EMPIRE telecom

June 21, 2016

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

Regarding:	Notice of Exempt Modification – Swap of 3 Antennas and addition of associated lines
Property Address:	761 Federal Road, Brookfield, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 85 foot monopole tower ("tower") at the above-referenced address, latitude 41.47877, longitude -73.408305. AT&T's facility consists of six (6) wireless telecommunications antennas at 97 feet. The tower is controlled and owned by Eversource Energy. Assessor's information is attached hereto.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and adding (3) coax cables. The centerline height of said antennas is and will remain at 97 feet.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman of Brookfield and the Land Use Manager of the Town of Brookfield. A copy of this letter is also being sent to Eversource, Energy, the owner of the structure that AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's antennas and associated lines will be installed at 97 foot level of the 85 foot monopole tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation is attached.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Centek Engineering dated January 27, 2016).

For the foregoing reasons AT&T respectfully requests that the proposed swap of 3 antennas and addition of associated lines be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Nicole Caplan
Site Acquisition Specialist
Empire Telecom

CC: The Honorable Stephen C. Dunn, First Selectman, Town of Brookfield
Alice Dew, Land Use Manager, Town of Brookfield
Eversource Energy, c/o Robert Gray

16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com

761 FEDERAL RD

Location 761 FEDERAL RD

Mblu D08/ / 060/ /

Acct# 01179000

Owner CONNECTICUT STATE OF

Assessment $184,570

Appraisal $263,650

PID 2420

Building Count 1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$33,170	$230,480	$263,650

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$23,230	$161,340	$184,570

Owner of Record

Owner CONNECTICUT STATE OF
Co-Owner
Address 450 CAPITOL AVE
HARTFORD, CT 06106

Sale Price $0
Certificate
Book & Page 103/ 160
Sale Date 09/19/1973

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CONNECTICUT STATE OF	$0		103/ 160	09/19/1973

Building Information

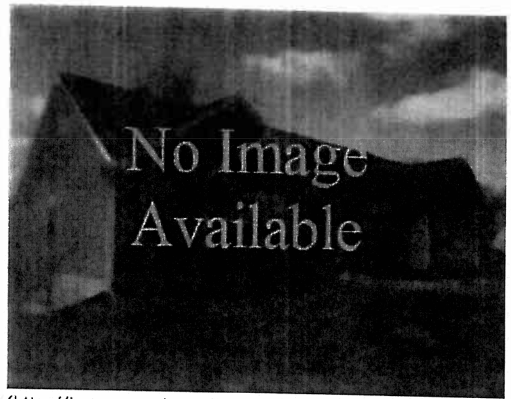
Building 1 : Section 1

Year Built:
Living Area: 0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	

Building Photo

Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bathrooms	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Kitchens	
Whirlpool Tub	
Hot Tubs	
Fireplaces	
Fin Bsmt Area	
Fin Bsmt Quality	
Bsmt Garages	



(http://images.vgsi.com/photos/BrookfieldCTPhotos//default.jpg)

Building Layout

Building Layout

Building Sub-Areas (sq ft)
No Data for Building Sub-Areas

Extra Features

Extra Features
No Data for Extra Features

Land

Land Use

Use Code 913
Description State Lnd Com
Zone TCD

Land Line Valuation

Size (Acres) 0.13
Depth
Assessed Value $161,340
Appraised Value $230,480

Outbuildings

Outbuildings						
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHD3	Comm Shed	CB		200 S.F.	$13,650	1
FN3	Fence 6'			110 L.F.	$1,040	1
CB1	PreCastConc Shed			80 S.F	$18,480	1

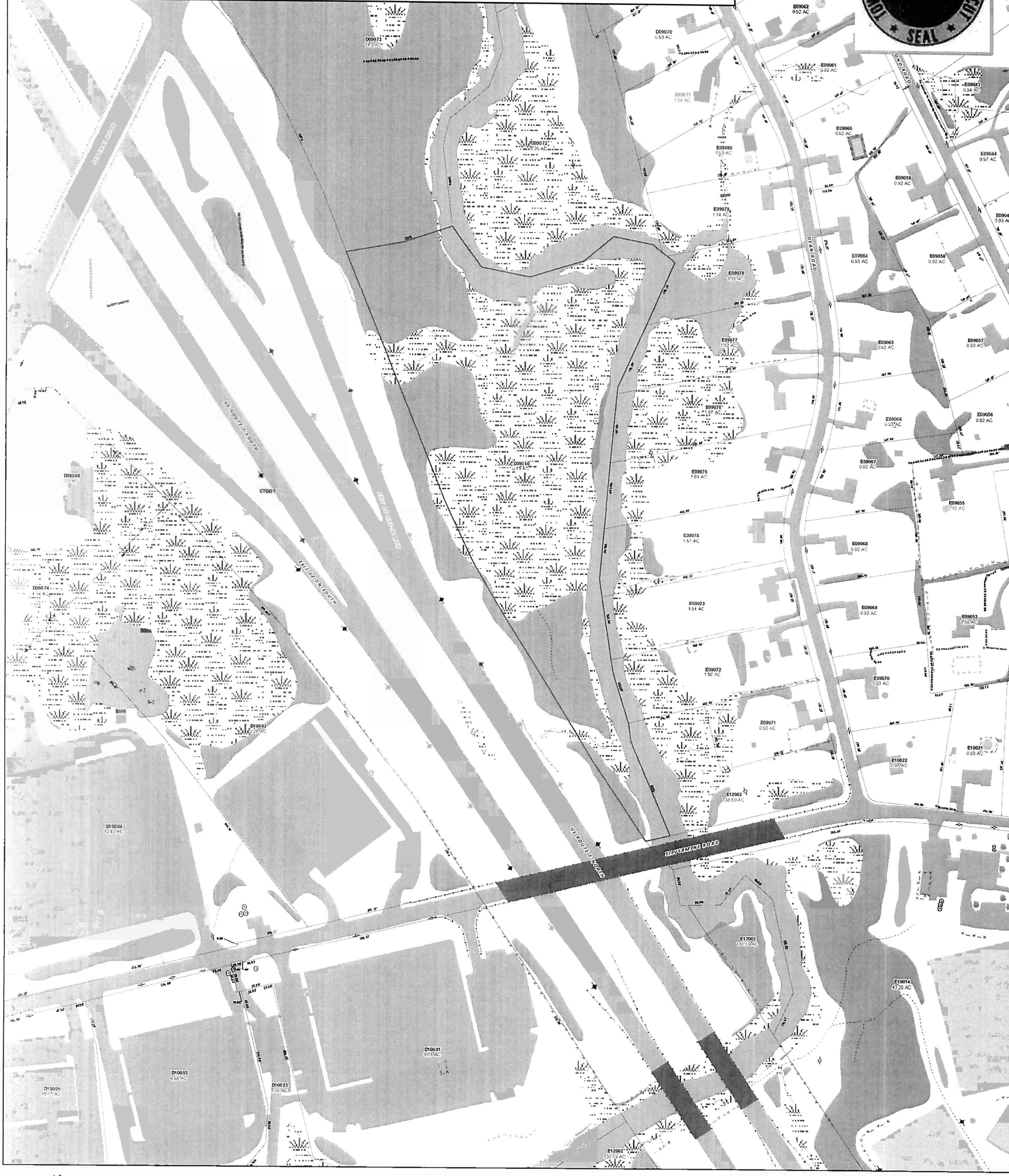
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$33,170	$230,480	$263,650
2014	$33,170	$230,480	$263,650
2013	$33,170	$230,480	$263,650

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$23,230	$161,340	$184,570
2014	$23,230	$161,340	$184,570
2013	$23,230	$161,340	$184,570

Town of Brookfield, Connecticut - Assessment Parcel Map

Parcel: **D08060** **Address:** 761 FEDERAL RD



Approximate Scale: 1 inch = 300 feet

Map Produced July 2015

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Brookfield and its mapping contractors assume no legal responsibility for the information contained herein.

PROJECT INFORMATION

SCOPE OF WORK:

- REMOVE (1) EXISTING LTE ANTENNA PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) EXISTING ANTENNAS TO BE REMOVED.
- NEW AT&T ANTENNAS: (1) NEW ANTENNA PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW ANTENNAS; (1) EXISTING GSM/UMTS ANTENNAS TO REMAIN (1 PER SECTOR)
- AT&T RRUs: (1) NEW RRUs PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs; (1) EXISTING RRU PER SECTOR TO REMAIN, FOR A TOTAL OF (3) EXISTING RRUs.
- (1) NEW A2 MODULE PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (3) NEW A2 MODULES.

SITE ADDRESS: 761 FEDERAL ROAD
BROOKFIELD, CT 06804

LATITUDE: 41.4787700 41° 28' 43.572"N
LONGITUDE: -73.4083050 -73° 24' 29.898"W

USID: 60437

TOWER OWNER:

TYPE OF SITE: UTILITY POLE/INDOOR EQUIPMENT

POLE HEIGHT: 85'-0"±
RAD CENTER: 97'-0"±

CURRENT USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

PROPOSED USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

DRAWING INDEX

	DRAWING INDEX	REV.
T-1	TITLE SHEET	A
GN-1	GROUNDING & GENERAL NOTES	A
A-1	COMPOUND LAYOUT	A
A-2	EQUIPMENT LAYOUTS	A
A-3	ANTENNA LAYOUTS & ELEVATIONS	A
A-4	DETAILS	A
A-5	ANTENNA MOUNTING DETAILS	A
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS	A

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

at&t MOBILITY

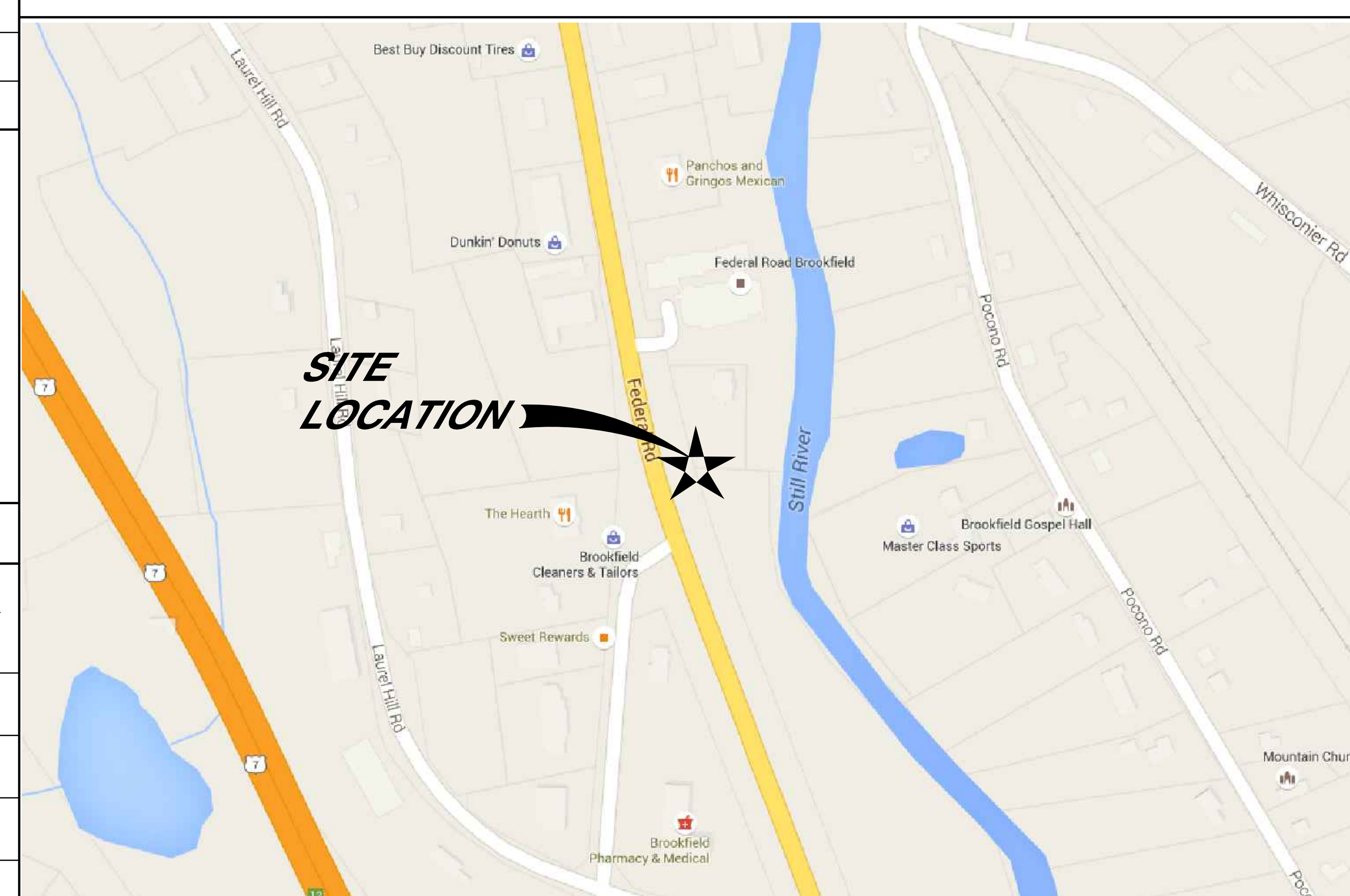
FA CODE: 10035273

SITE NUMBER: CT2185

SITE NAME: BROOKFIELD STATION RD

VICINITY MAP

1. DEPART ENTERPRISE DR TOWARD CAPITOL BLVD, 0.4MI. 2. TURN LEFT ONTO CAPITOL BLVD, 0.2MI. 3. TURN LEFT ONTO WEST ST, 0.3MI. 4. TAKE RAMP LEFT FOR I-91 SOUTH, 9.1MI. 5. AT EXIT 18, TAKE RAMP RIGHT FOR I-691 WEST TOWARD WATERBURY/MERIDEN, 7.9MI. 6. AT EXIT 1, TAKE RAMP LEFT FOR I-84 WEST TOWARD WATERBURY/DANBURY, 33.1MI. 7. AT EXIT 7, TAKE RAMP RIGHT FOR US-7 NORTH/US-202 EAST TOWARD BROOKFIELD/NEW MILFORD, 0.3MI. 8. ROAD NAME CHANGES TO US-7 NORTH, 4.2MI. 9. TURN RIGHT ONTO US-7/US-202/FEDERAL RD, 0.4MI. 10. ARRIVE AT 761 FEDERAL RD, BROOKFIELD, CT 06804 ON THE RIGHT.



PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ZONING:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:

COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 4 SECOND AVENUE
SUITE 204
DENVILLE, NJ 07834
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:

COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

GENERAL NOTES

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

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP-CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

COM-EX Consultants
4 SECOND AVENUE
SUITE 204
DENVILLE, NJ 07834
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2185
SITE NAME: BROOKFIELD STATION RD

761 FEDERAL ROAD
BROOKFIELD, CT 06804
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	11/05/15	ISSUED AS FINAL	AM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: AM | DRAWN BY: AM

SEAL:
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15133-EMP	T-1	A

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE–SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471–000–3PS–EG00–0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON–METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV–G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').
14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – EMPIRE TELECOM
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR (EMPIRE TELECOM).
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR
9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741–000–3APS–A00Z–00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
   - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA–101 2009 WITH LOCAL & COUNTY AMENDMENTS
20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
   - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA–222–G–1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR–1503, COAXIAL CABLE CONNECTIONS
21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.
22. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.
23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY DEWBERRY ENGINEERING FOR A RECENT UPGRADE DATED 07/06/2011. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

COM-EX Consultants
4 SECOND AVENUE
SUITE 204
DENVILLE, NJ 07834
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT2185
SITE NAME: BROOKFIELD STATION RD
761 FEDERAL ROAD
BROOKFIELD, CT 06804
FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

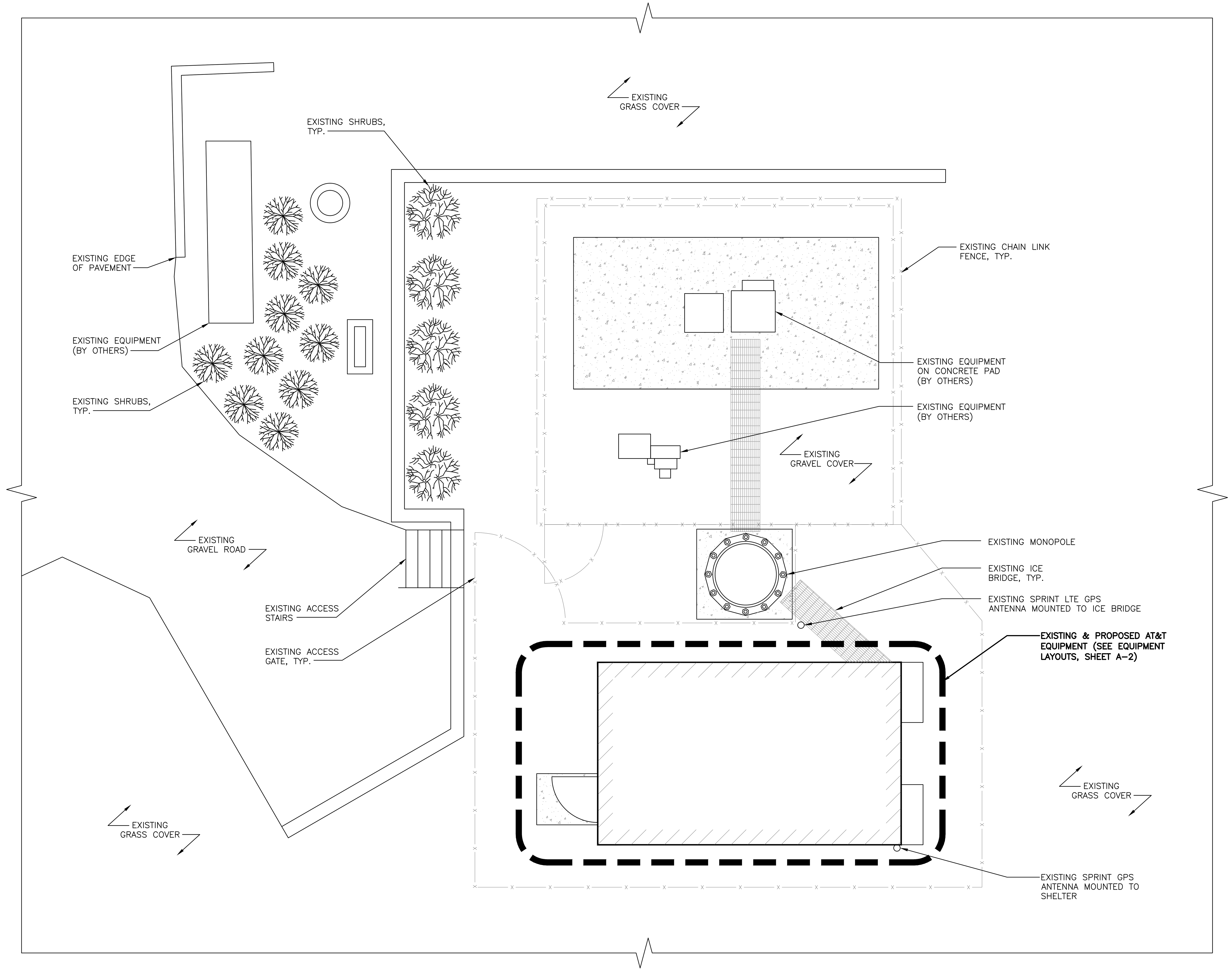
NO.	DATE	REVISIONS	BY	CHK	APP'D
0	11/05/15	ISSUED AS FINAL	AM	NDB	NDB

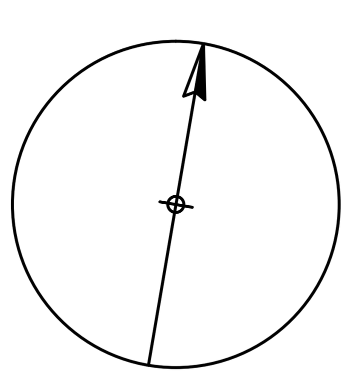
SCALE: AS SHOWN | DESIGNED BY: AM | DRAWN BY: AM

SEAL:
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T
DRAWING TITLE: GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15133–EMP	GN–1	A





COMPOUND LAYOUT

SCALE: 1" = 4'-0"

4 0 2 4 8 16

(IN FEET)
1/4 Inch = 1 Foot

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

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FAIRFIELD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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0	11/05/15	ISSUED AS FINAL	AM	NDB	NDB

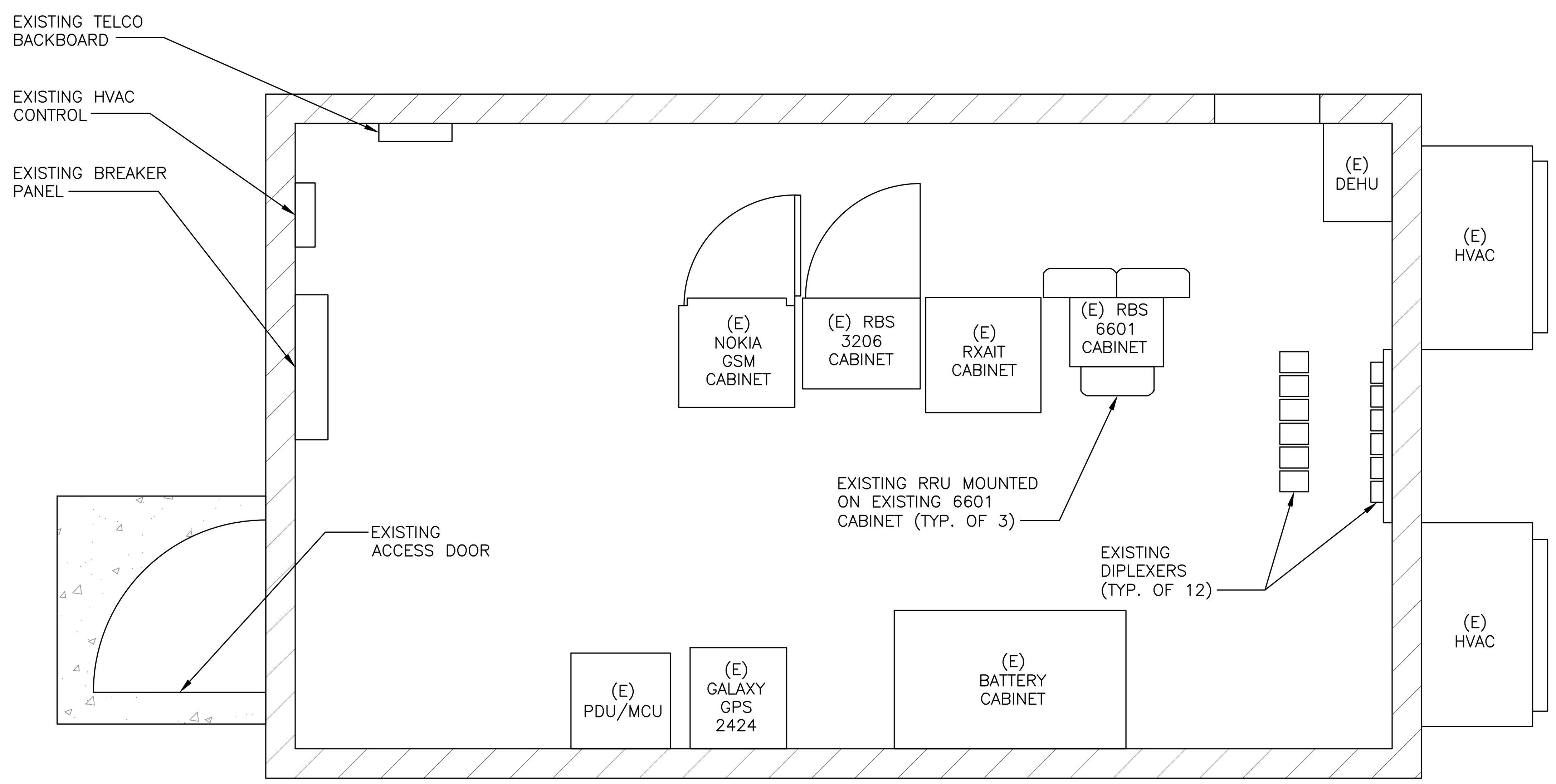
SCALE: AS SHOWN | DESIGNED BY: AM | DRAWN BY: AM

SEAL:
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE: COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15133-EMP	A-1	A

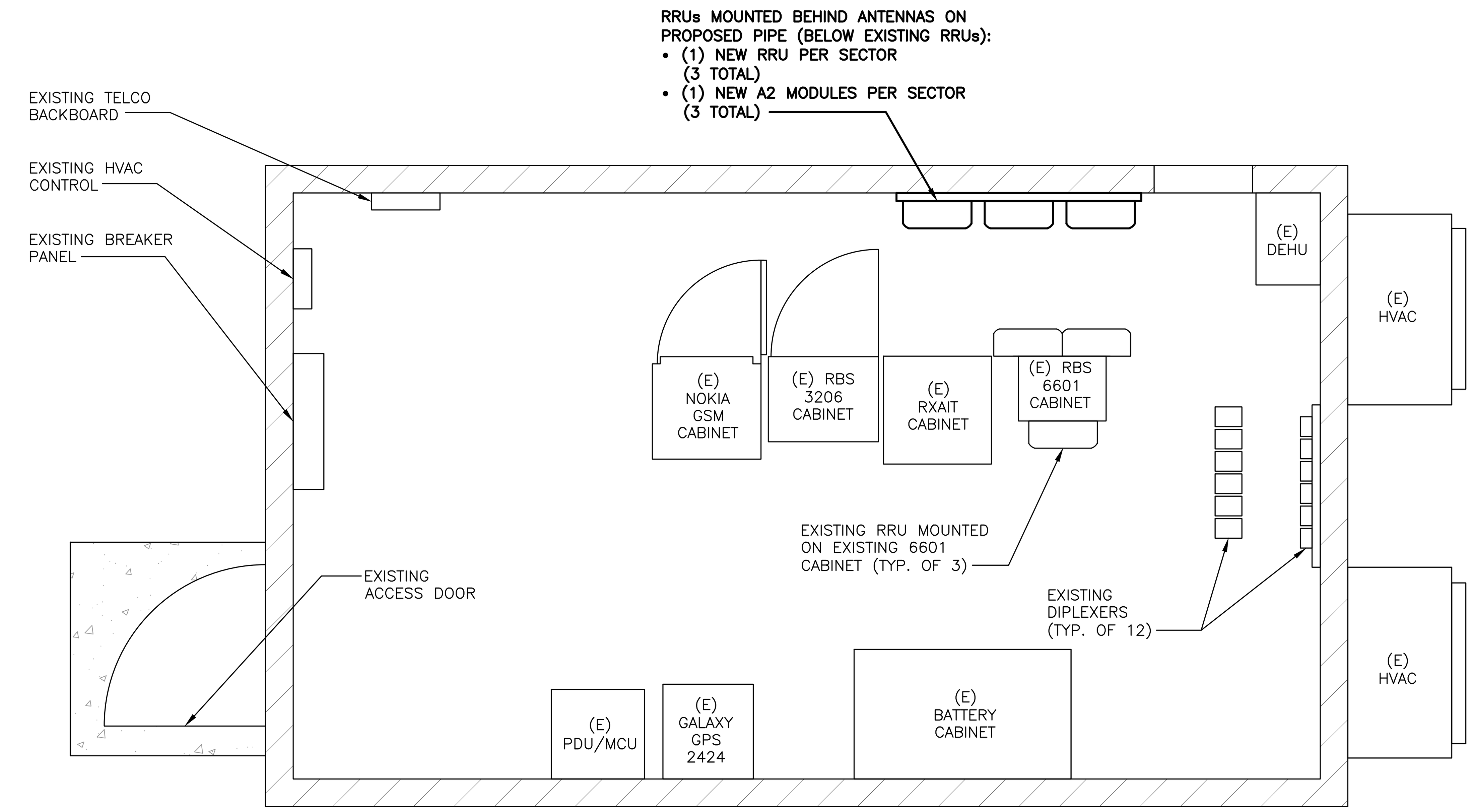


EXISTING EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

(IN FEET)
1/2 Inch = 1 Foot

NORTH



PROPOSED EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

(IN FEET)
1/2 Inch = 1 Foot

NORTH

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DRAWING TITLE: EQUIPMENT LAYOUTS

JOB NUMBER	DRAWING NUMBER	REV
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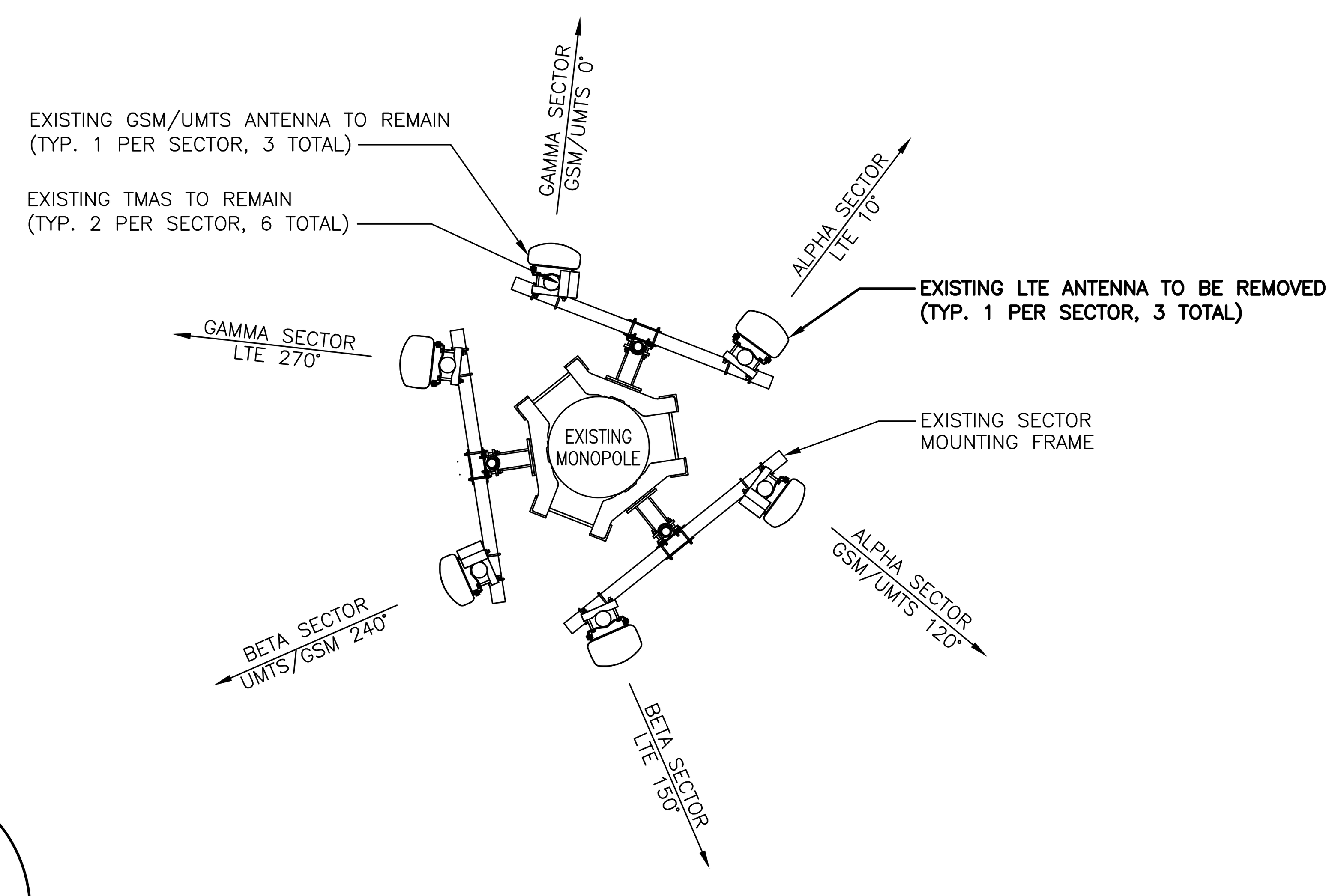
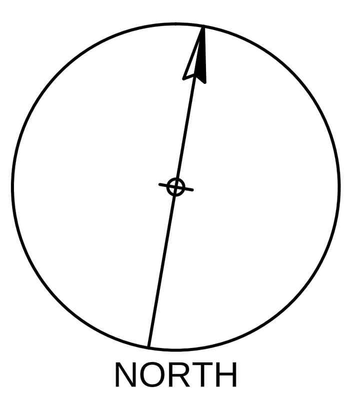
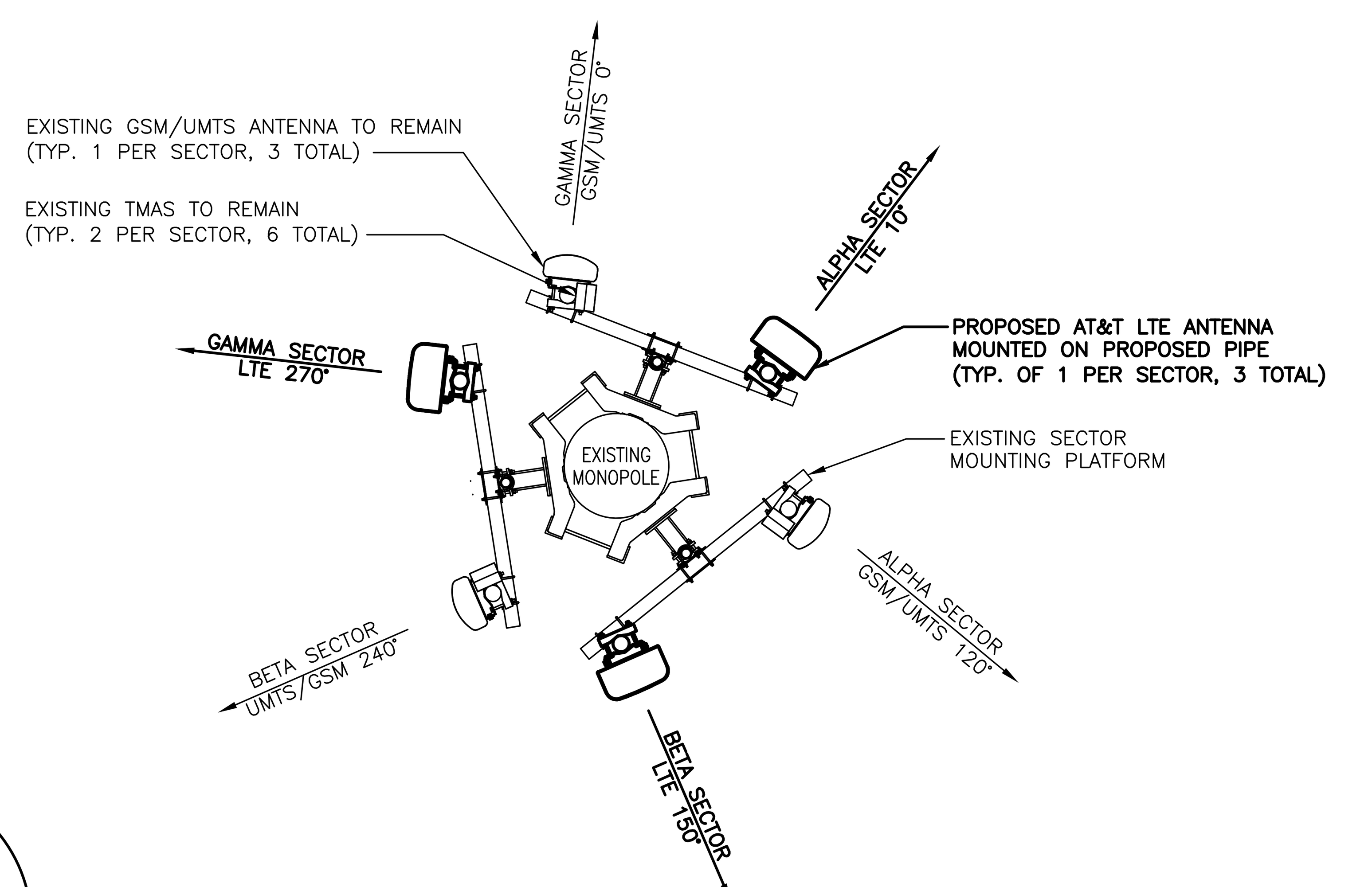
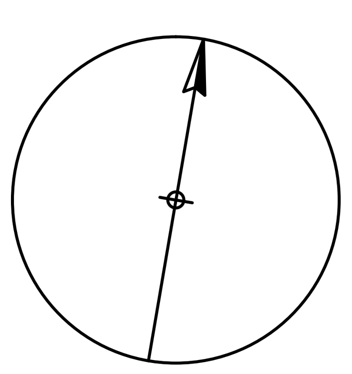




EXISTING ANTENNA LAYOUT

SCALE: N.T.S.





PROPOSED ANTENNA LAYOUT

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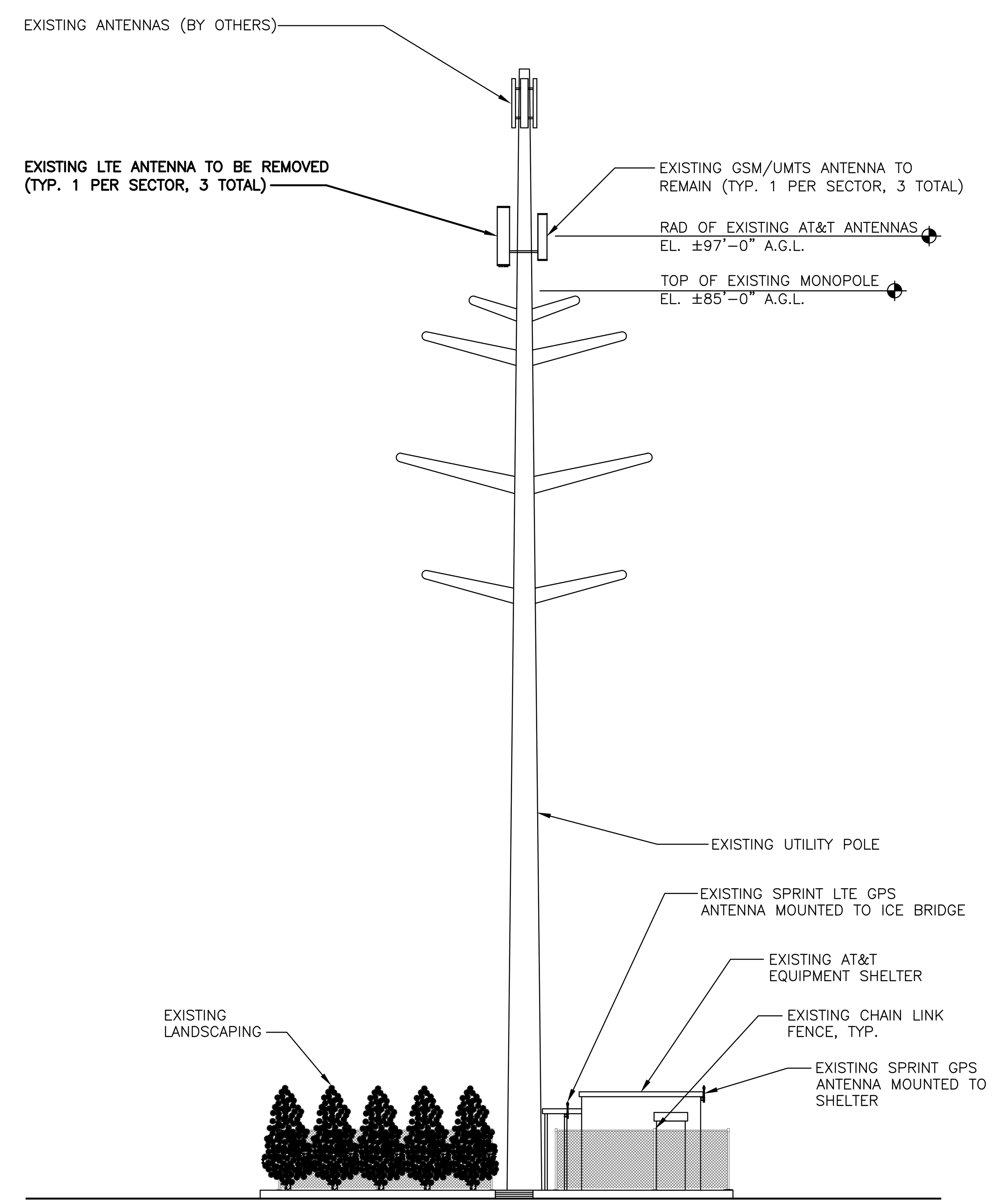
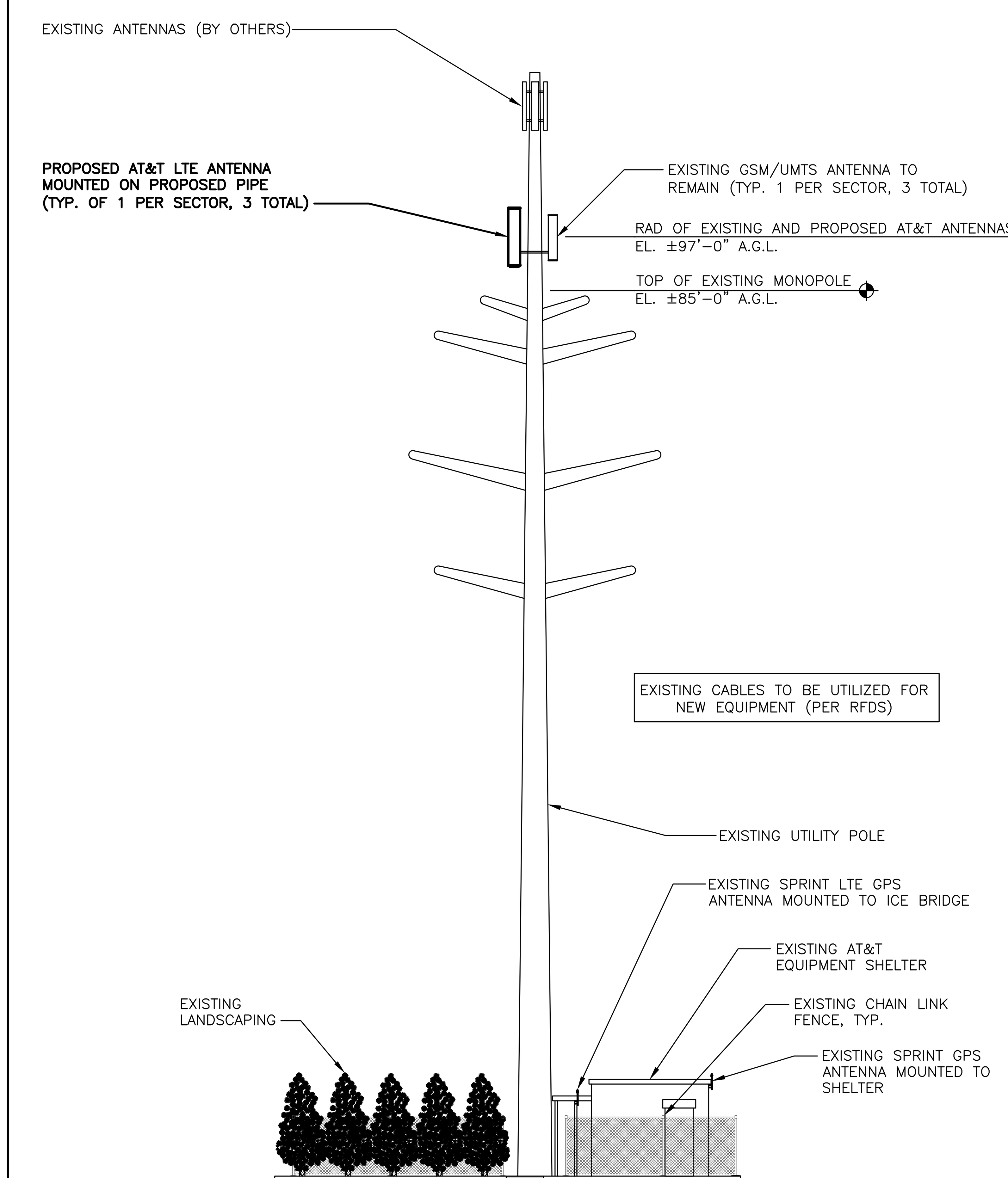


EXISTING TOWER ELEVATION

SCALE: NTS



PROPOSED TOWER ELEVATION

SCALE: NTS

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CT LICENSE NO. 28643

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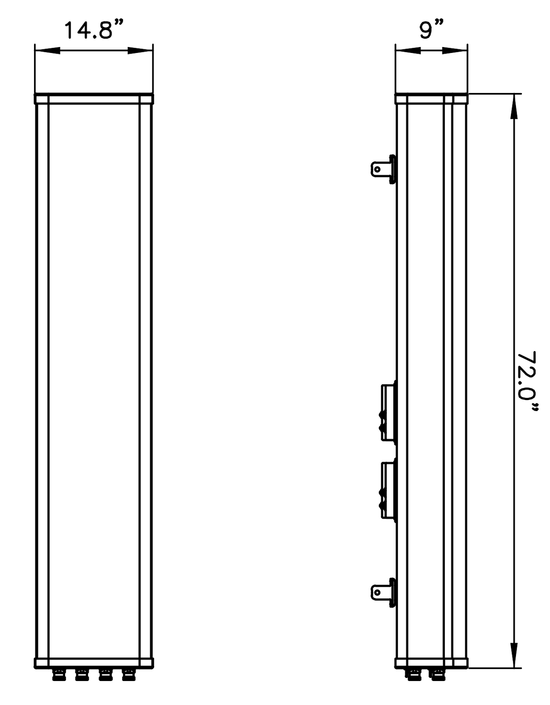
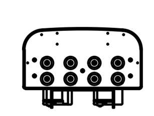
DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
15133-EMP	A-3	A



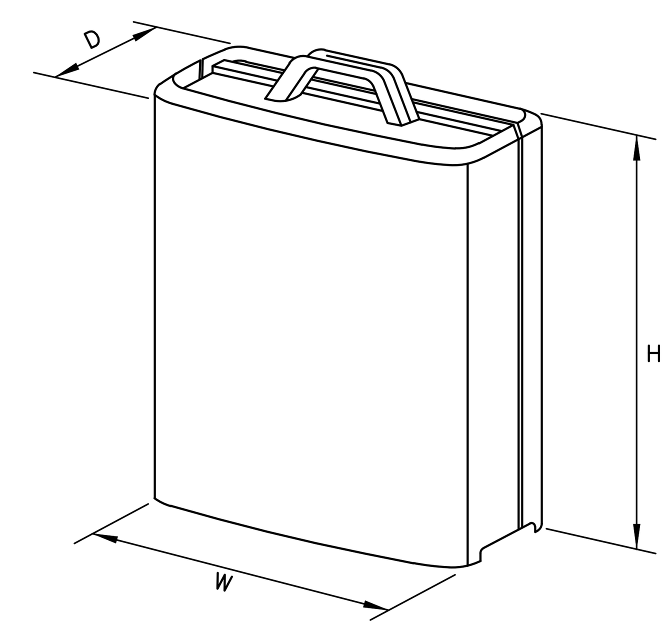
FRONT VIEW   SIDE VIEW



BOTTOM VIEW

MANUFACTURER	CCI
MODEL	OPA-65R-LCUU-H6
WEIGHT	57.0 LBS

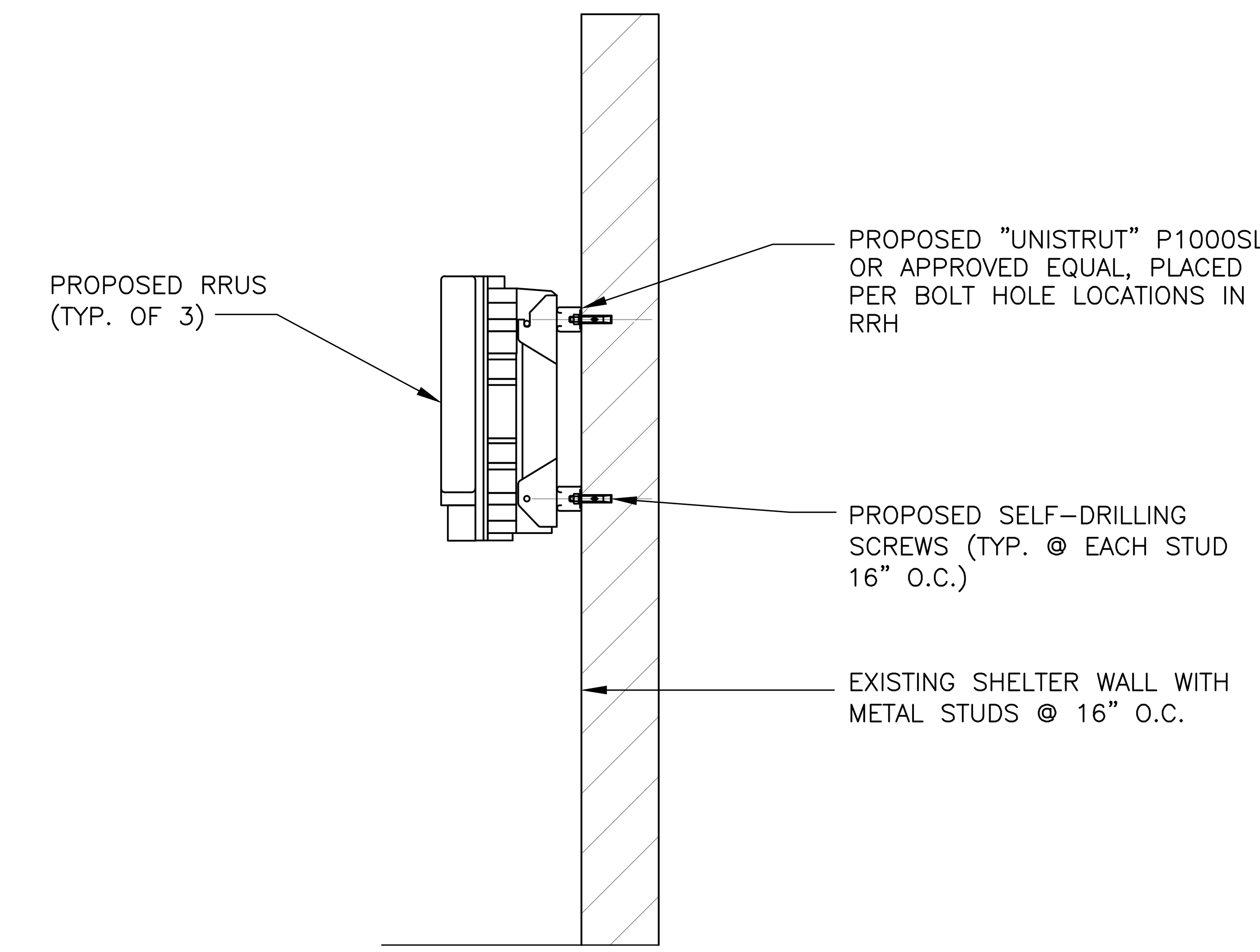
LTE ANTENNA DETAIL
SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	20.4" x 18.5" x 7.5"	58 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

*DENOTES EXISTING.

RRUS DETAIL
SCALE: N.T.S.



RRUS MOUNTING DETAIL
SCALE: N.T.S.

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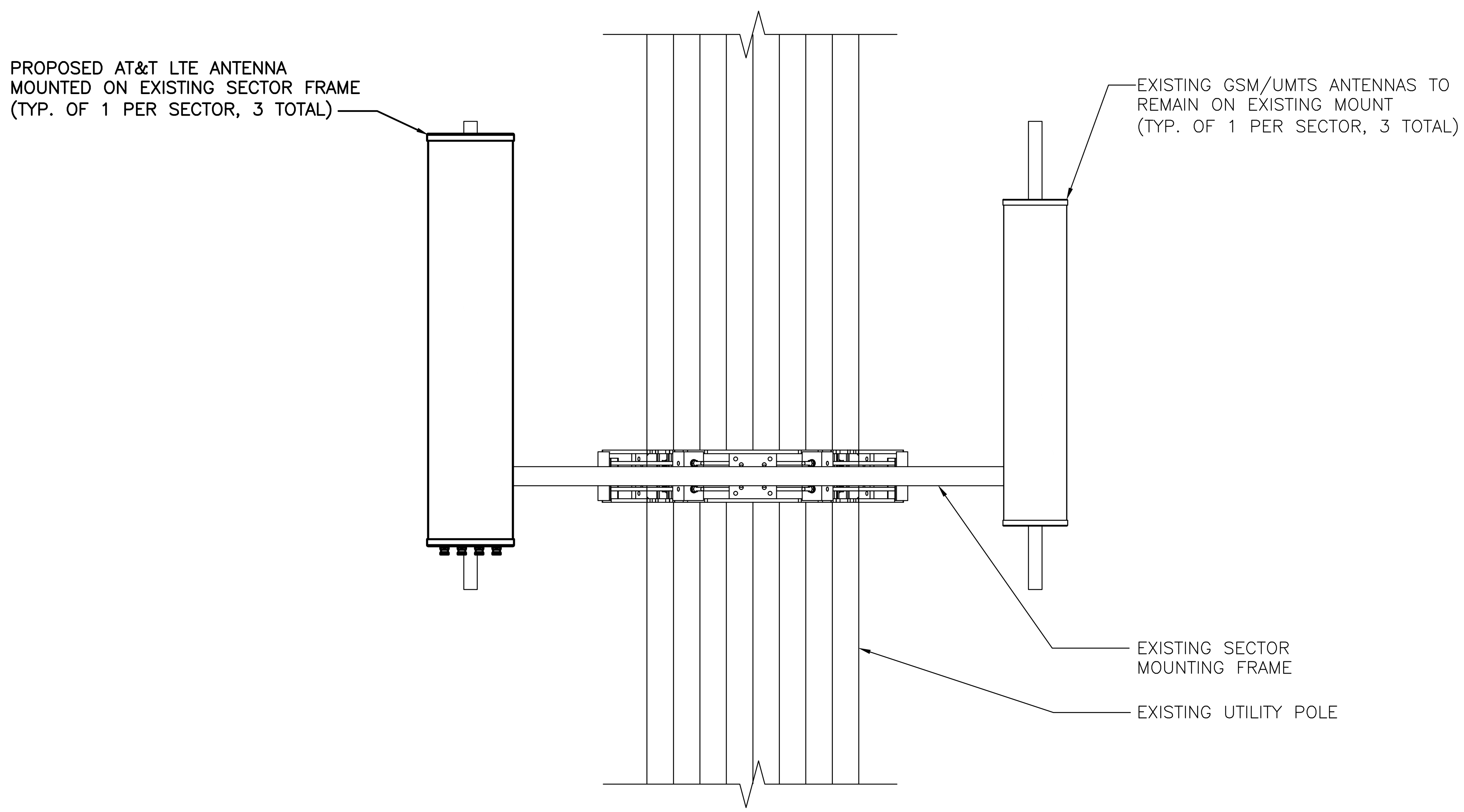
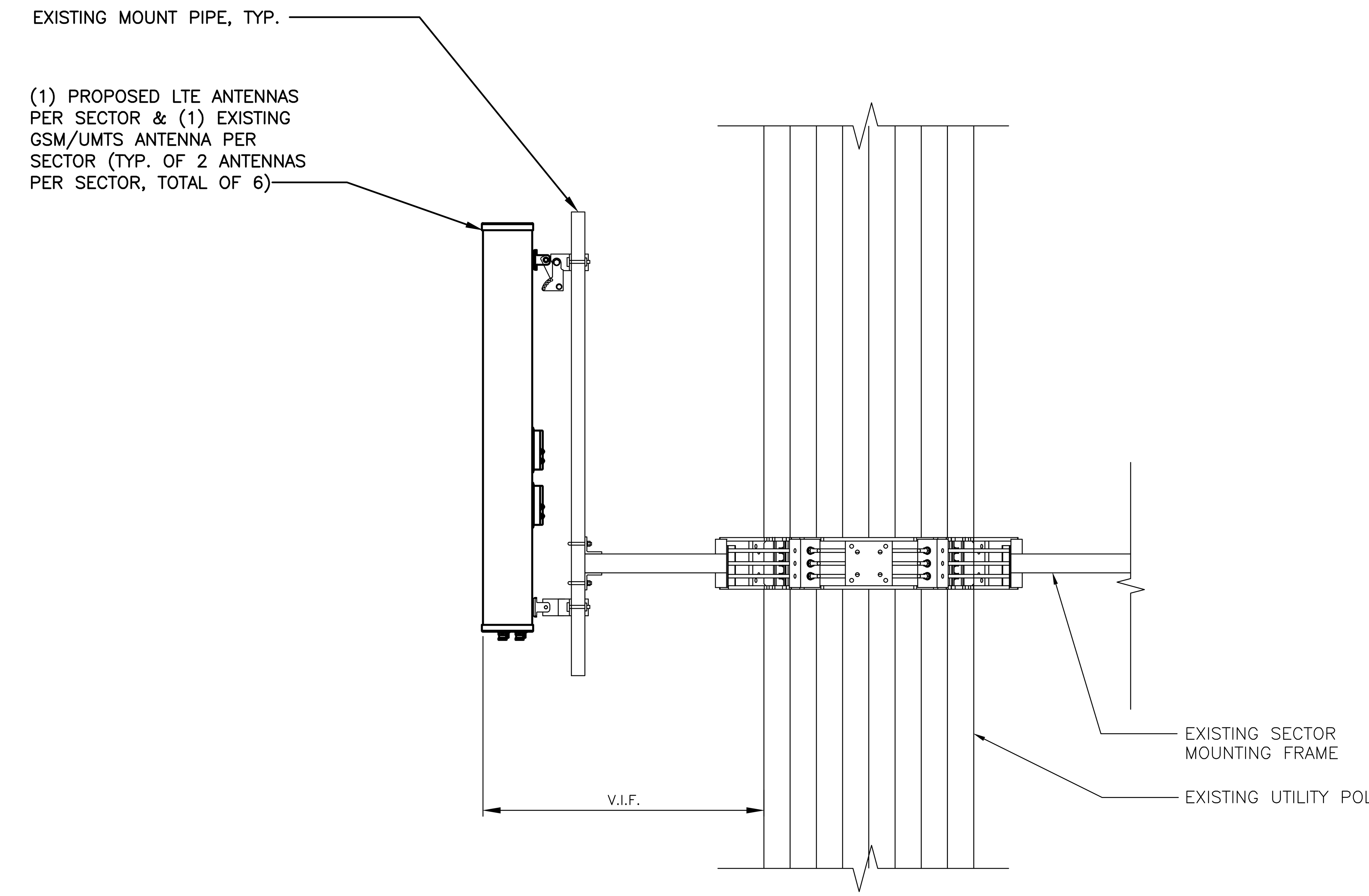
DRAWING TITLE: DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15133-EMP	A-4	A



PROPOSED ANTENNA MOUNTING DETAIL (FRONT VIEW)

SCALE: N.T.S.



PROPOSED ANTENNA MOUNTING DETAIL (SIDE VIEW)

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	POWERWAVE	P65-16-XLH-RR_716MHZ	72"x12"x6"
	A3	–	–	–
	A4	–	–	–
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	POWERWAVE	P65-16-XLH-RR_716MHZ	72"x12"x6"
	B3	–	–	–
	B4	–	–	–
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	POWERWAVE	P65-16-XLH-RR_716MHZ	72"x12"x6"
	G3	–	–	–
	G4	–	–	–

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	CCI	OPA-65R-LCUU-H6	72"x14.8"x9"
	A3	–	–	–
	A4	–	–	–
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	CCI	OPA-65R-LCUU-H6	72"x14.8"x9"
	B3	–	–	–
	B4	–	–	–
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	CCI	OPA-65R-LCUU-H6	72"x14.8"x9"
	G3	–	–	–
	G4	–	–	–

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS-12	20.4"x18.5"x7.5"	ERICSSON A2 MODULE	16.4"x15.2"x3.4"
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
BETA	ERICSSON	RRUS-12	20.4"x18.5"x7.5"	ERICSSON A2 MODULE	16.4"x15.2"x3.4"
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
GAMMA	ERICSSON	RRUS-12	20.4"x18.5"x7.5"	ERICSSON A2 MODULE	16.4"x15.2"x3.4"
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		

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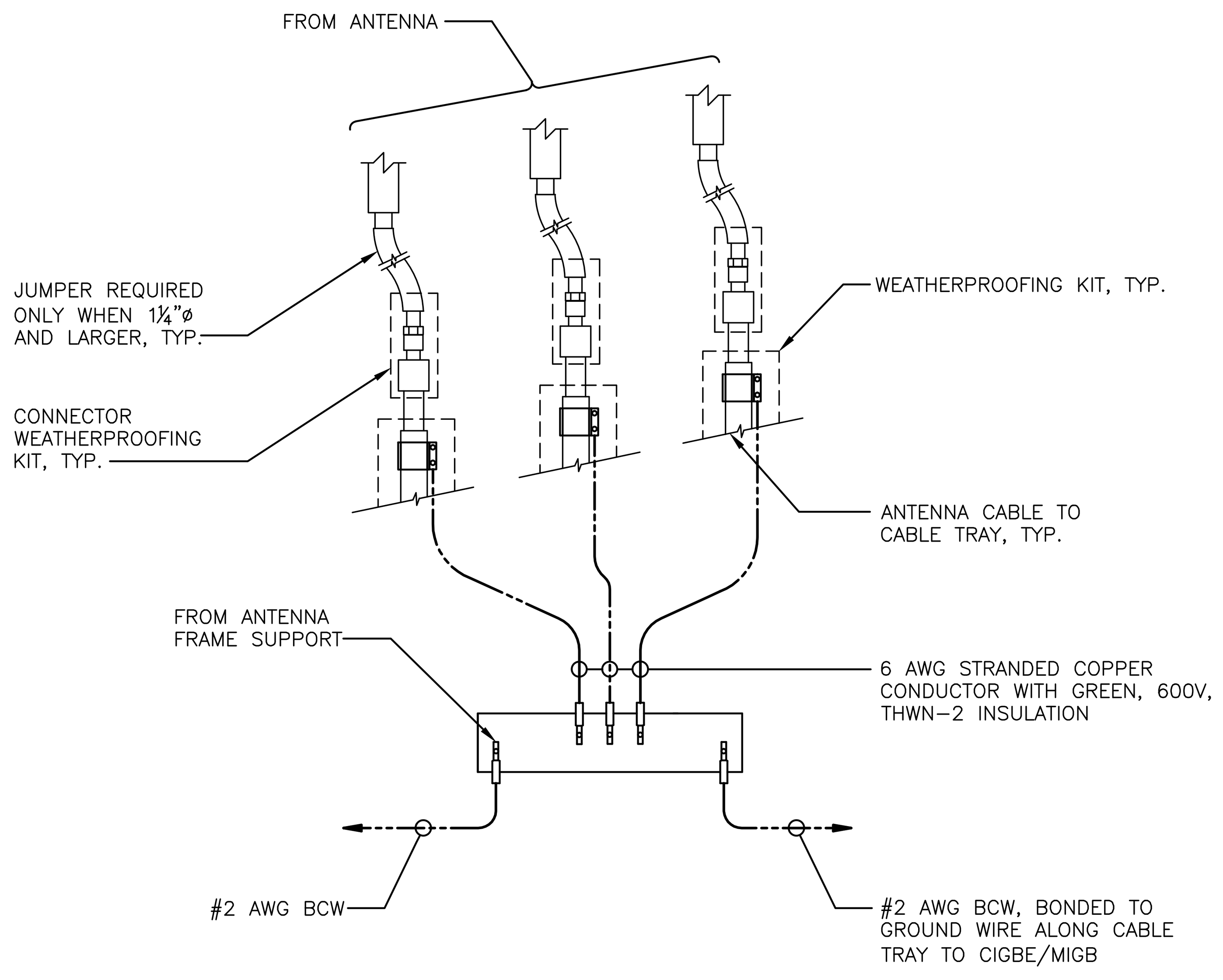
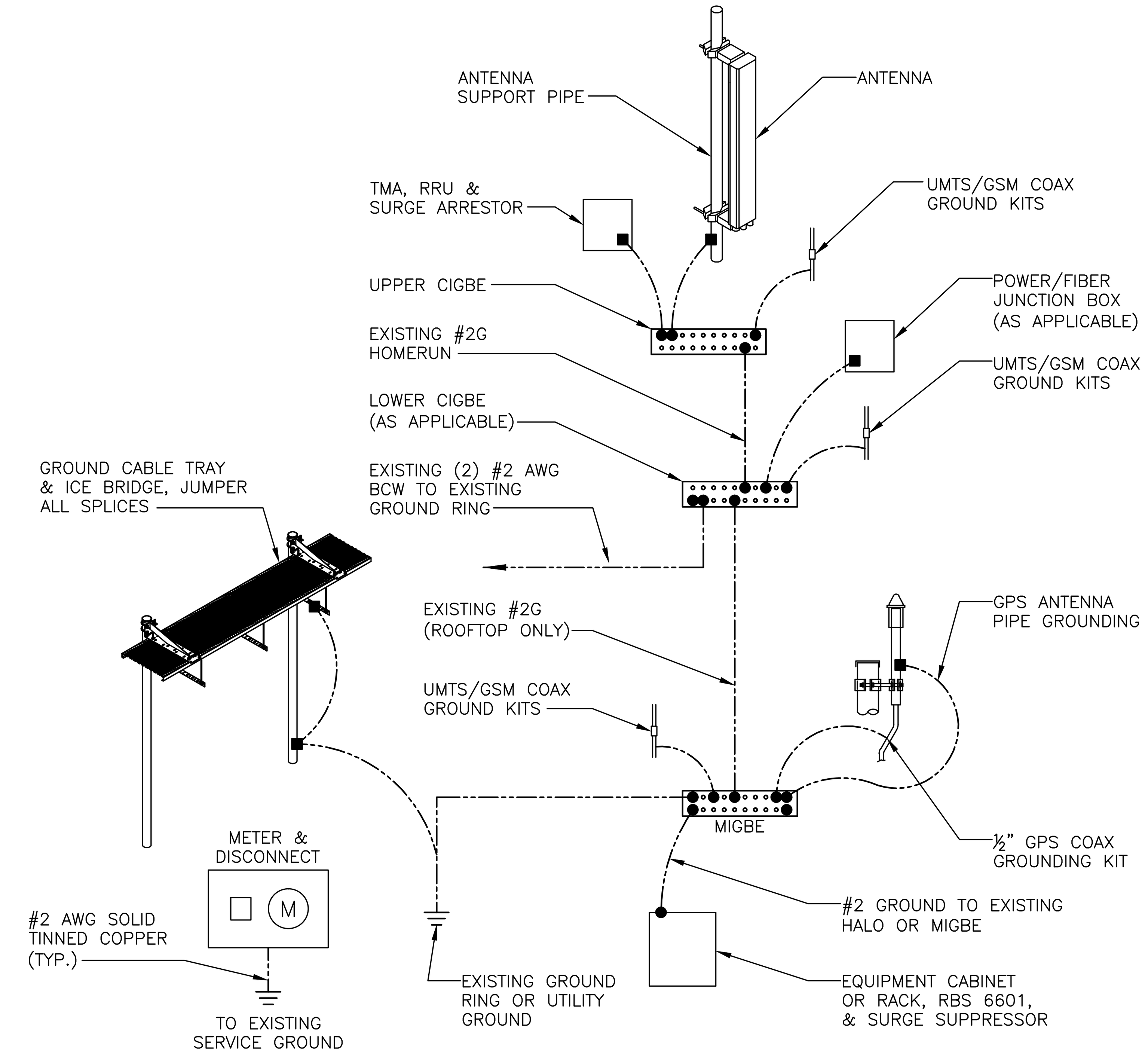
DRAWING TITLE: ANTENNA MOUNTING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15133-EMP	A-5	A



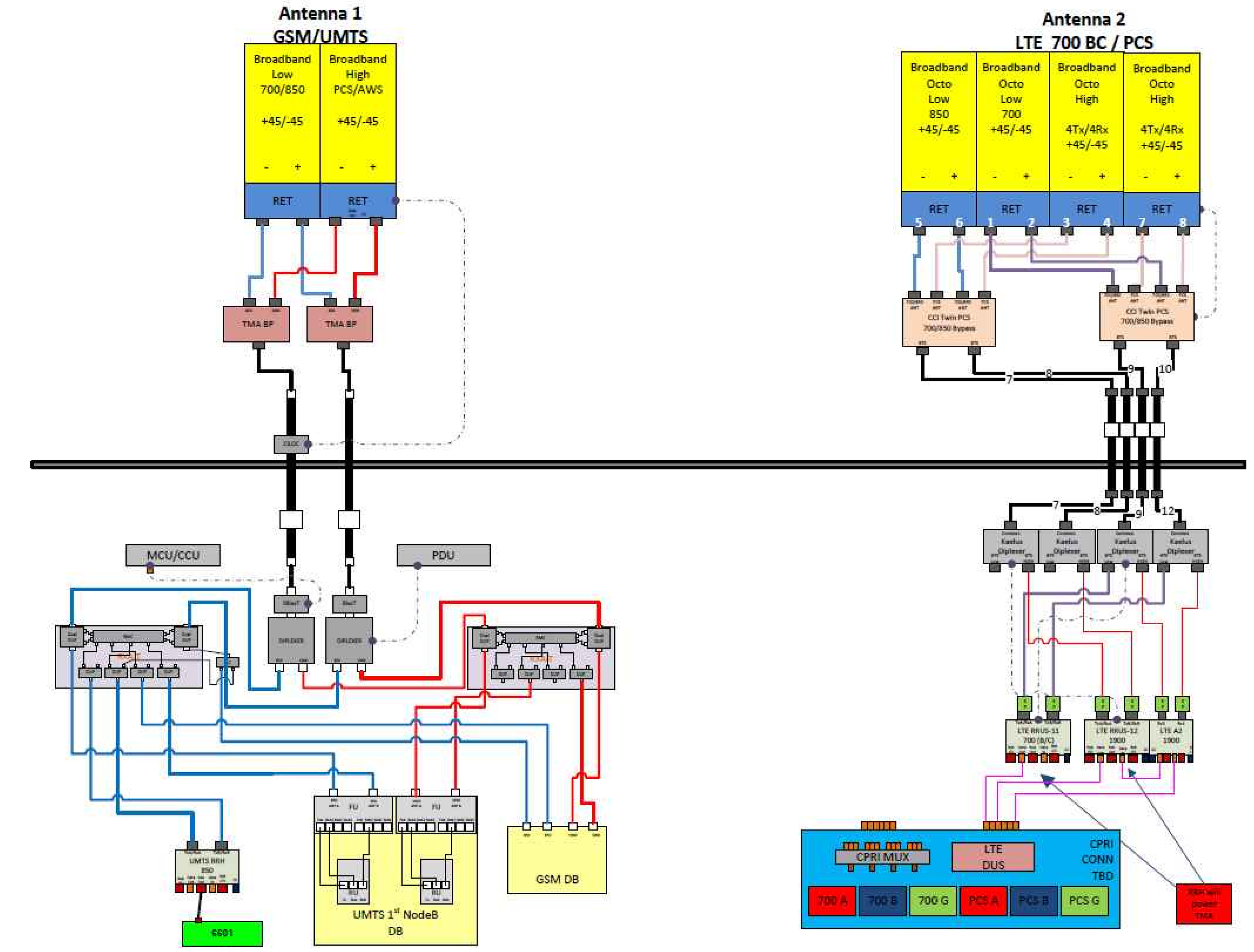
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



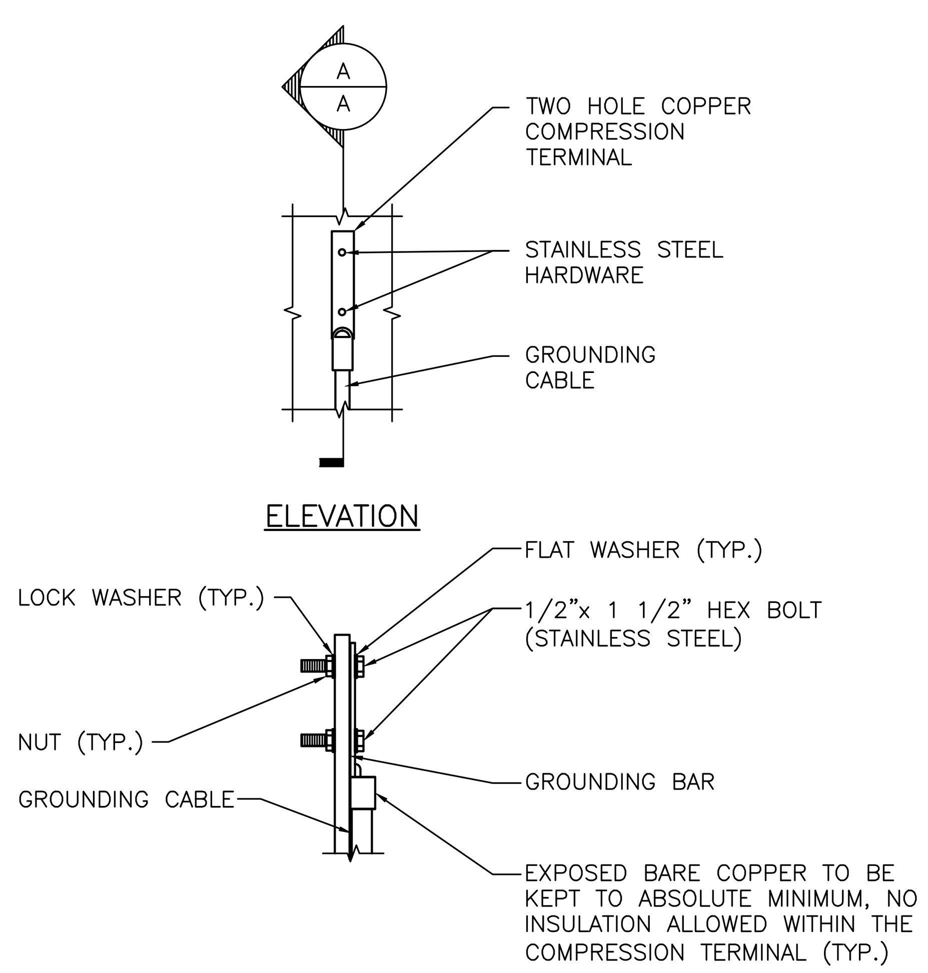
GROUNDING RISER DIAGRAM

SCALE: N.T.S.



TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.

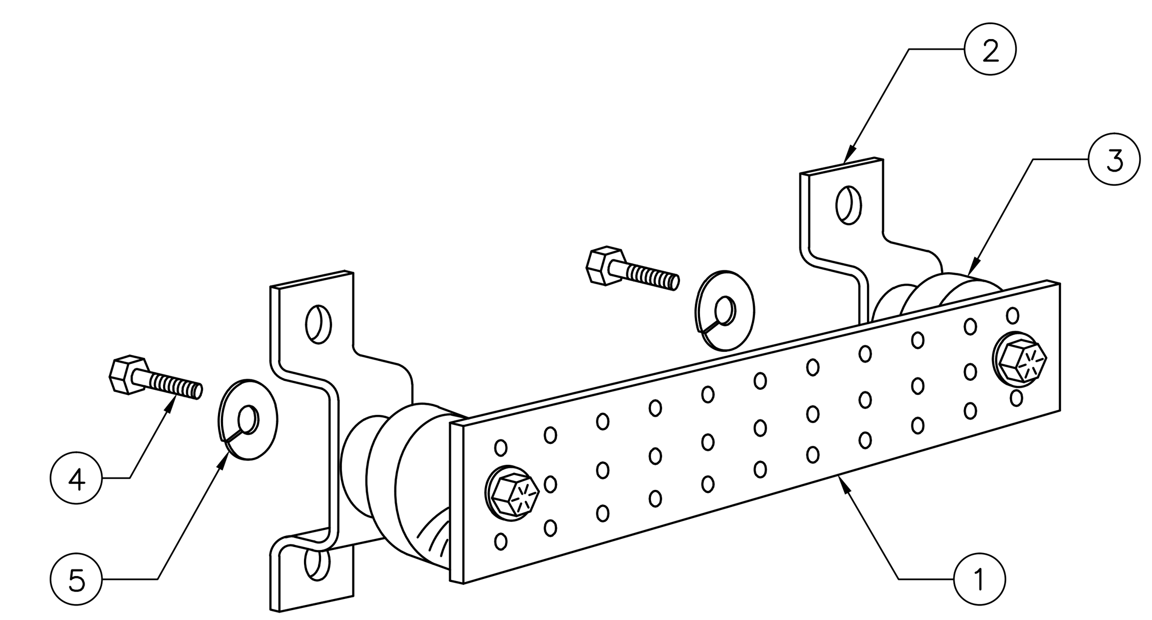


NOTE:

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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

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

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

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CT LICENSE NO. 28643

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DRAWING TITLE: GROUNDING, ONE–LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15133–EMP	G–1	A

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Pole

AT&T Site Ref: CT2185

Eversource Structure No. 2683

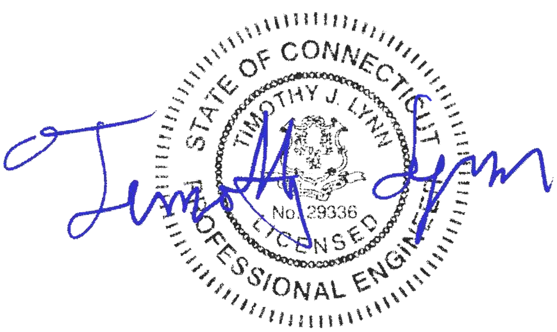
90' Electric Transmission Pole

761 Federal Road

Brookfield, CT

CENTEK Project No. 16002.003

Date: January 27, 2016



Prepared for:

AT&T Mobility

500 Enterprise Drive, Suite 3A

Rocky Hill, CT 06067

Table of Contents

Introduction

The purpose of this report is to analyze the existing mast and 90' utility pole located at 761 Federal Road in Brookfield, CT for the proposed antenna and equipment upgrade by AT&T.

The existing/proposed loads consist of the following:

- SPRINT (Existing):

  Antennas: Two (2) RFS APXVSPP18-C and one (1) RFS APXV9ERR18-C panel antennas panel antennas flush mounted on the existing mast with a RAD center elevation of 110-ft-8-in above grade level.
  Coax Cables: Eighteen (18) 1-1/4" ∅ coax cables running on the exterior of the pole and antenna mast.

- AT&T (Existing to Remain):

  Antennas: Three (3) Powerwave 7770 panel antennas and six (6) Powerwave LGP-21401 TMAs mounted on dual standoff mounts to the existing mast with a RAD center elevation of 97-ft above grade level.
  Coax Cables: Fifteen (15) 1-1/4" ∅ coax cables running on the exterior of the pole.

- AT&T (Existing to Remove):

  Antennas: Three (3) Powerwave P65-16-XLH-RR panel antennas and three (3) Powerwave TTAW-07BP111-001 TMAs mounted on dual standoff mounts to the existing mast with a RAD center elevation of 97-ft above grade level.

- **AT&T (Proposed):**

  Antennas: Three (3) CCI OPA-65R-LCUU-H6 panel antennas and six (6) CCI DTMABP7819VG12A TMAs mounted on dual standoff mounts to the existing mast with a RAD center elevation of 97-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ coax cables running on the exterior of the pole.

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

The existing mast consisting of a 12" Sch. 40 x 22' long pipe conforming to ASTM A53 Grade B (Fy = 35ksi) flange connected to a HSS16"x0.375" x 42' long pipe conforming to ASTM A500 Grade B (Fy = 42ksi) connected at two points to the existing pole 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 in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/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 pole structure.

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

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.

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

  Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the 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.

Results

- MAST ASSEMBLY

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

Member	Stress Ratio (% of capacity)	Result
12” Sch. 40 pipe x 22-ft long	72.0%	**PASS**
HSS 16”x0.375” pipe x 42-ft long	85.8%	**PASS**
5/8” ∅ ASTM A325 Bolt	45.6% [1]	**PASS**

Note 1 – 1/3 increase in allowable stress not used 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 **88.10%** occurs in the utility pole under the **NESC Heavy** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 3	0’-20.67’ (AGL)	88.10%	**PASS**

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 10 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	67.58%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 10-ft square x 9-ft long reinforced concrete pier with (16) rock anchors. The base of the tower is connected to the foundation by means of (12) 2.25”∅, ASTM A615-75 anchor bolts embedded approximately 8-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01039-60001.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	28.87 kips	56.79 kips	2206.64 ft-kips
NESC Extreme Wind	30.35 kips	28.31 kips	2196.17 ft-kips

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

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	40.97%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Load (1)	Proposed Loading (2)	Result
Reinf. Conc. Pier w/ Rock Anchors	OTM(3)	2973.5 ft-kips	2427.3 ft-kips	**PASS**

Note 1: Allowable Load taken from NUSCO drawing no. 01039-50002.
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.
Note 3: OTM denotes Overturning Moment

Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

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

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.

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 ~ R I S A - 3 D

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as 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
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
    - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- 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
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

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 stress increase of TIA Section 3.1.1.1 is disallowed. 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

Condition	Standard	Item	Basic Wind Speed V (MPH)	Pressure Q (PSF)	Height Factor Kz	Gust Factor Gh	Load or Stress Factor	Force Coef - Shape Factor
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	------	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	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
High Wind Condtion	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
High Wind Condtion	NESC Extreme Wind	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
High Wind Condtion	NESC Extreme Wind	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
NESC Extreme Ice with Wind Conditon*		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
NESC Extreme Ice with Wind Conditon*		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.

INPUT DATA

TOWER ID: 2683

Structure Height (ft) : 90

Wind Zone : NW CT and MA (blue)

Wind Speed : 100 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 =	*LINNET*	*LINNET*
	336	336
	26/7 ACSR	26/7 ACSR
DIAMETER =	0.720 in	0.720 in
WEIGHT =	0.462 lb/ft	0.462 lb/ft
Number of Conductors per phase	1	1

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	4,200	4,000	4,200	4,000
EXTREME WIND =	3,113	3,526	3,113	3,526
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 =	1,769	1,193	1,769	1,193

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	7	AHEAD:	7	**14**
WIND SPAN (ft) =	BACK:	243	AHEAD:	243	**486**
WEIGHT SPAN (ft) =	BACK:	345	AHEAD:	345	**690**

WIRE LOADING AT ATTACHMENTS

TOWER ID: 2683

Wind Span =	486	ft
Weight Span =	690	ft
Total Angle =	14	degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	2,250 lb	0 lb	840 lb	1,125 lb	6,878 lb	420 lb
Conductor =	2,305 lb	0 lb	1,863 lb	1,153 lb	6,551 lb	932 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,143 lb	0 lb	181 lb
Conductor =	1,578 lb	0 lb	719 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	181 lb
Conductor =	#VALUE!	#VALUE!	719 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,369 lb
Conductor =	#VALUE!	#VALUE!	2,195 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	560 lb
Conductor =	#VALUE!	#VALUE!	1,242 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	431 lb	0 lb	181 lb
Conductor =	291 lb	0 lb	719 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	431 lb	0 lb	181 lb
Conductor =	291 lb	0 lb	719 lb

EVERSOURCE

				Page	of
Job :		Spec. Number		Sheet	of
Description:	1887 side	Computed by		Date	12/14/15
		Checked by		Date	

INPUT DATA

TOWER ID: 2683

Structure Height (ft) : 90

Wind Zone : NW CT and MA (blue)

Wind Speed : 100 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*DNO4963*	*DNO4963*
DESCRIPTION =	-	-
STRANDING =	24.000 Fiber	24.000 Fiber
DIAMETER =	0.457 in	0.457 in
WEIGHT =	0.245 lb/ft	0.245 lb/ft

Conductor Properties:

	BACK	AHEAD
NAME =	*DOVE*	*DOVE*
	556	556
	26/7 ACSR	26/7 ACSR
DIAMETER =	0.927 in	0.927 in
WEIGHT =	0.765 lb/ft	0.765 lb/ft

Number of Conductors per phase (BACK): 1

Number of Conductors per phase (AHEAD): 1

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	4,200	7,000	4,200	7,000
EXTREME WIND =	3,285	6,012	3,285	6,012
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 =	1,715	3,387	1,715	3,387

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	7	AHEAD:	7	**14**
WIND SPAN (ft) =	BACK:	243	AHEAD:	243	**486**
WEIGHT SPAN (ft) =	BACK:	345	AHEAD:	345	**690**

EVERSOURCE

				Page	of
Job :		Spec. Number		Sheet	of
Description:	1887 side	Computed by		Date	12/14/15
		Checked by		Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 2683

Wind Span =	486	ft
Weight Span =	690	ft
Total Angle =	14	degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	2,279 lb	0 lb	869 lb	1,140 lb	6,878 lb	435 lb
Conductor =	3,596 lb	0 lb	2,310 lb	1,798 lb	11,464 lb	1,155 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,257 lb	0 lb	169 lb
Conductor =	2,390 lb	0 lb	928 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	169 lb
Conductor =	#VALUE!	#VALUE!	928 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,419 lb
Conductor =	#VALUE!	#VALUE!	2,581 lb

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

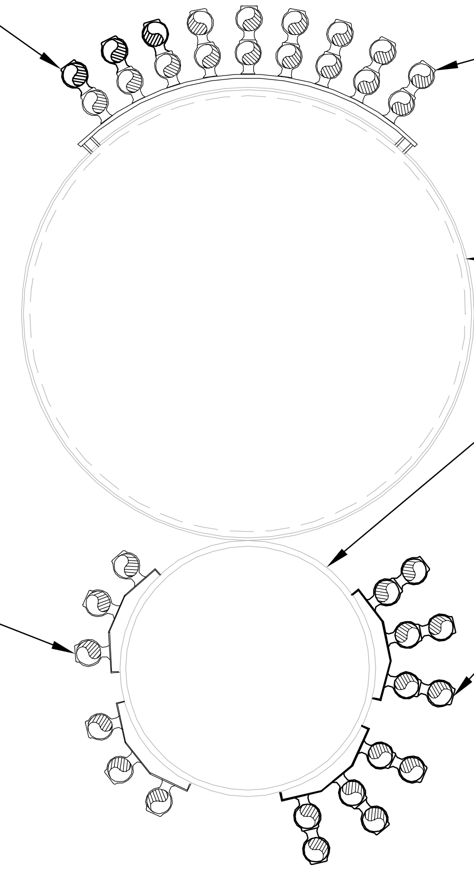
	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	580 lb
Conductor =	#VALUE!	#VALUE!	1,540 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	418 lb	0 lb	169 lb
Conductor =	826 lb	0 lb	928 lb

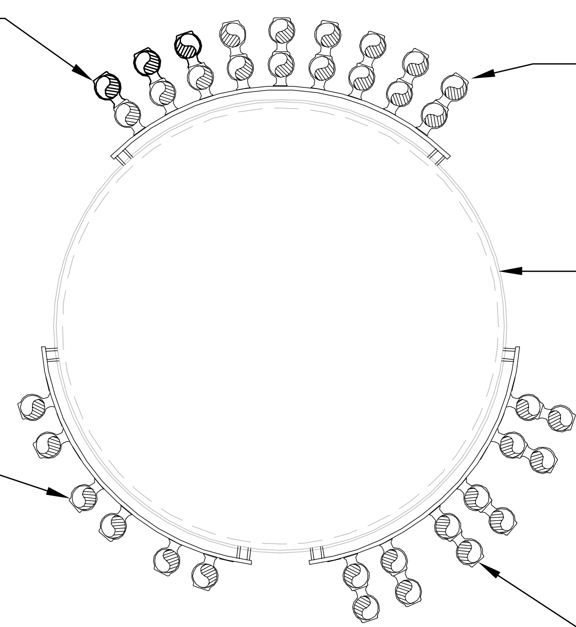
7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	418 lb	0 lb	169 lb
Conductor =	826 lb	0 lb	928 lb



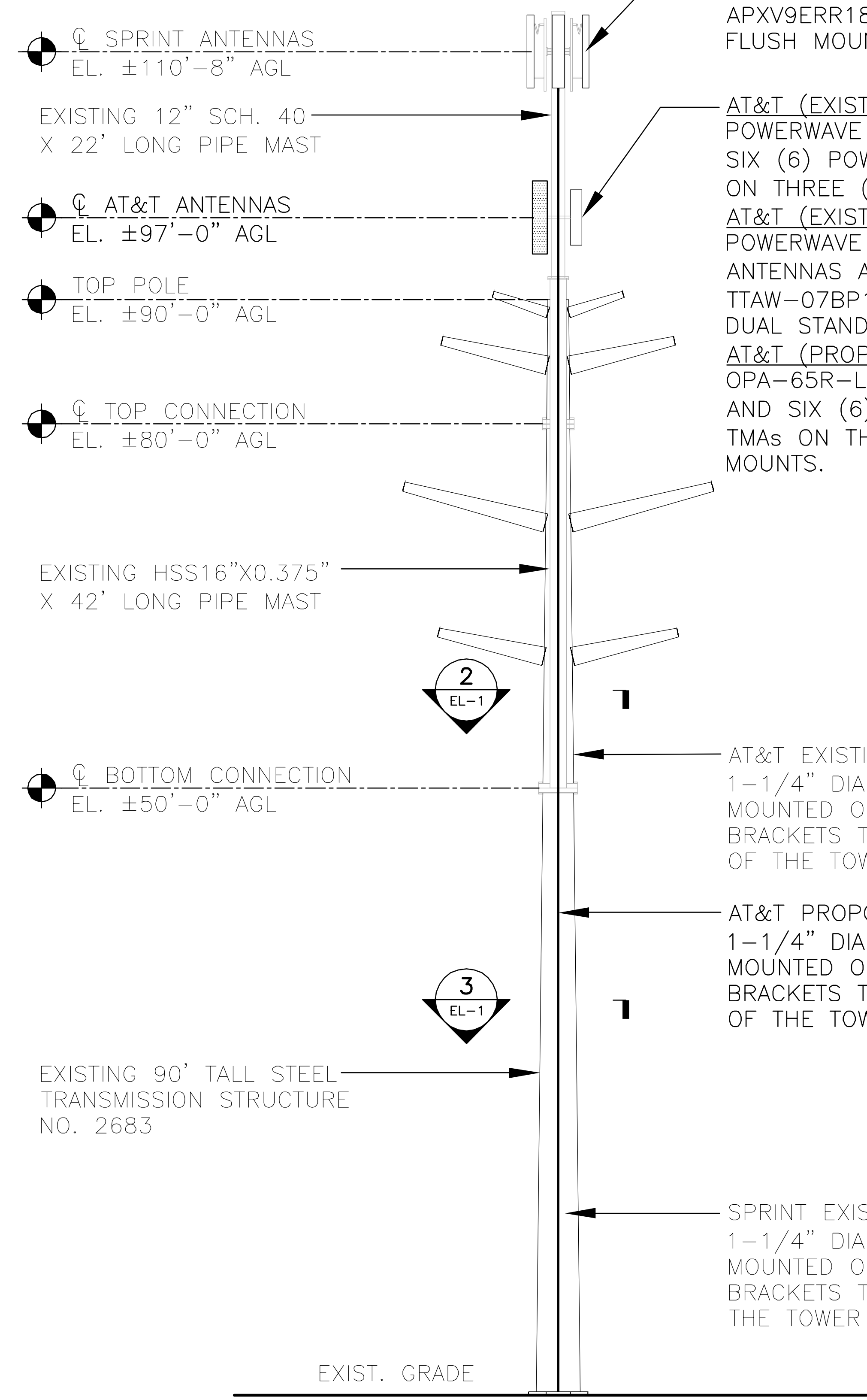
2 EL-1 COAX CABLE PLAN

SCALE: 1" = 1'-0"



3 EL-1 COAX CABLE PLAN

SCALE: 1" = 1'-0"



1 EL-1 TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	1/27/16	TJL	CFC	ISSUED FOR EVERSOURCE REVIEW

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DATE: 1/27/16
SCALE: AS SHOWN
JOB NO. 16002.003

POLE AND MAST ELEVATION

SHEET NO.
EL-1
Sheet No. 1 of 1

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 1 $z_{mast1} := 103$ ft (User Input)

Mast 2 $z_{mast2} := 71$ ft (User Input)

Sprint $z_{Sprint} := 110.67$ ft (User Input)

AT&T $z_{AT\&T} := 97$ ft (User Input)

Coax Cable $z_{coax} := 82$ ft (User Input)

Exposure Coefficients, kz (per TIA/EIA-222-F Section 2.3.3)

Mast 1 $$Kz_{mast1} := \left(\frac{z_{mast1}}{33}\right)^{\frac{2}{7}} = 1.384$$

Mast 2 $$Kz_{mast2} := \left(\frac{z_{mast2}}{33}\right)^{\frac{2}{7}} = 1.245$$

Sprint $$Kz_{Sprint} := \left(\frac{z_{Sprint}}{33}\right)^{\frac{2}{7}} = 1.413$$

AT&T $$Kz_{AT\&T} := \left(\frac{z_{AT\&T}}{33}\right)^{\frac{2}{7}} = 1.361$$

Coax Cable $$Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.297$$

Velocity Pressure without ice, qz (per TIA/EIA-222-F Section 2.3.3)

Mast 1 $qz_{mast1} := 0.00256 \cdot Kz_{mast1} \cdot V^2 = 25.604$

Mast 2 $qz_{mast2} := 0.00256 \cdot Kz_{mast2} \cdot V^2 = 23.022$

Sprint $qz_{Sprint} := 0.00256 \cdot Kz_{Sprint} \cdot V^2 = 26.135$

AT&T $qz_{AT\&T} := 0.00256 \cdot Kz_{AT\&T} \cdot V^2 = 25.169$

Coax Cable $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 23.989$

Velocity Pressure with ice, qzICE (per TIA/EIA-222-F Section 2.3.3)

Mast 1 $qzICE_{mast1} := 0.00256 \cdot Kz_{mast1} \cdot V_i^2 = 19.406$

Mast 2 $qzICE_{mast2} := 0.00256 \cdot Kz_{mast2} \cdot V_i^2 = 17.449$

Sprint $qzICE_{Sprint} := 0.00256 \cdot Kz_{Sprint} \cdot V_i^2 = 19.808$

AT&T $qzICE_{AT\&T} := 0.00256 \cdot Kz_{AT\&T} \cdot V_i^2 = 19.076$

Coax Cable $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 18.182$

TIA/EIA Common Factors:

Gust Response Factor = $G_H := 1.69$ (User Input per TIA/EIA-222-F Section 2.3.4)

Gust Response Factor Multiplier = $m := 1.25$ (User Input per TIA/EIA-222-F Section 2.3.4.4)

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

Existing Upper Mast Data (Pipe 12 STD) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 12.8$ in (User Input)

Mast Length = $L_{mast} := 22.417$ ft (User Input)

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

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 21.0$

Mast Force Coefficient = $Ca_{mast} = 1.11$ (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 = $A_{mast} := \frac{D_{mast}}{12} = 1.067$ sf/ft

Total Mast Wind Force = $qz_{mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 51$ plf **BLC 5**

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

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.15$ sf/ft

Total Mast Wind Force w/ Ice = $qzICE_{mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 42$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\,2}\right] = 20.9$ sq in

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

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

Existing Lower Mast Data HSS16.0x0.375 (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 16.0$ in (User Input)

Mast Length = $L_{mast} := 41.583$ ft (User Input)

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

Mast Aspect Ratio = $Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 31.2$

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 = $A_{mast} := \frac{D_{mast}}{12} = 1.333$ sf/ft

Total Mast Wind Force = $qz_{mast2} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 62$ plf **BLC 5**

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

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.417$ sf/ft

Total Mast Wind Force w/ Ice = $qzICE_{mast2} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 50$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 25.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 10$ plf **BLC 3**

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

Existing Antenna Data: (Sprint)

Antenna Model = RFS APXVSPP18-C

Antenna Shape = Flat (User Input)

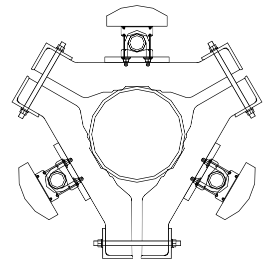
Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 11.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7$ in (User Input)

Antenna Weight = $WT_{ant} := 57$ lbs (User Input)

Number of Antennas = $N_{ant} := 2$ (User Input)



Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$

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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 11.8$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 730$ 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 = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 608$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 114$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5947$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1528$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$ lbs

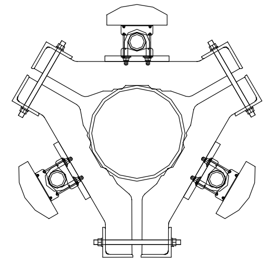
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 99$ lbs **BLC 3**

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

Existing Antenna Data: (Sprint)

Antenna Model = RFS APXV9ERR18-C

Antenna Shape = Flat (User Input)



Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 11.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7.9$ in (User Input)

Antenna Weight = $WT_{ant} := 57$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$

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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$ sf

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

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 365$ 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 = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ sf

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

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 304$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 57$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6712$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1604$ cu in

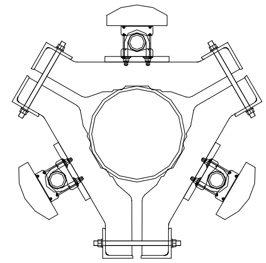
Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 52$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 52$ lbs **BLC 3**

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

Mount Data: (Sprint)

Mount Type: Microflect Universal Tri-Bracket



Mount Shape = Flat (User Input)

Pipe Mount Length = $L_{mnt} := 72$ 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)

Tri Bracket Weight = $W_{tb.mnt} := 197$ lbs (User Input)

Mount Aspect Ratio = $Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 30$

Mount Force Coefficient = $Ca_{mnt} = 2$ (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 = $F_{mnt} := qz_{Sprint} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 0$ 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 = $Fi_{mnt} := qzICE_{Sprint} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICEmnt} = 0$ lbs **BLC 4**

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

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 22$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{tb.mnt} = 263$ lbs **BLC 2**

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

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 319$ cu in

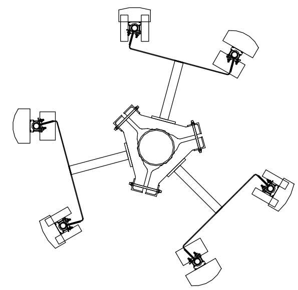
Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[(D_{mnt} + 1)^2\right] \cdot (L_{mnt} + 1)\right] - V_{mnt} = 334$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 11$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 37$ lbs **BLC 3**

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

Existing Antenna Data: (AT&T)



Antenna Model = Powerwave 7770.00

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 55$ in (User Input)

Antenna Width = $W_{ant} := 11$ in (User Input)

Antenna Thickness = $T_{ant} := 5$ in (User Input)

Antenna Weight = $WT_{ant} := 39$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 5.0$

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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$ sf

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

Total Antenna Wind Force = $F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 751$ 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 = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4.7$ sf

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

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 632$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 117$ lbs **BLC 2**

Gravity Loads (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1007$ cu in

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

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 98$ lbs **BLC 3**

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Subject: Load Analysis of Antenna Mast on Tower # 2683

Location: Brookfield, CT

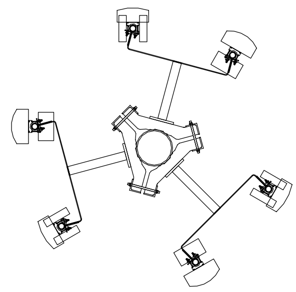
Rev. 0: 1/26/16

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 16002.003

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

Proposed Antenna Data: (AT&T)

Antenna Model = CCI OPA-65R-LCUU-H6



Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 14.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7.4$ in (User Input)

Antenna Weight = $WT_{ant} := 75$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.9$

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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 22.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1322$ 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 = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 24$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 1085$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 225$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 7885$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1803$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 58$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 175$ lbs **BLC 3**

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

Existing TMA Data: (AT&T)

TMA Model = Powerwave LGP 21401

TMA Shape = Flat (User Input)

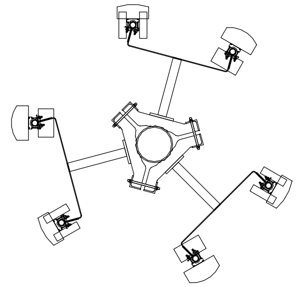
TMA Height = $L_{TMA} := 14.4$ in (User Input)

TMA Width = $W_{TMA} := 9.2$ in (User Input)

TMA Thickness = $T_{TMA} := 2.6$ in (User Input)

TMA Weight = $WT_{TMA} := 14.1$ lbs (User Input)

Number of TMA's = $N_{TMA} := 6$ (User Input)



TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.6$

TMA Force Coefficient = $Ca_{TMA} = 1.4$ (per TIA/EIA-222-F Table 3)

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

Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously

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

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

Total TMA Wind Force = $F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 329$ 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 TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.1$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 6.5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qzICE_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 295$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 85$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 221$ cu in

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

Weight of Ice on All TMA's $W_{ICETMA} \cdot N_{TMA} = 43$ lbs **BLC 3**

Development of Wind & Ice Load on TMA's

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

Proposed TMA Data: (AT&T)

TMA Model = CCI DTMABP7819VG12A

TMA Shape = Flat (User Input)

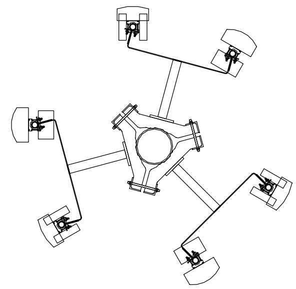
TMA Height = $L_{TMA} := 14.25$ in (User Input)

TMA Width = $W_{TMA} := 11.46$ in (User Input)

TMA Thickness = $T_{TMA} := 4.17$ in (User Input)

TMA Weight = $WT_{TMA} := 20$ lbs (User Input)

Number of TMA's = $N_{TMA} := 6$ (User Input)



TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.2$

TMA Force Coefficient = $Ca_{TMA} = 1.4$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously

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

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 6.8$ sf

Total TMA Wind Force = $F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 405$ 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 TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.3$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 7.9$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qzICE_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 357$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 120$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 301$ cu in

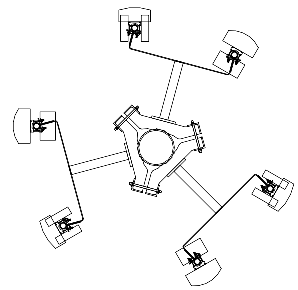
Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All TMA's = $W_{ICETMA} \cdot N_{TMA} = 59$ lbs **BLC 3**

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

Mount Data: (AT&T)

Mount Type: (3) Valmont Dual Standoff Mounts w/ Universal Tr-Bracket



Mount Shape = Flat (User Input)

Mount Area = $A_{mnt} := 4.0$ sq ft (User Input)

Mount Area w/ Ice = $A_{ICE.mnt} := 4.6$ sq ft (User Input)

Mount Weight = $WT_{mnt} := 610$ lbs (User Input)

Mount Weight w/ Ice = $WT_{ICE.mnt} := 700$ lbs (User Input)

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

Total Mount Wind Force = $F_{mnt} := qz_{AT\&T} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 238$ lbs **BLC 5**

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

Total Mount Wind Force w/ Ice = $Fi_{mnt} := qzICE_{AT\&T} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICE.mnt} = 208$ lbs **BLC 4**

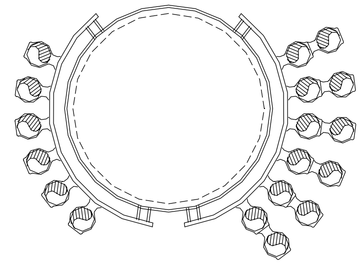
Gravity Load (without ice)

Weight of Mount = $WT_{mnt} = 610$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Mount = $WT_{ICE.mnt} - WT_{mnt} = 90$ lbs **BLC 3**

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



Existing Coax Cable Data: (Sprint)

Coax Type = HELIAX 1-1/4"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax} := 64$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 0.66$ plf (User Input)

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

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 3$ (User Input)

Note: AT&T Existing/Proposed cables attached to CL&P Pole

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 495.5$

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 = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.4$ ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{coax} \cdot G_H \cdot A_{coax} = 19$ plf **BLC 5**

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

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.5$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{coax} \cdot G_H \cdot AICE_{coax} = 17$ plf **BLC 4**

Gravity Loads (without ice)

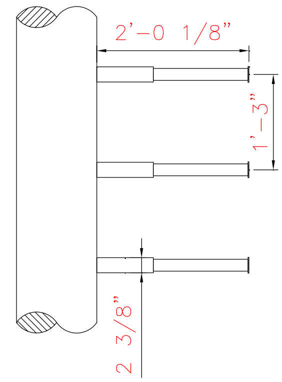
Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}{}^2\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 23$ plf **BLC 3**

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



Member Data: Step Bolts

Shape = Round (User Input)

Diameter = $D_{mem} := 2.38$ in (User Input)

Length = $L_{mem} := 2$ ft (User Input)

Spacing = $Sp_{mem} := 1.25$ ft (User Input)

Weight = $Wt_{mem} := 3.66$ plf

Member Aspect Ratio = $Ar_{mem} := \frac{D_{mem}}{L_{mem} \cdot 12} = 0.1$

Member Force Coefficient = $Ca_{mem} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

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

Member Projected Surface Area = $A_{mem} := \frac{D_{mem} \cdot L_{mem}}{12 \cdot Sp_{mem}} = 0.3$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{mast1} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 19$ lbs **BLC 5**

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

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(D_{mem} + 2 \cdot Ir) \cdot (L_{mem} + 2 \cdot Ir)}{12 \cdot Sp_{mem}} = 0.7$ plf

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{mast1} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 31$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Member = $\frac{Wt_{mem} \cdot L_{mem}}{Sp_{mem}} = 6$ lbs **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear foot = $Ai_{mem} := \frac{1}{4} \cdot \pi \cdot \left[(D_{mem} + 2 \cdot Ir)^2 - D_{mem}^{\,2} \right] = 4.5$ sq in

Weight of Ice on Member = $W_{ICEmem} := Id \cdot \frac{Ai_{mem}}{144} \cdot \frac{L_{mem}}{Sp_{mem}} = 3$ lbs **BLC 3**

CENTEK engineering, INC.
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 Analysis of Mast Only**
Tabulated Load Cases
Location: **Brookfield, CT**
Date: 1/26/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16002.003

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

Footnotes:

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

Location: **Brookfield, CT**

Date: 1/26/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16002.003

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

Footnotes:
(1) BLC = Basic Load Case

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 530-05: ASD
Aluminum Code	AA ADM1-05: 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	Existing Lower Mast	41.583	30		30									Lateral
2	M2	Existing Upper Mast	22.417	30		30									Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Upper Mast	PIPE_12.0	Beam	Pipe	A53 Gr. B	Typical	13.7	262	262	523
2	Existing Lower Mast	HSS16x0.375	Beam	Pipe	A500 Gr.42	Typical	17.2	526	526	1050

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOT_C...	SPLICE			Existing Lower Mast	Beam	Pipe	A500 Gr.42	Typical
2	M2	SPLICE	TOP_M...			Existing Upper Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From D...
1	BOT_CONN	0	0	0	0	
2	TOP_CONN	0	30	0	0	
3	SPLICE	0	41.583	0	0	
4	TOP_MAST	0	64	0	0	
5	CL_SPRINT	0	60.667	0	0	
6	CL_ATT	0	47	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	BOT_CONN	Reaction	Reaction	Reaction		Reaction		
2	TOP_CONN	Reaction	Reaction	Reaction		Reaction		

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Joint Loads and Enforced Displacements (BLC 2 : Weight of Appurtenances)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	Y	-.114
2	CL_SPRINT	L	Y	-.057
3	CL_SPRINT	L	Y	-.263
4	CL_ATT	L	Y	-.117
5	CL_ATT	L	Y	-.225
6	CL_ATT	L	Y	-.085
7	CL_ATT	L	Y	-.12
8	CL_ATT	L	Y	-.61

Joint Loads and Enforced Displacements (BLC 3 : Weight of Ice Only)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	Y	-.099
2	CL_SPRINT	L	Y	-.052
3	CL_SPRINT	L	Y	-.037
4	CL_ATT	L	Y	-.098
5	CL_ATT	L	Y	-.175
6	CL_ATT	L	Y	-.043
7	CL_ATT	L	Y	-.059
8	CL_ATT	L	Y	-.09

Joint Loads and Enforced Displacements (BLC 4 : TIA/EIA Wind with Ice)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	X	.608
2	CL_SPRINT	L	X	.304
3	CL_ATT	L	X	.632
4	CL_ATT	L	X	1.085
5	CL_ATT	L	X	.295
6	CL_ATT	L	X	.357
7	CL_ATT	L	X	.208

Joint Loads and Enforced Displacements (BLC 5 : TIA/EIA Wind)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	X	.73
2	CL_SPRINT	L	X	.365
3	CL_ATT	L	X	.751
4	CL_ATT	L	X	1.322
5	CL_ATT	L	X	.329
6	CL_ATT	L	X	.405
7	CL_ATT	L	X	.238

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	-.012	-.012	0	0
2	M2	Y	-.012	-.012	0	0
3	M1	Y	-.006	-.006	36	0
4	M2	Y	-.006	-.006	0	10

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.01	-.01	0	0
2	M2	Y	-.008	-.008	0	0
3	M1	Y	-.023	-.023	0	0
4	M2	Y	-.023	-.023	0	0
5	M1	Y	-.003	-.003	36	0
6	M2	Y	-.003	-.003	0	10

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.05	.05	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
2	M2	X	.042	.042	0	0
3	M1	X	.017	.017	0	0
4	M2	X	.017	.017	0	0
5	M1	X	.031	.031	36	0
6	M2	X	.031	.031	0	10

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.062	.062	0	0
2	M2	X	.051	.051	0	0
3	M1	X	.019	.019	0	0
4	M2	X	.019	.019	0	0
5	M1	X	.019	.019	36	0
6	M2	X	.019	.019	0	10

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				8		4		
3	Weight of Ice Only	None				8		6		
4	TIA/EIA Wind with Ice	None				7		6		
5	TIA/EIA Wind	None				7		6		

Load Combinations

	Description	Sol...	PDelta	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	TIA/EIA Wind + Ice	Yes			1	1	2	1	3	1	4	1								
2	TIA/EIA Wind	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

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	1.553	1	-2.764	1	0	1	0	1	0	1	0	1
2			min	1.058	2	-3.139	2	0	1	0	1	0	1	0	1
3		2	max	.477	1	-3.461	1	0	1	0	1	0	1	37.012	2
4			min	.325	2	-3.981	2	0	1	0	1	0	1	32.358	1
5		3	max	-.408	2	-4.157	1	0	1	0	1	0	1	82.778	2
6			min	-.6	1	-4.823	2	0	1	0	1	0	1	71.956	1
7		4	max	5.469	1	6.847	2	0	1	0	1	0	1	122.44	2
8			min	3.732	2	5.991	1	0	1	0	1	0	1	105.918	1
9		5	max	4.343	1	5.899	2	0	1	0	1	0	1	55.93	2
10			min	2.965	2	5.122	1	0	1	0	1	0	1	47.739	1
11	M2	1	max	4.343	1	5.899	2	0	1	0	1	0	1	55.93	2
12			min	2.965	2	5.122	1	0	1	0	1	0	1	47.739	1
13		2	max	2.168	1	2.355	2	0	1	0	1	0	1	24.837	2
14			min	1.446	2	2.04	1	0	1	0	1	0	1	20.932	1
15		3	max	1.626	1	1.88	2	0	1	0	1	0	1	13.021	2
16			min	1.091	2	1.573	1	0	1	0	1	0	1	10.889	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
17		4	max	1.124	1	1.487	2	0	1	0	1	0	1	3.586	2
18			min	.763	2	1.243	1	0	1	0	1	0	1	2.998	1
19		5	max	0	1	0	1	0	1	0	1	0	1	0	1
20			min	0	1	0	1	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	.09	1	-.321	1	0	1	0	1	0	1	0	1	0	1
2			min	.062	2	-.365	2	0	1	0	1	0	1	0	1	0	1
3		2	max	.028	1	-.402	1	0	1	-5.906	1	6.755	2	0	1	0	1
4			min	.019	2	-.463	2	0	1	-6.755	2	5.906	1	0	1	0	1
5		3	max	-.024	2	-.483	1	0	1	-13.133	1	15.108	2	0	1	0	1
6			min	-.035	1	-.561	2	0	1	-15.108	2	13.133	1	0	1	0	1
7		4	max	.318	1	.796	2	0	1	-19.331	1	22.346	2	0	1	0	1
8			min	.217	2	.697	1	0	1	-22.346	2	19.331	1	0	1	0	1
9		5	max	.252	1	.686	2	0	1	-8.713	1	10.208	2	0	1	0	1
10			min	.172	2	.596	1	0	1	-10.208	2	8.713	1	0	1	0	1
11	M2	1	max	.317	1	.861	2	0	1	-13.994	1	16.395	2	0	1	0	1
12			min	.216	2	.748	1	0	1	-16.395	2	13.994	1	0	1	0	1
13		2	max	.158	1	.344	2	0	1	-6.136	1	7.281	2	0	1	0	1
14			min	.106	2	.298	1	0	1	-7.281	2	6.136	1	0	1	0	1
15		3	max	.119	1	.274	2	0	1	-3.192	1	3.817	2	0	1	0	1
16			min	.08	2	.23	1	0	1	-3.817	2	3.192	1	0	1	0	1
17		4	max	.082	1	.217	2	0	1	-.879	1	1.051	2	0	1	0	1
18			min	.056	2	.181	1	0	1	-1.051	2	.879	1	0	1	0	1
19		5	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
20			min	0	1	0	1	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	BOT_CONN	max	3.139	2	1.553	1	0	1	0	1	0	1	0	1
2		min	2.764	1	1.058	2	0	1	0	1	0	1	0	1
3	TOP_CONN	max	-10.845	1	7.145	1	0	1	0	1	0	1	0	1
4		min	-12.513	2	4.873	2	0	1	0	1	0	1	0	1
5	Totals:	max	-8.081	1	8.698	1	0	1						
6		min	-9.373	2	5.931	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	BOT_CONN	max	0	1	0	2	0	1	0	1	0	1	5.263e-3	2
2		min	0	2	0	1	0	1	0	1	0	1	4.589e-3	1
3	TOP_CONN	max	0	2	0	2	0	1	0	1	0	1	-1.e-2	1
4		min	0	1	0	1	0	1	0	1	0	1	-1.151e-2	2
5	SPLICE	max	2.405	2	0	2	0	1	0	1	0	1	-1.869e-2	1
6		min	2.085	1	-.001	1	0	1	0	1	0	1	-2.16e-2	2
7	TOP_MAST	max	9.679	2	-.002	2	0	1	0	1	0	1	-2.475e-2	1
8		min	8.351	1	-.003	1	0	1	0	1	0	1	-2.878e-2	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation...	LC	Y Rotation...	LC	Z Rotation...	LC
9	CL_SPRINT	max	8.528	2	-.002	2	0	1	0	1	0	1	-2.475e-2	1
10		min	7.361	1	-.003	1	0	1	0	1	0	1	-2.877e-2	2
11	CL_ATT	max	3.966	2	-.001	2	0	1	0	1	0	1	-2.221e-2	1
12		min	3.433	1	-.002	1	0	1	0	1	0	1	-2.575e-2	2

Envelope AISC ASD Steel Code Checks

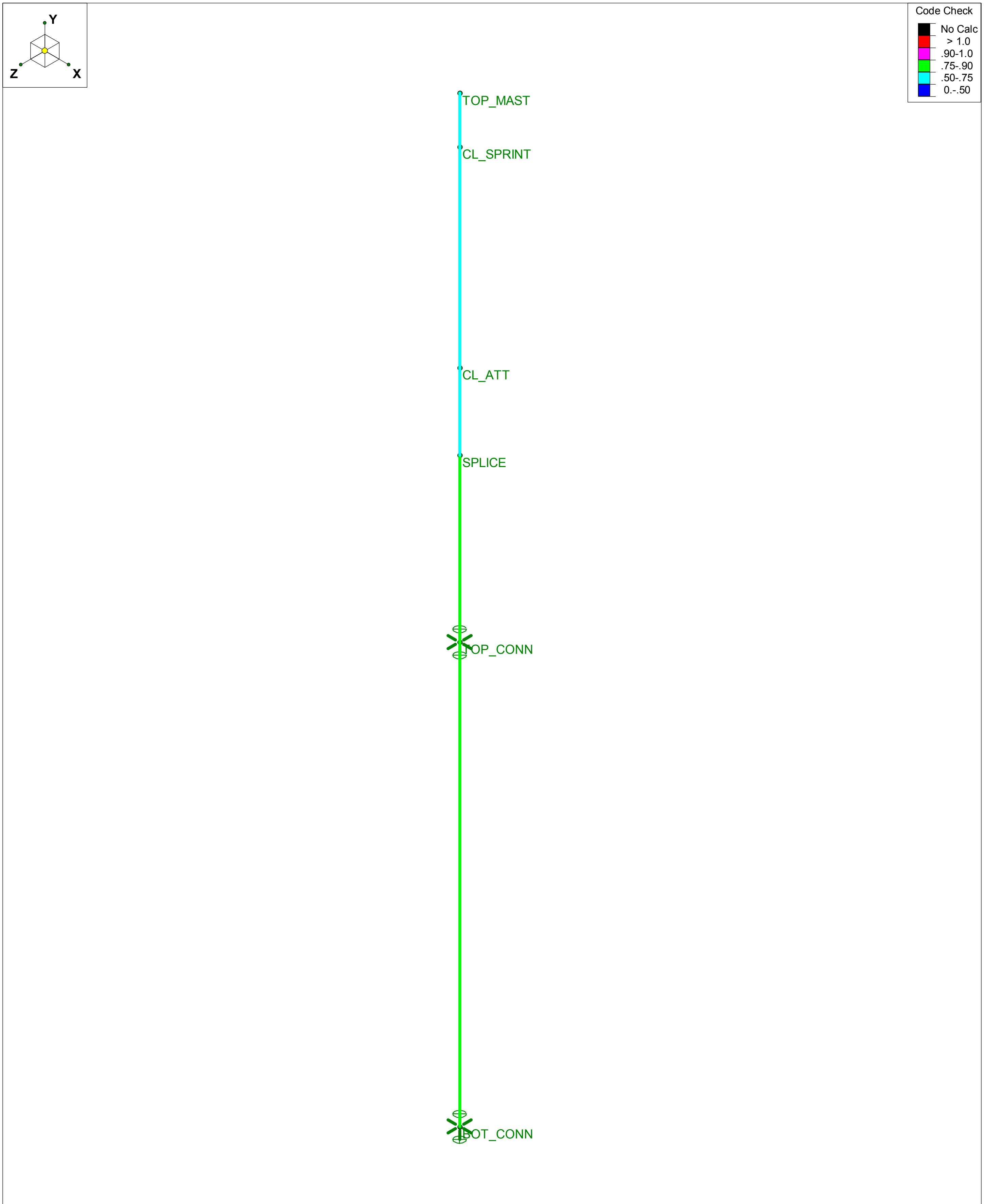
	Me...	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	Fa ...	Ft [...	Fb y-y [ksi]	Fb ...	...	...	...	AS...
1	M1	HSS16...	.858	29.888	2	.048	30.321		2	15...	25.2	27.72	27...	1	.6	....	H2-1
2	M2	PIPE_1...	.720	0	2	.062	0		2	14...	21	23.1	23.1	...	.6	....	H1-2

Joint Reactions

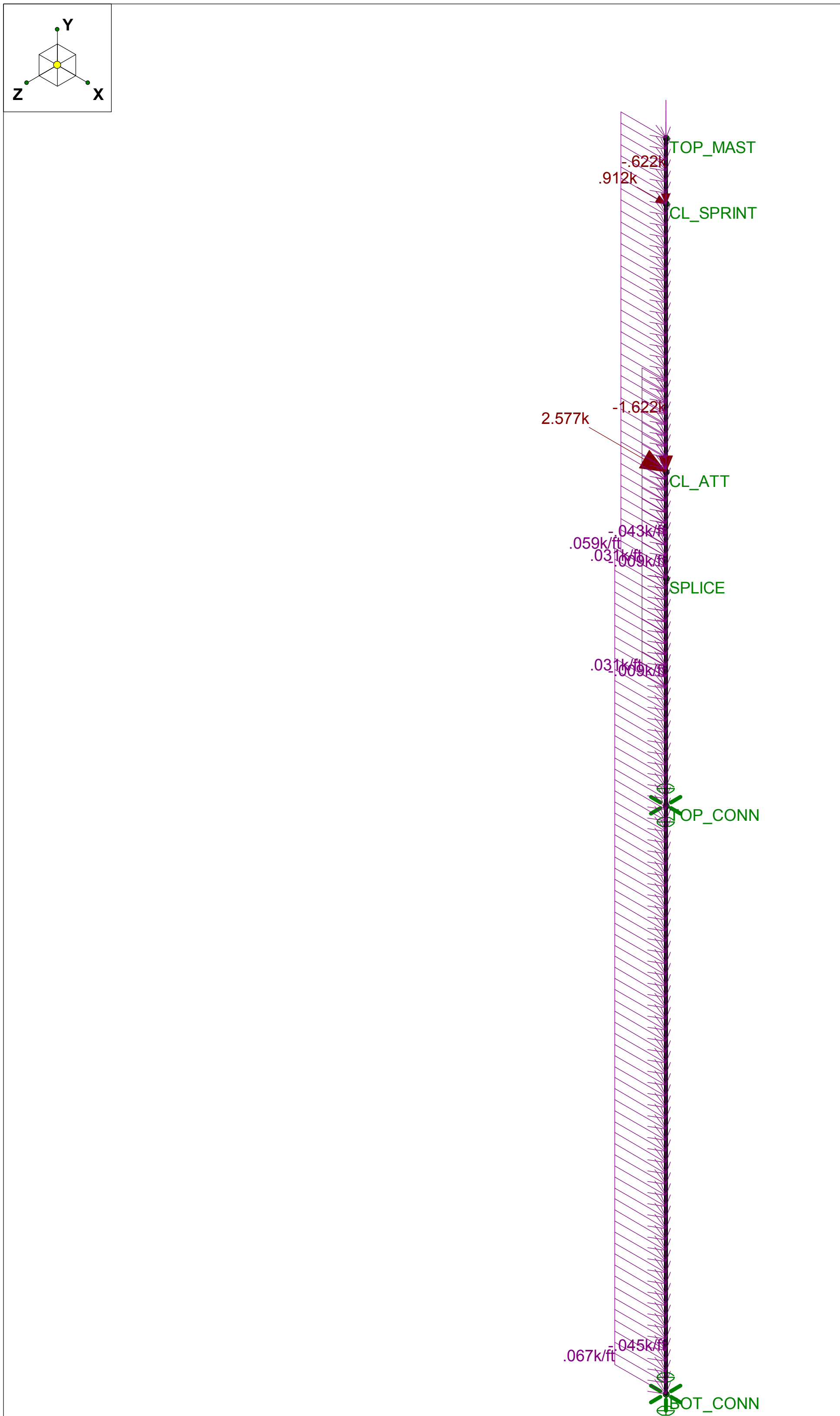
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOT_CONN	2.764	1.553	0	0	0	0
2	1	TOP_CONN	-10.845	7.145	0	0	0	0
3	1	Totals:	-8.081	8.698	0			
4	1	COG (ft):	X: 0	Y: 36.292	Z: 0			

Joint Reactions

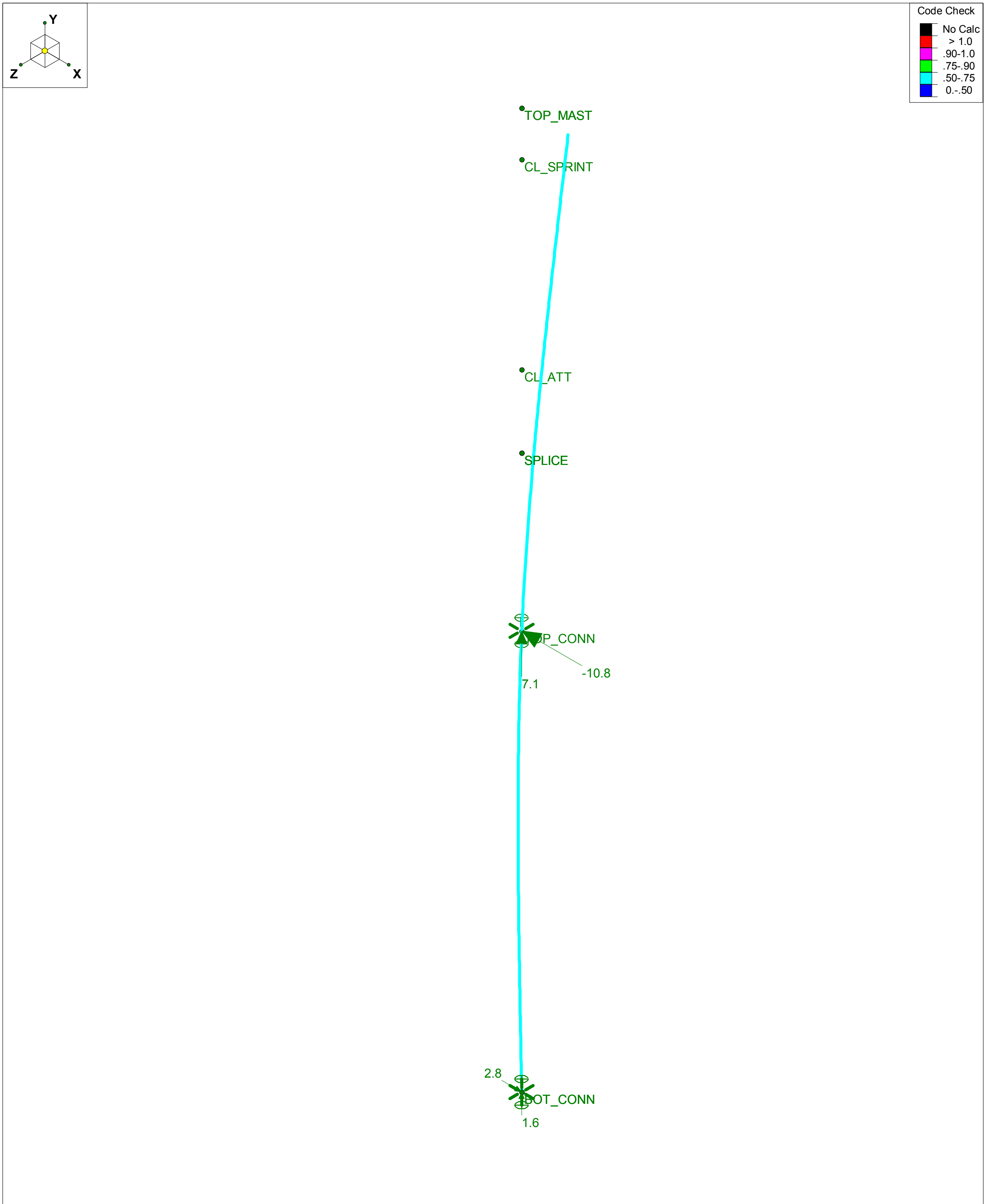
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOT_CONN	3.139	1.058	0	0	0	0
2	2	TOP_CONN	-12.513	4.873	0	0	0	0
3	2	Totals:	-9.373	5.931	0			
4	2	COG (ft):	X: 0	Y: 36.274	Z: 0			



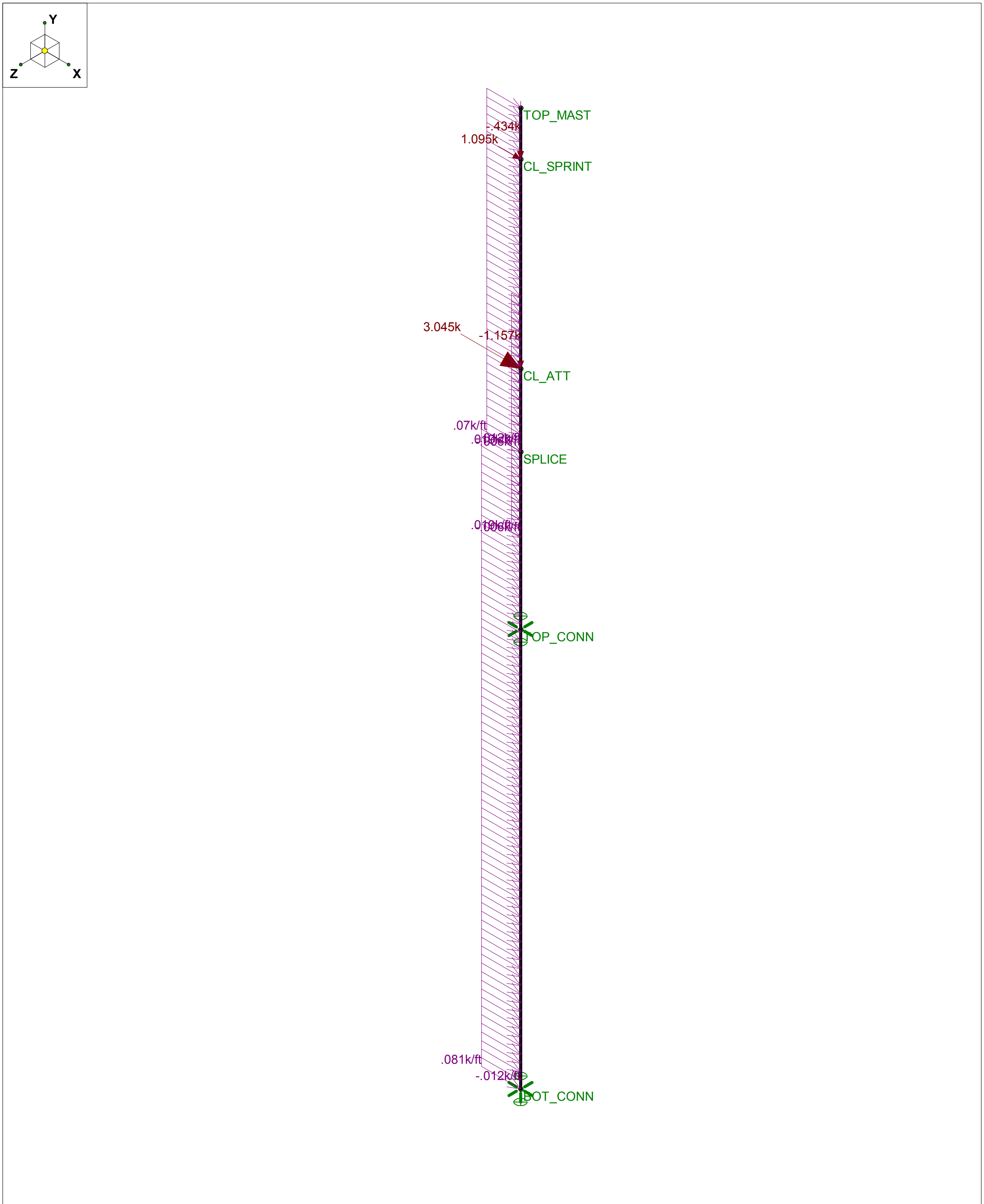
CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 3:04 PM
16002.003 /AT&T CT2185	Unity Check	EIA-TIA Loads.r3d



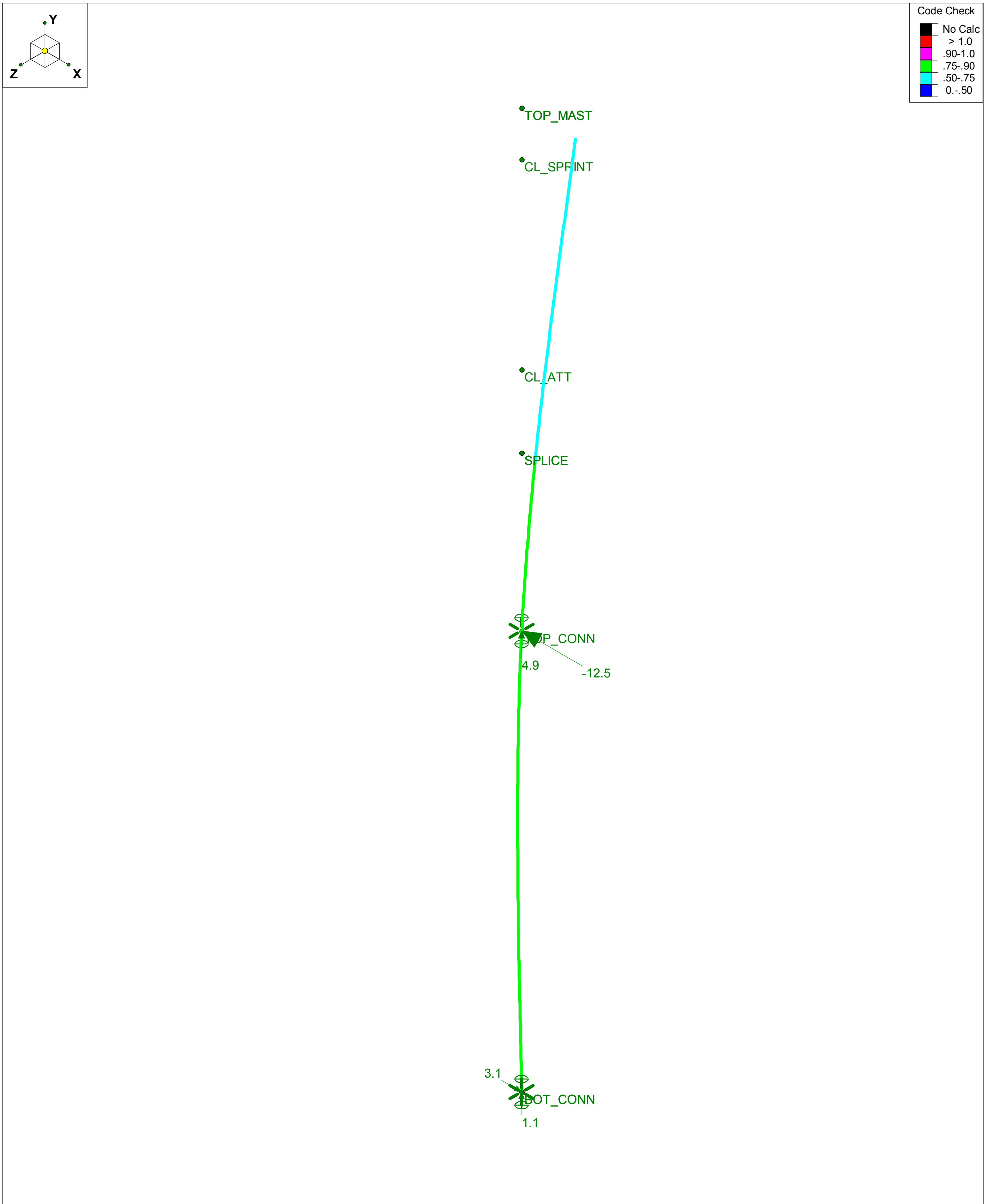
CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 3:05 PM
16002.003 /AT&T CT2185	LC #1 Loads	EIA-TIA Loads.r3d



CENTEK Engineering, INC.	Tower # 2683 - Antenna Mast	
tjl, cfc		Jan 26, 2016 at 3:06 PM
16002.003 /AT&T CT2185	LC #1 Reactions and Deflected Shape	EIA-TIA Loads.r3d



CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 3:05 PM
16002.003 /AT&T CT2185	LC #2 Loads	EIA-TIA Loads.r3d



CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 3:07 PM
16002.003 /AT&T CT2185	LC #2 Reactions and Deflected Shape	EIA-TIA Loads.r3d

Mast Connection to Utility Tower:

Reactions:

Moment =	$Moment := 0 \cdot kips$	(Input From Risa-3D)
Vertical =	$Vertical := 4.9 \cdot kips$	(Input From Risa-3D)
Horizontal x-dir =	$Horizontal_x := 12.5 \cdot kips$	(Input From Risa-3D)
Horizontal z-dir =	$Horizontal_z := 12.5 \cdot kips$	(Input From Risa-3D)

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.625 \cdot in$	(User Input)
Number of Bolts =	$N_b := 4$	(User Input)
Allowable Tensile Strength =	$F_t := 13.8 \cdot kips$	(User Input)
Allowable Shear Strength =	$F_v := 7.36 \cdot kips$	(User Input)

Shear Force = $f_v := \frac{\sqrt{Horizontal_z^2 + Vertical^2}}{N_b} = 3.4 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 45.6 \cdot \%$

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

$Bolt\_Shear = \text{"OK"}$

Tension Force = $f_t := \frac{Horizontal_x}{N_b} = 3.1 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 22.64 \cdot \%$

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

$Bolt\_Tension = \text{"OK"}$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 100$	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 PCS Mast Above Grade =	$TME := 114$	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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.301$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.307$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.837$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.86$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 28.6$ 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 Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

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

Development of Wind & Ice Load on PCS Mast

Existing Upper PCS Mast Data: (Pipe 12 STD)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.8$	in	(User Input)
Mast Length =	$L_{mast} := 22.417$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.067$ sf/ft

Total Mast Wind Force (Above NU Structure) = $qz \cdot Cd_R \cdot A_{mast} \cdot m = 50$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.15$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 6$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\,2}\right] = 20.9$ sq in

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

Development of Wind & Ice Load on PCS Mast

Existing Lower PCS Mast Data: HSS16.0x0.375

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 16.0$	in	(User Input)
Mast Length =	$L_{mast} := 41.583$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.333$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 50$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.417$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 7$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\,2}\right] = 25.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 10$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Existing Antenna Data: (Sprint)

Antenna Model = RFS APXVSPP18-C

Antenna Shape = Flat (User Input)

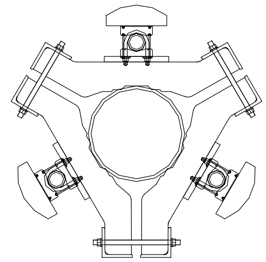
Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 11.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7$ in (User Input)

Antenna Weight = $WT_{ant} := 57$ lbs (User Input)

Number of Antennas = $N_{ant} := 2$ (User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 11.8$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 676$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 13$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 83$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 114$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5947$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1528$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$ lbs

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

Development of Wind & Ice Load on Antennas

Existing Antenna Data: (Sprint)

Antenna Model = RFS APXV9ERR18-C

Antenna Shape = Flat (User Input)

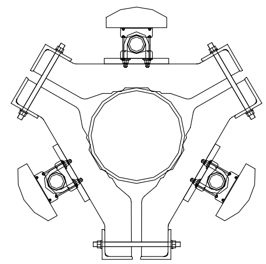
Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 11.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7.9$ in (User Input)

Antenna Weight = $WT_{ant} := 57$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 338$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ sf

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

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 42$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 57$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6712$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1604$ cu in

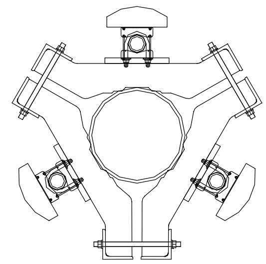
Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 52$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 52$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (Sprint)

Mount Type: Microflect Universal Tri-Bracket



Mount Shape = Flat (User Input)

Pipe Mount Length = $L_{mnt} := 72$ 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)

Tri-Bracket Weight = $W_{tb.mnt} := 197$ 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 = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 22$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{tb.mnt} = 263$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 319$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 334$ cu in

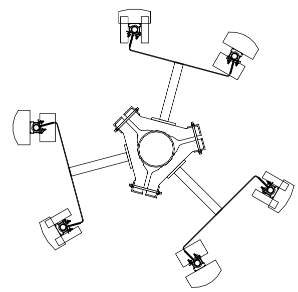
Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 11$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 37$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Existing Antenna Data: (AT&T)

Antenna Model =	Powerwave 7770.00		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55$	in	(User Input)
Antenna Width =	$W_{ant} := 11.0$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 39$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 722$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4.7$ sf

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

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 90$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 117$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1007$ cu in

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

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 98$ lbs **BLC 3**

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Subject: Load Analysis of Antenna Mast on Tower # 2683

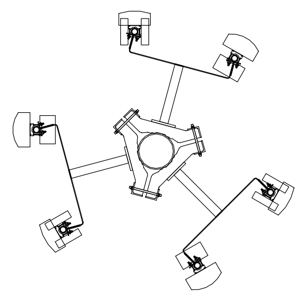
Location: Brookfield, CT

Rev. 0: 1/26/16

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 16002.003

Development of Wind & Ice Load on Antennas

Proposed Antenna Data: (AT&T)



Antenna Model =	CCI OPA-65R-LCUU-H6		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 14.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.4$	in	(User Input)
Antenna Weight =	$WT_{ant} := 75$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 22.2$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1271$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 24$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 154$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 225$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 7885$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1803$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 58$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 175$ lbs **BLC 3**

Development of Wind & Ice Load on TMA's

Existing TMA Data: (AT&T)

TMA Model = Powerwave LGP 21401

TMA Shape = Flat (User Input)

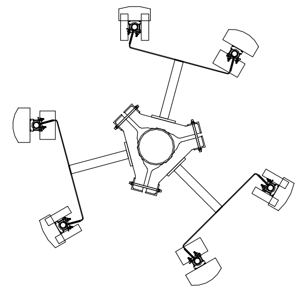
TMA Height = $L_{TMA} := 14.4$ in (User Input)

TMA Width = $W_{TMA} := 9.2$ in (User Input)

TMA Thickness = $T_{TMA} := 2.6$ in (User Input)

TMA Weight = $WT_{TMA} := 14.1$ lbs (User Input)

Number of TMA's = $N_{TMA} := 6$ (User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously

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

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

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 316$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.1$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 6.5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 42$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 85$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 221$ cu in

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

Weight of Ice on All TMA's $W_{ICETMA} \cdot N_{TMA} = 43$ lbs **BLC 3**

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject: Location: Rev. 0: 1/26/16	Load Analysis of Antenna Mast on Tower # 2683 Brookfield, CT Prepared by: T.J.L. Checked by: C.F.C. Job No. 16002.003

Development of Wind & Ice Load on TMA's

Proposed TMA Data: (AT&T)

TMA Model = CCI DTMABP7819VG12A

TMA Shape = Flat (User Input)

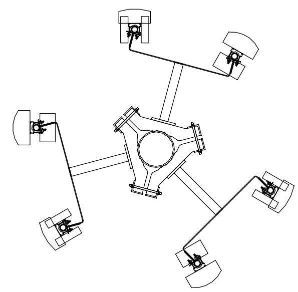
TMA Height = $L_{TMA} := 14.25$ in (User Input)

TMA Width = $W_{TMA} := 11.46$ in (User Input)

TMA Thickness = $T_{TMA} := 4.17$ in (User Input)

TMA Weight = $WT_{TMA} := 20$ lbs (User Input)

Number of TMA's = $N_{TMA} := 6$ (User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously

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

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 6.8$ sf

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 390$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.3$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 7.9$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 51$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 120$ lbs **BLC 2**

Gravity Load (ice only)

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

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 301$ cu in

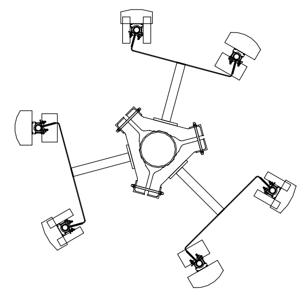
Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All TMA's $W_{ICETMA} \cdot N_{TMA} = 59$ lbs **BLC 3**

Development of Wind & Ice Load on Mounts

Mount Data: (AT&T)

Mount Type = (3) Valmont Dual Standoff Mounts w/ Universal Tri-Bracket



Mount Shape = Flat (User Input)

Mount Area = $A_{mnt} := 4.0$ sq ft (User Input)

Mount Area w/ Ice = $A_{ICEmnt} := 4.6$ sq ft (User Input)

Mount Weight = $WT_{mnt} := 610$ lbs (User Input)

Mount Weight w/ Ice = $WT_{ICEmnt} := 700$ lbs (User Input)

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt} := qz \cdot Cd_F \cdot A_{mnt} \cdot m = 229$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt} := p \cdot Cd_F \cdot A_{ICEmnt} = 29$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Mount = $WT_{mnt} = 610$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Mount = $WT_{ICEmnt} - WT_{mnt} = 90$ lbs **BLC 3**

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Subject: Load Analysis of Antenna Mast on Tower # 2683

Location: Brookfield, CT

Rev. 0: 1/26/16

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 16002.003

Development of Wind & Ice Load on Coax Cables

Existing Coax Cable Data: (Sprint)

Coax Type = HELIAX 1-1/4"

Shape = Round (User Input)

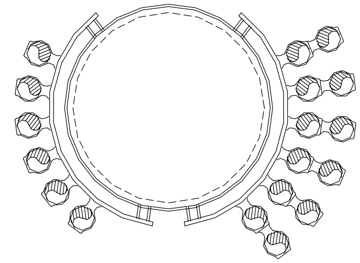
Coax Outside Diameter = $D_{coax} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax} := 64$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 0.66$ plf (User Input)

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

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 3$ (User Input)



Note: AT&T Existing/Proposed cables attached to CL&P Pole

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.4$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 20$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 16$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.5$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 3$ plf **BLC 4**

Gravity Loads (without ice)

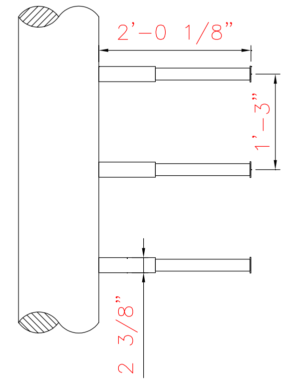
Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}{}^2\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 23$ plf **BLC 3**

Development of Wind & Ice Load on Brace Member



Member Data: Step Bolts

Shape =	Round		(User Input)
Diameter =	$D_{mem} := 2.38$	in	(User Input)
Length =	$L_{mem} := 2$	ft	(User Input)
Spacing =	$Sp_{mem} := 1.25$	ft	(User Input)
Weight =	$Wt_{mem} := 3.66$	plf	(User Input)

Wind Load (NESC Extreme)

Member Projected Surface Area = $A_{mem} := \frac{D_{mem} \cdot L_{mem}}{12 \cdot Sp_{mem}} = 0.317$ sf/ft

Total Member Wind Force = $qz \cdot Cd_R \cdot A_{mem} \cdot m = 15$ plf **BLC 5**

Wind Load (NESE Heavy)

Member Projected Surface Area w/ Ice = $AICE_{mem} := \frac{(D_{mem} + 2 \cdot Ir) \cdot (L_{mem} + 2 \cdot Ir)}{12 \cdot Sp_{mem}} = 0.676$ sf/ft

Total Member Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mem} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the Member = $\frac{Wt_{mem} \cdot L_{mem}}{Sp_{mem}} = 6$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mem} := \frac{1}{4} \cdot \pi \cdot \left[(D_{mem} + 2 \cdot Ir)^2 - D_{mem}^{\ 2} \right] = 4.5$ sq in

Weight of Ice on Member = $W_{ICEmem} := Id \cdot \frac{Ai_{mem}}{144} \cdot \frac{L_{mem}}{Sp_{mem}} = 3$ plf **BLC 3**

CENTEK engineering, INC.
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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 Reactions Applied to Utility Pole**
Tabulated Load Cases
Location: **Brookfield, CT**
Date:1/26/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16002.003

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

Footnotes:

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Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Reactions Applied to Utility Pole**
Load Combinations Table
Location: **Brookfield, CT**
Date: 1/26/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 16002.003

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

Footnotes:
(1) BLC = Basic Load Case

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 530-05: ASD
Aluminum Code	AA ADM1-05: 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	Existing Lower Mast	41.583	30		30									Lateral
2	M2	Existing Upper Mast	22.417	30		30									Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Upper Mast	PIPE_12.0	Beam	Pipe	A53 Gr. B	Typical	13.7	262	262	523
2	Existing Lower Mast	HSS16x0.375	Beam	Pipe	A500 Gr.42	Typical	17.2	526	526	1050

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOT_C...	SPLICE			Existing Lower Mast	Beam	Pipe	A500 Gr.42	Typical
2	M2	SPLICE	TOP_M...			Existing Upper Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From D...
1	BOT_CONN	0	0	0	0	
2	TOP_CONN	0	30	0	0	
3	SPLICE	0	41.583	0	0	
4	TOP_MAST	0	64	0	0	
5	CL_SPRINT	0	60.667	0	0	
6	CL_ATT	0	47	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	BOT_CONN	Reaction	Reaction	Reaction		Reaction		
2	TOP_CONN	Reaction	Reaction	Reaction		Reaction		

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Joint Loads and Enforced Displacements (BLC 2 : Weight of Appurtenances)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	Y	-.114
2	CL_SPRINT	L	Y	-.057
3	CL_SPRINT	L	Y	-.263
4	CL_ATT	L	Y	-.117
5	CL_ATT	L	Y	-.225
6	CL_ATT	L	Y	-.085
7	CL_ATT	L	Y	-.12
8	CL_ATT	L	Y	-.61

Joint Loads and Enforced Displacements (BLC 3 : Weight of Ice Only)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	Y	-.099
2	CL_SPRINT	L	Y	-.052
3	CL_SPRINT	L	Y	-.037
4	CL_ATT	L	Y	-.098
5	CL_ATT	L	Y	-.175
6	CL_ATT	L	Y	-.043
7	CL_ATT	L	Y	-.059
8	CL_ATT	L	Y	-.09

Joint Loads and Enforced Displacements (BLC 4 : NESC Heavy Wind)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	X	.083
2	CL_SPRINT	L	X	.042
3	CL_ATT	L	X	.09
4	CL_ATT	L	X	.154
5	CL_ATT	L	X	.042
6	CL_ATT	L	X	.051
7	CL_ATT	L	X	.029

Joint Loads and Enforced Displacements (BLC 5 : NESC Extreme Wind)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	CL_SPRINT	L	X	.676
2	CL_SPRINT	L	X	.338
3	CL_ATT	L	X	.722
4	CL_ATT	L	X	1.271
5	CL_ATT	L	X	.316
6	CL_ATT	L	X	.39
7	CL_ATT	L	X	.229

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	-.012	-.012	0	0
2	M2	Y	-.012	-.012	0	0
3	M1	Y	-.006	-.006	36	0
4	M2	Y	-.006	-.006	0	10

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.01	-.01	0	0
2	M2	Y	-.008	-.008	0	0
3	M1	Y	-.023	-.023	0	0
4	M2	Y	-.023	-.023	0	0
5	M1	Y	-.003	-.003	36	0
6	M2	Y	-.003	-.003	0	10

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

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

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
2	M2	X	.006	.006	0	0
3	M1	X	.003	.003	0	0
4	M2	X	.003	.003	0	0
5	M1	X	.004	.004	36	0
6	M2	X	.004	.004	0	10

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.05	.05	0	0
2	M2	X	.05	.05	0	0
3	M1	X	.016	.016	0	0
4	M2	X	.02	.02	0	0
5	M1	X	.015	.015	36	0
6	M2	X	.015	.015	0	10

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				8		4		
3	Weight of Ice Only	None				8		6		
4	NESC Heavy Wind	None				7		6		
5	NESC Extreme Wind	None				7		6		

Load Combinations

	Description	Sol...	PDelta	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	NESC Heavy Wind	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Joint Reactions

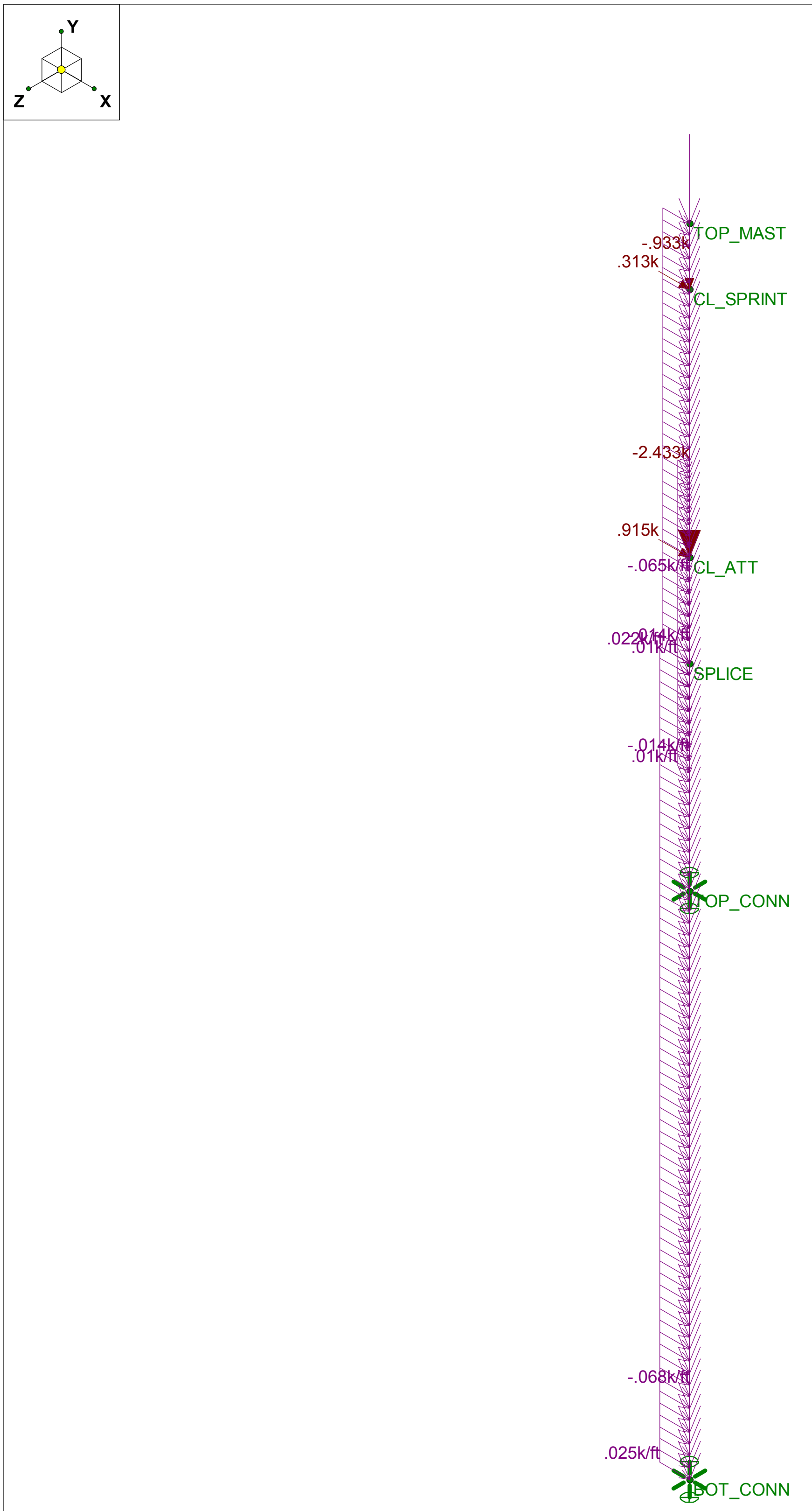
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOT_CONN	max	3.153	2	2.329	1	0	1	0	1	0	1	0	1
2		min	.974	1	1.058	2	0	1	0	1	0	1	0	1
3	TOP_CONN	max	-3.901	1	10.718	1	0	1	0	1	0	1	0	1
4		min	-11.642	2	4.873	2	0	1	0	1	0	1	0	1
5	Totals:	max	-2.927	1	13.047	1	0	1						
6		min	-8.489	2	5.931	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	BOT_CONN	.974	2.329	0	0	0	0
2	1	TOP_CONN	-3.901	10.718	0	0	0	0
3	1	Totals:	-2.927	13.047	0			
4	1	COG (ft):	X: 0	Y: 36.292	Z: 0			

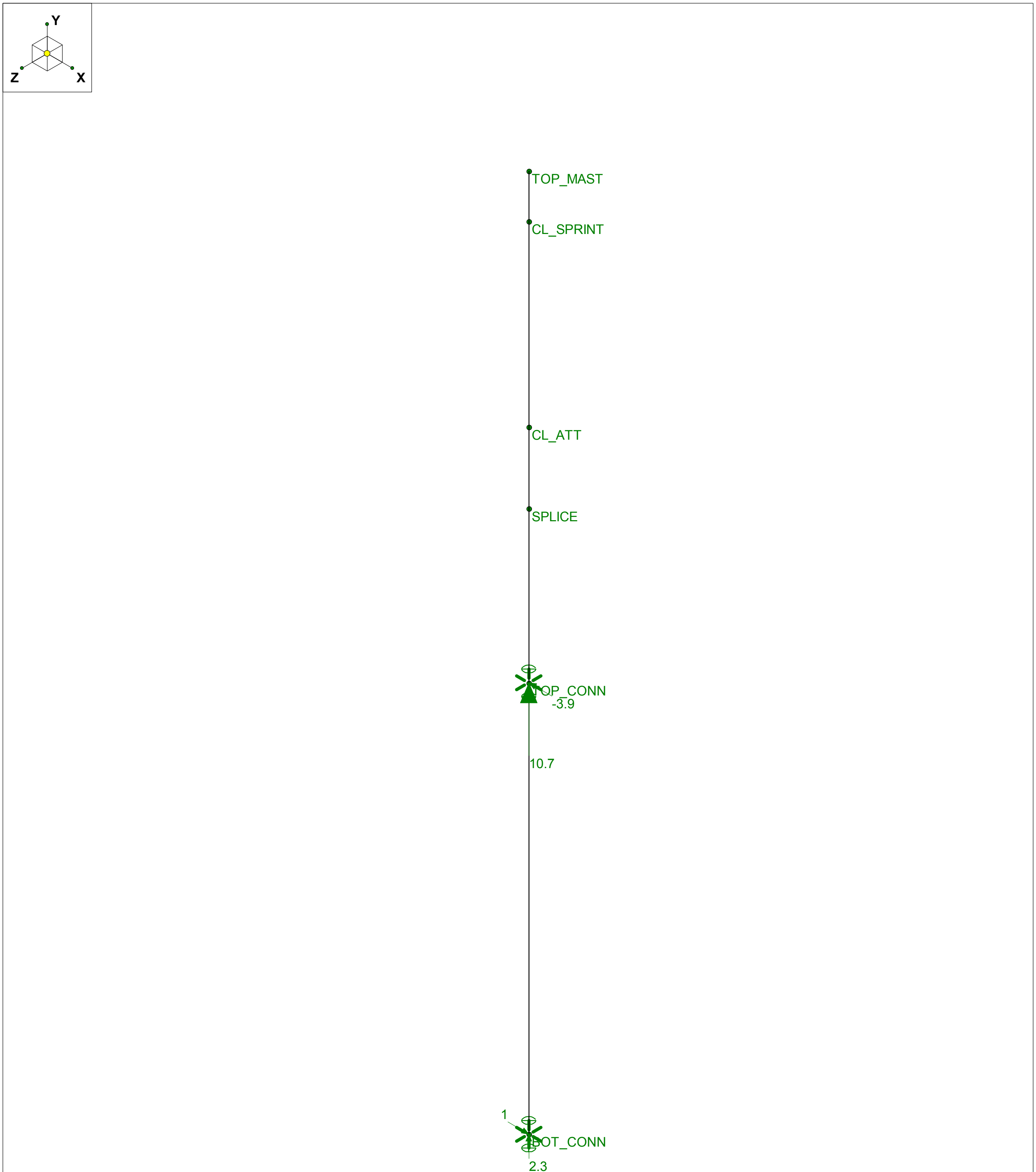
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOT_CONN	3.153	1.058	0	0	0	0
2	2	TOP_CONN	-11.642	4.873	0	0	0	0
3	2	Totals:	-8.489	5.931	0			
4	2	COG (ft):	X: 0	Y: 36.274	Z: 0			

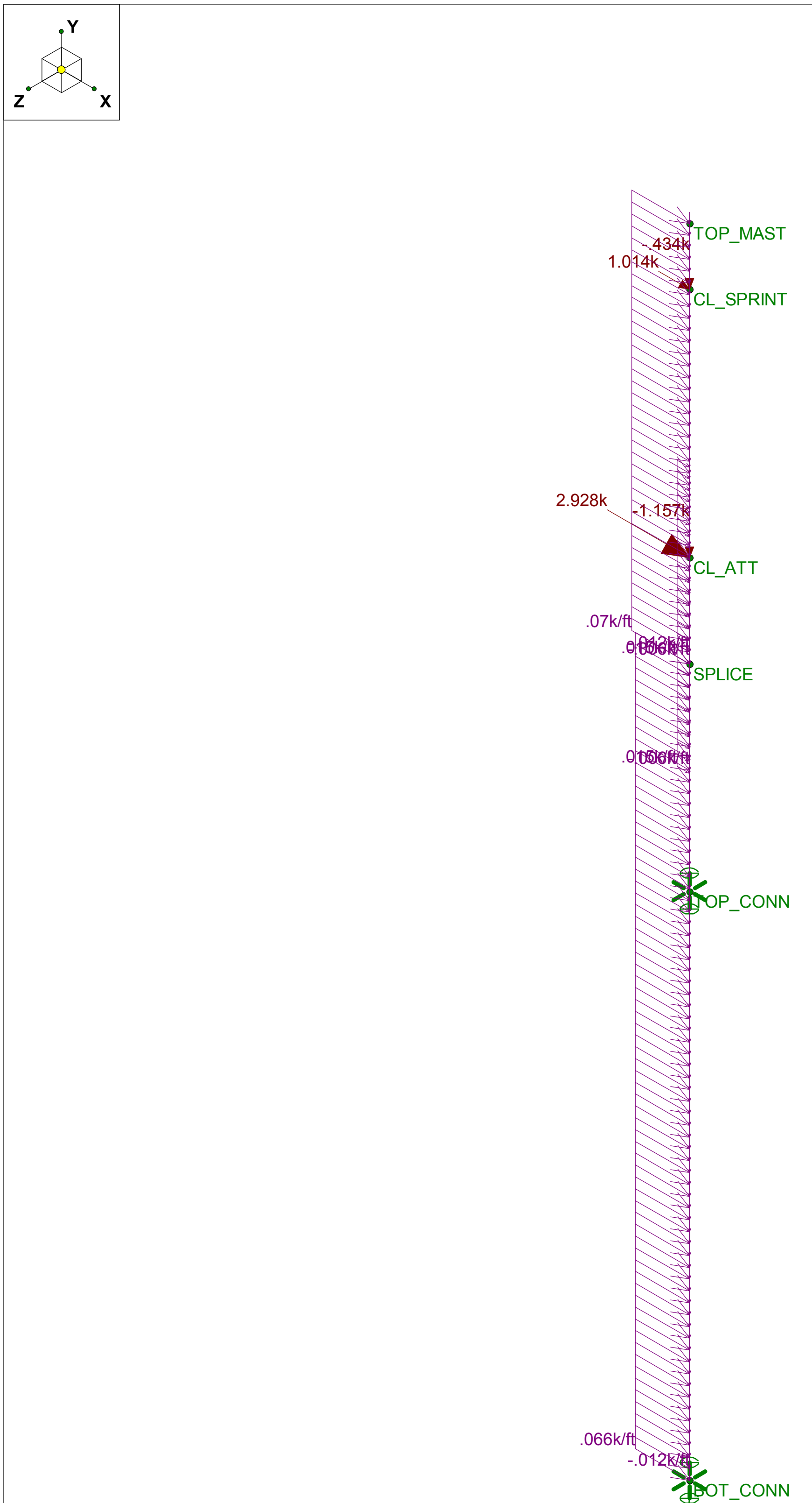


Loads: LC 1, NESC Heavy Wind

CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 4:15 PM
16002.003 /AT&T CT2185	LC #1 Loads	NESC Loads.r3d

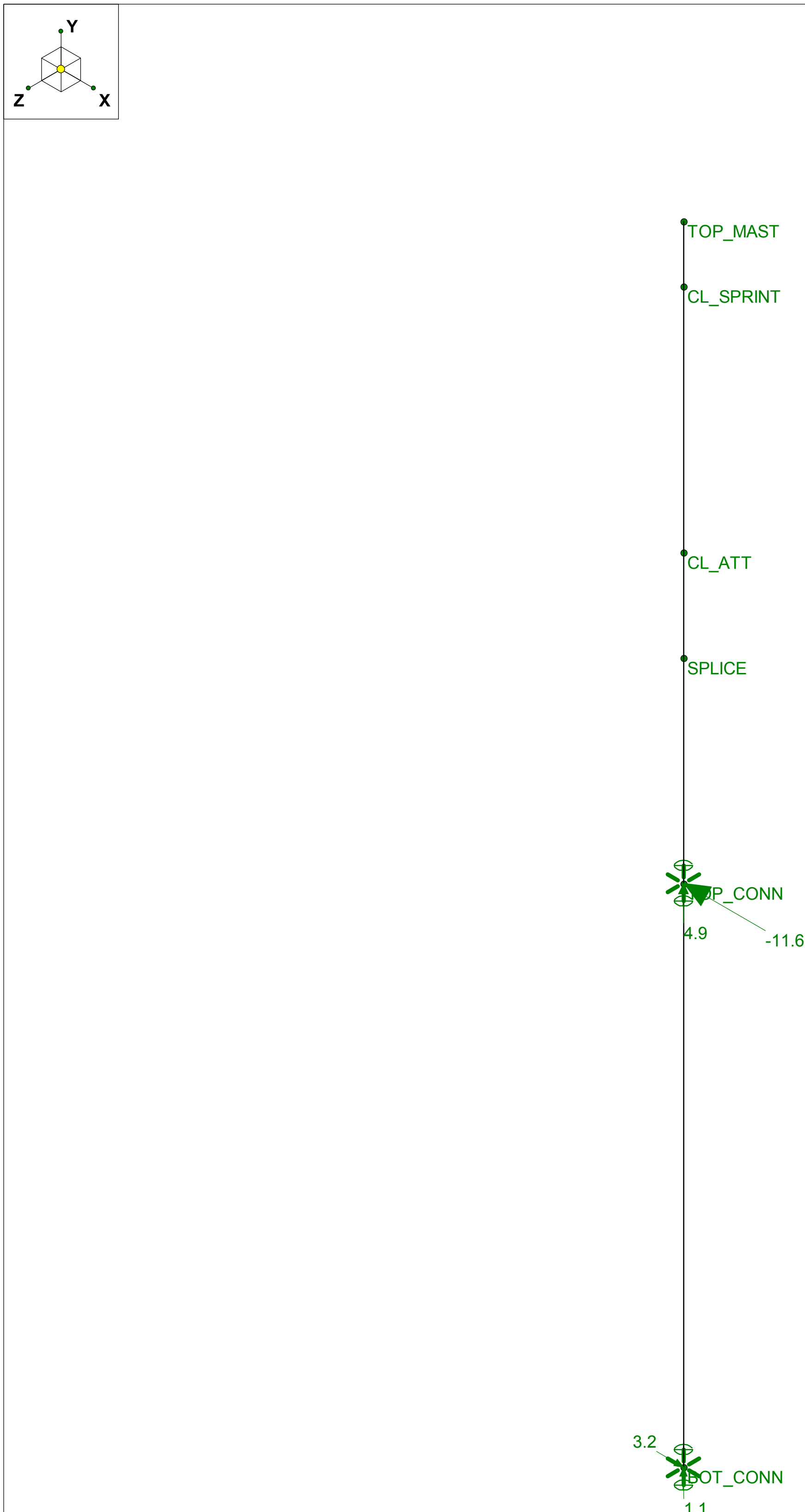


CENTEK Engineering, INC.	Tower # 2683 - Antenna Mast	
tjl, cfc		Jan 26, 2016 at 4:16 PM
16002.003 /AT&T CT2185	LC #1 Reactions	NESC Loads.r3d



Loads: LC 2, NESC Extreme Wind

CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 4:15 PM
16002.003 /AT&T CT2185	LC #2 Loads	NESC Loads.r3d



CENTEK Engineering, INC.		
tjl, cfc	Tower # 2683 - Antenna Mast	Jan 26, 2016 at 4:17 PM
16002.003 /AT&T CT2185	LC #2 Reactions	NESC Loads.r3d

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

Subject:	Coax Cable on Pole # 2683
Location:	Brookfield, CT
Rev. 0: 1/26/16	Prepared by: T.J.L Checked by: C.F.C. Job No. 16002.003

Coax Cable on Pole (Below 50-ft AGL)

Distance Between Coax Cable Attach Points =

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

Diameter of Coax Cable = $D_{coax1} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax1} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax1} := 36$ *(User Input)* 18 AT&T Cables and 18 Sprint Cables

Number of Projected Coax Cables = $NP_{coax1} := 4$ *(User Input)*

Extreme Wind Pressure = $qz := 28.6 \cdot psf$ *(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 Load = $OF_{HW} := 2.5$ *(User Input)*

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

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

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

Wind Area with Ice = $A_{ice} := \left(NP_{coax1} \cdot D_{coax1} + 2 \cdot Ir\right) = 7.2 \cdot in$

Wind Area without Ice = $A := \left(NP_{coax1} \cdot D_{coax1}\right) = 6.2 \cdot in$

Ice Area per Liner Ft = $Ai_{coax1} := \frac{\pi}{4} \cdot \left[\left(D_{coax1} + 2 \cdot Ir\right)^2 - D_{coax1}{}^2\right] = 0.022 ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax1} \cdot Id \cdot N_{coax1} = 45 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax1} \cdot W_{coax1} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

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

$$Heavy_{Vert} = \begin{pmatrix} 1033 \\ 1033 \\ 1033 \\ 1033 \\ 1033 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 87 \\ 87 \\ 87 \\ 87 \\ 87 \end{pmatrix} lb$$

Extreme Vertical Load =

$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax1} \cdot W_{coax1}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

Extreme Transverse Load =

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

$$Extreme_{Vert} = \begin{pmatrix} 238 \\ 238 \\ 238 \\ 238 \\ 238 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 214 \\ 214 \\ 214 \\ 214 \\ 214 \end{pmatrix} lb$$

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

Subject:	Coax Cable on Pole # 2683
Location:	Brookfield, CT
Rev. 0: 1/26/16	Prepared by: T.J.L Checked by: C.F.C. Job No. 16002.003

Coax Cable on Pole (Above 50-ft AGL)

Distance Between Coax Cable Attach Points =

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

Diameter of Coax Cable = $D_{coax1} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax1} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax1} := 18$ *(User Input)* 18 AT&T Cables

Number of Projected Coax Cables = $NP_{coax1} := 2$ *(User Input)* Sprint Cables on Mast

Extreme Wind Pressure = $qz := 28.6 \cdot psf$ *(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 Load = $OF_{HW} := 2.5$ *(User Input)*

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

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

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

Wind Area with Ice = $A_{ice} := (NP_{coax1} \cdot D_{coax1} + 2 \cdot Ir) = 4.1 \cdot in$

Wind Area without Ice = $A := (NP_{coax1} \cdot D_{coax1}) = 3.1 \cdot in$

Ice Area per Liner Ft = $Ai_{coax1} := \frac{\pi}{4} \cdot \left[(D_{coax1} + 2 \cdot Ir)^2 - D_{coax1}{}^2 \right] = 0.022 ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax1} \cdot Id \cdot N_{coax1} = 23 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax1}\cdot W_{coax1} + W_{ice}\right)\cdot Coax_{Span}\cdot OF_{HV}\right]}$$

Heavy Transverse Load =

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

$$Heavy_{Vert} = \begin{pmatrix} 516 \\ 516 \\ 516 \\ 516 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 50 \\ 50 \\ 50 \\ 50 \end{pmatrix} lb$$

Extreme Vertical Load =

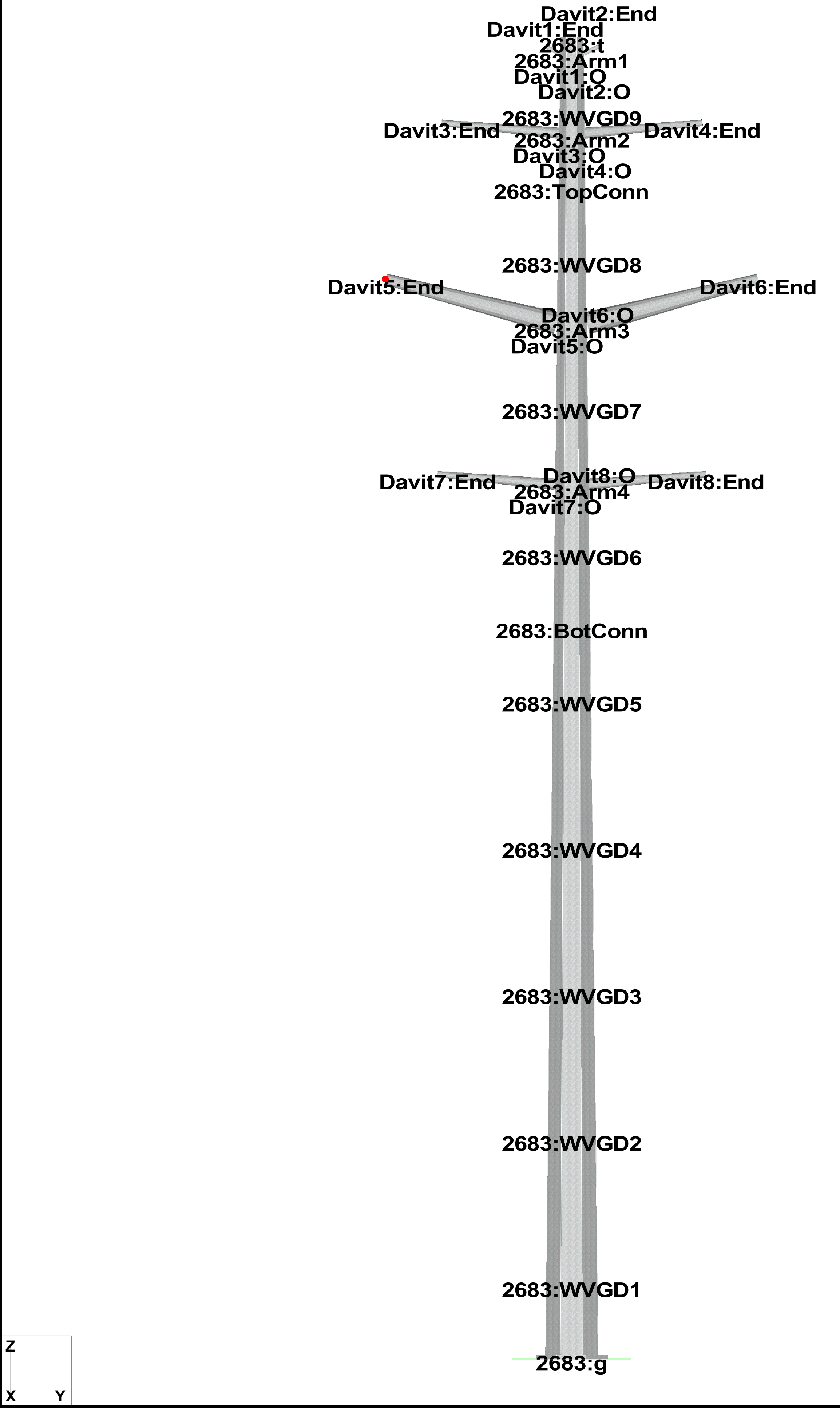
$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax1}\cdot W_{coax1}\right)\cdot Coax_{Span}\cdot OF_{EV}\right]}$$

Extreme Transverse Load =

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

$$Extreme_{Vert} = \begin{pmatrix} 119 \\ 119 \\ 119 \\ 119 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 107 \\ 107 \\ 107 \\ 107 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "cl&p structure # 2683"
PLS-POLE Version 12.50, 8:40:42 AM Wednesday, January 27, 2016
Undeformed geometry displayed



Project Name : 16002.003 - Brookfield, CT
Project Notes: Structure # 2683/ AT&T - CT2185
Project File : J:\Jobs\1600200.WI\003_Brookfield Station Rd - CT2185\04_Structural\Backup Documentation\Calcs\PLS Pole\cl&p structure # 2683.pol
Date run : 8:38:44 AM Wednesday, January 27, 2016
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\1600200.wi\003_brookfield station rd - ct2185\04_structural\backup documentation\calcs\pls pole\cl&p #2683.lca

*** Analysis Results:

Maximum element usage is 88.10% for Steel Pole "2683" in load case "NESC Heavy"
Maximum insulator usage is 15.78% for Clamp "Clamp21" in load case "NESC Extreme"

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	2683:g	-0.08	-28.87	-56.79	28.87	2206.64	-3.50	2206.64	-0.00	0.00
NESC Extreme	2683:g	-0.03	-30.35	-28.31	30.35	2196.17	-1.08	2196.17	-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	2683:t	0.05	42.37	-1.11	42.38	0.00	-3.85	0.00
NESC Extreme	2683:t	0.01	41.96	-1.07	41.97	0.00	-3.78	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
2683	1	3397	NESC Heavy	56.91	628.91
2683	2	5750	NESC Heavy	71.99	1487.71
2683	3	3427	NESC Heavy	88.10	2206.64

*** 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)
2683	88.10	NESC Heavy	25	13920.9

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	5.84	NESC Heavy	1	8.5
Davit2	18.66	NESC Heavy	1	8.5
Davit3	21.79	NESC Heavy	1	109.6
Davit4	33.13	NESC Heavy	1	109.6
Davit5	4.94	NESC Heavy	1	434.7
Davit6	11.53	NESC Heavy	1	434.7
Davit7	22.23	NESC Heavy	1	109.6
Davit8	33.72	NESC Heavy	1	109.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	88.10	2683	Steel Pole
NESC Extreme	80.76	2683	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	88.10	2683	25
NESC Extreme	80.76	2683	25

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	2683	6	30.544	55.446	2206.637	-3.500	37.168	141.906	6	99.748	2.466	67.58
NESC Extreme	2683	6	30.544	26.962	2196.168	-1.075	36.112	137.875	6	96.706	2.431	65.66

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	33.72	Davit8	1
NESC Extreme	14.52	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.00	NESC Heavy	0.0
Clamp2	Clamp	3.05	NESC Heavy	0.0
Clamp3	Clamp	3.70	NESC Heavy	0.0

Clamp4	Clamp	5.34	NESC Heavy	0.0
Clamp5	Clamp	3.70	NESC Heavy	0.0
Clamp6	Clamp	5.34	NESC Heavy	0.0
Clamp7	Clamp	3.70	NESC Heavy	0.0
Clamp8	Clamp	5.34	NESC Heavy	0.0
Clamp9	Clamp	1.30	NESC Heavy	0.0
Clamp10	Clamp	1.30	NESC Heavy	0.0
Clamp11	Clamp	1.30	NESC Heavy	0.0
Clamp12	Clamp	1.30	NESC Heavy	0.0
Clamp13	Clamp	1.30	NESC Heavy	0.0
Clamp14	Clamp	0.65	NESC Heavy	0.0
Clamp15	Clamp	0.65	NESC Heavy	0.0
Clamp16	Clamp	0.65	NESC Heavy	0.0
Clamp17	Clamp	0.65	NESC Heavy	0.0
Clamp21	Clamp	15.78	NESC Extreme	0.0
Clamp23	Clamp	4.16	NESC Extreme	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	1325.0
Weight of Steel Poles:	13920.9
Total:	15245.9

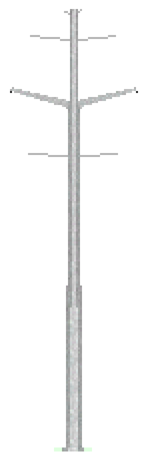
*** End of Report

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

Project Name : 16002.003 - Brookfield, CT
Project Notes: Structure # 2683/ AT&T - CT2185
Project File : J:\Jobs\1600200.WI\003_Brookfield Station Rd - CT2185\04_Structural\Backup Documentation\Calcs\PLS Pole\cl&p structure # 2683.pol
Date run   : 8:38:44 AM Wednesday, January 27, 2016
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 48-05

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

Steel Pole Properties:

Steel Pole Property	Stock Number	Length	Default Embedded	Base Plate	Shape	Tip Diameter	Base Diameter	Taper	Default Drag	Tubes	Modulus of Elasticity	Weight Density	Shape At	Strength Check	Distance From	Ultimate	Ultimate

Label		Length (ft)	(ft)			(in)	(in)	(in/ft)	Coef.		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
CL&P2683	2683	90.00	0	Yes	8F	19.63	43.21	0	1.3	3 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

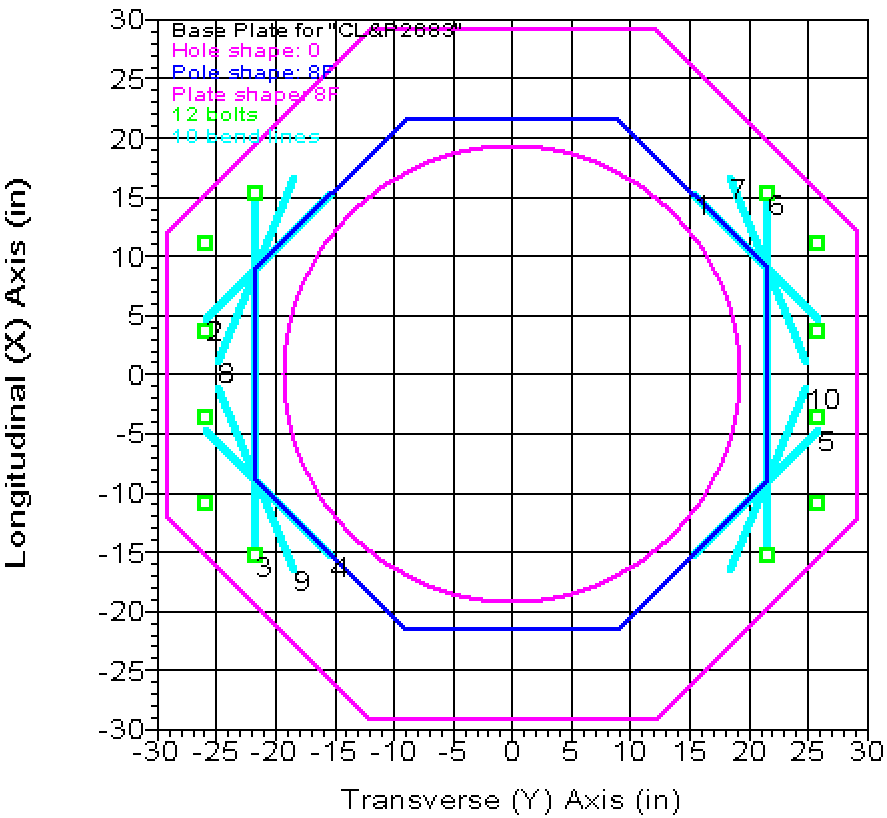
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CL&P2683	1	39	0.3125	4.167	0.000	0.000	65.000	0.000	3397	20.92	0.27728	19.63	30.44	3.727	4.167
CL&P2683	2	40.1667	0.375	5.250	0.000	0.000	65.000	0.000	5750	21.18	0.27728	28.66	39.80	4.881	5.250
CL&P2683	3	20.25	0.375	0.000	0.000	0.000	65.000	0.000	3427	10.36	0.27728	37.59	43.20	0.000	0.000

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CL&P2683	58.250	8F	3.000	1347	0.000	38.750	0	490.00	55.000	2.250	51.750	12	28733.01	5839.56

Base Plate Bolt Coordinates for Property "CL&P2683":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.5894	0.8357	0
0.4251	1	0
0.1425	1	0



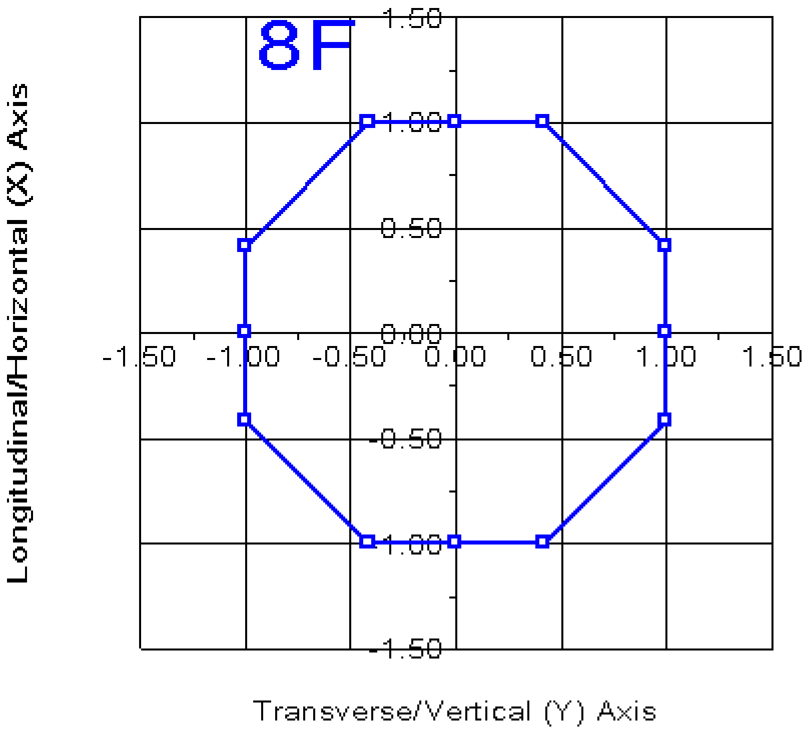
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
2683			0	0	0	0	0	CL&P2683	15 labels	Fixed	0.00	0

Relative Attachment Labels for Steel Pole "2683":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
2683:WVGD1	0.00	5.00
2683:WVGD2	0.00	15.00
2683:WVGD3	0.00	25.00
2683:WVGD4	0.00	35.00
2683:WVGD5	0.00	45.00

2683:WVGD6	0.00	55.00
2683:WVGD7	0.00	65.00
2683:WVGD8	0.00	75.00
2683:TopConn	0.00	80.00
2683:BotConn	0.00	50.00
2683:WVGD9	0.00	85.00
2683:Arm1	0.00	88.92
2683:Arm2	0.00	83.50
2683:Arm3	0.00	70.50
2683:Arm4	0.00	59.50



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)
2683	2683:t	2683:t Ori	0.00	19.63	20.00	985.95	985.95	0.00	21.9	65.00	65.00	544.26	544.26
2683	2683:Arm1	2683:Arm1 End	1.08	19.92	20.31	1032.52	1032.52	0.00	22.3	65.00	65.00	561.40	561.40
2683	2683:Arm1	2683:Arm1 Ori	1.08	19.92	20.31	1032.52	1032.52	0.00	22.3	65.00	65.00	561.40	561.40
2683	2683:WVGD9	2683:WVGD9 End	5.00	21.01	21.43	1213.85	1213.85	0.00	23.7	65.00	65.00	625.85	625.85
2683	2683:WVGD9	2683:WVGD9 Ori	5.00	21.01	21.43	1213.85	1213.85	0.00	23.7	65.00	65.00	625.85	625.85

2683	2683:Arm2	2683:Arm2	End	6.50	21.43	21.87	1288.49	1288.49	0.00	24.3	65.00	65.00	651.44	651.44
2683	2683:Arm2	2683:Arm2	Ori	6.50	21.43	21.87	1288.49	1288.49	0.00	24.3	65.00	65.00	651.44	651.44
2683	2683:TopConn	2683:TopConn	End	10.00	22.40	22.87	1474.42	1474.42	0.00	25.5	65.00	65.00	713.14	713.14
2683	2683:TopConn	2683:TopConn	Ori	10.00	22.40	22.87	1474.42	1474.42	0.00	25.5	65.00	65.00	713.15	713.15
2683	2683:WVGD8	2683:WVGD8	End	15.00	23.78	24.31	1769.84	1769.84	0.00	27.4	65.00	65.00	806.14	806.14
2683	2683:WVGD8	2683:WVGD8	Ori	15.00	23.78	24.31	1769.84	1769.84	0.00	27.4	65.00	65.00	806.14	806.14
2683	2683:Arm3	2683:Arm3	End	19.50	25.03	25.60	2067.33	2067.33	0.00	29.0	65.00	65.00	894.70	894.70
2683	2683:Arm3	2683:Arm3	Ori	19.50	25.03	25.60	2067.33	2067.33	0.00	29.0	65.00	65.00	894.70	894.70
2683	#2683:0	Tube 1	End	22.25	25.79	26.39	2264.58	2264.58	0.00	30.0	65.00	65.00	951.09	951.09
2683	#2683:0	Tube 1	Ori	22.25	25.79	26.39	2264.58	2264.58	0.00	30.0	65.00	65.00	951.09	951.09
2683	2683:WVGD7	2683:WVGD7	End	25.00	26.56	27.18	2474.00	2474.00	0.00	31.1	65.00	65.00	1009.21	1009.21
2683	2683:WVGD7	2683:WVGD7	Ori	25.00	26.56	27.18	2474.00	2474.00	0.00	31.1	65.00	65.00	1009.21	1009.21
2683	#2683:1	Tube 1	End	27.75	27.32	27.97	2695.95	2695.95	0.00	32.1	65.00	65.00	1069.06	1069.06
2683	#2683:1	Tube 1	Ori	27.75	27.32	27.97	2695.95	2695.95	0.00	32.1	65.00	65.00	1069.06	1069.06
2683	2683:Arm4	2683:Arm4	End	30.50	28.08	28.76	2930.78	2930.78	0.00	33.1	65.00	64.24	1117.35	1117.35
2683	2683:Arm4	2683:Arm4	Ori	30.50	28.08	28.76	2930.78	2930.78	0.00	33.1	65.00	64.24	1117.35	1117.35
2683	#2683:2	SpliceT	End	34.83	29.28	30.00	3327.87	3327.87	0.00	34.7	65.00	62.89	1191.09	1191.09
2683	#2683:2	SpliceT	Ori	34.83	29.28	30.00	3327.87	3327.87	0.00	34.7	65.00	62.89	1191.10	1191.10
2683	2683:WVGD6	2683:WVGD6	End	35.00	28.70	35.20	3734.31	3734.31	0.00	27.6	65.00	65.00	1409.35	1409.35
2683	2683:WVGD6	2683:WVGD6	Ori	35.00	28.70	35.20	3734.31	3734.31	0.00	27.6	65.00	65.00	1409.35	1409.35
2683	#2683:3	SpliceB	End	39.00	29.81	36.58	4190.24	4190.24	0.00	28.8	65.00	65.00	1522.59	1522.59
2683	#2683:3	SpliceB	Ori	39.00	29.81	36.58	4190.24	4190.24	0.00	28.8	65.00	65.00	1522.59	1522.59
2683	2683:BotConn	2683:BotConn	End	40.00	30.09	36.93	4309.75	4309.75	0.00	29.1	65.00	65.00	1551.58	1551.58
2683	2683:BotConn	2683:BotConn	Ori	40.00	30.09	36.93	4309.75	4309.75	0.00	29.1	65.00	65.00	1551.58	1551.58
2683	2683:WVGD5	2683:WVGD5	End	45.00	31.48	38.65	4941.47	4941.47	0.00	30.6	65.00	65.00	1700.66	1700.66
2683	2683:WVGD5	2683:WVGD5	Ori	45.00	31.48	38.65	4941.47	4941.47	0.00	30.6	65.00	65.00	1700.66	1700.66
2683	#2683:4	Tube 2	End	50.00	32.86	40.37	5632.09	5632.09	0.00	32.2	65.00	65.00	1856.57	1856.57
2683	#2683:4	Tube 2	Ori	50.00	32.86	40.37	5632.09	5632.09	0.00	32.2	65.00	65.00	1856.57	1856.57
2683	2683:WVGD4	2683:WVGD4	End	55.00	34.25	42.09	6384.24	6384.24	0.00	33.7	65.00	63.72	1979.56	1979.56
2683	2683:WVGD4	2683:WVGD4	Ori	55.00	34.25	42.09	6384.24	6384.24	0.00	33.7	65.00	63.72	1979.56	1979.56
2683	#2683:5	Tube 2	End	60.00	35.64	43.82	7200.54	7200.54	0.00	35.2	65.00	62.42	2102.06	2102.06
2683	#2683:5	Tube 2	Ori	60.00	35.64	43.82	7200.54	7200.54	0.00	35.2	65.00	62.42	2102.06	2102.06
2683	2683:WVGD3	2683:WVGD3	End	65.00	37.02	45.54	8083.61	8083.61	0.00	36.8	65.00	61.12	2224.22	2224.22
2683	2683:WVGD3	2683:WVGD3	Ori	65.00	37.02	45.54	8083.61	8083.61	0.00	36.8	65.00	61.12	2224.22	2224.22
2683	#2683:6	SpliceT	End	69.75	38.34	47.18	8986.78	8986.78	0.00	38.2	65.00	59.89	2339.57	2339.57
2683	#2683:6	SpliceT	Ori	69.75	38.34	47.18	8986.78	8986.78	0.00	38.2	65.00	59.89	2339.57	2339.57
2683	#2683:7	Tube 2	End	72.38	38.32	47.15	8971.06	8971.06	0.00	38.2	65.00	59.91	2337.64	2337.64
2683	#2683:7	Tube 2	Ori	72.38	38.32	47.15	8971.06	8971.06	0.00	38.2	65.00	59.91	2337.64	2337.64
2683	2683:WVGD2	2683:WVGD2	End	75.00	39.05	48.05	9497.27	9497.27	0.00	39.0	65.00	59.23	2400.97	2400.97
2683	2683:WVGD2	2683:WVGD2	Ori	75.00	39.05	48.05	9497.27	9497.27	0.00	39.0	65.00	59.23	2400.97	2400.97
2683	#2683:8	Tube 3	End	80.00	40.43	49.78	10555.72	10555.72	0.00	40.5	65.00	57.93	2520.52	2520.52
2683	#2683:8	Tube 3	Ori	80.00	40.43	49.78	10555.72	10555.72	0.00	40.5	65.00	57.93	2520.52	2520.52
2683	2683:WVGD1	2683:WVGD1	End	85.00	41.82	51.50	11690.03	11690.03	0.00	42.0	65.00	56.63	2638.31	2638.31
2683	2683:WVGD1	2683:WVGD1	Ori	85.00	41.82	51.50	11690.03	11690.03	0.00	42.0	65.00	56.63	2638.31	2638.31
2683	2683:g	2683:g	End	90.00	43.20	53.22	12902.82	12902.82	0.00	43.6	65.00	55.27	2751.00	2751.00

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)	Weight Density Override (lbs/ft^3)	Steel Shape At End
ARM A		0	0.1875	4	4	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	

ARM B	0	0.1875	9	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0
ARM C	0	0.25	18.5	9	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0

Intermediate Joints for Davit Property "ARM A":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	1	-0.5

Intermediate Joints for Davit Property "ARM B":

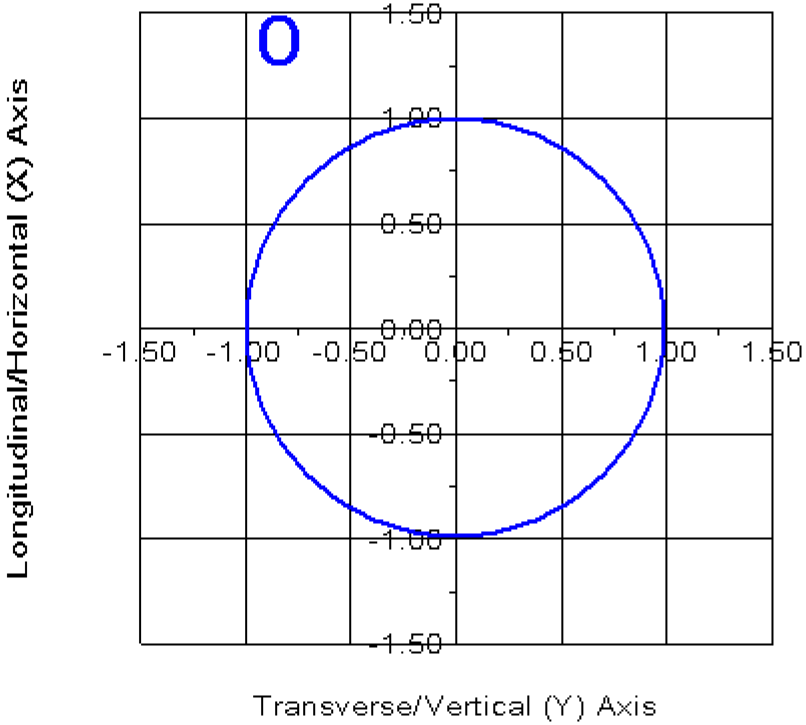
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	8	-0.67

Intermediate Joints for Davit Property "ARM C":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	11.67	-3

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	2683:Arm1	ARM A	180
Davit2	2683:Arm1	ARM A	0
Davit3	2683:Arm2	ARM B	180
Davit4	2683:Arm2	ARM B	0
Davit5	2683:Arm3	ARM C	180
Davit6	2683:Arm3	ARM C	0
Davit7	2683:Arm4	ARM B	180
Davit8	2683:Arm4	ARM B	0



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Davit1	Davit1:O	Origin	0.00	4.00	2.25	4.09	4.09	21.33	0.0	65.00	65.00	11.08	11.08
Davit1	Davit1:End	End	1.12	4.00	2.25	4.09	4.09	21.33	0.0	65.00	65.00	11.08	11.08
Davit2	Davit2:O	Origin	0.00	4.00	2.25	4.09	4.09	21.33	0.0	65.00	65.00	11.08	11.08
Davit2	Davit2:End	End	1.12	4.00	2.25	4.09	4.09	21.33	0.0	65.00	65.00	11.08	11.08
Davit3	Davit3:O	Origin	0.00	9.00	5.19	50.41	50.41	48.00	0.0	65.00	65.00	60.68	60.68
Davit3	#Davit3:0	End	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit3	#Davit3:0	Origin	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit3	Davit3:End	End	8.03	5.00	2.83	8.22	8.22	26.67	0.0	65.00	65.00	17.81	17.81
Davit4	Davit4:O	Origin	0.00	9.00	5.19	50.41	50.41	48.00	0.0	65.00	65.00	60.68	60.68
Davit4	#Davit4:0	End	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit4	#Davit4:0	Origin	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit4	Davit4:End	End	8.03	5.00	2.83	8.22	8.22	26.67	0.0	65.00	65.00	17.81	17.81
Davit5	Davit5:O	Origin	0.00	18.50	14.33	596.86	596.86	74.00	0.0	65.00	65.00	349.51	349.51

Davit5	#Davit5:0	End	5.00	14.56	11.24	287.65	287.65	58.23	0.0	65.00	65.00	214.05	214.05
Davit5	#Davit5:0	Origin	5.00	14.56	11.24	287.65	287.65	58.23	0.0	65.00	65.00	214.05	214.05
Davit5	#Davit5:1	End	8.52	11.78	9.05	150.51	150.51	47.12	0.0	65.00	65.00	138.43	138.43
Davit5	#Davit5:1	Origin	8.52	11.78	9.05	150.51	150.51	47.12	0.0	65.00	65.00	138.43	138.43
Davit5	Davit5:End	End	12.05	9.00	6.87	65.82	65.82	36.00	0.0	65.00	65.00	79.23	79.23
Davit6	Davit6:O	Origin	0.00	18.50	14.33	596.86	596.86	74.00	0.0	65.00	65.00	349.51	349.51
Davit6	#Davit6:0	End	5.00	14.56	11.24	287.65	287.65	58.23	0.0	65.00	65.00	214.05	214.05
Davit6	#Davit6:0	Origin	5.00	14.56	11.24	287.65	287.65	58.23	0.0	65.00	65.00	214.05	214.05
Davit6	#Davit6:1	End	8.52	11.78	9.05	150.51	150.51	47.12	0.0	65.00	65.00	138.43	138.43
Davit6	#Davit6:1	Origin	8.52	11.78	9.05	150.51	150.51	47.12	0.0	65.00	65.00	138.43	138.43
Davit6	Davit6:End	End	12.05	9.00	6.87	65.82	65.82	36.00	0.0	65.00	65.00	79.23	79.23
Davit7	Davit7:O	Origin	0.00	9.00	5.19	50.41	50.41	48.00	0.0	65.00	65.00	60.68	60.68
Davit7	#Davit7:0	End	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit7	#Davit7:0	Origin	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit7	Davit7:End	End	8.03	5.00	2.83	8.22	8.22	26.67	0.0	65.00	65.00	17.81	17.81
Davit8	Davit8:O	Origin	0.00	9.00	5.19	50.41	50.41	48.00	0.0	65.00	65.00	60.68	60.68
Davit8	#Davit8:0	End	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit8	#Davit8:0	Origin	4.01	7.00	4.01	23.30	23.30	37.33	0.0	65.00	65.00	36.06	36.06
Davit8	Davit8:End	End	8.03	5.00	2.83	8.22	8.22	26.67	0.0	65.00	65.00	17.81	17.81

*** 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	2683:WVGD1	clamp	No Limit
Clamp10	2683:WVGD2	clamp	No Limit
Clamp11	2683:WVGD3	clamp	No Limit
Clamp12	2683:WVGD4	clamp	No Limit
Clamp13	2683:WVGD5	clamp	No Limit
Clamp14	2683:WVGD6	clamp	No Limit
Clamp15	2683:WVGD7	clamp	No Limit
Clamp16	2683:WVGD8	clamp	No Limit
Clamp17	2683:WVGD9	clamp	No Limit
Clamp21	2683:TopConn	clamp	No Limit
Clamp23	2683:BotConn	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1600200.wi\003_brookfield station rd - ct2185\04_structural\backup documentation\calcs\pls pole\cl&p #2683.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)	90.00 (ft)	
Structure height	90.00 (ft)	
Structure height above ground	90.00 (ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular and Towers	SF for Wood Poles	SF for Conc. Poles Ult.	SF for Conc. Arms First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	19 loads	Wind on All	4	0	0.000	0.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	19 loads	NESC 2007	25.6	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	840	2250	0	
Davit2:End	869	2279	0	
Davit3:End	1863	2305	0	
Davit4:End	2310	3596	0	
Davit5:End	1863	2305	0	
Davit6:End	2310	3596	0	
Davit7:End	1863	2305	0	
Davit8:End	2310	3596	0	
2683:TopConn	10718	3901	0	
2683:BotConn	2329	-974	0	
2683:WVGD1	1033	87	0	
2683:WVGD2	1033	87	0	
2683:WVGD3	1033	87	0	
2683:WVGD4	1033	87	0	
2683:WVGD5	1033	87	0	
2683:WVGD6	516	50	0	

2683:WVGD7	516	50	0
2683:WVGD8	516	50	0
2683:WVGD9	516	50	0

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	181	1143	0	
Davit2:End	169	1257	0	
Davit3:End	719	1578	0	
Davit4:End	928	2390	0	
Davit5:End	719	1578	0	
Davit6:End	928	2390	0	
Davit7:End	719	1578	0	
Davit8:End	928	2390	0	
2683:TopConn	4873	11642	0	
2683:BotConn	1058	-3153	0	
2683:WVGD1	238	214	0	
2683:WVGD2	238	214	0	
2683:WVGD3	238	214	0	
2683:WVGD4	238	214	0	
2683:WVGD5	238	214	0	
2683:WVGD6	119	107	0	
2683:WVGD7	119	107	0	
2683:WVGD8	119	107	0	
2683:WVGD9	119	107	0	

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

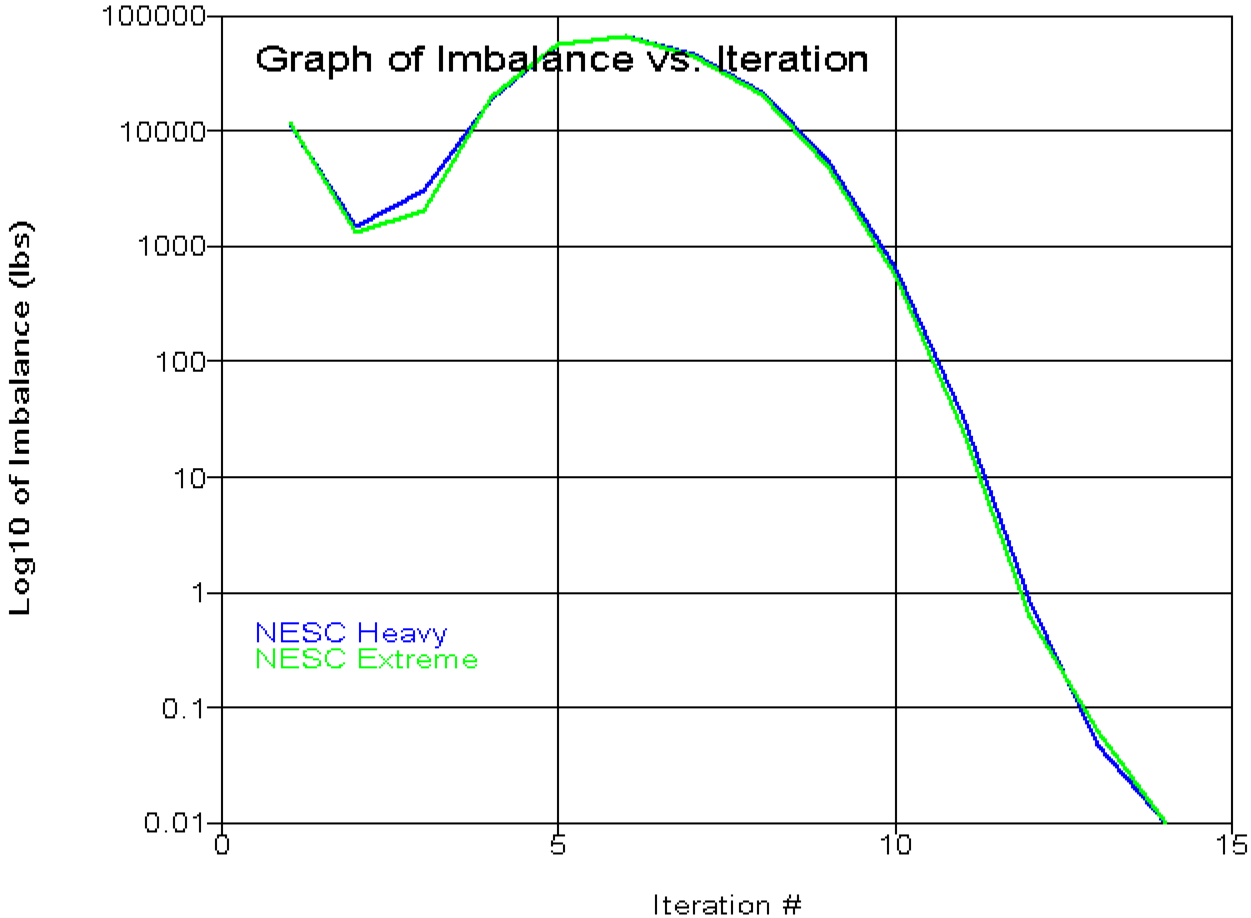
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
2683	2683:t	2683:Arm1	90.00	88.92	89.46	19.775	1.5e+006	1.000	25.59	0.00	74.07	45.54	0.00	0.00	45.54	0.00
2683	2683:Arm1	2683:WVGD9	88.92	85.00	86.96	20.468	1.55e+006	1.000	25.59	0.00	278.40	171.09	0.00	0.00	171.09	0.00
2683	2683:WVGD9	2683:Arm2	85.00	83.50	84.25	21.219	1.61e+006	1.000	25.59	0.00	110.50	67.87	0.00	0.00	67.87	0.00
2683	2683:Arm2	2683:TopConn	83.50	80.00	81.75	21.913	1.66e+006	1.000	25.59	0.00	266.39	163.54	0.00	0.00	163.54	0.00
2683	2683:TopConn	2683:WVGD8	80.00	75.00	77.50	23.091	1.75e+006	1.000	25.59	0.00	401.32	246.19	0.00	0.00	246.19	0.00
2683	2683:WVGD8	2683:Arm3	75.00	70.50	72.75	24.408	1.85e+006	1.000	25.59	0.00	382.07	234.21	0.00	0.00	234.21	0.00
2683	2683:Arm3		70.50	67.75	69.13	25.413	1.92e+006	1.000	25.59	0.00	243.23	149.02	0.00	0.00	149.02	0.00
2683		2683:WVGD7	67.75	65.00	66.38	26.176	1.98e+006	1.000	25.59	0.00	250.62	153.49	0.00	0.00	153.49	0.00
2683	2683:WVGD7		65.00	62.25	63.63	26.938	2.04e+006	1.000	25.59	0.00	258.01	157.96	0.00	0.00	157.96	0.00
2683		2683:Arm4	62.25	59.50	60.88	27.701	2.1e+006	1.000	25.59	0.00	265.40	162.44	0.00	0.00	162.44	0.00
2683	2683:Arm4		59.50	55.17	57.33	28.683	2.17e+006	1.000	25.59	0.00	433.19	265.03	0.00	0.00	265.03	0.00
2683		2683:WVGD6	55.17	55.00	55.08	28.994	2.2e+006	1.000	25.59	0.00	36.98	10.31	0.00	0.00	10.31	0.00
2683	2683:WVGD6		55.00	51.00	53.00	29.259	2.22e+006	1.000	25.59	0.00	905.35	249.56	0.00	0.00	249.56	0.00
2683		2683:BotConn	51.00	50.00	50.50	29.952	2.27e+006	1.000	25.59	0.00	125.15	63.87	0.00	0.00	63.87	0.00
2683	2683:BotConn	2683:WVGD5	50.00	45.00	47.50	30.784	2.33e+006	1.000	25.59	0.00	642.92	328.21	0.00	0.00	328.21	0.00
2683	2683:WVGD5		45.00	40.00	42.50	32.171	2.44e+006	1.000	25.59	0.00	672.23	342.99	0.00	0.00	342.99	0.00
2683		2683:WVGD4	40.00	35.00	37.50	33.557	2.54e+006	1.000	25.59	0.00	701.54	357.78	0.00	0.00	357.78	0.00
2683	2683:WVGD4		35.00	30.00	32.50	34.943	2.65e+006	1.000	25.59	0.00	730.85	372.56	0.00	0.00	372.56	0.00
2683		2683:WVGD3	30.00	25.00	27.50	36.330	2.75e+006	1.000	25.59	0.00	760.16	387.34	0.00	0.00	387.34	0.00

2683	2683:WVGD3		25.00	20.25	22.63	37.682	2.85e+006	1.000	25.59	0.00	749.30	381.66	0.00	0.00	381.66	0.00
2683			20.25	17.63	18.94	38.329	2.9e+006	1.000	25.59	0.00	842.55	214.54	0.00	0.00	214.54	0.00
2683		2683:WVGD2	17.63	15.00	16.31	38.682	2.93e+006	1.000	25.59	0.00	858.71	216.52	0.00	0.00	216.52	0.00
2683	2683:WVGD2		15.00	10.00	12.50	39.739	3.01e+006	1.000	25.59	0.00	832.34	423.69	0.00	0.00	423.69	0.00
2683		2683:WVGD1	10.00	5.00	7.50	41.125	3.11e+006	1.000	25.59	0.00	861.55	438.47	0.00	0.00	438.47	0.00
2683	2683:WVGD1	2683:g	5.00	0.00	2.50	42.512	3.22e+006	1.000	25.59	0.00	890.86	453.25	0.00	0.00	453.25	0.00

*** Analysis Results:

Maximum element usage is 88.10% for Steel Pole "2683" in load case "NESC Heavy"
Maximum insulator usage is 15.78% for Clamp "Clamp21" in load case "NESC Extreme"



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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
2683:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
2683:t	0.004069	3.531	-0.09267	-3.8473	0.0039	0.0001	0.004069	3.531	89.91
2683:Arm1	0.003995	3.458	-0.09023	-3.8473	0.0039	0.0001	0.003995	3.458	88.83

2683:WVGD9	0.003726	3.195	-0.0814	-3.8358	0.0039	0.0001	0.003726	3.195	84.92
2683:Arm2	0.003623	3.095	-0.07804	-3.8274	0.0039	0.0001	0.003623	3.095	83.42
2683:TopConn	0.003384	2.862	-0.07026	-3.7879	0.0039	0.0001	0.003384	2.862	79.93
2683:WVGD8	0.003044	2.536	-0.05944	-3.6880	0.0039	0.0001	0.003044	2.536	74.94
2683:Arm3	0.002743	2.251	-0.05028	-3.5613	0.0038	0.0001	0.002743	2.251	70.45
2683:WVGD7	0.002385	1.918	-0.04006	-3.3474	0.0037	0.0000	0.002385	1.918	64.96
2683:Arm4	0.002042	1.609	-0.03114	-3.0957	0.0035	0.0000	0.002042	1.609	59.47
2683:WVGD6	0.001774	1.374	-0.02486	-2.8640	0.0033	0.0000	0.001774	1.374	54.98
2683:BotConn	0.001493	1.134	-0.01896	-2.6142	0.0031	0.0000	0.001493	1.134	49.98
2683:WVGD5	0.001231	0.9171	-0.01406	-2.3532	0.0029	0.0000	0.001231	0.9171	44.99
2683:WVGD4	0.0007705	0.5519	-0.007028	-1.8188	0.0024	0.0000	0.0007705	0.5519	34.99
2683:WVGD3	0.0004063	0.2799	-0.002964	-1.2884	0.0018	0.0000	0.0004063	0.2799	25
2683:WVGD2	0.0001508	0.09978	-0.000968	-0.7634	0.0011	0.0000	0.0001508	0.09978	15
2683:WVGD1	1.768e-005	0.01114	-0.0001926	-0.2469	0.0004	0.0000	1.768e-005	0.01114	5
Davit1:O	0.004	3.46	-0.03453	-3.8473	0.0039	0.0001	0.004	2.63	88.89
Davit1:End	0.00404	3.496	0.03164	-3.8652	0.0039	0.0001	0.00404	1.666	89.45
Davit2:O	0.00399	3.456	-0.1459	-3.8473	0.0039	0.0001	0.00399	4.287	88.77
Davit2:End	0.004019	3.488	-0.2151	-3.9206	0.0039	0.0001	0.004019	5.318	89.2
Davit3:O	0.003628	3.097	-0.01844	-3.8274	0.0039	0.0001	0.003628	2.204	83.48
Davit3:End	0.00372	3.154	0.4716	-3.3082	0.0039	0.0001	0.00372	-5.739	84.64
Davit4:O	0.003618	3.093	-0.1376	-3.8274	0.0039	0.0001	0.003618	3.986	83.36
Davit4:End	0.003614	3.121	-0.7384	-4.6186	0.0039	0.0001	0.003614	12.01	83.43
Davit5:O	0.002749	2.253	0.01451	-3.5613	0.0038	0.0001	0.002749	1.21	70.51
Davit5:End	0.00301	2.458	0.7237	-3.4748	0.0038	0.0001	0.00301	-10.25	74.22
Davit6:O	0.002738	2.249	-0.1151	-3.5613	0.0038	0.0001	0.002738	3.292	70.38
Davit6:End	0.002877	2.417	-0.8714	-3.7821	0.0038	0.0000	0.002877	15.13	72.63
Davit7:O	0.002046	1.61	0.03205	-3.0957	0.0035	0.0000	0.002046	0.4402	59.53
Davit7:End	0.002119	1.652	0.4197	-2.5656	0.0035	0.0001	0.002119	-7.518	60.59
Davit8:O	0.002037	1.607	-0.09433	-3.0957	0.0035	0.0000	0.002037	2.777	59.41
Davit8:End	0.002042	1.633	-0.5939	-3.9018	0.0035	0.0000	0.002042	10.8	59.58

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
2683:g	-0.08	0.0	-28.87	0.0	0.0	-56.79	0.0	0.0	63.71	0.0	2206.64	0.0	-3.5	0.0	0.0	-0.00	0.0	0.0

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
2683	2683:t	Origin	0.00	42.37	0.05	-1.11	-0.00	-0.00	0.0	-0.06	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
2683	2683:Arm1	End	1.08	41.50	0.05	-1.08	0.02	-0.00	0.0	-0.06	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	2
2683	2683:Arm1	Origin	1.08	41.50	0.05	-1.08	2.38	-0.00	0.0	-1.75	4.72	-0.00	-0.09	0.00	0.48	0.00	0.84	1.3	4
2683	2683:WVGD9	End	5.00	38.34	0.04	-0.98	20.90	-0.01	0.0	-1.75	4.72	-0.00	-0.08	2.17	0.18	0.00	2.27	3.5	2
2683	2683:WVGD9	Origin	5.00	38.34	0.04	-0.98	20.90	-0.01	0.0	-2.55	4.89	-0.00	-0.12	2.17	0.18	0.00	2.31	3.6	2
2683	2683:Arm2	End	6.50	37.14	0.04	-0.94	28.23	-0.01	0.0	-2.55	4.89	-0.00	-0.12	2.82	0.18	0.00	2.95	4.5	2
2683	2683:Arm2	Origin	6.50	37.14	0.04	-0.94	35.24	-0.01	0.0	-6.93	11.15	-0.01	-0.32	3.52	0.41	0.00	3.90	6.0	2
2683	2683:TopConn	End	10.00	34.35	0.04	-0.84	74.26	-0.03	0.0	-6.93	11.15	-0.01	-0.30	6.77	0.39	0.00	7.11	10.9	2
2683	2683:TopConn	Origin	10.00	34.35	0.04	-0.84	74.26	-0.03	0.0	-17.88	15.87	-0.01	-0.78	6.77	0.55	0.00	7.61	11.7	2
2683	2683:WVGD8	End	15.00	30.43	0.04	-0.71	153.63	-0.08	0.0	-17.88	15.87	-0.01	-0.74	12.39	0.52	0.00	13.16	20.2	2
2683	2683:WVGD8	Origin	15.00	30.43	0.04	-0.71	153.63	-0.08	0.0	-19.01	16.08	-0.01	-0.78	12.39	0.53	0.00	13.20	20.3	2
2683	2683:Arm3	End	19.50	27.01	0.03	-0.60	225.98	-0.14	0.0	-19.01	16.08	-0.01	-0.74	16.42	0.50	0.00	17.19	26.4	2
2683	2683:Arm3	Origin	19.50	27.01	0.03	-0.60	249.23	-0.14	0.0	-24.61	22.40	-0.02	-0.96	18.11	0.69	0.00	19.11	29.4	2

2683	Tube 1	End	22.25	24.98	0.03	-0.54	310.82	-0.19	0.0	-24.61	22.40	-0.02	-0.93	21.25	0.67	0.00	22.21	34.2	2
2683	Tube 1	Origin	22.25	24.98	0.03	-0.54	310.82	-0.19	0.0	-25.02	22.45	-0.02	-0.95	21.25	0.67	0.00	22.23	34.2	2
2683	2683:WVGD7	End	25.00	23.02	0.03	-0.48	372.55	-0.24	0.0	-25.02	22.45	-0.02	-0.92	24.00	0.65	0.00	24.95	38.4	2
2683	2683:WVGD7	Origin	25.00	23.02	0.03	-0.48	372.55	-0.24	0.0	-25.96	22.58	-0.02	-0.96	24.00	0.66	0.00	24.98	38.4	2
2683	Tube 1	End	27.75	21.12	0.03	-0.43	434.64	-0.30	0.0	-25.96	22.58	-0.02	-0.93	26.43	0.64	0.00	27.39	42.1	2
2683	Tube 1	Origin	27.75	21.12	0.03	-0.43	434.64	-0.30	0.0	-26.40	22.62	-0.02	-0.94	26.43	0.64	0.00	27.40	42.2	2
2683	2683:Arm4	End	30.50	19.30	0.02	-0.37	496.86	-0.37	0.0	-26.40	22.62	-0.02	-0.92	28.57	0.62	0.00	29.51	45.9	2
2683	2683:Arm4	Origin	30.50	19.30	0.02	-0.37	504.08	-0.37	0.0	-31.18	28.81	-0.03	-1.08	28.99	0.79	0.00	30.10	48.7	2
2683	SpliceT	End	34.83	16.59	0.02	-0.30	628.91	-0.49	0.0	-31.18	28.81	-0.03	-1.04	33.22	0.76	0.00	34.28	56.9	2
2683	SpliceT	Origin	34.83	16.59	0.02	-0.30	628.91	-0.49	0.0	-31.59	28.83	-0.03	-1.05	33.22	0.76	0.00	34.29	56.9	2
2683	2683:WVGD6	End	35.00	16.49	0.02	-0.30	633.72	-0.49	0.0	-31.59	28.83	-0.03	-0.90	29.24	0.65	0.00	30.16	46.4	2
2683	2683:WVGD6	Origin	35.00	16.49	0.02	-0.30	633.72	-0.49	0.0	-32.86	28.95	-0.03	-0.93	29.24	0.65	0.00	30.19	46.4	2
2683	SpliceB	End	39.00	14.17	0.02	-0.24	749.51	-0.62	0.0	-32.86	28.95	-0.03	-0.90	32.01	0.63	0.00	32.92	50.7	2
2683	SpliceB	Origin	39.00	14.17	0.02	-0.24	749.51	-0.61	0.0	-33.70	28.99	-0.03	-0.92	32.01	0.63	0.00	32.95	50.7	2
2683	2683:BotConn	End	40.00	13.61	0.02	-0.23	778.50	-0.65	0.0	-33.70	28.99	-0.03	-0.91	32.62	0.62	0.00	33.55	51.6	2
2683	2683:BotConn	Origin	40.00	13.61	0.02	-0.23	778.50	-0.65	0.0	-36.72	28.15	-0.04	-0.99	32.62	0.60	0.00	33.64	51.7	2
2683	2683:WVGD5	End	45.00	11.00	0.01	-0.17	919.27	-0.83	0.0	-36.72	28.15	-0.04	-0.95	35.15	0.58	0.00	36.11	55.6	2
2683	2683:WVGD5	Origin	45.00	11.00	0.01	-0.17	919.27	-0.82	0.0	-38.87	28.32	-0.04	-1.01	35.15	0.58	0.00	36.17	56.3	2
2683	Tube 2	End	50.00	8.67	0.01	-0.12	1060.86	-1.02	0.0	-38.87	28.32	-0.04	-0.96	37.16	0.56	0.00	38.13	58.7	2
2683	Tube 2	Origin	50.00	8.67	0.01	-0.12	1060.86	-1.02	0.0	-40.03	28.35	-0.04	-0.99	37.16	0.56	0.00	38.16	58.7	2
2683	2683:WVGD4	End	55.00	6.62	0.01	-0.08	1202.61	-1.25	0.0	-40.03	28.35	-0.04	-0.95	38.73	0.53	0.00	39.69	62.3	2
2683	2683:WVGD4	Origin	55.00	6.62	0.01	-0.08	1202.61	-1.25	0.0	-42.26	28.50	-0.05	-1.00	38.73	0.54	0.00	39.74	64.9	2
2683	Tube 2	End	60.00	4.85	0.01	-0.06	1345.10	-1.49	0.0	-42.26	28.50	-0.05	-0.96	39.96	0.52	0.00	40.94	65.6	2
2683	Tube 2	Origin	60.00	4.85	0.01	-0.06	1345.10	-1.49	0.0	-43.51	28.52	-0.05	-0.99	39.96	0.52	0.00	40.96	65.6	2
2683	2683:WVGD3	End	65.00	3.36	0.00	-0.04	1487.70	-1.76	0.0	-43.51	28.52	-0.05	-0.96	40.90	0.50	0.00	41.87	68.5	2
2683	2683:WVGD3	Origin	65.00	3.36	0.00	-0.04	1487.70	-1.76	0.0	-45.80	28.65	-0.06	-1.01	40.90	0.50	0.00	41.92	72.0	2
2683	SpliceT	End	69.75	2.19	0.00	-0.02	1623.81	-2.04	0.0	-45.80	28.65	-0.06	-0.97	41.59	0.48	0.00	42.57	71.1	2
2683	SpliceT	Origin	69.75	2.19	0.00	-0.02	1623.81	-2.04	0.0	-47.09	28.67	-0.06	-1.00	41.59	0.48	0.00	42.59	71.1	2
2683	Tube 2	End	72.38	1.66	0.00	-0.02	1699.07	-2.20	0.0	-47.09	28.67	-0.06	-1.00	43.57	0.48	0.00	44.57	74.4	2
2683	Tube 2	Origin	72.38	1.66	0.00	-0.02	1699.07	-2.20	0.0	-48.44	28.68	-0.07	-1.03	43.57	0.48	0.00	44.60	78.5	2
2683	2683:WVGD2	End	75.00	1.20	0.00	-0.01	1774.37	-2.38	0.0	-48.44	28.68	-0.07	-1.01	43.79	0.47	0.00	44.81	80.0	2
2683	2683:WVGD2	Origin	75.00	1.20	0.00	-0.01	1774.37	-2.38	0.0	-50.84	28.79	-0.07	-1.06	43.79	0.47	0.00	44.86	80.1	2
2683	Tube 3	End	80.00	0.53	0.00	-0.01	1918.31	-2.72	0.0	-50.84	28.79	-0.07	-1.02	44.11	0.46	0.00	45.14	82.8	2
2683	Tube 3	Origin	80.00	0.53	0.00	-0.01	1918.31	-2.72	0.0	-52.24	28.79	-0.07	-1.05	44.11	0.46	0.00	45.17	82.8	2
2683	2683:WVGD1	End	85.00	0.13	0.00	-0.00	2062.25	-3.10	0.0	-52.24	28.79	-0.07	-1.01	44.29	0.44	0.00	45.31	85.4	2
2683	2683:WVGD1	Origin	85.00	0.13	0.00	-0.00	2062.25	-3.10	0.0	-54.71	28.88	-0.08	-1.06	44.29	0.44	0.00	45.36	85.5	2
2683	2683:g	End	90.00	0.00	0.00	0.00	2206.64	-3.50	0.0	-54.71	28.88	-0.08	-1.03	44.36	0.43	0.00	45.40	88.1	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	41.52	0.05	-0.41	0.46	0.00	0.0	-2.37	-0.41	-0.00	-1.05	2.69	0.37	0.00	3.80	5.8	1
Davit1	Davit1:End	End	1.12	41.95	0.05	0.38	-0.00	0.00	0.0	-2.37	-0.41	-0.00	-1.05	0.00	0.37	0.00	1.23	1.9	1
Davit2	Davit2:O	Origin	0.00	41.48	0.05	-1.75	-1.89	-0.00	0.0	1.77	1.69	0.00	0.79	11.06	1.50	0.00	12.13	18.7	1
Davit2	Davit2:End	End	1.12	41.86	0.05	-2.58	0.00	0.00	0.0	1.77	1.69	0.00	0.79	0.00	1.50	0.00	2.72	4.2	1
Davit3	Davit3:O	Origin	0.00	37.17	0.04	-0.22	-12.73	0.00	0.0	-2.57	1.62	-0.00	-0.50	13.63	0.62	0.00	14.17	21.8	1
Davit3	#Davit3:0	End	4.01	37.52	0.04	2.84	-6.23	0.00	0.0	-2.57	1.62	-0.00	-0.64	11.22	0.81	0.00	11.95	18.4	1
Davit3	#Davit3:0	Origin	4.01	37.52	0.04	2.84	-6.23	0.00	0.0	-2.55	1.55	-0.00	-0.64	11.22	0.77	0.00	11.93	18.4	1
Davit3	Davit3:End	End	8.03	37.84	0.04	5.66	-0.00	0.00	0.0	-2.55	1.55	-0.00	-0.90	0.00	1.09	0.00	2.10	3.2	1
Davit4	Davit4:O	Origin	0.00	37.12	0.04	-1.65	-19.40	-0.00	-0.0	3.57	2.47	0.00	0.69	20.79	0.95	0.00	21.54	33.1	1
Davit4	#Davit4:0	End	4.01	37.28	0.04	-5.08	-9.48	-0.00	-0.0	3.57	2.47	0.00	0.89	17.10	1.23	0.00	18.11	27.9	1
Davit4	#Davit4:0	Origin	4.01	37.28	0.04	-5.08	-9.48	-0.00	0.0	3.58	2.36	0.00	0.89	17.10	1.18	0.00	18.11	27.9	1

Davit4	Davit4:End	End	8.03	37.45	0.04	-8.86	0.00	0.00	0.0	3.58	2.36	0.00	1.26	0.00	1.67	0.00	3.15	4.8	1
Davit5	Davit5:O	Origin	0.00	27.03	0.03	0.17	-16.07	0.01	0.0	-2.92	1.51	-0.00	-0.20	2.99	0.21	0.00	3.21	4.9	1
Davit5	#Davit5:0	End	5.00	28.06	0.03	3.73	-8.50	0.00	0.0	-2.92	1.51	-0.00	-0.26	2.58	0.27	0.00	2.88	4.4	1
Davit5	#Davit5:0	Origin	5.00	28.06	0.03	3.73	-8.50	0.00	0.0	-2.84	1.28	-0.00	-0.25	2.58	0.23	0.00	2.86	4.4	1
Davit5	#Davit5:1	End	8.52	28.79	0.04	6.22	-3.99	0.00	0.0	-2.84	1.28	-0.00	-0.31	1.87	0.28	0.00	2.24	3.4	1
Davit5	#Davit5:1	Origin	8.52	28.79	0.04	6.22	-3.99	0.00	0.0	-2.79	1.13	-0.00	-0.31	1.87	0.25	0.00	2.22	3.4	1
Davit5	Davit5:End	End	12.05	29.50	0.04	8.68	-0.00	0.00	0.0	-2.79	1.13	-0.00	-0.41	0.00	0.33	0.00	0.70	1.1	1
Davit6	Davit6:O	Origin	0.00	26.98	0.03	-1.38	-38.91	-0.01	-0.0	3.01	3.43	0.00	0.21	7.24	0.48	0.00	7.49	11.5	1
Davit6	#Davit6:0	End	5.00	27.81	0.03	-5.08	-21.77	-0.00	-0.0	3.01	3.43	0.00	0.27	6.61	0.61	0.00	6.96	10.7	1
Davit6	#Davit6:0	Origin	5.00	27.81	0.03	-5.08	-21.77	-0.00	-0.0	3.06	3.17	0.00	0.27	6.61	0.56	0.00	6.95	10.7	1
Davit6	#Davit6:1	End	8.52	28.40	0.03	-7.74	-10.59	-0.00	-0.0	3.06	3.17	0.00	0.34	4.97	0.70	0.00	5.45	8.4	1
Davit6	#Davit6:1	Origin	8.52	28.40	0.03	-7.74	-10.59	-0.00	0.0	3.09	3.01	0.00	0.34	4.97	0.66	0.00	5.44	8.4	1
Davit6	Davit6:End	End	12.05	29.01	0.03	-10.46	-0.00	0.00	0.0	3.09	3.01	0.00	0.45	0.00	0.87	0.00	1.58	2.4	1
Davit7	Davit7:O	Origin	0.00	19.32	0.02	0.38	-12.99	0.00	0.0	-2.55	1.65	-0.00	-0.49	13.91	0.64	0.00	14.45	22.2	1
Davit7	#Davit7:0	End	4.01	19.59	0.02	2.83	-6.36	0.00	0.0	-2.55	1.65	-0.00	-0.64	11.46	0.82	0.00	12.18	18.7	1
Davit7	#Davit7:0	Origin	4.01	19.59	0.02	2.83	-6.36	0.00	0.0	-2.53	1.58	-0.00	-0.63	11.46	0.79	0.00	12.17	18.7	1
Davit7	Davit7:End	End	8.03	19.83	0.03	5.04	-0.00	0.00	0.0	-2.53	1.58	-0.00	-0.89	0.00	1.12	0.00	2.13	3.3	1
Davit8	Davit8:O	Origin	0.00	19.28	0.02	-1.13	-19.77	-0.00	-0.0	3.53	2.52	0.00	0.68	21.17	0.97	0.00	21.92	33.7	1
Davit8	#Davit8:0	End	4.01	19.44	0.02	-3.95	-9.66	-0.00	-0.0	3.53	2.52	0.00	0.88	17.42	1.25	0.00	18.43	28.4	1
Davit8	#Davit8:0	Origin	4.01	19.44	0.02	-3.95	-9.66	-0.00	0.0	3.55	2.41	0.00	0.89	17.42	1.20	0.00	18.42	28.3	1
Davit8	Davit8:End	End	8.03	19.60	0.02	-7.13	0.00	0.00	0.0	3.55	2.41	0.00	1.25	0.00	1.70	0.00	3.20	4.9	1

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	2.402	80.00	80.00	3.00
Clamp2	2.439	80.00	80.00	3.05
Clamp3	2.964	80.00	80.00	3.70
Clamp4	4.274	80.00	80.00	5.34
Clamp5	2.964	80.00	80.00	3.70
Clamp6	4.274	80.00	80.00	5.34
Clamp7	2.964	80.00	80.00	3.70
Clamp8	4.274	80.00	80.00	5.34
Clamp9	1.037	80.00	80.00	1.30
Clamp10	1.037	80.00	80.00	1.30
Clamp11	1.037	80.00	80.00	1.30
Clamp12	1.037	80.00	80.00	1.30
Clamp13	1.037	80.00	80.00	1.30
Clamp14	0.518	80.00	80.00	0.65
Clamp15	0.518	80.00	80.00	0.65
Clamp16	0.518	80.00	80.00	0.65
Clamp17	0.518	80.00	80.00	0.65
Clamp21	11.406	80.00	80.00	14.26
Clamp23	2.524	80.00	80.00	3.16

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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
2683:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
2683:t	0.001241	3.497	-0.08945	-3.7806	0.0012	0.0000	0.001241	3.497	89.91
2683:Arm1	0.001218	3.425	-0.0871	-3.7806	0.0012	0.0000	0.001218	3.425	88.83
2683:WVGD9	0.001136	3.167	-0.07857	-3.7745	0.0012	0.0000	0.001136	3.167	84.92
2683:Arm2	0.001105	3.068	-0.07532	-3.7699	0.0012	0.0000	0.001105	3.068	83.42
2683:TopConn	0.001032	2.839	-0.06776	-3.7470	0.0012	0.0000	0.001032	2.839	79.93
2683:WVGD8	0.0009292	2.514	-0.05719	-3.6662	0.0012	0.0000	0.0009292	2.514	74.94
2683:Arm3	0.0008377	2.231	-0.0482	-3.5435	0.0012	0.0000	0.0008377	2.231	70.45
2683:WVGD7	0.0007287	1.9	-0.03817	-3.3313	0.0011	0.0000	0.0007287	1.9	64.96
2683:Arm4	0.0006241	1.592	-0.02945	-3.0760	0.0011	0.0000	0.0006241	1.592	59.47
2683:WVGD6	0.0005426	1.359	-0.02335	-2.8411	0.0010	0.0000	0.0005426	1.359	54.98
2683:BotConn	0.0004569	1.122	-0.01764	-2.5885	0.0009	0.0000	0.0004569	1.122	49.98
2683:WVGD5	0.0003769	0.9066	-0.01294	-2.3263	0.0009	0.0000	0.0003769	0.9066	44.99
2683:WVGD4	0.000236	0.5458	-0.006251	-1.7962	0.0007	0.0000	0.000236	0.5458	34.99
2683:WVGD3	0.0001246	0.2772	-0.00246	-1.2735	0.0005	0.0000	0.0001246	0.2772	25
2683:WVGD2	4.628e-005	0.09902	-0.0006821	-0.7562	0.0003	0.0000	4.628e-005	0.09902	15
2683:WVGD1	5.432e-006	0.01109	-9.939e-005	-0.2453	0.0001	0.0000	5.432e-006	0.01109	5
Davit1:O	0.00122	3.427	-0.03236	-3.7806	0.0012	0.0000	0.00122	2.597	88.89
Davit1:End	0.001232	3.462	0.0327	-3.7989	0.0012	0.0000	0.001232	1.632	89.45
Davit2:O	0.001217	3.424	-0.1418	-3.7806	0.0012	0.0000	0.001217	4.254	88.78
Davit2:End	0.001225	3.455	-0.2092	-3.8088	0.0012	0.0000	0.001225	5.285	89.21
Davit3:O	0.001107	3.07	-0.01662	-3.7699	0.0012	0.0000	0.001107	2.177	83.48
Davit3:End	0.001136	3.13	0.494	-3.5998	0.0012	0.0000	0.001136	-5.763	84.66
Davit4:O	0.001103	3.066	-0.134	-3.7699	0.0012	0.0000	0.001103	3.959	83.37
Davit4:End	0.001103	3.094	-0.6887	-4.0998	0.0012	0.0000	0.001103	11.99	83.48
Davit5:O	0.0008394	2.233	0.01627	-3.5435	0.0012	0.0000	0.0008394	1.19	70.52
Davit5:End	0.0009202	2.44	0.7293	-3.5228	0.0012	0.0000	0.0009202	-10.27	74.23
Davit6:O	0.000836	2.229	-0.1127	-3.5435	0.0012	0.0000	0.000836	3.272	70.39
Davit6:End	0.0008781	2.394	-0.8519	-3.6482	0.0012	0.0000	0.0008781	15.11	72.65
Davit7:O	0.0006256	1.594	0.03333	-3.0760	0.0011	0.0000	0.0006256	0.4236	59.53
Davit7:End	0.0006487	1.639	0.4471	-2.8991	0.0011	0.0000	0.0006487	-7.531	60.62
Davit8:O	0.0006226	1.59	-0.09224	-3.0760	0.0011	0.0000	0.0006226	2.76	59.41
Davit8:End	0.0006246	1.616	-0.5505	-3.4153	0.0011	0.0000	0.0006246	10.79	59.62

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
2683:g	-0.03	0.0	-30.35	0.0	0.0	-28.31	0.0	0.0	41.51	0.0	2196.17	0.0	-1.1	0.0	0.0	-0.00	0.0	0.0

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
2683	2683:t	Origin	0.00	41.96	0.01	-1.07	-0.00	-0.00	0.0	-0.04	0.03	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4

2683	2683:Arm1	End	1.08	41.10	0.01	-1.05	0.03	-0.00	0.0	-0.04	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	2
2683	2683:Arm1	Origin	1.08	41.10	0.01	-1.05	1.21	-0.00	0.0	-0.42	2.57	-0.00	-0.02	0.00	0.26	0.00	0.45	0.7	4
2683	2683:WVGD9	End	5.00	38.00	0.01	-0.94	11.26	-0.00	0.0	-0.42	2.57	-0.00	-0.02	1.17	0.10	0.00	1.20	1.8	2
2683	2683:WVGD9	Origin	5.00	38.00	0.01	-0.94	11.26	-0.00	0.0	-0.73	2.81	-0.00	-0.03	1.17	0.10	0.00	1.22	1.9	2
2683	2683:Arm2	End	6.50	36.82	0.01	-0.90	15.48	-0.00	0.0	-0.73	2.81	-0.00	-0.03	1.55	0.10	0.00	1.59	2.4	2
2683	2683:Arm2	Origin	6.50	36.82	0.01	-0.90	19.52	-0.00	0.0	-2.51	7.02	-0.00	-0.11	1.95	0.26	0.00	2.11	3.2	2
2683	2683:TopConn	End	10.00	34.06	0.01	-0.81	44.10	-0.01	0.0	-2.51	7.02	-0.00	-0.11	4.02	0.24	0.00	4.15	6.4	2
2683	2683:TopConn	Origin	10.00	34.06	0.01	-0.81	44.10	-0.01	0.0	-6.96	19.18	-0.00	-0.30	4.02	0.67	0.00	4.48	6.9	2
2683	2683:WVGD8	End	15.00	30.17	0.01	-0.69	139.99	-0.02	0.0	-6.96	19.18	-0.00	-0.29	11.29	0.63	0.00	11.63	17.9	2
2683	2683:WVGD8	Origin	15.00	30.17	0.01	-0.69	139.99	-0.02	0.0	-7.50	19.54	-0.00	-0.31	11.29	0.64	0.00	11.65	17.9	2
2683	2683:Arm3	End	19.50	26.77	0.01	-0.58	227.94	-0.04	0.0	-7.50	19.54	-0.00	-0.29	16.56	0.61	0.00	16.89	26.0	2
2683	2683:Arm3	Origin	19.50	26.77	0.01	-0.58	242.56	-0.04	0.0	-10.09	23.87	-0.01	-0.39	17.62	0.74	0.00	18.06	27.8	2
2683	Tube 1	End	22.25	24.76	0.01	-0.52	308.20	-0.06	0.0	-10.09	23.87	-0.01	-0.38	21.06	0.72	0.00	21.48	33.1	2
2683	Tube 1	Origin	22.25	24.76	0.01	-0.52	308.20	-0.06	0.0	-10.38	24.02	-0.01	-0.39	21.06	0.72	0.00	21.49	33.1	2
2683	2683:WVGD7	End	25.00	22.80	0.01	-0.46	374.24	-0.07	0.0	-10.38	24.02	-0.01	-0.38	24.11	0.70	0.00	24.52	37.7	2
2683	2683:WVGD7	Origin	25.00	22.80	0.01	-0.46	374.24	-0.07	0.0	-10.80	24.28	-0.01	-0.40	24.11	0.71	0.00	24.53	37.7	2
2683	Tube 1	End	27.75	20.92	0.01	-0.40	441.00	-0.09	0.0	-10.80	24.28	-0.01	-0.39	26.82	0.69	0.00	27.23	41.9	2
2683	Tube 1	Origin	27.75	20.92	0.01	-0.40	441.00	-0.09	0.0	-11.11	24.43	-0.01	-0.40	26.82	0.69	0.00	27.24	41.9	2
2683	2683:Arm4	End	30.50	19.10	0.01	-0.35	508.18	-0.11	0.0	-11.11	24.43	-0.01	-0.39	29.22	0.67	0.00	29.63	46.1	2
2683	2683:Arm4	Origin	30.50	19.10	0.01	-0.35	512.33	-0.11	0.0	-13.19	28.68	-0.01	-0.46	29.46	0.79	0.00	29.95	46.6	2
2683	SpliceT	End	34.83	16.41	0.01	-0.28	636.63	-0.15	0.0	-13.19	28.68	-0.01	-0.44	33.62	0.76	0.00	34.08	54.2	2
2683	SpliceT	Origin	34.83	16.41	0.01	-0.28	636.63	-0.15	0.0	-13.49	28.80	-0.01	-0.45	33.62	0.76	0.00	34.09	54.2	2
2683	2683:WVGD6	End	35.00	16.31	0.01	-0.28	641.43	-0.15	0.0	-13.49	28.80	-0.01	-0.38	29.59	0.65	0.00	29.99	46.1	2
2683	2683:WVGD6	Origin	35.00	16.31	0.01	-0.28	641.43	-0.15	0.0	-14.13	29.05	-0.01	-0.40	29.59	0.65	0.00	30.01	46.2	2
2683	SpliceB	End	39.00	14.01	0.01	-0.22	757.61	-0.19	0.0	-14.13	29.05	-0.01	-0.39	32.35	0.63	0.00	32.75	50.4	2
2683	SpliceB	Origin	39.00	14.01	0.01	-0.22	757.61	-0.19	0.0	-14.71	29.19	-0.01	-0.40	32.35	0.63	0.00	32.77	50.4	2
2683	2683:BotConn	End	40.00	13.46	0.01	-0.21	786.80	-0.20	0.0	-14.71	29.19	-0.01	-0.40	32.96	0.63	0.00	33.38	51.4	2
2683	2683:BotConn	Origin	40.00	13.46	0.01	-0.21	786.80	-0.20	0.0	-16.36	26.26	-0.01	-0.44	32.96	0.56	0.00	33.42	51.4	2
2683	2683:WVGD5	End	45.00	10.88	0.00	-0.16	918.10	-0.25	0.0	-16.36	26.26	-0.01	-0.42	35.09	0.54	0.00	35.53	54.7	2
2683	2683:WVGD5	Origin	45.00	10.88	0.00	-0.16	918.10	-0.25	0.0	-17.37	26.77	-0.01	-0.45	35.09	0.55	0.00	35.56	54.7	2
2683	Tube 2	End	50.00	8.58	0.00	-0.11	1051.94	-0.31	0.0	-17.37	26.77	-0.01	-0.43	36.83	0.53	0.00	37.28	57.3	2
2683	Tube 2	Origin	50.00	8.58	0.00	-0.11	1051.94	-0.31	0.0	-18.18	27.06	-0.01	-0.45	36.83	0.53	0.00	37.30	57.4	2
2683	2683:WVGD4	End	55.00	6.55	0.00	-0.08	1187.24	-0.38	0.0	-18.18	27.06	-0.01	-0.43	38.22	0.51	0.00	38.66	60.7	2
2683	2683:WVGD4	Origin	55.00	6.55	0.00	-0.08	1187.24	-0.38	0.0	-19.25	27.58	-0.02	-0.46	38.22	0.52	0.00	38.69	60.7	2
2683	Tube 2	End	60.00	4.80	0.00	-0.05	1325.16	-0.45	0.0	-19.25	27.58	-0.02	-0.44	39.36	0.50	0.00	39.81	63.8	2
2683	Tube 2	Origin	60.00	4.80	0.00	-0.05	1325.16	-0.45	0.0	-20.13	27.89	-0.02	-0.46	39.36	0.50	0.00	39.83	63.8	2
2683	2683:WVGD3	End	65.00	3.33	0.00	-0.03	1464.62	-0.54	0.0	-20.13	27.89	-0.02	-0.44	40.25	0.48	0.00	40.70	66.6	2
2683	2683:WVGD3	Origin	65.00	3.33	0.00	-0.03	1464.62	-0.54	0.0	-21.24	28.42	-0.02	-0.47	40.25	0.49	0.00	40.73	66.6	2
2683	SpliceT	End	69.75	2.18	0.00	-0.02	1599.63	-0.62	0.0	-21.24	28.42	-0.02	-0.45	40.95	0.48	0.00	41.41	69.1	2
2683	SpliceT	Origin	69.75	2.18	0.00	-0.02	1599.63	-0.62	0.0	-22.13	28.66	-0.02	-0.47	40.95	0.48	0.00	41.43	69.2	2
2683	Tube 2	End	72.38	1.64	0.00	-0.01	1674.87	-0.67	0.0	-22.13	28.66	-0.02	-0.47	42.93	0.48	0.00	43.41	72.5	2
2683	Tube 2	Origin	72.38	1.64	0.00	-0.01	1674.87	-0.67	0.0	-23.05	28.84	-0.02	-0.49	42.93	0.48	0.00	43.43	72.5	2
2683	2683:WVGD2	End	75.00	1.19	0.00	-0.01	1750.57	-0.73	0.0	-23.05	28.84	-0.02	-0.48	43.19	0.47	0.00	43.68	73.7	2
2683	2683:WVGD2	Origin	75.00	1.19	0.00	-0.01	1750.57	-0.73	0.0	-24.23	29.30	-0.02	-0.50	43.19	0.48	0.00	43.70	73.8	2
2683	Tube 3	End	80.00	0.53	0.00	-0.00	1897.08	-0.83	0.0	-24.23	29.30	-0.02	-0.49	43.61	0.47	0.00	44.10	76.1	2
2683	Tube 3	Origin	80.00	0.53	0.00	-0.00	1897.08	-0.83	0.0	-25.21	29.63	-0.02	-0.51	43.61	0.47	0.00	44.12	76.2	2
2683	2683:WVGD1	End	85.00	0.13	0.00	-0.00	2045.24	-0.95	0.0	-25.21	29.63	-0.02	-0.49	43.91	0.45	0.00	44.40	78.4	2
2683	2683:WVGD1	Origin	85.00	0.13	0.00	-0.00	2045.24	-0.95	0.0	-26.45	30.19	-0.02	-0.51	43.91	0.46	0.00	44.43	78.5	2
2683	2683:g	End	90.00	0.00	0.00	0.00	2196.17	-1.08	0.0	-26.45	30.19	-0.02	-0.50	44.13	0.45	0.00	44.64	80.8	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	41.13	0.01	-0.39	0.47	0.00	-0.0	-1.08	-0.42	-0.00	-0.48	2.75	0.37	0.00	3.30	5.1	1
Davit1	Davit1:End	End	1.12	41.55	0.01	0.39	-0.00	0.00	-0.0	-1.08	-0.42	-0.00	-0.48	0.00	0.37	0.00	0.81	1.2	1

Davit2	Davit2:O	Origin	0.00	41.08	0.01	-1.70	-0.72	-0.00	0.0	1.09	0.65	0.00	0.49	4.25	0.58	0.00	4.84	7.4	1
Davit2	Davit2:End	End	1.12	41.45	0.01	-2.51	0.00	0.00	0.0	1.09	0.65	0.00	0.49	0.00	0.58	0.00	1.11	1.7	1
Davit3	Davit3:O	Origin	0.00	36.84	0.01	-0.20	-4.24	0.00	0.0	-1.68	0.55	-0.00	-0.32	4.54	0.21	0.00	4.88	7.5	1
Davit3	#Davit3:0	End	4.01	37.20	0.01	2.90	-2.02	0.00	0.0	-1.68	0.55	-0.00	-0.42	3.64	0.28	0.00	4.09	6.3	1
Davit3	#Davit3:0	Origin	4.01	37.20	0.01	2.90	-2.02	0.00	0.0	-1.67	0.50	-0.00	-0.42	3.64	0.25	0.00	4.08	6.3	1
Davit3	Davit3:End	End	8.03	37.56	0.01	5.93	-0.00	0.00	0.0	-1.67	0.50	-0.00	-0.59	0.00	0.35	0.00	0.85	1.3	1
Davit4	Davit4:O	Origin	0.00	36.80	0.01	-1.61	-8.13	-0.00	-0.0	2.37	1.04	0.00	0.46	8.71	0.40	0.00	9.19	14.1	1
Davit4	#Davit4:0	End	4.01	36.96	0.01	-4.86	-3.94	-0.00	-0.0	2.37	1.04	0.00	0.59	7.11	0.52	0.00	7.75	11.9	1
Davit4	#Davit4:0	Origin	4.01	36.96	0.01	-4.86	-3.94	-0.00	0.0	2.38	0.98	0.00	0.59	7.11	0.49	0.00	7.74	11.9	1
Davit4	Davit4:End	End	8.03	37.12	0.01	-8.26	0.00	0.00	0.0	2.38	0.98	0.00	0.84	0.00	0.69	0.00	1.46	2.3	1
Davit5	Davit5:O	Origin	0.00	26.79	0.01	0.20	-4.38	0.00	-0.0	-1.82	0.47	-0.00	-0.13	0.81	0.07	0.00	0.95	1.5	1
Davit5	#Davit5:0	End	5.00	27.83	0.01	3.75	-2.01	0.00	-0.0	-1.82	0.47	-0.00	-0.16	0.61	0.08	0.00	0.79	1.2	1
Davit5	#Davit5:0	Origin	5.00	27.83	0.01	3.75	-2.01	0.00	-0.0	-1.77	0.33	-0.00	-0.16	0.61	0.06	0.00	0.77	1.2	1
Davit5	#Davit5:1	End	8.52	28.55	0.01	6.25	-0.84	0.00	-0.0	-1.77	0.33	-0.00	-0.20	0.39	0.07	0.00	0.60	0.9	1
Davit5	#Davit5:1	Origin	8.52	28.55	0.01	6.25	-0.84	0.00	0.0	-1.74	0.24	-0.00	-0.19	0.39	0.05	0.00	0.59	0.9	1
Davit5	Davit5:End	End	12.05	29.28	0.01	8.75	-0.00	0.00	0.0	-1.74	0.24	-0.00	-0.25	0.00	0.07	0.00	0.28	0.4	1
Davit6	Davit6:O	Origin	0.00	26.75	0.01	-1.35	-18.78	-0.00	-0.0	2.11	1.69	0.00	0.15	3.49	0.24	0.00	3.66	5.6	1
Davit6	#Davit6:0	End	5.00	27.56	0.01	-5.00	-10.31	-0.00	-0.0	2.11	1.69	0.00	0.19	3.13	0.30	0.00	3.36	5.2	1
Davit6	#Davit6:0	Origin	5.00	27.56	0.01	-5.00	-10.31	-0.00	-0.0	2.14	1.52	0.00	0.19	3.13	0.27	0.00	3.36	5.2	1
Davit6	#Davit6:1	End	8.52	28.15	0.01	-7.60	-4.96	-0.00	-0.0	2.14	1.52	0.00	0.24	2.33	0.34	0.00	2.63	4.0	1
Davit6	#Davit6:1	Origin	8.52	28.15	0.01	-7.60	-4.96	-0.00	0.0	2.17	1.41	0.00	0.24	2.33	0.31	0.00	2.62	4.0	1
Davit6	Davit6:End	End	12.05	28.73	0.01	-10.22	0.00	0.00	0.0	2.17	1.41	0.00	0.32	0.00	0.41	0.00	0.78	1.2	1
Davit7	Davit7:O	Origin	0.00	19.12	0.01	0.40	-4.40	0.00	0.0	-1.67	0.57	-0.00	-0.32	4.72	0.22	0.00	5.05	7.8	1
Davit7	#Davit7:0	End	4.01	19.40	0.01	2.92	-2.10	0.00	0.0	-1.67	0.57	-0.00	-0.42	3.79	0.29	0.00	4.23	6.5	1
Davit7	#Davit7:0	Origin	4.01	19.40	0.01	2.92	-2.10	0.00	0.0	-1.66	0.52	-0.00	-0.41	3.79	0.26	0.00	4.23	6.5	1
Davit7	Davit7:End	End	8.03	19.67	0.01	5.37	-0.00	0.00	0.0	-1.66	0.52	-0.00	-0.59	0.00	0.37	0.00	0.87	1.3	1
Davit8	Davit8:O	Origin	0.00	19.08	0.01	-1.11	-8.36	-0.00	-0.0	2.36	1.07	0.00	0.45	8.96	0.41	0.00	9.44	14.5	1
Davit8	#Davit8:0	End	4.01	19.23	0.01	-3.78	-4.06	-0.00	-0.0	2.36	1.07	0.00	0.59	7.31	0.53	0.00	7.95	12.2	1
Davit8	#Davit8:0	Origin	4.01	19.23	0.01	-3.78	-4.06	-0.00	0.0	2.37	1.01	0.00	0.59	7.31	0.50	0.00	7.95	12.2	1
Davit8	Davit8:End	End	8.03	19.39	0.01	-6.61	0.00	0.00	0.0	2.37	1.01	0.00	0.83	0.00	0.71	0.00	1.49	2.3	1

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	1.157	80.00	80.00	1.45
Clamp2	1.268	80.00	80.00	1.59
Clamp3	1.734	80.00	80.00	2.17
Clamp4	2.564	80.00	80.00	3.20
Clamp5	1.734	80.00	80.00	2.17
Clamp6	2.564	80.00	80.00	3.20
Clamp7	1.734	80.00	80.00	2.17
Clamp8	2.564	80.00	80.00	3.20
Clamp9	0.320	80.00	80.00	0.40
Clamp10	0.320	80.00	80.00	0.40
Clamp11	0.320	80.00	80.00	0.40
Clamp12	0.320	80.00	80.00	0.40
Clamp13	0.320	80.00	80.00	0.40

Clamp14	0.160	80.00	80.00	0.20
Clamp15	0.160	80.00	80.00	0.20
Clamp16	0.160	80.00	80.00	0.20
Clamp17	0.160	80.00	80.00	0.20
Clamp21	12.621	80.00	80.00	15.78
Clamp23	3.326	80.00	80.00	4.16

*** 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)
2683	88.10	NESC Heavy	25	13920.9

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
2683	NESC Heavy	1	1.271	1.275	0.390	2.156	14.956	36.386	68.022	2	99.119	2.440	3.000	66.16
2683	NESC Heavy	2	0.390	-2.156	1.271	-1.275	14.956	33.001	61.694	2	-90.507	2.324	3.000	60.00
2683	NESC Heavy	3	-1.273	-1.800	1.273	-1.800	30.544	33.712	128.713	6	-90.507	2.349	3.000	61.29
2683	NESC Heavy	4	-1.271	-1.275	-0.390	-2.156	14.956	32.702	61.135	2	-89.878	2.313	3.000	59.46
2683	NESC Heavy	5	-0.390	2.156	-1.271	1.275	14.956	36.685	68.581	2	99.748	2.450	3.000	66.70
2683	NESC Heavy	6	1.273	1.800	-1.273	1.800	30.544	37.168	141.906	6	99.748	2.466	3.000	67.58
2683	NESC Heavy	7	1.381	1.537	0.097	2.069	16.676	34.541	72.001	3	99.328	2.377	3.000	62.80
2683	NESC Heavy	8	0.097	-2.069	1.381	-1.537	16.676	31.400	65.453	3	-90.507	2.267	3.000	57.09
2683	NESC Heavy	9	-1.381	-1.537	-0.097	-2.069	16.676	31.180	64.995	3	-90.087	2.259	3.000	56.69
2683	NESC Heavy	10	-0.097	2.069	-1.381	1.537	16.676	34.762	72.460	3	99.748	2.385	3.000	63.20
2683	NESC Extreme	1	1.271	1.275	0.390	2.156	14.956	35.379	66.139	2	96.513	2.406	3.000	64.32
2683	NESC Extreme	2	0.390	-2.156	1.271	-1.275	14.956	33.679	62.962	2	-92.213	2.348	3.000	61.23
2683	NESC Extreme	3	-1.273	-1.800	1.273	-1.800	30.544	34.432	131.460	6	-92.213	2.374	3.000	62.60
2683	NESC Extreme	4	-1.271	-1.275	-0.390	-2.156	14.956	33.587	62.790	2	-92.019	2.344	3.000	61.07
2683	NESC Extreme	5	-0.390	2.156	-1.271	1.275	14.956	35.471	66.311	2	96.706	2.409	3.000	64.49
2683	NESC Extreme	6	1.273	1.800	-1.273	1.800	30.544	36.112	137.875	6	96.706	2.431	3.000	65.66
2683	NESC Extreme	7	1.381	1.537	0.097	2.069	16.676	33.598	70.034	3	96.577	2.345	3.000	61.09
2683	NESC Extreme	8	0.097	-2.069	1.381	-1.537	16.676	32.031	66.768	3	-92.213	2.289	3.000	58.24
2683	NESC Extreme	9	-1.381	-1.537	-0.097	-2.069	16.676	31.963	66.627	3	-92.084	2.287	3.000	58.12
2683	NESC Extreme	10	-0.097	2.069	-1.381	1.537	16.676	33.666	70.175	3	96.706	2.347	3.000	61.21

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	5.84	NESC Heavy	1	8.5
Davit2	18.66	NESC Heavy	1	8.5
Davit3	21.79	NESC Heavy	1	109.6
Davit4	33.13	NESC Heavy	1	109.6
Davit5	4.94	NESC Heavy	1	434.7
Davit6	11.53	NESC Heavy	1	434.7
Davit7	22.23	NESC Heavy	1	109.6
Davit8	33.72	NESC Heavy	1	109.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum	Element	Element

	Usage %	Label	Type
NESC Heavy	88.10	2683	Steel Pole
NESC Extreme	80.76	2683	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	88.10	2683	25
NESC Extreme	80.76	2683	25

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	2683	6	30.544	55.446	2206.637	-3.500	37.168	141.906	6	99.748	2.466	67.58
NESC Extreme	2683	6	30.544	26.962	2196.168	-1.075	36.112	137.875	6	96.706	2.431	65.66

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	33.72	Davit8	1
NESC Extreme	14.52	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.00	NESC Heavy	0.0
Clamp2	Clamp	3.05	NESC Heavy	0.0
Clamp3	Clamp	3.70	NESC Heavy	0.0
Clamp4	Clamp	5.34	NESC Heavy	0.0
Clamp5	Clamp	3.70	NESC Heavy	0.0
Clamp6	Clamp	5.34	NESC Heavy	0.0
Clamp7	Clamp	3.70	NESC Heavy	0.0
Clamp8	Clamp	5.34	NESC Heavy	0.0
Clamp9	Clamp	1.30	NESC Heavy	0.0
Clamp10	Clamp	1.30	NESC Heavy	0.0
Clamp11	Clamp	1.30	NESC Heavy	0.0
Clamp12	Clamp	1.30	NESC Heavy	0.0
Clamp13	Clamp	1.30	NESC Heavy	0.0
Clamp14	Clamp	0.65	NESC Heavy	0.0
Clamp15	Clamp	0.65	NESC Heavy	0.0
Clamp16	Clamp	0.65	NESC Heavy	0.0
Clamp17	Clamp	0.65	NESC Heavy	0.0
Clamp21	Clamp	15.78	NESC Extreme	0.0
Clamp23	Clamp	4.16	NESC Extreme	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	Clamp1	Clamp	Davit1:End	0.000	2.250	0.840	2.402
NESC Heavy	Clamp2	Clamp	Davit2:End	0.000	2.279	0.869	2.439
NESC Heavy	Clamp3	Clamp	Davit3:End	0.000	2.305	1.863	2.964
NESC Heavy	Clamp4	Clamp	Davit4:End	0.000	3.596	2.310	4.274
NESC Heavy	Clamp5	Clamp	Davit5:End	0.000	2.305	1.863	2.964
NESC Heavy	Clamp6	Clamp	Davit6:End	0.000	3.596	2.310	4.274
NESC Heavy	Clamp7	Clamp	Davit7:End	0.000	2.305	1.863	2.964
NESC Heavy	Clamp8	Clamp	Davit8:End	0.000	3.596	2.310	4.274
NESC Heavy	Clamp9	Clamp	2683:WVGD1	0.000	0.087	1.033	1.037
NESC Heavy	Clamp10	Clamp	2683:WVGD2	0.000	0.087	1.033	1.037
NESC Heavy	Clamp11	Clamp	2683:WVGD3	0.000	0.087	1.033	1.037
NESC Heavy	Clamp12	Clamp	2683:WVGD4	0.000	0.087	1.033	1.037
NESC Heavy	Clamp13	Clamp	2683:WVGD5	0.000	0.087	1.033	1.037
NESC Heavy	Clamp14	Clamp	2683:WVGD6	0.000	0.050	0.516	0.518
NESC Heavy	Clamp15	Clamp	2683:WVGD7	0.000	0.050	0.516	0.518
NESC Heavy	Clamp16	Clamp	2683:WVGD8	0.000	0.050	0.516	0.518
NESC Heavy	Clamp17	Clamp	2683:WVGD9	0.000	0.050	0.516	0.518
NESC Heavy	Clamp21	Clamp	2683:TopConn	0.000	3.901	10.718	11.406
NESC Heavy	Clamp23	Clamp	2683:BotConn	0.000	-0.974	2.329	2.524
NESC Extreme	Clamp1	Clamp	Davit1:End	0.000	1.143	0.181	1.157
NESC Extreme	Clamp2	Clamp	Davit2:End	0.000	1.257	0.169	1.268
NESC Extreme	Clamp3	Clamp	Davit3:End	0.000	1.578	0.719	1.734
NESC Extreme	Clamp4	Clamp	Davit4:End	0.000	2.390	0.928	2.564
NESC Extreme	Clamp5	Clamp	Davit5:End	0.000	1.578	0.719	1.734
NESC Extreme	Clamp6	Clamp	Davit6:End	0.000	2.390	0.928	2.564
NESC Extreme	Clamp7	Clamp	Davit7:End	0.000	1.578	0.719	1.734
NESC Extreme	Clamp8	Clamp	Davit8:End	0.000	2.390	0.928	2.564
NESC Extreme	Clamp9	Clamp	2683:WVGD1	0.000	0.214	0.238	0.320
NESC Extreme	Clamp10	Clamp	2683:WVGD2	0.000	0.214	0.238	0.320
NESC Extreme	Clamp11	Clamp	2683:WVGD3	0.000	0.214	0.238	0.320
NESC Extreme	Clamp12	Clamp	2683:WVGD4	0.000	0.214	0.238	0.320
NESC Extreme	Clamp13	Clamp	2683:WVGD5	0.000	0.214	0.238	0.320
NESC Extreme	Clamp14	Clamp	2683:WVGD6	0.000	0.107	0.119	0.160
NESC Extreme	Clamp15	Clamp	2683:WVGD7	0.000	0.107	0.119	0.160
NESC Extreme	Clamp16	Clamp	2683:WVGD8	0.000	0.107	0.119	0.160
NESC Extreme	Clamp17	Clamp	2683:WVGD9	0.000	0.107	0.119	0.160
NESC Extreme	Clamp21	Clamp	2683:TopConn	0.000	11.642	4.873	12.621
NESC Extreme	Clamp23	Clamp	2683:BotConn	0.000	-3.153	1.058	3.326

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	25.794	0.000	34.504	1992.522	-0.000	-0.000
NESC Extreme	24.291	0.000	12.888	1915.827	-0.000	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 1325.0

Weight of Steel Poles:	13920.9
Total:	15245.9

*** End of Report

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 99.8 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	$N := 12$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yeild Strength=	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

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

Bolt Tension Check:

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot (A_n \cdot F_y) = 243.576 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 40.97 \cdot \%$

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

Condition1 = "OK"

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 2206.6 \cdot ft \cdot kips \cdot 1.1 = 2427 \cdot ft \cdot kips$	(User Input from PLSPole)	
Shear Force =	$Shear := 28.9 \cdot kip \cdot 1.1 = 31.79 \cdot kips$	(User Input from PLSPole)	
Axial Force =	$Axial := 56.8 \cdot kip \cdot 1.1 = 62.48 \cdot kips$	(User Input from PLSPole)	
Tower Height =	$H_t := 90 \cdot ft$	(User Input)	

Footing Data:

Depth to Bottom of Footing =	$D_f := 9 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 9.5 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Width of Pier =	$W_p := 10 \cdot ft$	(User Input)	
Depth of Soil =	$D_{soil} := 9 \cdot ft$	(User Input)	
Depth of Rock =	$D_{rock} := 12 \cdot ft$	(User Input)	(2/3 of tot. rock depth)

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 9000 \cdot psf$	(User Input)	
Ultimate Rock Bearing Capacity =	$q_{rock} := 50000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Unit Weight of Rock =	$\gamma_{rock} := 160 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 1.0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Rock Anchor Properties:

ASTM A615 Grade 60

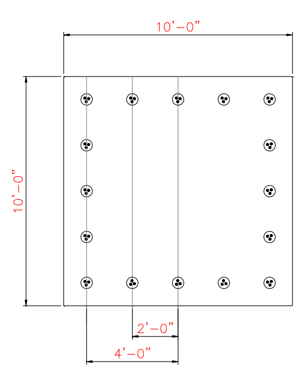
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Anchor Diameter =	$d_{ra} := 1.27 \cdot in$	(User Input)
Anchors per Hole =	$N_{ra} := 3$	(User Input)
Hole Diameter =	$d_{Hole} := 6 \cdot in$	(User Input)
Grout Strength =	$\tau := 120 \cdot psi$	(User Input)
Total Number of Rock Bolts =	$N_{atot} := 16$	(User Input)

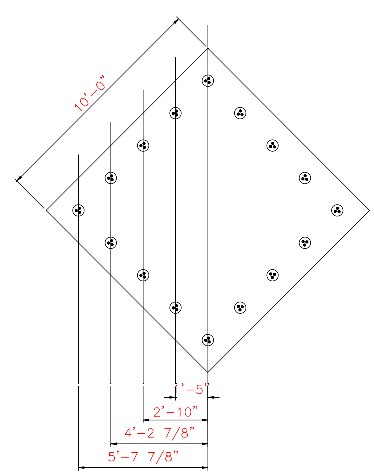
Perpendicular Direction:

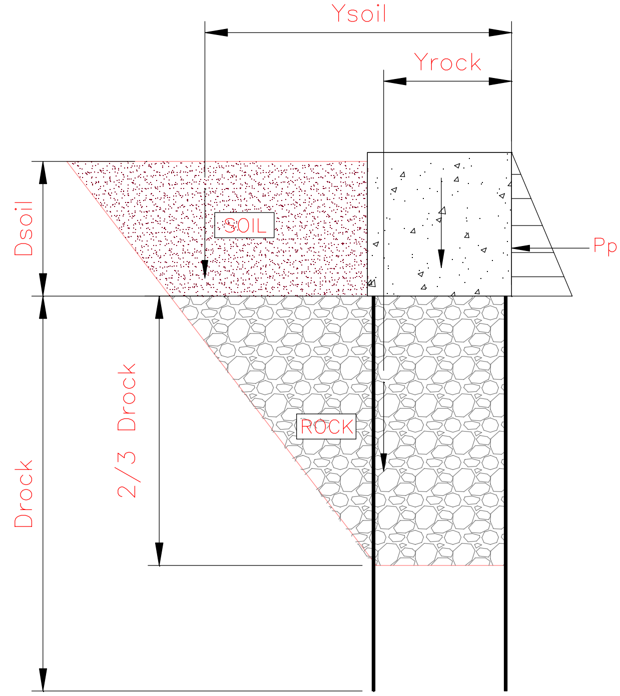
Distance to Rock Anchor Group 1 =	$D_{a1} := 24 \cdot in$	(User Input)
Distance to Rock Anchor Group 2 =	$D_{a2} := 48 \cdot in$	(User Input)
Number of Rock Anchors in Group 1 =	$N_{a1} := 4$	(User Input)
Number of Rock Anchors in Group 2 =	$N_{a2} := 10$	(User Input)

Diagonal Direction:

Distance to Rock Anchor Group 3 =	$D_{a3} := 17 \cdot in$	(User Input)
Distance to Rock Anchor Group 4 =	$D_{a4} := 34 \cdot in$	(User Input)
Distance to Rock Anchor Group 5 =	$D_{a5} := 50.875 \cdot in$	(User Input)
Distance to Rock Anchor Group 6 =	$D_{a6} := 67.875 \cdot in$	(User Input)
Number of Rock Anchors in Group 3 =	$N_{a3} := 4$	(User Input)
Number of Rock Anchors in Group 4 =	$N_{a4} := 4$	(User Input)
Number of Rock Anchors in Group 5 =	$N_{a5} := 4$	(User Input)
Number of Rock Anchors in Group 6 =	$N_{a6} := 2$	(User Input)







Area 1 =	$A1 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{soil}^2 = 23.383\,ft^2$	sf
Area 2 =	$A2 := \tan(\Phi_s) \cdot D_{rock} \cdot D_{soil} = 62.354\,ft^2$	sf
Distance to Centroid 1 =	$Y1 := \tan(\Phi_s) \cdot D_{rock} + \frac{1}{3} \cdot \tan(\Phi_s) \cdot D_{soil} = 8.66\,ft$	ft
Distance to Centroid 2 =	$Y2 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{rock} = 3.464\,ft$	ft
Distance from Toe to Centroid of Soil =	$Y_{soil} := \frac{(A1 \cdot Y1 + A2 \cdot Y2)}{(A1 + A2)} + W_p = 14.88\,ft$	ft
Area 1 =	$A1 := \frac{1}{2} \cdot \tan(\Phi_s) \cdot D_{rock}^2 = 41.569\,ft^2$	sf
Area 2 =	$A2 := W_p \cdot D_{rock} = 120\,ft^2$	sf
Distance to Centroid 1 =	$Y1 := W_p + \frac{1}{3} \cdot \tan(\Phi_s) \cdot D_{rock} = 12.309\,ft$	ft
Distance to Centroid 2 =	$Y2 := \frac{W_p}{2} = 5\,ft$	ft
Distance from Toe to Centroid of Rock =	$Y_{rock} := \frac{(A1 \cdot Y1 + A2 \cdot Y2)}{(A1 + A2)} = 6.88\,ft$	ft

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 100 \cdot \text{pcf}$

Coefficient of Lateral Soil Pressure = $K_p := \dfrac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Passive Pressure = $P_{top} := 0 = 0 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot (D_f - n) + c \cdot 2 \cdot \sqrt{K_p} = 2.4 \cdot \text{ksf}$

$P_{ave} := \dfrac{P_{top} + P_{bot}}{2} = 1.2 \cdot \text{ksf}$

$A_p := W_p \cdot (L_p - L_{pag} - n) = 80\text{ft}^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 96 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := (W_p{}^2 \cdot L_p) \cdot \gamma_c = 142.5 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s1} := \left[W_p \cdot (D_{soil} - n) \cdot \tan(\Phi_s) \cdot \left(\dfrac{D_{soil} - n}{2} + D_{rock}\right)\right] \cdot \gamma_s = 73.901 \cdot \text{kip}$

Weight of Soil Wedge at Back Face Corners = $WT_{s2} := 2 \cdot \left[\dfrac{D_{soil} - n}{3} \cdot \left[\tan(\Phi_s) \cdot (D_{soil} - n)\right]^2\right] \cdot \gamma_s = 11.378 \cdot \text{kips}$

Total Weight of Soil = $WT_{Stot} := WT_{s1} + WT_{s2} = 85.3 \cdot \text{kips}$

Weight of Rock Between Rock Anchors = $WT_{R1} := (W_p{}^2 \cdot D_{rock}) \cdot \gamma_{rock} = 192 \cdot \text{kip}$

Weight of Rock Wedge at Back Face = $WT_{R2} := \left(\dfrac{D_{rock}{}^2 \cdot \tan(\Phi_s)}{2} \cdot W_p\right) \cdot \gamma_{rock} = 66.511 \cdot \text{kip}$

Weight of Rock at Back Face Corners = $WT_{R3} := 2 \cdot \left[\dfrac{D_{rock}}{3} \cdot (\tan(\Phi_s) \cdot D_{rock})^2\right] \cdot \gamma_{rock} = 61.44 \cdot \text{kips}$

Total Weight of Rock = $WT_{Rtot} := WT_{R1} + WT_{R2} + WT_{R3} = 320 \cdot \text{kips}$

Resisting Moment = $M_r := (WT_c + \text{Axial}) \cdot \dfrac{W_p}{2} + S_u \cdot \dfrac{L_p - L_{pag} - n}{3} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 4751 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := \text{OM} + \text{Shear} \cdot L_p = 2729 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \dfrac{M_r}{M_{ot}} = 1.74$

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

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

OverTurning_Moment_Check = "Okay"

Rock Anchor Check:

Area of Bolt Group = $A_n := \frac{\pi}{4} \cdot d_{ra}^2 \cdot N_{ra} = 3.8 \cdot in^2$

Allowable Tension = $T_{all} := A_n \cdot F_y = 228 \cdot kips$

Perpendicular Direction:

Polar Moment of Inertia = $I_p := \left(D_{a1}^2 \cdot N_{a1} + D_{a2}^2 \cdot N_{a2}\right) = 25344 \cdot in^2$

Maximum Tension Force = $T_{perp} := \frac{M_{ot} \cdot D_{a2}}{I_p} - \frac{Axial + WT_c}{N_{atot}} = 49.2 \cdot kips$

$\frac{T_{perp}}{T_{all}} = 21.6 \cdot \%$

Condition1 := if($T_{perp} < T_{all}$, "OK", "NG")

Condition1 = "OK"

Diagonal Direction:

Polar Moment of Inertia = $I_p := \left(D_{a3}^2 \cdot N_{a3} + D_{a4}^2 \cdot N_{a4} + D_{a5}^2 \cdot N_{a5} + D_{a6}^2 \cdot N_{a6}\right) = 25347 \cdot in^2$

Maximum Tension Force = $T_{diag} := \frac{M_{ot} \cdot D_{a6}}{I_p} - \frac{Axial + WT_c}{N_{atot}} = 74.9 \cdot kips$

$\frac{T_{diag}}{T_{all}} = 32.8 \cdot \%$

Condition2 := if($T_{diag} < T_{all}$, "OK", "NG")

Condition2 = "OK"

Bond Strength Check:

Bond Strength = Bond_Strength := $d_{Hole} \cdot \pi \cdot D_{rock} \cdot \tau = 326 \cdot kips$

Perpendicular Direction:

$\frac{T_{perp}}{Bond\_Strength} = 15.1 \cdot \%$

Condition1 := if(T_{perp} < Bond_Strength, "OK", "NG")

Condition1 = "OK"

Diagonal Direction:

$\frac{T_{diag}}{Bond\_Strength} = 23 \cdot \%$

Condition2 := if(T_{diag} < Bond_Strength, "OK", "NG")

Condition2 = "OK"

Rock Bearing Capacity Check:

Bearing Force =

$$MaxBearing := \left[\frac{(Axial + WT_c)}{W_p^{\,2}}\right] + \frac{M_{ot}}{\left(\frac{W_p^{\,3}}{6}\right)}$$

$MaxBearing = 18.43 \cdot ksf$

$\frac{MaxBearing}{q_{rock}} = 0.37$

$Rock\_Bearing\_Check := if\left(\frac{MaxBearing}{q_{rock}} \le 1.00, "OK", "Overstressed"\right)$

$Rock\_Bearing\_Check = "OK"$

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CT2185	DATE:	12/03/2012	RF DESIGN ENG:	Sohail Usmani
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	
REVISION:	Final	RF MANAGER:	CAMERON SYME	RF DESIGN EMAIL:	su0170@att.com
INITIATIVE /PROJECT:	LTE 2C 1900 Carrier Add.				

RF PERF ENG:	TBD	RFDS PROGRAM TYPE:	2016 LTE Next Carrier
RF PERF PHONE:	TBD	RFDS TECHNOLOGY:	LTE 2C
RF PERF EMAIL:		State:	Final
TRIDENT:	NA	Status:	Approved
GSM FREQUENCY:	850	RFDS ID:	856609
UMTS FREQUENCY:	850, 1900	RFDS Version:	2.00
LTE FREQUENCY:	700, 1900	Created By:	su0170
		Date Created:	9/21/2015 10:00:30 AM
		Date Updated:	11/20/2015 11:12:21 AM
		Updated By:	mm093q
I-PLAN JOB # 1:	NER-RCTB-12-04518	IPLAN PRD GRP || SUB GRP #1:	LTE Next Carrier || LTE 2C
I-PLAN JOB # 2:		IPLAN PRD GRP || SUB GRP #2:	
I-PLAN JOB # 3:		IPLAN PRD GRP || SUB GRP #3:	
I-PLAN JOB # 4:		IPLAN PRD GRP || SUB GRP #4:	

Section 2 - LOCATION INFORMATION

USID:	60437	FA LOCATION CODE:	10035273	LOCATION NAME:	BROOKFIELD STATION RD
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT
ADDRESS:	761 FEDERAL ROAD	CITY:	BROOKFIELD	STATE:	CT
ZIP CODE:	06804	COUNTY:	FAIRFIELD	MSA / RSA:	
LATITUDE (D-M-S):	41d 28m 43.572s	LONGITUDE (D-M-S):	-73d -24m -29.898s	LAT (DEC. DEG.):	41.4787700
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	2185 BROOKFIELD TAKE ROUTE 84 WEST TO EXIT 9 ROUTE 25 RIGHT ON RT 25, FOLLOW ROUTE 25 TO ROUTE 7, LEFT ON ROUTE 7 CELL SITE UNDER POWER LINES ON THE LEFT.				

ORACLE PTN # 1:	2051A03JJU	PACE JOB # 1:	MRCTB016731
ORACLE PTN # 2:		PACE JOB # 2:	
ORACLE PTN # 3:		PACE JOB # 3:	
ORACLE PTN # 4:		PACE JOB # 4:	
SEARCH RING NAME:			
SEARCH RING ID:		CASPR INITIATIVE # 1:	3rd Carrier|Site Overlay|UMTS
BTA:		CASPR INITIATIVE # 2:	2nd Carrier|Site Overlay|UMTS
LONG (DEC. DEG.):	-73.4083050	CASPR INITIATIVE # 3:	Site Overlay|LTE
BORDER CELL WITH CONTOUR COORD:		CASPR INITIATIVE # 4:	ETTCS|Transport|Site Mod
AM STUDY REQ'D (Y/N):	No		
FREQ COORD:			

Section 3 - LICENSE COVERAGE/FILING INFORMATION

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

CGSA CALL SIGNS:	

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):		STRUCTURE TYPE:	UTILITY
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):		FCC ASR NUMBER:	NR
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	85.00		
LIGHTING TYPE:	NOT REQUIRED				

MARKET LOCATION 700 MHz Band:	
MARKET LOCATION 850 MHz Band:	On-Air
MARKET LOCATION 1900 MHz Band:	On-Air
MARKET LOCATION AWS Band:	
MARKET LOCATION WCS Band:	
MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911	BROOKFIELD POLICE DEPARTMENT	1308		INTRADO_MIAMI		0		
SECTOR B	BROOKFIELD POLICE DEPARTMENT	1308		INTRADO_MIAMI		0		
SECTOR C	BROOKFIELD POLICE DEPARTMENT	1308		INTRADO_MIAMI		0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911	BROOKFIELD POLICE DEPARTMENT	1308		INTRADO_MIAMI		0		
SECTOR B	BROOKFIELD POLICE DEPARTMENT	1308		INTRADO_MIAMI		0		
SECTOR C	BROOKFIELD POLICE DEPARTMENT	1308		INTRADO_MIAMI		0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
RBS ID:	98478	175026	218836	290905	401293				363954			
CTS COMMON ID:	321D2185	321X2185	CTV2185	CTU2185	CTV6185				CTL02185			
BTA/TID:	042G	321P	321U	321W	321W				321L			
4-DIGIT SITE ID:	2185	2185	2185	2185	6185				02185			
COW OR TOY?:	No	No	No	No	No				No			
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED				SECTORIZED			
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL				MACRO-CONVENTIONAL			
BTS LOCATION ID:	GROUND	GROUND	INTERNAL	INTERNAL	INTERNAL				INTERNAL			
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR				CINGULAR			
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD				GOLD			
OPS DISTRICT:	CT SOUTH-WEST	CT SOUTH-WEST	CT-SOUTH	CT-SOUTH	CT-SOUTH				CT SOUTH-WEST			
RF DISTRICT:	NPO TRIAGE	NPO TRIAGE	BRIDGEPORT	NPO TRIAGE	NPO TRIAGE				NPO TRIAGE			
OPS ZONE:	NE_CT_S_FRFD_NE_CS	NE_CT_S_FRFD_NE_CS	NE_CT_S_FRFD_NE_CS	NE_CT_S_FRFD_NW_CS	NE_CT_S_FRFD_NW_CS				NE_CT_S_FRFD_NW_CS			
RF ZONE:	HOTSEAT	HOTSEAT	BBP06	HOTSEAT	HOTSEAT				HOTSEAT			
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	OVERLAY				BASE			
EQUIPMENT NAME:	BROOKFIELD STATION RD	BROOKFIELD STATION RD	BROOKFIELD STATION RD	BROOKFIELD STATION RD	BROOKFIELD - STATION ROAD				BROOKFIELD STATION RD			
DISASTER PRIORITY:	0	0	0	0	0				3			

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
RBS ID:	98478	175026	218836	290905	401293				363954			
CTS COMMON ID:	321D2185	321X2185	CTV2185	CTU2185	CTV6185				CTL02185			
BTA/TID:	042G	321P	321U	321W	321W				321L			
4-DIGIT SITE ID:	2185	2185	2185	2185	6185				02185			
COW OR TOY?:	No	No	No	No	No				No			
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED				SECTORIZED			
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL				MACRO-CONVENTIONAL			
BTS LOCATION ID:	GROUND	GROUND	INTERNAL	INTERNAL	INTERNAL				INTERNAL			
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR				CINGULAR			
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD				GOLD			
OPS DISTRICT:	CT-South	CT-South	CT-South	CT-South	CT-South				CT-South			
RF DISTRICT:	NPO Triage	NPO Triage	Bridgeport	NPO Triage	NPO Triage				NPO Triage			
OPS ZONE:	NE_CT_S_FRFD_NE_CS	NE_CT_S_FRFD_NE_CS	NE_CT_S_FRFD_NE_CS	NE_CT_S_FRFD_NW_CS	NE_CT_S_FRFD_NW_CS				NE_CT_S_FRFD_NW_CS			
RF ZONE:	Hotseat	Hotseat	BBP06	Hotseat	Hotseat				Hotseat			
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	OVERLAY				BASE			
EQUIPMENT NAME:	BROOKFIELD STATION RD	BROOKFIELD STATION RD	BROOKFIELD STATION RD	BROOKFIELD STATION RD	BROOKFIELD - STATION ROAD				BROOKFIELD STATION RD			
DISASTER PRIORITY:	0	0	0	0	0				3			

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
MSC												
BSC/RNC/MME POOL ID	BRPTCTBSC06	BRPTCTBSC06	BRPTCT04CR0R03	BRPTCT04CR0R03	BRPTCT04CR0R03				FF01			
LAC	05015	05015	05995	05995	05995							
RAC												
EQUIPMENT VENDOR	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON				ERICSSON			
EQUIPMENT TYPE	ULTRASITE	ULTRASITE	3206 INDOOR	3206 INDOOR	6601 MAIN UNIT UMTS				6601 INDOOR MU			
LOCATION												
CABINET LOCATION												
MARKET STATE CODE									CT			
AGPS	Yes	Yes	Yes	Yes	Yes				Yes			
NODE B NUMBER	0	0	0	0	0				2185			
PARENT NAME	BRIDGEPORT BSC 06	BRIDGEPORT BSC 06	BRIDGEPORT RNC03	BRIDGEPORT RNC03	BRIDGEPORT RNC03				FF01			

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
MSC												
BSC/RNC/MME POOL ID	BRPTCTBSC06	BRPTCTBSC06	BRPTCT04CR0R03	BRPTCT04CR0R03	BRPTCT04CR0R03				FF01			
LAC	05015	05015	05995	05995	05995							
RAC												
EQUIPMENT VENDOR	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON				ERICSSON			
EQUIPMENT TYPE	ULTRASITE	ULTRASITE	3206 INDOOR	3206 INDOOR	6601 MAIN UNIT UMTS				6601 INDOOR MU			
LOCATION												
CABINET LOCATION												
MARKET STATE CODE									CT			
AGPS	Yes	Yes	Yes	Yes	Yes				Yes			
NODE B NUMBER	0	0	0	0	0				2185			
PARENT NAME	BRIDGEPORT BSC 06	BRIDGEPORT BSC 06	BRIDGEPORT RNC03	BRIDGEPORT RNC03	BRIDGEPORT RNC03							

Section 8 - RBS INDIVIDUAL INFORMATION - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
RBS ID:	98478	175026			218836	290905	401293										363954							
CELL ID/BCF:	042G2185	321P2185			CTV2185	CTV2185	CTV6185										CTL02185							
CTS COMMON ID:	321D2185	321X2185			CTV2185	CTU2185	CTV6185										CTL02185							
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
RBS ID:																								
CELL ID/BCF:																								
CTS COMMON ID:																								

Section 8 - RBS INDIVIDUAL INFORMATION - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
RBS ID:	98478	175026			218836	290905	401293										363954		363954					
CELL ID/BCF:	042G2185	321P2185			CTV2185	CTV2185	CTV6185										CTL02185		CTL02185					
CTS COMMON ID:	321D2185	321X2185			CTV2185	CTU2185	CTV6185										CTL02185		CTL02185					
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
RBS ID:																								
CELL ID/BCF:																								
CTS COMMON ID:																								

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	60437.850.25G.1	60437.1900.25G.1			60437.850.3G.1	60437.1900.3G.2	60437.850.3G.2										60437.700.4G.1							
SECTOR A SOFT SECTOR ID	321G21851				CTV21851	CTU21857	CTV6185A										CTL02185_7A_1							
SECTOR B	321G21852				CTV21852	CTU21858	CTV6185B										CTL02185_7B_1							
SECTOR C	321G21853	321P21853			CTV21853	CTU21859	CTV6185C										CTL02185_7C_1							
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	**LTE 2ND 850**	**LTE 2ND 1900**	**LTE 2ND AWS**	**LTE 2ND WCS**	**LTE 2ND FUTURE**		
USEID (excluding Hard Sector)																								
SECTOR A SOFT SECTOR ID																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	60437.850.25G.1	60437.1900.25G.1			60437.850.3G.1	60437.1900.3G.2	60437.850.3G.2										60437.700.4G.1		60437.1900.4G.111					
SECTOR A SOFT SECTOR ID	321G21851				CTV21851	CTU21857	CTV6185A										CTL02185_7A_1		CTL02185_9A_1					
SECTOR B	321G21852				CTV21852	CTU21858	CTV6185B										CTL02185_7B_1		CTL02185_9B_1					
SECTOR C	321G21853	321P21853			CTV21853	CTU21859	CTV6185C										CTL02185_7C_1		CTL02185_9C_1					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	**LTE 2ND 850**	**LTE 2ND 1900**	**LTE 2ND AWS**	**LTE 2ND WCS**	**LTE 2ND FUTURE**		
USEID (excluding Hard Sector)																								
SECTOR A SOFT SECTOR ID																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR CELL NUMBER - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	60437.850.25G.1	60437.1900.25G.1			60437.850.3G.1	60437.1900.3G.2	60437.850.3G.2										60437.700.4G.1							
SECTOR A CELL NUMBER																	15							
SECTOR B																	16							
SECTOR C																	17							
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
USEID (excluding Hard Sector)																								
SECTOR A CELL NUMBER																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR CELL NUMBER - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	60437.850.25G.1	60437.1900.25G.1			60437.850.3G.1	60437.1900.3G.2	60437.850.3G.2										60437.700.4G.1		60437.1900.4G.111					
SECTOR A CELL NUMBER																	15		8					
SECTOR B																	16		9					
SECTOR C																	17		10					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
USEID (excluding Hard Sector)																								
SECTOR A CELL NUMBER																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 10 - CID/SAC - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900								
SECTOR A CID/SAC	21851				21851	21857	61851																	
SECTOR B	21852				21852	21858	61852																	
SECTOR C	21853	21853			21853	21859	61853																	
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 10 - CID/SAC - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900								
SECTOR A CID/SAC	21851				21851	21857	61851																	
SECTOR B	21852				21852	21858	61852																	
SECTOR C	21853	21853			21853	21859	61853																	
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 11 - CURRENT RADIO COUNTS existing

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

Section 12 - CURRENT T1 COUNTS existing

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet	UMTS 5th Cabinet	UMTS 6th Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet	LTE 3rd Cabinet	LTE 4th Cabinet
# T1s												
LINK PROFILE												
RF COMBINING												
FIBER or ETHERNET?												
Tx Board Model												
Tx Board QTY												
RAX/ECU Board Model												
RAX/ECU Board QTY												
BBU Board Model												
BBU Board QTY												
RRU - location												
FIBER JUMPER												
DC CABLE												
DC/Fiber Dem. Box												
Bundled Fiber Cable												
Bundled DC Cable												

Section 13 - NEW/PROPOSED RADIO COUNTS

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

Section 14 - NEW/PROPOSED T1 COUNTS

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet	UMTS 5th Cabinet	UMTS 6th Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet	LTE 3rd Cabinet	LTE 4th Cabinet
# T1s												
LINK PROFILE												
RF COMBINING												
FIBER or ETHERNET?												
Tx Board Model												
Tx Board QTY												
RAX/ECU Board Model												
RAX/ECU Board QTY												
BBU Board Model												
BBU Board QTY												
RRU - location												
FIBER JUMPER												
DC CABLE												
DC/Fiber Dem. Box												
Bundled Fiber Cable												
Bundled DC Cable												

Section 15A - CURRENT SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		P65-16-XLH-RR_716MHz											
ANTENNA VENDOR	Powerwave		POWERWAVE											
ANTENNA SIZE (H x W x D)	55X11X5		72X12X6											
ANTENNA WEIGHT	35		64											
AZIMUTH	120		30											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	97		97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		2											
Antenna RET Motor (QTY/MODEL)	2	POWERWAVE DB		POWERWAVE BUILT-IN										
SURGE ARRESTOR (QTY/MODEL)			2	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)	2	LGP 21901	2	POWERWAVE / CM1007-DBPXBC-003										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	POWERWAVE 7070		LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP 21401	1	POWERWAVE / TTAW-07BP111-001										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	POLYPHASER 1000860		BUILT-IN										
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104												
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1														
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1			CTV21851	CTV21851		UMTS 850	7770.00.850.04	13		4	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
	PORT 2			CTV21851	CTV2185A		UMTS 850	7770.00.850.04	13		4	BOTTOM	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
	PORT 3			CTU21857	CTU21857		UMTS 1900	7770.00.1900.00	15		0	None	RFS 1/1/4"	120				NO				
	PORT 5			321G21851	321G21851		GSM 850	7770.00.850.04	13		4	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
ANTENNA POSITION 2	PORT 1			CTL02185_7A_1	CTL02185_7A_1		LTE 700	P65-16-XLH-RR_716MHz_08DT	13	30	8	BOTTOM	RFS 1-1/4"	120				NO				

Section 15B - CURRENT SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		P65-16-XLH-RR_716MHz											
ANTENNA VENDOR	Powerwave		POWERWAVE											
ANTENNA SIZE (H x W x D)	55X11X5		72X12X6											
ANTENNA WEIGHT	35		64											
AZIMUTH	240		150											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	97		97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		2											
Antenna RET Motor (QTY/MODEL)	2	POWERWAVE DB		POWERWAVE BUILT-IN										
SURGE ARRESTOR (QTY/MODEL)			2	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)	2	LGP 21901	2	POWERWAVE / CM1007-DBPXBC-003										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP 21401	1	POWERWAVE / TTAW-07BP111-001										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	POLYPHASER 1000860		BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1														
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1			CTV21852	CTV21852		UMTS 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
	PORT 2			CTV21852	CTV2185B		UMTS 850	7770.00.850.03	13		3	BOTTOM	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
	PORT 3			CTU21858	CTU21858		UMTS 1900	7770.00.1900.00	15		0	None	RFS 1/1/4"	120				NO				
	PORT 5			321G21852	321G21852		GSM 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
ANTENNA POSITION 2	PORT 1			CTL02185_7B_1	CTL02185_7B_1		LTE 700	P65-16-XLH-RR_716MHz_02DT	13	150	2	BOTTOM	RFS 1-1/4"	120				NO				

Section 15C - CURRENT SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		P65-16-XLH-RR_716MHz											
ANTENNA VENDOR	Powerwave		POWERWAVE											
ANTENNA SIZE (H x W x D)	55X11X5		72X12X6											
ANTENNA WEIGHT	35		64											
AZIMUTH	0		270											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	97		97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		2											
Antenna RET Motor (QTY/MODEL)	2	POWERWAVE DB		POWERWAVE BUILT-IN										
SURGE ARRESTOR (QTY/MODEL)			2	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)	2	LGP 21901	2	POWERWAVE / CM1007-DBPXBC-003										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP 21401	1	POWERWAVE / TTAW-07BP111-001										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	POLYPHASER 1000860		BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1														
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1			CTU21853	CTU21853		UMTS 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
	PORT 2			CTU21853	CTU2185C		UMTS 850	7770.00.850.03	13		3	BOTTOM	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
	PORT 3			CTU21859	CTU21859		UMTS 1900	7770.00.1900.00	15		0	None	RFS 1/1/4"	120				NO				
	PORT 5			321G21853	321G21853		GSM 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO				
ANTENNA POSITION 2	PORT 1			CTL02185_7C_1	CTL02185_7C_1		LTE 700	P65-16-XLH-RR_716MHz_02DT	13	270	2	BOTTOM	RFS 1-1/4"	120				NO				

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL			OPA-65R-LCUU-H6											
ANTENNA VENDOR			CCI Antennas											
ANTENNA SIZE (H x W x D)			72X14.8X9											
ANTENNA WEIGHT			57											
AZIMUTH			30											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)			97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT			0											
FEEDER AMOUNT			2											
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)			4	Kaelus DBC2055F1V1-2										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)			2	CCI / DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)				BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	LTE 1900 will be 2C at the site with Bronze standard config Bottom// Replace the exisiting LTE antenna with a Octo port 6' Antenna and Install at POS2 // Install 1900 radio RRUS-12+A2 at BOTTOM // Add 2 Coax and 4 Diplexers, 2 Twin TMA and 4 surge arrestors per sector // DUL TO DUS upgrade.													
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3		60437.A.1900.4G.111	CTL02185_9A_1	CTL02185_9A_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_02DT	16.85	30	2	BOTTOM	RFS 1-1/4"	120				NO				

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL			OPA-65R-LCUU-H6											
ANTENNA VENDOR			CCI Antennas											
ANTENNA SIZE (H x W x D)			72X14.8X9											
ANTENNA WEIGHT			57											
AZIMUTH			150											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)			97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT			0											
FEEDER AMOUNT			2											
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)			4	Kaelus DBC2055F1V1-2										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)			2	CCI / DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)				BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	LTE 1900 will be 2C at the site with Bronze standard config Bottom// Replace the exisiting LTE antenna with a Octo port 6' Antenna and Install at POS2 // Install 1900 radio RRUS-12+A2 at BOTTOM // Add 2 Coax and 4 Diplexers, 2 Twin TMA and 4 surge arrestors per sector // DUL TO DUS upgrade.													
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3		60437.B.1900.4G.111	CTL02185_9B_1	CTL02185_9B_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_02DT	16.85	150	2	BOTTOM	RFS 1-1/4"	120				NO				

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL			OPA-65R-LCUU-H6											
ANTENNA VENDOR			CCI Antennas											
ANTENNA SIZE (H x W x D)			72X14.8X9											
ANTENNA WEIGHT			57											
AZIMUTH			270											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)			97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT			0											
FEEDER AMOUNT			2											
Antenna RET Motor (QTY/MODEL)														
SURGE ARRESTOR (QTY/MODEL)			4	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)			4	Kaelus DBC2055F1V1-2										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)			2	CCI / DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)				BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	LTE 1900 will be 2C at the site with Bronze standard config Bottom// Replace the exisiting LTE antenna with a Octo port 6' Antenna and Install at POS2 // Install 1900 radio RRUS-12+A2 at BOTTOM // Add 2 Coax and 4 Diplexers, 2 Twin TMA and 4 surge arrestors per sector // DUL TO DUS upgrade.													
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3		60437.C.1900.4G.111	CTL02185_9C_1	CTL02185_9C_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_02DT	16.85	270	2	BOTTOM	RFS 1-1/4"	120				NO				

Section 17A - FINAL SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6											
ANTENNA VENDOR	Powerwave		CCI Antennas											
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X9											
ANTENNA WEIGHT	35		57											
AZIMUTH	120		30											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	97		97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		4											
Antenna RET Motor (QTY/MODEL)	2	POWERWAVE DB												
SURGE ARRESTOR (QTY/MODEL)			6	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)	2	LGP 21901	4	Kaelus DBC2055F1V1-2										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	POWERWAVE 7070		LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP 21401	2	CCI / DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	POLYPHASER 1000860		BUILT-IN										
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104												
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	LTE 1900 will be 2C at the site with Bronze standard config Bottom// Replace the exisiting LTE antenna with a Octo port 6' Antenna and Install at POS2 // Install 1900 radio RRUS-12+A2 at BOTTOM // Add 2 Coax and 4 Diplexers, 2 Twin TMA and 4 surge arrestors per sector // DUL TO DUS upgrade.													
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	60437.A.850.3G.1		CTV21851	CTV21851		UMTS 850	7770.00.850.04	13		4	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	1	
	PORT 2	60437.A.850.3G.2		CTV6185A	CTV6185A		UMTS 850	7770.00.850.04	13		4	BOTTOM	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	2	
	PORT 3	60437.A.1900.3G.2		CTU21857	CTU21857		UMTS 1900	7770.00.1900.00	15		0	None	RFS 1-1/4"	120		0		NO		395.37	1	
	PORT 5	60437.A.850.25G.1		321G21851	321G21851		GSM 850	7770.00.850.04	13		4	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	1	
ANTENNA POSITION 2	PORT 1	60437.A.700.4G.1	60437.A.700.4G.1	CTL02185_7A_1	CTL02185_7A_1		LTE 700	OPA-65R-LCUU-H6_716MHz_08DT	13	30	8	BOTTOM	RFS 1-1/4"	120				NO		756.83	3	
	PORT 3	60437.A.1900.4G.111	60437.A.1900.4G.111	CTL02185_9A_1	CTL02185_9A_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_02DT	16.85	30	2	BOTTOM	RFS 1-1/4"	120				NO		2152.78	3	

Section 17B - FINAL SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6											
ANTENNA VENDOR	Powerwave		CCI Antennas											
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X9											
ANTENNA WEIGHT	35		57											
AZIMUTH	240		150											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	97		97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		4											
Antenna RET Motor (QTY/MODEL)	2	POWERWAVE DB												
SURGE ARRESTOR (QTY/MODEL)			6	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)	2	LGP 21901	4	Kaelus DBC2055F1V1-2										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP 21401	2	CCI / DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	POLYPHASER 1000860		BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	LTE 1900 will be 2C at the site with Bronze standard config Bottom// Replace the exisiting LTE antenna with a Octo port 6' Antenna and Install at POS2 // Install 1900 radio RRUS-12+A2 at BOTTOM // Add 2 Coax and 4 Diplexers, 2 Twin TMA and 4 surge arrestors per sector // DUL TO DUS upgrade.													
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	60437.B.850.3G.1		CTV21852	CTV21852		UMTS 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	9	
	PORT 2	60437.B.850.3G.2		CTV21852	CTV2185B		UMTS 850	7770.00.850.03	13		3	BOTTOM	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	10	
	PORT 3	60437.B.1900.3G.2		CTU21858	CTU21858		UMTS 1900	7770.00.1900.00	15		0	None	RFS 1-1/4"	120		0		NO		395.37	9	
	PORT 5	60437.B.850.25G.1		321G21852	321G21852		GSM 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	9	
ANTENNA POSITION 2	PORT 1	60437.B.700.4G.1	60437.B.700.4G.1	CTL02185_7B_1	CTL02185_7B_1		LTE 700	OPA-65R-LCUU-H6_700MHz_02DT	13	150	2	BOTTOM	RFS 1-1/4"	120				NO		756.83	11	
	PORT 3	60437.B.1900.4G.111	60437.B.1900.4G.111	CTL02185_9B_1	CTL02185_9B_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_02DT	16.85	150	2	BOTTOM	RFS 1-1/4"	120				NO		2233.57	11	

Section 17C - FINAL SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6											
ANTENNA VENDOR	Powerwave		CCI Antennas											
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X9											
ANTENNA WEIGHT	35		57											
AZIMUTH	0		270											
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	97		97											
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0											
FEEDER AMOUNT	2		4											
Antenna RET Motor (QTY/MODEL)	2	POWERWAVE DB												
SURGE ARRESTOR (QTY/MODEL)			6	ANDREW / APTDC-BDFDM-DBW BROADBAND										
DIPLEXER (QTY/MODEL)	2	LGP 21901	4	Kaelus DBC2055F1V1-2										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH										
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	LGP 21401	2	CCI / DTMABP7819VG12A										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	POLYPHASER 1000860		BUILT-IN										
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	RRUS-11										
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	LTE 1900 will be 2C at the site with Bronze standard config Bottom// Replace the exisiting LTE antenna with a Octo port 6' Antenna and Install at POS2 // Install 1900 radio RRUS-12+A2 at BOTTOM // Add 2 Coax and 4 Diplexers, 2 Twin TMA and 4 surge arrestors per sector // DUL TO DUS upgrade.													
Local Market Note2														
Local Market Note3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	60437.C.850.3G.1		CTU21853	CTU21853		UMTS 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	17	
	PORT 2	60437.C.850.3G.2		CTU6185C	CTU6185C		UMTS 850	7770.00.850.03	13		3	BOTTOM	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	18	
	PORT 3	60437.C.1900.25G.1,60437.C.1900.3G.2		CTU21859	CTU21859		UMTS 1900	7770.00.1900.00	15		0	None	RFS 1-1/4"	120		0		NO		395.37	17	
	PORT 5	60437.C.850.25G.1		321G21853	321G21853		GSM 850	7770.00.850.03	13		3	None	RFS 1-1/4"	120	RxAit 850	1	850 LLC	NO		262.42	17	
ANTENNA POSITION 2	PORT 1	60437.C.700.4G.1	60437.C.700.4G.1	CTL02185_7C_1	CTL02185_7C_1		LTE 700	OPA-65R-LCUU-H6_700MHz_02DT	13	270	2	BOTTOM	RFS 1-1/4"	120				NO		756.83	19	
	PORT 3	60437.C.1900.4G.111	60437.C.1900.4G.111	CTL02185_9C_1	CTL02185_9C_1		LTE 1900	OPA-65R-LCUU-H6_1930MHz_02DT	16.85	270	2	BOTTOM	RFS 1-1/4"	120				NO		2233.57	19	

Diagram - Sector	A	Diagram File Name - CT12185_LTE2C_BOTTOM_ABC_BrStd_Rev2.vsd					
Atoll Site Name -	CT2185	Location Name -	BROOKFIELD STATION RD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

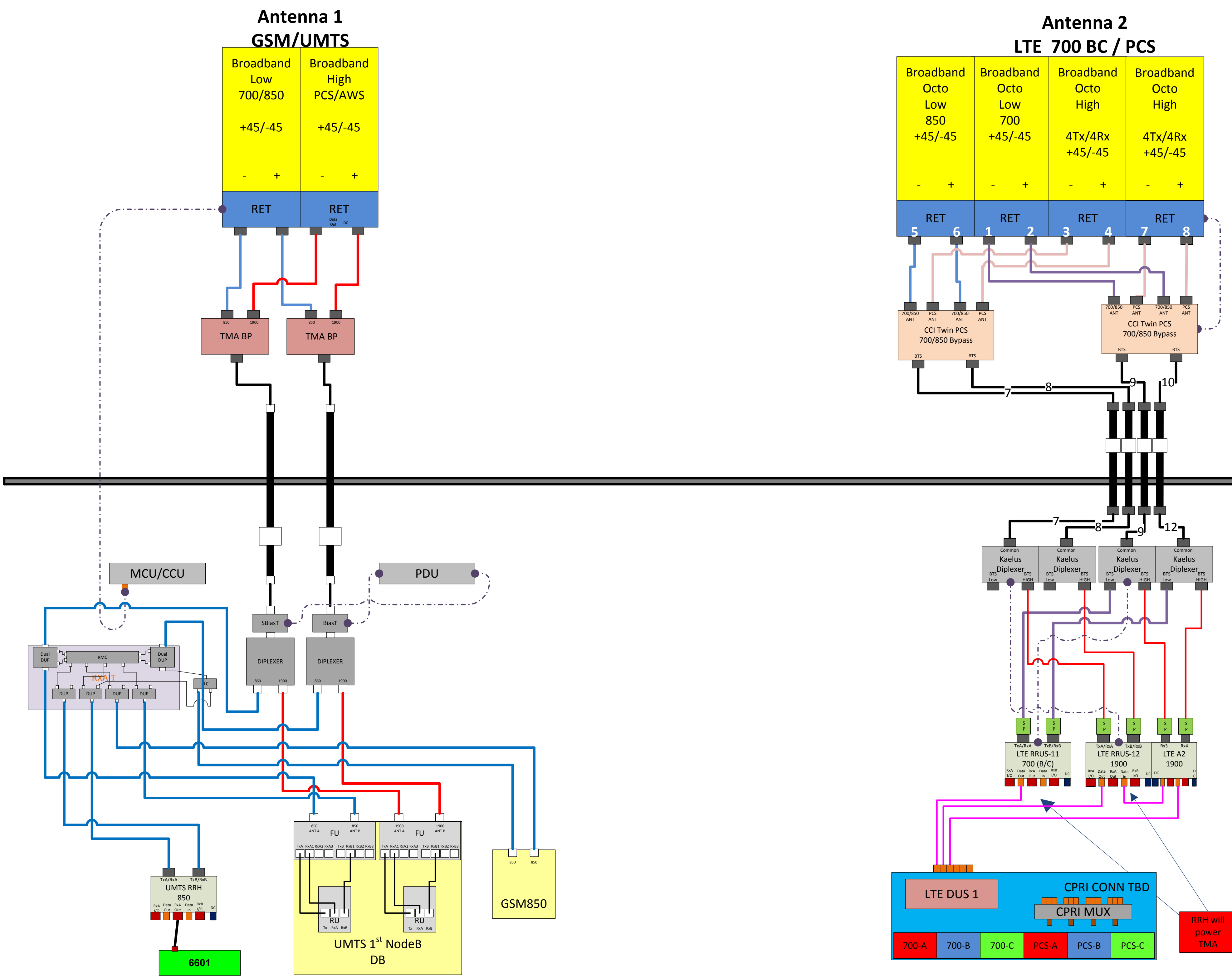


Diagram - Sector	B	Diagram File Name - CT12185_LTE2C_BOTTOM_ABC_BrStd_Rev2.vsd					
Atoll Site Name -	CT2185	Location Name -	BROOKFIELD STATION RD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

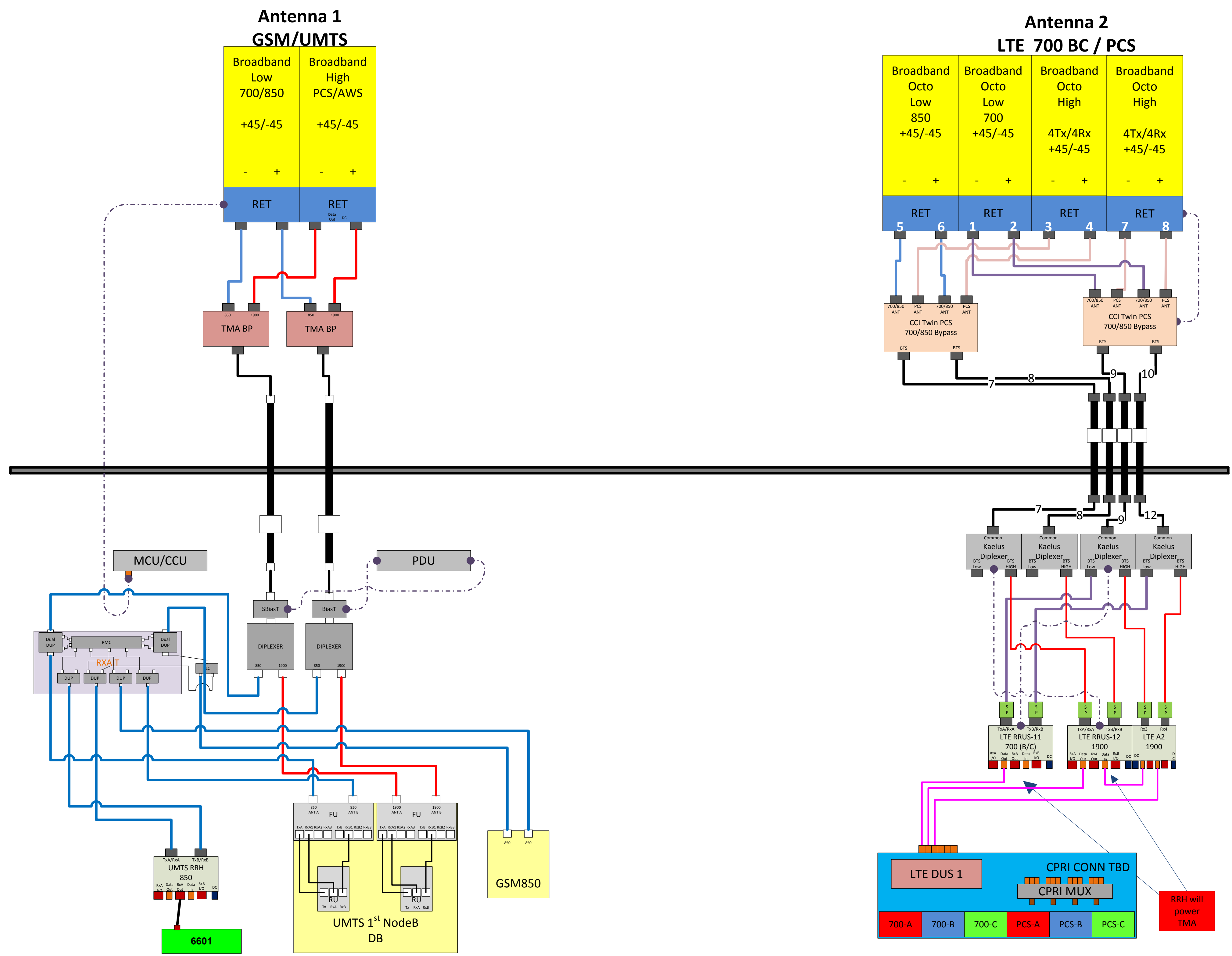
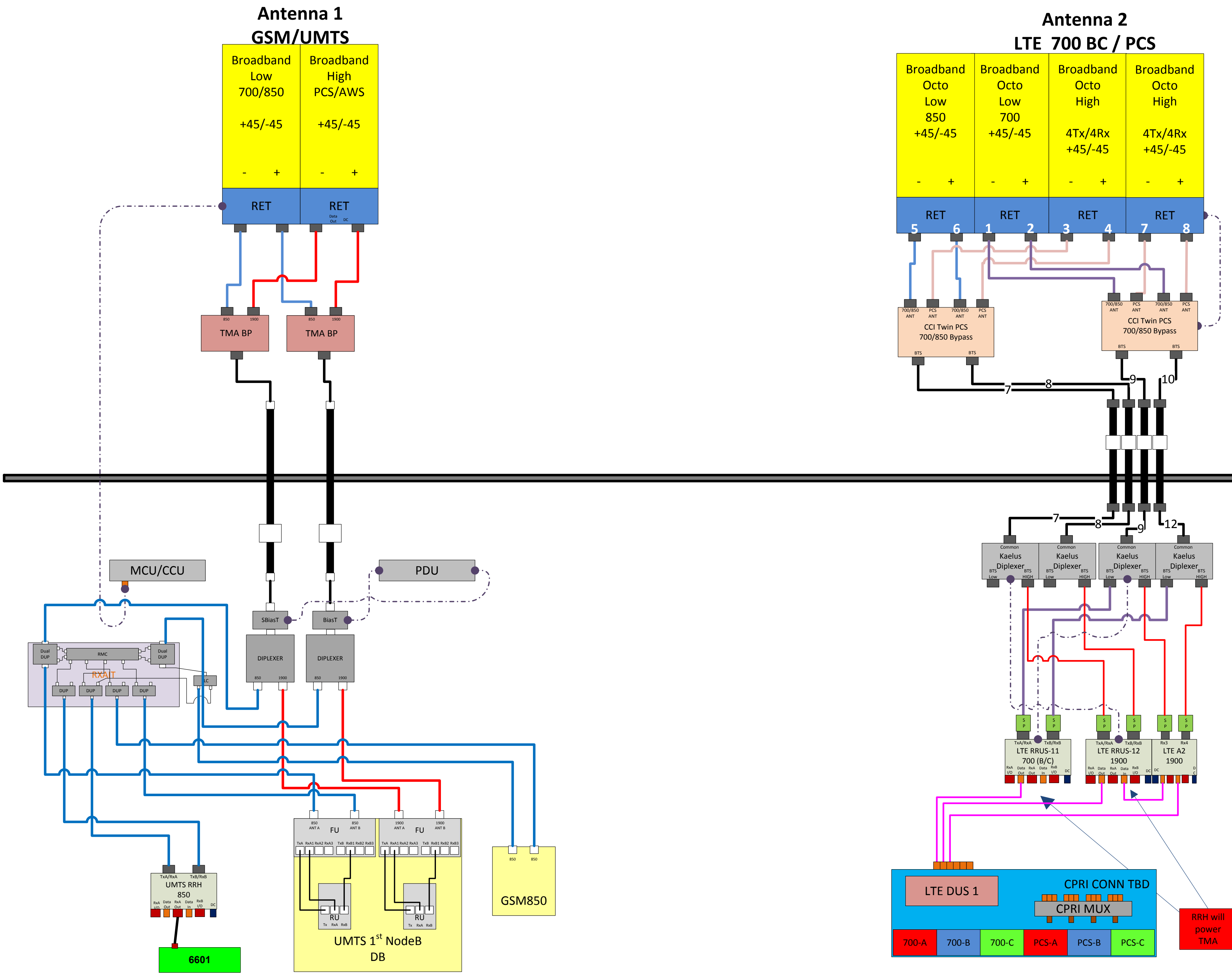


Diagram - Sector	C	Diagram File Name - CT12185_LTE2C_BOTTOM_ABC_BrStd_Rev2.vsd					
Atoll Site Name -	CT2185	Location Name -	BROOKFIELD STATION RD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

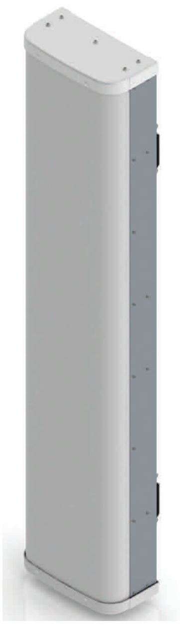


WORKFLOW SUMMARY						
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments
09/21/2015	Preliminary / In Progress	su0170	Preliminary / Submitted for Approval	NA515M	Promote	
09/30/2015	Preliminary / Submitted for Approval	NA515M	Preliminary / Approved	BG144B	Promote	
11/17/2015	Preliminary / Approved	BG144B	Final / RF Approval	om636a	Promote	
11/20/2015	Final / RF Approval	om636a	Final / RF Approval	MM093Q	Re-Assign	
11/20/2015	Final / RF Approval	MM093Q	Final / Approved	BG144B	Promote	LTE Final RFDS

OPA Antenna Series

65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H6



Octoport Multi-Band Antenna Array

The CCI Octoport Multi-Band Antenna Array is an industry first 8-port antenna with full WCS Band Coverage. With four high band ports covering PCS, AWS and WCS bands, two 700 MHZ ports, and two 850 MHz ports our octoport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2155 MHz and WCS 2300 MHz coverage in a single enclosure.

Benefits

- **RET System allows Independent Tilt of each band specific paired port**
- **Reduces tower loading**
- **Frees up space for tower mounted Remote Radio Heads**
- **Single radome with eight ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with four Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and Dual 2x2 MIMO on 700 & 850 Low Bands
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

ISO 9001:2008
Quality Management Systems
Système de Qualité
www.ca.sgs.com

65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H6

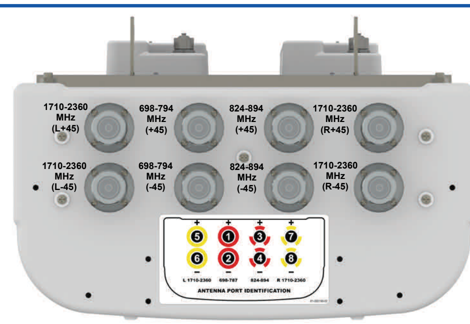
OPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports (L) which cover the range from 698-787	2 X Low Band Ports (C) which cover the range from 824-894	4 X High Band Ports (H1 & H2) which cover the full range from 1710-2360 MHz			
			1850-1990 MHz	1710-1755/2110-2170 MHz		2305-2360 MHz
Gain	13.8 dBi	14.6 dBi	17.0 dBi	16.3 dBi	17.4 dBi	17.6 dBi
Azimuth Beamwidth (-3dB)	66°	61°	60°	68°	64°	60°
Elevation Beamwidth (-3dB)	12.2°	10.3°	5.7°	6.3°	5.1°	4.5°
Electrical Downtilt	0° to 10°	0° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -18 dB	< -19 dB	< -19 dB	< -18 dB	< -18 dB
Front-to-Back Ratio @180°	> 30 dB	> 27 dB	> 32 dB	> 32 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 27 dB	> 25 dB	> 27 dB	> 27 dB	> 28 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 22 dB	> 22 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 17 dB	> 17 dB	> 17 dB	> 17 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

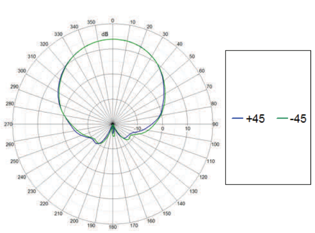
Dimensions (LxWxD)	72.0 x 14.8 x 7.4 inches (1828 x 376 x 189 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	247 lbs (1099 N) @ 100 mph
Side Wind Load	142 lbs (631 N) @ 100 mph
Equivalent Flat Plate Area	9.7 ft^2 (0.9 m^2)
Weight (w/o RET/Mounting)	73 lbs (33 kg)
RET System Weight	7.0 lbs (3.0 kg)
Connector	8; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



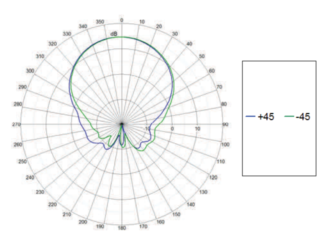
Bottom View

Rear View

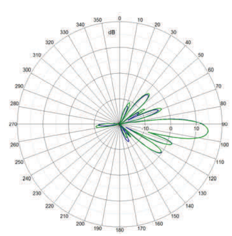
Antenna Patterns*



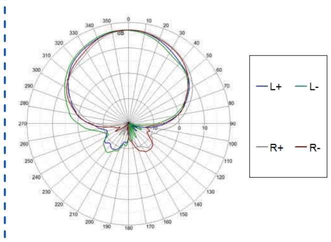
737 MHz Azimuth



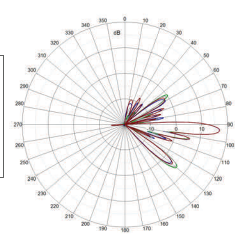
887 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

USA HQ: 89 Leuning Street, South Hackensack, NJ 07606 Telephone: 201-342-3338,
Canada: 411 Legget Drive, Suite 104, Ottawa, ON, Canada K2K 3C9 Telephone: 613-591-6696

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

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

General Information

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

Model DTMABP7819VG12A

Contents:

Features:

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

Technical Description

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

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

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

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

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

EBI Consulting
environmental | engineering | due diligence

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

AT&T Existing Facility

Site ID: CT2185

Brookfield Station Rd
761 Federal Road
Brookfield, CT 06804

June 12, 2016

EBI Project Number: 6216002780

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general public allowable limit:	**5.74 %**

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

June 12, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT2185 – Brookfield Station Rd**

EBI Consulting was directed to analyze the proposed AT&T facility located at **761 Federal Road, Brookfield, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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.

<u>General population/uncontrolled exposure</u> 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 limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) 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 AT&T Wireless antenna facility located at **761 Federal Road, Brookfield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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 UMTS channels (850 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 (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 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.

7) For the following calculations the sample point was the top of a 6-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.

8) The antennas used in this modeling are the **Kathrein 7770 and the CCI OPA-65R-LCUU-H6** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. 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.

9) The antenna mounting height centerlines of the proposed antennas are **97 feet** above ground level (AGL) for **Sector A**, **97 feet** above ground level (AGL) for **Sector B** and **97 feet** above ground level (AGL) for Sector C.

10) 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.

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AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Kathrein 7770	Make / Model:	Kathrein 7770	Make / Model:	Kathrein 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**97 feet**	Height (AGL):	**97 feet**	Height (AGL):	**97 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts
ERP (W):	2,969.12	ERP (W):	2,969.12	ERP (W):	2,969.12
Antenna A1 MPE%	**1.84 %**	Antenna B1 MPE%	**1.84 %**	Antenna C1 MPE%	**1.84 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	11.65 / 14.85 dBd	Gain:	11.65 / 14.85 dBd	Gain:	11.65 / 14.85 dBd
Height (AGL):	**97 feet**	Height (AGL):	**97 feet**	Height (AGL):	**97 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	5,420.52	ERP (W):	5,420.52	ERP (W):	5,420.52
Antenna A2 MPE%	**3.22 %**	Antenna B2 MPE%	**3.22 %**	Antenna C2 MPE%	**3.22 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**5.06 %**
Sprint	0.68 %
Site Total MPE %:	**5.74 %**

AT&T Sector A Total:	5.06 %
AT&T Sector B Total:	5.06 %
AT&T Sector C Total:	5.06 %
Site Total:	5.74 %

AT&T _ Max Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm^2)	Frequency (MHz)	Allowable MPE (μW/cm^2)	Calculated % MPE
AT&T 850 MHz UMTS	2	828.23	97	3.60	850 MHz	567	0.63%
AT&T 1900 MHz (PCS) UMTS	2	1,312.66	97	5.70	1900 MHz (PCS)	1000	0.57%
AT&T 850 MHz GSM	2	828.23	97	3.60	850 MHz	567	0.63%
AT&T 700 MHz LTE	2	1,754.61	97	7.62	700 MHz	467	1.63%
AT&T 1900 MHz (PCS) LTE	2	3,665.91	97	15.91	1900 MHz (PCS)	1000	1.59%
						Total:	5.06 %

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 AT&T 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:

AT&T Sector	Power Density Value (%)
Sector A:	5.06 %
Sector B:	5.06 %
Sector C:	5.06 %
AT&T Maximum Total (per sector):	5.06 %
Site Total:	5.74 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.74 %** 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.