Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

February 3, 2017

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU:876314**
AT&T Site ID: CT5183
214 Russian Village Road, Southbury, CT 06488
Latitude: 41° 27' 7.97"/ Longitude: -73° 15' 1.25"

Dear Ms. Bachman:

AT&T currently maintains six (6) antennas at the 130-foot level of the existing 132-foot monopole tower at 214 Russian Village Road in Southbury, CT. The tower is owned by Crown Castle. The property is owned by the Thomas and Mieke Crider. AT&T now intends to replace three (3) RRHUs with three (3) new RRHs.

This facility was approved by the by the Town of Southbury Zoning Board of Appeals on March 4, 1997. This approval was given without conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 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.S.C.A. § 16-50j-73, a copy of this letter is being sent to Mr. Jeff Manville, First-Selectman, Town of Southbury, as well as the property owner, and Crown Castle is the tower owner.

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

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

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mr. Jeff Manville, First-Selectman
Town of Southbury
501 Main Street
Southbury, CT 06488

Planning Department
Town of Southburty
501 Main Street
Southbury, CT 06488

Thomas and Mieke Crider
100 Russian Village Road
Southbury, CT 06488

TOWN OF SOUTHBURY

ZONING BOARD OF APPEALS

501 Main Street South
Southbury, Connecticut 06488
(203) 264-0606 - ext. 257
FAX: (203) 264-9762

February 14, 1997

Thomas and Meike Crider
100 Russian Village Road
Southbury, CT 06488

Dear Crider Family:

On **TUESDAY, March 4, 1997,** at 7:30 p.m. in Room 205A of the Southbury Town Hall, the Southbury Zoning Board of Appeals will conduct the continuation of your public hearing to consider your appeal. **It is important that you, or someone representing you, be present to state your case.**

An On-Site Inspection of the property under appeal will be conducted by the Board members during the week before the public hearing. There may be more than one group of members inspecting the property. If at all possible, please stake out where the proposed construction will be located on the property.

The Public Notice will appear in Voices on Wednesday, February 19, and Wednesday, February 26, 1997.

The Zoning Board of Appeals has 65 days after the close of the hearing in which to make a decision. You will be notified within 15 days after such decision has been rendered.

Sincerely,

Barbara Browne
Clerk

cc: Christopher Cody
Sprint PCS

HURWITZ & SAGARIN PC

LEWIS A. HURWITZ
JACOB DANIEL SAGARIN
CHRISTINE M. GONILLO
ELIAS A. ALEXIADES
DAVID A. SLOSSBERG
ANDREW C. KRUGER
JULIE M. CASHIN
JOHN W. KNUFF

MEMORANDUM

TO: Julie Reach, Sprint PCS

FROM: Lisa Dalfonso

DATE: February 6, 1997

RE: Site 017 - Southbury

* *

Attached please find a copy of the referral from the Southbury Planning Commission to the Zoning Board of Appeals on site 017. According to the letter, the Planning Commission voted to recommend approval of the Special Exception application for the PCS facility. As you know, Chris Cody of our office was present at the ZBA hearing on February 4, 1997 and a memo to Larry from Chris will follow, advising of the outcome and additional considerations for the continuation hearing. Overall, the hearing went well most of the unaddressed issues involved structural considerations. Therefore, can we please have a structural engineer available for the next hearing. I will let you know the date as soon as possible.

LAW OFFICES
147 North Broad Street, P.O. Box 112, Milford, Connecticut 06460-0112
Tel. 203-877-8000 • Fax 203-878-9800

TOWN OF SOUTHBURY
PLANNING COMMISSION
501 Main Street South
Southbury, Connecticut 06488-2295
(203) 262-0634
FAX: (203) 264-3719

January 30, 1997

TO: Zoning Board of Appeals
FROM: Planning Commission

RE: Referral - Proposed Sprint Tower on Land of Crider

The Planning Commission was presented with the proposal to erect a PCS Sprint Tower off Russian Village Road by the applicants and the land owner at their meeting on January 21, 1997. The Special Exception Application was reviewed for consistency with the Comprehensive Plan of Development and compliance with Section 7 of the Zoning Regulations. The Commission recognizes that an application also exists for the height of the tower at 128 feet but is not responding to that variance application.

During the discussion the applicant satisfied questions with regard to strength of the tower in high winds, adequate fall area, setbacks to nearest existing and potential home sites (600 feet), lighting on the tower (none is proposed), other areas of town investigated for the placement of the tower, the maximum number of additional units that could be placed on the tower (3), the maintenance of the structure and need for inspections and the utility lines needed to address this site.

The Commission recognizes the changes in the state and federal laws regarding telecommunications and the necessity of the towers. They felt that this site, in particular, is technically a good site due to the density of population and that the horizon line as outlined in the Plan was not affected. Further, the possibility of the need for additional antennae, by others, could be addressed by acknowledging that three units are possible on this type of tower.

Therefore, the Commission voted to recommend approval of the Special Exception Application of Sprint PCS for the installation of a utility tower on Russian Village Road.

H. William Davis

H. William Davis, Chairman

214 RUSSIAN VILLAGE ROAD

Location	214 RUSSIAN VILLAGE ROAD	**Mblu**	19/ 92/ 45/ /
Acct#	00070700	**Owner**	CRIDER MIEKE & THOMAS S
Assessment	$133,170	**Appraisal**	$567,373
PID	859	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$567,373	$567,373
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$133,170	$133,170

Owner of Record

Owner	CRIDER MIEKE & THOMAS S	**Sale Price**	$0
Co-Owner	AKA MAAS MIEKE	**Certificate**	
Address	100 RUSSIAN VILLAGE ROAD SOUTHBURY, CT 06488	**Book & Page**	311/1220
		Sale Date	09/11/1996
		Instrument	25

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CRIDER MIEKE & THOMAS S	$0		311/1220	25	09/11/1996
AKA MAAS MIEKE			0/ 0	25	

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land

Building Photo

Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Percent	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Num Kitchens	
Pln FPL:	
Det FPL:	
Gas Fireplace(s)	
% Attic Fin	
LF Dormer	
Foundation	
Bsmt Gar(s)	
Bsmt %	
SF FBM	
Fin Bsmt Qual	
Bsmt Access	

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

Building Layout

Building Layout

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

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use	Land Line Valuation

Use Code	100W	**Size (Acres)**	87.68
Description	Res Vacant	**Frontage**	0
Zone	R-60	**Depth**	0
Neighborhood	14W	**Assessed Value**	$133,170
Alt Land Appr	No	**Appraised Value**	$567,373
Category			

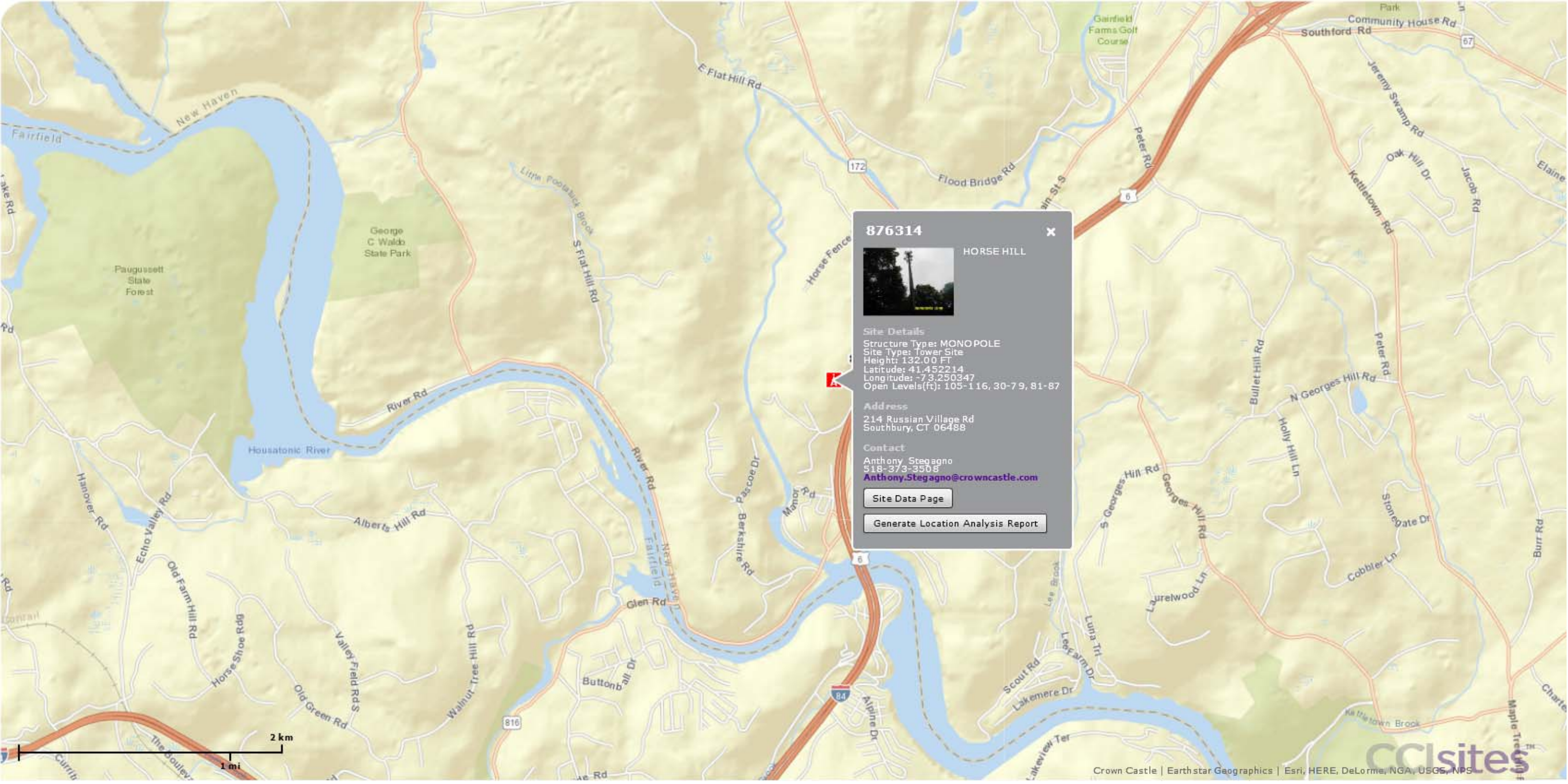
Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$80,000	$90,510	$170,510

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2011	$56,000	$63,360	$119,360


876314
HORSE HILL
Site Details
Structure Type: MONOPOLE
Site Type: Tower Site
Height: 132.00 FT
Latitude: 41.452214
Longitude: -73.250347
Open Levels(ft): 105-116, 30-79, 81-87
Address
214 Russian Village Rd
Southbury, CT 06488
Contact
Anthony Stegagno
518-373-3508
Anthony.Stegagno@crowncastle.com
Site Data Page
Generate Location Analysis Report
Paugussett State Forest
George C Waldo State Park
Housatonic River
River Rd
Flood Bridge Rd
E Flat Hill Rd
S Flat Hill Rd
Albert Hill Rd
Glen Rd
Kettletown Rd
Peter Rd
N Georges Hill Rd
S Georges Hill Rd
Southford Rd
Community House Rd
Lakemere Dr
2 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites

WIRELESS COMMUNICATIONS FACILITY
CT5183 - LTE BWE
HORSE HILL
CROWN CASTLE SITE NO.: 876314
214 RUSSIAN VILLAGE ROAD
SOUTHBURY, CT 06488

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO "EXTRA" WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

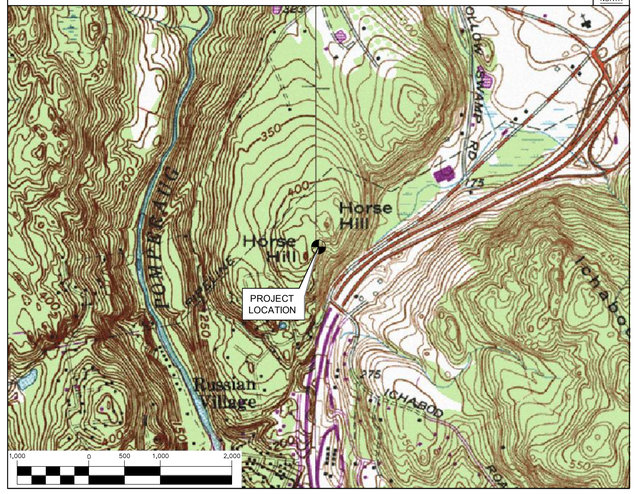
SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT
TO: 214 RUSSIAN VILLAGE ROAD, SOUTHBURY, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.3 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.2 MI
3.	USE THE LEFT 2 LANES TO TURN LEFT ONTO CT-411	0.3 MI
4.	TURN LEFT TO MERGE ONTO I-91 S	0.3 MI
5.	MERGE ONTO I-91 S	8.8 MI
6.	TAKE EXIT 18 FOR I-691 W TOWARD MERIDEN/WATERBURY	0.2 MI
7.	CONTINUE ONTO I-691 W	7.7 MI
8.	USE THE LEFT 2 LANES TO TAKE EXIT 1 FOR I-84 W TOWARD WATERBURY/DANBURY	1.0 MI
9.	MERGE ONTO I-84	19.5 MI
10.	TAKE EXIT 14 FOR CT-172 TOWARD S BRITAIN	0.3 MI
11.	TURN RIGHT ONTO CT-172 N/S BRITAIN RD	180 FT
12.	TURN LEFT ONTO MAIN ST S	0.9 MI
13.	TURN RIGHT ONTO RUSSIAN VILLAGE RD	0.2 MI

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

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

A. INSTALL (3) NEW RRUS-12 TO REPLACE (3) RRUS-11 ON EXISTING TOWER MOUNT.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5183
AT&T SITE NAME:	HORSE HILL
SITE ADDRESS:	CROWN CASTLE, INC. SITE NO.: 876314 214 RUSSIAN VILLAGE ROAD SOUTHBURY, CT 06488
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-26'-56.010" N LONGITUDE: 73°-15'-06.116" W GROUND ELEVATION: ±443' AMSL GROUND ELEVATION REFERENCED FROM GOOGLE EARTH. COORDINATES REFERENCED FROM RFDS DOCUMENTS.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES AND SPECIFICATIONS	0
C-1	PLANS AND ELEVATION	0
C-2	LTE BWE EQUIPMENT DETAILS	0
E-1	ELECTRICAL DETAILS AND NOTES	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/22/16	HMR	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
HORSE HILL
CT5183 - LTE BWE
214 RUSSIAN VILLAGE ROAD
SOUTHBURY, CT 06488

DATE: 11/10/16
SCALE: AS NOTED
JOB NO. 16071.77

TITLE SHEET

T-1

Sheet No. 1 of 5

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 95–115 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

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

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

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

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:
   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
2. COAXIAL CABLES:
   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI–SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH–PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON–PETROLEUM–BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

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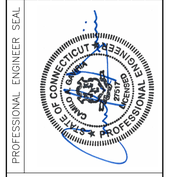

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NOTES AND SPECIFICATIONS

N–1

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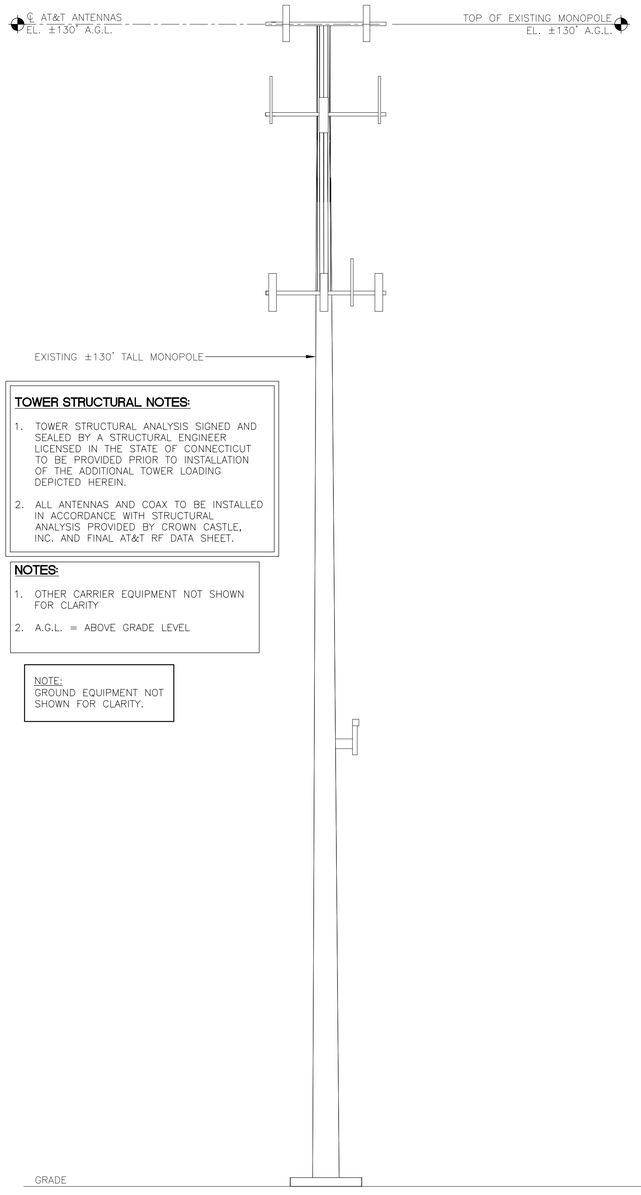


TOWER STRUCTURAL NOTES:

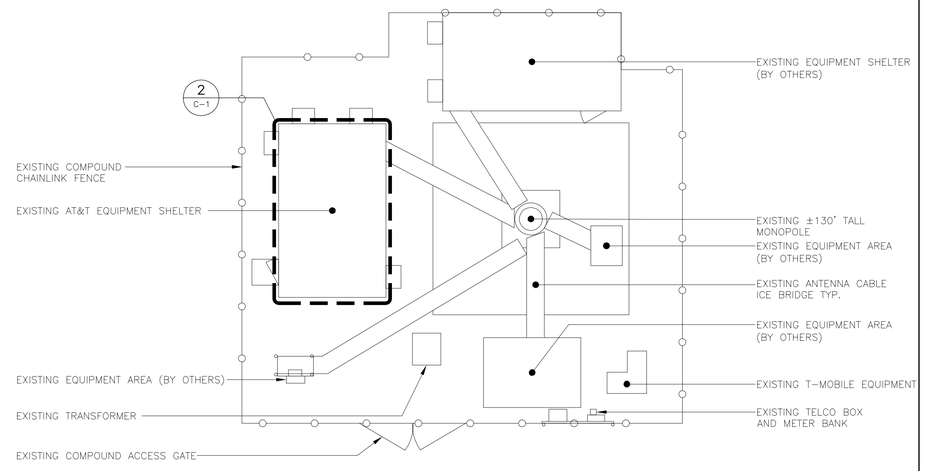
1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL AT&T RF DATA SHEET.

NOTES:

1. OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
2. A.G.L. = ABOVE GRADE LEVEL

NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

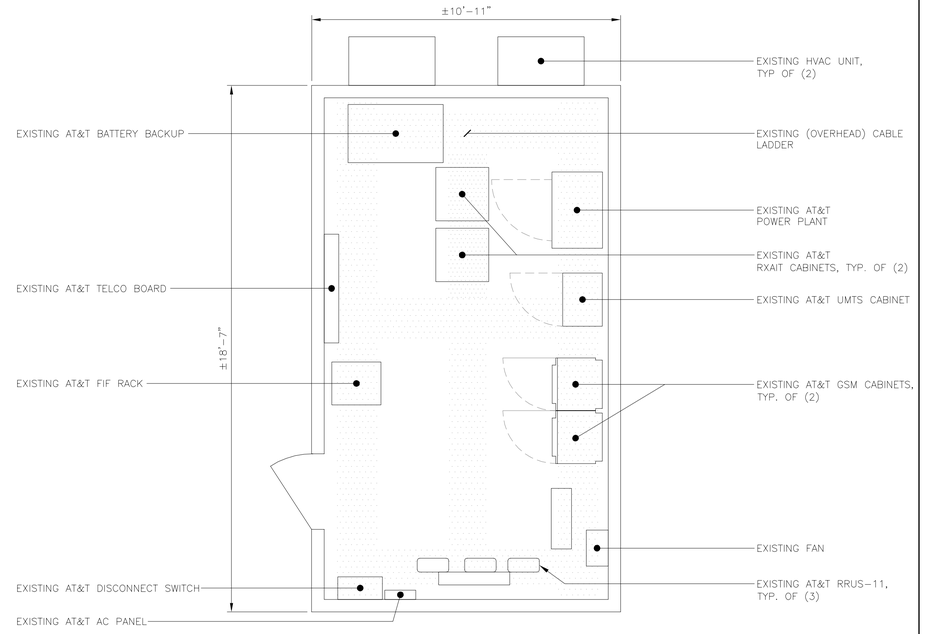
3 / C-1 **TOWER ELEVATION**
SCALE: 1/8" = 1'-0"



1 / C-1 **COMPOUND PLAN**
SCALE: 1/8" = 1'-0"

NORTH

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.



2 / C-1 **EQUIPMENT ROOM PLAN**
SCALE: 1/8" = 1'-0"

NORTH

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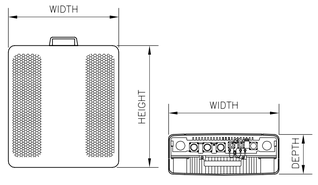
PLANS AND ELEVATION

C-1

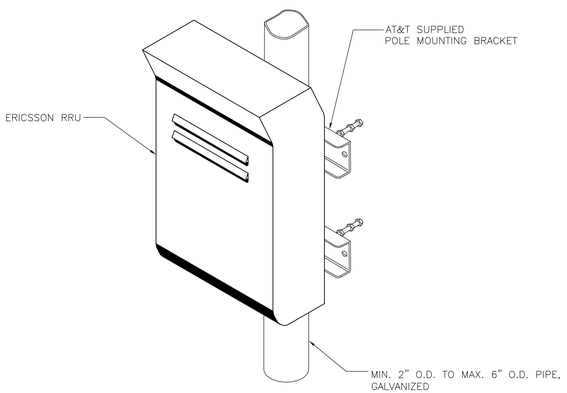
Sheet No. 3 of 5



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 12	20.4"L x 18.5"W x 7.5"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

5 C-2 ERICSSON RRUS 12 DETAIL
SCALE: 1" = 1'-0"

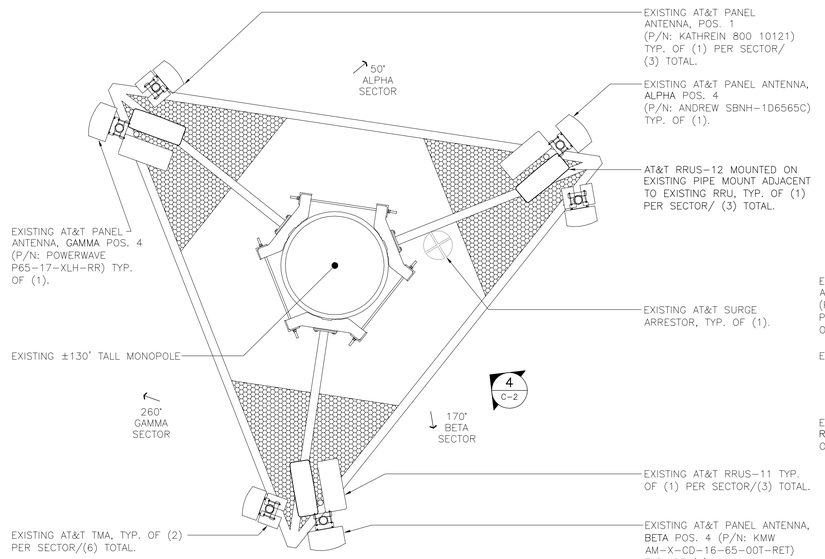


ISOMETRIC VIEW

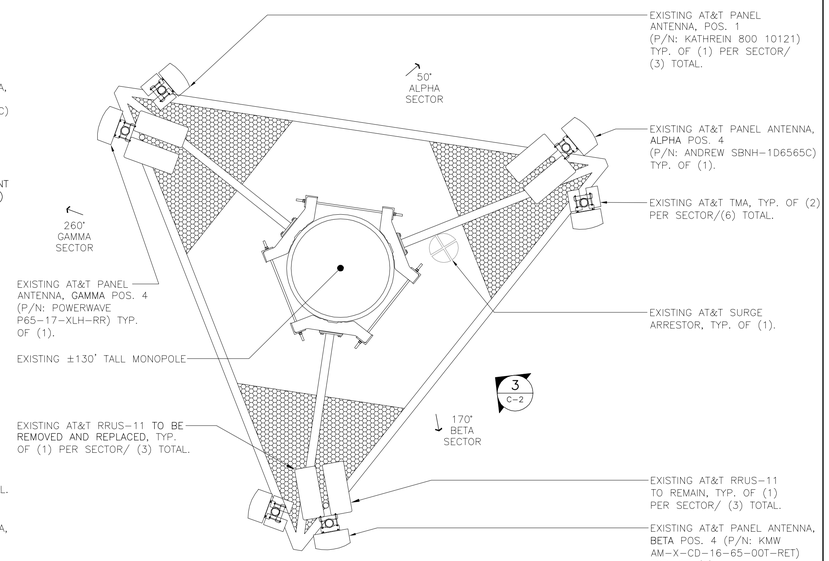
NOTES:

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

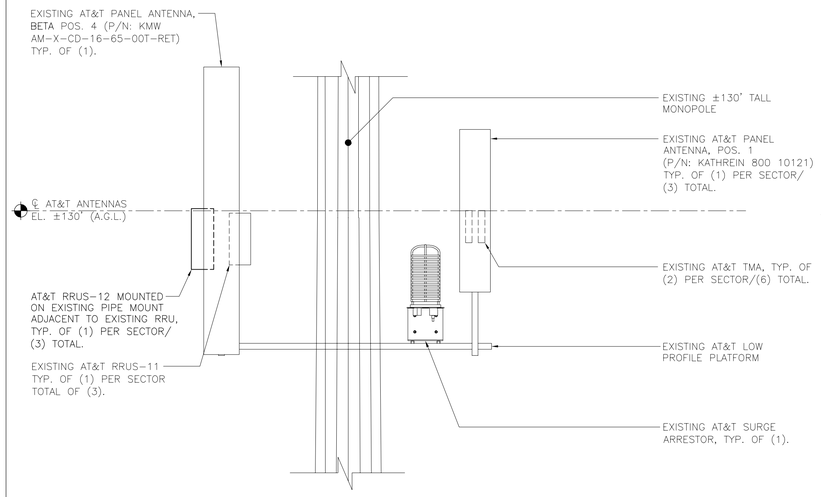
6 C-2 TYPICAL RRUS MOUNTING DETAILS
SCALE: 1 1/2" = 1'-0"



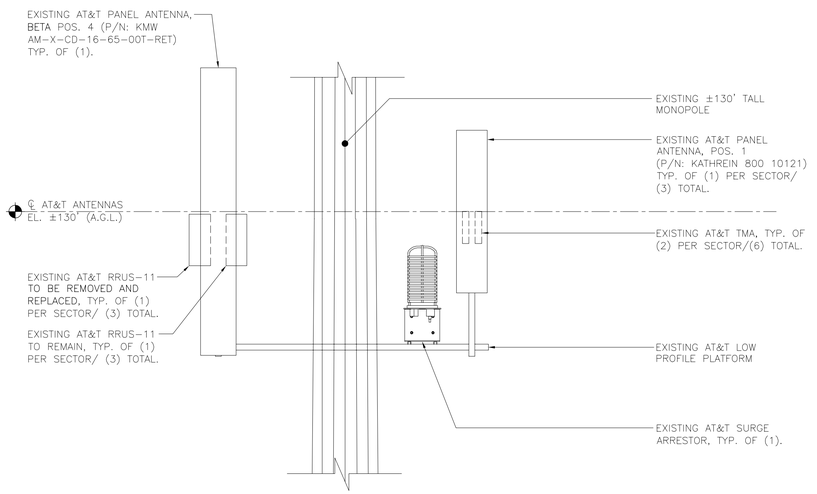
2 C-2 PROPOSED ANTENNA PLAN
SCALE: 1/2" = 1'-0"
NORTH



1 C-2 EXISTING ANTENNA PLAN
SCALE: 1/2" = 1'-0"
NORTH



4 C-2 PROPOSED ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"



3 C-2 EXISTING ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"

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LTE BWE EQUIPMENT DETAILS

C-2

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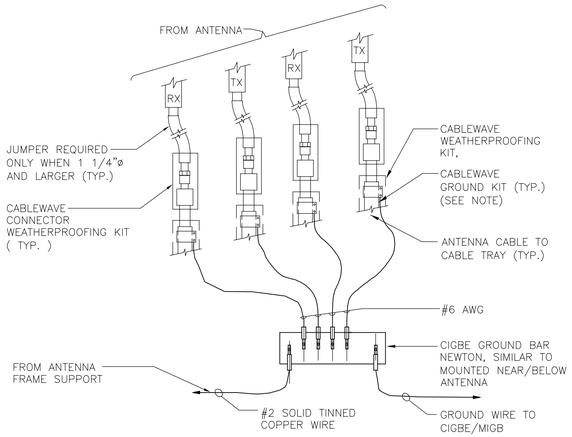
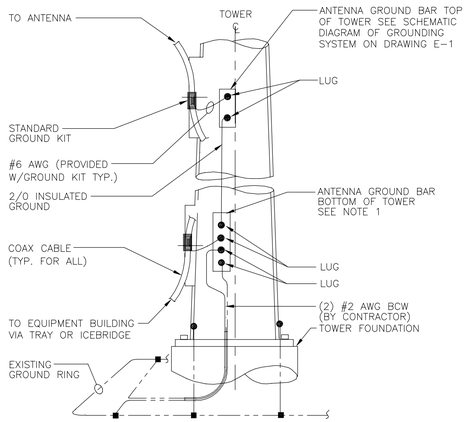


NOTE:

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

5 E-1 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

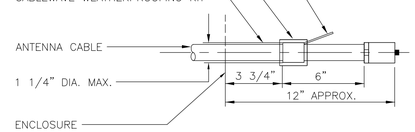


NOTES:

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

2 E-1 ANTENNA CABLE GROUNDING - TOWER

NOT TO SCALE

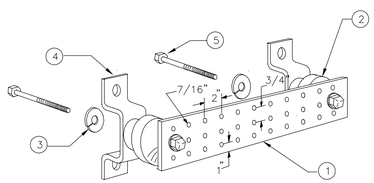


NOTE:

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

4 E-1 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

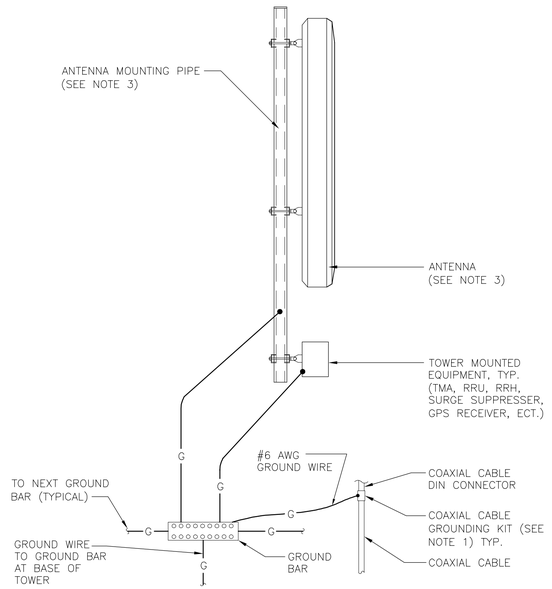


LEGEND

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

3 E-1 GROUND BAR DETAIL

NOT TO SCALE



NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

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

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

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

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

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

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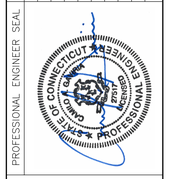

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ELECTRICAL DETAILS AND NOTES

E-1

Sheet No. 5 of 5

Date: **January 25, 2017**

Kevin Morrow
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6619

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5183
	Carrier Site Name:	Horse Hill
Crown Castle Designation:	**Crown Castle BU Number:**	876314
	Crown Castle Site Name:	Horse Hill
	Crown Castle JDE Job Number:	410215
	Crown Castle Work Order Number:	1351542
	Crown Castle Application Number:	369844 Rev. 3
Engineering Firm Designation:	**TEP Project Number:**	25675.106519
Site Data:	**214 Russian Village Rd., Southbury, New Haven County, CT 06488**	
	Latitude *41° 27' 7.97"*, Longitude *-73° 15' 1.25"*	
	130 Foot - Monopole Tower (Includes 10-ft extension)	

Dear Kevin Morrow,

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 992149, in accordance with application 369844, revision 3.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code (2012 International Building Code) based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *Crown Castle*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Jacob S. Pratt, E.I. / ZRH

Respectfully submitted by:

Graham M. Andres, P.E.

STATE OF CONNECTICUT
GRAHAM M. ANDRES
29538
LICENSED
PROFESSIONAL ENGINEER

1/25/17

Electronic Copy

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1) INTRODUCTION

This tower was originally a 120-ft monopole tower designed by Summit Manufacturing, Inc. in January of 1998. The tower was originally designed for a wind speed of 90 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified per reinforcement drawings prepared by GPD Group in August of 2012, including a 10-ft extension bringing the total tower height to 130-ft. TEP visited the site in April of 2013 to perform a post-modification inspection. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 using a nominal 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads with the following design criteria:

Type of Analysis: **Rigorous Structural Analysis**
Classification of Structure: **Class II**
Exposure Category: **Exposure B**
Topographic Category: **Category 1**
Earthquake Category: **Not Considered**
Earthquake effects may be ignored per this standard for site locations where Ss does not exceed 1.0. (New Haven County Max Ss = 0.32).

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	Ericsson	RRUS-11	-	-	-
		3	Ericsson	RRUS 12			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	Ericsson	RRUS-11 Band 12	-	-	1
		3	Powerwave Technologies	TMA DD 1900 with 850 Bypass			
		3	Kathrein	800 10121 w/ Mount Pipe	6 2 1	1-5/8 3/4 3/8	2
		1	Andrew	SBNH-1D6565C w/ Mount Pipe			
		1	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	Powerwave Technologies	P65-17-XLH-RR w/ Mount Pipe			
		6	Powerwave Technologies	LGP21401			
		6	Kathrein	860 10025			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	120.0	3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	2
		9	RFS Celwave	ACU-A20-N			
		3	Alcatel Lucent	800 External Notch Filter			
		1	Tower Mounts	Platform Mount [LP 1201-1]			
118.0	119.0	3	Alcatel Lucent	TME-1900MHz RRH (65MHz)	-	-	2
	118.0	1	Tower Mounts	Side Arm Mount [SO 102-3]			
	117.0	3	Alcatel Lucent	TME-800MHz RRH w/ Mount Pipe			
100.0	100.0	6	EMS Wireless	RR90-17-02DP w/ Mount Pipe	8 6 4	1-5/8 7/8 1-1/4	2
		3	Commscope	LNX-6515DS-VTM w/ Mount Pipe			
		6	RFS Celwave	ATMAP1412D-1A20			
		3	Commscope	ATBT-BOTTOM-24V			
		1	Tower Mounts	Platform Mount [LP 1201-1]			
90.0	90.0	-	-	-	6	1-5/8	3
80.0	80.0	1	GPS	GPS_A	1	1/2	2
		1	Tower Mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing equipment to be removed; not considered in this analysis
2) Existing equipment
3) Abandoned equipment; considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120.0	120.0	12	Swedcom	ALPS 9212-N	-	-
110.0	110.0	12	Swedcom	ALPS 9212-N	-	-
100.0	100.0	12	Swedcom	ALPS 9212-N	-	-
80.0	80.0	1	Generic	GPS	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Clarence Welti Assoc. Inc.	1529735	CCISites
Tower Foundation Drawings	Paul J. Ford and Company	1611741	CCISites
Tower Manufacturer Drawings	Summit Manufacturing, Inc.	1529812	CCISites
Tower Reinforcement Drawings	GPD Group	3797841	CCISites
Post-Modification Inspection	Tower Engineering Professionals	3797830	CCISites

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

For analysis of monopole shaft reinforcements, the plates are modeled as linear appurtenances along the exterior of the pole. The loads calculated from tnxTower are then exported to a proprietary calculation sheet created by Tower Engineering Professionals, Inc. that analyzes each reinforcing element along each critical axis and presents percent capacities for each element and the pole shaft along each critical axis. The actual percent capacity of the tower structure including the reinforcing elements is reported in Table 5 - Section Capacity (Summary).

RISA-3D, a commercially available analysis software package, was used to model and analyze the foundation. Selected output from the analysis is included in Appendix C.

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and "Appendix B – Base Level Drawing".
4) All tower components are in sufficient condition to carry their full design capacity.
5) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
6) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.
7) TEP assumes the steel-grout bond is sufficient to develop the tensile strength of the rock anchors in the foundation.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ϕP_{allow} (lb)	% Capacity	Pass / Fail
L1	130.00-120.00	Pole	TP16.00×16.00×0.3750	1	Note 1	Note 1	12.2	Pass
L2	120.00-91.50	Pole	TP22.98×16.00×0.1875	2	Note 1	Note 1	33.4	Pass
L3	94.50-64.50	Pole	TP29.22×21.87×0.2500	3	Note 1	Note 1	55.9	Pass
L4	68.25-42.50	Pole	TP34.11×27.80×0.3125	4	Note 1	Note 1	39.6	Pass
L5	46.75-20.25	Pole	TP38.94×32.44×0.3438	5	Note 1	Note 1	57.0	Pass
L6	25.25-0.00	Pole	TP43.21×37.03×0.3750	6	Note 1	Note 1	47.8	Pass
M1	15.50-0.50	Mod (Ex)	(Aero) MP304	1	Note 1	Note 1	57.2	Pass
M2	42.67-12.67	Mod (Ex)	(Aero) MP304	2	Note 1	Note 1	56.1	Pass
M3	70.33-40.33	Mod (Ex)	(Aero) MP304	3	Note 1	Note 1	53.0	Pass
M4	88.17-68.17	Mod (Ex)	(Aero) MP303	4	Note 1	Note 1	62.6	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	ϕP_{allow} (lb)	% Capacity	Pass / Fail
M5	73.08-68.17	Mod (Ex)	(Aero) MP303	5	Note 1	Note 1	37.7	Pass
M6	89.50-79.50	Mod (Ex)	(Aero) MP303	6	Note 1	Note 1	48.9	Pass
M7	116.17-86.17	Mod (Ex)	(Aero) MP303	7	Note 1	Note 1	51.0	Pass
M8	97.67-87.67	Mod (Ex)	(Aero) MP303	8	Note 1	Note 1	43.6	Pass
M9	103.92-95.17	Mod (Ex)	(Aero) MP303	9	Note 1	Note 1	33.4	Pass
M10	109.42-103.92	Mod (Ex)	(Aero) MP303	10	Note 1	Note 1	30.3	Pass
M11	116.17-109.42	Mod (Ex)	(Aero) MP303	11	Note 1	Note 1	19.9	Pass
							Summary	
						Pole (L5)	57.0	Pass
						Mod (M4)	62.6	Pass
						RATING =	**62.6**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	120.0	40.6	Pass
1	Anchor Rods	-	40.4	Pass
1	Base Plate	-	50.2	Pass
1	Base Foundation Soil Interaction	-	19.7	Pass
1	Base Foundation Structural	-	25.2	Pass

Structure Rating (max from all components) =	**62.6%**

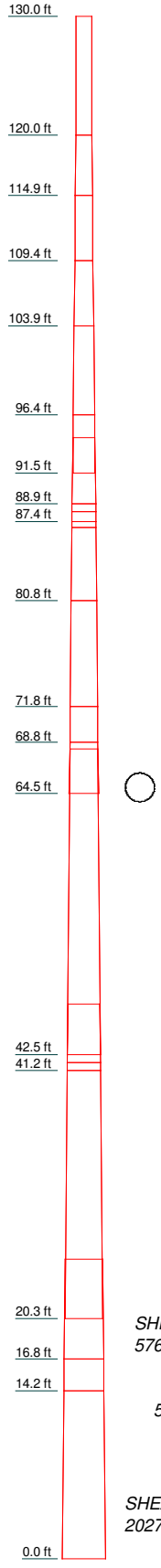
Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Length (ft)	10.00	5.08	5.50	5.50	7.50	4.92	5.58	3.87	0.87	0.87	6.17	8.92	3.00	4.33	25.75	4.92	0.66	20.92	8.42	2.66	14.17
Number of Sides	1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.375	0.188	0.490	0.412	0.434	0.382	0.438	0.313	0.313	0.313	0.420	0.320	0.619	0.462	0.490	0.349	0.349	0.497	0.523	0.668	0.507
Socket Length (ft)						3.00								3.75	4.25			5.00			
Top Dia (in)	16.000	16.000	17.244	18.591	19.938	21.775	23.870	24.237	24.604	24.971	25.239	25.239	27.424	28.159	27.801	33.504	33.871	33.812	37.027	39.089	39.740
Bot Dia (in)	16.000	17.244	18.591	19.938	21.775	22.980	24.237	24.604	24.971	25.239	27.424	27.424	28.159	29.220	34.110	33.871	34.238	38.940	39.089	39.740	43.210
Grade	MPRF-Fy=60ksi, Density=100%						MPRF-Fy=65ksi, Density=100%							MPRF-Fy=65ksi, Density=50%		MPRF-Fy=65ksi, Density=100%			MPRF-Fy=60ksi, Density=100%		
Weight (lb)	626.4	171.5	200.2	215.5	318.3	224.3	340.8	352.9	364.9	376.9	409.5	637.2	226.3	337.4	2700.8	337.0	337.0	2839.1	303.6	426.7	2392.6

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
800 10121 w/ Mount Pipe	130	(2) 2.4" Dia x 6-ft Pipe	120
800 10121 w/ Mount Pipe	130	(2) 2.4" Dia x 6-ft Pipe	120
800 10121 w/ Mount Pipe	130	(2) 2.4" Dia x 6-ft Pipe	120
P65-17-XLH-RR w/ Mount Pipe	130	Platform Mount [LP 1201-1]	120
SBNH-1D6565C w/ Mount Pipe	130	TME-800MHZ RRH w/ Mount Pipe	118
AM-X-CD-16-65-00T-RET w/ Mount Pipe	130	TME-800MHZ RRH w/ Mount Pipe	118
		TME-800MHZ RRH w/ Mount Pipe	118
RRUS-11	130	TME-1900MHz RRH (65MHz)	118
RRUS-11	130	TME-1900MHz RRH (65MHz)	118
RRUS-11	130	TME-1900MHz RRH (65MHz)	118
RRUS 12	130	Side Arm Mount [SO 102-3]	118
RRUS 12	130	(2) RR90-17-02DP w/ Mount Pipe	100
RRUS 12	130	(2) RR90-17-02DP w/ Mount Pipe	100
(2) 860 10025	130	(2) RR90-17-02DP w/ Mount Pipe	100
(2) 860 10025	130	LNX-6515DS-VTM w/ Mount Pipe	100
(2) 860 10025	130	LNX-6515DS-VTM w/ Mount Pipe	100
(2) LGP21401	130	LNX-6515DS-VTM w/ Mount Pipe	100
(2) LGP21401	130	(2) ATMAP1412D-1A20	100
(2) LGP21401	130	(2) ATMAP1412D-1A20	100
DC6-48-60-18-8F	130	(2) ATMAP1412D-1A20	100
Platform Mount [LP 303-1]	130	ATBT-BOTTOM-24V	100
APXVSPP18-C-A20 w/ Mount Pipe	120	ATBT-BOTTOM-24V	100
APXVSPP18-C-A20 w/ Mount Pipe	120	ATBT-BOTTOM-24V	100
APXVSPP18-C-A20 w/ Mount Pipe	120	2.4" Dia x 6-ft Pipe	100
(3) ACU-A20-N	120	2.4" Dia x 6-ft Pipe	100
(3) ACU-A20-N	120	2.4" Dia x 6-ft Pipe	100
(3) ACU-A20-N	120	Platform Mount [LP 1201-1]	100
800 EXTERNAL NOTCH FILTER	120	GPS_A	80
800 EXTERNAL NOTCH FILTER	120	Side Arm Mount [SO 701-1]	80
800 EXTERNAL NOTCH FILTER	120		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
MPRF-Fy=42ks Density=100%	42 ksi	63 ksi	MPRF-Fy=65ks Density=100%	65 ksi	80 ksi
MPRF-Fy=60ks Density=100%	60 ksi	75 ksi	MPRF-Fy=65ks Density=50%	65 ksi	80 ksi
MPRF-Fy=60ks Density=50%	60 ksi	75 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Equivalent Thickness Model

ALL REACTIONS ARE FACTORED

AXIAL 63523 lb

SHEAR 5768 lb *MOMENT 524241 lb-ft*

TORQUE 249 lb-ft
50 mph WIND - 0.750 in ICE

AXIAL 37520 lb

SHEAR 20276 lb *MOMENT 1768658 lb-ft*

TORQUE 774 lb-ft
REACTIONS - 93 mph WIND

Tower Engineering Professionals
326 Tryon Road
Raleigh NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: **Horse Hill (BU 876314)**			
Project: **TEP No. 25675.106519**			
Client: Crown Castle	Drawn by: JSP	App'd:	
Code: TIA-222-G	Date: 01/25/17	Scale: NTS	
Path: \\tep-netapp-01\towers\25675\64002_106519_876314 HORSE HILL SA\tnxTower\876314_LC5.eri		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Equivalent Thickness Model.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	130.00-120.00	10.00	0.000	Round	16.000	16.000	0.375		MPRF-Fy=42ksi, Density=100%

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	120.00-114.92	5.08	0.000	12	16.000	17.244	0.188	0.750	(42 ksi) MPRF-Fy=60ksi, Density=100%
L3	114.92-109.42	5.50	0.000	12	17.244	18.591	0.490	1.960	(60 ksi) MPRF-Fy=60ksi, Density=50%
L4	109.42-103.92	5.50	0.000	12	18.591	19.938	0.412	1.646	(60 ksi) MPRF-Fy=60ksi, Density=50%
L5	103.92-96.42	7.50	0.000	12	19.938	21.775	0.434	1.735	(60 ksi) MPRF-Fy=60ksi, Density=50%
L6	96.42-91.50	4.92	3.000	12	21.775	22.980	0.382	1.530	(60 ksi) MPRF-Fy=60ksi, Density=50%
L7	91.50-88.92	5.58	0.000	12	21.870	23.237	0.438	1.752	(60 ksi) MPRF-Fy=65ksi, Density=100%
L8	88.92-88.25	0.67	0.000	12	23.237	23.401	0.334	1.334	(65 ksi) MPRF-Fy=65ksi, Density=100%
L9	88.25-87.42	0.83	0.000	12	23.401	23.605	0.387	1.550	(65 ksi) MPRF-Fy=65ksi, Density=100%
L10	87.42-86.92	0.50	0.000	12	23.605	23.727	0.251	1.005	(65 ksi) MPRF-Fy=65ksi, Density=100%
L11	86.92-80.75	6.17	0.000	12	23.727	25.239	0.420	1.679	(65 ksi) MPRF-Fy=65ksi, Density=100%
L12	80.75-71.83	8.92	0.000	12	25.239	27.424	0.320	1.279	(65 ksi) MPRF-Fy=65ksi, Density=100%
L13	71.83-68.83	3.00	0.000	12	27.424	28.159	0.619	2.475	(65 ksi) MPRF-Fy=65ksi, Density=50%
L14	68.83-64.50	4.33	3.750	12	28.159	29.220	0.462	1.846	(65 ksi) MPRF-Fy=65ksi, Density=100%
L15	64.50-42.50	25.75	4.250	12	27.801	34.110	0.490	1.961	(65 ksi) MPRF-Fy=65ksi, Density=100%
L16	42.50-41.83	4.92	0.000	12	32.444	33.650	0.519	2.076	(65 ksi) MPRF-Fy=65ksi, Density=100%
L17	41.83-41.17	0.66	0.000	12	33.650	33.812	0.344	1.375	(65 ksi) MPRF-Fy=65ksi, Density=100%
L18	41.17-20.25	20.92	5.000	12	33.812	38.940	0.497	1.988	(65 ksi) MPRF-Fy=65ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L19	20.25-16.83	8.42	0.000	12	37.027	39.089	0.523	2.091	i, Density=100% (65 ksi) MPRF-Fy=60ksi, Density=100% (60 ksi)
L20	16.83-14.17	2.66	0.000	12	39.089	39.740	0.668	2.673	MPRF-Fy=60ksi, Density=100% (60 ksi)
L21	14.17-0.00	14.17		12	39.740	43.210	0.507	2.027	MPRF-Fy=60ksi, Density=100% (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	16.000	18.408	562.084	5.526	8.000	70.261	1124.168	9.198	0.000	0
	16.000	18.408	562.084	5.526	8.000	70.261	1124.168	9.198	0.000	0
L2	16.564	9.547	304.681	5.661	8.288	36.762	617.365	4.699	3.785	20.189
	17.852	10.298	382.406	6.106	8.932	42.811	774.858	5.068	4.119	21.968
L3	17.852	26.435	947.140	5.998	8.932	106.033	1919.163	13.011	3.308	6.751
	19.247	28.561	1194.447	6.480	9.630	124.031	2420.274	14.057	3.669	7.488
L4	19.247	24.091	1016.268	6.508	9.630	105.529	2059.234	11.857	3.880	9.427
	20.642	25.876	1259.320	6.991	10.328	121.933	2551.723	12.735	4.241	10.304
L5	20.642	27.248	1323.092	6.983	10.328	128.108	2680.943	13.411	4.181	9.636
	22.543	29.815	1733.213	7.640	11.279	153.661	3511.959	14.674	4.673	10.77
L6	22.543	26.346	1538.938	7.659	11.279	136.437	3118.306	12.967	4.811	12.578
	23.791	27.830	1813.910	8.090	11.904	152.383	3675.473	13.697	5.134	13.423
L7	23.403	30.221	1771.878	7.673	11.329	156.405	3590.305	14.874	4.688	10.705
	24.057	32.148	2133.016	8.162	12.037	177.206	4322.070	15.822	5.054	11.541
L8	24.057	24.601	1647.242	8.200	12.037	136.849	3337.759	12.108	5.334	15.989
	24.227	24.778	1682.912	8.258	12.122	138.832	3410.037	12.195	5.378	16.121
L9	24.227	28.715	1941.237	8.239	12.122	160.142	3933.472	14.133	5.233	13.505
	24.438	28.969	1993.148	8.312	12.227	163.008	4038.659	14.258	5.288	13.646
L10	24.438	18.896	1315.381	8.361	12.227	107.577	2665.319	9.300	5.653	22.496
	24.564	18.995	1336.189	8.404	12.291	108.715	2707.481	9.349	5.686	22.627
L11	24.564	31.494	2183.782	8.344	12.291	177.677	4424.934	15.500	5.234	12.474
	26.129	33.536	2636.811	8.885	13.074	201.687	5342.894	16.506	5.639	13.439
L12	26.129	25.648	2032.892	8.921	13.074	155.494	4119.190	12.623	5.907	18.481
	28.392	27.897	2615.992	9.703	14.206	184.150	5300.709	13.730	6.493	20.313
L13	28.392	53.414	4898.724	9.596	14.206	344.841	9926.143	26.289	5.691	9.197
	29.153	54.878	5312.824	9.859	14.586	364.230	10765.222	27.009	5.888	9.515
L14	29.153	41.165	4030.829	9.916	14.586	276.340	8167.552	20.260	6.310	13.67
	30.251	42.741	4511.930	10.296	15.136	298.093	9142.394	21.036	6.594	14.286
L15	29.733	43.116	4104.881	9.777	14.401	285.040	8317.602	21.220	6.137	12.517
	35.313	53.076	7657.185	12.036	17.669	433.369	15515.532	26.122	7.828	15.965
L16	34.667	53.350	6940.293	11.429	16.806	412.968	14062.916	26.257	7.304	14.074
	34.837	55.366	7756.976	11.861	17.431	445.020	15717.735	27.249	7.627	14.697
L17	34.837	36.871	5220.577	11.924	17.431	299.506	10578.305	18.147	8.097	23.551
	35.004	37.050	5297.028	11.982	17.514	302.438	10733.215	18.235	8.140	23.677
L18	35.004	53.316	7552.939	11.927	17.514	431.240	15304.302	26.241	7.730	15.552
	40.314	61.523	11605.422	13.763	20.171	575.354	23515.732	30.280	9.104	18.317

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L19	39.601	61.443	10450.607	13.068	19.180	544.873	21175.763	30.240	8.522	16.303
	40.468	64.914	12323.380	13.807	20.248	608.624	24970.510	31.949	9.075	17.361
L20	40.468	82.670	15576.041	13.755	20.248	769.266	31561.282	40.688	8.685	12.997
	41.142	84.071	16381.775	13.988	20.585	795.798	33193.918	41.377	8.859	13.258
L21	41.142	64.005	12575.054	14.046	20.585	610.874	25480.469	31.501	9.293	18.342
	44.734	69.665	16215.392	15.288	22.383	724.458	32856.779	34.287	10.222	20.177

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-120.00				1	1	1			
L2 120.00-114.92				1	1	1			
L3 114.92-109.42				1	1	0.778078			
L4 109.42-103.92				1	1	0.921669			
L5 103.92-96.42				1	1	0.874299			
L6 96.42-91.50				1	1	0.989229			
L7 91.50-88.92				1	1	0.575605			
L8 88.92-88.25				1	1	0.752169			
L9 88.25-87.42				1	1	0.648999			
L10 87.42-86.92				1	1	0.994975			
L11 86.92-80.75				1	1	0.59983			
L12 80.75-71.83				1	1	0.784131			
L13 71.83-68.83				1	1	0.818791			
L14 68.83-64.50				1	1	0.545762			
L15 64.50-42.50				1	1	0.640868			
L16 42.50-41.83				1	1	0.665957			
L17 41.83-41.17				1	1	1			
L18 41.17-20.25				1	1	0.694581			
L19 20.25-16.83				1	1	0.720138			
L20 16.83-14.17				1	1	0.565393			
L21 14.17-0.00				1	1	0.742452			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
** Safety ** Step Pegs (5/8" SR) 7-in. w/30"	A	Surface Ar	130.00 - 0.00	1	1	-0.250	0.350		0.487

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
step		(CaAa)				-0.250			
Safety Line 3/8	A	Surface Ar	130.00 - 0.00	1	1	-0.250	0.375		0.220
		(CaAa)				-0.250			
HB114-21U3M12-XXXF(1-1/4")	A	Surface Ar	120.00 - 0.00	3	3	-0.250	1.540		1.220
		(CaAa)				-0.250			
** 90 **									
LDF7-50A(1-5/8")	C	Surface Ar	90.00 - 0.00	6	6	0.000	1.980		0.820
		(CaAa)				0.000			
****									
Aero MP3-04	A	Surface Ar	15.50 - 0.50	1	1	-0.250	1.610		14.100
		(CaAa)				-0.250			
Aero MP3-04	A	Surface Ar	15.50 - 0.50	1	1	0.500	1.610		14.100
		(CaAa)				0.500			
Aero MP3-04	B	Surface Ar	15.50 - 0.50	1	1	0.250	1.610		14.100
		(CaAa)				0.250			
Aero MP3-04	C	Surface Ar	15.50 - 0.50	1	1	0.000	1.610		14.100
		(CaAa)				0.000			
Aero MP3-04	A	Surface Ar	42.67 - 15.50	1	1	-0.250	1.610		14.100
		(CaAa)				-0.250			
Aero MP3-04	A	Surface Ar	42.67 - 15.50	1	1	0.500	1.610		14.100
		(CaAa)				0.500			
Aero MP3-04	B	Surface Ar	42.67 - 15.50	1	1	0.250	1.610		14.100
		(CaAa)				0.250			
Aero MP3-04	C	Surface Ar	42.67 - 15.50	1	1	0.000	1.610		14.100
		(CaAa)				0.000			
Aero MP3-04	A	Surface Ar	70.33 - 42.67	1	1	-0.250	1.610		14.100
		(CaAa)				-0.250			
Aero MP3-04	A	Surface Ar	70.33 - 42.67	1	1	0.500	1.610		14.100
		(CaAa)				0.500			
Aero MP3-04	B	Surface Ar	70.33 - 42.67	1	1	0.250	1.610		14.100
		(CaAa)				0.250			
Aero MP3-04	C	Surface Ar	70.33 - 42.67	1	1	0.000	1.610		14.100
		(CaAa)				0.000			
Aero MP3-03	A	Surface Ar	88.17 - 70.33	1	1	0.500	1.570		9.900
		(CaAa)				0.500			
Aero MP3-03	A	Surface Ar	88.17 - 70.33	1	1	-0.250	1.570		9.900
		(CaAa)				-0.250			
Aero MP3-03	B	Surface Ar	88.17 - 70.33	1	1	0.250	1.570		9.900
		(CaAa)				0.250			
Aero MP3-03	C	Surface Ar	73.08 - 70.33	1	1	0.000	1.570		9.900
		(CaAa)				0.000			
Aero MP3-03	C	Surface Ar	89.50 - 79.50	1	1	0.000	1.570		9.900
		(CaAa)				0.000			
Aero MP3-03	C	Surface Ar	116.17 - 89.50	1	1	0.000	1.570		9.900
		(CaAa)				0.000			
Aero MP3-03	A	Surface Ar	116.17 - 88.17	1	1	0.500	1.570		9.900
		(CaAa)				0.500			
Aero MP3-03	B	Surface Ar	116.17 - 88.17	1	1	0.250	1.570		9.900
		(CaAa)				0.250			
Aero MP3-03	A	Surface Ar	97.67 - 88.17	1	1	-0.250	1.570		9.900
		(CaAa)				-0.250			
Aero MP3-03	A	Surface Ar	103.92 - 97.67	1	1	-0.250	1.570		9.900
		(CaAa)				-0.250			
Aero MP3-03	A	Surface Ar	109.42 - 103.92	1	1	-0.250	1.570		9.900
		(CaAa)				-0.250			
Aero MP3-03	A	Surface Ar	116.17 - 109.42	1	1	-0.250	1.570		9.900
		(CaAa)				-0.250			
*									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
** 130 **								
CR 50 1873(1-5/8")	C	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	0.830
						1/2" Ice	0.00	0.830
						1" Ice	0.00	0.830
FB-L98B-002-75000(3/8")	C	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.059
						1/2" Ice	0.00	0.059
						1" Ice	0.00	0.059
2" Flexible Conduit	C	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.340
						1/2" Ice	0.00	0.340
						1" Ice	0.00	0.340
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	0.584
						1/2" Ice	0.00	0.584
						1" Ice	0.00	0.584
** 120 **								
** 100 **								
LDF7-50A(1-5/8")	B	No	Inside Pole	100.00 - 0.00	8	No Ice	0.00	0.820
						1/2" Ice	0.00	0.820
						1" Ice	0.00	0.820
LDF5-50A(7/8")	B	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.330
						1/2" Ice	0.00	0.330
						1" Ice	0.00	0.330
AVA6-50(1-1/4")	B	No	Inside Pole	100.00 - 0.00	4	No Ice	0.00	0.450
						1/2" Ice	0.00	0.450
						1" Ice	0.00	0.450
** 80 **								
LDF4-50A(1/2")	C	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.150
						1/2" Ice	0.00	0.150
						1" Ice	0.00	0.150
***								
Aero MP3-04	A	No	CaAa (Out Of Face)	15.50 - 12.67	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
Aero MP3-04	A	No	CaAa (Out Of Face)	15.50 - 12.67	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
Aero MP3-04	B	No	CaAa (Out Of Face)	15.50 - 12.67	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
Aero MP3-04	C	No	CaAa (Out Of Face)	15.50 - 12.67	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
***								
Aero MP3-04	A	No	CaAa (Out Of Face)	42.67 - 40.33	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
Aero MP3-04	A	No	CaAa (Out Of Face)	42.67 - 40.33	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
Aero MP3-04	B	No	CaAa (Out Of Face)	42.67 - 40.33	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
Aero MP3-04	C	No	CaAa (Out Of Face)	42.67 - 40.33	1	No Ice	0.00	14.100
						1/2" Ice	0.00	15.303
						1" Ice	0.00	16.852
***								
Aero MP3-03	A	No	CaAa (Out Of Face)	70.33 - 68.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Aero MP3-03	A	No	CaAa (Out Of Face)	70.33 - 68.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	B	No	CaAa (Out Of Face)	70.33 - 68.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	C	No	CaAa (Out Of Face)	70.33 - 68.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
***								
Aero MP3-03	C	No	CaAa (Out Of Face)	89.50 - 86.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	A	No	CaAa (Out Of Face)	88.17 - 86.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	B	No	CaAa (Out Of Face)	88.17 - 86.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
**								
Aero MP3-03	A	No	CaAa (Out Of Face)	88.17 - 87.67	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	C	No	CaAa (Out Of Face)	103.92 - 95.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	A	No	CaAa (Out Of Face)	97.67 - 95.17	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
Aero MP3-03	C	No	CaAa (Out Of Face)	116.17 - 109.42	1	No Ice	0.00	9.900
						1/2" Ice	0.00	11.063
						1" Ice	0.00	12.572
*								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	130.00-120.00	A	0.000	0.000	0.725	0.000	7.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	65.47
L2	120.00-114.92	A	0.000	0.000	3.108	0.000	46.93
		B	0.000	0.000	0.196	0.000	12.38
		C	0.000	0.000	0.196	0.000	58.01
L3	114.92-109.42	A	0.000	0.000	4.667	0.000	132.92
		B	0.000	0.000	0.863	0.000	54.45
		C	0.000	0.000	0.863	0.000	144.91
L4	109.42-103.92	A	0.000	0.000	4.667	0.000	132.92
		B	0.000	0.000	0.863	0.000	54.45
		C	0.000	0.000	0.863	0.000	90.46
L5	103.92-96.42	A	0.000	0.000	6.364	0.000	193.63
		B	0.000	0.000	1.178	0.000	111.27
		C	0.000	0.000	1.178	0.000	197.60
L6	96.42-91.50	A	0.000	0.000	4.175	0.000	131.28
		B	0.000	0.000	0.772	0.000	99.58
		C	0.000	0.000	0.772	0.000	93.29
L7	91.50-88.92	A	0.000	0.000	2.189	0.000	62.35

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B	0.000	0.000	0.405	0.000	52.22
		C	0.000	0.000	1.688	0.000	53.49
L8	88.92-88.25	A	0.000	0.000	0.568	0.000	16.19
		B	0.000	0.000	0.105	0.000	13.56
		C	0.000	0.000	0.901	0.000	20.95
L9	88.25-87.42	A	0.000	0.000	0.704	0.000	32.43
		B	0.000	0.000	0.130	0.000	24.22
		C	0.000	0.000	1.116	0.000	25.95
L10	87.42-86.92	A	0.000	0.000	0.424	0.000	17.03
		B	0.000	0.000	0.079	0.000	15.07
		C	0.000	0.000	0.672	0.000	15.63
L11	86.92-80.75	A	0.000	0.000	5.235	0.000	156.54
		B	0.000	0.000	0.969	0.000	132.31
		C	0.000	0.000	8.299	0.000	139.26
L12	80.75-71.83	A	0.000	0.000	7.569	0.000	215.57
		B	0.000	0.000	1.400	0.000	180.54
		C	0.000	0.000	10.975	0.000	128.26
L13	71.83-68.83	A	0.000	0.000	2.558	0.000	114.80
		B	0.000	0.000	0.477	0.000	81.87
		C	0.000	0.000	4.024	0.000	85.70
L14	68.83-64.50	A	0.000	0.000	3.709	0.000	154.08
		B	0.000	0.000	0.697	0.000	112.36
		C	0.000	0.000	5.841	0.000	117.89
L15	64.50-42.50	A	0.000	0.000	18.843	0.000	721.27
		B	0.000	0.000	3.542	0.000	540.08
		C	0.000	0.000	29.678	0.000	568.16
L16	42.50-41.83	A	0.000	0.000	0.574	0.000	40.71
		B	0.000	0.000	0.108	0.000	25.82
		C	0.000	0.000	0.904	0.000	26.68
L17	41.83-41.17	A	0.000	0.000	0.565	0.000	40.11
		B	0.000	0.000	0.106	0.000	25.44
		C	0.000	0.000	0.890	0.000	26.28
L18	41.17-20.25	A	0.000	0.000	17.918	0.000	704.99
		B	0.000	0.000	3.368	0.000	523.13
		C	0.000	0.000	28.221	0.000	549.84
L19	20.25-16.83	A	0.000	0.000	2.929	0.000	111.38
		B	0.000	0.000	0.551	0.000	83.58
		C	0.000	0.000	4.614	0.000	87.95
L20	16.83-14.17	A	0.000	0.000	2.278	0.000	124.13
		B	0.000	0.000	0.428	0.000	83.76
		C	0.000	0.000	3.588	0.000	87.16
L21	14.17-0.00	A	0.000	0.000	11.976	0.000	489.67
		B	0.000	0.000	2.201	0.000	360.41
		C	0.000	0.000	19.035	0.000	378.50

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	130.00-120.00	A	1.714	0.000	0.000	7.580	0.000	94.01
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	65.47
L2	120.00-114.92	A	1.703	0.000	0.000	10.077	0.000	164.63
		B		0.000	0.000	0.622	0.000	20.89
		C		0.000	0.000	0.622	0.000	73.42
L3	114.92-109.42	A	1.695	0.000	0.000	14.688	0.000	315.54
		B		0.000	0.000	2.728	0.000	91.64

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C		0.000	0.000	2.728	0.000	212.30
L4	109.42-103.92	A	1.687	0.000	0.000	14.490	0.000	314.16
		B		0.000	0.000	2.719	0.000	91.36
		C		0.000	0.000	2.719	0.000	127.37
L5	103.92-96.42	A	1.676	0.000	0.000	19.898	0.000	445.19
		B		0.000	0.000	3.692	0.000	161.12
		C		0.000	0.000	3.692	0.000	288.05
L6	96.42-91.50	A	1.665	0.000	0.000	13.299	0.000	297.03
		B		0.000	0.000	2.411	0.000	131.97
		C		0.000	0.000	2.411	0.000	132.39
L7	91.50-88.92	A	1.659	0.000	0.000	6.975	0.000	145.75
		B		0.000	0.000	1.264	0.000	69.20
		C		0.000	0.000	3.318	0.000	97.21
L8	88.92-88.25	A	1.656	0.000	0.000	1.805	0.000	37.66
		B		0.000	0.000	0.327	0.000	17.93
		C		0.000	0.000	1.599	0.000	43.46
L9	88.25-87.42	A	1.654	0.000	0.000	2.241	0.000	65.65
		B		0.000	0.000	0.405	0.000	33.63
		C		0.000	0.000	1.981	0.000	53.81
L10	87.42-86.92	A	1.653	0.000	0.000	1.350	0.000	35.67
		B		0.000	0.000	0.244	0.000	20.98
		C		0.000	0.000	1.193	0.000	32.40
L11	86.92-80.75	A	1.647	0.000	0.000	16.615	0.000	356.55
		B		0.000	0.000	3.000	0.000	176.20
		C		0.000	0.000	14.703	0.000	316.48
L12	80.75-71.83	A	1.631	0.000	0.000	23.875	0.000	494.97
		B		0.000	0.000	4.310	0.000	237.44
		C		0.000	0.000	17.896	0.000	335.00
L13	71.83-68.83	A	1.618	0.000	0.000	8.000	0.000	223.41
		B		0.000	0.000	1.448	0.000	108.66
		C		0.000	0.000	6.883	0.000	176.10
L14	68.83-64.50	A	1.609	0.000	0.000	11.525	0.000	294.47
		B		0.000	0.000	2.091	0.000	143.16
		C		0.000	0.000	10.263	0.000	239.98
L15	64.50-42.50	A	1.573	0.000	0.000	58.557	0.000	1401.85
		B		0.000	0.000	10.623	0.000	680.22
		C		0.000	0.000	52.143	0.000	1172.14
L16	42.50-41.83	A	1.537	0.000	0.000	1.758	0.000	67.56
		B		0.000	0.000	0.319	0.000	33.35
		C		0.000	0.000	1.577	0.000	48.00
L17	41.83-41.17	A	1.535	0.000	0.000	1.705	0.000	65.63
		B		0.000	0.000	0.309	0.000	32.60
		C		0.000	0.000	1.542	0.000	46.68
L18	41.17-20.25	A	1.488	0.000	0.000	53.021	0.000	1287.44
		B		0.000	0.000	9.594	0.000	644.96
		C		0.000	0.000	48.443	0.000	1077.49
L19	20.25-16.83	A	1.416	0.000	0.000	8.668	0.000	205.29
		B		0.000	0.000	1.568	0.000	102.85
		C		0.000	0.000	7.919	0.000	173.56
L20	16.83-14.17	A	1.391	0.000	0.000	6.470	0.000	201.89
		B		0.000	0.000	1.168	0.000	103.14
		C		0.000	0.000	6.043	0.000	154.60
L21	14.17-0.00	A	1.284	0.000	0.000	32.464	0.000	810.84
		B		0.000	0.000	5.712	0.000	428.39
		C		0.000	0.000	31.304	0.000	682.36

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130.00-120.00	-0.105	0.000	-0.652	0.000
L2	120.00-114.92	-0.567	0.000	-0.840	0.000
L3	114.92-109.42	-0.476	0.000	-0.650	0.000
L4	109.42-103.92	-0.488	0.000	-0.675	0.000
L5	103.92-96.42	-0.502	0.000	-0.721	0.000
L6	96.42-91.50	-0.513	0.000	-0.776	0.000
L7	91.50-88.92	-0.446	0.429	-0.677	0.327
L8	88.92-88.25	-0.378	0.861	-0.573	0.658
L9	88.25-87.42	-0.380	0.864	-0.578	0.661
L10	87.42-86.92	-0.381	0.867	-0.582	0.665
L11	86.92-80.75	-0.387	0.881	-0.596	0.681
L12	80.75-71.83	-0.411	0.844	-0.653	0.603
L13	71.83-68.83	-0.410	0.926	-0.655	0.721
L14	68.83-64.50	-0.415	0.941	-0.663	0.761
L15	64.50-42.50	-0.432	0.977	-0.707	0.809
L16	42.50-41.83	-0.444	1.003	-0.736	0.848
L17	41.83-41.17	-0.445	1.005	-0.734	0.855
L18	41.17-20.25	-0.458	1.035	-0.766	0.901
L19	20.25-16.83	-0.469	1.059	-0.797	0.936
L20	16.83-14.17	-0.473	1.066	-0.793	0.957
L21	14.17-0.00	-0.484	1.090	-0.808	1.003

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Step Pegs (5/8" SR) 7-in. w/30" step	120.00 - 130.00	1.0000	1.0000
L1	3	Safety Line 3/8	120.00 - 130.00	1.0000	1.0000
L2	2	Step Pegs (5/8" SR) 7-in. w/30" step	114.92 - 120.00	1.0000	1.0000
L2	3	Safety Line 3/8	114.92 - 120.00	1.0000	1.0000
L2	11	HB114-21U3M12-XXXF(1-1/4")	114.92 - 120.00	1.0000	1.0000
L2	56	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L2	59	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L2	60	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L2	68	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L3	2	Step Pegs (5/8" SR) 7-in. w/30" step	109.42 - 114.92	1.0000	1.0000
L3	3	Safety Line 3/8	109.42 - 114.92	1.0000	1.0000
L3	11	HB114-21U3M12-XXXF(1-1/4")	109.42 - 114.92	1.0000	1.0000
L3	56	Aero MP3-03	109.42 - 114.92	1.0000	1.0000
L3	59	Aero MP3-03	109.42 - 114.92	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L3	60	Aero MP3-03	109.42 - 114.92	1.0000	1.0000
L3	68	Aero MP3-03	109.42 - 114.92	1.0000	1.0000
L4	2	Step Pegs (5/8" SR) 7-in. w/30" step	103.92 - 109.42	1.0000	1.0000
L4	3	Safety Line 3/8	103.92 - 109.42	1.0000	1.0000
L4	11	HB114-21U3M12-XXXF(1-1/4")	103.92 - 109.42	1.0000	1.0000
L4	56	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L4	59	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L4	60	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L4	67	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L5	2	Step Pegs (5/8" SR) 7-in. w/30" step	96.42 - 103.92	1.0000	1.0000
L5	3	Safety Line 3/8	96.42 - 103.92	1.0000	1.0000
L5	11	HB114-21U3M12-XXXF(1-1/4")	96.42 - 103.92	1.0000	1.0000
L5	56	Aero MP3-03	96.42 - 103.92	1.0000	1.0000
L5	59	Aero MP3-03	96.42 - 103.92	1.0000	1.0000
L5	60	Aero MP3-03	96.42 - 103.92	1.0000	1.0000
L5	63	Aero MP3-03	96.42 - 97.67	1.0000	1.0000
L5	66	Aero MP3-03	97.67 - 103.92	1.0000	1.0000
L6	2	Step Pegs (5/8" SR) 7-in. w/30" step	91.50 - 96.42	1.0000	1.0000
L6	3	Safety Line 3/8	91.50 - 96.42	1.0000	1.0000
L6	11	HB114-21U3M12-XXXF(1-1/4")	91.50 - 96.42	1.0000	1.0000
L6	56	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	59	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	60	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	63	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	18	LDF7-50A(1-5/8")	91.50 - 90.00	1.0000	1.0000
L6	53	Aero MP3-03	91.50 - 89.50	1.0000	1.0000
L8	2	Step Pegs (5/8" SR) 7-in. w/30" step	88.25 - 88.92	1.0000	1.0000
L8	3	Safety Line 3/8	88.25 - 88.92	1.0000	1.0000
L8	11	HB114-21U3M12-XXXF(1-1/4")	88.25 - 88.92	1.0000	1.0000
L8	18	LDF7-50A(1-5/8")	88.25 - 88.92	1.0000	1.0000
L8	53	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L8	59	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L8	60	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L8	63	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L9	2	Step Pegs (5/8" SR) 7-in. w/30" step	87.42 - 88.25	1.0000	1.0000
L9	3	Safety Line 3/8	87.42 - 88.25	1.0000	1.0000
L9	11	HB114-21U3M12-XXXF(1-1/4")	87.42 - 88.25	1.0000	1.0000
L9	18	LDF7-50A(1-5/8")	87.42 - 88.25	1.0000	1.0000
L9	49	Aero MP3-03	87.42 - 88.17	1.0000	1.0000
L9	50	Aero MP3-03	87.42 - 88.17	1.0000	1.0000
L9	51	Aero MP3-03	87.42 - 88.17	1.0000	1.0000
L9	53	Aero MP3-03	87.42 - 88.25	1.0000	1.0000
L9	59	Aero MP3-03	88.17 - 88.25	1.0000	1.0000
L9	60	Aero MP3-03	88.17 - 88.25	1.0000	1.0000
L9	63	Aero MP3-03	88.17 - 88.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L10	2	Step Pegs (5/8" SR) 7-in. w/30" step	86.92 - 87.42	1.0000	1.0000
L10	3	Safety Line 3/8	86.92 - 87.42	1.0000	1.0000
L10	11	HB114-21U3M12-XXXF(1-1/4")	86.92 - 87.42	1.0000	1.0000
L10	18	LDF7-50A(1-5/8")	86.92 - 87.42	1.0000	1.0000
L10	49	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L10	50	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L10	51	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L10	53	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L11	2	Step Pegs (5/8" SR) 7-in. w/30" step	80.75 - 86.92	1.0000	1.0000
L11	3	Safety Line 3/8	80.75 - 86.92	1.0000	1.0000
L11	11	HB114-21U3M12-XXXF(1-1/4")	80.75 - 86.92	1.0000	1.0000
L11	18	LDF7-50A(1-5/8")	80.75 - 86.92	1.0000	1.0000
L11	49	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L11	50	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L11	51	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L11	53	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L12	2	Step Pegs (5/8" SR) 7-in. w/30" step	71.83 - 80.75	1.0000	1.0000
L12	3	Safety Line 3/8	71.83 - 80.75	1.0000	1.0000
L12	11	HB114-21U3M12-XXXF(1-1/4")	71.83 - 80.75	1.0000	1.0000
L12	18	LDF7-50A(1-5/8")	71.83 - 80.75	1.0000	1.0000
L12	49	Aero MP3-03	71.83 - 80.75	1.0000	1.0000
L12	50	Aero MP3-03	71.83 - 80.75	1.0000	1.0000
L12	51	Aero MP3-03	71.83 - 80.75	1.0000	1.0000
L12	52	Aero MP3-03	71.83 - 73.08	1.0000	1.0000
L12	53	Aero MP3-03	79.50 - 80.75	1.0000	1.0000
L13	2	Step Pegs (5/8" SR) 7-in. w/30" step	68.83 - 71.83	1.0000	1.0000
L13	3	Safety Line 3/8	68.83 - 71.83	1.0000	1.0000
L13	11	HB114-21U3M12-XXXF(1-1/4")	68.83 - 71.83	1.0000	1.0000
L13	18	LDF7-50A(1-5/8")	68.83 - 71.83	1.0000	1.0000
L13	40	Aero MP3-04	68.83 - 70.33	1.0000	1.0000
L13	41	Aero MP3-04	68.83 - 70.33	1.0000	1.0000
L13	42	Aero MP3-04	68.83 - 70.33	1.0000	1.0000
L13	43	Aero MP3-04	68.83 - 70.33	1.0000	1.0000
L13	49	Aero MP3-03	70.33 - 71.83	1.0000	1.0000
L13	50	Aero MP3-03	70.33 - 71.83	1.0000	1.0000
L13	51	Aero MP3-03	70.33 - 71.83	1.0000	1.0000
L13	52	Aero MP3-03	70.33 - 71.83	1.0000	1.0000
L14	2	Step Pegs (5/8" SR) 7-in. w/30" step	64.50 - 68.83	1.0000	1.0000
L14	3	Safety Line 3/8	64.50 - 68.83	1.0000	1.0000
L14	11	HB114-21U3M12-XXXF(1-1/4")	64.50 - 68.83	1.0000	1.0000
L14	18	LDF7-50A(1-5/8")	64.50 - 68.83	1.0000	1.0000
L14	40	Aero MP3-04	64.50 - 68.83	1.0000	1.0000
L14	41	Aero MP3-04	64.50 - 68.83	1.0000	1.0000
L14	42	Aero MP3-04	64.50 - 68.83	1.0000	1.0000
L14	43	Aero MP3-04	64.50 - 68.83	1.0000	1.0000
L14	31	Aero MP3-04	64.50 - 42.67	1.0000	1.0000
L14	32	Aero MP3-04	64.50 - 42.67	1.0000	1.0000
L14	33	Aero MP3-04	64.50 - 42.67	1.0000	1.0000
L14	34	Aero MP3-04	64.50 - 42.67	1.0000	1.0000
L15	2	Step Pegs (5/8" SR) 7-in. w/30" step	42.50 - 64.50	1.0000	1.0000
L15	3	Safety Line 3/8	42.50 - 64.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L15	11	HB114-21U3M12-XXXF(1-1/4")	42.50 - 64.50	1.0000	1.0000
L15	18	LDF7-50A(1-5/8")	42.50 - 64.50	1.0000	1.0000
L15	31	Aero MP3-04	42.50 - 42.67	1.0000	1.0000
L15	32	Aero MP3-04	42.50 - 42.67	1.0000	1.0000
L15	33	Aero MP3-04	42.50 - 42.67	1.0000	1.0000
L15	34	Aero MP3-04	42.50 - 42.67	1.0000	1.0000
L17	2	Step Pegs (5/8" SR) 7-in. w/30" step	41.17 - 41.83	1.0000	1.0000
L17	3	Safety Line 3/8	41.17 - 41.83	1.0000	1.0000
L17	11	HB114-21U3M12-XXXF(1-1/4")	41.17 - 41.83	1.0000	1.0000
L17	18	LDF7-50A(1-5/8")	41.17 - 41.83	1.0000	1.0000
L17	31	Aero MP3-04	41.17 - 41.83	1.0000	1.0000
L17	32	Aero MP3-04	41.17 - 41.83	1.0000	1.0000
L17	33	Aero MP3-04	41.17 - 41.83	1.0000	1.0000
L17	34	Aero MP3-04	41.17 - 41.83	1.0000	1.0000
L18	2	Step Pegs (5/8" SR) 7-in. w/30" step	20.25 - 41.17	1.0000	1.0000
L18	3	Safety Line 3/8	20.25 - 41.17	1.0000	1.0000
L18	11	HB114-21U3M12-XXXF(1-1/4")	20.25 - 41.17	1.0000	1.0000
L18	18	LDF7-50A(1-5/8")	20.25 - 41.17	1.0000	1.0000
L18	31	Aero MP3-04	20.25 - 41.17	1.0000	1.0000
L18	32	Aero MP3-04	20.25 - 41.17	1.0000	1.0000
L18	33	Aero MP3-04	20.25 - 41.17	1.0000	1.0000
L18	34	Aero MP3-04	20.25 - 41.17	1.0000	1.0000
L20	2	Step Pegs (5/8" SR) 7-in. w/30" step	14.17 - 16.83	1.0000	1.0000
L20	3	Safety Line 3/8	14.17 - 16.83	1.0000	1.0000
L20	11	HB114-21U3M12-XXXF(1-1/4")	14.17 - 16.83	1.0000	1.0000
L20	18	LDF7-50A(1-5/8")	14.17 - 16.83	1.0000	1.0000
L20	22	Aero MP3-04	14.17 - 15.50	1.0000	1.0000
L20	23	Aero MP3-04	14.17 - 15.50	1.0000	1.0000
L20	24	Aero MP3-04	14.17 - 15.50	1.0000	1.0000
L20	25	Aero MP3-04	14.17 - 15.50	1.0000	1.0000
L20	31	Aero MP3-04	15.50 - 16.83	1.0000	1.0000
L20	32	Aero MP3-04	15.50 - 16.83	1.0000	1.0000
L20	33	Aero MP3-04	15.50 - 16.83	1.0000	1.0000
L20	34	Aero MP3-04	15.50 - 16.83	1.0000	1.0000
L21	2	Step Pegs (5/8" SR) 7-in. w/30" step	0.00 - 14.17	1.0000	1.0000
L21	3	Safety Line 3/8	0.00 - 14.17	1.0000	1.0000
L21	11	HB114-21U3M12-XXXF(1-1/4")	0.00 - 14.17	1.0000	1.0000
L21	18	LDF7-50A(1-5/8")	0.00 - 14.17	1.0000	1.0000
L21	22	Aero MP3-04	0.50 - 14.17	1.0000	1.0000
L21	23	Aero MP3-04	0.50 - 14.17	1.0000	1.0000
L21	24	Aero MP3-04	0.50 - 14.17	1.0000	1.0000
L21	25	Aero MP3-04	0.50 - 14.17	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
130									
800 10121 w/ Mount Pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	66.50 114.02 167.89
800 10121 w/ Mount Pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	66.50 114.02 167.89
800 10121 w/ Mount Pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	66.50 114.02 167.89
P65-17-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	11.70 12.42 13.15	8.94 10.45 11.99	91.85 177.61 273.25
SBNH-1D6565C w/ Mount Pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	11.69 12.42 13.16	9.85 11.38 12.94	99.25 189.04 288.81
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	74.05 139.04 211.91
RRUS-11	A	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	50.00 70.87 94.78
RRUS-11	B	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	50.00 70.87 94.78
RRUS-11	C	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	50.00 70.87 94.78
RRUS 12	A	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	58.00 81.22 107.64
RRUS 12	B	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	58.00 81.22 107.64
RRUS 12	C	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	58.00 81.22 107.64
(2) 860 10025	A	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	1.16 2.72 5.20
(2) 860 10025	B	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	1.16 2.72 5.20
(2) 860 10025	C	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	1.16 2.72 5.20
(2) LGP21401	A	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	14.10 21.26 30.32
(2) LGP21401	B	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	14.10 21.26 30.32
(2) LGP21401	C	From Centroid-Face	4.00 0.000 0.000	0.000	130.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	14.10 21.26 30.32
DC6-48-60-18-8F	B	From Centroid-Face	4.00 0.000	0.000	130.00	No Ice 1/2" Ice	0.92 1.46	0.92 1.46	18.90 36.62

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		ce	0.000			1" Ice	1.64	1.64	56.82
Platform Mount [LP 303-1]	A	None		0.000	130.00	No Ice	14.66	14.66	1250.00
						1/2" Ice	18.87	18.87	1481.33
						1" Ice	23.08	23.08	1712.66
120									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	82.55 150.56 226.53
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	82.55 150.56 226.53
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	82.55 150.56 226.53
(3) ACU-A20-N	A	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	1.04 2.32 4.41
(3) ACU-A20-N	B	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	1.04 2.32 4.41
(3) ACU-A20-N	C	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	1.04 2.32 4.41
800 EXTERNAL NOTCH FILTER	A	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	11.00 16.81 24.26
800 EXTERNAL NOTCH FILTER	B	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	11.00 16.81 24.26
800 EXTERNAL NOTCH FILTER	C	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	11.00 16.81 24.26
(2) 2.4" Dia x 6-ft Pipe	A	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
(2) 2.4" Dia x 6-ft Pipe	B	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
(2) 2.4" Dia x 6-ft Pipe	C	From Centroid-Le g	4.00 0.000 0.000	0.000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
Platform Mount [LP 1201-1]	A	None		0.000	120.00	No Ice	23.10	23.10	2100.00
						1/2" Ice	26.80	26.80	2500.00
						1" Ice	30.50	30.50	2900.00
118									
TME-800MHZ RRH w/ Mount Pipe	A	From Leg	1.00 0.000 -1.000	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.20 2.40 2.62	2.12 2.42 2.74	60.30 86.95 117.49
TME-800MHZ RRH w/ Mount Pipe	B	From Leg	1.00 0.000 -1.000	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.20 2.40 2.62	2.12 2.42 2.74	60.30 86.95 117.49
TME-800MHZ RRH w/ Mount Pipe	C	From Leg	1.00 0.000 -1.000	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.20 2.40 2.62	2.12 2.42 2.74	60.30 86.95 117.49
TME-1900MHz RRH (65MHz)	A	From Leg	1.00 0.000 1.000	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	60.00 83.90 111.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
TME-1900MHz RRH (65MHz)	B	From Leg	1.00 0.000 1.000	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	60.00 83.90 111.08
TME-1900MHz RRH (65MHz)	C	From Leg	1.00 0.000 1.000	0.000	118.00	No Ice 1/2" Ice 1" Ice	2.70 2.94 3.18	2.77 3.01 3.26	60.00 83.90 111.08
Side Arm Mount [SO 102-3]	A	None		0.000	118.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	81.00 111.00 141.00
100									
(2) RR90-17-02DP w/ Mount Pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.59 5.02 5.44	3.32 4.09 4.78	34.18 71.62 115.19
(2) RR90-17-02DP w/ Mount Pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.59 5.02 5.44	3.32 4.09 4.78	34.18 71.62 115.19
(2) RR90-17-02DP w/ Mount Pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	4.59 5.02 5.44	3.32 4.09 4.78	34.18 71.62 115.19
LNX-6515DS-VTM w/ Mount Pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	83.27 172.93 272.55
LNX-6515DS-VTM w/ Mount Pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	83.27 172.93 272.55
LNX-6515DS-VTM w/ Mount Pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	83.27 172.93 272.55
(2) ATMAP1412D-1A20	A	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	1.00 1.13 1.26	13.00 20.62 30.11
(2) ATMAP1412D-1A20	B	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	1.00 1.13 1.26	13.00 20.62 30.11
(2) ATMAP1412D-1A20	C	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	0.41 0.50 0.59	1.00 1.13 1.26	13.00 20.62 30.11
ATBT-BOTTOM-24V	A	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.06 0.10 0.15	2.87 4.02 5.94
ATBT-BOTTOM-24V	B	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.06 0.10 0.15	2.87 4.02 5.94
ATBT-BOTTOM-24V	C	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.06 0.10 0.15	2.87 4.02 5.94
2.4" Dia x 6-ft Pipe	A	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Pipe	B	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
2.4" Dia x 6-ft Pipe	C	From Centroid-Face	4.00 0.000 0.000	0.000	100.00	No Ice 1/2" Ice 1" Ice	1.43 1.93 2.30	1.43 1.93 2.30	21.96 32.81 47.71
Platform Mount [LP 1201-1]	A	None		0.000	100.00	No Ice 1/2" Ice	23.10 26.80	23.10 26.80	2100.00 2500.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1" Ice	30.50	30.50	2900.00
80									
GPS_A	A	From Leg	3.00	0.000	80.00	No Ice	0.26	0.26	0.87
			0.000			1/2" Ice	0.32	0.32	4.66
			0.000			1" Ice	0.39	0.39	9.76
Side Arm Mount [SO 701-1]	A	From Leg	1.50	0.000	80.00	No Ice	0.85	1.67	65.00
			0.000			1/2" Ice	1.14	2.34	79.00
			0.000			1" Ice	1.43	3.01	93.00
*****									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	13.887	39	0.990	0.004
L2	120 - 114.92	11.827	39	0.970	0.003
L3	114.92 - 109.42	10.818	39	0.922	0.002
L4	109.42 - 103.92	9.772	39	0.894	0.002
L5	103.92 - 96.42	8.764	39	0.855	0.001
L6	96.42 - 91.5	7.465	39	0.798	0.001
L7	94.5 - 88.92	7.148	39	0.780	0.001
L8	88.92 - 88.25	6.256	39	0.742	0.001
L9	88.25 - 87.42	6.152	39	0.733	0.001
L10	87.42 - 86.92	6.025	39	0.725	0.001
L11	86.92 - 80.75	5.950	39	0.717	0.001
L12	80.75 - 71.83	5.064	39	0.655	0.001
L13	71.83 - 68.83	3.952	45	0.536	0.001
L14	68.83 - 64.5	3.622	45	0.515	0.001
L15	68.25 - 42.5	3.560	45	0.509	0.000
L16	46.75 - 41.83	1.637	45	0.333	0.000
L17	41.83 - 41.17	1.304	45	0.310	0.000
L18	41.17 - 20.25	1.262	45	0.302	0.000
L19	25.25 - 16.83	0.482	45	0.168	0.000
L20	16.83 - 14.17	0.219	45	0.122	0.000
L21	14.17 - 0	0.155	45	0.106	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	800 10121 w/ Mount Pipe	39	13.887	0.990	0.004	20320
120.00	APXVSPP18-C-A20 w/ Mount Pipe	39	11.827	0.970	0.003	10188
118.00	TME-800MHZ RRH w/ Mount Pipe	39	11.426	0.952	0.002	8585
100.00	(2) RR90-17-02DP w/ Mount Pipe	39	8.073	0.827	0.001	7137
80.00	GPS_A	39	4.962	0.646	0.001	4713

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	60.102	2	4.286	0.016
L2	120 - 114.92	51.192	2	4.202	0.012
L3	114.92 - 109.42	46.827	2	3.996	0.008
L4	109.42 - 103.92	42.296	2	3.873	0.007
L5	103.92 - 96.42	37.934	2	3.702	0.006
L6	96.42 - 91.5	32.312	2	3.455	0.005
L7	94.5 - 88.92	30.939	2	3.377	0.005
L8	88.92 - 88.25	27.074	2	3.212	0.004
L9	88.25 - 87.42	26.626	2	3.177	0.004
L10	87.42 - 86.92	26.078	2	3.139	0.004
L11	86.92 - 80.75	25.751	2	3.104	0.004
L12	80.75 - 71.83	21.915	2	2.835	0.003
L13	71.83 - 68.83	17.101	14	2.320	0.002
L14	68.83 - 64.5	15.672	14	2.228	0.002
L15	68.25 - 42.5	15.403	14	2.204	0.002
L16	46.75 - 41.83	7.080	14	1.443	0.001
L17	41.83 - 41.17	5.640	14	1.340	0.001
L18	41.17 - 20.25	5.457	14	1.305	0.001
L19	25.25 - 16.83	2.082	14	0.728	0.000
L20	16.83 - 14.17	0.945	14	0.528	0.000
L21	14.17 - 0	0.671	14	0.458	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	800 10121 w/ Mount Pipe	2	60.102	4.286	0.016	4797
120.00	APXVSPP18-C-A20 w/ Mount Pipe	2	51.192	4.202	0.012	2400
118.00	TME-800MHZ RRH w/ Mount Pipe	2	49.454	4.122	0.010	2017
100.00	(2) RR90-17-02DP w/ Mount Pipe	2	34.944	3.582	0.006	1658
80.00	GPS_A	2	21.475	2.798	0.003	1092

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 120 (1)	TP16x16x0.375	10.00	0.00	0.0	18.408	-3174.88	695814.00	0.005
L2	120 - 114.92 (2)	TP17.244x16x0.188	5.08	0.00	0.0	10.298	-6872.07	698925.00	0.010
L3	114.92 - 109.42 (3)	TP18.591x17.244x0.49	5.50	0.00	0.0	28.561	-7489.41	1943270.00	0.004
L4	109.42 - 103.92 (4)	TP19.938x18.591x0.412	5.50	0.00	0.0	25.876	-8065.42	1760590.00	0.005

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L5	103.92 - 96.42 (5)	TP21.775x19.938x0.434	7.50	0.00	0.0	29.815	-12111.60	2028590.00	0.006
L6	96.42 - 91.5 (6)	TP22.98x21.775x0.382	4.92	0.00	0.0	26.925	-12365.60	1831960.00	0.007
L7	91.5 - 88.92 (7)	TP23.237x21.87x0.438	5.58	0.00	0.0	32.148	-13379.80	2369660.00	0.006
L8	88.92 - 88.25 (8)	TP23.401x23.237x0.334	0.67	0.00	0.0	24.778	-13496.60	1826360.00	0.007
L9	88.25 - 87.42 (9)	TP23.605x23.401x0.387	0.83	0.00	0.0	28.969	-13661.80	2135280.00	0.006
L10	87.42 - 86.92 (10)	TP23.727x23.605x0.251	0.50	0.00	0.0	18.995	-13762.30	1368250.00	0.010
L11	86.92 - 80.75 (11)	TP25.239x23.727x0.42	6.17	0.00	0.0	33.536	-14789.50	2471960.00	0.006
L12	80.75 - 71.83 (12)	TP27.424x25.239x0.32	8.92	0.00	0.0	27.897	-16341.60	2056320.00	0.008
L13	71.83 - 68.83 (13)	TP28.159x27.424x0.619	3.00	0.00	0.0	54.878	-16967.00	4045080.00	0.004
L14	68.83 - 64.5 (14)	TP29.22x28.159x0.462	4.33	0.00	0.0	41.376	-17086.70	3049800.00	0.006
L15	64.5 - 42.5 (15)	TP34.11x27.801x0.49	25.75	0.00	0.0	51.432	-22400.30	3791040.00	0.006
L16	42.5 - 41.83 (16)	TP33.65x32.444x0.519	4.92	0.00	0.0	55.366	-24263.30	4081000.00	0.006
L17	41.83 - 41.17 (17)	TP33.812x33.65x0.344	0.66	0.00	0.0	37.050	-24480.40	2630650.00	0.009
L18	41.17 - 20.25 (18)	TP38.94x33.812x0.497	20.92	0.00	0.0	59.562	-28801.70	4390310.00	0.007
L19	20.25 - 16.83 (19)	TP39.089x37.027x0.523	8.42	0.00	0.0	64.914	-32129.10	4416720.00	0.007
L20	16.83 - 14.17 (20)	TP39.74x39.089x0.668	2.66	0.00	0.0	84.071	-33016.40	5720210.00	0.006
L21	14.17 - 0 (21)	TP43.21x39.74x0.507	14.17	0.00	0.0	69.261	-37195.60	4712530.00	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 120 (1)	TP16x16x0.375	33865.08	288446.67	0.117	0.00	288446.67	0.000
L2	120 - 114.92 (2)	TP17.244x16x0.188	65561.42	242131.67	0.271	0.00	242131.67	0.000
L3	114.92 - 109.42 (3)	TP18.591x17.244x0.49	103546.67	703255.83	0.147	0.00	703255.83	0.000
L4	109.42 - 103.92 (4)	TP19.938x18.591x0.412	144624.17	691359.17	0.209	0.00	691359.17	0.000
L5	103.92 - 96.42 (5)	TP21.775x19.938x0.434	216219.17	871258.33	0.248	0.00	871258.33	0.000
L6	96.42 - 91.5 (6)	TP22.98x21.775x0.382	238465.83	808286.67	0.295	0.00	808286.67	0.000
L7	91.5 - 88.92 (7)	TP23.237x21.87x0.438	305446.67	1088483.33	0.281	0.00	1088483.33	0.000
L8	88.92 - 88.25 (8)	TP23.401x23.237x0.334	313712.50	852775.00	0.368	0.00	852775.00	0.000
L9	88.25 - 87.42 (9)	TP23.605x23.401x0.387	324028.33	1001275.00	0.324	0.00	1001275.00	0.000
L10	87.42 - 86.92 (10)	TP23.727x23.605x0.251	330275.00	652592.50	0.506	0.00	652592.50	0.000
L11	86.92 - 80.75 (11)	TP25.239x23.727x0.42	409578.33	1238866.67	0.331	0.00	1238866.67	0.000
L12	80.75 - 71.83	TP27.424x25.239x0.32	531172.50	1131141.67	0.470	0.00	1131141.67	0.000

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L13	71.83 - 68.83 (12)	TP28.159x27.424x0.619	573550.83	2237283.33	0.256	0.00	2237283.33	0.000
L14	68.83 - 64.5 (13)	TP29.22x28.159x0.462	581838.33	1715025.00	0.339	0.00	1715025.00	0.000
L15	64.5 - 42.5 (14)	TP34.11x27.801x0.49	911200.00	2498483.33	0.365	0.00	2498483.33	0.000
L16	42.5 - 41.83 (15)	TP33.65x32.444x0.519	992766.67	2733533.33	0.363	0.00	2733533.33	0.000
L17	41.83 - 41.17 (16)	TP33.812x33.65x0.344	1003908.33	1789483.33	0.561	0.00	1789483.33	0.000
L18	41.17 - 20.25 (17)	TP38.94x33.812x0.497	1282691.67	3310950.00	0.387	0.00	3310950.00	0.000
L19	20.25 - 16.83 (18)	TP39.089x37.027x0.523	1438891.67	3450900.00	0.417	0.00	3450900.00	0.000
L20	16.83 - 14.17 (19)	TP39.74x39.089x0.668	1489458.33	4512175.00	0.330	0.00	4512175.00	0.000
L21	14.17 - 0 (20)	TP43.21x39.74x0.507	1748175.00	4059858.33	0.431	0.00	4059858.33	0.000

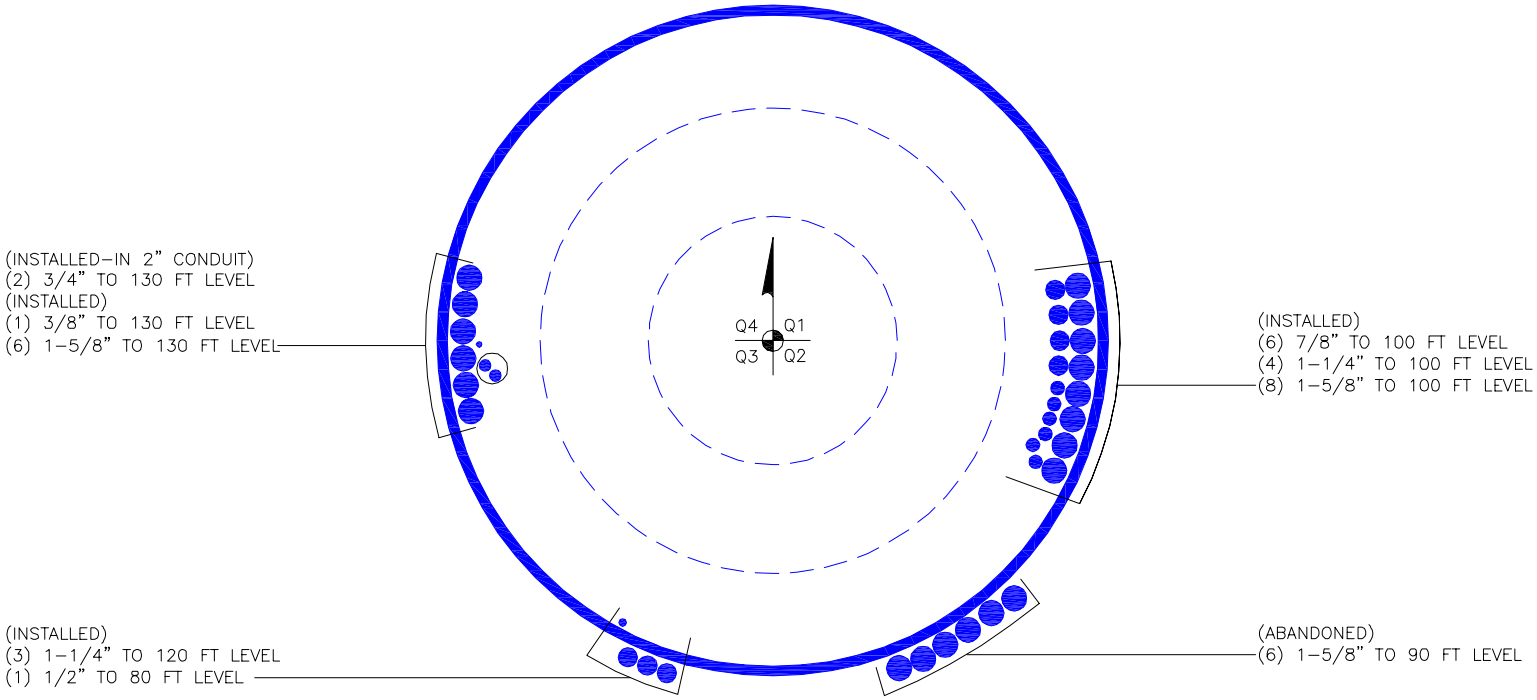
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 120 (1)	TP16x16x0.375	3559.09	347907.00	0.010	569.09	442641.67	0.001
L2	120 - 114.92 (2)	TP17.244x16x0.188	6640.19	349463.00	0.019	257.80	490967.50	0.001
L3	114.92 - 109.42 (3)	TP18.591x17.244x0.49	7192.33	971633.00	0.007	216.64	1425983.33	0.000
L4	109.42 - 103.92 (4)	TP19.938x18.591x0.412	7755.13	880296.00	0.009	162.53	1401858.33	0.000
L5	103.92 - 96.42 (5)	TP21.775x19.938x0.434	11489.80	1014290.00	0.011	84.15	1766641.67	0.000
L6	96.42 - 91.5 (6)	TP22.98x21.775x0.382	11695.30	915981.00	0.013	72.46	1638950.00	0.000
L7	91.5 - 88.92 (7)	TP23.237x21.87x0.438	12318.70	1184830.00	0.010	8.17	2207108.33	0.000
L8	88.92 - 88.25 (8)	TP23.401x23.237x0.334	12388.80	913178.00	0.014	5.72	1729158.33	0.000
L9	88.25 - 87.42 (9)	TP23.605x23.401x0.387	12479.50	1067640.00	0.012	10.37	2030275.00	0.000
L10	87.42 - 86.92 (10)	TP23.727x23.605x0.251	12532.60	684126.00	0.018	13.19	1323258.33	0.000
L11	86.92 - 80.75 (11)	TP25.239x23.727x0.42	13205.30	1235980.00	0.011	48.66	2512033.33	0.000
L12	80.75 - 71.83 (12)	TP27.424x25.239x0.32	13995.20	1028160.00	0.014	48.64	2293608.33	0.000
L13	71.83 - 68.83 (13)	TP28.159x27.424x0.619	14273.40	2022540.00	0.007	48.63	4536508.33	0.000
L14	68.83 - 64.5 (14)	TP29.22x28.159x0.462	14326.40	1524900.00	0.009	48.63	3477533.33	0.000
L15	64.5 - 42.5 (15)	TP34.11x27.801x0.49	16328.60	1895520.00	0.009	48.60	5066150.00	0.000
L16	42.5 - 41.83 (16)	TP33.65x32.444x0.519	16846.40	2040500.00	0.008	48.59	5542750.00	0.000
L17	41.83 - 41.17 (17)	TP33.812x33.65x0.344	16902.70	1315320.00	0.013	48.59	3628508.33	0.000
L18	41.17 - 20.25 (18)	TP38.94x33.812x0.497	18163.60	2195150.00	0.008	48.59	6713583.33	0.000
L19	20.25 - 16.83	TP39.089x37.027x0.523	18912.20	2208360.00	0.009	48.58	6997341.33	0.000

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L20	(19) 16.83 - 14.17	TP39.74x39.089x0.668	19138.00	2860100.00	0.007	48.58	9149250.00	0.000
L21	(20) 14.17 - 0 (21)	TP43.21x39.74x0.507	20286.30	2370020.00	0.009	48.58	8232124.67	0.000

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876314 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Mod #	Modification Type	Termination Length (ft)	Bot. Elevation (ft)	Top Elevation (ft)	Termination Length (ft)	Modification Location (° or Flat/Point #)	Location (F/P)	Lateral Offset (in)
1	(Aero) MP304	-0.50	0.50	15.50	-1.33	3 6 9 12	Flats	0.00
2	(Aero) MP304		12.67	42.67		1 4 7 10	Flats	0.00
3	(Aero) MP304		40.33	70.33	-1.50	3 6 9 12	Flats	0.00
4	(Aero) MP303	0.66	68.17	88.17		1 4 10	Flats	0.00
5	(Aero) MP303	0.66	68.17	73.08		7	Flats	0.00
6	(Aero) MP303		79.50	89.50		7	Flats	0.00
7	(Aero) MP303-BB		86.17	116.17		3 9 12	Flats	0.00
8	(Aero) MP303-BB		87.67	97.67		6	Flats	0.00
9	(Aero) MP303-BB		95.17	103.92	0.00	5 7	Flats	0.00
10	(Aero) MP303-BB	0.00	103.92	109.42	0.00	6	Flats	0.00
11	(Aero) MP303-BB	0.00	109.42	116.17		5 7	Flats	0.00

MODIFICATION PROPERTIES

#	Modification	Default Termination (ft)	Stitch (in)	k	Drill Hole (in)	Bolt/Weld Capacity (k)	A_G (in^2)	F_Y (ksi)	F_U (ksi)
1	(Aero) MP304	1.50	18.00	0.80	1.2188	36.0	4.13	65.0	80.0
4	(Aero) MP303	1.25	18.00	0.80	1.2188	36.0	2.92	65.0	80.0
7	(Aero) MP303-BB	1.25	18.00	0.80	1.2188	36.0	2.92	65.0	80.0

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Section No.	*Elevation (ft)*	*Type*	*Size*	*Critical Element*	*Pu (lb)*	*φPn (lb)*	*% Capacity*	*Pass/Fail*
L1	130.00-120.00	Pole	TP16.00×16.00×0.3750	1	Note 1	Note 1	12.2	Pass
L2	120.00-91.50	Pole	TP22.98×16.00×0.1875	2	Note 1	Note 1	33.4	Pass
L3	94.50-64.50	Pole	TP29.22×21.87×0.2500	3	Note 1	Note 1	55.9	Pass
L4	68.25-42.50	Pole	TP34.11×27.80×0.3125	4	Note 1	Note 1	39.6	Pass
L5	46.75-20.25	Pole	TP38.94×32.44×0.3438	5	Note 1	Note 1	57.0	Pass
L6	25.25-0.00	Pole	TP43.21×37.03×0.3750	6	Note 1	Note 1	47.8	Pass
M1	15.50-0.50	Mod (Ex)	(Aero) MP304	1	Note 1	Note 1	57.2	Pass
M2	42.67-12.67	Mod (Ex)	(Aero) MP304	2	Note 1	Note 1	56.1	Pass
M3	70.33-40.33	Mod (Ex)	(Aero) MP304	3	Note 1	Note 1	53.0	Pass
M4	88.17-68.17	Mod (Ex)	(Aero) MP303	4	Note 1	Note 1	62.6	Pass
M5	73.08-68.17	Mod (Ex)	(Aero) MP303	5	Note 1	Note 1	37.7	Pass
M6	89.50-79.50	Mod (Ex)	(Aero) MP303	6	Note 1	Note 1	48.9	Pass
M7	116.17-86.17	Mod (Ex)	(Aero) MP303-BB	7	Note 1	Note 1	51.0	Pass
M8	97.67-87.67	Mod (Ex)	(Aero) MP303-BB	8	Note 1	Note 1	43.6	Pass
M9	103.92-95.17	Mod (Ex)	(Aero) MP303-BB	9	Note 1	Note 1	33.4	Pass
M10	109.42-103.92	Mod (Ex)	(Aero) MP303-BB	10	Note 1	Note 1	30.3	Pass
M11	116.17-109.42	Mod (Ex)	(Aero) MP303-BB	11	Note 1	Note 1	19.9	Pass

	Summary	
Pole (L5)	57.0	Pass
Mod (M4)	62.6	Pass
RATING =	**62.6**	**Pass**

*Note 1: See additional documentation in following sheets for details.

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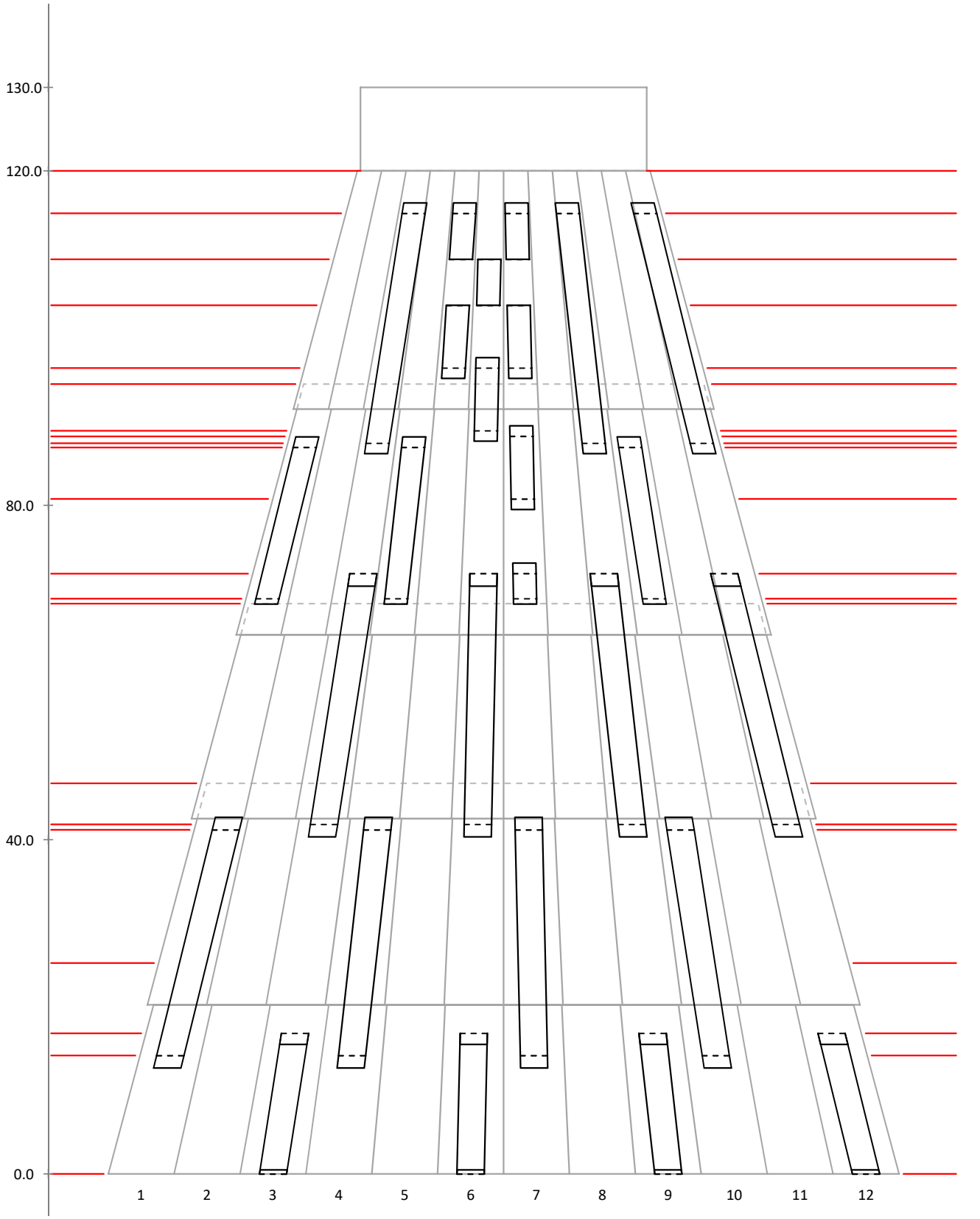
Reinforcement Layout



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Loads	
Axial:	37.5 k
Moment:	1,768.7 k·ft
Shear:	20.3 k
Torsion:	0.0 k·ft

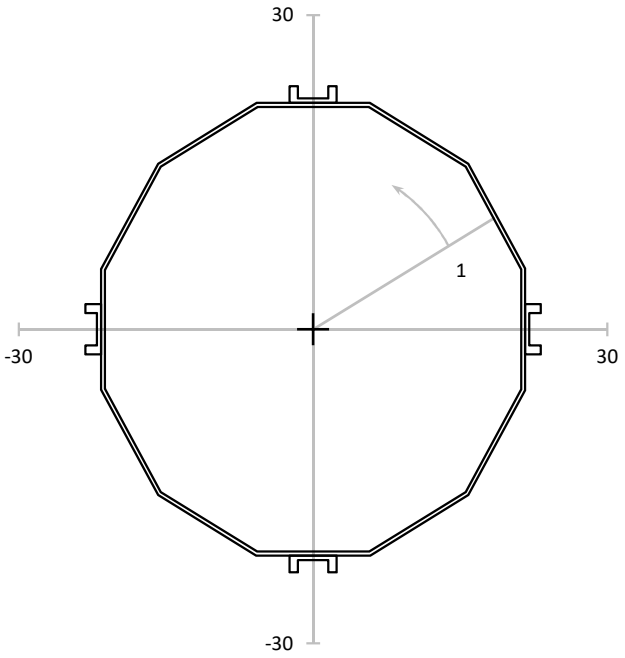
Equivalent Loads to Pole	
Axial:	28.4 k
Moment:	1,321.3 k·ft
Shear:	15.4 k
Torsion:	0.0 k·ft

Shear Flow	
Controlling Mod:	1
q:	0.115 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	313.64 in
Stitch:	18.00 in
Capacity:	5.7%

Pole Info	
OD:	43.21 in
t:	0.3750 in
Pole A_G:	51.72 in^2
Pole I_G:	12,113.5 in^4

Controlling	
Angle:	60.00°
I_{CONT}:	16,215.4 in^4
A_G:	68.24 in^2

Minimum	
Angle:	13.90°
I_{MIN}:	16,215.4 in^4
t_{EFF}:	0.5066 in



Pole Segment: L6, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
15.00	22.38	16215.4	0.550	29.296	0.297	0.001	62.444	62.444	31.222	62.444	**47.8%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
1	1	**60.00**	22.22	16215.4	0.550	29.077	0.297	53.494	49.881	29.250	**57.2%**
1	2	**150.00**	22.22	16215.4	0.550	29.077	0.297	53.494	49.881	29.250	**57.2%**
1	3	**240.00**	22.22	16215.4	0.550	29.077	0.297	53.494	49.881	29.250	**57.2%**
1	4	**330.00**	22.22	16215.4	0.550	29.077	0.297	53.494	49.881	29.250	**57.2%**

Elevation: 14.17-ft

Loads	
Axial:	33.0 k
Moment:	1,489.5 k·ft
Shear:	19.1 k
Torsion:	0.0 k·ft

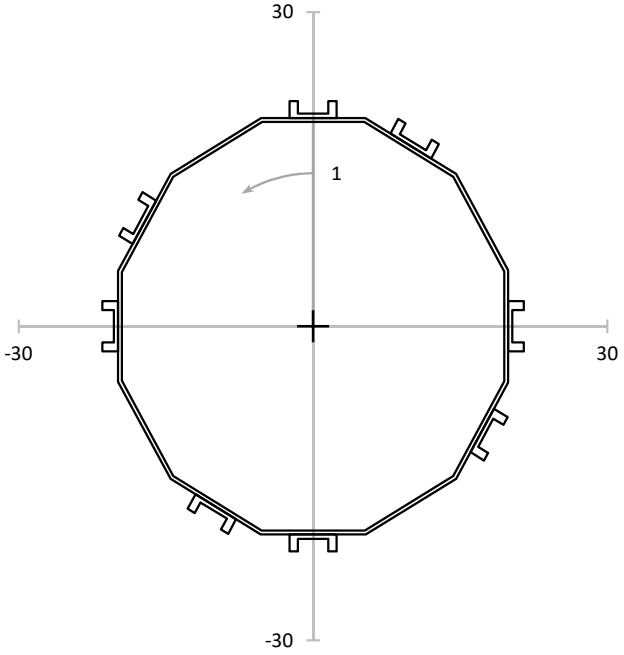
Pole Info	
OD:	39.74 in
t:	0.3750 in
Pole A_G:	47.53 in^2
Pole I_G:	9,401.7 in^4

Equivalent Loads to Pole	
Axial:	19.5 k
Moment:	854.8 k·ft
Shear:	11.3 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**360.00°**
I_G:	16,381.8 in^4
A_G:	80.57 in^2

Shear Flow	
Controlling Mod:	1
q:	0.099 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	364.32 in
Stitch:	18.00 in
Capacity:	**4.9%**

Minimum	
Angle:	**7.50°**
I_{MIN}:	16,381.8 in^4
t_{EFF}:	0.6682 in



Pole Segment: L6, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
165.00	20.59	16381.8	0.410	22.460	0.238	0.001	64.603	64.603	32.301	64.603	**35.4%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
1	1	**60.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
1	2	**150.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
1	3	**240.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
1	4	**330.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
2	1	**360.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
2	2	**90.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
2	3	**180.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**
2	4	**270.00**	20.48	16381.8	0.410	22.345	0.238	53.494	49.881	29.250	**44.0%**

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Elevation: 16.83-ft

Loads	
Axial:	32.1 k
Moment:	1,438.9 k·ft
Shear:	18.9 k
Torsion:	0.0 k·ft

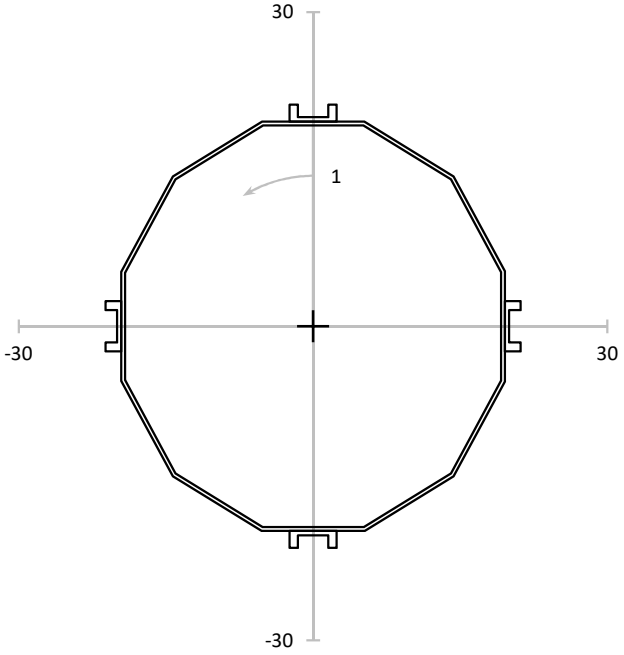
Equivalent Loads to Pole	
Axial:	23.7 k
Moment:	1,044.2 k·ft
Shear:	14.0 k
Torsion:	0.0 k·ft

Shear Flow	
Controlling Mod:	2
q:	0.128 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	281.82 in
Stitch:	18.00 in
Capacity:	6.4%

Pole Info	
OD:	39.09 in
t:	0.3750 in
Pole A_G:	46.75 in^2
Pole I_G:	8,942.7 in^4

Controlling	
Angle:	**0.00°**
I_G:	12,323.4 in^4
A_G:	63.27 in^2

Minimum	
Angle:	**112.50°**
I_{MIN}:	12,323.4 in^4
t_{EFF}:	0.5227 in



Pole Segment: L6, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
135.00	20.25	12323.4	0.508	28.370	0.299	0.001	65.008	65.008	32.504	65.008	**44.4%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
2	1	**0.00**	20.15	12323.4	0.508	28.239	0.299	53.494	49.881	29.250	**55.6%**
2	2	**90.00**	20.15	12323.4	0.508	28.239	0.299	53.494	49.881	29.250	**55.6%**
2	3	**180.00**	20.15	12323.4	0.508	28.239	0.299	53.494	49.881	29.250	**55.6%**
2	4	**270.00**	20.15	12323.4	0.508	28.239	0.299	53.494	49.881	29.250	**55.6%**

Elevation: 25.25-ft

Loads	
Axial:	28.8 k
Moment:	1,282.7 k·ft
Shear:	18.2 k
Torsion:	0.0 k·ft

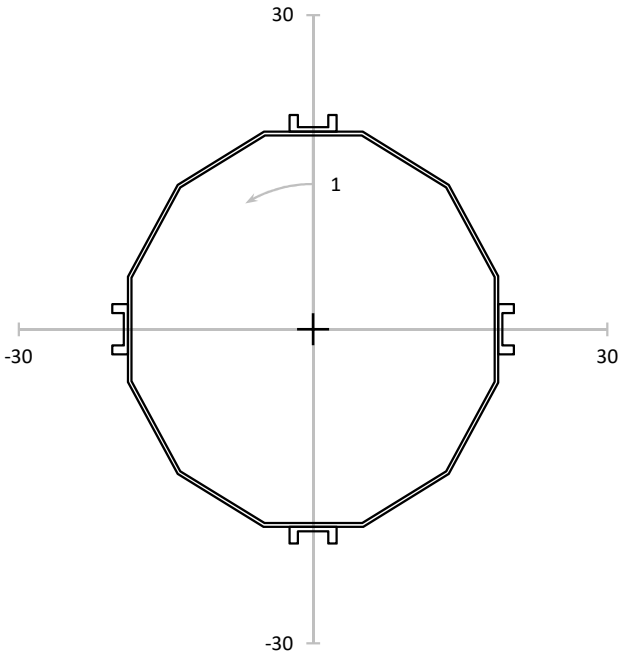
Pole Info	
OD:	37.71 in
t:	0.3438 in
Pole A_G:	41.37 in^2
Pole I_G:	7,374.5 in^4

Equivalent Loads to Pole	
Axial:	20.6 k
Moment:	898.3 k·ft
Shear:	13.0 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**360.00°**
I_G:	10,530.4 in^4
A_G:	57.89 in^2

Shear Flow	
Controlling Mod:	2
q:	0.139 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	259.59 in
Stitch:	18.00 in
Capacity:	**6.9%**

Minimum	
Angle:	**113.90°**
I_{MIN}:	10,530.4 in^4
t_{EFF}:	0.4970 in



Pole Segment: L5, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
135.00	19.54	10530.4	0.498	28.556	0.314	0.001	68.016	68.016	34.008	68.016	**42.7%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
2	1	**360.00**	19.47	10530.4	0.498	28.455	0.314	53.494	49.881	29.250	**56.1%**
2	2	**90.00**	19.47	10530.4	0.498	28.455	0.314	53.494	49.881	29.250	**56.1%**
2	3	**180.00**	19.47	10530.4	0.498	28.455	0.314	53.494	49.881	29.250	**56.1%**
2	4	**270.00**	19.47	10530.4	0.498	28.455	0.314	53.494	49.881	29.250	**56.1%**

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Elevation: 41.17-ft

Loads	
Axial:	24.5 k
Moment:	1,003.9 k·ft
Shear:	16.9 k
Torsion:	0.0 k·ft

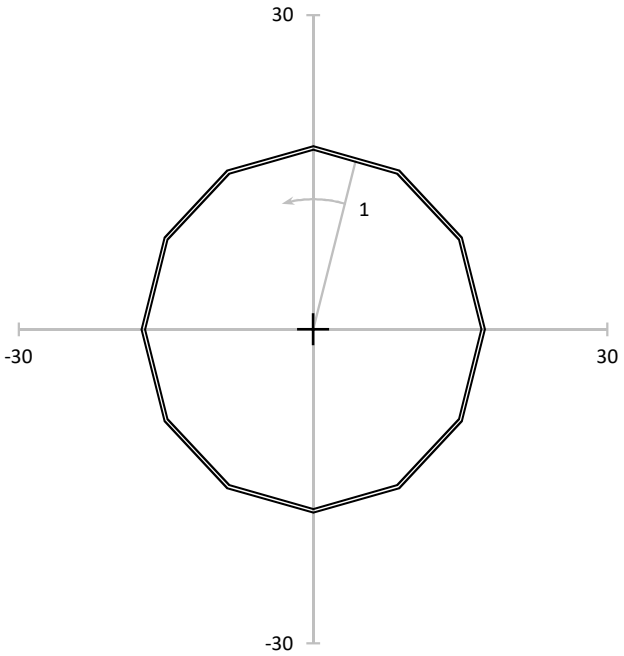
Equivalent Loads to Pole	
Axial:	24.5 k
Moment:	1,003.9 k·ft
Shear:	16.9 k
Torsion:	0.0 k·ft

Shear Flow N/A

Pole Info	
OD:	33.81 in
t:	0.3438 in
Pole A_G:	37.05 in^2
Pole I_G:	5,297.0 in^4

Controlling	
Angle:	**15.00°**
I_G:	5,297.0 in^4
A_G:	37.05 in^2

Minimum	
Angle:	**0.00°**
I_{MIN}:	5,297.0 in^4
t_{EFF}:	0.3438 in



Pole Segment: L5, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
15.00	17.51	5297.0	0.661	39.833	0.456	0.001	71.002	71.002	35.501	71.002	**57.0%**

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity

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Elevation: 41.83-ft

Loads	
Axial:	24.3 k
Moment:	992.8 k·ft
Shear:	16.8 k
Torsion:	0.0 k·ft

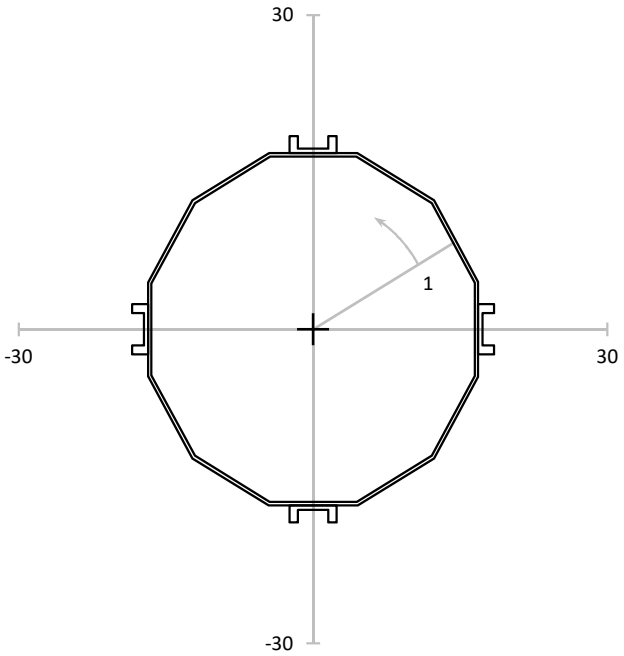
Pole Info	
OD:	33.65 in
t:	0.3438 in
Pole A_G:	36.87 in^2
Pole I_G:	5,220.6 in^4

Equivalent Loads to Pole	
Axial:	16.8 k
Moment:	668.2 k·ft
Shear:	11.6 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**60.00°**
I_G:	7,757.0 in^4
A_G:	53.39 in^2

Shear Flow	
Controlling Mod:	3
q:	0.156 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	230.21 in
Stitch:	18.00 in
Capacity:	**7.8%**

Minimum	
Angle:	**2.00°**
I_{MIN}:	7,757.0 in^4
t_{EFF}:	0.5190 in



Pole Segment: L5, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
195.00	17.43	7757.0	0.454	26.770	0.316	0.001	71.126	71.126	35.563	71.126	**38.3%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
3	1	**60.00**	17.43	7757.0	0.454	26.777	0.316	53.494	49.881	29.250	**52.8%**
3	2	**150.00**	17.43	7757.0	0.454	26.777	0.316	53.494	49.881	29.250	**52.8%**
3	3	**240.00**	17.43	7757.0	0.454	26.777	0.316	53.494	49.881	29.250	**52.8%**
3	4	**330.00**	17.43	7757.0	0.454	26.777	0.316	53.494	49.881	29.250	**52.8%**

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Elevation: 46.75-ft

Loads	
Axial:	22.4 k
Moment:	911.2 k·ft
Shear:	16.3 k
Torsion:	0.0 k·ft

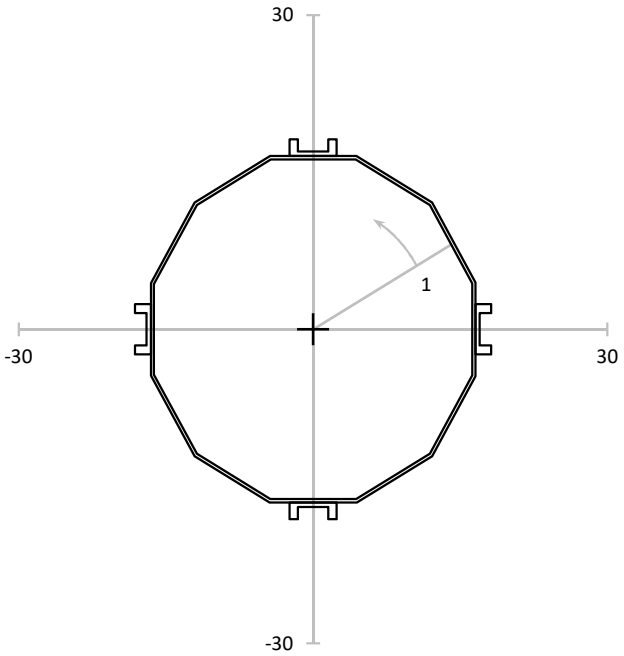
Pole Info	
OD:	33.07 in
t:	0.3125 in
Pole A_G:	32.96 in^2
Pole I_G:	4,514.1 in^4

Equivalent Loads to Pole	
Axial:	14.9 k
Moment:	590.3 k·ft
Shear:	10.9 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**60.00°**
I_G:	6,967.5 in^4
A_G:	49.48 in^2

Shear Flow	
Controlling Mod:	3
q:	0.166 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	216.95 in
Stitch:	18.00 in
Capacity:	**8.3%**

Minimum	
Angle:	**0.35°**
I_{MIN}:	6,967.5 in^4
t_{EFF}:	0.4903 in



Pole Segment: L4, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	**y_{CONT} (in)**	**I (in^4)**	**σ_A (ksi)**	**σ_B (ksi)**	**σ_V (ksi)**	**σ_T (ksi)**	**ϕF_A (ksi)**	**ϕF_B (ksi)**	**ϕF_V (ksi)**	**ϕF_T (ksi)**	**Capacity**
195.00	17.13	6967.5	0.453	26.882	0.330	0.001	69.036	69.036	34.518	69.036	**39.6%**

MODIFICATION CAPACITIES											
Mod Number	**#**	**Angle (°)**	**$\bar{y}_{CONT}$ (in)**	**I (in^4)**	**σ_A (ksi)**	**σ_B (ksi)**	**σ_V (ksi)**	**ϕF_A (ksi)**	**ϕF_B (ksi)**	**ϕF_V (ksi)**	**Capacity**
3	1	**60.00**	17.14	6967.5	0.453	26.905	0.330	53.494	49.881	29.250	**53.0%**
3	2	**150.00**	17.14	6967.5	0.453	26.905	0.330	53.494	49.881	29.250	**53.0%**
3	3	**240.00**	17.14	6967.5	0.453	26.905	0.330	53.494	49.881	29.250	**53.0%**
3	4	**330.00**	17.14	6967.5	0.453	26.905	0.330	53.494	49.881	29.250	**53.0%**

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Elevation: 68.25-ft

Loads	
Axial:	17.1 k
Moment:	581.8 k·ft
Shear:	14.3 k
Torsion:	0.0 k·ft

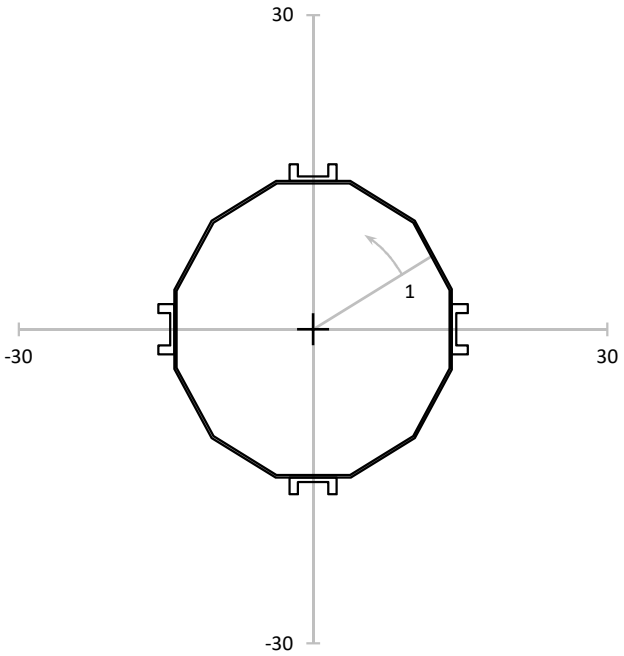
Pole Info	
OD:	28.30 in
t:	0.2500 in
Pole A_G:	22.58 in^2
Pole I_G:	2,268.0 in^4

Equivalent Loads to Pole	
Axial:	9.9 k
Moment:	322.4 k·ft
Shear:	8.3 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**60.00°**
I_G:	4,093.2 in^4
A_G:	39.10 in^2

Shear Flow	
Controlling Mod:	3
q:	0.213 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	168.72 in
Stitch:	18.00 in
Capacity:	**10.7%**

Minimum	
Angle:	**7.50°**
I_{MIN}:	4,093.2 in^4
t_{EFF}:	0.4616 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	**y_{CONT} (in)**	**I (in^4)**	**σ_A (ksi)**	**σ_B (ksi)**	**σ_V (ksi)**	**σ_T (ksi)**	**ϕF_A (ksi)**	**ϕF_B (ksi)**	**ϕF_V (ksi)**	**ϕF_T (ksi)**	**Capacity**
195.00	14.66	4093.2	0.437	25.007	0.366	0.002	67.094	67.094	33.547	67.094	**37.9%**

MODIFICATION CAPACITIES											
Mod Number	**#**	**Angle (°)**	**$\bar{y}_{CONT}$ (in)**	**I (in^4)**	**σ_A (ksi)**	**σ_B (ksi)**	**σ_V (ksi)**	**ϕF_A (ksi)**	**ϕF_B (ksi)**	**ϕF_V (ksi)**	**Capacity**
3	1	**60.00**	14.76	4093.2	0.437	25.178	0.366	53.494	49.881	29.250	**49.6%**
3	2	**150.00**	14.76	4093.2	0.437	25.178	0.366	53.494	49.881	29.250	**49.6%**
3	3	**240.00**	14.76	4093.2	0.437	25.178	0.366	53.494	49.881	29.250	**49.6%**
3	4	**330.00**	14.76	4093.2	0.437	25.178	0.366	53.494	49.881	29.250	**49.6%**

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Elevation: 68.83-ft

Loads	
Axial:	17.0 k
Moment:	573.6 k·ft
Shear:	14.3 k
Torsion:	0.0 k·ft

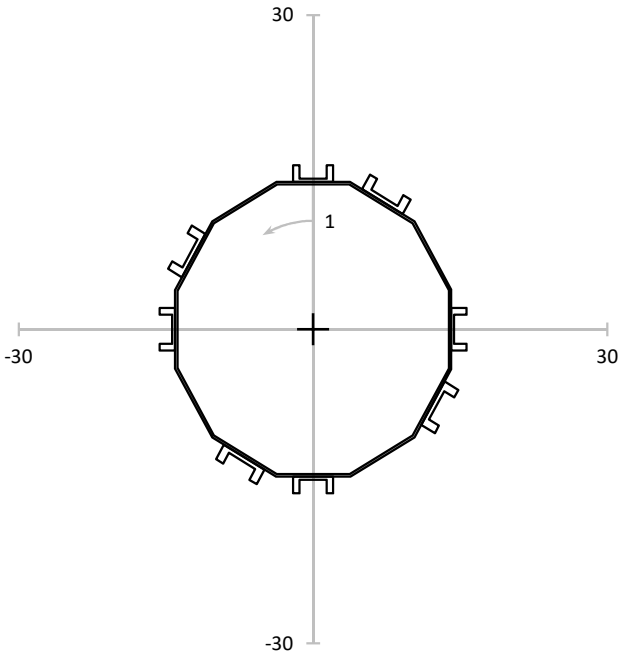
Pole Info	
OD:	28.16 in
t:	0.2500 in
Pole A_G:	22.47 in^2
Pole I_G:	2,233.7 in^4

Equivalent Loads to Pole	
Axial:	7.5 k
Moment:	241.1 k·ft
Shear:	6.3 k
Torsion:	0.0 k·ft

Controlling	
Angle:	0.00°
I_G:	5,312.8 in^4
A_G:	50.67 in^2

Shear Flow	
Controlling Mod:	3
q:	0.163 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	220.87 in
Stitch:	18.00 in
Capacity:	8.1%

Minimum	
Angle:	4.25°
I_{MIN}:	5,312.8 in^4
t_{EFF}:	0.6188 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
165.00	14.59	5312.8	0.335	18.896	0.282	0.002	67.243	67.243	33.622	67.243	**28.6%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
3	1	**60.00**	14.69	5312.8	0.335	19.030	0.282	53.494	49.881	29.250	**37.5%**
3	2	**150.00**	14.69	5312.8	0.335	19.030	0.282	53.494	49.881	29.250	**37.5%**
3	3	**240.00**	14.69	5312.8	0.335	19.030	0.282	53.494	49.881	29.250	**37.5%**
3	4	**330.00**	14.69	5312.8	0.335	19.030	0.282	53.494	49.881	29.250	**37.5%**
4	1	**0.00**	14.67	5312.8	0.335	19.004	0.282	53.615	49.540	29.250	**37.7%**
4	2	**90.00**	14.67	5312.8	0.335	19.004	0.282	53.615	49.540	29.250	**37.7%**
4	3	**270.00**	14.67	5312.8	0.335	19.004	0.282	53.615	49.540	29.250	**37.7%**
5	1	**180.00**	14.67	5312.8	0.335	19.004	0.282	53.615	49.540	29.250	**37.7%**

Elevation: 71.83-ft

Loads	
Axial:	16.3 k
Moment:	531.2 k·ft
Shear:	14.0 k
Torsion:	0.0 k·ft

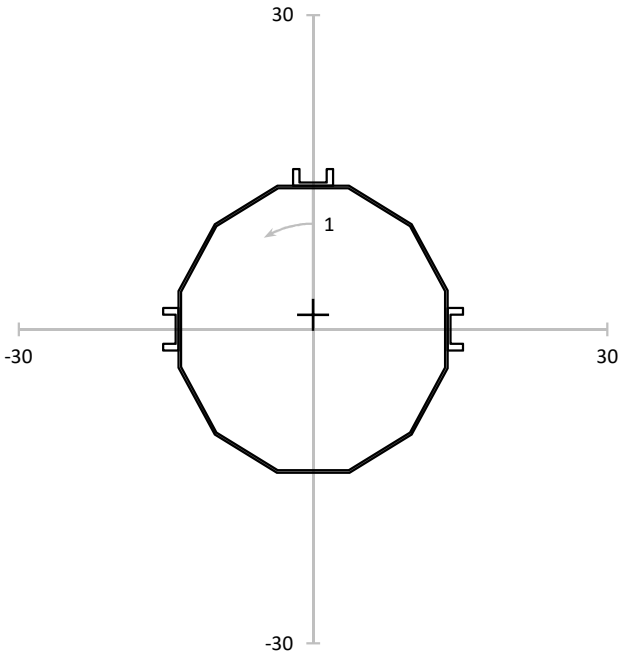
Pole Info	
OD:	27.42 in
t:	0.2500 in
Pole A_G:	21.88 in^2
Pole I_G:	2,061.8 in^4

Equivalent Loads to Pole	
Axial:	11.7 k
Moment:	424.2 k·ft
Shear:	10.0 k
Torsion:	0.0 k·ft

Controlling	
Angle:	0.00°
I_G:	2,616.0 in^4
A_G:	30.64 in^2

Shear Flow	
Controlling Mod:	4
q:	0.202 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	178.11 in
Stitch:	18.00 in
Capacity:	10.1%

Minimum	
Angle:	0.00°
I_{MIN}:	2,616.0 in^4
t_{EFF}:	0.3196 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
189.25	15.48	2632.7	0.533	37.478	0.457	0.002	68.017	68.017	34.008	68.017	**55.9%**

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
4	1	**0.00**	12.94	2616.0	0.533	31.527	0.457	53.615	49.540	29.250	**62.6%**
4	2	**98.95**	14.34	3248.6	0.533	28.137	0.457	53.615	49.540	29.250	**55.7%**
4	3	**261.05**	14.34	3248.6	0.533	28.137	0.457	53.615	49.540	29.250	**55.7%**

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Elevation: 80.75-ft

Loads	
Axial:	14.8 k
Moment:	409.6 k·ft
Shear:	13.2 k
Torsion:	0.0 k·ft

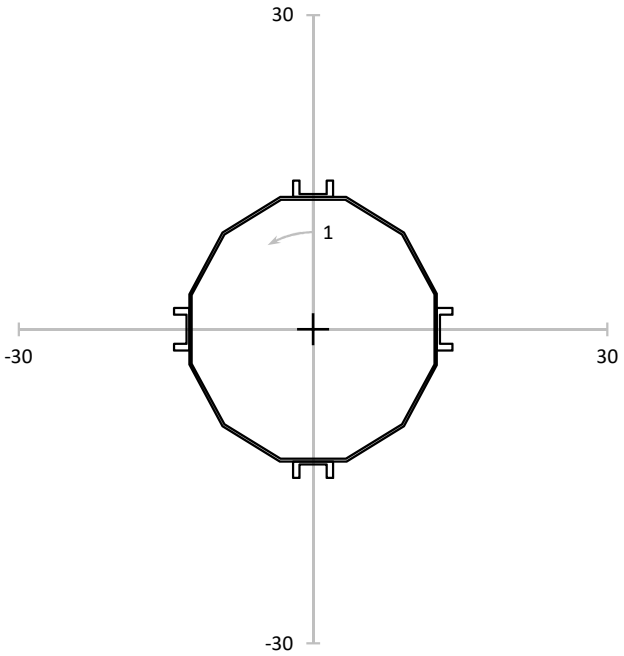
Pole Info	
OD:	25.24 in
t:	0.2500 in
Pole A_G:	20.12 in^2
Pole I_G:	1,603.3 in^4

Equivalent Loads to Pole	
Axial:	9.4 k
Moment:	249.0 k·ft
Shear:	8.4 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**0.00°**
I_G:	2,636.8 in^4
A_G:	31.80 in^2

Shear Flow	
Controlling Mod:	4
q:	0.193 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	186.37 in
Stitch:	18.00 in
Capacity:	**9.7%**

Minimum	
Angle:	**113.00°**
I_{MIN}:	2,636.8 in^4
t_{EFF}:	0.4196 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
135.00	13.07	2636.8	0.465	24.369	0.415	0.002	70.316	70.316	35.158	70.316	**35.3%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
4	1	**0.00**	13.21	2636.8	0.465	24.622	0.415	53.615	49.540	29.250	**48.8%**
4	2	**90.00**	13.21	2636.8	0.465	24.622	0.415	53.615	49.540	29.250	**48.8%**
4	3	**270.00**	13.21	2636.8	0.465	24.622	0.415	53.615	49.540	29.250	**48.8%**
6	1	**180.00**	13.21	2636.8	0.465	24.622	0.415	53.615	49.540	29.250	**48.8%**

Elevation: 86.92-ft

Loads	
Axial:	13.8 k
Moment:	330.3 k·ft
Shear:	12.5 k
Torsion:	0.0 k·ft

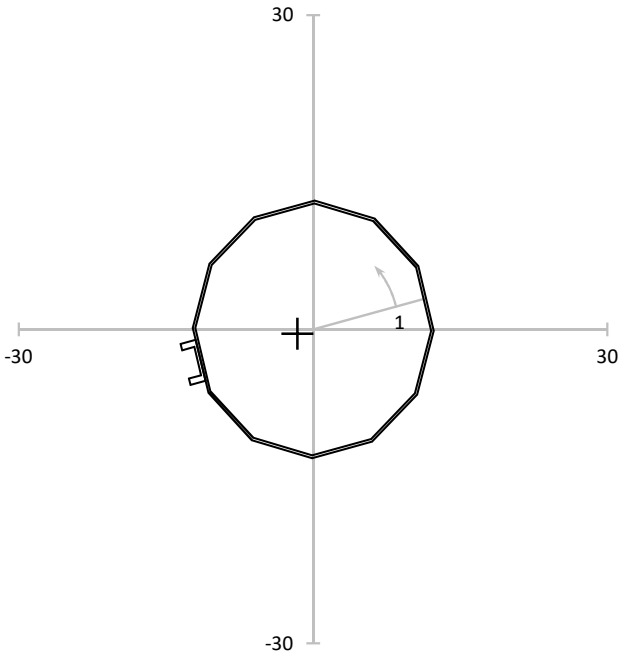
Pole Info	
OD:	23.73 in
t:	0.2500 in
Pole A_G:	18.90 in^2
Pole I_G:	1,329.6 in^4

Equivalent Loads to Pole	
Axial:	11.9 k
Moment:	335.6 k·ft
Shear:	10.9 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**75.60°**
I_G:	1,360.1 in^4
A_G:	21.82 in^2

Shear Flow	
Controlling Mod:	6
q:	0.229 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	157.09 in
Stitch:	18.00 in
Capacity:	**11.5%**

Minimum	
Angle:	**90.00°**
I_{MIN}:	1,336.2 in^4
t_{EFF}:	0.2513 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
75.60	12.70	1360.1	0.631	37.021	0.574	0.001	71.907	71.907	35.953	71.907	**52.4%**

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
6	1	**180.00**	10.79	1722.5	0.631	24.819	0.574	53.615	49.540	29.250	**48.9%**

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Loads	
Axial:	13.7 k
Moment:	324.0 k·ft
Shear:	12.5 k
Torsion:	0.0 k·ft

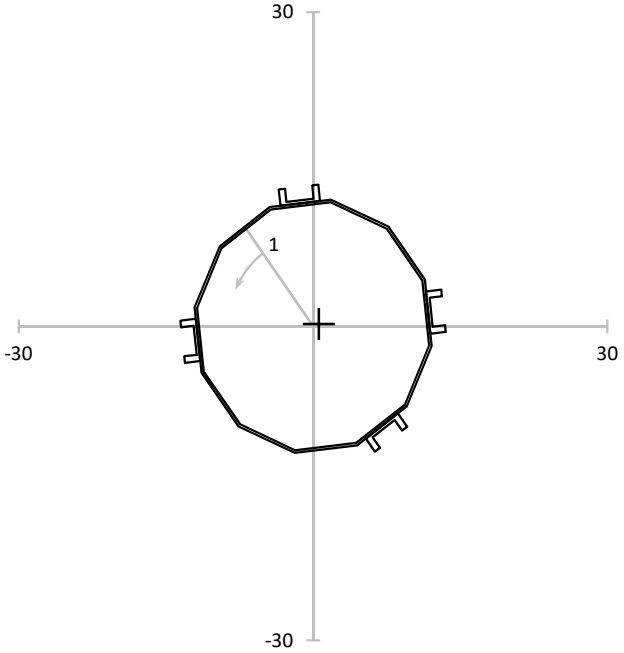
Pole Info	
OD:	23.60 in
t:	0.2500 in
Pole A_G:	18.80 in^2
Pole I_G:	1,308.9 in^4

Equivalent Loads to Pole	
Axial:	8.4 k
Moment:	211.2 k·ft
Shear:	7.7 k
Torsion:	0.0 k·ft

Controlling	
Angle:	323.65°
I_G:	2,068.7 in^4
A_G:	30.48 in^2

Shear Flow	
Controlling Mod:	7
q:	0.213 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	169.00 in
Stitch:	18.00 in
Capacity:	10.7%

Minimum	
Angle:	119.25°
I_{MIN}:	1,993.1 in^4
t_{EFF}:	0.3875 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
108.30	12.72	2009.1	0.448	24.619	0.409	0.001	72.036	72.036	36.018	72.036	**34.8%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
6	1	**166.00**	12.01	2228.0	0.448	20.967	0.409	53.615	49.540	29.250	**41.4%**
7	1	**71.90**	12.74	2232.7	0.448	22.187	0.409	49.176	49.176	29.250	**46.0%**
7	2	**250.30**	11.58	2244.9	0.448	20.058	0.409	49.176	49.176	29.250	**41.7%**
7	3	**323.65**	12.09	2068.7	0.448	22.730	0.409	49.176	49.176	29.250	**47.2%**

Elevation: 88.25-ft

Loads	
Axial:	13.5 k
Moment:	313.7 k·ft
Shear:	12.4 k
Torsion:	0.0 k·ft

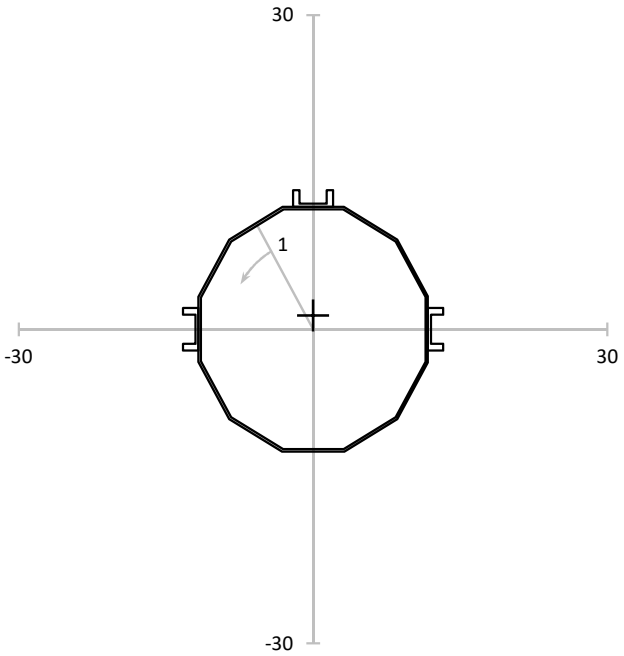
Pole Info	
OD:	23.40 in
t:	0.2500 in
Pole A_G:	18.64 in^2
Pole I_G:	1,275.0 in^4

Equivalent Loads to Pole	
Axial:	9.2 k
Moment:	240.6 k·ft
Shear:	8.4 k
Torsion:	0.0 k·ft

Controlling	
Angle:	**330.00°**
I_G:	1,682.9 in^4
A_G:	27.40 in^2

Shear Flow	
Controlling Mod:	7
q:	0.236 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	152.52 in
Stitch:	18.00 in
Capacity:	**11.8%**

Minimum	
Angle:	**150.00°**
I_{MIN}:	1,682.9 in^4
t_{EFF}:	0.3336 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
338.70	13.34	1693.9	0.493	29.654	0.452	0.000	72.250	72.250	36.125	72.250	**41.7%**

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
7	1	**70.80**	12.32	2148.2	0.493	21.587	0.452	49.176	49.176	29.250	**44.9%**
7	2	**229.20**	12.32	2148.2	0.493	21.587	0.452	49.176	49.176	29.250	**44.9%**
7	3	**330.00**	10.98	1682.9	0.493	24.563	0.452	49.176	49.176	29.250	**51.0%**

Loads	
Axial:	13.4 k
Moment:	305.4 k·ft
Shear:	12.3 k
Torsion:	0.0 k·ft

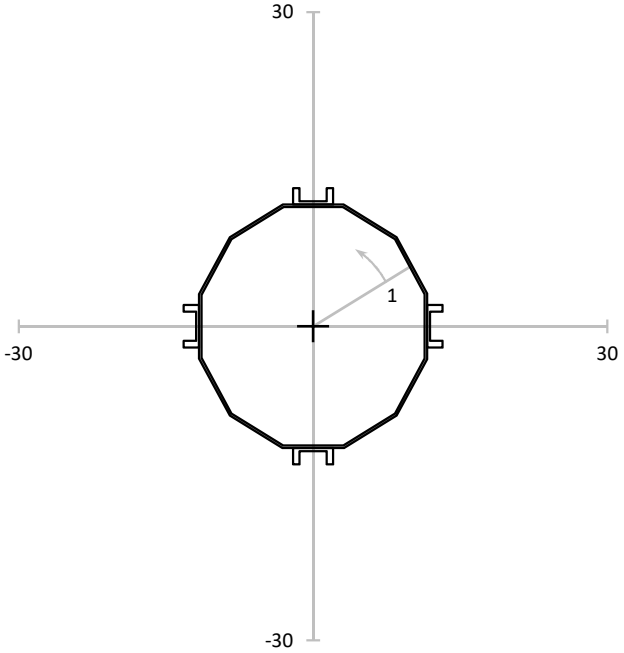
Pole Info	
OD:	23.24 in
t:	0.2500 in
Pole A_G:	18.50 in^2
Pole I_G:	1,248.1 in^4

Equivalent Loads to Pole	
Axial:	8.2 k
Moment:	178.7 k·ft
Shear:	7.6 k
Torsion:	0.0 k·ft

Controlling	
Angle:	60.00°
I_G:	2,133.0 in^4
A_G:	30.18 in^2

Shear Flow	
Controlling Mod:	7
q:	0.206 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	174.86 in
Stitch:	18.00 in
Capacity:	10.3%

Minimum	
Angle:	0.05°
I_{MIN}:	2,133.0 in^4
t_{EFF}:	0.4379 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY											
Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
195.00	12.04	2133.0	0.443	20.684	0.408	0.000	72.422	72.422	36.211	72.422	**29.2%**

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
7	1	**60.00**	12.21	2133.0	0.443	20.979	0.408	49.176	49.176	29.250	**43.6%**
7	2	**240.00**	12.21	2133.0	0.443	20.979	0.408	49.176	49.176	29.250	**43.6%**
7	3	**330.00**	12.21	2133.0	0.443	20.979	0.408	49.176	49.176	29.250	**43.6%**
8	1	**150.00**	12.21	2133.0	0.443	20.979	0.408	49.176	49.176	29.250	**43.6%**

Loads	
Axial:	12.4 k
Moment:	238.5 k·ft
Shear:	11.7 k
Torsion:	0.1 k·ft

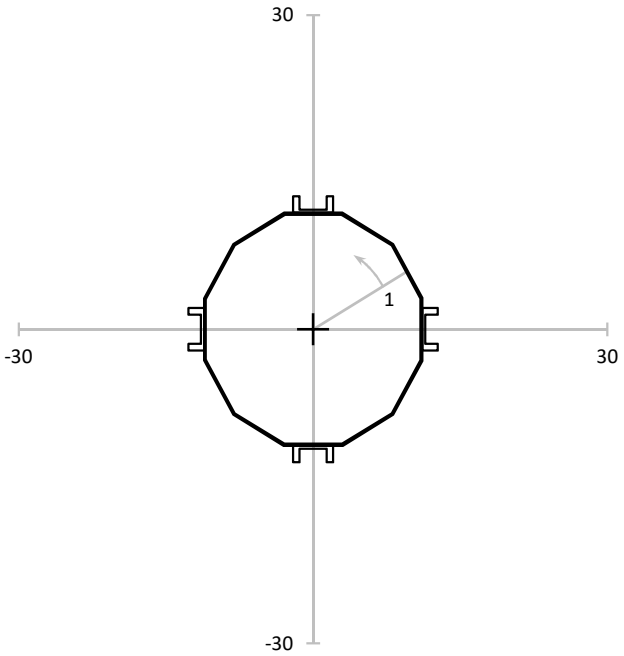
Pole Info	
OD:	22.25 in
t:	0.1875 in
Pole A_G:	13.32 in^2
Pole I_G:	827.0 in^4

Equivalent Loads to Pole	
Axial:	6.6 k
Moment:	120.1 k·ft
Shear:	6.2 k
Torsion:	0.1 k·ft

Controlling	
Angle:	**60.00°**
I_G:	1,642.7 in^4
A_G:	25.00 in^2

Shear Flow	
Controlling Mod:	7
q:	0.244 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	147.84 in
Stitch:	18.00 in
Capacity:	**12.2%**

Minimum	
Angle:	**7.50°**
I_{MIN}:	1,642.7 in^4
t_{EFF}:	0.3825 in



Pole Segment: L2, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
195.00	11.52	1642.7	0.495	20.074	0.468	0.004	61.647	61.647	30.824	61.647	**33.4%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
7	1	**60.00**	11.71	1642.7	0.495	20.404	0.468	49.176	49.176	29.250	**42.5%**
7	2	**240.00**	11.71	1642.7	0.495	20.404	0.468	49.176	49.176	29.250	**42.5%**
7	3	**330.00**	11.71	1642.7	0.495	20.404	0.468	49.176	49.176	29.250	**42.5%**
8	1	**150.00**	11.71	1642.7	0.495	20.404	0.468	49.176	49.176	29.250	**42.5%**

Elevation: 96.42-ft

Loads	
Axial:	12.1 k
Moment:	216.2 k·ft
Shear:	11.5 k
Torsion:	0.1 k·ft

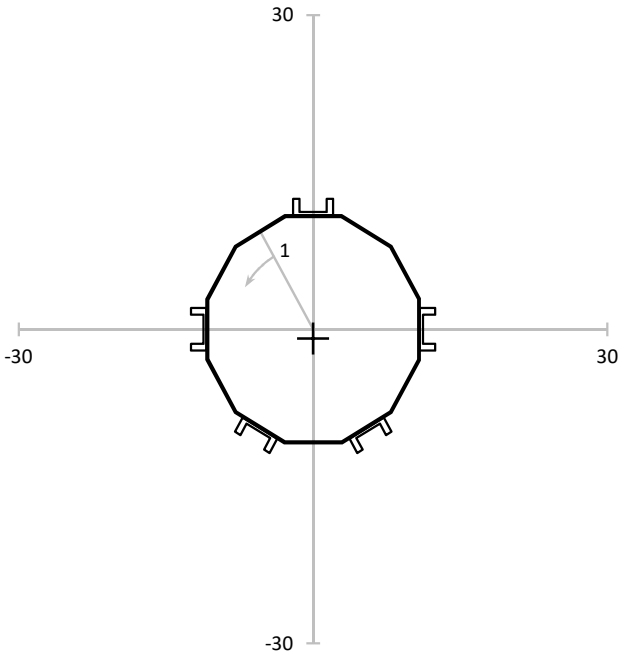
Pole Info	
OD:	21.78 in
t:	0.1875 in
Pole A_G:	13.03 in^2
Pole I_G:	775.3 in^4

Equivalent Loads to Pole	
Axial:	5.7 k
Moment:	97.6 k·ft
Shear:	5.4 k
Torsion:	0.1 k·ft

Controlling	
Angle:	**330.00°**
I_G:	1,733.2 in^4
A_G:	27.63 in^2

Shear Flow	
Controlling Mod:	7
q:	0.239 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	150.40 in
Stitch:	18.00 in
Capacity:	**12.0%**

Minimum	
Angle:	**150.00°**
I_{MIN}:	1,733.2 in^4
t_{EFF}:	0.4339 in



Pole Segment: L2, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
163.60	12.14	1734.4	0.438	18.160	0.416	0.006	62.233	62.233	31.116	62.233	**29.9%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
7	1	**55.45**	11.51	1754.9	0.438	17.021	0.416	49.176	49.176	29.250	**35.5%**
7	2	**244.55**	11.51	1754.9	0.438	17.021	0.416	49.176	49.176	29.250	**35.5%**
7	3	**330.00**	12.37	1733.2	0.438	18.511	0.416	49.176	49.176	29.250	**38.6%**
9	1	**118.25**	10.72	1739.2	0.438	15.988	0.416	49.176	49.176	29.250	**33.4%**
9	2	**181.75**	10.72	1739.2	0.438	15.988	0.416	49.176	49.176	29.250	**33.4%**

Elevation: 103.92-ft

Loads	
Axial:	8.1 k
Moment:	144.6 k·ft
Shear:	7.8 k
Torsion:	0.2 k·ft

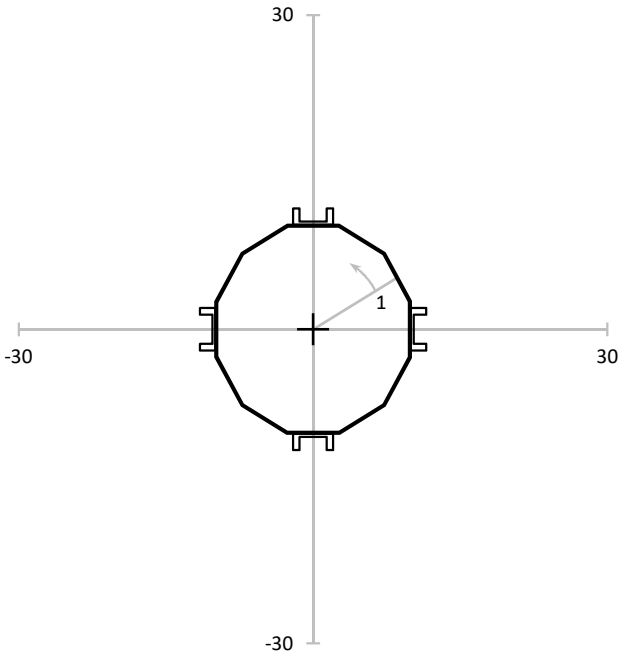
Pole Info	
OD:	19.94 in
t:	0.1875 in
Pole A_G:	11.92 in^2
Pole I_G:	593.7 in^4

Equivalent Loads to Pole	
Axial:	4.1 k
Moment:	68.2 k·ft
Shear:	3.9 k
Torsion:	0.2 k·ft

Controlling	
Angle:	**60.00°**
I_G:	1,259.3 in^4
A_G:	23.60 in^2

Shear Flow	
Controlling Mod:	7
q:	0.190 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	189.60 in
Stitch:	18.00 in
Capacity:	9.5%

Minimum	
Angle:	**2.05°**
I_{MIN}:	1,259.3 in^4
t_{EFF}:	0.4115 in



Pole Segment: L2, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
195.00	10.33	1259.3	0.342	14.233	0.329	0.016	64.518	64.518	32.259	64.518	**22.6%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
7	1	**60.00**	10.56	1259.3	0.342	14.552	0.329	49.176	49.176	29.250	**30.3%**
7	2	**240.00**	10.56	1259.3	0.342	14.552	0.329	49.176	49.176	29.250	**30.3%**
7	3	**330.00**	10.56	1259.3	0.342	14.552	0.329	49.176	49.176	29.250	**30.3%**
10	1	**150.00**	10.56	1259.3	0.342	14.552	0.329	49.176	49.176	29.250	**30.3%**

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Elevation: 109.42-ft

Loads	
Axial:	7.5 k
Moment:	103.5 k·ft
Shear:	7.2 k
Torsion:	0.2 k·ft

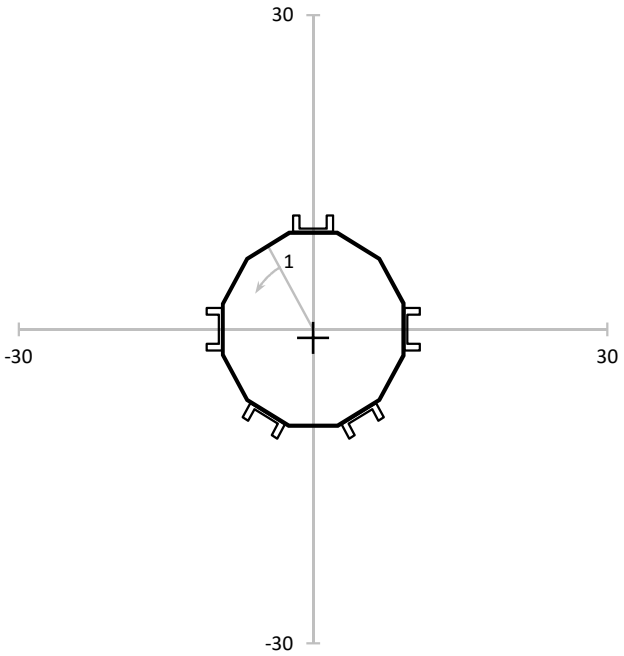
Pole Info	
OD:	18.59 in
t:	0.1875 in
Pole A_G:	11.11 in^2
Pole I_G:	480.3 in^4

Equivalent Loads to Pole	
Axial:	3.2 k
Moment:	42.1 k·ft
Shear:	3.1 k
Torsion:	0.2 k·ft

Controlling	
Angle:	**330.00°**
I_G:	1,194.4 in^4
A_G:	25.71 in^2

Shear Flow	
Controlling Mod:	7
q:	0.188 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	191.22 in
Stitch:	18.00 in
Capacity:	**9.4%**

Minimum	
Angle:	**150.00°**
I_{MIN}:	1,194.4 in^4
t_{EFF}:	0.4900 in



Pole Segment: L2, F_Y = 60 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
163.45	10.43	1195.4	0.291	10.837	0.280	0.024	66.194	66.194	33.097	66.194	**16.8%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity
7	1	**55.10**	9.92	1211.7	0.291	10.172	0.280	49.176	49.176	29.250	**21.3%**
7	2	**244.90**	9.92	1211.7	0.291	10.172	0.280	49.176	49.176	29.250	**21.3%**
7	3	**330.00**	10.71	1194.4	0.291	11.139	0.280	49.176	49.176	29.250	**23.3%**
11	1	**118.20**	9.18	1199.3	0.291	9.514	0.280	49.176	49.176	29.250	**19.9%**
11	2	**181.80**	9.18	1199.3	0.291	9.514	0.280	49.176	49.176	29.250	**19.9%**

Elevation: 114.92-ft

Loads	
Axial:	6.9 k
Moment:	65.6 k·ft
Shear:	6.6 k
Torsion:	0.3 k·ft

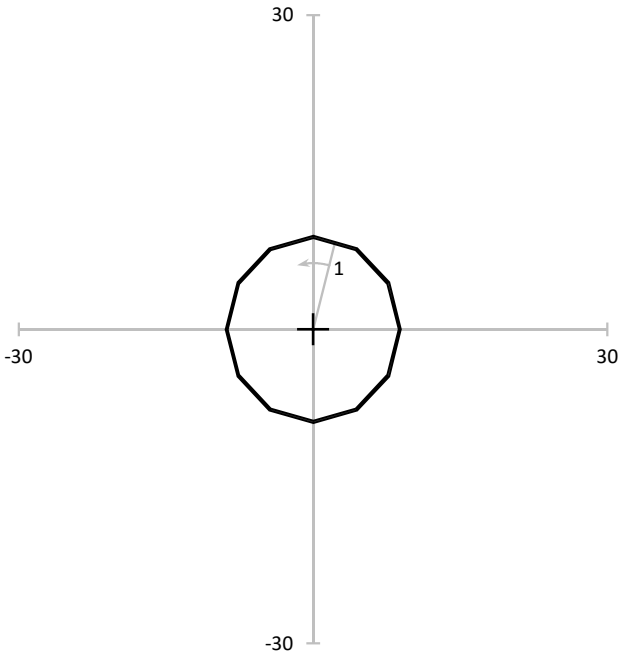
Equivalent Loads to Pole	
Axial:	6.9 k
Moment:	65.6 k·ft
Shear:	6.6 k
Torsion:	0.3 k·ft

Shear Flow N/A

Pole Info	
OD:	17.24 in
t:	0.1875 in
Pole A_G:	10.30 in^2
Pole I_G:	382.4 in^4

Controlling	
Angle:	**15.00°**
I_G:	382.4 in^4
A_G:	10.30 in^2

Minimum	
Angle:	**0.00°**
I_{MIN}:	382.4 in^4
t_{EFF}:	0.1875 in



Pole Segment: L2, F_Y = 60 ksi

POLE CAPACITY											
Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
15.00	8.93	382.4	0.667	18.377	0.645	0.036	67.870	67.870	33.935	67.870	**28.1%**

MODIFICATION CAPACITIES											
Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity

Elevation: 120.00-ft

Loads	
Axial:	3.2 k
Moment:	33.9 k·ft
Shear:	3.6 k
Torsion:	0.6 k·ft

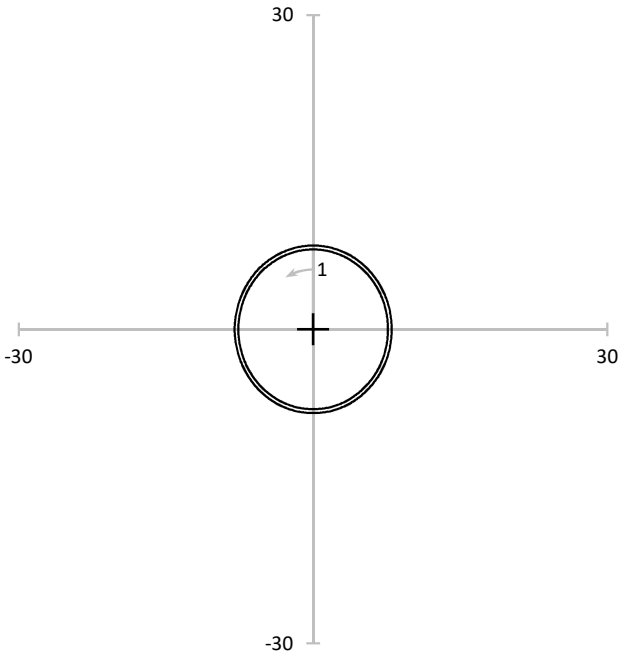
Equivalent Loads to Pole	
Axial:	3.2 k
Moment:	33.9 k·ft
Shear:	3.6 k
Torsion:	0.6 k·ft

Shear Flow N/A

Pole Info	
OD:	16.00 in
t:	0.3750 in
Pole A_G:	18.41 in^2
Pole I_G:	562.1 in^4

Controlling	
Angle:	**0.00°**
I_G:	562.1 in^4
A_G:	18.41 in^2

Minimum	
Angle:	**0.00°**
I_{MIN}:	562.1 in^4
t_{EFF}:	0.3750 in



Pole Segment: L1, F_Y = 42 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	σ_T (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	ϕF_T (ksi)	Capacity
0.00	8.00	562.1	0.172	5.784	0.193	0.049	37.800	49.265	18.900	37.800	**12.2%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in^4)	σ_A (ksi)	σ_B (ksi)	σ_V (ksi)	ϕF_A (ksi)	ϕF_B (ksi)	ϕF_V (ksi)	Capacity

Tower Engineering Professionals, Inc.
326 Tryon Road|Raleigh, NC 27603-3530|Office: (919) 661-6351|Fax: (919) 661-6350|www.tepgroup.net

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876314*
Site Name: *Horse Hill*
App #: *369844 Rev. 3*

Reactions		
Mu	33.9	ft-kips
Axial, Pu:	3.2	kips
Shear, Vu:	3.6	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	15		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	19		

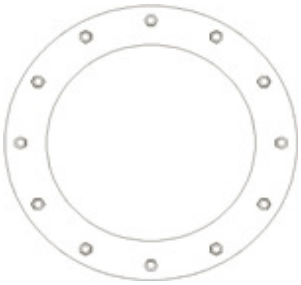
Plate Data		
Diam:	24	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.35	in

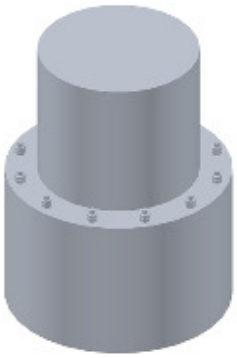
Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	16	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.06	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	5.49	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.879	in	
Min PL "treq" for actual **T w/ Pry**:	0.283	in	
Min PL "t1" for actual **T w/o Pry**:	0.376	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.49	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	18.3%	**Pass**	





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876314*
Site Name: *Horse Hill*
App #: *369844 Rev. 3*

Reactions		
Mu	40.4	ft-kips
Axial, Pu:	3.2	kips
Shear, Vu:	3.6	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Flange Bolt Results

Bolt Data			
Qty:	18		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	19		

Plate Data		
Diam:	24	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.79	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	16	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Total Bolt Tension=Tu+q: 5.49 kips

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	3.3 ksi	Rigid
Allowable Plate Stress:	32.4 ksi	TIA G
Compression Plate Stress Ratio:	10.2% Pass	φ*Fy
No Prying		Comp. Y.L. Length: 10.25
Tension Side Stress Ratio, (treq/t)^2:	4.4% Pass	

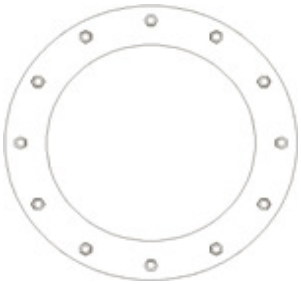
n/a

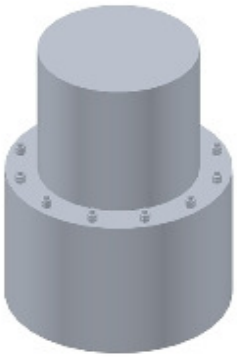
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876314*
Site Name: *Horse Hill*
App #: *369844 Rev. 3*

Reactions		
Mu	40.4	ft-kips
Axial, Pu:	3.2	kips
Shear, Vu:	3.6	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Flange Bolt Results

Bolt Data			
Qty:	18		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	19		

Plate Data		
Diam:	24	in
Thick, t:	0.75	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.86	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	16	in
Thick:	0.1875	in
Grade:	60	ksi
# of Sides:	12	"0" IF Round
Fu	75	ksi
Reinf. Fillet Weld	0	"0" if None

Total Bolt Tension=Tu+q: 5.49 kips

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	13.2 ksi	
Allowable Plate Stress:	32.4 ksi	
Compression Plate Stress Ratio:	40.6% **Pass**	
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	17.6% **Pass**	

Non-Rigid
TIA G
φ*Fy
Comp. Y.L. Length: 10.25

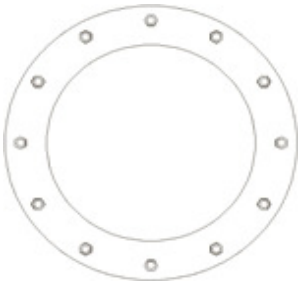
n/a

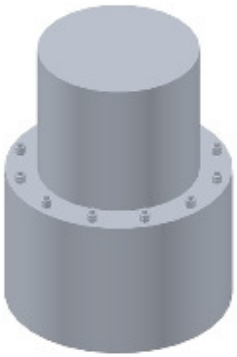
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876314*
Site Name: *Horse Hill*
App #: *369844 Rev. 3*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	53	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	7	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	43.21	in
Thick:	0.375	in
Grade:	60	ksi
# of Sides:	12	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	1768.7	ft-kips
Factored Axial, Pu:	37.5	kips
Factored Shear, Vu:	20.3	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	105.0	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	40.4%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	22.6	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	50.2%	**Pass**

PL Ref. Data
Yield Line (in):
31.74
Max PL Length:
31.74

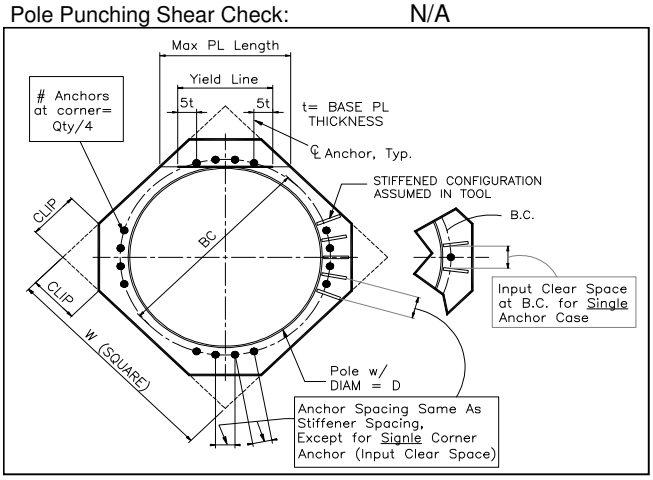
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A



** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Monopole on Mat Foundation with Rock Anchors - TIA-222-G

Site Data	
Site Name:	Horse Hill
CCI Number:	BU 876314
TEP Job Number:	25675.106519

Factored Reactions from TNX		
Axial	37.5	k
Shear	20.3	k
Moment	1768.7	k-ft

Mat and Pier Properties		
Mat Width	16.5	ft
Mat Length	16.5	ft
Mat Thickness	4.0	ft
Pier Type	Round	
Pier Width/Diam.	6.0	ft
Pier Height	0.0	ft

Soil Properties		
q_{allow}	20.0	ksf
FS	2.0	
Subgrade Mod.	720	kcf
Rock Weight	165	pcf
Rock Cone Angle	30	deg

Rock Anchor Properties		
Type of Bar	Williams R1H Low Grade	
Bar Size	2.00	in
Net Area	2.43	in^2
Ultimate Stress, Fu	90.0	ksi
Yield Stress, Fy	70.0	ksi
Bar Diameter	2.000	in
Steel/Grout Bond[1]	270	psi
Grout/Rock Allow Bond	75	psi
FS	2	
Drilled Shaft Diam.	3.50	in
Frustum Volume	6244.10	ft^3

[1] Ultimate Bond Values

Spring Stiffness 546.6 k/in

Mat Foundation Results

Bearing Stress	5.9	ksf
Bearing Capacity, Φq_{allow}	30.0	ksf
% Capacity	19.7%	**Pass**

Mat and Pier Structural Results

Bending Moment	1241.16	kft
Flexural Capacity, ΦMn	4921.36	kft
% Capacity	25.2%	**Pass**

Rock Anchor Results

Max Tension Force	25.67	k
Anchor Capacity, ΦPn	163.8	k
% Capacity	15.7%	**Pass**

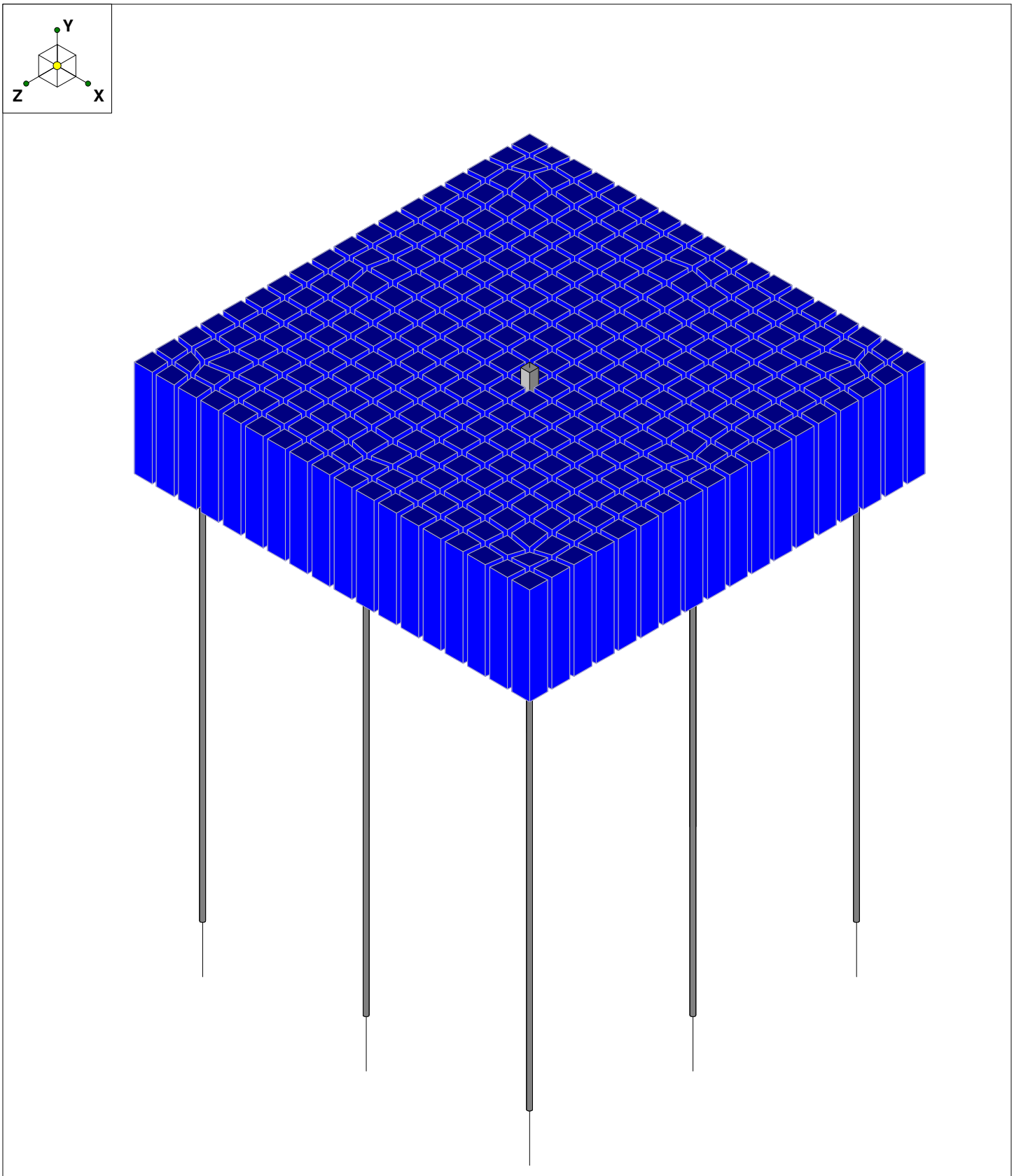
Bond Strength

Steel to Grout, ΦRn	305.36	k
Req. Bond Length, ld	10.7	ft
Grout to Rock, ΦRn	222.66	k
Req. Bond Length, ld	11.0	ft

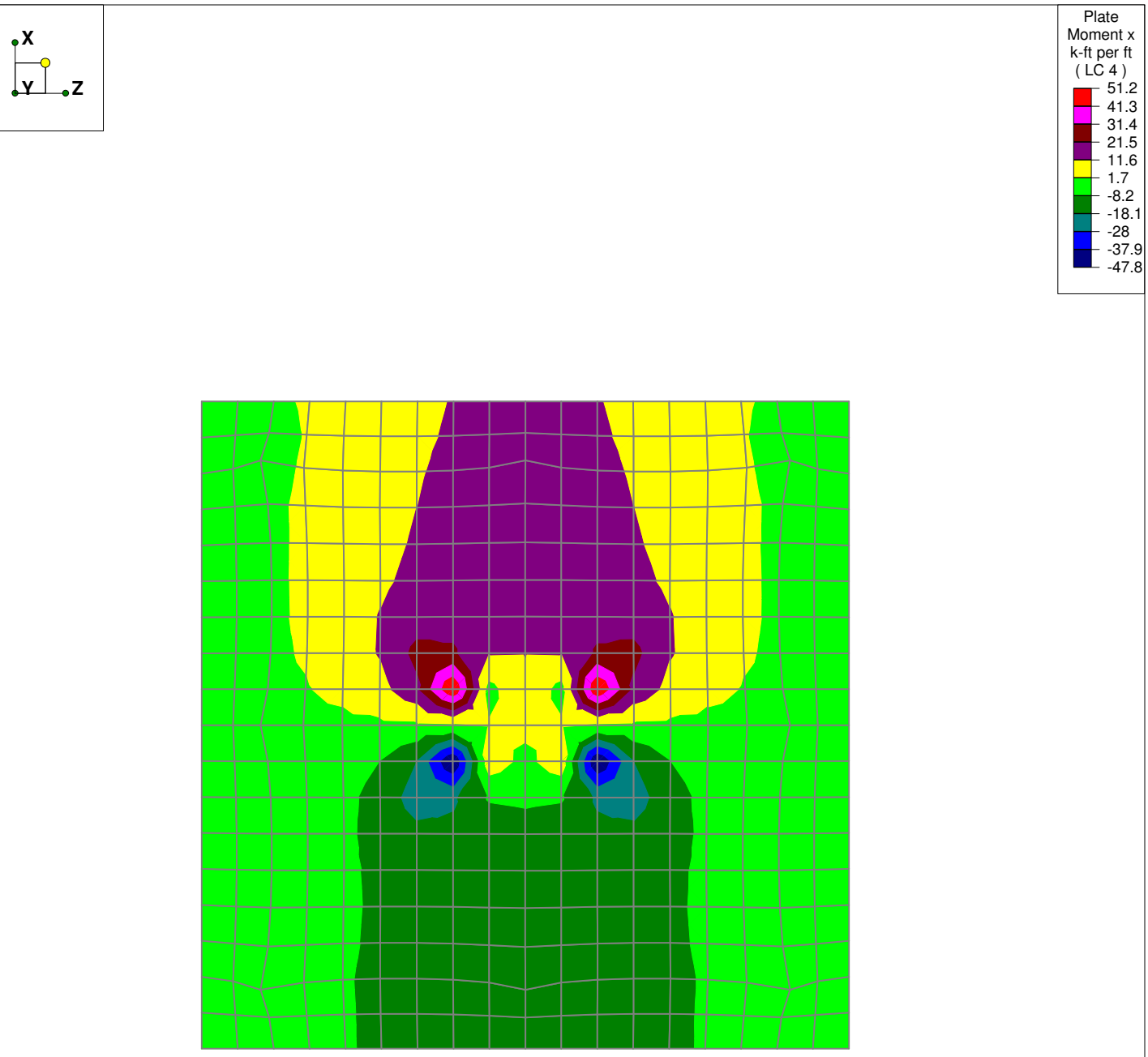
Controlling Capacity 163.82 k

Frustum Capacity

Frustum Weight	772.7	k
Applied Uplift	60.1	k
% Capacity	7.8%	**Pass**



Tower Engineering Profes...	Horse Hill (BU 876314)	SK - 3
Analysis By: JSP		Jan 25, 2017 at 1:41 PM
25675.106519		Foundation.r3d



Results for LC 4, 0.9D+1.6Wind 0

Tower Engineering Profes...	Horse Hill (BU 876314)	SK - 2
Analysis By: JSP		Jan 25, 2017 at 1:39 PM
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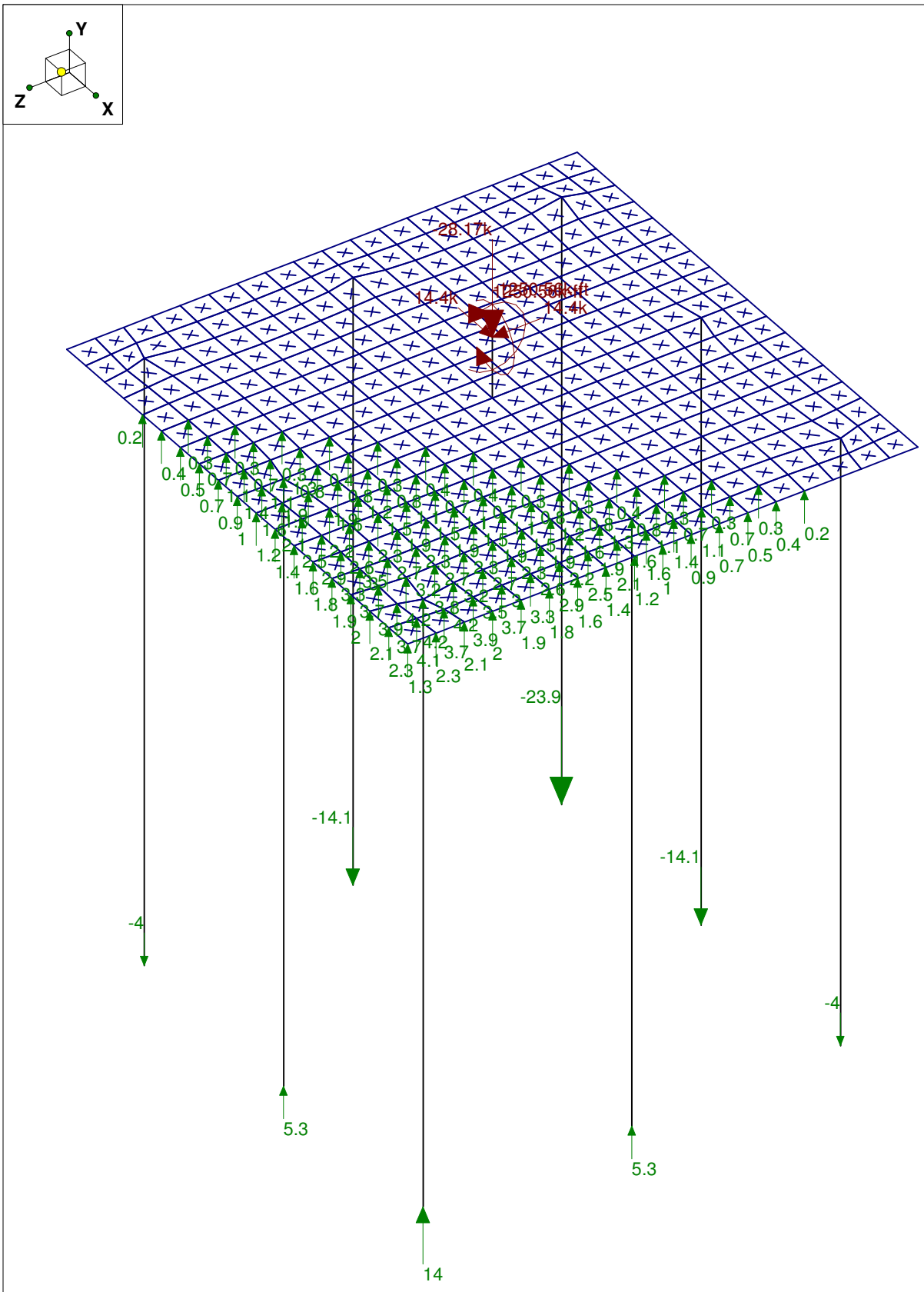

Loads: LC 6, 0.9D+1.6Wind 45
Results for LC 6, 0.9D+1.6Wind 45
Y-direction Reaction Units are k and k-ft

Tower Engineering Profes...	Horse Hill (BU 876314)	SK - 1
Analysis By: JSP		Jan 25, 2017 at 1:37 PM
25675.106519		Foundation.r3d

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5183

Horse Hill
214 Russian Village Road
Southbury, CT 6488

January 16, 2017

Centerline Communications Project Number: 950006-018

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**9.15 %**

January 16, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5183 – Horse Hill**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **214 Russian Village Road, Southbury, 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.

General population/uncontrolled exposure limits apply to situations in which the general population 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 population 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.

Population 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 performed for the proposed AT&T Wireless antenna facility located at **214 Russian Village Road, Southbury, 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
GSM	850 MHz	2	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Kathrein 800-10121	130
A	2	Commscope SBNH-1D6565C	130
B	1	Kathrein 800-10121	130
B	2	KMW AM-X-CD-16-65-00T-RET	130
C	1	Kathrein 800-10121	130
C	2	Powerwave P65-17-XLH-RR	130

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	6	180	3,309.26	1.07
Antenna A2	Commscope SBNH-1D6565C	700 MHz / 1900 MHz (PCS)	13.65 / 15.85	4	240	7,395.97	2.47
						Sector A Composite MPE%	**3.54**
Antenna B1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	6	180	3,309.26	1.07
Antenna B2	KMW AM-X-CD-16-65-00T-RET	700 MHz / 1900 MHz (PCS)	13.35 / 15.25	4	240	6,614.85	2.24
						Sector B Composite MPE%	**3.31**
Antenna C1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	6	180	3,309.26	1.07
Antenna C2	Powerwave P65-17-XLH-RR	700 MHz / 1900 MHz (PCS)	14.3 / 15.1	4	240	7,112.97	2.52
						Sector C Composite MPE%	**3.60**

Table 3: AT&T Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, the sector with the largest calculated MPE% is Sector C. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**3.60 %**
MetroPCS	0.96 %
Sprint	1.15 %
T-Mobile	3.44 %
Site Total MPE %:	**9.15 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	3.54 %
AT&T Sector B Total:	3.31 %
AT&T Sector C Total:	3.60 %
Site Total:	9.15 %

Table 5: Site MPE Summary

Per FCC OET 65, carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, the sector with the largest calculated MPE% is Sector C.

AT&T _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	418.91	130	1.96	850 MHz	567	0.35%
AT&T 1900 MHz (PCS) UMTS	2	816.81	130	3.82	1900 MHz (PCS)	1000	0.38%
AT&T 850 MHz GSM	2	418.91	130	1.96	850 MHz	567	0.35%
AT&T 700 MHz LTE	2	1,614.92	130	7.55	700 MHz	467	1.62%
AT&T 1900 MHz (PCS) LTE	2	1,941.56	130	9.08	1900 MHz (PCS)	1000	0.91%
						Total:	3.60%

Table 6: AT&T Maximum Sector MPE Power Values

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population 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 population exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	3.54 %
Sector B:	3.31 %
Sector C:	3.60 %
AT&T Maximum Total (per sector):	3.60 %
Site Total:	9.15 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.15 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767