53	16.2	1
Davit6	#Davit6:0	End	4.07	22.89	0.04	-6.22	-5.50	-0.00	-0.0	1.39	1.08	0.00	0.31	8.59	0.00	0.00	8.90	13.7	1
Davit6	#Davit6:0	Origin	4.07	22.89	0.04	-6.22	-5.50	-0.00	-0.0	1.40	1.01	0.00	0.31	8.59	0.00	0.00	8.90	13.7	1
Davit6	Davit6:Bend	End	8.14	23.57	0.04	-11.26	-1.39	-0.00	-0.0	1.40	1.01	0.00	0.40	3.61	0.00	0.00	4.01	6.2	1
Davit6	Davit6:Bend	Origin	8.14	23.57	0.04	-11.26	-1.39	-0.00	0.0	1.56	0.69	0.00	0.45	3.61	0.00	0.00	4.06	6.2	1
Davit6	Davit6:End	End	10.14	23.43	0.04	-13.79	0.00	0.00	0.0	1.56	0.69	0.00	0.52	0.00	0.48	0.00	0.99	1.5	3
Davit7	Davit7:O	Origin	0.00	11.08	0.03	0.27	-0.30	0.00	0.0	-0.02	0.07	-0.00	-0.00	0.53	0.00	0.00	0.54	0.8	1
Davit7	#Davit7:0	End	2.80	11.53	0.03	2.37	-0.12	0.00	0.0	-0.02	0.07	-0.00	-0.00	0.26	0.00	0.00	0.27	0.4	1

Davit7	#Davit7:0	Origin	2.80	11.53	0.03	2.37	-0.12	0.00	0.0	-0.01	0.04	-0.00	-0.00	0.26	0.00	0.00	0.27	0.4	1
Davit7	Davit7:Bend	End	5.59	11.98	0.03	4.48	-0.02	0.00	0.0	-0.01	0.04	-0.00	-0.00	0.06	0.00	0.00	0.06	0.1	1
Davit7	Davit7:Bend	Origin	5.59	11.98	0.03	4.48	-0.02	0.00	0.0	-0.00	0.01	-0.00	-0.00	0.06	0.00	0.00	0.06	0.1	1
Davit7	Davit7:End	End	7.59	12.03	0.03	6.01	-0.00	0.00	0.0	-0.00	0.01	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	3
Davit8	Davit8:O	Origin	0.00	11.04	0.03	-0.74	-7.42	-0.00	-0.0	1.37	1.08	0.00	0.32	12.99	0.00	0.00	13.31	20.5	1
Davit8	#Davit8:0	End	2.80	11.37	0.03	-2.94	-4.40	-0.00	-0.0	1.37	1.08	0.00	0.36	9.71	0.00	0.00	10.07	15.5	1
Davit8	#Davit8:0	Origin	2.80	11.37	0.03	-2.94	-4.40	-0.00	-0.0	1.37	1.04	0.00	0.36	9.71	0.00	0.00	10.08	15.5	1
Davit8	Davit8:Bend	End	5.59	11.71	0.03	-5.25	-1.49	-0.00	-0.0	1.37	1.04	0.00	0.41	4.29	0.00	0.00	4.70	7.2	1
Davit8	Davit8:Bend	Origin	5.59	11.71	0.03	-5.25	-1.49	-0.00	0.0	1.54	0.75	0.00	0.46	4.29	0.00	0.00	4.75	7.3	1
Davit8	Davit8:End	End	7.59	11.65	0.03	-6.96	0.00	0.00	0.0	1.54	0.75	0.00	0.51	0.00	0.52	0.00	1.04	1.6	3

Summary of Guy Tensions and Usages for Load Case "NESC Extreme - One Circuit":

Guy Label	Max. Tension (kips)	Allowable Tension (kips)	Factored Allowable (kips)	Usage %
Guy1	0.30	43.24	43.24	0.70
Guy2	29.92	43.24	43.24	69.18

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme - One Circuit":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	0.000	80.00	80.00	0.00
Clamp2	0.552	80.00	80.00	0.69
Clamp3	0.000	80.00	80.00	0.00
Clamp4	1.703	80.00	80.00	2.13
Clamp5	0.000	80.00	80.00	0.00
Clamp6	1.703	80.00	80.00	2.13
Clamp7	0.000	80.00	80.00	0.00
Clamp8	1.703	80.00	80.00	2.13
Clamp9	0.128	80.00	80.00	0.16
Clamp10	0.128	80.00	80.00	0.16
Clamp11	0.128	80.00	80.00	0.16
Clamp12	0.128	80.00	80.00	0.16
Clamp13	0.128	80.00	80.00	0.16
Clamp14	0.128	80.00	80.00	0.16
Clamp15	0.128	80.00	80.00	0.16
Clamp16	0.128	80.00	80.00	0.16
Clamp17	5.508	80.00	80.00	6.88
Clamp18	2.128	80.00	80.00	2.66
Clamp19	2.619	80.00	80.00	3.27
Clamp20	2.619	80.00	80.00	3.27
Clamp21	4.849	80.00	80.00	6.06

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
4955	98.20	NESC Extreme - One Circuit	15	5986.6

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	0.49	NESC Heavy - One Circuit	1	56.9
Davit2	9.12	NESC Heavy - One Circuit	1	56.9
Davit3	1.30	NESC Heavy - One Circuit	1	93.3
Davit4	42.68	NESC Heavy - One Circuit	1	93.3
Davit5	1.57	NESC Heavy - One Circuit	1	146.0
Davit6	34.83	NESC Heavy - One Circuit	1	146.0
Davit7	1.32	NESC Heavy - One Circuit	1	93.3
Davit8	43.26	NESC Heavy - One Circuit	1	93.3

Summary of Guy Usages:

Guy Label	Maximum Usage %	Load Case	Weight (lbs)	Unstressed Length (ft)
Guy1	0.70	NESC Extreme - One Circuit	44.1	61.81
Guy2	69.18	NESC Extreme - One Circuit	44.1	61.81

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy - One Circuit	62.65	4955	Steel Pole
NESC Extreme - One Circuit	98.20	4955	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy - One Circuit	62.65	4955	15
NESC Extreme - One Circuit	98.20	4955	15

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number

NESC Heavy - One Circuit	43.26	Davit8 1
NESC Extreme - One Circuit	20.48	Davit8 1

Summary of Guy Usages by Load Case:

Load Case	Maximum Usage %	Guy Label
NESC Heavy - One Circuit	37.33	Guy2
NESC Extreme - One Circuit	69.18	Guy2

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp2	Clamp	1.01	NESC Heavy - One Circuit	0.0
Clamp3	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp4	Clamp	2.68	NESC Heavy - One Circuit	0.0
Clamp5	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp6	Clamp	2.68	NESC Heavy - One Circuit	0.0
Clamp7	Clamp	0.00	NESC Heavy - One Circuit	0.0
Clamp8	Clamp	2.68	NESC Heavy - One Circuit	0.0
Clamp9	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp10	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp11	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp12	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp13	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp14	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp15	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp16	Clamp	0.35	NESC Heavy - One Circuit	0.0
Clamp17	Clamp	6.88	NESC Extreme - One Circuit	0.0
Clamp18	Clamp	3.30	NESC Heavy - One Circuit	0.0
Clamp19	Clamp	3.27	NESC Extreme - One Circuit	0.0
Clamp20	Clamp	3.27	NESC Extreme - One Circuit	0.0
Clamp21	Clamp	6.06	NESC Extreme - One Circuit	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy - One Circuit	Clamp1	Clamp	Davit1:End	0.000	0.000	0.000	0.000
NESC Heavy - One Circuit	Clamp2	Clamp	Davit2:End	0.000	0.536	0.604	0.808
NESC Heavy - One Circuit	Clamp3	Clamp	Davit3:End	0.000	0.000	0.000	0.000
NESC Heavy - One Circuit	Clamp4	Clamp	Davit4:End	0.000	0.798	1.989	2.143
NESC Heavy - One Circuit	Clamp5	Clamp	Davit5:End	0.000	0.000	0.000	0.000
NESC Heavy - One Circuit	Clamp6	Clamp	Davit6:End	0.000	0.798	1.989	2.143
NESC Heavy - One Circuit	Clamp7	Clamp	Davit7:End	0.000	0.000	0.000	0.000
NESC Heavy - One Circuit	Clamp8	Clamp	Davit8:End	0.000	0.798	1.989	2.143
NESC Heavy - One Circuit	Clamp9	Clamp	4955:Coax1	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp10	Clamp	4955:Coax2	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp11	Clamp	4955:Coax3	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp12	Clamp	4955:Coax4	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp13	Clamp	4955:Coax5	0.000	0.043	0.274	0.277

NESC Heavy - One Circuit	Clamp14	Clamp	4955:Coax6	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp15	Clamp	4955:Coax7	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp16	Clamp	4955:Coax8	0.000	0.043	0.274	0.277
NESC Heavy - One Circuit	Clamp17	Clamp	4955:TopCon	0.000	1.237	0.000	1.237
NESC Heavy - One Circuit	Clamp18	Clamp	4955:BotCon	0.000	0.391	2.613	2.642
NESC Heavy - One Circuit	Clamp19	Clamp	4955:BotCTop	0.000	0.579	0.000	0.579
NESC Heavy - One Circuit	Clamp20	Clamp	4955:BotCBot	0.000	-0.579	0.000	0.579
NESC Heavy - One Circuit	Clamp21	Clamp	4955:Mid	0.000	-1.032	0.000	1.032
NESC Extreme - One Circuit	Clamp1	Clamp	Davit1:End	0.000	0.000	0.000	0.000
NESC Extreme - One Circuit	Clamp2	Clamp	Davit2:End	0.000	0.536	0.130	0.552
NESC Extreme - One Circuit	Clamp3	Clamp	Davit3:End	0.000	0.000	0.000	0.000
NESC Extreme - One Circuit	Clamp4	Clamp	Davit4:End	0.000	1.479	0.844	1.703
NESC Extreme - One Circuit	Clamp5	Clamp	Davit5:End	0.000	0.000	0.000	0.000
NESC Extreme - One Circuit	Clamp6	Clamp	Davit6:End	0.000	1.479	0.844	1.703
NESC Extreme - One Circuit	Clamp7	Clamp	Davit7:End	0.000	0.000	0.000	0.000
NESC Extreme - One Circuit	Clamp8	Clamp	Davit8:End	0.000	1.479	0.844	1.703
NESC Extreme - One Circuit	Clamp9	Clamp	4955:Coax1	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp10	Clamp	4955:Coax2	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp11	Clamp	4955:Coax3	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp12	Clamp	4955:Coax4	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp13	Clamp	4955:Coax5	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp14	Clamp	4955:Coax6	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp15	Clamp	4955:Coax7	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp16	Clamp	4955:Coax8	0.000	0.110	0.065	0.128
NESC Extreme - One Circuit	Clamp17	Clamp	4955:TopCon	0.000	5.508	0.000	5.508
NESC Extreme - One Circuit	Clamp18	Clamp	4955:BotCon	0.000	1.747	1.215	2.128
NESC Extreme - One Circuit	Clamp19	Clamp	4955:BotCTop	0.000	2.619	0.000	2.619
NESC Extreme - One Circuit	Clamp20	Clamp	4955:BotCBot	0.000	-2.619	0.000	2.619
NESC Extreme - One Circuit	Clamp21	Clamp	4955:Mid	0.000	-4.849	0.000	4.849

Loads At Guy Attachments For All Load Cases:

Note: Loads on the structure from guys have same sign convention as LCA file.

Load Case	Guy Label	Structure Attach Label	Structure Attach Vert. Load (kips)	Structure Attach Tran. Load (kips)	Structure Attach Long. Load (kips)	Structure Attach Load Res. (kips)
NESC Heavy - One Circuit	Guy1	4955:Guy	0.042	0.032	0.001	0.053
NESC Heavy - One Circuit	Guy2	4955:Guy	13.430	-8.956	-0.001	16.142
NESC Extreme - One Circuit	Guy1	4955:Guy	0.225	0.201	0.000	0.302
NESC Extreme - One Circuit	Guy2	4955:Guy	24.841	-16.668	-0.001	29.915

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy - One Circuit	3.870	0.000	11.376	350.262	0.000	0.000
NESC Extreme - One Circuit	8.259	0.000	4.397	662.186	0.000	0.000

*** Weight of structure (lbs):
    Weight of Guys: 88.3
    Weight of Tubular Davit Arms: 778.9

Weight of Steel Poles:	5986.6
Total:	6853.8

*** End of Report

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

Subject:	Direct Embedment Check
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Direct Embedment Calculation

Reactions:

Shear = $Shear := 3.19 \cdot kips \cdot 1.1 = 3509\,lbf$ (User Input from PLSPole)

Vertical = $Vertical := 33.19 \cdot kips \cdot 1.1 = 36509\,lbf$ (User Input from PLSPole)

Moment = $Moment := 31.13 \cdot kips \cdot ft \cdot 1.1 = 34 \cdot kip \cdot ft$ (User Input from PLSPole)

$$E := \frac{Moment}{Shear} = 9.759\,ft$$

Embedment Properties:

Depth of Embedment = $D_{emb} := 13.5 \cdot ft$ (User Input)

Pole Diameter = $B_p := 2.33 \cdot ft$ (User Input)

Increment Length = $Ic := 0.01 \cdot ft$ (User Input)

Number of Increments = $N := \frac{D_{emb}}{Ic} = 1350$ (User Input)

$i := 0 .. N$

Internal Fricton Angle = $\phi := 34 \cdot deg$ (User Input)

Unit Weight = $\gamma := 0.1 \cdot kcf$ (User Input)

Cohesion = $c := 0 \cdot ksf$ (User Input)

Pressure Coefficients: Taken from Bullentin No. 12 by J. Brinch Hansen

Friction Coefficient at Ground Level =

$$K_{qO} := \left(\cos(\phi)\cdot\tan\left(\frac{\pi}{4}+\frac{\phi}{2}\right)\right)e^{\left[\left(\frac{\pi}{2}+\phi\right)\cdot\tan(\phi)\right]} - \left(\cos(\phi)\cdot\tan\left(\frac{\pi}{4}-\frac{\phi}{2}\right)\right)e^{\left[\left(\phi-\frac{\pi}{2}\right)\cdot\tan(\phi)\right]} = 6.5 \quad \text{(Eq 4)}$$

Cohesion Coefficient at Ground Level =

$$K_{cO} := \left[\cos(\phi)\cdot\tan\left(\frac{\pi}{4}+\frac{\phi}{2}\right)\cdot e^{\left[\left(\frac{\pi}{2}+\phi\right)\cdot\tan(\phi)\right]} - 1\right]\cdot\tan(\phi)^{-1} = 8.469 \quad \text{(Eq 5)}$$

$$d_{cX} := 1.58 + 4.09\cdot\tan(\phi)^{4} = 2.427 \quad \text{(Eq 12)}$$

Bearing Capacity Factor =

$$N_c := \frac{\left[\tan\left(\frac{\pi}{4}+\frac{\phi}{2}\right)^{2}\cdot e^{(\pi\cdot\tan(\phi))} - 1\right]}{\tan(\phi)} = 42.164 \quad \text{(Eq 13)}$$

Earth Pressure Coefficient at Rest =

$$K_o := 1 - \sin(\phi) = 0.441 \quad \text{(Eq 14)}$$

Friction Coefficient at Great Depth =

$$K_{qX} := N_c\cdot d_{cX}\cdot K_o\cdot\tan(\phi) = 30.421 \quad \text{(Eq 16)}$$

Cohesion Coefficient at Great Depth =

$$K_{cX} := N_c\cdot d_{cX} = 102.314 \quad \text{(Eq 15)}$$

$$a_q := \frac{\left(K_{qO}\cdot K_o\cdot\sin(\phi)\right)}{\left[\left(K_{qX} - K_{qO}\right)\cdot\sin\left(\frac{\pi}{4}+\frac{\phi}{2}\right)\right]} = 0.076 \quad \text{(Eq 18)}$$

$$a_c := \frac{\left(2\cdot K_{cO}\cdot\sin\left(\frac{\pi}{4}+\frac{\phi}{2}\right)\right)}{\left(K_{cX} - K_{cO}\right)} = 0.159 \quad \text{(Eq 20)}$$

Distance Below Ground Level =

Bearing Pressure =

Friction Factor =

Cohesion Factor =

$$z_i := \begin{vmatrix} x \leftarrow (Ic \cdot i) \\ d \leftarrow (0 + x) \end{vmatrix} \qquad q_i := z_i \cdot \gamma \qquad K_{q_i} := \frac{\left(K_{qO} + K_{qX} \cdot a_q \cdot \frac{z_i}{B_p}\right)}{\left(1 + a_q \cdot \frac{z_i}{B_p}\right)} \qquad K_{c_i} := \frac{\left(K_{cO} + K_{cX} \cdot a_c \cdot \frac{z_i}{B_p}\right)}{\left(1 + a_c \cdot \frac{z_i}{B_p}\right)}$$

z_i =	q_i =	K_{q_i} =	K_{c_i} =
0 ft	0 ·ksf	6.48	8.47
0.01	$1 \cdot 10^{-3}$	6.49	8.53
0.02	$2 \cdot 10^{-3}$	6.5	8.6
0.03	$3 \cdot 10^{-3}$	6.51	8.66
0.04	$4 \cdot 10^{-3}$	6.52	8.72
0.05	$5 \cdot 10^{-3}$	6.52	8.79
0.06	$6 \cdot 10^{-3}$	6.53	8.85
0.07	$7 \cdot 10^{-3}$	6.54	8.92
0.08	$8 \cdot 10^{-3}$	6.55	8.98
0.09	$9 \cdot 10^{-3}$	6.55	9.04
0.1	0.01	6.56	9.11
0.11	0.01	6.57	9.17
0.12	0.01	6.58	9.23
0.13	0.01	6.58	9.3
0.14	0.01	6.59	9.36
...	...	...	...

Ulitmate Lateral Force per Unit Length =

$pult\phi_i := B_p \cdot q_i \cdot K_{q_i}$

Resisting Force per Increment =

$pultc_i := B_p \cdot c \cdot K_{c_i}$

$Fn_i := Ic \cdot (pult\phi_i + pultc_i)$

Moment Arm =

$MA_i := z_i + E$

Resisting Moment per Increment =

$M_i := Fn_i \cdot MA_i$

$pult\phi_i$ =	·klf	$pultc_i$ =	·klf	Fn_i =	·kips	MA_i =	ft	M_i =	·ft·ki
0		0		0		9.8		0	
0.02		0		$1.51 \cdot 10^{-4}$		9.8		$1.5 \cdot 10^{-3}$	
0.03		0		$3.03 \cdot 10^{-4}$		9.8		$3 \cdot 10^{-3}$	
0.05		0		$4.55 \cdot 10^{-4}$		9.8		$4.5 \cdot 10^{-3}$	
0.06		0		$6.07 \cdot 10^{-4}$		9.8		$6 \cdot 10^{-3}$	
0.08		0		$7.6 \cdot 10^{-4}$		9.8		$7.5 \cdot 10^{-3}$	
0.09		0		$9.13 \cdot 10^{-4}$		9.8		$9 \cdot 10^{-3}$	
0.11		0		$1.07 \cdot 10^{-3}$		9.8		0	
0.12		0		$1.22 \cdot 10^{-3}$		9.8		0	
0.14		0		$1.37 \cdot 10^{-3}$		9.8		0	
0.15		0		$1.53 \cdot 10^{-3}$		9.9		0	
0.17		0		$1.68 \cdot 10^{-3}$		9.9		0	
0.18		0		$1.84 \cdot 10^{-3}$		9.9		0	
0.2		0		$1.99 \cdot 10^{-3}$		9.9		0	
0.22		0		$2.15 \cdot 10^{-3}$		9.9		0	
...		...		...		...		...	

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

Subject:	Direct Embedment Check
Location:	North Branford, CT
Rev. 1: 5/26/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.005

Calculate Hinge Point:

Guess = $a := 1053$ Change value untill M.1 and M.2 are approximately equal

$i := 0 .. a$

Sum of the Moments Above Hinge Point = $M_1 := \sum_i M_i = 2395 \cdot ft \cdot kips$

$i := (a + 1) .. N$

Sum of the Moments Below Hinge Point = $M_2 := \sum_i M_i = 2404 \cdot ft \cdot kips$

$i := 0 .. a$

Sum of the Force Above Hinge Point = $F_{r.1} := \sum_i Fn_i = 140.16 \cdot kips$

$i := (a + 1) .. N$

Sum of the Force Below Hinge Point = $F_{r.2} := \sum_i Fn_i = 109.96 \cdot kips$

Ultimate Shear Force at (E) Aboved Grade = $S_{ult} := F_{r.1} - F_{r.2} = 30.197 \cdot kips$

Check Embedment:

Factor of Safety = $\frac{S_{ult}}{Shear} = 8.606$

$Embedment\_Depth := if(S_{ult} > Shear, "OK", "NG")$

Embedment_Depth = "OK"

Network Modernization RFDS v3.0

Site ID	**CT11026A**	**Latitude**	41.31512
		Longitude	-72.74975
Site Name	Guilford/Route 1	**Site Type**	Structure (Non-Building)
Address	72 Notch Hill Road Route 22, Tower #4955 Line #150,North Branford	**Site Class**	Utility Lattice Towe
Market	CONNECTICUT	**Landlord**	

Configuration
4E-GU19

Approvals	
Market RF	
Market Development	

RFDS Revision		**Date**	07/29/2014
RFDS Final			
Work Order #		**NOC#**	877-611-5868

Site Information

Existing Configuration					Proposed Configuration			
1	2	3	4	Cabinet #	1	2	3	4
GSM				Technology	GSM/UMTS/LTE			
S8000				Cabinet type	6201 ODE			
				CBU				
				DUW30	1			
				DUL20				
				DUG20	1			
				DUS41	1			
				RBS6601				
6				dTRU/TRX				
				RU22 B4				
				RUS01 B2	3			
				RUS01 B4	6			

	Relocate cabinet
	Add cabinet
x	Swap cabinet
	Remove cabinet
	Make cabinet dark

Scope of Work

Swap existing Nortel cabinet for E/// 6201 cabinet. Add DUG,DUW&DUS41

ALPHA - Scope of Work

	Add new mount		Add RRU	Swap existing dualpole with quadpole.Swap existing single GMA's with twin GMA's on GSM/UMTS and Add AWS GMA on LTE.Add coax .Daisy chain all Rets and add homerun cable.
	Relocate antenna		Swap existing RRU	
	Add antenna		Remove RRU	
x	Swap antenna		Consolidate coax cables	
	Remove antenna	x	Add coax cables	
x	Add TMA		Add fiber cables	
x	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

BETA - Scope of Work

	Add new mount		Add RRU	Swap existing dualpole with quadpole.Swap existing single GMA's with twin GMA's on GSM/UMTS and Add AWS GMA on LTE.Add coax .Daisy chain all Rets and add homerun cable.
	Relocate antenna		Swap existing RRU	
	Add antenna		Remove RRU	
x	Swap antenna		Consolidate coax cables	
	Remove antenna	x	Add coax cables	
x	Add TMA		Add fiber cables	
x	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

GAMMA - Scope of Work

	Add new mount		Add RRU	Swap existing dualpole with quadpole.Swap existing single GMA's with twin GMA's on GSM/UMTS and Add AWS GMA on LTE.Add coax .Daisy chain all Rets and add homerun cable.
	Relocate antenna		Swap existing RRU	
	Add antenna		Remove RRU	
x	Swap antenna		Consolidate coax cables	
	Remove antenna	x	Add coax cables	
x	Add TMA		Add fiber cables	
x	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

DELTA - Scope of Work

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Network Modernization RFDS v3.0

Site ID	**CT11026A**	**Latitude**	41.31512
		Longitude	-72.74975
Site Name	Guilford/Route 1	**Site Type**	Structure (Non-Building)
Address	72 Notch Hill Road Route 22, Tower #4955 Line #150,North Branford	**Site Class**	Utility Lattice Towe
Market	CONNECTICUT	**Landlord**	

Configuration
4E-GU19

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date 07/29/2014

ALPHA (view from behind)

Existing Configuration					Proposed Configuration			
x				Mount	x			
GSM				Technology	GSM/UMTS	LTE		
B2				Band	B2	B4		
P				Active/Passive	P	P		
Dual pole				Ant. Type	Quad pole			
RR90_17_02DP				Ant. Model	APX16DWV_16DWVS			
EMS				Ant. Vendor	RFS			
118				Ant. Height	118			
79				Azimuth	79			
No				RET deployed	Yes	Yes		
2				E-Tilt	2	2		
0				M-Tilt	0	0		
1				TMA #	1	1		
d B2				TMA Type	dd B2	dd B4		
				RRU #				
				RRU Type				
2				Used Coax #	2	2		
7/8"				Coax Type	7/8"	7/8"		
140				Coax Length (ft)	140			
				Fiber (CPRI) #				
				Splitter #				
				Combiner #				
				Combiner Type				

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
x	Swap antenna		Consolidate coax cables
	Remove antenna	x	Add coax cables
x	Add TMA		Add fiber cables
x	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing dualpole with quadpole.Swap existing single GMA's with twin GMA's on GSM/UMTS and Add AWS GMA on LTE.Add coax .Daisy chain all Rets and add homerun cable.

BETA (view from behind)

Existing Configuration					Proposed Configuration			
x					x			
GSM				Technology	GSM/UMTS	LTE		
B2				Band	B2	B4		
P				Active/Passive	P	P		
Dual pole				Ant. Type	Quad pole			
RR90_17_02DP				Ant. Model	APX16DWV_16DWVS			
EMS				Ant. Vendor	RFS			
118				Ant. Height	118			
185				Azimuth	185			
No				RET deployed	Yes	Yes		
2				E-Tilt	2	2		
0				M-Tilt	0	0		
1				TMA #	1	1		
d B2				TMA Type	dd B2	dd B4		
				RRU #				
				RRU Type				
2				Used Coax #	2	2		
7/8"				Coax Type	7/8"	7/8"		
140				Coax Length (ft)	140			
				Fiber (CPRI) #				
				Splitter #				
				Combiner #				
				Combiner Type				

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
x	Swap antenna		Consolidate coax cables
	Remove antenna	x	Add coax cables
x	Add TMA		Add fiber cables
x	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing dualpole with quadpole.Swap existing single GMA's with twin GMA's on GSM/UMTS and Add AWS GMA on LTE.Add coax .Daisy chain all Rets and add homerun cable.

Network Modernization RFDS v3.0

T-Mobile

Site ID	**CT11026A**	**Latitude**	41.31512
		Longitude	-72.74975
Site Name	Guilford/Route 1	**Site Type**	Structure (Non-Building)
Address	72 Notch Hill Road Route 22, Tower #4955 Line #150,North Branford	**Site Class**	Utility Lattice Towe
Market	CONNECTICUT	**Landlord**	

Configuration
4E-GU19

Approvals	
Market RF	
Market Development	

RFDS Revision	
RFDS Final	

Date 07/29/2014

GAMMA (view from behind)

Existing Configuration					Proposed Configuration			
x					x			
GSM				Technology	GSM/UMTS	LTE		
B2				Band	B2	B4		
P				Active/Passive	P	P		
Dual pole				Ant. Type	Quad pole			
RR90_17_02DP				Ant. Model	APX16DWV_16DWVS			
EMS				Ant. Vendor	RFS			
118				Ant. Height	118			
285				Azimuth	285			
No				RET deployed	Yes	Yes		
2				E-Tilt	2	2		
0				M-Tilt	0	0		
1				TMA #	1	1		
d B2				TMA Type	dd B2	dd B4		
				RRU #				
				RRU Type				
2				Used Coax #	2	2		
7/8"				Coax Type	7/8"	7/8"		
140				Coax Length (ft)	140			
				Fiber (CPRI) #				
				Splitter #				
				Combiner #				
				Combiner Type				

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
x	Swap antenna		Consolidate coax cables
	Remove antenna	x	Add coax cables
x	Add TMA		Add fiber cables
x	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing dualpole with quadpole.Swap existing single GMA's with twin GMA's on GSM/UMTS and Add AWS GMA on LTE.Add coax .Daisy chain all Rets and add homerun cable.

DELTA (view from behind)

Existing Configuration					Proposed Configuration			
				Technology				
				Band				
				Active/Passive				
				Ant. Type				
				Ant. Model				
				Ant. Vendor				
				Ant. Height				
				Azimuth				
				RET deployed				
				E-Tilt				
				M-Tilt				
				TMA #				
				TMA Type				
				RRU #				
				RRU Type				
				Used Coax #				
				Coax Type				
				Coax Length (ft)				
				Fiber (CPRI) #				
				Splitter #				
				Combiner #				
				Combiner Type				

	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
	Add antenna		Remove RRU
	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA		Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Product Data Sheet **APX16DWV-16DWVS-E-A20**

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

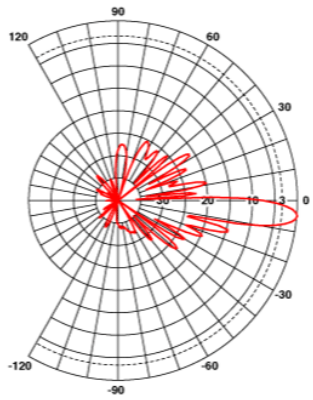
Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female

Mechanical Specifications

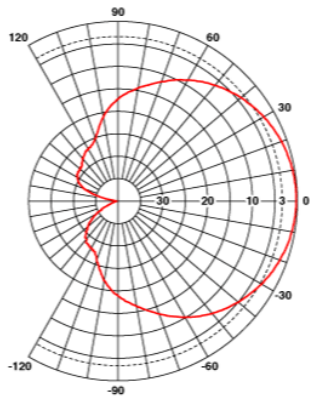
Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Vertical Pattern



Horizontal Pattern

Exhibit C

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11026A

Guilford/ Route 1
72 Notch Hill Road Route 22
North Branford, CT 06471

June 8, 2015

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general public allowable limit:	**11.98 %**

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

EBI Consulting
environmental | engineering | due diligence

June 8, 2015

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

Emissions Analysis for Site: **CT11026A – Guilford/ Route 1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **72 Notch Hill Road Route 22, North Branford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **72 Notch Hill Road Route 22, North Branford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

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

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

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

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

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

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

7) The antenna mounting height centerline of the proposed antennas is **102 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	102	Height (AGL):	102	Height (AGL):	102
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	10,237.91	ERP (W):	10,237.91	ERP (W):	10,237.91
Antenna A1 MPE%	3.99	Antenna B1 MPE%	3.99	Antenna C1 MPE%	3.99

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile	**11.98**
Site Total MPE %:	**11.98 %**

T-Mobile Sector 1 Total:	3.99 %
T-Mobile Sector 2 Total:	3.99 %
T-Mobile Sector 3 Total:	3.99 %
Site Total:	11.98 %

EBI Consulting
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Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	3.99 %
Sector 2:	3.99 %
Sector 3 :	3.99 %
T-Mobile Total:	11.98 %
Site Total:	11.98 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.98%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Exhibit D

EVERSOURCE ENERGY

107 Selden Street
Berlin, CT 06037

June 16, 2015

David Karpinski, General Manager
T-Mobile Northeast LLC
35 Griffin Road, South
Bloomfield, CT 06002

Re: Site Permitting Authorization

Dear Mr. Karpinski,

Authorization is hereby given to T-Mobile Northeast LLC , its employees and its duly authorized agents and independent contractors (hereinafter collectively referred to as "T-Mobile Northeast LLC "), to apply for any and all local municipal, state and federal licenses, permits and approvals, including but not limited to Connecticut Siting Council, building permits, zoning variances, zoning special exceptions, site plan and subdivision approvals, driveway, wetlands and terrain alteration permits, which are or may be necessary or required for T-Mobile Northeast LLC to construct, operate and maintain a wireless communications system (PCS System), and/or antenna site on the following property owned by The Connecticut Light & Power Company dba Eversource Energy (ES):

72 Notch Hill Road
North Branford, CT 06471
Pole 4955
CT11026C

The foregoing authorization is given subject to the following conditions:

1. This authorization shall be nonexclusive. Nothing herein shall prevent or restrict ES from authorizing any other person or entity to apply for any similar licenses, permits or approvals to construct, operate and maintain any other communication system or facility of any type on the property at any time.

2. This authorization shall not obligate ES to pay for or reimburse any costs or expenses or to provide any assistance of any kind in connection with any applications, or bind or obligate ES to agree or be responsible for any on-site or off-site improvements, development restrictions, impact fees or assessments, capital improvement charges, bonds or other security, or any other fee, assessment, charge or expense imposed or required as a condition of any license, permit or approval. T-Mobile Northeast LLC shall be solely and fully responsible for all fees, charges costs and expenses of any kind in connection with any applications. ES agrees to reasonably cooperate with T-Mobile Northeast LLC in signing such applications or other similar documents as may be required in order for T-Mobile Northeast LLC to apply for any license, permit or approval.

EVERSOURCE ENERGY

107 Selden Street
Berlin, CT 06037

3. This authorization shall not be deemed or construed to grant or transfer to T-Mobile Northeast LLC any interest in the property, whatsoever, and shall not in any respect obligate or require ES to sell, lease or license the Property to T-Mobile Northeast LLC or otherwise allow T-Mobile Northeast LLC to use or occupy the property for any purpose, regardless of whether any licenses, permits and approvals applied for by T-Mobile Northeast LLC for the property are granted. T-Mobile Northeast LLC understands and acknowledges that any and all applications filed by T-Mobile Northeast LLC for the property at T-Mobile Northeast LLC sole risk and without any enforceable expectation that the property will be made available for T-Mobile Northeast LLC ' use.

4. T-Mobile Northeast LLC shall be required to supply to ES, free of charge and contemporaneous with T-Mobile Northeast LLC filing of same, a complete copy of any and all applications, plans, reports and other public filings made by T-Mobile Northeast LLC with any local, municipal, state or federal governmental or regulatory officer, agency board, bureau, commission or other person or body for any licenses, permits or approvals for the property, and to keep ES fully informed on a regular basis of the status of T-Mobile Northeast LLC ' applications.

5. This authorization shall automatically expire six (6) months after the date of this letter, unless extended in writing by mutual agreement of ES and T-Mobile Northeast LLC .

Very truly yours,

T & D ROW & Survey Engineering
Eversource Energy

AGREED TO ON BEHALF OF
T-MOBILE NORTHEAST LLC

By: _____
Duly Authorized
David Karpinski
CT Market Manager

Date: 6-25-2015

72 Notch Hill Road
North Branford, CT 06471
Pole 4955
CT11026C