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

August 9, 2017

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

RE: **Notice of Exempt Modification for Sprint2.5 Crown Site BU: 876314**
Sprint Site ID: CT03XC017
100 Russian Village Road, Southbury, CT 06488
Latitude: 41° 27' 7.97"/ Longitude: -73° 15' 1.25"

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 118-foot level of the existing 130-foot monopole tower at 100 Russian Village Road in Southbury, CT. The tower is owned by Crown Castle. The property is owned by the Thomas and Mieke Crider. Sprint now intends to replace install three (3) antennas, one (1) hybrid, and 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, Sprint 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

11770

CROWN CASTLE - ETA PROPERTY
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

DATE 8-8-2017 32-61/1110

PAY TO THE ORDER OF Connecticut Siting Council $ 625 -

Six hundred twenty five 00/100 DOLLARS

Security Features Included Details on Back

CHASE
JPMorgan Chase Bank, N.A.
www.Chase.com

VALID FOR 180 DAYS

FOR CT03XC017-876314-393394-441739

MP

⑈011770⑈ ⑆111000614⑆ 164638118⑈

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			

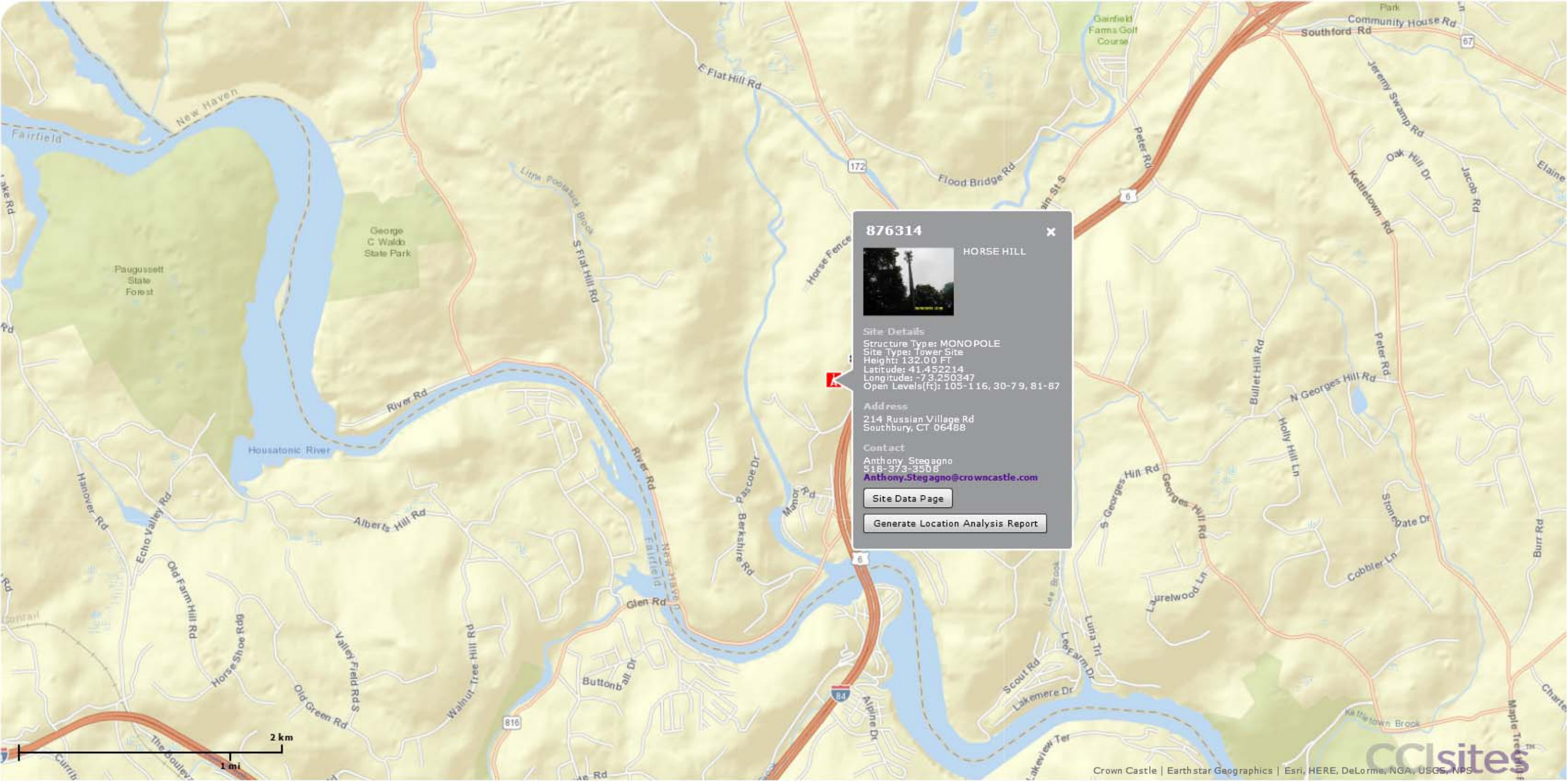
Outbuildings

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
E Flat Hill Rd
Flood Bridge Rd
S Flat Hill Rd
Little Pootatuck Brook
Garfield Farms Golf Course
Southford Rd
Community House Rd
Jeremy Swamp Rd
Kettletown Rd
Oak Hill Dr
Jacob Rd
Peter Rd
N Georges Hill Rd
Bullet Hill Rd
Holly Hill Ln
S Georges Hill Rd
Georges Hill Rd
Stongate Dr
Cobbler Ln
Laurelwood Ln
Luna Trl
Leefarm Dr
Scout Rd
Lakemere Dr
Lakeview Ter
Kettletown Brook
Alpine Dr
Glen Rd
Buttonball Dr
Berkshire Rd
Pascoe Dr
Manor Rd
Alberts Hill Rd
Hanover Rd
Echo Valley Rd
Old Farm Hill Rd
Horse Shoe Rdg
Valley Field Rd S
Old Green Rd
Walnut Tree Hill Rd
New Haven
Fairfield
2 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT03XC017

SITE NAME:

HORSE HILL

SITE ADDRESS:

100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

CROWN ID#: 876314

CROWN SITE NAME: HORSE HILL

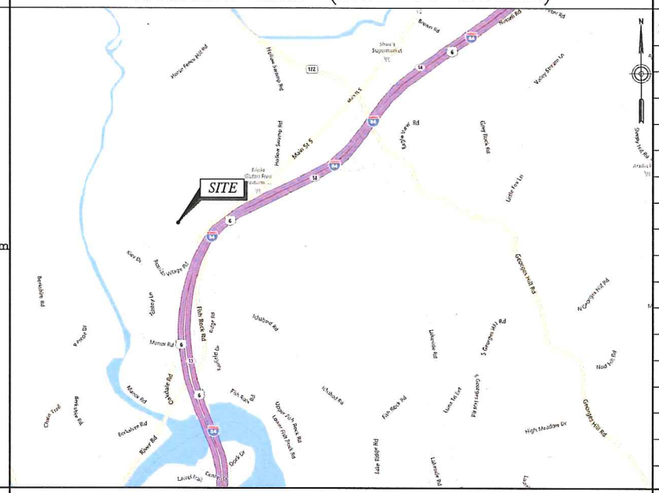
APPROVED
By Jeff Barbadora at 10:50 pm, Aug 02, 2014

SHEET INFORMATION

SITE NUMBER:	CT03XC017
SITE NAME:	HORSE HILL
SITE ADDRESS:	100 RUSSIAN VILLAGE RD SOUTHBURY, CT 06488
COUNTY:	NEW HAVEN
COORDINATES: (NAD 83)	41° 27' 7.97" N 73° 15' 1.25" W
GROUND ELEV:	415'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	120'-0"± AGL
STRUCTURE RAD CENTER:	120'-0"± AGL
ZONING CLASSIFICATION:	R
MAP-BLOCK-LOT:	19-92-45

LANDLORD:	CROWN CASTLE USA 2000 CORPORATE DRIVE CANONSBURG, PA
LOCAL POWER COMPANY:	CONNECTICUT LIGHT AND POWER CONTACT CUSTOMER SERVICE (800) 286-2000
APPLICANT:	SPRINT 6580 SPRINT PARKWAY OVERLAND, KS 66251
ENGINEER:	JAMES QUICKSELL (845) 567-6656 EXT. 2835 JQuicksell@tectonicengineering.com
SPRINT CM:	GARY WOOD (860) 940-9168 gary.wood@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico @crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

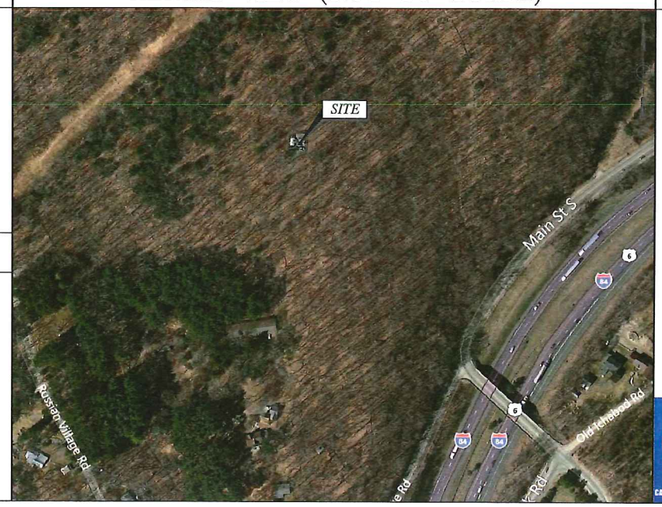
GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION: HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED. FACILITY HAS NO PLUMBING OR REFRIGERANTS. THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATOR REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
3. DEVELOPMENT AND USE OF THIS SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - 2005 STATE OF CONNECTICUT BUILDING CODE.
   - ANSI/TIA/EIA-222-F-1996.
   - NATIONAL ELECTRICAL CODE, LATEST EDITION.

PROJECT DESCRIPTION

1. (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBTS CABINET.
2. (3) NEW RFS APXVTM14-C-120 ANTENNAS.
3. (3) NEW TD-RRH8x20-25 RRH.
4. (1) NEW 5/8" FIBER CABLE.

AERIAL VIEW (NOT TO SCALE)



APPROVALS

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

CONSTRUCTION: _____ DATE: _____

LEASING/
SITE ACQUISITION: _____ DATE: _____

LANDLORD/
PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

Sprint
2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT03XC017

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	DC
1	07/28/14	FOR CONSTRUCTION	DC
2	08/01/14	PER COMMENTS	KA

DATE	REVIEWED BY
8/1/14	JMG

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 23059
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
TITLE SHEET

SHEET NO:
T-1

DIVISION 01000–GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE PROJECT OWNER'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1–800–788–7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING AND EXCAVATION OF ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHICH INTERFERE WITH THE EXECUTION OF THE WORK SHALL BE REMOVED AND OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER.
14. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
16. THE CONTRACTOR SHALL NOTIFY THE THE RF ENGINEER FOR ANTENNA AZIMUTH VERIFICATION (DURING ANTENNA INSTALLATION) PRIOR TO CONDUCTING SWEEP TESTS.
17. THE CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS–BUILT DRAWINGS TO THE CLIENT REPRESENTATIVE.
18. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT EXHIBIT A–STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV. 4.0– 02.15.2011.DOCM.
19. REFER TO: WEATHER PROOFING SPECS: EXCERPT EXH A–WIHRPRF–STD CONSTR SPECS._15720111042185549 2.DOCM.
20. REFER TO: COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF
21. REFER TO LATEST DOCUMENTATION REVISION.

DIVISION 03000–CONCRETE

1.03 APPLICABLE STANDARDS (USE LATEST EDITIONS)

A. ACI–301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
B. ACI–347 GUIDE TO FORM WORK FOR CONCRETE.
C. ASTM C33– CONCRETE AGGREGATE
D. ASTM C94 – READY MIXED CONCRETE e. ASTM C150 – PORTLAND CEMENT.
E. ASTM C260 – AIR–ENTRAINING ADMIXTURES FOR CONCRETE
F. ASTM C309– LIQUID MEMBRANE FORMING COMPOUNDS FOR CURING CONCRETE.
H. ASTM C494 – CHEMICAL ADMIXTURES FOR CONCRETE
I. ASTM A615– DEFORMED AND PLAIN BILLET–STEEL BARS FOR CONCRETE REINFORCEMENT
J. ASTM A185– STEEL WELDED WIRE FABRIC (PLAIN) FOR CONCRETE REINFORCEMENT

1.04 QUALITY ASSURANCE

CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ARCHITECT/ENGINEER AS DIRECTED BY THE CLIENT'S REPRESENTATIVE.

3.04 SURFACE FINISHES

A. SURFACES AGAINST WHICH BACKFILL OR CONCRETE SHALL BE PLACED REQUIRE NO TREATMENT EXCEPT REPAIR OF DEFECTIVE AREAS.

B. SURFACES THAT WILL BE PERMANENTLY EXPOSED SHALL PRESENT A UNIFORM FINISH PROVIDED BY THE REMOVAL OF FINS AND THE FILLING HOLES AND OTHER IRREGULARITIES WITH DRY PACK GROUT, OR BY SACKING WITH UTILITY OR ORDINARY GROUT.

C. SURFACES THAT WOULD NORMALLY BE LEVEL AND WHICH WILL BE PERMANENTLY EXPOSED TO THE WEATHER SHALL BE SLOPED FOR DRAINAGE. UNLESS ENGINEER'S DESIGN DRAWING SPECIFIES A HORIZONTAL SURFACE OR SURFACES SUCH AS STAIR TREADS, WALLS, CURBS, AND PARAPETS SHALL BE SLOPED APPROXIMATELY 1/4" PER FOOT.

D. SURFACES THAT WILL BE COVERED BY BACKFILL OR CONCRETE SHALL BE SMOOTH SCREENED.

E. EXPOSED SLAB SURFACES SHALL BE CONSOLIDATED, SCREENED, FLOATED, AND STEEL TROWELED. HAND OR POWER–DRIVEN EQUIPMENT MAY BE USED FOR FLOATING. FLOATING SHALL BE STARTED AS SOON AS THE SCREENED SURFACE HAS ATTAINED A STIFFNESS TO PERMIT FINISHING OPERATIONS. OPERATIONS. ALL EDGES MUST HAVE A 3/4" CHAMFER.

1.04 QUALITY ASSURANCE CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ENGINEER.

3.05 PATCHING

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY UPON REMOVAL OF THE FORMS TO OBSERVE CONCRETE SURFACE CONDITIONS. IMPERFECTIONS SHALL BE PATCHED ACCORDING TO THE ENGINEER'S DIRECTION.

3.06 DEFECTIVE CONCRETE

THE CONTRACTOR SHALL NOTIFY OR REPLACE CONCRETE NOT CONFORMING TO REQUIRED LEVELS AND LINES, DETAILS, AND ELEVATIONS AS SPECIFIED IN ACI 301.

3.07 PROTECTION

A. IMMEDIATELY AFTER PLACEMENT. THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY. FINISHED WORK SHALL BE PROTECTED.

B. CONCRETE SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT RELATIVELY CONSTANT TEMPERATURE FOR PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.

C. ALL CONCRETE SHALL BE WATER CURED PER ACCEPTABLE PRACTICES SPECIFIED BY ACI CODE (LATEST EDITION)

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. THE WORK CONSISTS OF THE FABRICATION AND INSTALLATION OF ALL MATERIALS TO BE FURNISHED. AND WITHOUT LIMITING THE GENERALITY THEREOF, INCLUDING ALL EQUIPMENT, LABOR AND SERVICES REQUIRED FOR ALL STRUCTURAL STEEL WORK AND ALL ITEMS INCIDENTAL AS SPECIFIED AND AS SHOWN ON THE DRAWINGS:

1. STEEL FRAMING INCLUDING BEAMS, ANGLES, CHANNELS AND PLATES.
2. WELDING AND BOLTING OF ATTACHMENTS.

1.02 REFERENCE STANDARDS

A. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

1. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS IN BUILDING CODES" OR LATEST EDITION.
2. AWS: AMERICAN WELDING SOCIETY CODE OR LATEST EDITION.
3. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

PART 2 – PRODUCTS

2.01 MATERIALS

A. STRUCTURAL STEEL: SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A36 AND A992 FOR STRUCTURAL STEEL.

ALL PROPOSED STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AISC CODE AND ASTM SPECIFICATIONS (LATEST EDITION) ALL NEW STEEL SHALL CONFORM TO THE FOLLOWING.

1. STRUCTURAL WIDE FLANGE: ASTM A992 Fy=50KSI.
2. MISCELLANEOUS STEEL (PLATES), CHANNELS, ANGLES, ETC): ASTM A36 (Fy=36KSI).
3. STRUCTURAL TUBING: ASTM A500 Gr. B (Fy=46KSI).
4. STEEL PIPE: ASTM A53 Gr B (Fy=35KSI).

2.02 WELDING

A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS. CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEER'S AND/OR OWNER'S REVIEW IF REQUESTED.

B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM 1–233, E70 SERIES. BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERGED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATIONS.

C. FIELD WELDING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.

D. STUD WELDING SHALL BE ACCOMPLISHED BY CAPACITOR DISCHARGE (CD) WELDING TECHNIQUE USING CAPACITOR DISCHARGE STUD WELDER.

E. PROVIDE STUD FASTENERS OF MATERIALS AND SIZES SHOWN ON DRAWINGS OR AS RECOMMENDED BY THE MANUFACTURER FOR STRUCTURAL LOADINGS REQUIRED.

F. FOLLOW MANUFACTURERS SPECIFICATIONS AND INSTRUCTIONS TO PROPERLY SELECT AND INSTALL STUD WELDS.

2.03 BOLTING

A. BOLTS SHALL BE CONFORMING TO ASTM A35 HIGH STRENGTH HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4" (MINIMUM) CONFORMING TO ASTM A325, HOT DIP GALVANIZED, ASTM A153 NUTS SHALL BE HEAVY HEX TYPE.

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

D. EXCEPT WHERE SHOWN, ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS TO BE DOUBLE ANGLED CONNECTIONS WITH HIGH STRENGTH BOLTS (THREADS EXCLUDED FROM SHEAR PLANE) AND HARDENED WASHERS.

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

F. SNUG–TIGHT STRENGTH BEARING BOLTS MAY BE USED IN STANDARD HOLES CONFORMING TO ACIS, USING THE TURN OF THE NUT METHOD.

H. FULLY–TENSIONED HIGH STRENGTH (SLIP CRITICAL) SHALL BE USED IN OVERSIZED SLOT HOLES (RESPECTIVE OF SLOT ORIENTATION).

I. ALL BRACED CONNECTION, MOMENT CONNECTION AND CONNECTIONS NOTED AS "SLIP CRITICAL" SHALL BE BE SLIP CRITICAL JOINTS WITH CLASS A SURFACE CONDITIONS, UNLESS OTHERWISE NOTED.

J. EPOXY ANCHOR ASSEMBLIES SHALL BE AS MANUFACTURED BY HILTI OR ENGINEER APPROVED EQUAL, AS FOLLOWS:

BASE MATERIAL	ANCHOR SYSTEM
CONCRETE	HILTI HIT–HY 200
HOLLOW & GROUTED CMU OR BRICK	HILTI HIT–HY 70

2.04 FABRICATION

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS

2.05 FINISH

A. STRUCTURAL STEEL EXPOSED TO WEATHER SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. (LATEST EDITION) UNLESS OTHERWISE NOTED.

2.06 PROTECTION

A. UPON COMPLETION OF ERECTION, INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS OR GALVANIZED BREAKS WITH (2) COATS OF ZINC–RICH COLD GALVANIZING PAINT.

PART 3 – ERECTION

A. PROVIDE ALL ERECTION, EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION, BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING

C. TEMPORARY BRACING, GUYING, AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SET AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

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2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
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SUBMITTALS

PROJECT NO: 7225.CT03XC017

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	DC
1	07/28/14	FOR CONSTRUCTION	DC
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DATE	REVIEWED BY
8/1/14	JMA

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 23038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

A. ANTENNAS AND HYBRIFLEX CABLES ARE FURNISHED BY CLIENT'S REPRESENTATIVE UNDER SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPERTY.

B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE AND PROVIDE PRINTOUT OF THAT RESULT

F. INSTALL HYBRIFLEX CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

1. ALL EXTERIOR #6 GREEN GROUND WIRE DAISY CHAIN CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE 3221213 OR EQUIVALENT.

2. ALL HYBRIFLEX CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF HYBRIFLEX CABLE (NOT WITHIN BENDS). 1.02 RELATED WORK FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH QOTHER TRADES PRIOR TO BID:

   1. FLASHING OF OPENING INTO OUTSIDE WALLS.
   2. SEALING AND CAULKING ALL OPENINGS.
   3. PAINTING.
   4. CUTTING AND PATCHING.

1.03 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. EIA – ELECTRONIC INDUSTRIES ASSOCIATION RS-22. STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

2. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7480-IH, CONSTRUCTION MARKING AND LIGHTING.

3. FCC – FEDERAL COMMUNICATION COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES

4. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION FOR STRUCTURAL JOINTS USING ASTM 1325 OR A490 BOLTS.

5. NEC – NATIONAL ELECTRIC CODE – ON TOWER LIGHTING KITS.

6. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

7. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

8. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED: REFER TO SURVEY AND SITE PLAN FOR WORK INCLUDED.

1.02 RELATED WORK

A. CONSTRUCTION OF EQUIPMENT FOUNDATIONS
B. INSTALLATION OF ANTENNA SYSTEM

PART 2 PRODUCTS

2.01 MATERIALS

A. ROAD AND SITE MATERIALS; FILL MATERIAL SHALL BE ACCEPTABLE, SELECT FILL SHALL BE IN ACCORDANCE WITH LOCAL DEPARTMENT OF HIGHWAY AND PUBLIC TRANSPORTATION STANDARD SPECIFICATIONS.

B. SOIL STERILIZER SHALL BE EPA REGISTERED OF LIQUID COMPOSITION AND OF PRE-EMERGENCE DESIGN.

C. SOIL STABILIZER FABRIC SHALL BE MIRAFI OR EQUAL – 600X AT ACCESS ROAD AND COMPOUND.

D. GRAVEL FILL; WELL GRADED, HARD, DURABLE, NATURAL SAND AND GRAVEL, FREE FROM ICE AND SNOW, ROOTS, SOD RUBBISH, AND OTHER DELETERIOUS OR ORGANIC MATTER.

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

GRAVEL FILL TO BE PLACED IN LIFTS OF 9" MAXIMUM THICKNESS AND 90 % DENSITY. COMPACTED TO 95

E. NO FILL OR EMBANKMENT MATERIALS SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OF EMBANKMENT

2.02 EQUIPMENT

A. COMPACTION SHALL BE ACCOMPLISHED BY MECHANICAL MEANS. LARGER AREAS SHALL BE COMPACTED BY SHEEPS FOOT, VIBRATORY OR RUBBER TIED ROLLERS WEIGHING AT LEAST FIVE TONS. SMALLER AREAS SHALL BE COMPACTED BY POWER-DRIVER, HAND HELD TAMPERS.

B. PRIOR TO OTHER EXCAVATION AND CONSTRUCTION EFFORTS GRUB ORGANIC MATERIAL TO A MINIMUM OF 6" BELOW ORIGINAL GROUND LEVEL.

C. UNLESS OTHERWISE INSTRUCTED BY CLIENT'S REPRESENTATIVE. REMOVE TREES, BRUSH AND DEBRIS FROM THE PROPERTY TO AN AUTHORIZED DISPOSAL LOCATION.

D. PRIOR TO PLACEMENT OF FILL OR BASE MATERIALS, ROLL THE SOIL.

E. WHERE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, LINE THE GRUBBED AREAS WITH STABILIZER MAT PRIOR TO PLACEMENT OF FILL OR BASE MATERIAL.

3.03 INSTALLATION

A. THE SITE AND TURNAROUND AREAS SHALL BE AT THE SUB-BASE COURSE ELEVATION PRIOR TO FORMING FOUNDATIONS. GRADE OR FILL THE SITE AND ACCESS ROAD AS REQUIRED TO PRODUCE EVEN DISTRIBUTION OF SPOILS RESULTING FROM FOUNDATION EXCAVATIONS. THE RESULTING GRADE SHALL CORRESPOND WITH SAID SUB-BASE COURSE, ELEVATIONS ARE TO BE CALCULATED FORM FINISHED GRADES OR SLOPES INDICATED.

B. THE ACCESS ROAD SHALL BE BROUGHT TO BASE COURSE ELEVATION PRIOR TO FOUNDATION CONSTRUCTION.

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

D. THE CONTRACT INCLUDES ALL NECESSARY GRADING, BANKING, DITCHING AND COMPLETE SURFACE COURSE FOR ACCESS ROAD. ALL ROADS OR ROUTES UTILIZED FOR ACCESS TO PUBLIC THOROUGHFARE IS INCLUDED IN SCOPE OF WORK UNLESS OTHERWISE INDICATED.

E. WHEN IMPROVING AN EXISTING ACCESS ROAD, GRADE THE EXISTING ROAD TO REMOVE ANY ORGANIC MATTER AND SMOOTH THE SURFACE BEFORE PLACING FILL OR STONE.

F. PLACE FILL OR STONE IN 3" MAXIMUM LIFTS AND COMPACT BEFORE PLACING NEXT LIFT.

G. THE FINISH GRADE, INCLUDING TOP SURFACE COURSE, SHALL EXTEND A MINIMUM OF 12" BEYOND THE SITE FENCE AND SHALL COVER THE AREA AS INDICATED.

H. RIPRAP SHALL BE APPLIED TO THE SIDE SLOPES OF ALL FENCED AREAS, PARKING AREAS AND TO ALL OTHER SLOPES GREATER THAN 2:1.

I. RIPRAP SHALL BE APPLIED TO THE SIDES OF DITCHES OR DRAINAGE SWALES AS INDICATED ON PLANS.

J. RIPRAP ENTIRE DITCH FOR 6'-0" IN ALL DIRECTIONS AT CULVERT OPENINGS.

K. SEED, FERTILIZER AND STRAW COVER SHALL BE APPLIED TO ALL OTHER DISTURBED AREAS AND DITCHES, DRAINAGE, SWALES, NOT OTHERWISE RIP-RAPPED.

L. UNDER NO CIRCUMSTANCES SHALL DITCHES, SWALES OR CULVERTS BE PLACED SO THEY DIRECT WATER TOWARDS, OR PERMIT STANDING WATER IMMEDIATELY ADJACENT TO SITE. IF OWNER DESIGNS OR IF DESIGN ELEVATIONS CONFLICT WITH THIS GUIDANCE ADVISE THE OWNER IMMEDIATELY.

M. IF A DITCH LIES WITH SLOPE GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALL IN THE DITCH AT CULVERT ENTRANCES. RIP-RAP THE UPSTREAM SIDE OF THE HEADWALL AS WELL AS THE DITCH FOR 6'-0" ABOVE THE CULVERT.

N. IF A DITCH LIES WITH SLOPES GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALLS IN THE DITCH FOR 6'-0" ABOVE THE CULVERT ENTRANCE.

O. SEED AND FERTILIZER SHALL BE APPLIED TO SURFACE CONDITIONS WHICH WILL ENCOURAGE ROOTING. RAKE AREAS TO BE SEEDED TO EVEN THE SURFACE AND TO LOOSEN THE SOIL.

P. SOW SEED IN TWO DIRECTIONS IN TWICE THE QUANTITY RECOMMENDED BY THE SEED PRODUCER.

Q. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROWTH OF SEEDED AND LANDSCAPED AREAS BY WATERING UP TO THE POINT OF RELEASE FROM THE CONTRACT. CONTINUE TO REWORK BARE AREAS UNTIL COMPLETE COVERAGE IS OBTAINED.

3.04 FIELD QUALITY CONTROL

A. COMPACTION SHALL BE D-1557 FOR SITE WORK AND 95 % MAXIMUM DENSITY UNDER SLAB AREAS. AREAS OF SETTLEMENT WILL BE EXCAVATED AND REFILLED AT CONTRACTOR'S EXPENSE. REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. THE COMPACTION TEST RESULTS SHALL BE AVAILABLE PRIOR TO THE CONCRETE POUR.

3.05 PROTECTION

A. PROTECT SEEDED AREAS FORM EROSION BY SPREADING STRAW TO A UNIFORM LOOSE DEPTH OF 1"-2". STAKE AND TIE DOWN AS REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. ALL TREES PLACED IN CONJUNCTION WITH A LANDSCAPE CONTRACT SHALL BE WRAPPED, TIED WITH HOSE PROTECTED WIRE AND SECURED TO STAKES EXTENDING 2'-0" INTO THE GROUND ON FOUR SIDES OF THE TREE.

C. ALL EXPOSED AREAS SHALL BE PROTECTED AGAINST WASHOUTS AND SOIL EROSION. STRAW BALES SHALL BE PLACED AT THE INLET APPROACH TO ALL NEW OR EXISTING CULVERTS. REFER TO DETAILS ON DRAWINGS

SYMBOLS	ABBREVIATIONS
— — — G — — — G —	GROUND WIRE
— — — E — — — E —	ELECTRIC
— — — T — — — T —	TELEPHONE
—OH—OH—OH—OH—OH—	OVERHEAD WIRE
——— — — ———	PROPERTY LINE
—X———X———X———	CHAIN LINK FENCE
A-1	ANTENNA MARK
(E)	EXISTING
(P)	PROPOSED DETAIL
DET # / SHT #	REFERENCE
⌖	SURFACE ELEVATION

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OVERLAND PARK, KS 66251

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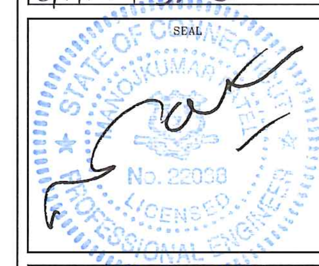
SUBMITTALS

PROJECT NO: 7225.CT03XC017

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	DC
1	07/28/14	FOR CONSTRUCTION	DC
2	08/01/14	PER COMMENTS	KA

DATE	REVIEWED BY
8/1/14	JMG

SEAL



SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
GENERAL NOTES

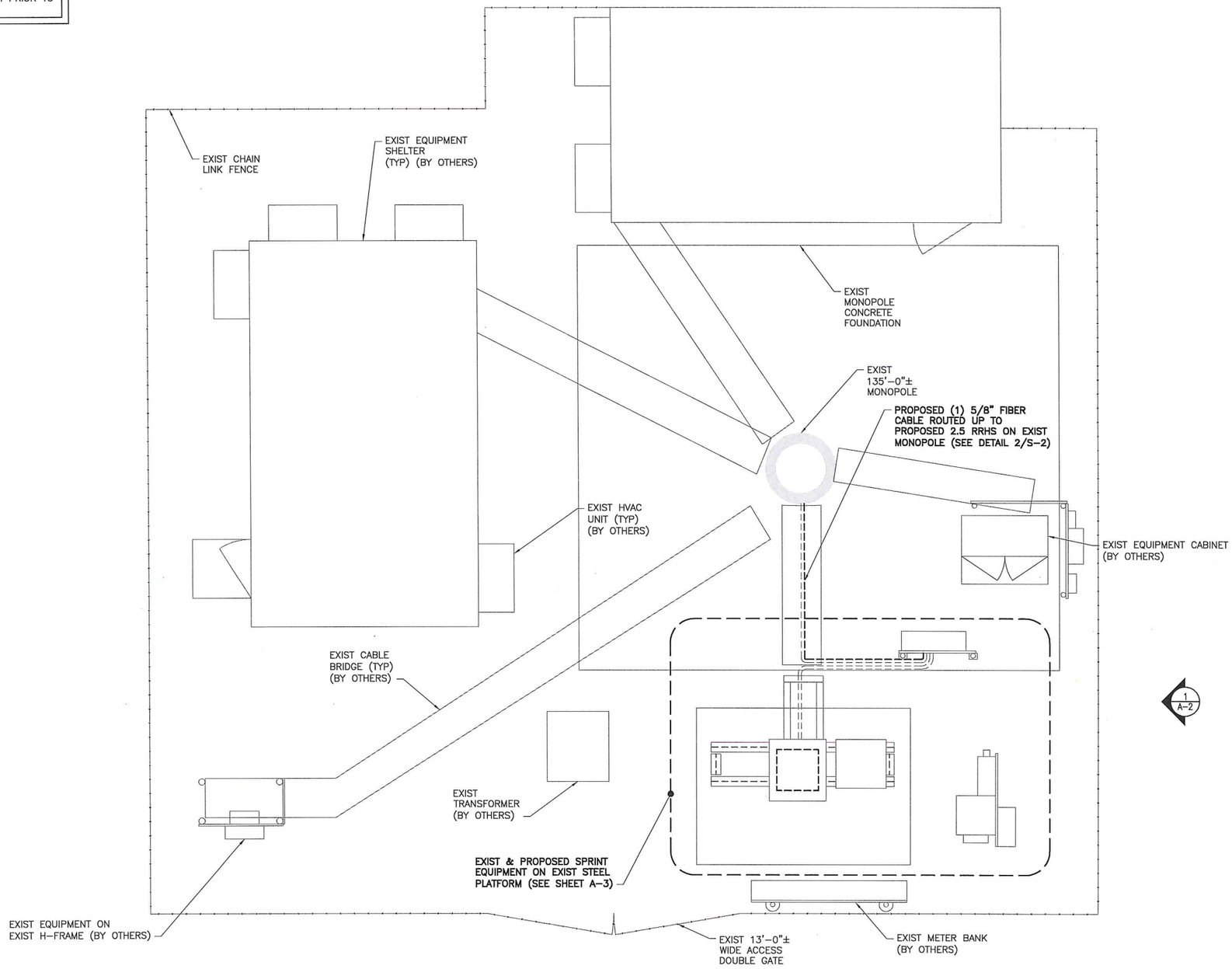
SHEET NO:
SP-2

N

APPROX.

NORTH NOTE:

NORTH SHOWN HAS BEEN ESTABLISHED USING THE USGS QUADRANGLE 7.5 MINUTE MAPS AND IS APPROXIMATE. VERIFY TRUE NORTH PRIOR TO INSTALLATION OF ANTENNAS.



1 A-1 SITE PLAN

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

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2.5 EQUIPMENT DEPLOYMENT
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DATE	REVIEWED BY
8/1/14	JMG

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 23033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

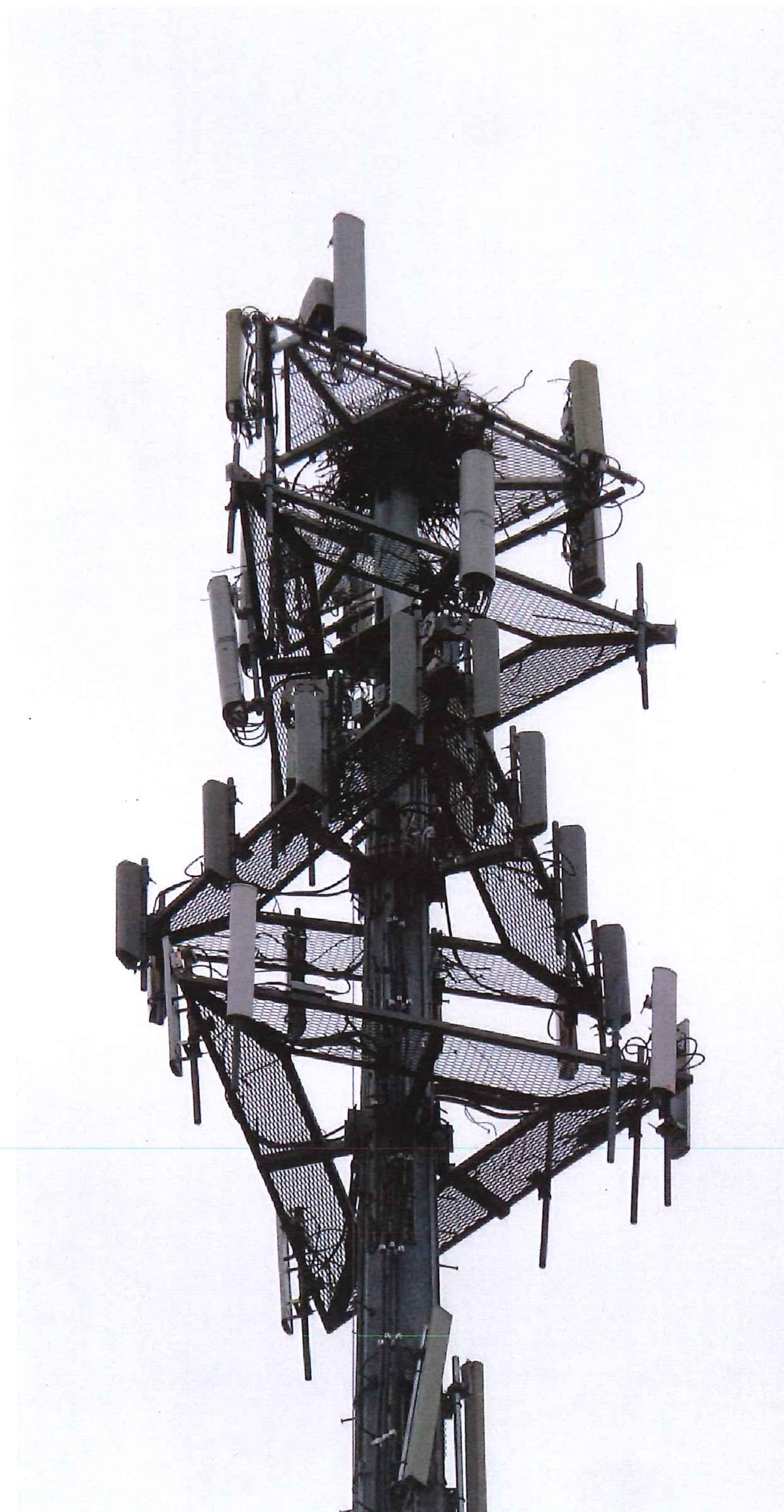
SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
SITE PLAN

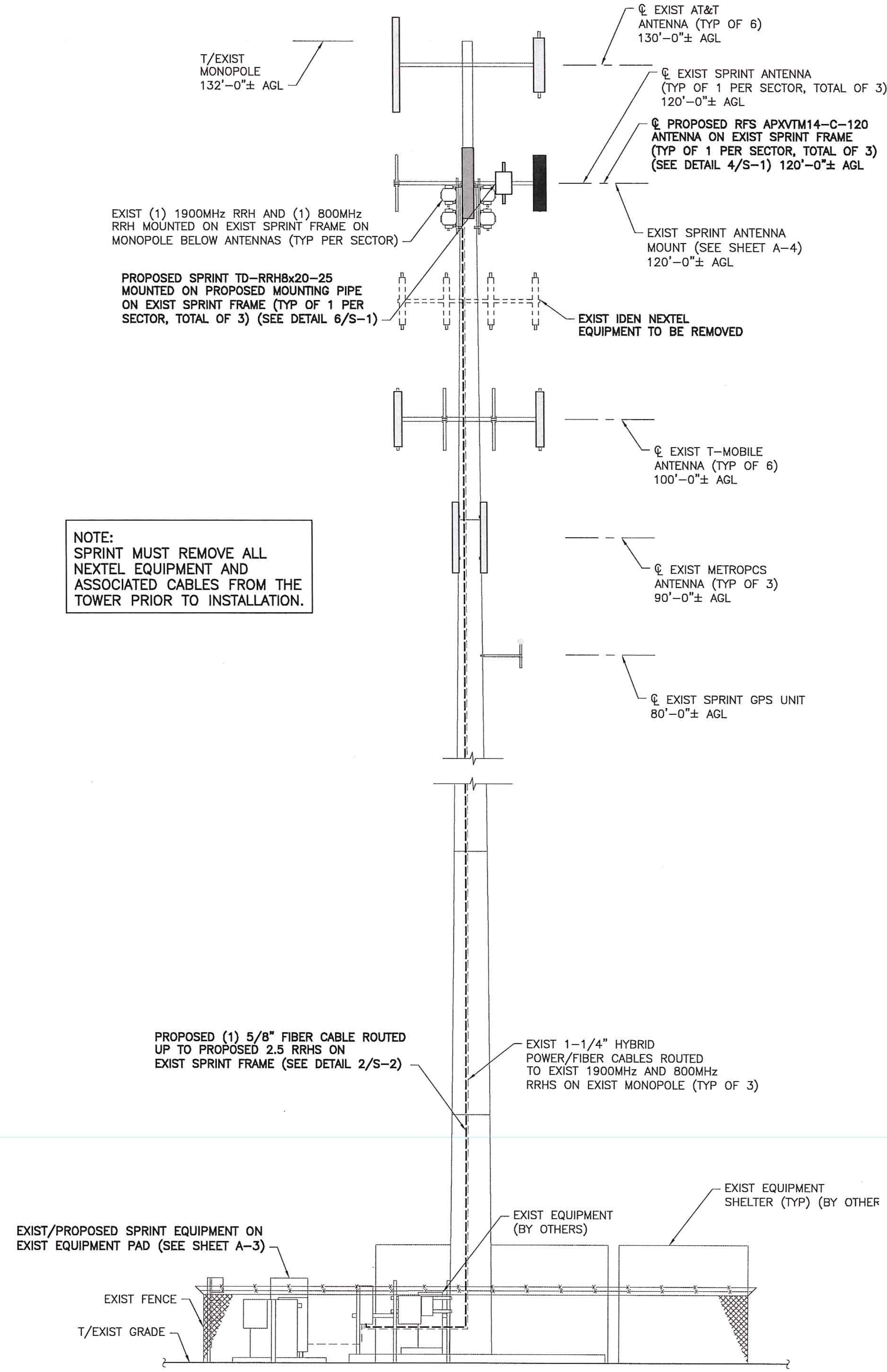
SHEET NO:
A-1

THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 7/28/14.



NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.



1 / A-2 ELEVATION
SCALE: 3/16" = 1'-0"

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2.5 EQUIPMENT DEPLOYMENT
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8/1/14	JMG

SEAL
STATE OF CONNECTICUT · MANOJKUMAR ... PATEL · No. 22... · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
ELEVATION

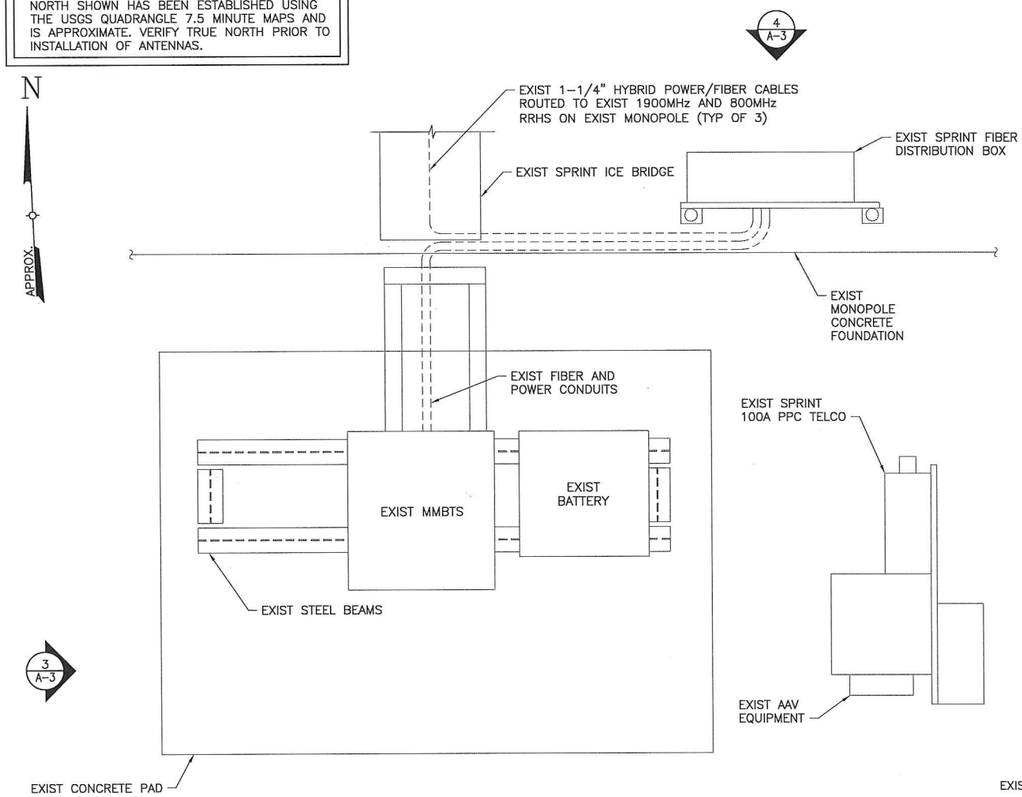
SHEET NO:
A-2

NORTH NOTE:

NORTH SHOWN HAS BEEN ESTABLISHED USING THE USGS QUADRANGLE 7.5 MINUTE MAPS AND IS APPROXIMATE. VERIFY TRUE NORTH PRIOR TO INSTALLATION OF ANTENNAS.

N

APPROX.

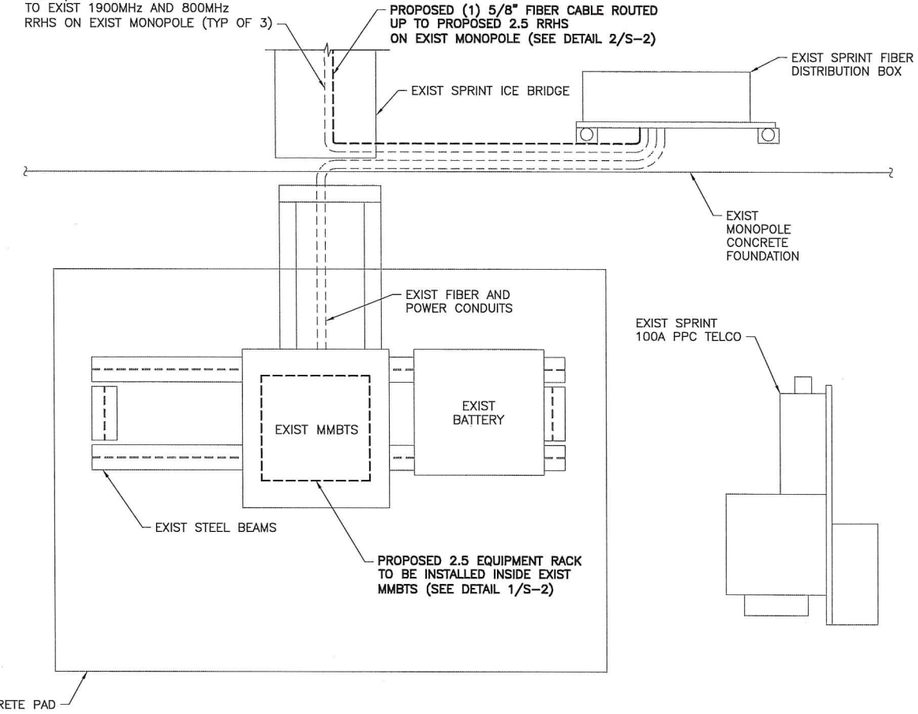


1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

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

3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS



2 A-3 ENLARGED EQUIP. LAYOUT PLAN (FINAL)

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

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

2.5 EQUIPMENT DEPLOYMENT
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OVERLAND PARK, KS 66251

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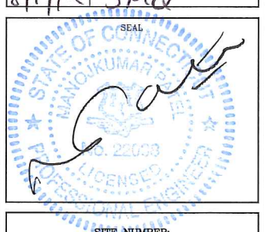


SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

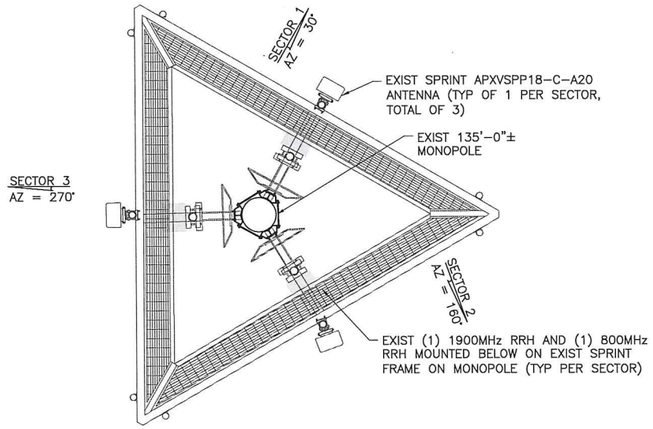
SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

N

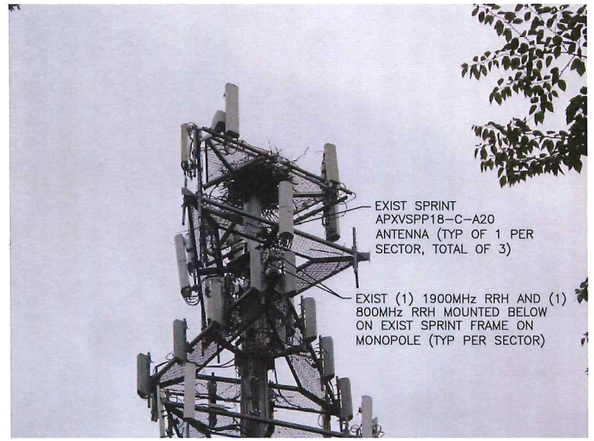
APPROX.

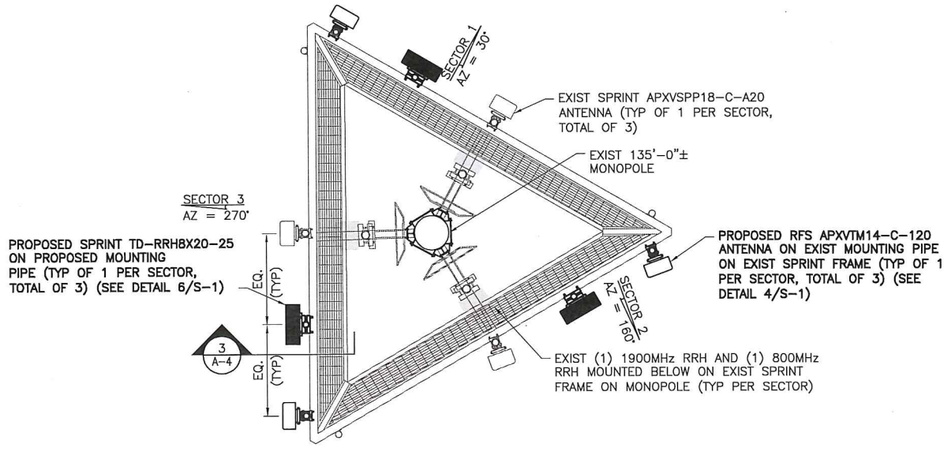


1 A-4 ANTENNA LAYOUT PLAN (EXIST)

SCALE: 3/8" = 1'-0"

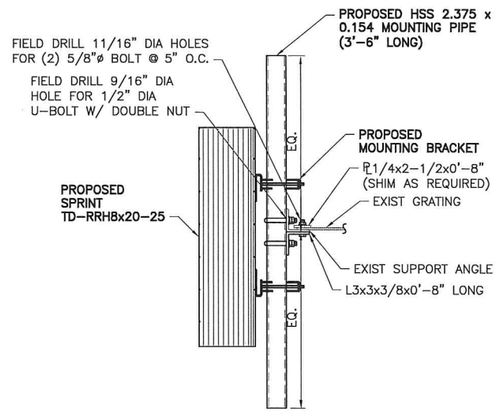
NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.





2 A-4 ANTENNA LAYOUT PLAN (FINAL)

SCALE: 3/8" = 1'-0"



3 A-4 RRH MOUNTING DETAIL

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

THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 7/28/14.

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	RFS-CEL WAVE	RFS-CEL WAVE
Antenna Model Number	APXVSPP18C-A20	APXVTM14-C-120
Number of Antennas	3	3
Antenna RAD Center	119'	120'
Antenna Azimuth	30/160/270	30/160/270
Antenna RRH Model Number	1900MHz/800MHz RRHS	2.5GHz RRH-V3
Number of RRH	3	3

Sprint

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6580 SPRINT PARKWAY
OVERLAND PARK, KS 66251

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www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT03XC017

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	DC
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2	08/01/14	PER COMMENTS	KA

DATE	REVIEWED BY
8/11/14	JMQ

SEAL

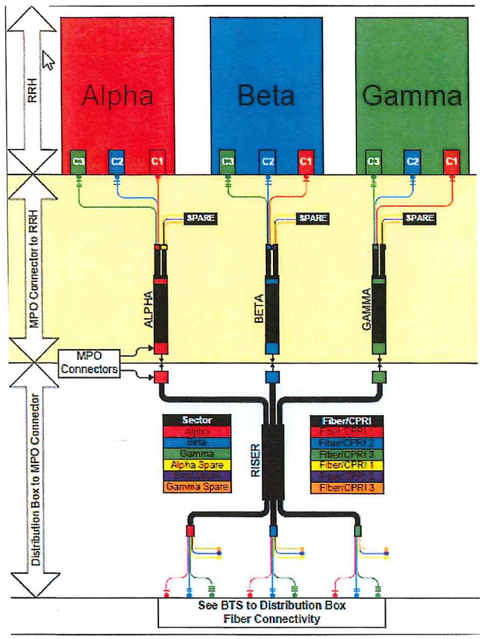
SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

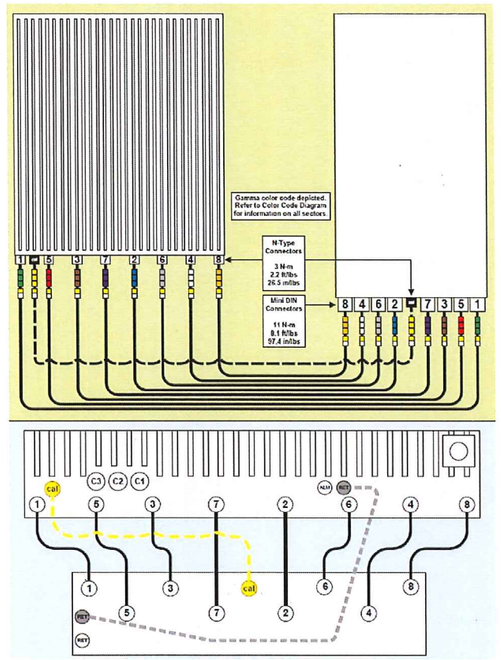
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



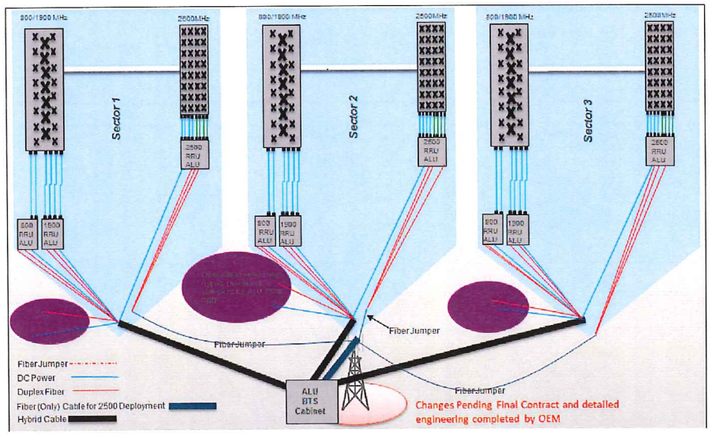
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



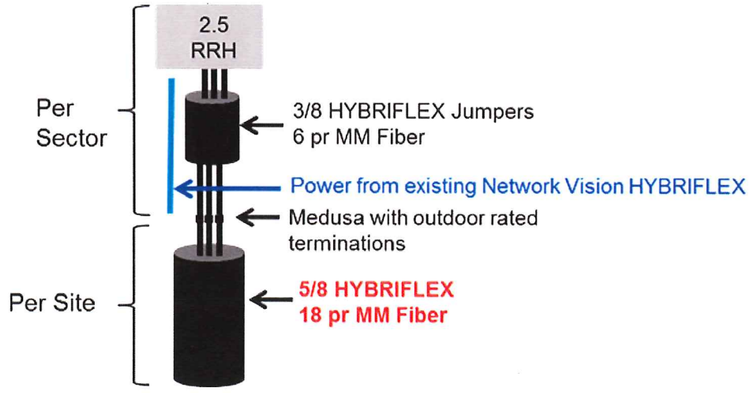
2 A–5 RRH CONNECTIVITY

SCALE: N.T.S.



3 A–5 RAN WIRING

SCALE: N.T.S.



4 A–5 CABLE SCENARIO

SCALE: N.T.S.

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DATE	REVIEWED BY
8/1/14	JMG

SEAL

STATE OF ARIZONA · YAVAPAI · COCONINO · MARICOPA · PINAL · GILA · PIMA · KINGMAN · No. 22033 · Licensed · Professional Engineer

SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
RAN WIRING DIAGRAM

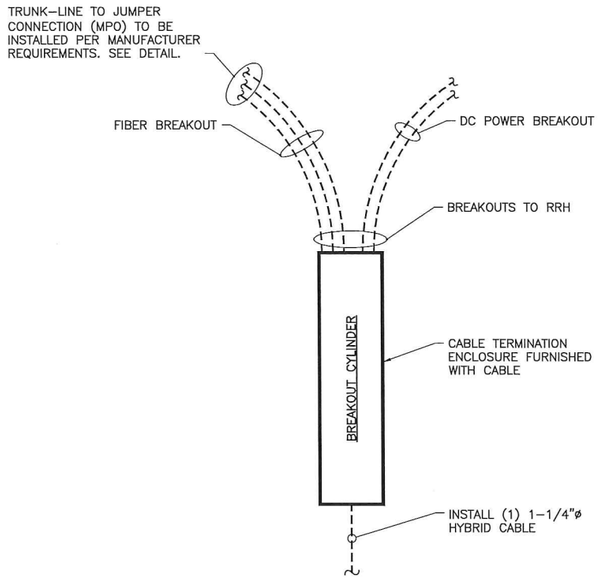
SHEET NO:
A–5

IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

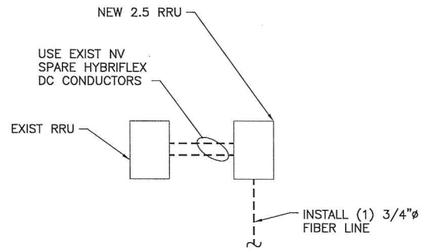
IMPORTANT!! ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL A CLICK SOUND IS HEARD TO ENSURE A GOOD CONNECTION

1 A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.



2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

2 A-6 TRUNK LINE DETAILS (TYPICAL)

SCALE: N.T.S.

SPECIAL NOTES: CABLE MARKINGS AT RAD CENTER AND ALL WALL/BLDG. PENETRATIONS

- ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) WRAPS OF TAPE.
- ALL COLOR BANDS INSTALLED AT THE TOWER TOP SHALL BE A MINIMUM OF 3" WIDE AND SHALL HAVE A MINIMUM OF 3/4" OF SPACING BETWEEN EACH COLOR.
- ALL COLOR BANDS INSTALLED AT OR NEAR THE GROUND MAY BE ONLY 3/4" WIDE. EACH TOP-JUMPER SHALL BE COLOR CORDED WITH (1) SET OF 3" WIDE BANDS.
- EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH 3/4" COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
- ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" BANDS ON EACH END OF THE BOTTOM JUMPER.
- ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
- EACH COLOR BAND SHALL HAVE A MINIMUM OF (3) WRAPS AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT AS TO AVOID UNRAVELING.
- X-POLE ANTENNAS SHOULD USE "XX-1" FOR THE "+45" PORT, "XX-2" FOR THE "-45" PORT.
- COLOR BAND #4 REFERS TO THE FREQUENCY BAND: ORANGE=850, VIOLET=1900. USED ON JUMPERS ONLY.
- RF FEEDLINE SHALL BE IDENTIFIED WITH A METAL TAG (STAINLESS OR BRASS) AND STAMPED WITH THE SECTOR, ANTENNA POSITION, AND CABLE NUMBER.
- ANTENNAS MUST BE IDENTIFIED, USING THE SECTOR LETTER AND ANTENNA NUMBER, WITH A BLACK MARKER PRIOR TO INSTALLATION.

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DATE	REVIEWED BY
8/1/14	JMQ

SEAL

STATE OF CONNECTICUT
JAMES M. QUINN
No. 22830
LICENSED PROFESSIONAL ENGINEER

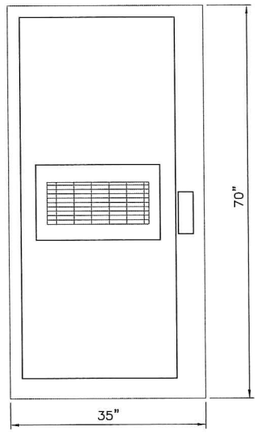
SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
CABLE DETAILS

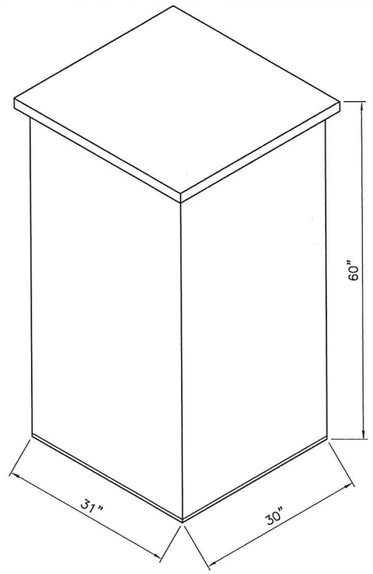
SHEET NO:
A-6



CABINET FRONT 9928 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 70" WIDTH: 35" DEPTH: 37.8" WEIGHT: 1090 LBS.

1/S-1 (EXIST) MMBTS CABINET

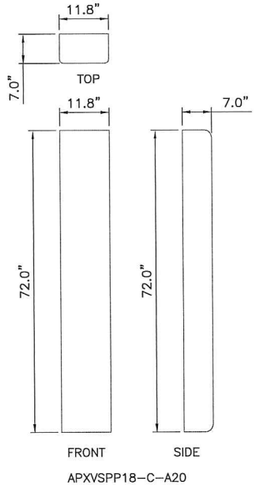
SCALE: 1" = 1'-0"



ANDREW 60ECv2
SPECIFICATIONS:
HEIGHT: 60" WIDTH: 31" DEPTH: 30" WEIGHT: 2430 LBS.

2/S-1 (EXIST) BATTERY CABINET

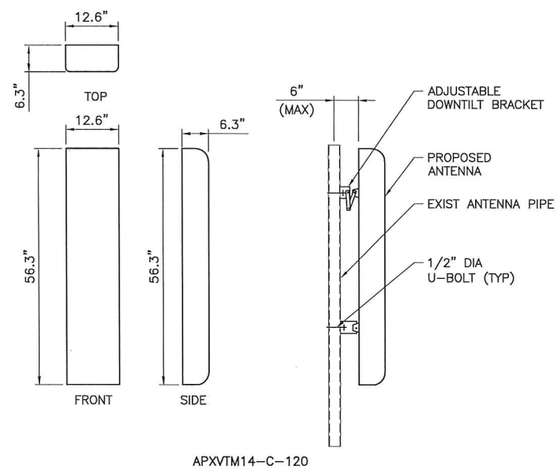
SCALE: 1" = 1'-0"



APXVSPP18-C-A20

3/S-1 (EXIST) ANTENNA DETAIL

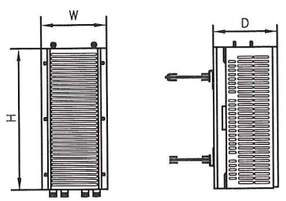
SCALE: 3/4"=1'-0"



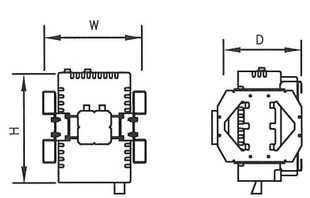
APXVTM14-C-120

4/S-1 (PROPOSED) ANTENNA DETAIL

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



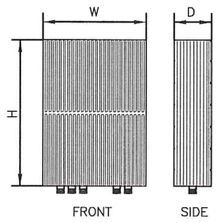
TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.



TYPE: 800 MHz 2x50W MODEL #: FD-RRH-2x50-800 HEIGHT: 19.7" WIDTH: 13" DEPTH: 10.8" WEIGHT: ±53 LBS

5/S-1 (EXIST) RRH DETAILS

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



TYPE: 2.5 RRH MODEL #: TD-RRH8x20-25 HEIGHT: 26.1" WIDTH: 18.6" DEPTH: 6.7" WEIGHT: ±70 LBS

6/S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.

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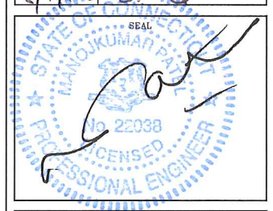
DATE	REVIEWED BY
8/1/14	SMW



SITE NUMBER:
CT03XC017

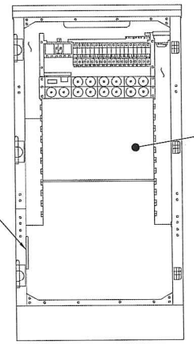
SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

NOTE:
LOCATIONS SHOWN FOR INSTALLATION OF NEW EQUIPMENT IN EXISTING CABINET ARE APPROXIMATE. ACTUAL SPACE AVAILABLE TO BE VERIFIED IN FIELD ON A SITE BY SITE BASIS.



EXIST GROUND BAR TO BE UTILIZED

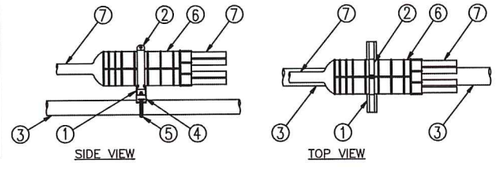
INSTALL NEW 2.5 EQUIPMENT IN EXIST MMBTS CABINET INCLUDING BUT NOT LIMITED TO BASE BAND UNIT, CELL SITE ROUTER AND SURGE ARRESTORS. GROUND EQUIPMENT TO EXIST INTERIOR CABINET GROUND BAR

FRONT ELEVATION
(CABINET INTERIOR)

1 S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

LEGEND:
1. P1000T-HG UNISTRUT, 12" LONG.
2. 6" PIPE HANGER.
3. EXISTING SUPPORT PIPE.
4. NEW STANDOFF BRACKET, ANDREW PART# 30848-4.
5. NEW ROUND MEMBER ADAPTER SIZED FOR EXISTING PIPE SUPPORT.
6. BREAKOUT UNIT.
7. CABLE.



3 S-2 MEDUSA HEAD DETAIL

SCALE: NTS

RFS HYBRIFLEX RISER CABLES SCHEDULE

Fiber Only (Existing DC Power)	**Hybrid cable** MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F	200 ft
8 AWG Power	**Hybrid cable** MN: HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 50ft	50 ft
	MN: HB114-08U3M12-075F	75 ft
	MN: HB114-08U3M12-100F	100 ft
	MN: HB114-08U3M12-125F	125 ft
	MN: HB114-08U3M12-150F	150 ft
	MN: HB114-08U3M12-175F	175 ft
	MN: HB114-08U3M12-200F	200 ft
6 AWG Power	**Hybrid cable** MN: HB114-13U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	**Hybrid cable** MN: HB114-21U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

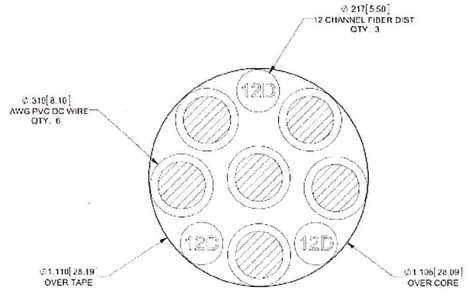
Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
	MN: HBF058-08U1M3-15F1	15 ft
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft
6 AWG Power	**Hybrid Jumper cable** MN: HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-13U1M3-10F1	10 ft
	MN: HBF058-13U1M3-15F1	15 ft
	MN: HBF058-13U1M3-20F1	20 ft
	MN: HBF058-13U1M3-25F1	25 ft
	MN: HBF058-13U1M3-30F1	30 ft
4 AWG Power	**Hybrid Jumper cable** MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft

2 S-2 2.5 HYBRID CABLE X-SECTION AND DATA

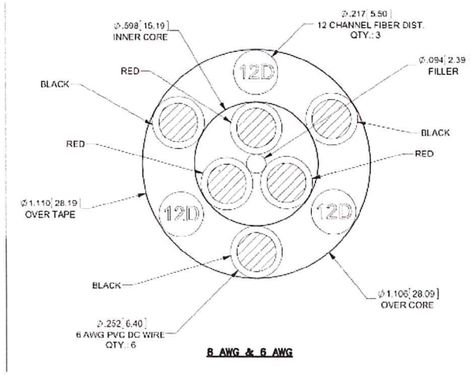
SCALE: NTS

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE

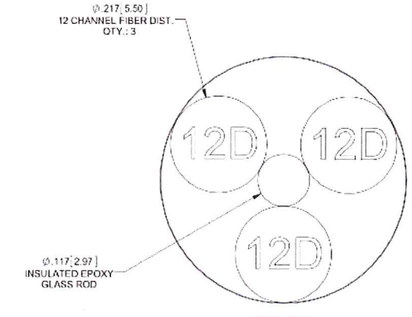
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



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OVERLAND PARK, KS 66251

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DATE	REVIEWED BY
8/1/14	JMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

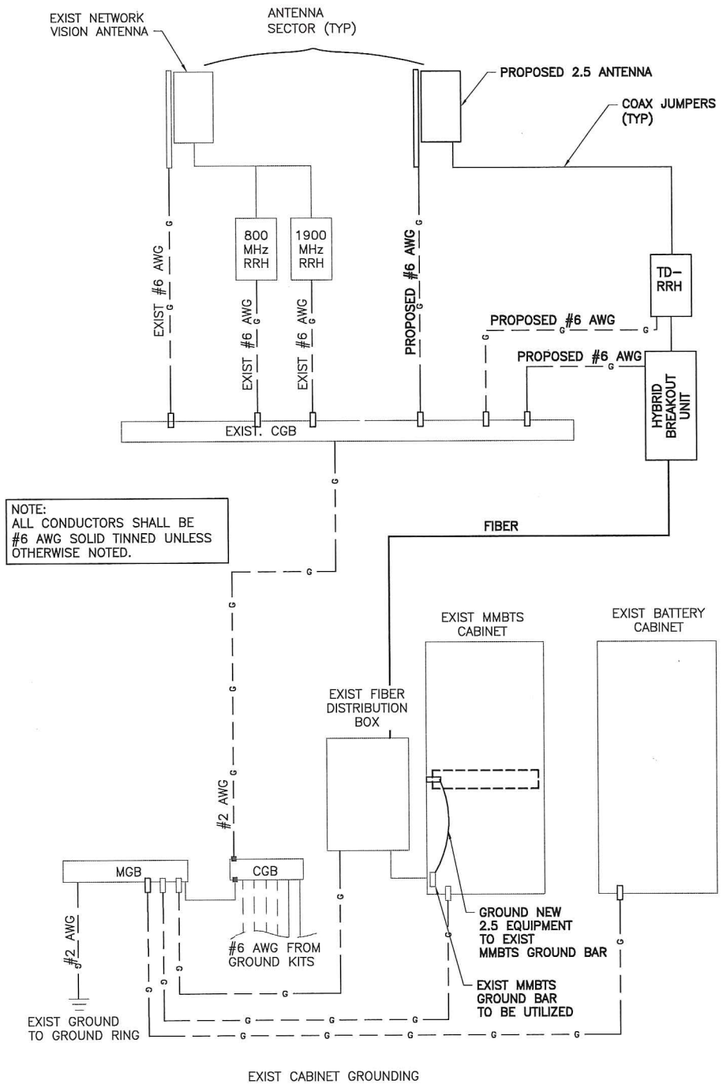
SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

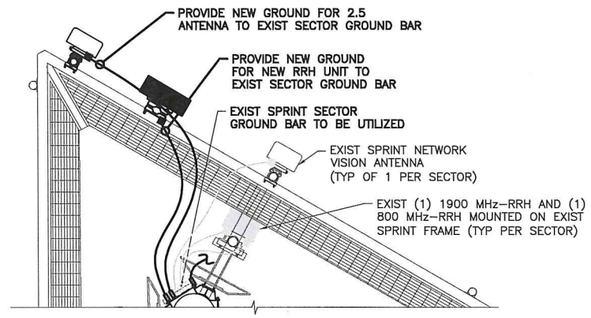
SHEET TITLE:
EQUIPMENT
SCHEMATIC DETAILS

SHEET NO:
S-2



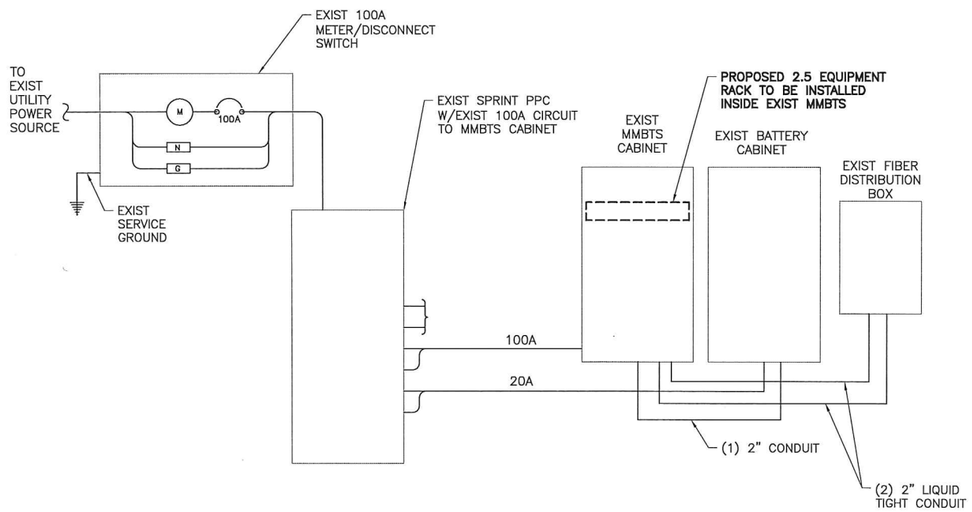
1 E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KS 66251

CROWN CASTLE

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1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT03XC017

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	DC
1	07/28/14	FOR CONSTRUCTION	DC
2	08/01/14	PER COMMENTS	KA

DATE	REVIEWED BY
8/1/14	SMG

STATE OF CONNECTICUT · MANOJ GUPTA · No. 23033 · LICENSED PROFESSIONAL ENGINEER · SEAL

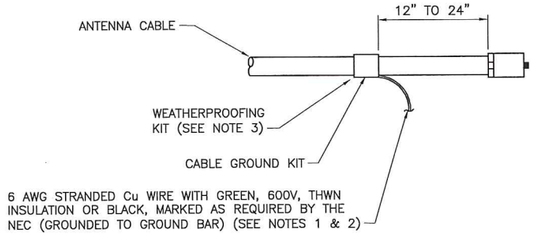
SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

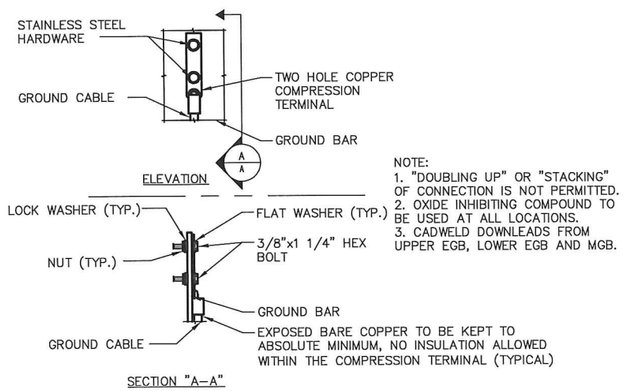
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

WEATHER PROOFING SHALL BE (TYPE AND PART NUMBER) AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER AND APPROVED BY CONTRACTOR.

1 E-2 CABLE GROUNDING KIT DETAIL

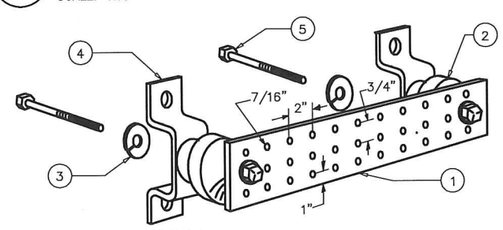
SCALE: N.T.S.



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

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



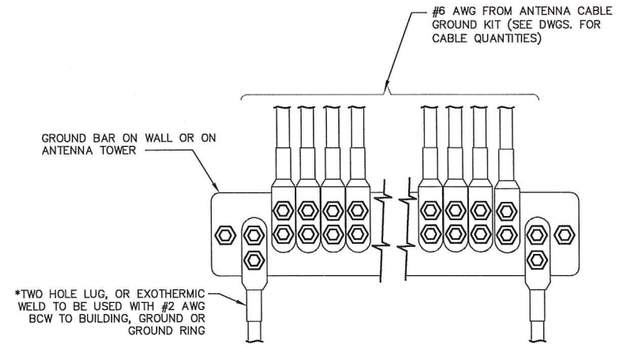
LEGEND

1– COPPER TINNED GROUND BAR, 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED, HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2– INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061–4 OR EQUAL
3– 5/8" LOCKWASHERS OR EQUAL
4– WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A–6056 OR EQUAL
5– 5/8–11 X 1" H.H.C.S.BOLTS

NOTE:
ALL BOLTS, NUTS, WASHERS AND LOCK WASHERS SHALL BE 18–8 STAINLESS STEEL.

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



* – GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

– ATTACH "DO NOT DISCONNECT" LABELS TO GROUND BARS. CAN USE BRASS TAG "DO NOT DISCONNECT" AT EACH HYBRID GROUND POINT OR BACK–A–LITE PLATE LABEL ON GROUND BAR.

– CONNECT SEQUENCE– BOLT/WASHER/NO–OX/GROUND BAR/NO–OX/WASHER/LOCK–WASHER/NUT. THIS IS REPEATED FOR EACH LUG CONNECTION POINT.

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250–GROUNDING AND BONDING.
2. ALL GROUND WIRES SHALL BE #2 AWG UNLESS NOTED OTHERWISE.
3. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
6. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
7. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL AND SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
8. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
9. WHEN CABLE LENGTH IS OVER 20' THE MANUFACTURERS GROUND KIT MUST BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.
10. REFER TO "ANTI–THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUNDING.
11. HOME RUN GROUNDS ARE NOT APPROVED BY CROWN CASTLE CONSTRUCTION STANDARDS AND THAT ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INSULATORS OR DOWN CONDUCTORS.

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

1. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF–TAPPING SCREWS.
2. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
3. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI–CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH PROJECT MANAGER.
4. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
5. INSTALL GROUND BUSHING ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANEL BOARD.
6. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
7. GROUND HYBRID CABLE SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
4. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
5. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THNN INSULATION.
6. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
7. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
8. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
9. GROUNDING SHALL COMPLY WITH NEC ART. 250.
10. GROUND HYBRID CABLE SHIELDS AT 3 LOCATIONS USING MANUFACTURER'S HYBRID CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
11. USE #2 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
12. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
13. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #2 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
14. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
15. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
16. BOND ANTENNA MOUNTING BRACKETS, HYBRID CABLE GROUND KITS, AND RRHs TO EGB PLACED NEAR THE ANTENNA LOCATION.
17. BOND ANTENNA EGB'S AND MGB TO GROUND RING.
18. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULT FOR PROJECT CLOSE–OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
19. CONTRACTOR SHALL CONDUCT ANTENNA, HYBRID CABLES, GPS COAX AND RRH RETURN–LOSS AND DISTANCE– TO–FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.
20. CONTRACTOR SHALL CHECK CAPACITY OF EXISTING SERVICE & PANEL ON SITE TO DETERMINE IF CAPACITY EXISTS TO ACCOMMODATE THE ADDED LOAD OF THIS PROJECT. ADVISE ENGINEER OF ANY DISCREPANCY.
21. LOCATION OF ALL OUTLET, BOXES, ETC, AND THE TYPE OF CONNECTION (PLUG OR DIRECT) SHALL BE CONFIRMED WITH THE OWNER'S REPRESENTATIVE PRIOR TO ROUGH–IN.
22. ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT (NEW AND EXISTING) SHALL BE FIELD VERIFIED WITH THE OWNERS REPRESENTATIVE AND EQUIPMENT SUPPLIER PRIOR TO ROUGH–IN OF CONDUIT AND WIRE. ALL EQUIPMENT SHALL BE PROPERLY CONNECTED ACCORDING TO THE NAMEPLATE DATA FURNISHED ON THE EQUIPMENT.

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2.5 EQUIPMENT DEPLOYMENT
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OVERLAND PARK, KS 66251

CROWN CASTLE

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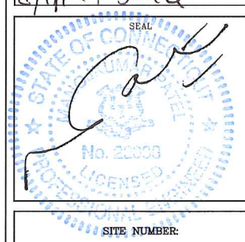
SUBMITTALS

PROJECT NO: 7225.CT03XC017

NO	DATE	DESCRIPTION	BY
0	06/10/14	FOR COMMENT	DC
1	07/28/14	FOR CONSTRUCTION	DC
2	08/01/14	PER COMMENTS	KA

DATE	REVIEWED BY
8/11/14	JMQ

SEAL



SITE NUMBER:
CT03XC017

SITE NAME:
HORSE HILL

SITE ADDRESS:
100 RUSSIAN VILLAGE RD
SOUTHBURY, CT 06488

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E–2

Date: **June 21, 2017**

Charles Trask
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(980) 209-8228

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

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC017
	Carrier Site Name:	CT03XC017
Crown Castle Designation:	**Crown Castle BU Number:**	876314
	Crown Castle Site Name:	Horse Hill
	Crown Castle JDE Job Number:	441739
	Crown Castle Work Order Number:	1418977
	Crown Castle Application Number:	393394 Rev. 1
Engineering Firm Designation:	**TEP Project Number:**	25675.122192
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 Charles Trask,

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 1047983, in accordance with application 393394, revision 1.

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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved 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: Alan R. Freer / AMA

Respectfully submitted by:

Graham M. Andres, P.E.

STATE OF CONNECTICUT
GRAHAM M. ANDRES
29538
LICENSED
PROFESSIONAL ENGINEER

6/21/17

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TABLE OF CONTENTS

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
120.0	120.0	3	RFS/Celwave	APXVTM14-ALU-I20 w/ Mount Pipe	1	1-1/4	1
		3	Alcatel Lucent	TD-RRH8x20-25			

Notes:
1) See “Appendix B – Base Level Drawing” for assumed feed line configuration.

Table 2 - Existing and Reserved 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	-	-	1
		3	Ericsson	RRUS 12			
		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]			
120.0	120.0	3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	2
		9	RFS Celwave	ACU-A20-N			
		1	Tower Mounts	Platform Mount [LP 1201-1]			
118.0	119.0	3	Alcatel Lucent	TME-1900MHz RRH (65MHz)	-	-	2
	118.0	3	Alcatel Lucent	800 External Notch Filter			
		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) Reserved equipment
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	11.5	Pass
L2	120.00-91.50	Pole	TP22.98×16.00×0.1875	2	Note 1	Note 1	35.3	Pass
L3	94.50-64.50	Pole	TP29.22×21.87×0.2500	3	Note 1	Note 1	58.8	Pass
L4	68.25-42.50	Pole	TP34.11×27.80×0.3125	4	Note 1	Note 1	41.5	Pass
L5	46.75-20.25	Pole	TP38.94×32.44×0.3438	5	Note 1	Note 1	59.7	Pass
L6	25.25-0.00	Pole	TP43.21×37.03×0.3750	6	Note 1	Note 1	49.7	Pass
M1	15.50-0.50	Mod (Ex)	(Aero) MP304	1	Note 1	Note 1	59.5	Pass
M2	42.67-12.67	Mod (Ex)	(Aero) MP304	2	Note 1	Note 1	58.5	Pass
M3	70.33-40.33	Mod (Ex)	(Aero) MP304	3	Note 1	Note 1	55.6	Pass
M4	88.17-68.17	Mod (Ex)	(Aero) MP303	4	Note 1	Note 1	65.9	Pass
M5	73.08-68.17	Mod (Ex)	(Aero) MP303	5	Note 1	Note 1	39.6	Pass
M6	89.50-79.50	Mod (Ex)	(Aero) MP303	6	Note 1	Note 1	51.6	Pass
M7	116.17-86.17	Mod (Ex)	(Aero) MP303-BB	7	Note 1	Note 1	53.8	Pass
M8	97.67-87.67	Mod (Ex)	(Aero) MP303-BB	8	Note 1	Note 1	46.0	Pass
M9	103.92-95.17	Mod (Ex)	(Aero) MP303-BB	9	Note 1	Note 1	35.3	Pass
M10	109.42-103.92	Mod (Ex)	(Aero) MP303-BB	10	Note 1	Note 1	31.9	Pass
M11	116.17-109.42	Mod (Ex)	(Aero) MP303-BB	11	Note 1	Note 1	20.7	Pass
							Summary	
						Pole (L5)	59.7	Pass
						Mod (M4)	65.9	Pass
						RATING =	**65.9**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	120.0	38.1	Pass
1	Anchor Rods	-	42.0	Pass
1	Base Plate	-	52.2	Pass
1	Base Foundation Soil Interaction	-	24.5	Pass
1	Base Foundation Structural	-	29.6	Pass

Structure Rating (max from all components) =	**65.9%**

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

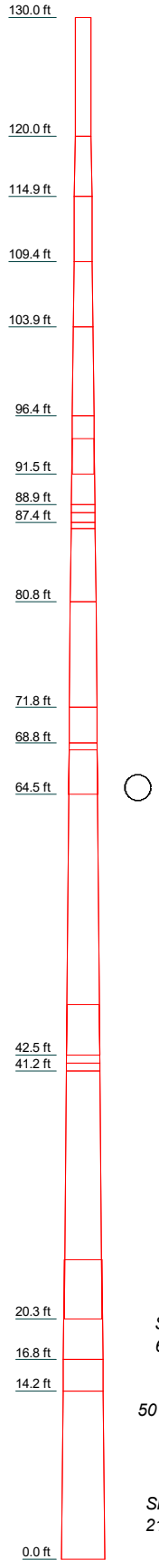
4.1) Recommendations

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.

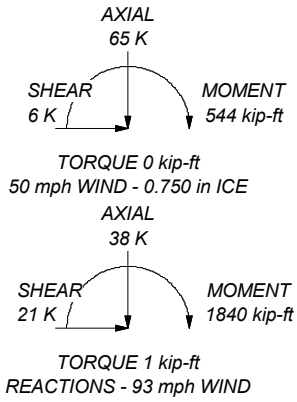
APPENDIX A

TNXTOWER OUTPUT

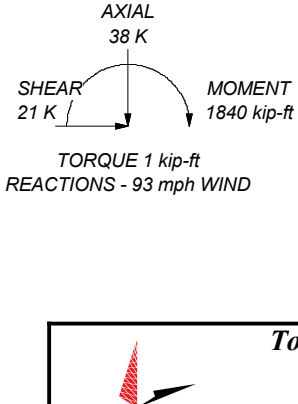
Section	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Length (ft)	14.17	2.66	8.42	20.92	0.66	4.92	25.75	4.33	3.00	8.92	6.17	0.58	0.67	0.58	0.67	5.58	7.50	5.50	5.50	5.08	10.00
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	1
Thickness (in)	0.507	0.668	0.523	0.497	0.034	0.049	0.490	0.462	0.619	0.320	0.420	0.035	0.049	0.035	0.049	0.382	0.434	0.412	0.490	0.188	0.375
Socket Length (ft)				5.00			4.25	3.75		3.00											
Top Dia (in)	39.740	39.089	37.027	33.812	33.540	33.490	27.801	28.159	27.424	25.239	23.722	23.670	23.621	23.572	23.523	21.775	19.938	18.591	17.244	16.000	16.000
Bot Dia (in)	43.210	39.740	39.089	38.940	33.812	33.540	34.110	29.220	28.159	27.424	25.239	23.722	23.670	23.621	23.572	22.980	21.775	19.938	18.591	17.244	16.000
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=50%					MPRF-Fy=42ksi, Density=100%
Weight (K)	14.2	2.4	0.4	1.3	2.8	0.0	0.1	2.7	0.3	0.2	0.6	0.4	0.0	0.0	0.0	0.3	0.2	0.2	0.2	0.2	0.6



ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 0.750 in ICE



TORQUE 1 kip-ft
REACTIONS - 93 mph WIND

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
(2) 860 10025	130	TME-1900MHz RRH (65MHz)	118
(2) 860 10025	130	TME-1900MHz RRH (65MHz)	118
(2) 860 10025	130	TME-1900MHz RRH (65MHz)	118
(2) LGP21401	130	800 EXTERNAL NOTCH FILTER	118
(2) LGP21401	130	800 EXTERNAL NOTCH FILTER	118
(2) LGP21401	130	800 EXTERNAL NOTCH FILTER	118
DC6-48-60-18-8F	130	Side Arm Mount [SO 102-3]	118
RRUS-11	130	(2) RR90-17-02DP w/ Mount Pipe	100
RRUS-11	130	(2) RR90-17-02DP w/ Mount Pipe	100
RRUS-11	130	(2) RR90-17-02DP w/ Mount Pipe	100
RRUS 12	130	LNX-6515DS-VTM w/ Mount Pipe	100
RRUS 12	130	LNX-6515DS-VTM w/ Mount Pipe	100
RRUS 12	130	LNX-6515DS-VTM w/ Mount Pipe	100
Platform Mount [LP 303-1]	130	(2) ATMAP1412D-1A20	100
APXVTM14-ALU-I20 w/ Mount Pipe	120	(2) ATMAP1412D-1A20	100
APXVTM14-ALU-I20 w/ Mount Pipe	120	(2) ATMAP1412D-1A20	100
APXVTM14-ALU-I20 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	ATBT-BOTTOM-24V	100
APXVSPP18-C-A20 w/ Mount Pipe	120	2.4" Dia x 6-ft Pipe	100
TD-RRH8x20-25	120	2.4" Dia x 6-ft Pipe	100
TD-RRH8x20-25	120	2.4" Dia x 6-ft Pipe	100
TD-RRH8x20-25	120	Platform Mount [LP 1201-1]	100
(3) ACU-A20-N	120	GPS_A	80
(3) ACU-A20-N	120	Side Arm Mount [SO 701-1]	80
(3) ACU-A20-N	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

Tower Engineering Professionals

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 611-6350

Job: **Horse Hill (BU 876314)**			
Project: **TEP No. 25675.122192**			
Client: Crown Castle	Drawn by: arfreer	App'd:	
Code: TIA-222-G	Date: 06/21/17	Scale: NTS	
Path: T:\25675\73171_122192_876314 HORSE HILL SA\tnxTower\EQT_876314_LC7.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	2551.724	12.735	4.241	10.304
L5	20.642	27.248	1323.092	6.983	10.328	128.108	2680.944	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	1941.232	8.239	12.122	160.142	3933.463	14.133	5.233	13.505
	24.438	28.969	1993.144	8.312	12.227	163.008	4038.649	14.257	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			
120									
HB114-21U3M12-XXXF(1-1/4")	A	Surface Ar	120.00 - 0.00	4	4	-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			
****Mods****									
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")	A	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")	A	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	A	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")	A	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
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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	12.572
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 K
L1	130.00-120.00	A	0.000	0.000	0.725	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	120.00-114.92	A	0.000	0.000	3.890	0.000	0.09
		B	0.000	0.000	0.196	0.000	0.01
		C	0.000	0.000	0.196	0.000	0.02
L3	114.92-109.42	A	0.000	0.000	5.514	0.000	0.18
		B	0.000	0.000	0.863	0.000	0.05
		C	0.000	0.000	0.863	0.000	0.11
L4	109.42-103.92	A	0.000	0.000	5.514	0.000	0.18
		B	0.000	0.000	0.863	0.000	0.05
		C	0.000	0.000	0.863	0.000	0.05
L5	103.92-96.42	A	0.000	0.000	7.519	0.000	0.25
		B	0.000	0.000	1.178	0.000	0.11
		C	0.000	0.000	1.178	0.000	0.15
L6	96.42-91.50	A	0.000	0.000	4.932	0.000	0.17
		B	0.000	0.000	0.772	0.000	0.10
		C	0.000	0.000	0.772	0.000	0.06

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 K
L7	91.50-88.92	A	0.000	0.000	2.586	0.000	0.08
		B	0.000	0.000	0.405	0.000	0.05
		C	0.000	0.000	1.688	0.000	0.04
L8	88.92-88.25	A	0.000	0.000	0.672	0.000	0.02
		B	0.000	0.000	0.105	0.000	0.01
		C	0.000	0.000	0.901	0.000	0.02
L9	88.25-87.42	A	0.000	0.000	0.832	0.000	0.04
		B	0.000	0.000	0.130	0.000	0.02
		C	0.000	0.000	1.116	0.000	0.02
L10	87.42-86.92	A	0.000	0.000	0.501	0.000	0.02
		B	0.000	0.000	0.079	0.000	0.02
		C	0.000	0.000	0.672	0.000	0.01
L11	86.92-80.75	A	0.000	0.000	6.185	0.000	0.20
		B	0.000	0.000	0.969	0.000	0.13
		C	0.000	0.000	8.299	0.000	0.10
L12	80.75-71.83	A	0.000	0.000	8.942	0.000	0.28
		B	0.000	0.000	1.400	0.000	0.18
		C	0.000	0.000	10.975	0.000	0.07
L13	71.83-68.83	A	0.000	0.000	3.019	0.000	0.14
		B	0.000	0.000	0.477	0.000	0.08
		C	0.000	0.000	4.024	0.000	0.07
L14	68.83-64.50	A	0.000	0.000	4.375	0.000	0.19
		B	0.000	0.000	0.697	0.000	0.11
		C	0.000	0.000	5.841	0.000	0.09
L15	64.50-42.50	A	0.000	0.000	22.231	0.000	0.89
		B	0.000	0.000	3.542	0.000	0.54
		C	0.000	0.000	29.678	0.000	0.42
L16	42.50-41.83	A	0.000	0.000	0.677	0.000	0.05
		B	0.000	0.000	0.108	0.000	0.03
		C	0.000	0.000	0.904	0.000	0.02
L17	41.83-41.17	A	0.000	0.000	0.667	0.000	0.05
		B	0.000	0.000	0.106	0.000	0.03
		C	0.000	0.000	0.890	0.000	0.02
L18	41.17-20.25	A	0.000	0.000	21.140	0.000	0.87
		B	0.000	0.000	3.368	0.000	0.52
		C	0.000	0.000	28.221	0.000	0.41
L19	20.25-16.83	A	0.000	0.000	3.456	0.000	0.14
		B	0.000	0.000	0.551	0.000	0.08
		C	0.000	0.000	4.614	0.000	0.07
L20	16.83-14.17	A	0.000	0.000	2.688	0.000	0.14
		B	0.000	0.000	0.428	0.000	0.08
		C	0.000	0.000	3.588	0.000	0.07
L21	14.17-0.00	A	0.000	0.000	14.158	0.000	0.60
		B	0.000	0.000	2.201	0.000	0.36
		C	0.000	0.000	19.035	0.000	0.29

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 K
L1	130.00-120.00	A	1.714	0.000	0.000	7.580	0.000	0.16
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	120.00-114.92	A	1.703	0.000	0.000	11.055	0.000	0.22
		B		0.000	0.000	0.622	0.000	0.02
		C		0.000	0.000	0.622	0.000	0.04
L3	114.92-109.42	A	1.695	0.000	0.000	15.747	0.000	0.37

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 K
		B		0.000	0.000	2.728	0.000	0.09
		C		0.000	0.000	2.728	0.000	0.18
L4	109.42-103.92	A	1.687	0.000	0.000	15.549	0.000	0.37
		B		0.000	0.000	2.719	0.000	0.09
		C		0.000	0.000	2.719	0.000	0.09
L5	103.92-96.42	A	1.676	0.000	0.000	21.342	0.000	0.52
		B		0.000	0.000	3.692	0.000	0.16
		C		0.000	0.000	3.692	0.000	0.24
L6	96.42-91.50	A	1.665	0.000	0.000	14.246	0.000	0.35
		B		0.000	0.000	2.411	0.000	0.13
		C		0.000	0.000	2.411	0.000	0.10
L7	91.50-88.92	A	1.659	0.000	0.000	7.472	0.000	0.17
		B		0.000	0.000	1.264	0.000	0.07
		C		0.000	0.000	3.318	0.000	0.08
L8	88.92-88.25	A	1.656	0.000	0.000	1.934	0.000	0.04
		B		0.000	0.000	0.327	0.000	0.02
		C		0.000	0.000	1.599	0.000	0.04
L9	88.25-87.42	A	1.654	0.000	0.000	2.401	0.000	0.07
		B		0.000	0.000	0.405	0.000	0.03
		C		0.000	0.000	1.981	0.000	0.05
L10	87.42-86.92	A	1.653	0.000	0.000	1.446	0.000	0.04
		B		0.000	0.000	0.244	0.000	0.02
		C		0.000	0.000	1.193	0.000	0.03
L11	86.92-80.75	A	1.647	0.000	0.000	17.803	0.000	0.42
		B		0.000	0.000	3.000	0.000	0.18
		C		0.000	0.000	14.703	0.000	0.28
L12	80.75-71.83	A	1.631	0.000	0.000	25.592	0.000	0.58
		B		0.000	0.000	4.310	0.000	0.24
		C		0.000	0.000	17.896	0.000	0.28
L13	71.83-68.83	A	1.618	0.000	0.000	8.578	0.000	0.25
		B		0.000	0.000	1.448	0.000	0.11
		C		0.000	0.000	6.883	0.000	0.16
L14	68.83-64.50	A	1.609	0.000	0.000	12.359	0.000	0.34
		B		0.000	0.000	2.091	0.000	0.14
		C		0.000	0.000	10.263	0.000	0.21
L15	64.50-42.50	A	1.573	0.000	0.000	62.792	0.000	1.62
		B		0.000	0.000	10.623	0.000	0.68
		C		0.000	0.000	52.143	0.000	1.03
L16	42.50-41.83	A	1.537	0.000	0.000	1.887	0.000	0.07
		B		0.000	0.000	0.319	0.000	0.03
		C		0.000	0.000	1.577	0.000	0.04
L17	41.83-41.17	A	1.535	0.000	0.000	1.832	0.000	0.07
		B		0.000	0.000	0.309	0.000	0.03
		C		0.000	0.000	1.542	0.000	0.04
L18	41.17-20.25	A	1.488	0.000	0.000	57.048	0.000	1.49
		B		0.000	0.000	9.594	0.000	0.64
		C		0.000	0.000	48.443	0.000	0.94
L19	20.25-16.83	A	1.416	0.000	0.000	9.326	0.000	0.24
		B		0.000	0.000	1.568	0.000	0.10
		C		0.000	0.000	7.919	0.000	0.15
L20	16.83-14.17	A	1.391	0.000	0.000	6.982	0.000	0.23
		B		0.000	0.000	1.168	0.000	0.10
		C		0.000	0.000	6.043	0.000	0.14
L21	14.17-0.00	A	1.284	0.000	0.000	35.191	0.000	0.95
		B		0.000	0.000	5.712	0.000	0.43
		C		0.000	0.000	31.304	0.000	0.59

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	-0.682	0.000	-0.898	0.000
L3	114.92-109.42	-0.581	0.000	-0.705	0.000
L4	109.42-103.92	-0.598	0.000	-0.733	0.000
L5	103.92-96.42	-0.615	0.000	-0.782	0.000
L6	96.42-91.50	-0.631	0.000	-0.839	0.000
L7	91.50-88.92	-0.552	0.411	-0.736	0.319
L8	88.92-88.25	-0.471	0.832	-0.625	0.645
L9	88.25-87.42	-0.473	0.835	-0.631	0.648
L10	87.42-86.92	-0.475	0.838	-0.634	0.651
L11	86.92-80.75	-0.483	0.851	-0.650	0.667
L12	80.75-71.83	-0.512	0.816	-0.712	0.590
L13	71.83-68.83	-0.513	0.897	-0.716	0.706
L14	68.83-64.50	-0.519	0.912	-0.725	0.746
L15	64.50-42.50	-0.540	0.948	-0.773	0.793
L16	42.50-41.83	-0.556	0.975	-0.806	0.832
L17	41.83-41.17	-0.557	0.977	-0.805	0.838
L18	41.17-20.25	-0.575	1.007	-0.842	0.884
L19	20.25-16.83	-0.589	1.031	-0.876	0.919
L20	16.83-14.17	-0.593	1.038	-0.876	0.939
L21	14.17-0.00	-0.608	1.062	-0.896	0.984

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	10	HB114-21U3M12-XXXF(1-1/4")	114.92 - 120.00	1.0000	1.0000
L2	54	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L2	57	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L2	58	Aero MP3-03	114.92 - 116.17	1.0000	1.0000
L2	66	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	10	HB114-21U3M12-XXXF(1-1/4")	109.42 - 114.92	1.0000	1.0000
L3	54	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	57	Aero MP3-03	109.42 - 114.92	1.0000	1.0000
L3	58	Aero MP3-03	109.42 - 114.92	1.0000	1.0000
L3	66	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	10	HB114-21U3M12-XXXF(1-1/4")	103.92 - 109.42	1.0000	1.0000
L4	54	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L4	57	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L4	58	Aero MP3-03	103.92 - 109.42	1.0000	1.0000
L4	65	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	10	HB114-21U3M12-XXXF(1-1/4")	96.42 - 103.92	1.0000	1.0000
L5	54	Aero MP3-03	96.42 - 103.92	1.0000	1.0000
L5	57	Aero MP3-03	96.42 - 103.92	1.0000	1.0000
L5	58	Aero MP3-03	96.42 - 103.92	1.0000	1.0000
L5	61	Aero MP3-03	96.42 - 97.67	1.0000	1.0000
L5	64	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	10	HB114-21U3M12-XXXF(1-1/4")	91.50 - 96.42	1.0000	1.0000
L6	54	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	57	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	58	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	61	Aero MP3-03	91.50 - 96.42	1.0000	1.0000
L6	16	LDF7-50A(1-5/8")	91.50 - 90.00	1.0000	1.0000
L6	51	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	10	HB114-21U3M12-XXXF(1-1/4")	88.25 - 88.92	1.0000	1.0000
L8	16	LDF7-50A(1-5/8")	88.25 - 88.92	1.0000	1.0000
L8	51	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L8	57	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L8	58	Aero MP3-03	88.25 - 88.92	1.0000	1.0000
L8	61	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	10	HB114-21U3M12-XXXF(1-1/4")	87.42 - 88.25	1.0000	1.0000
L9	16	LDF7-50A(1-5/8")	87.42 - 88.25	1.0000	1.0000
L9	47	Aero MP3-03	87.42 - 88.17	1.0000	1.0000
L9	48	Aero MP3-03	87.42 - 88.17	1.0000	1.0000
L9	49	Aero MP3-03	87.42 - 88.17	1.0000	1.0000
L9	51	Aero MP3-03	87.42 - 88.25	1.0000	1.0000
L9	57	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
L9	58	Aero MP3-03	88.17 - 88.25	1.0000	1.0000
L9	61	Aero MP3-03	88.17 - 88.25	1.0000	1.0000
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	10	HB114-21U3M12-XXXF(1-1/4")	86.92 - 87.42	1.0000	1.0000
L10	16	LDF7-50A(1-5/8")	86.92 - 87.42	1.0000	1.0000
L10	47	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L10	48	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L10	49	Aero MP3-03	86.92 - 87.42	1.0000	1.0000
L10	51	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	10	HB114-21U3M12-XXXF(1-1/4")	80.75 - 86.92	1.0000	1.0000
L11	16	LDF7-50A(1-5/8")	80.75 - 86.92	1.0000	1.0000
L11	47	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L11	48	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L11	49	Aero MP3-03	80.75 - 86.92	1.0000	1.0000
L11	51	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	10	HB114-21U3M12-XXXF(1-1/4")	71.83 - 80.75	1.0000	1.0000
L12	16	LDF7-50A(1-5/8")	71.83 - 80.75	1.0000	1.0000
L12	47	Aero MP3-03	71.83 - 80.75	1.0000	1.0000
L12	48	Aero MP3-03	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 - 73.08	1.0000	1.0000
L12	51	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	10	HB114-21U3M12-XXXF(1-1/4")	68.83 - 71.83	1.0000	1.0000
L13	16	LDF7-50A(1-5/8")	68.83 - 71.83	1.0000	1.0000
L13	38	Aero MP3-04	68.83 - 70.33	1.0000	1.0000
L13	39	Aero MP3-04	68.83 - 70.33	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	47	Aero MP3-03	70.33 - 71.83	1.0000	1.0000
L13	48	Aero MP3-03	70.33 - 71.83	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
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	10	HB114-21U3M12-XXXF(1-1/4")	64.50 - 68.83	1.0000	1.0000
L14	16	LDF7-50A(1-5/8")	64.50 - 68.83	1.0000	1.0000
L14	38	Aero MP3-04	64.50 - 68.83	1.0000	1.0000
L14	39	Aero MP3-04	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	29	Aero MP3-04	64.50 - 42.67	1.0000	1.0000
L14	30	Aero MP3-04	64.50 - 42.67	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
L15	2	Step Pegs (5/8" SR) 7-in.	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
		w/30" step			
L15	3	Safety Line 3/8	42.50 - 64.50	1.0000	1.0000
L15	10	HB114-21U3M12-XXXF(1-1/4")	42.50 - 64.50	1.0000	1.0000
L15	16	LDF7-50A(1-5/8")	42.50 - 64.50	1.0000	1.0000
L15	29	Aero MP3-04	42.50 - 42.67	1.0000	1.0000
L15	30	Aero MP3-04	42.50 - 42.67	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
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	10	HB114-21U3M12-XXXF(1-1/4")	41.17 - 41.83	1.0000	1.0000
L17	16	LDF7-50A(1-5/8")	41.17 - 41.83	1.0000	1.0000
L17	29	Aero MP3-04	41.17 - 41.83	1.0000	1.0000
L17	30	Aero MP3-04	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
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	10	HB114-21U3M12-XXXF(1-1/4")	20.25 - 41.17	1.0000	1.0000
L18	16	LDF7-50A(1-5/8")	20.25 - 41.17	1.0000	1.0000
L18	29	Aero MP3-04	20.25 - 41.17	1.0000	1.0000
L18	30	Aero MP3-04	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
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	10	HB114-21U3M12-XXXF(1-1/4")	14.17 - 16.83	1.0000	1.0000
L20	16	LDF7-50A(1-5/8")	14.17 - 16.83	1.0000	1.0000
L20	20	Aero MP3-04	14.17 - 15.50	1.0000	1.0000
L20	21	Aero MP3-04	14.17 - 15.50	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	29	Aero MP3-04	15.50 - 16.83	1.0000	1.0000
L20	30	Aero MP3-04	15.50 - 16.83	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
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	10	HB114-21U3M12-XXXF(1-1/4")	0.00 - 14.17	1.0000	1.0000
L21	16	LDF7-50A(1-5/8")	0.00 - 14.17	1.0000	1.0000
L21	20	Aero MP3-04	0.50 - 14.17	1.0000	1.0000
L21	21	Aero MP3-04	0.50 - 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

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 K
130									
800 10121 w/ Mount Pipe	A	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17
800 10121 w/ Mount Pipe	B	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17
800 10121 w/ Mount Pipe	C	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17
P65-17-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	11.70 12.42 13.15	8.94 10.45 11.99	0.09 0.18 0.27
SBNH-1D6565C w/ Mount Pipe	B	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	11.69 12.42 13.16	9.85 11.38 12.94	0.10 0.19 0.29
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
(2) 860 10025	A	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	0.00 0.00 0.01
(2) 860 10025	B	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	0.00 0.00 0.01
(2) 860 10025	C	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	0.00 0.00 0.01
(2) LGP21401	A	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
(2) LGP21401	B	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
(2) LGP21401	C	From Centroid-Face	4.00 -6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	1.10 1.24 1.38	0.21 0.27 0.35	0.01 0.02 0.03
DC6-48-60-18-8F	B	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
RRUS-11	A	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.09
RRUS-11	B	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.09
RRUS-11	C	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	2.79 3.00 3.21	1.19 1.34 1.50	0.05 0.07 0.09
RRUS 12	A	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	B	From Centroid-Face	4.00 6.000 0.000	-10.000	130.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	C	From	4.00	-10.000	130.00	No Ice	3.15	1.29	0.06

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 K
		Centroid-Face	6.000 0.000			1/2" Ice 1" Ice	3.36 3.59	1.44 1.60	0.08 0.11
Platform Mount [LP 303-1]	A	None		0.000	130.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
120									
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Centroid-Leg	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Centroid-Leg	4.00 -7.000 0.000	40.000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Centroid-Leg	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.000 0.000	40.000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
TD-RRH8x20-25	A	From Centroid-Leg	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Centroid-Leg	4.00 -7.000 0.000	40.000	120.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Centroid-Leg	4.00 -7.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
(3) ACU-A20-N	A	From Centroid-Leg	4.00 0.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(3) ACU-A20-N	B	From Centroid-Leg	4.00 0.000 0.000	40.000	120.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(3) ACU-A20-N	C	From Centroid-Leg	4.00 0.000 0.000	30.000	120.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(2) 2.4" Dia x 6-ft Pipe	A	From Centroid-Leg	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	0.02 0.03 0.05
(2) 2.4" Dia x 6-ft Pipe	B	From Centroid-Leg	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	0.02 0.03 0.05
(2) 2.4" Dia x 6-ft Pipe	C	From Centroid-Leg	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	0.02 0.03 0.05
Platform Mount [LP 1201-1]	A	None		0.000	120.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
118									
TME-800MHZ RRH w/ Mount Pipe	A	From Leg	1.00 0.000	30.000	118.00	No Ice 1/2" Ice	2.20 2.40	2.12 2.42	0.06 0.09

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 K
			-1.000			1" Ice	2.62	2.74	0.12
TME-800MHZ RRH w/ Mount Pipe	B	From Leg	1.00 0.000	40.000	118.00	No Ice 1/2" Ice	2.20 2.40	2.12 2.42	0.06 0.09
			-1.000			1" Ice	2.62	2.74	0.12
TME-800MHZ RRH w/ Mount Pipe	C	From Leg	1.00 0.000	30.000	118.00	No Ice 1/2" Ice	2.20 2.40	2.12 2.42	0.06 0.09
			-1.000			1" Ice	2.62	2.74	0.12
TME-1900MHz RRH (65MHz)	A	From Leg	1.00 0.000	30.000	118.00	No Ice 1/2" Ice	2.70 2.94	2.77 3.01	0.06 0.08
			1.000			1" Ice	3.18	3.26	0.11
TME-1900MHz RRH (65MHz)	B	From Leg	1.00 0.000	40.000	118.00	No Ice 1/2" Ice	2.70 2.94	2.77 3.01	0.06 0.08
			1.000			1" Ice	3.18	3.26	0.11
TME-1900MHz RRH (65MHz)	C	From Leg	1.00 0.000	30.000	118.00	No Ice 1/2" Ice	2.70 2.94	2.77 3.01	0.06 0.08
			1.000			1" Ice	3.18	3.26	0.11
800 EXTERNAL NOTCH FILTER	A	From Leg	1.00 0.000	30.000	118.00	No Ice 1/2" Ice	0.66 0.76	0.32 0.40	0.01 0.02
			0.000			1" Ice	0.87	0.48	0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	1.00 0.000	40.000	118.00	No Ice 1/2" Ice	0.66 0.76	0.32 0.40	0.01 0.02
			0.000			1" Ice	0.87	0.48	0.02
800 EXTERNAL NOTCH FILTER	C	From Leg	1.00 0.000	30.000	118.00	No Ice 1/2" Ice	0.66 0.76	0.32 0.40	0.01 0.02
			0.000			1" Ice	0.87	0.48	0.02
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	0.08 0.11 0.14
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	0.03 0.07 0.12
(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	0.03 0.07 0.12
(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	0.03 0.07 0.12
LNX-6515DS-VTM w/ Mount Pipe	A	From Centroid-Face	4.00 -2.333 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	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Centroid-Face	4.00 -2.333 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	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Centroid-Face	4.00 -2.333 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	0.08 0.17 0.27
(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	0.01 0.02 0.03
(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	0.01 0.02 0.03
(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	0.01 0.02 0.03
ATBT-BOTTOM-24V	A	From	4.00	0.000	100.00	No Ice	0.10	0.06	0.00

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 K
		Centroid-Face	-2.333 0.000			1/2" Ice 1" Ice	0.15 0.20	0.10 0.15	0.00 0.01
ATBT-BOTTOM-24V	B	From Centroid-Face	4.00 -2.333 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	0.00 0.00 0.01
ATBT-BOTTOM-24V	C	From Centroid-Face	4.00 -2.333 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	0.00 0.00 0.01
2.4" Dia x 6-ft Pipe	A	From Centroid-Face	4.00 2.333 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	0.02 0.03 0.05
2.4" Dia x 6-ft Pipe	B	From Centroid-Face	4.00 2.333 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	0.02 0.03 0.05
2.4" Dia x 6-ft Pipe	C	From Centroid-Face	4.00 2.333 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	0.02 0.03 0.05
Platform Mount [LP 1201-1]	A	None		0.000	100.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
80									
GPS_A	A	From Leg	3.00 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	From Leg	1.50 0.000 0.000	0.000	80.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
*****									

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

Comb. No.	Description
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
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	14.520	45	1.031	0.006
L2	120 - 114.92	12.374	45	1.013	0.005
L3	114.92 - 109.42	11.319	45	0.966	0.003
L4	109.42 - 103.92	10.222	45	0.937	0.003
L5	103.92 - 96.42	9.166	45	0.896	0.002
L6	96.42 - 91.5	7.804	45	0.836	0.002
L7	94.5 - 88.92	7.472	45	0.817	0.002
L8	88.92 - 88.25	6.537	45	0.777	0.002
L9	88.25 - 87.42	6.428	45	0.768	0.002
L10	87.42 - 86.92	6.296	45	0.759	0.001
L11	86.92 - 80.75	6.217	45	0.751	0.001
L12	80.75 - 71.83	5.289	45	0.685	0.001
L13	71.83 - 68.83	4.126	45	0.560	0.001
L14	68.83 - 64.5	3.781	45	0.538	0.001
L15	68.25 - 42.5	3.716	45	0.532	0.001
L16	46.75 - 41.83	1.706	45	0.348	0.000
L17	41.83 - 41.17	1.359	45	0.323	0.000
L18	41.17 - 20.25	1.315	45	0.315	0.000
L19	25.25 - 16.83	0.502	45	0.175	0.000
L20	16.83 - 14.17	0.228	45	0.127	0.000
L21	14.17 - 0	0.162	45	0.110	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

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	45	14.520	1.031	0.006	20938
120.00	APXVTM14-ALU-I20 w/ Mount Pipe	45	12.374	1.013	0.005	10386
118.00	TME-800MHZ RRH w/ Mount Pipe	45	11.954	0.995	0.004	8645
100.00	(2) RR90-17-02DP w/ Mount Pipe	45	8.442	0.867	0.002	6772
80.00	GPS_A	45	5.183	0.676	0.001	4479

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	62.868	14	4.468	0.027
L2	120 - 114.92	53.574	14	4.390	0.020
L3	114.92 - 109.42	49.005	14	4.189	0.014
L4	109.42 - 103.92	44.254	14	4.062	0.012
L5	103.92 - 96.42	39.679	14	3.884	0.010
L6	96.42 - 91.5	33.783	14	3.622	0.008
L7	94.5 - 88.92	32.344	14	3.540	0.007
L8	88.92 - 88.25	28.293	14	3.366	0.007
L9	88.25 - 87.42	27.823	14	3.329	0.006
L10	87.42 - 86.92	27.249	14	3.289	0.006
L11	86.92 - 80.75	26.906	14	3.252	0.006
L12	80.75 - 71.83	22.888	14	2.968	0.005
L13	71.83 - 68.83	17.851	14	2.426	0.004
L14	68.83 - 64.5	16.357	14	2.329	0.003
L15	68.25 - 42.5	16.076	14	2.304	0.003
L16	46.75 - 41.83	7.380	14	1.506	0.002
L17	41.83 - 41.17	5.878	14	1.398	0.002
L18	41.17 - 20.25	5.687	14	1.361	0.001
L19	25.25 - 16.83	2.168	14	0.758	0.001
L20	16.83 - 14.17	0.984	14	0.549	0.000
L21	14.17 - 0	0.698	14	0.477	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	14	62.868	4.468	0.027	5051
120.00	APXVTM14-ALU-I20 w/ Mount Pipe	14	53.574	4.390	0.020	2490
118.00	TME-800MHZ RRH w/ Mount Pipe	14	51.757	4.312	0.017	2058

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	(2) RR90-17-02DP w/ Mount Pipe	14	36.543	3.757	0.009	1573
80.00	GPS_A	14	22.429	2.929	0.005	1037

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 120 (1)	TP16x16x0.375	10.00	0.00	0.0	18.408	-3.17	695.81	0.005
L2	120 - 114.92 (2)	TP17.244x16x0.188	5.08	0.00	0.0	10.298	-7.34	698.92	0.011
L3	114.92 - 109.42 (3)	TP18.591x17.244x0.49	5.50	0.00	0.0	28.561	-7.94	1943.27	0.004
L4	109.42 - 103.92 (4)	TP19.938x18.591x0.412	5.50	0.00	0.0	25.876	-8.52	1760.59	0.005
L5	103.92 - 96.42 (5)	TP21.775x19.938x0.434	7.50	0.00	0.0	29.815	-12.50	2028.59	0.006
L6	96.42 - 91.5 (6)	TP22.98x21.775x0.382	4.92	0.00	0.0	26.925	-12.76	1831.96	0.007
L7	91.5 - 88.92 (7)	TP23.237x21.87x0.438	5.58	0.00	0.0	32.148	-13.78	2369.66	0.006
L8	88.92 - 88.25 (8)	TP23.401x23.237x0.334	0.67	0.00	0.0	24.778	-13.90	1826.36	0.008
L9	88.25 - 87.42 (9)	TP23.605x23.401x0.387	0.83	0.00	0.0	28.969	-14.07	2135.28	0.007
L10	87.42 - 86.92 (10)	TP23.727x23.605x0.251	0.50	0.00	0.0	18.995	-14.17	1368.25	0.010
L11	86.92 - 80.75 (11)	TP25.239x23.727x0.42	6.17	0.00	0.0	33.536	-15.21	2471.96	0.006
L12	80.75 - 71.83 (12)	TP27.424x25.239x0.32	8.92	0.00	0.0	27.897	-16.79	2056.32	0.008
L13	71.83 - 68.83 (13)	TP28.159x27.424x0.619	3.00	0.00	0.0	54.878	-17.42	4045.08	0.004
L14	68.83 - 64.5 (14)	TP29.22x28.159x0.462	4.33	0.00	0.0	41.376	-17.54	3049.80	0.006
L15	64.5 - 42.5 (15)	TP34.11x27.801x0.49	25.75	0.00	0.0	51.432	-22.90	3791.04	0.006
L16	42.5 - 41.83 (16)	TP33.65x32.444x0.519	4.92	0.00	0.0	55.366	-24.77	4081.00	0.006
L17	41.83 - 41.17 (17)	TP33.812x33.65x0.344	0.66	0.00	0.0	37.050	-24.99	2630.65	0.010
L18	41.17 - 20.25 (18)	TP38.94x33.812x0.497	20.92	0.00	0.0	59.562	-29.35	4390.31	0.007
L19	20.25 - 16.83 (19)	TP39.089x37.027x0.523	8.42	0.00	0.0	64.914	-32.69	4416.72	0.007
L20	16.83 - 14.17 (20)	TP39.74x39.089x0.668	2.66	0.00	0.0	84.071	-33.59	5720.21	0.006
L21	14.17 - 0 (21)	TP43.21x39.74x0.507	14.17	0.00	0.0	66.835	-35.83	4547.46	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 120 (1)	TP16x16x0.375	31.82	288.45	0.110	0.00	288.45	0.000
L2	120 - 114.92 (2)	TP17.244x16x0.188	66.20	242.13	0.273	0.00	242.13	0.000
L3	114.92 - 109.42 (3)	TP18.591x17.244x0.49	107.62	703.26	0.153	0.00	703.26	0.000
L4	109.42 - 103.92 (4)	TP19.938x18.591x0.412	152.15	691.36	0.220	0.00	691.36	0.000
L5	103.92 - 96.42 (5)	TP21.775x19.938x0.434	228.52	871.26	0.262	0.00	871.26	0.000
L6	96.42 - 91.5 (6)	TP22.98x21.775x0.382	251.97	808.29	0.312	0.00	808.29	0.000
L7	91.5 - 88.92 (7)	TP23.237x21.87x0.438	322.48	1088.48	0.296	0.00	1088.48	0.000
L8	88.92 - 88.25 (8)	TP23.401x23.237x0.334	331.19	852.77	0.388	0.00	852.77	0.000
L9	88.25 - 87.42 (9)	TP23.605x23.401x0.387	342.03	1001.28	0.342	0.00	1001.28	0.000
L10	87.42 - 86.92 (10)	TP23.727x23.605x0.251	348.59	652.59	0.534	0.00	652.59	0.000
L11	86.92 - 80.75 (11)	TP25.239x23.727x0.42	431.85	1238.87	0.349	0.00	1238.87	0.000
L12	80.75 - 71.83 (12)	TP27.424x25.239x0.32	558.74	1131.14	0.494	0.00	1131.14	0.000
L13	71.83 - 68.83 (13)	TP28.159x27.424x0.619	602.97	2237.28	0.270	0.00	2237.28	0.000
L14	68.83 - 64.5 (14)	TP29.22x28.159x0.462	611.62	1715.03	0.357	0.00	1715.03	0.000
L15	64.5 - 42.5 (15)	TP34.11x27.801x0.49	954.30	2498.48	0.382	0.00	2498.48	0.000
L16	42.5 - 41.83 (16)	TP33.65x32.444x0.519	1038.91	2733.53	0.380	0.00	2733.53	0.000
L17	41.83 - 41.17 (17)	TP33.812x33.65x0.344	1050.43	1789.48	0.587	0.00	1789.48	0.000
L18	41.17 - 20.25 (18)	TP38.94x33.812x0.497	1338.93	3310.95	0.404	0.00	3310.95	0.000
L19	20.25 - 16.83 (19)	TP39.089x37.027x0.523	1500.08	3450.90	0.435	0.00	3450.90	0.000
L20	16.83 - 14.17 (20)	TP39.74x39.089x0.668	1552.20	4512.18	0.344	0.00	4512.18	0.000
L21	14.17 - 0 (21)	TP43.21x39.74x0.507	1693.88	3778.81	0.448	0.00	3778.81	0.000

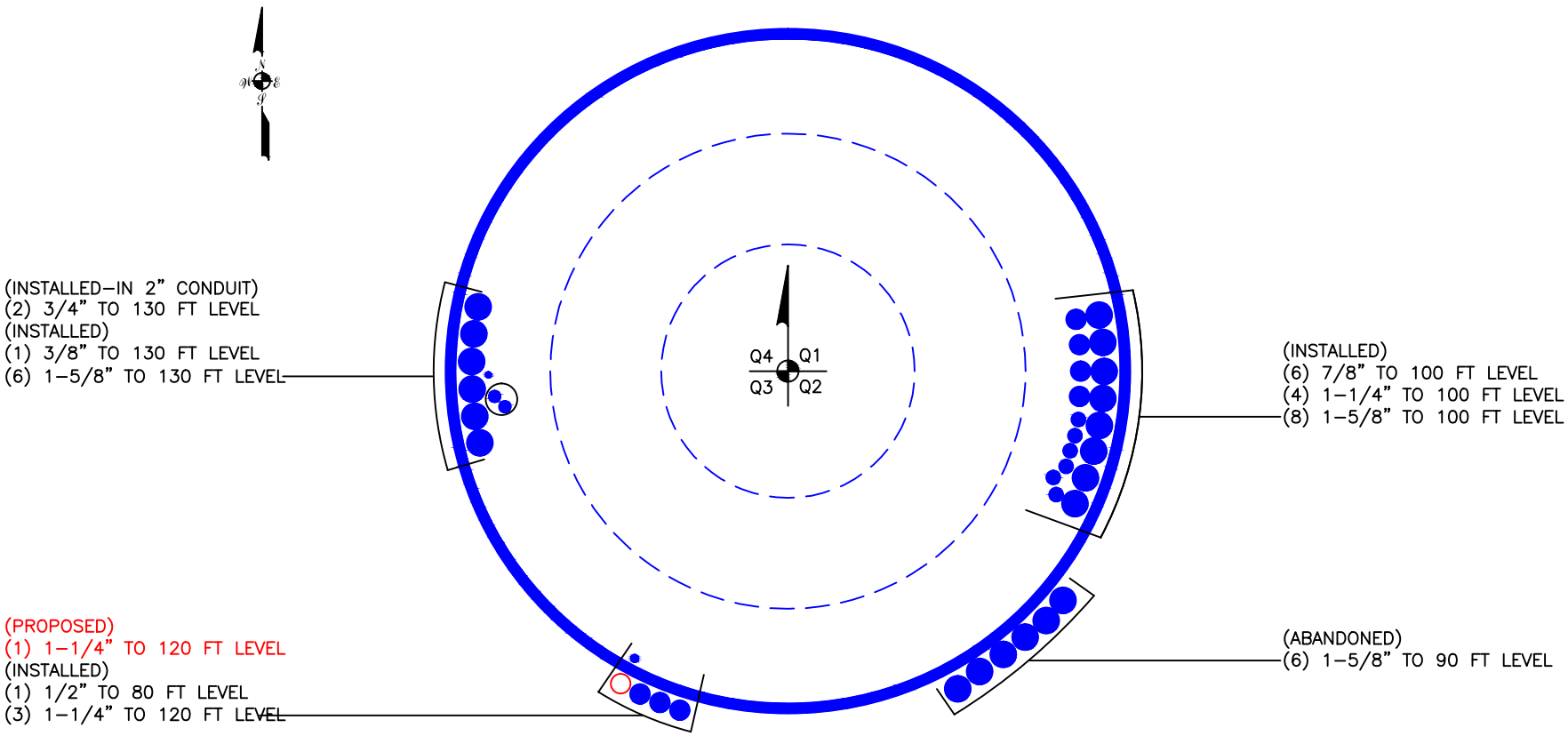
Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 120 (1)	TP16x16x0.375	3.33	347.91	0.010	0.36	442.64	0.001
L2	120 - 114.92 (2)	TP17.244x16x0.188	7.16	349.46	0.020	0.19	490.97	0.000
L3	114.92 - 109.42 (3)	TP18.591x17.244x0.49	7.82	957.17	0.008	1.09	1425.98	0.001
L4	109.42 - 103.92 (4)	TP19.938x18.591x0.412	8.38	868.15	0.010	1.03	1401.86	0.001
L5	103.92 - 96.42 (5)	TP21.775x19.938x0.434	12.12	1001.82	0.012	0.94	1766.64	0.001
L6	96.42 - 91.5 (6)	TP22.98x21.775x0.382	12.33	896.28	0.014	0.93	1638.95	0.001
L7	91.5 - 88.92 (7)	TP23.237x21.87x0.438	12.95	1168.41	0.011	0.86	2207.11	0.000
L8	88.92 - 88.25 (8)	TP23.401x23.237x0.334	13.02	906.68	0.014	0.84	1729.16	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L9	88.25 - 87.42 (9)	TP23.605x23.401x0.387	13.11	1067.64	0.012	0.84	2030.28	0.000
L10	87.42 - 86.92 (10)	TP23.727x23.605x0.251	13.16	684.13	0.019	0.83	1323.26	0.001
L11	86.92 - 80.75 (11)	TP25.239x23.727x0.42	13.83	1235.98	0.011	0.79	2512.03	0.000
L12	80.75 - 71.83 (12)	TP27.424x25.239x0.32	14.61	1028.16	0.014	0.79	2293.61	0.000
L13	71.83 - 68.83 (13)	TP28.159x27.424x0.619	14.89	2022.54	0.007	0.79	4536.51	0.000
L14	68.83 - 64.5 (14)	TP29.22x28.159x0.462	14.94	1524.90	0.010	0.79	3477.53	0.000
L15	64.5 - 42.5 (15)	TP34.11x27.801x0.49	16.93	1895.52	0.009	0.79	5066.15	0.000
L16	42.5 - 41.83 (16)	TP33.65x32.444x0.519	17.45	2040.50	0.009	0.79	5542.75	0.000
L17	41.83 - 41.17 (17)	TP33.812x33.65x0.344	17.51	1315.32	0.013	0.79	3628.51	0.000
L18	41.17 - 20.25 (18)	TP38.94x33.812x0.497	18.75	2195.15	0.009	0.79	6713.58	0.000
L19	20.25 - 16.83 (19)	TP39.089x37.027x0.523	19.50	2208.36	0.009	0.79	6997.34	0.000
L20	16.83 - 14.17 (20)	TP39.74x39.089x0.668	19.72	2860.10	0.007	0.79	9149.25	0.000
L21	14.17 - 0 (21)	TP43.21x39.74x0.507	20.36	2287.48	0.009	0.79	7662.24	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

Section No.	*Elevation (ft)*	*Type*	*Size*	*Critical Element*	*Pu (k)*	*φPn (k)*	*% Capacity*	*Pass/Fail*
L1	130.00-120.00	Pole	TP16.00×16.00×0.3750	1	Note 1	Note 1	11.5	Pass
L2	120.00-91.50	Pole	TP22.98×16.00×0.1875	2	Note 1	Note 1	35.3	Pass
L3	94.50-64.50	Pole	TP29.22×21.87×0.2500	3	Note 1	Note 1	58.8	Pass
L4	68.25-42.50	Pole	TP34.11×27.80×0.3125	4	Note 1	Note 1	41.5	Pass
L5	46.75-20.25	Pole	TP38.94×32.44×0.3438	5	Note 1	Note 1	59.7	Pass
L6	25.25-0.00	Pole	TP43.21×37.03×0.3750	6	Note 1	Note 1	49.7	Pass
M1	15.50-0.50	Mod (Ex)	(Aero) MP304	1	Note 1	Note 1	59.5	Pass
M2	42.67-12.67	Mod (Ex)	(Aero) MP304	2	Note 1	Note 1	58.5	Pass
M3	70.33-40.33	Mod (Ex)	(Aero) MP304	3	Note 1	Note 1	55.6	Pass
M4	88.17-68.17	Mod (Ex)	(Aero) MP303	4	Note 1	Note 1	65.9	Pass
M5	73.08-68.17	Mod (Ex)	(Aero) MP303	5	Note 1	Note 1	39.6	Pass
M6	89.50-79.50	Mod (Ex)	(Aero) MP303	6	Note 1	Note 1	51.6	Pass
M7	116.17-86.17	Mod (Ex)	(Aero) MP303-BB	7	Note 1	Note 1	53.8	Pass
M8	97.67-87.67	Mod (Ex)	(Aero) MP303-BB	8	Note 1	Note 1	46.0	Pass
M9	103.92-95.17	Mod (Ex)	(Aero) MP303-BB	9	Note 1	Note 1	35.3	Pass
M10	109.42-103.92	Mod (Ex)	(Aero) MP303-BB	10	Note 1	Note 1	31.9	Pass
M11	116.17-109.42	Mod (Ex)	(Aero) MP303-BB	11	Note 1	Note 1	20.7	Pass

	Summary	
Pole (L5)	59.7	Pass
Mod (M4)	65.9	Pass
RATING =	**65.9**	**Pass**

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

Tower Engineering Professionals, Inc.
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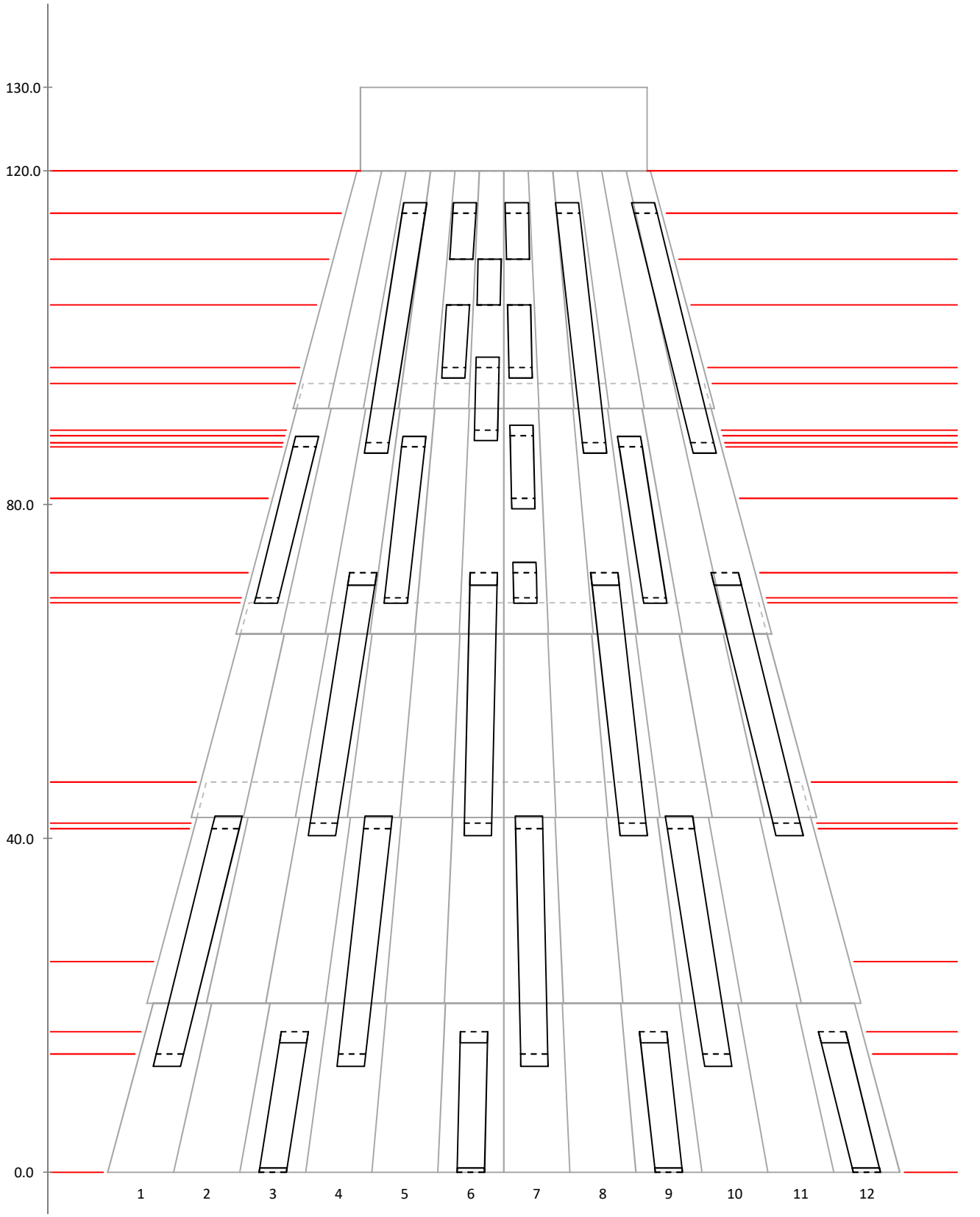
Reinforcement Layout



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

Loads	
Axial:	38.1 k
Moment:	1,839.6 k·ft
Shear:	20.9 k
Torsion:	0.8 k·ft

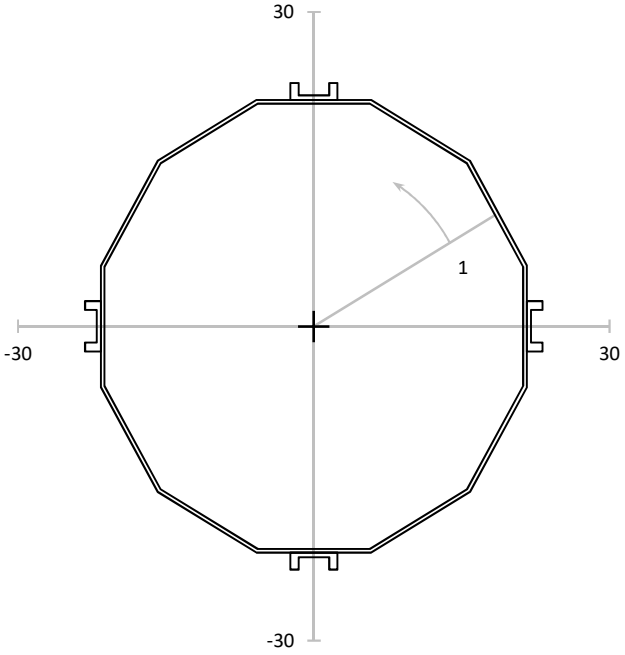
Equivalent Loads to Pole	
Axial:	28.9 k
Moment:	1,374.2 k·ft
Shear:	15.8 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	1
q:	0.118 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	305.09 in
Stitch:	18.00 in
Capacity:	5.9%

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	0.559	30.471	0.306	0.009	62.444	62.444	31.222	62.444	**49.7%**

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
1	1	**60.00**	22.22	16215.4	0.559	30.242	0.306	53.494	49.881	29.250	**59.5%**
1	2	**150.00**	22.22	16215.4	0.559	30.242	0.306	53.494	49.881	29.250	**59.5%**
1	3	**240.00**	22.22	16215.4	0.559	30.242	0.306	53.494	49.881	29.250	**59.5%**
1	4	**330.00**	22.22	16215.4	0.559	30.242	0.306	53.494	49.881	29.250	**59.5%**

Loads	
Axial:	33.6 k
Moment:	1,552.2 k·ft
Shear:	19.7 k
Torsion:	0.8 k·ft

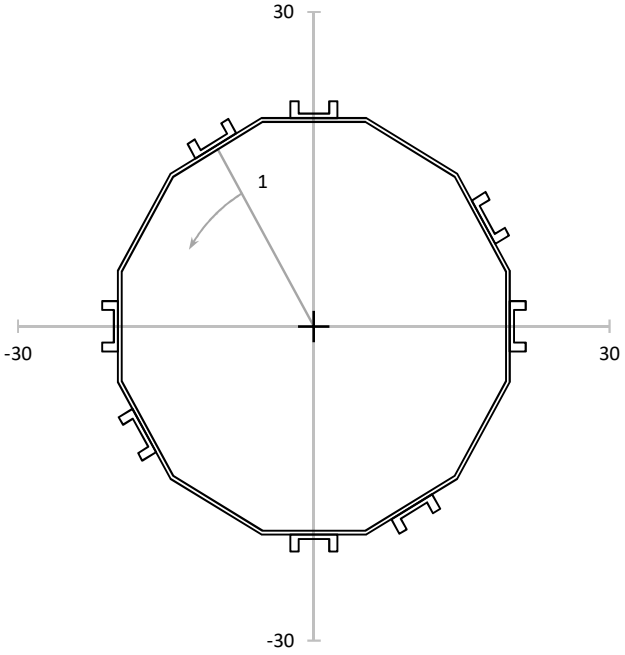
Equivalent Loads to Pole	
Axial:	19.8 k
Moment:	890.8 k·ft
Shear:	11.6 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	1
q:	0.102 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	353.53 in
Stitch:	18.00 in
Capacity:	**5.1%**

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

Controlling	
Angle:	**330.00°**
I_G:	16,381.8 in^4
A_G:	80.57 in^2

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	0.417	23.406	0.245	0.010	64.603	64.603	32.301	64.603	**36.9%**

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
1	1	**60.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
1	2	**150.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
1	3	**240.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
1	4	**330.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
2	1	**360.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
2	2	**90.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
2	3	**180.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**
2	4	**270.00**	20.48	16381.8	0.417	23.286	0.245	53.494	49.881	29.250	**45.9%**

Elevation: 16.83-ft

Loads	
Axial:	32.7 k
Moment:	1,500.1 k·ft
Shear:	19.5 k
Torsion:	0.8 k·ft

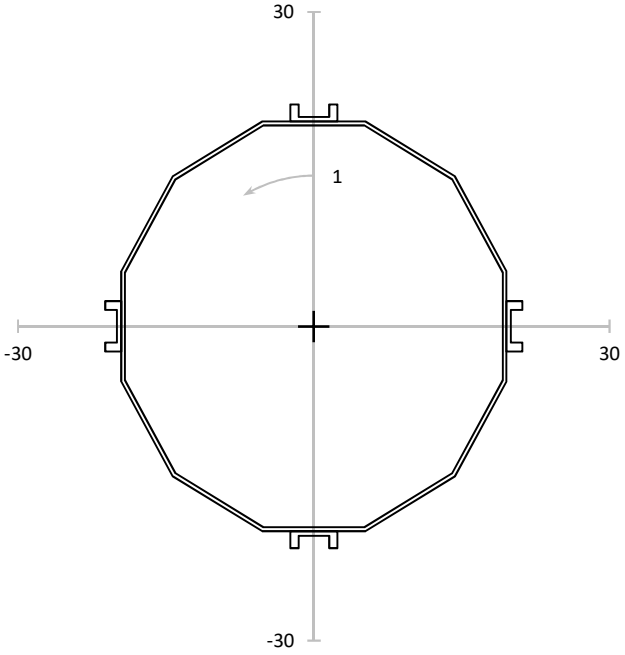
Equivalent Loads to Pole	
Axial:	24.2 k
Moment:	1,088.6 k·ft
Shear:	14.4 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	2
q:	0.132 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	273.35 in
Stitch:	18.00 in
Capacity:	6.6%

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	0.517	29.576	0.308	0.011	65.008	65.008	32.504	65.008	**46.3%**

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
2	1	**0.00**	20.15	12323.4	0.517	29.440	0.308	53.494	49.881	29.250	**58.0%**
2	2	**90.00**	20.15	12323.4	0.517	29.440	0.308	53.494	49.881	29.250	**58.0%**
2	3	**180.00**	20.15	12323.4	0.517	29.440	0.308	53.494	49.881	29.250	**58.0%**
2	4	**270.00**	20.15	12323.4	0.517	29.440	0.308	53.494	49.881	29.250	**58.0%**

Elevation: 25.25-ft

Loads	
Axial:	29.3 k
Moment:	1,338.9 k·ft
Shear:	18.8 k
Torsion:	0.8 k·ft

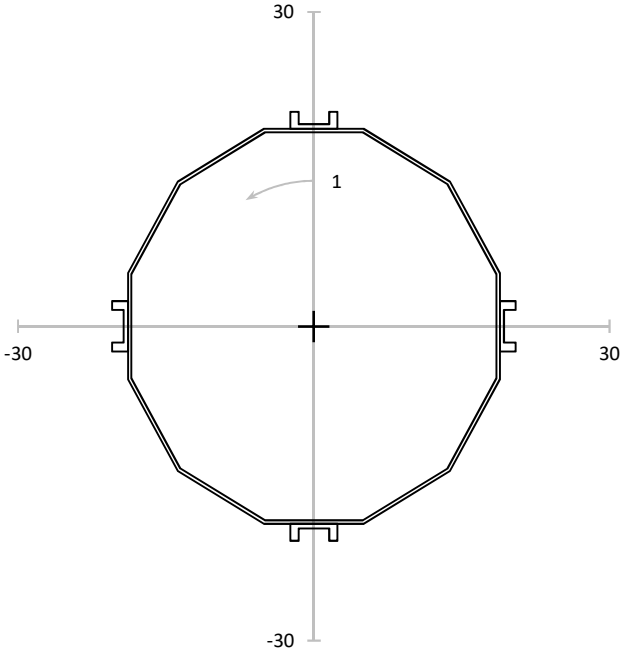
Equivalent Loads to Pole	
Axial:	21.0 k
Moment:	937.7 k·ft
Shear:	13.4 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	2
q:	0.143 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	251.42 in
Stitch:	18.00 in
Capacity:	**7.2%**

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

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

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	0.507	29.808	0.324	0.012	68.016	68.016	34.008	68.016	**44.6%**

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
2	1	**360.00**	19.47	10530.4	0.507	29.703	0.324	53.494	49.881	29.250	**58.5%**
2	2	**90.00**	19.47	10530.4	0.507	29.703	0.324	53.494	49.881	29.250	**58.5%**
2	3	**180.00**	19.47	10530.4	0.507	29.703	0.324	53.494	49.881	29.250	**58.5%**
2	4	**270.00**	19.47	10530.4	0.507	29.703	0.324	53.494	49.881	29.250	**58.5%**

Elevation: 41.17-ft

Loads	
Axial:	25.0 k
Moment:	1,050.4 k·ft
Shear:	17.5 k
Torsion:	0.8 k·ft

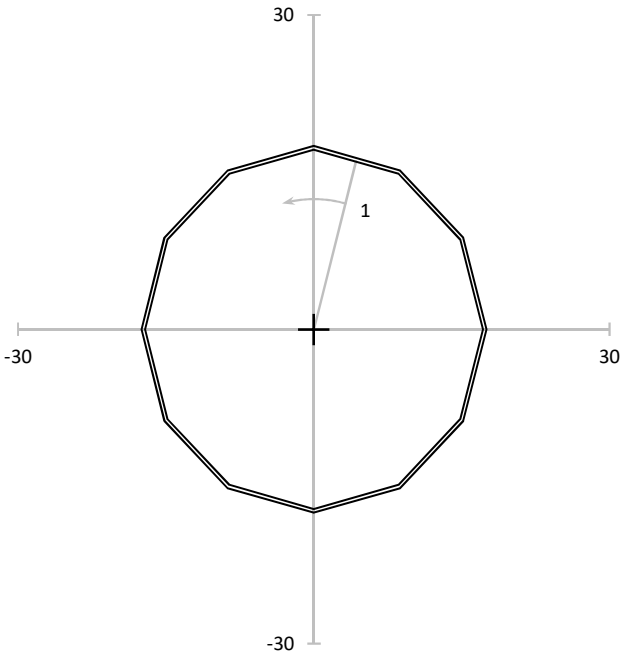
Equivalent Loads to Pole	
Axial:	25.0 k
Moment:	1,050.4 k·ft
Shear:	17.5 k
Torsion:	0.8 k·ft

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	0.675	41.679	0.473	0.015	71.002	71.002	35.501	71.002	**59.7%**

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

Loads	
Axial:	24.8 k
Moment:	1,038.9 k·ft
Shear:	17.5 k
Torsion:	0.8 k·ft

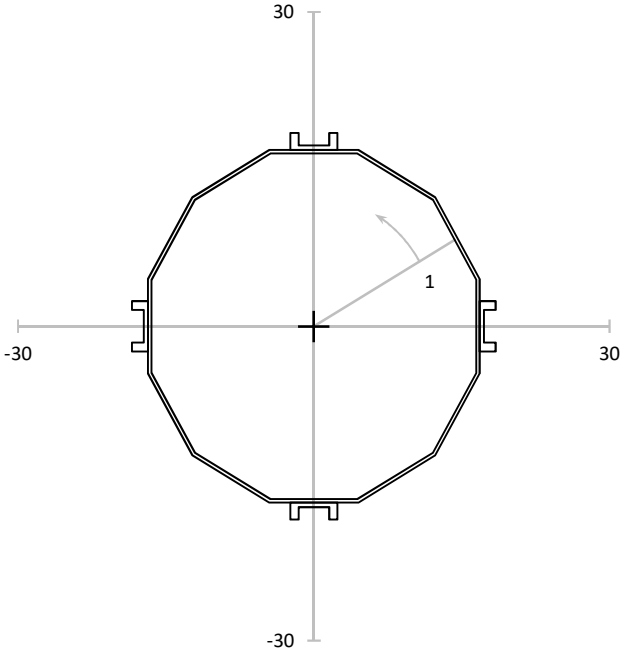
Equivalent Loads to Pole	
Axial:	17.1 k
Moment:	699.2 k·ft
Shear:	12.1 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	3
q:	0.162 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	222.23 in
Stitch:	18.00 in
Capacity:	**8.1%**

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

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

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	0.464	28.014	0.327	0.016	71.126	71.126	35.563	71.126	**40.0%**

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
3	1	**60.00**	17.43	7757.0	0.464	28.021	0.327	53.494	49.881	29.250	**55.3%**
3	2	**150.00**	17.43	7757.0	0.464	28.021	0.327	53.494	49.881	29.250	**55.3%**
3	3	**240.00**	17.43	7757.0	0.464	28.021	0.327	53.494	49.881	29.250	**55.3%**
3	4	**330.00**	17.43	7757.0	0.464	28.021	0.327	53.494	49.881	29.250	**55.3%**

Loads	
Axial:	22.9 k
Moment:	954.3 k·ft
Shear:	16.9 k
Torsion:	0.8 k·ft

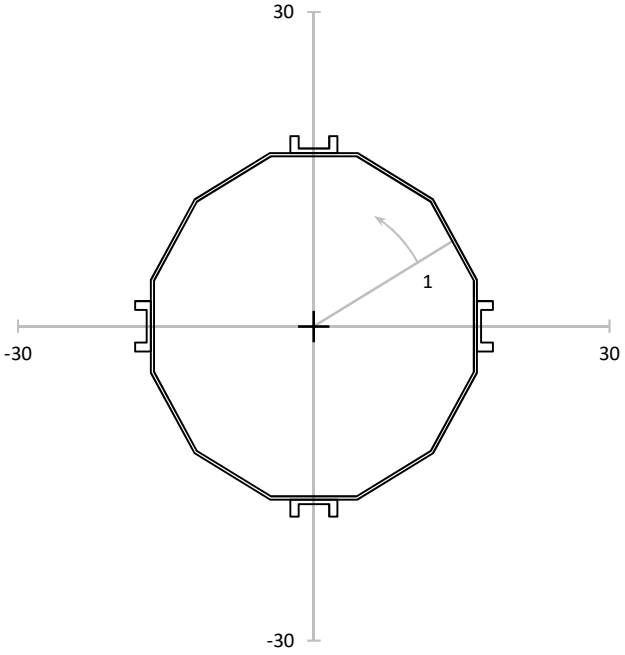
Equivalent Loads to Pole	
Axial:	15.3 k
Moment:	618.3 k·ft
Shear:	11.3 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	3
q:	0.172 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	209.18 in
Stitch:	18.00 in
Capacity:	**8.6%**

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

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

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	0.463	28.154	0.342	0.018	69.036	69.036	34.518	69.036	**41.5%**

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	0.463	28.178	0.342	53.494	49.881	29.250	**55.6%**
3	2	**150.00**	17.14	6967.5	0.463	28.178	0.342	53.494	49.881	29.250	**55.6%**
3	3	**240.00**	17.14	6967.5	0.463	28.178	0.342	53.494	49.881	29.250	**55.6%**
3	4	**330.00**	17.14	6967.5	0.463	28.178	0.342	53.494	49.881	29.250	**55.6%**

Loads	
Axial:	17.5 k
Moment:	611.6 k·ft
Shear:	14.9 k
Torsion:	0.8 k·ft

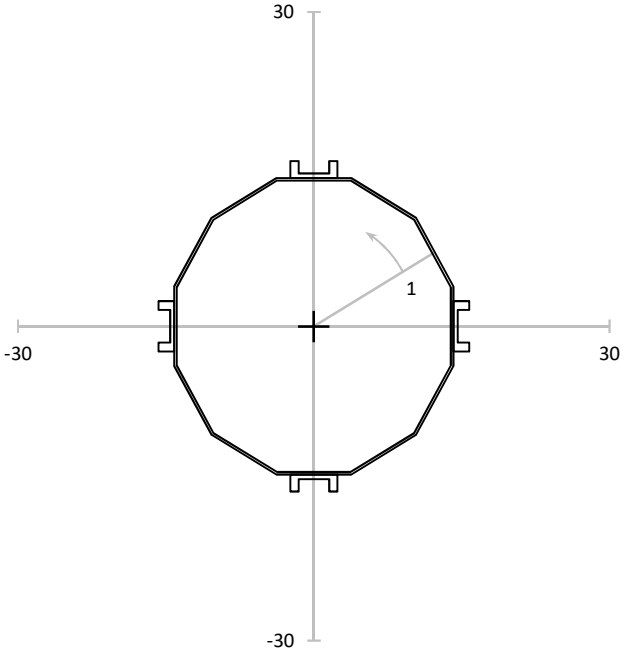
Pole Info	
OD:	28.30 in
t:	0.2500 in
Pole A_G:	22.58 in²
Pole I_G:	2,268.0 in⁴

Equivalent Loads to Pole	
Axial:	10.1 k
Moment:	338.9 k·ft
Shear:	8.6 k
Torsion:	0.8 k·ft

Controlling	
Angle:	**60.00°**
I_G:	4,093.2 in⁴
A_G:	39.10 in²

Shear Flow	
Controlling Mod:	3
q:	0.223 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	161.77 in
Stitch:	18.00 in
Capacity:	**11.1%**

Minimum	
Angle:	**7.50°**
I_{MIN}:	4,093.2 in⁴
t_{EFF}:	0.4616 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in⁴)	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	0.449	26.287	0.382	0.030	67.094	67.094	33.547	67.094	**39.9%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in⁴)	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	0.449	26.467	0.382	53.494	49.881	29.250	**52.2%**
3	2	**150.00**	14.76	4093.2	0.449	26.467	0.382	53.494	49.881	29.250	**52.2%**
3	3	**240.00**	14.76	4093.2	0.449	26.467	0.382	53.494	49.881	29.250	**52.2%**
3	4	**330.00**	14.76	4093.2	0.449	26.467	0.382	53.494	49.881	29.250	**52.2%**

Loads	
Axial:	17.4 k
Moment:	603.0 k·ft
Shear:	14.9 k
Torsion:	0.8 k·ft

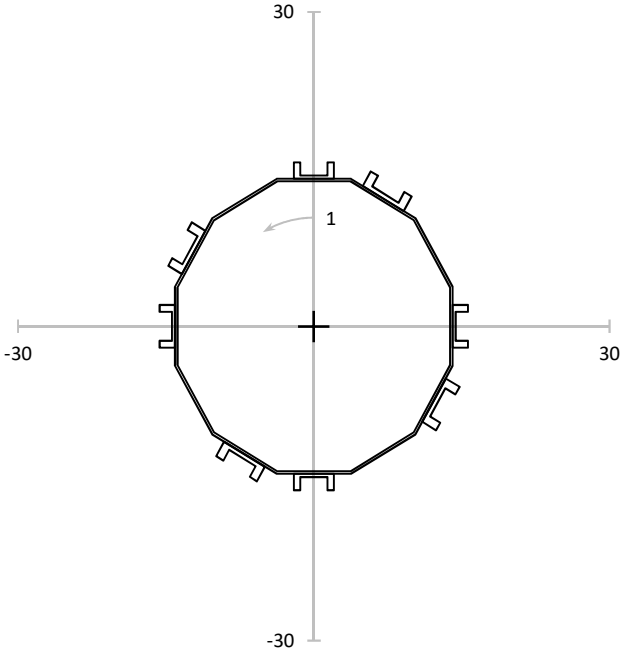
Pole Info	
OD:	28.16 in
t:	0.2500 in
Pole A_G:	22.47 in^2
Pole I_G:	2,233.7 in^4

Equivalent Loads to Pole	
Axial:	7.7 k
Moment:	253.5 k·ft
Shear:	6.6 k
Torsion:	0.8 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:	0.170 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	211.71 in
Stitch:	18.00 in
Capacity:	8.5%

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	0.344	19.866	0.294	0.030	67.243	67.243	33.622	67.243	**30.1%**

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
3	1	**60.00**	14.69	5312.8	0.344	20.006	0.294	53.494	49.881	29.250	**39.4%**
3	2	**150.00**	14.69	5312.8	0.344	20.006	0.294	53.494	49.881	29.250	**39.4%**
3	3	**240.00**	14.69	5312.8	0.344	20.006	0.294	53.494	49.881	29.250	**39.4%**
3	4	**330.00**	14.69	5312.8	0.344	20.006	0.294	53.494	49.881	29.250	**39.4%**
4	1	**0.00**	14.67	5312.8	0.344	19.979	0.294	53.615	49.540	29.250	**39.6%**
4	2	**90.00**	14.67	5312.8	0.344	19.979	0.294	53.615	49.540	29.250	**39.6%**
4	3	**270.00**	14.67	5312.8	0.344	19.979	0.294	53.615	49.540	29.250	**39.6%**
5	1	**180.00**	14.67	5312.8	0.344	19.979	0.294	53.615	49.540	29.250	**39.6%**

Loads	
Axial:	16.8 k
Moment:	558.7 k·ft
Shear:	14.6 k
Torsion:	0.8 k·ft

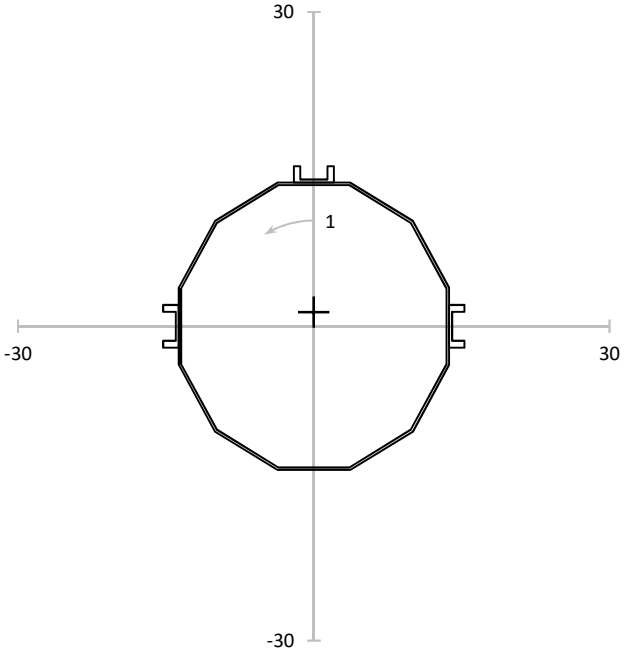
Pole Info	
OD:	27.42 in
t:	0.2500 in
Pole A_G:	21.88 in²
Pole I_G:	2,061.8 in⁴

Equivalent Loads to Pole	
Axial:	12.0 k
Moment:	446.2 k·ft
Shear:	10.4 k
Torsion:	0.8 k·ft

Controlling	
Angle:	**0.00°**
I_G:	2,616.0 in⁴
A_G:	30.64 in²

Shear Flow	
Controlling Mod:	4
q:	0.211 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	170.56 in
Stitch:	18.00 in
Capacity:	**10.6%**

Minimum	
Angle:	**0.00°**
I_{MIN}:	2,616.0 in⁴
t_{EFF}:	0.3196 in



Pole Segment: L3, F_Y = 65 ksi

POLE CAPACITY

Angle (°)	y_{CONT} (in)	I (in⁴)	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	0.548	39.423	0.477	0.032	68.017	68.017	34.008	68.017	**58.8%**

MODIFICATION CAPACITIES

Mod Number	#	Angle (°)	$\bar{y}_{CONT}$ (in)	I (in⁴)	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	0.548	33.163	0.477	53.615	49.540	29.250	**65.9%**
4	2	**98.95**	14.34	3248.6	0.548	29.597	0.477	53.615	49.540	29.250	**58.7%**
4	3	**261.05**	14.34	3248.6	0.548	29.597	0.477	53.615	49.540	29.250	**58.7%**

Loads	
Axial:	15.2 k
Moment:	431.9 k·ft
Shear:	13.8 k
Torsion:	0.8 k·ft

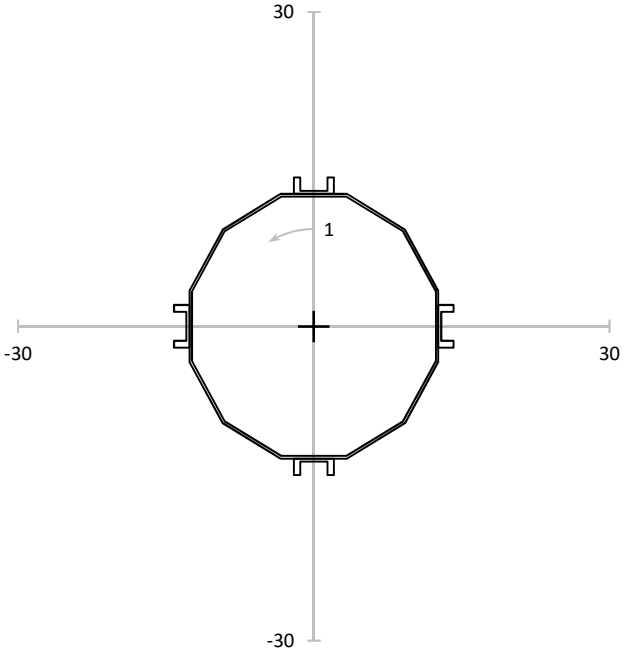
Pole Info	
OD:	25.24 in
t:	0.2500 in
Pole A_G:	20.12 in^2
Pole I_G:	1,603.3 in^4

Equivalent Loads to Pole	
Axial:	9.6 k
Moment:	262.6 k·ft
Shear:	8.8 k
Torsion:	0.8 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:	0.202 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	177.92 in
Stitch:	18.00 in
Capacity:	**10.1%**

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	0.478	25.694	0.435	0.038	70.316	70.316	35.158	70.316	**37.2%**

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
4	1	**0.00**	13.21	2636.8	0.478	25.961	0.435	53.615	49.540	29.250	**51.5%**
4	2	**90.00**	13.21	2636.8	0.478	25.961	0.435	53.615	49.540	29.250	**51.5%**
4	3	**270.00**	13.21	2636.8	0.478	25.961	0.435	53.615	49.540	29.250	**51.5%**
6	1	**180.00**	13.21	2636.8	0.478	25.961	0.435	53.615	49.540	29.250	**51.5%**

Loads	
Axial:	14.2 k
Moment:	348.6 k·ft
Shear:	13.1 k
Torsion:	0.8 k·ft

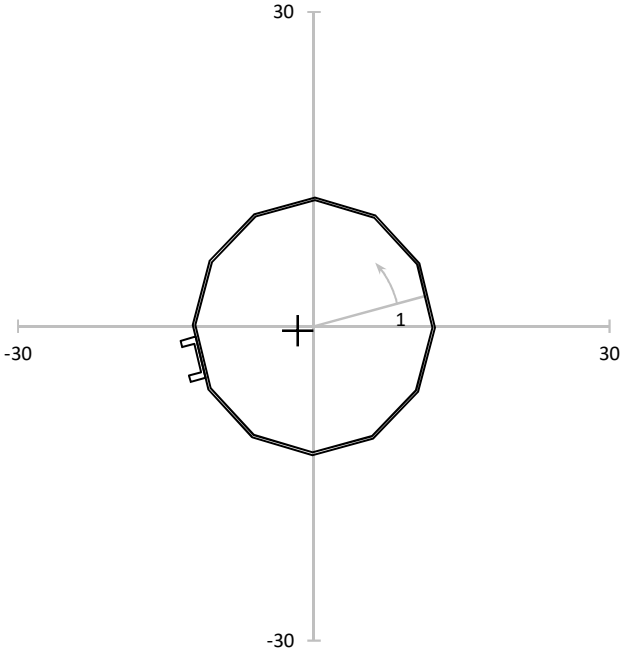
Pole Info	
OD:	23.73 in
t:	0.2500 in
Pole A_G:	18.90 in^2
Pole I_G:	1,329.6 in^4

Equivalent Loads to Pole	
Axial:	12.3 k
Moment:	354.2 k·ft
Shear:	11.4 k
Torsion:	0.8 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:	0.240 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	149.72 in
Stitch:	18.00 in
Capacity:	**12.0%**

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	0.650	39.075	0.603	0.045	71.907	71.907	35.953	71.907	**55.3%**

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**
6	1	**180.00**	10.79	1722.5	0.650	26.196	0.603	53.615	49.540	29.250	**51.6%**

Loads	
Axial:	14.1 k
Moment:	342.0 k·ft
Shear:	13.1 k
Torsion:	0.8 k·ft

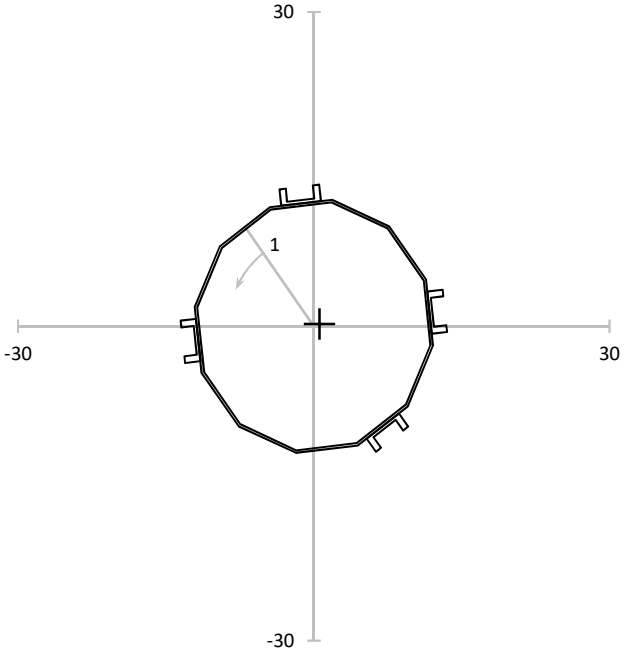
Equivalent Loads to Pole	
Axial:	8.7 k
Moment:	222.9 k·ft
Shear:	8.1 k
Torsion:	0.8 k·ft

Shear Flow	
Controlling Mod:	7
q:	0.224 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	160.88 in
Stitch:	18.00 in
Capacity:	**11.2%**

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

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

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	0.462	25.986	0.430	0.046	72.036	72.036	36.018	72.036	**36.7%**

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
6	1	**166.00**	12.01	2228.0	0.462	22.131	0.430	53.615	49.540	29.250	**43.8%**
7	1	**71.90**	12.74	2232.7	0.462	23.420	0.430	49.176	49.176	29.250	**48.6%**
7	2	**250.30**	11.58	2244.9	0.462	21.172	0.430	49.176	49.176	29.250	**44.0%**
7	3	**323.65**	12.09	2068.7	0.462	23.992	0.430	49.176	49.176	29.250	**49.7%**

Elevation: 88.25-ft

Loads	
Axial:	13.9 k
Moment:	331.2 k·ft
Shear:	13.0 k
Torsion:	0.8 k·ft

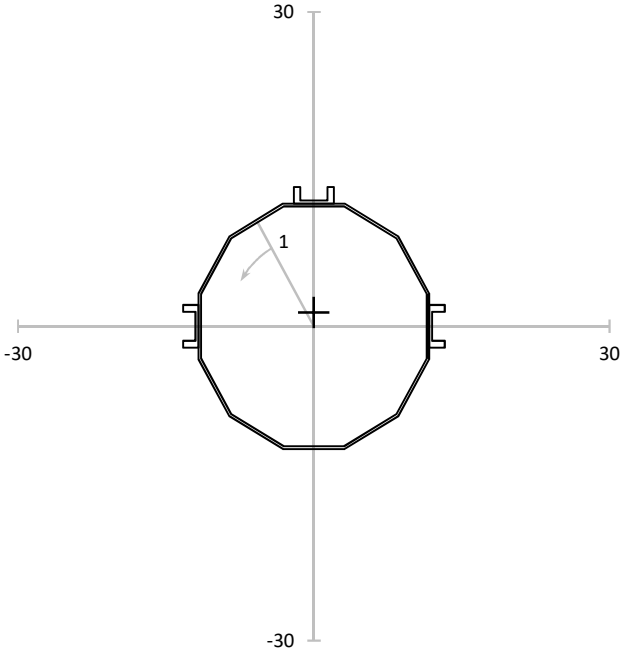
Pole Info	
OD:	23.40 in
t:	0.2500 in
Pole A_G:	18.64 in^2
Pole I_G:	1,275.0 in^4

Equivalent Loads to Pole	
Axial:	9.5 k
Moment:	254.0 k·ft
Shear:	8.9 k
Torsion:	0.8 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:	0.248 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	145.14 in
Stitch:	18.00 in
Capacity:	**12.4%**

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	0.507	31.306	0.475	0.047	72.250	72.250	36.125	72.250	**44.1%**

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**
7	1	**70.80**	12.32	2148.2	0.507	22.790	0.475	49.176	49.176	29.250	**47.4%**
7	2	**229.20**	12.32	2148.2	0.507	22.790	0.475	49.176	49.176	29.250	**47.4%**
7	3	**330.00**	10.98	1682.9	0.507	25.931	0.475	49.176	49.176	29.250	**53.8%**

Elevation: 88.92-ft

Loads	
Axial:	13.8 k
Moment:	322.5 k·ft
Shear:	12.9 k
Torsion:	0.8 k·ft

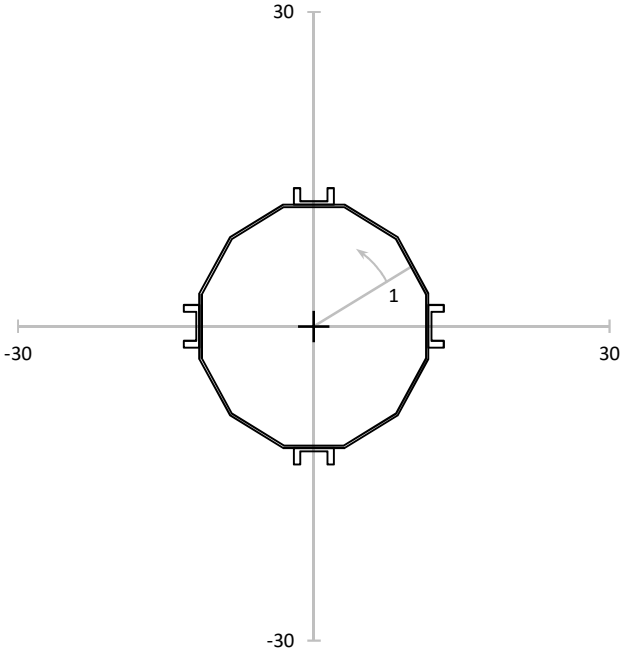
Pole Info	
OD:	23.24 in
t:	0.2500 in
Pole A_G:	18.50 in^2
Pole I_G:	1,248.1 in^4

Equivalent Loads to Pole	
Axial:	8.5 k
Moment:	188.7 k·ft
Shear:	7.9 k
Torsion:	0.8 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:	0.216 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	166.48 in
Stitch:	18.00 in
Capacity:	**10.8%**

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	0.457	21.838	0.429	0.048	72.422	72.422	36.211	72.422	**30.8%**

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	**60.00**	12.21	2133.0	0.457	22.149	0.429	49.176	49.176	29.250	**46.0%**
7	2	**240.00**	12.21	2133.0	0.457	22.149	0.429	49.176	49.176	29.250	**46.0%**
7	3	**330.00**	12.21	2133.0	0.457	22.149	0.429	49.176	49.176	29.250	**46.0%**
8	1	**150.00**	12.21	2133.0	0.457	22.149	0.429	49.176	49.176	29.250	**46.0%**

Elevation: 94.50-ft

Loads	
Axial:	12.8 k
Moment:	252.0 k·ft
Shear:	12.3 k
Torsion:	0.9 k·ft

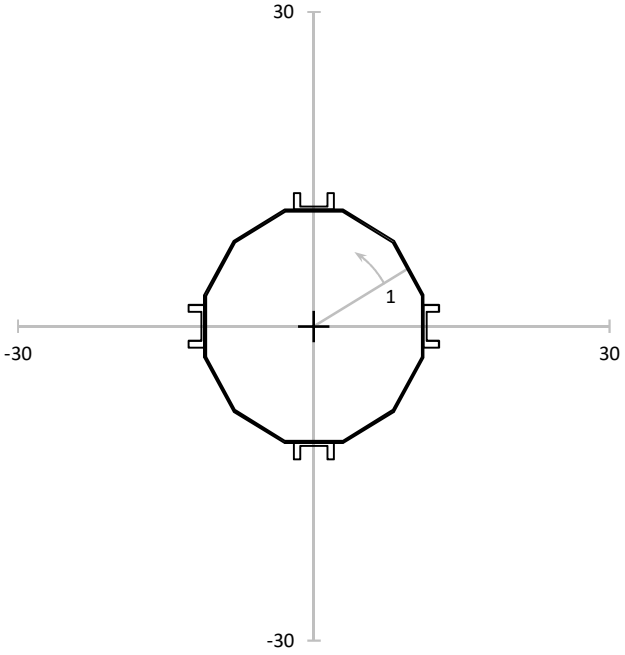
Pole Info	
OD:	22.25 in
t:	0.1875 in
Pole A_G:	13.32 in^2
Pole I_G:	827.0 in^4

Equivalent Loads to Pole	
Axial:	6.8 k
Moment:	126.9 k·ft
Shear:	6.6 k
Torsion:	0.9 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:	0.257 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	140.27 in
Stitch:	18.00 in
Capacity:	**12.8%**

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	0.510	21.210	0.493	0.075	61.647	61.647	30.824	61.647	**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
7	1	**60.00**	11.71	1642.7	0.510	21.559	0.493	49.176	49.176	29.250	**44.9%**
7	2	**240.00**	11.71	1642.7	0.510	21.559	0.493	49.176	49.176	29.250	**44.9%**
7	3	**330.00**	11.71	1642.7	0.510	21.559	0.493	49.176	49.176	29.250	**44.9%**
8	1	**150.00**	11.71	1642.7	0.510	21.559	0.493	49.176	49.176	29.250	**44.9%**

Elevation: 96.42-ft

Loads	
Axial:	12.5 k
Moment:	228.5 k·ft
Shear:	12.1 k
Torsion:	0.9 k·ft

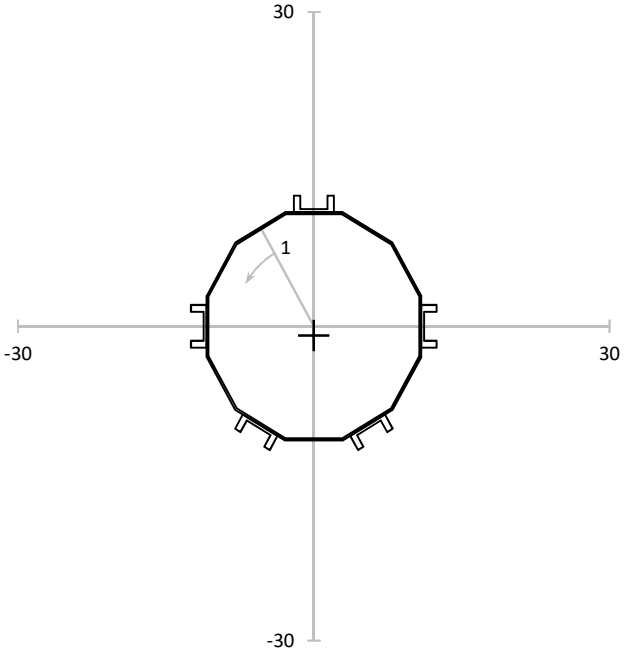
Pole Info	
OD:	21.78 in
t:	0.1875 in
Pole A_G:	13.03 in^2
Pole I_G:	775.3 in^4

Equivalent Loads to Pole	
Axial:	5.9 k
Moment:	103.2 k·ft
Shear:	5.7 k
Torsion:	0.9 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:	0.253 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	142.57 in
Stitch:	18.00 in
Capacity:	**12.6%**

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	0.452	19.192	0.439	0.080	62.233	62.233	31.116	62.233	**31.6%**

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	**55.45**	11.51	1754.9	0.452	17.989	0.439	49.176	49.176	29.250	**37.5%**
7	2	**244.55**	11.51	1754.9	0.452	17.989	0.439	49.176	49.176	29.250	**37.5%**
7	3	**330.00**	12.37	1733.2	0.452	19.564	0.439	49.176	49.176	29.250	**40.7%**
9	1	**118.25**	10.72	1739.2	0.452	16.897	0.439	49.176	49.176	29.250	**35.3%**
9	2	**181.75**	10.72	1739.2	0.452	16.897	0.439	49.176	49.176	29.250	**35.3%**

Elevation: 103.92-ft

Loads	
Axial:	8.5 k
Moment:	152.1 k·ft
Shear:	8.4 k
Torsion:	1.0 k·ft

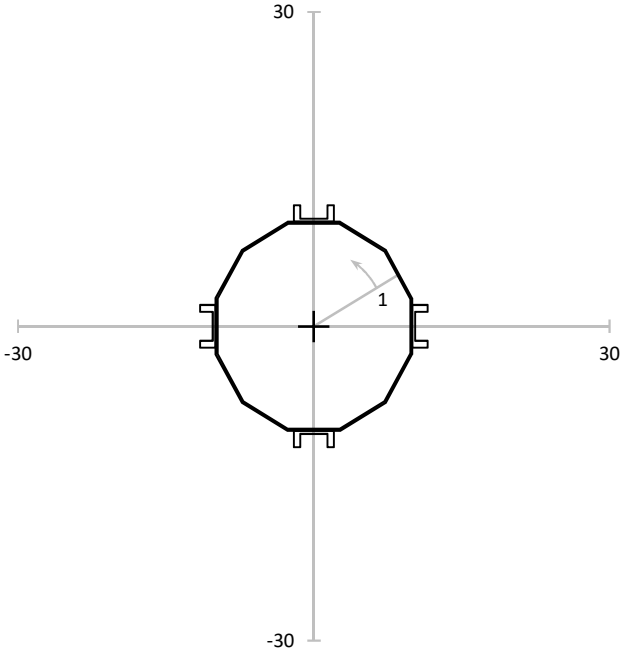
Pole Info	
OD:	19.94 in
t:	0.1875 in
Pole A_G:	11.92 in^2
Pole I_G:	593.7 in^4

Equivalent Loads to Pole	
Axial:	4.3 k
Moment:	71.7 k·ft
Shear:	4.2 k
Torsion:	1.0 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:	0.205 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	175.41 in
Stitch:	18.00 in
Capacity:	**10.3%**

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	0.361	14.974	0.355	0.105	64.518	64.518	32.259	64.518	**23.8%**

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	**60.00**	10.56	1259.3	0.361	15.309	0.355	49.176	49.176	29.250	**31.9%**
7	2	**240.00**	10.56	1259.3	0.361	15.309	0.355	49.176	49.176	29.250	**31.9%**
7	3	**330.00**	10.56	1259.3	0.361	15.309	0.355	49.176	49.176	29.250	**31.9%**
10	1	**150.00**	10.56	1259.3	0.361	15.309	0.355	49.176	49.176	29.250	**31.9%**

Elevation: 109.42-ft

Loads	
Axial:	7.9 k
Moment:	107.6 k·ft
Shear:	7.8 k
Torsion:	1.1 k·ft

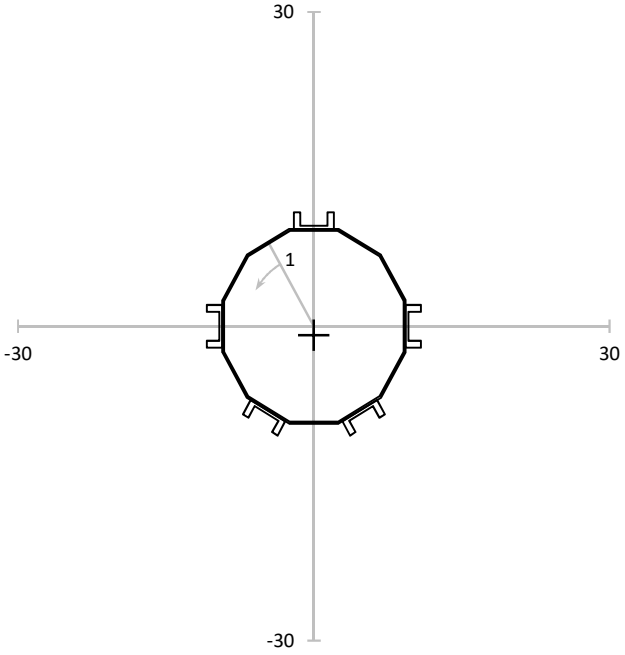
Pole Info	
OD:	18.59 in
t:	0.1875 in
Pole A_G:	11.11 in^2
Pole I_G:	480.3 in^4

Equivalent Loads to Pole	
Axial:	3.4 k
Moment:	43.8 k·ft
Shear:	3.4 k
Torsion:	1.1 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:	0.205 k/in
Bolt/Weld Cap:	36.0 k/bolt
Max Spacing:	175.87 in
Stitch:	18.00 in
Capacity:	**10.2%**

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	0.309	11.264	0.304	0.129	66.194	66.194	33.097	66.194	**17.5%**

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	0.309	10.573	0.304	49.176	49.176	29.250	**22.1%**
7	2	**244.90**	9.92	1211.7	0.309	10.573	0.304	49.176	49.176	29.250	**22.1%**
7	3	**330.00**	10.71	1194.4	0.309	11.577	0.304	49.176	49.176	29.250	**24.2%**
11	1	**118.20**	9.18	1199.3	0.309	9.888	0.304	49.176	49.176	29.250	**20.7%**
11	2	**181.80**	9.18	1199.3	0.309	9.888	0.304	49.176	49.176	29.250	**20.7%**

Elevation: 114.92-ft

Loads	
Axial:	7.3 k
Moment:	66.2 k·ft
Shear:	7.2 k
Torsion:	0.2 k·ft

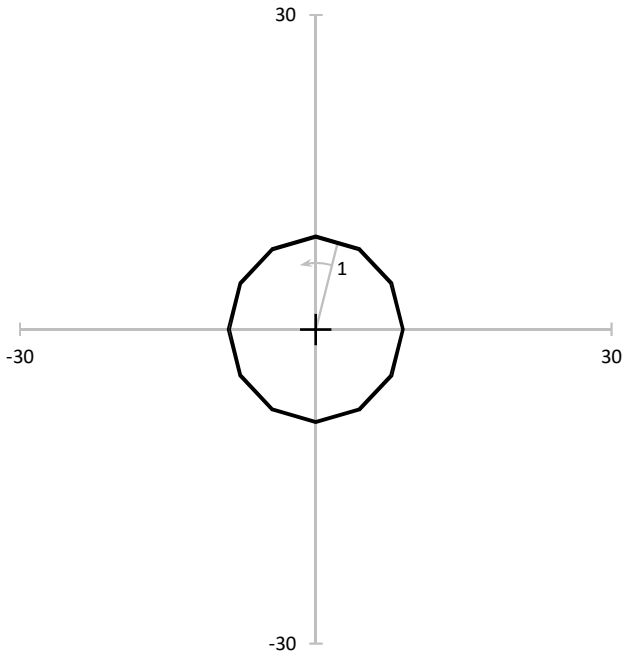
Pole Info	
OD:	17.24 in
t:	0.1875 in
Pole A_G:	10.30 in^2
Pole I_G:	382.4 in^4

Equivalent Loads to Pole	
Axial:	7.3 k
Moment:	66.2 k·ft
Shear:	7.2 k
Torsion:	0.2 k·ft

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

Shear Flow N/A

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	0.713	18.557	0.696	0.026	67.870	67.870	33.935	67.870	**28.4%**

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

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

Elevation: 120.00-ft

Loads	
Axial:	3.2 k
Moment:	31.8 k·ft
Shear:	3.3 k
Torsion:	0.4 k·ft

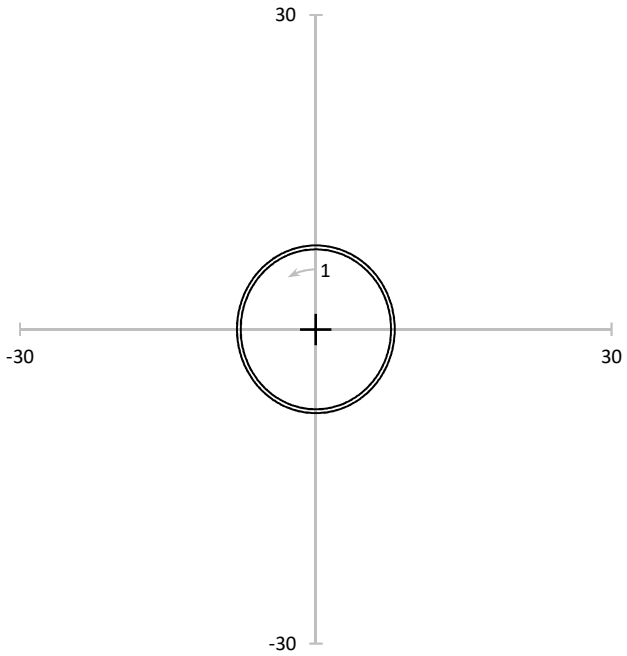
Equivalent Loads to Pole	
Axial:	3.2 k
Moment:	31.8 k·ft
Shear:	3.3 k
Torsion:	0.4 k·ft

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	5.435	0.181	0.031	37.800	49.265	18.900	37.800	**11.5%**

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 #: *393394 Rev. 1*

Reactions		
Mu	31.8	ft-kips
Axial, Pu:	3.2	kips
Shear, Vu:	3.3	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		

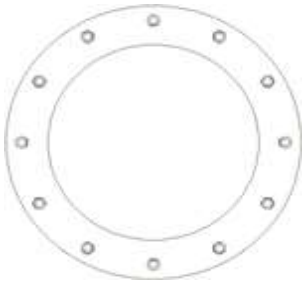
Plate Data		
Diam:	24	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.35	in

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:	5.14	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.879	in	
Min PL "treq" for actual **T w/ Pry**:	0.274	in	
Min PL "t1" for actual **T w/o Pry**:	0.364	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.14	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	17.1%	**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 #: *393394 Rev. 1*

Reactions		
Mu	37.8	ft-kips
Axial, Pu:	3.1	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: 5.14 kips

Exterior Flange Plate Results	Flexural Check		Non-Rigid
Compression Side Plate Stress:	12.4	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	38.1%	Pass	Comp. Y.L. Length:
No Prying			10.25
Tension Side Stress Ratio, (treq/t)^2:	16.5%	Pass	

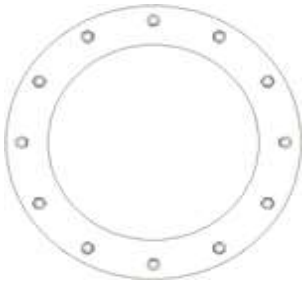
n/a

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 #: *393394 Rev. 1*

Reactions		
Mu	37.9	ft-kips
Axial, Pu:	3.2	kips
Shear, Vu:	3.3	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: 5.14 kips

Exterior Flange Plate Results	Flexural Check		Rigid
Compression Side Plate Stress:	3.1	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	9.6%	Pass	Comp. Y.L. Length:
No Prying			10.25
Tension Side Stress Ratio, (treq/t)^2:	4.1%	Pass	

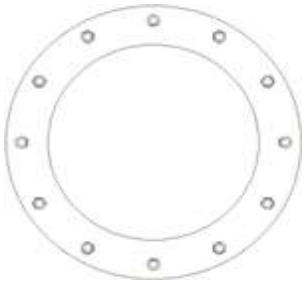
n/a

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

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 #: *393394 Rev. 1*

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:	1840.0	ft-kips
Factored Axial, Pu:	38.0	kips
Factored Shear, Vu:	21.0	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	109.2 Kips
Axial Design Strength, Φ*Fu*Anet:	260.0 Kips
Anchor Rod Stress Ratio:	42.0% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	23.5 ksi
PL Design Bending Strength, Φ*Fy:	45.0 ksi
Base Plate Stress Ratio:	52.2% **Pass**

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

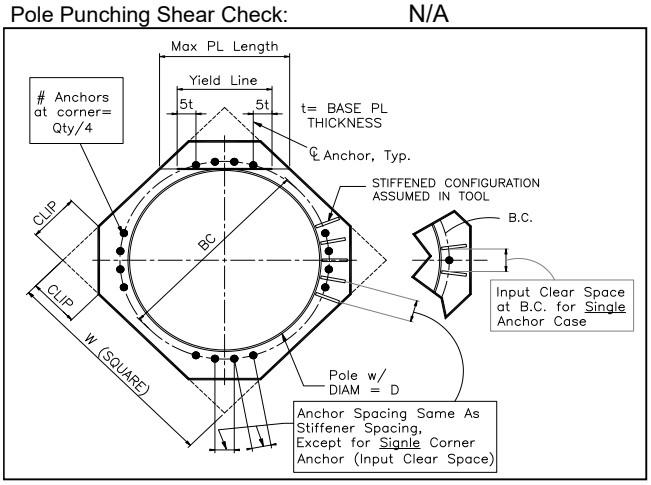
N/A - Unstiffened

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:	25675.122192

Factored Reactions from TNX		
Axial	38.0	k
Shear	21.0	k
Moment	1840.0	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	7.3	ksf
Bearing Capacity, Φq_{allow}	30.0	ksf
% Capacity	24.5%	Pass

Mat and Pier Structural Results

Bending Moment	1457.62	kft
Flexural Capacity, ΦMn	4921.36	kft
% Capacity	29.6%	Pass

Rock Anchor Results

Max Tension Force	28.55	k
Anchor Capacity, ΦPn	163.8	k
% Capacity	17.4%	Pass

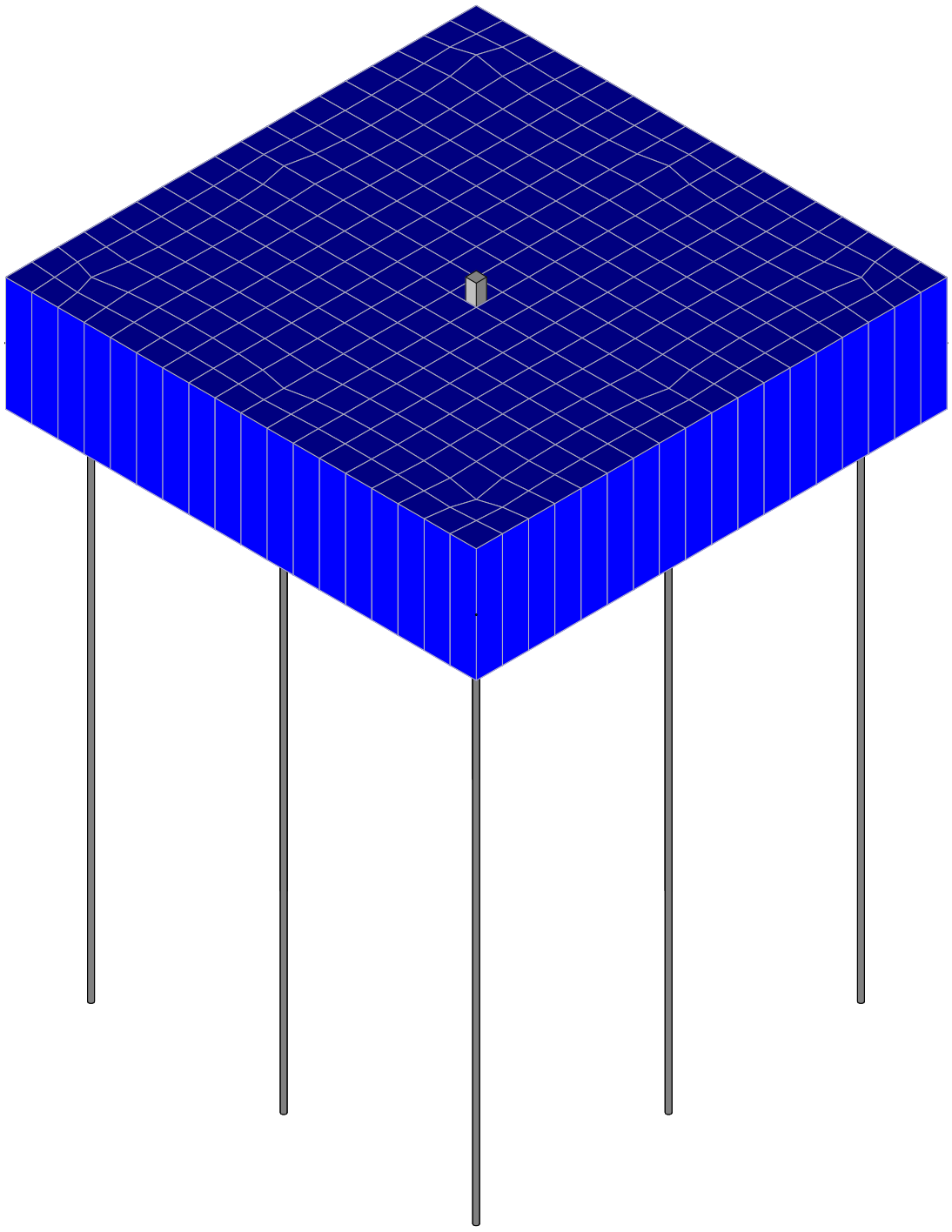
Bond Strength

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

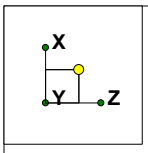
Controlling Capacity	163.82	k

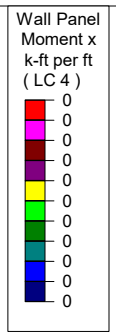
Frustum Capacity

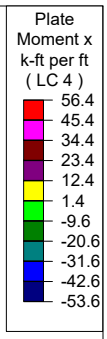
Frustum Weight	772.7	k
Applied Uplift	60.1	k
% Capacity	7.8%	Pass

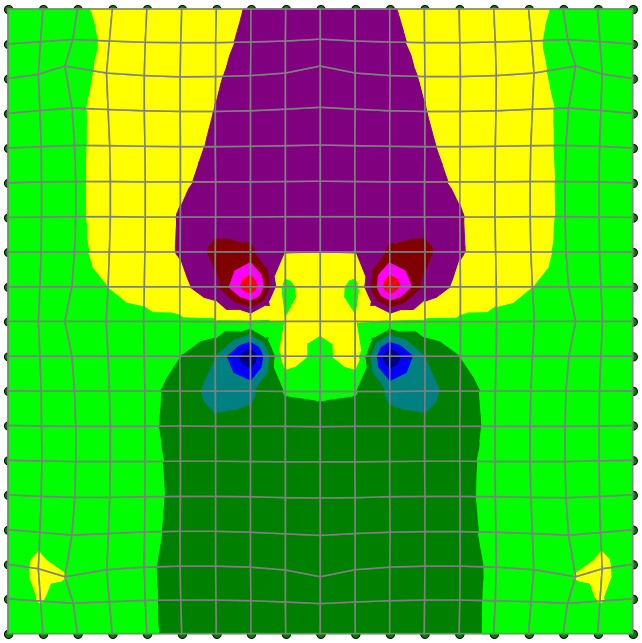


Tower Engineering Profes...	Horse Hill (BU 876314)	SK - 1
Analysis By: ARF		June 21, 2017 at 12:59 PM
25675.122192		Foundation.r3d



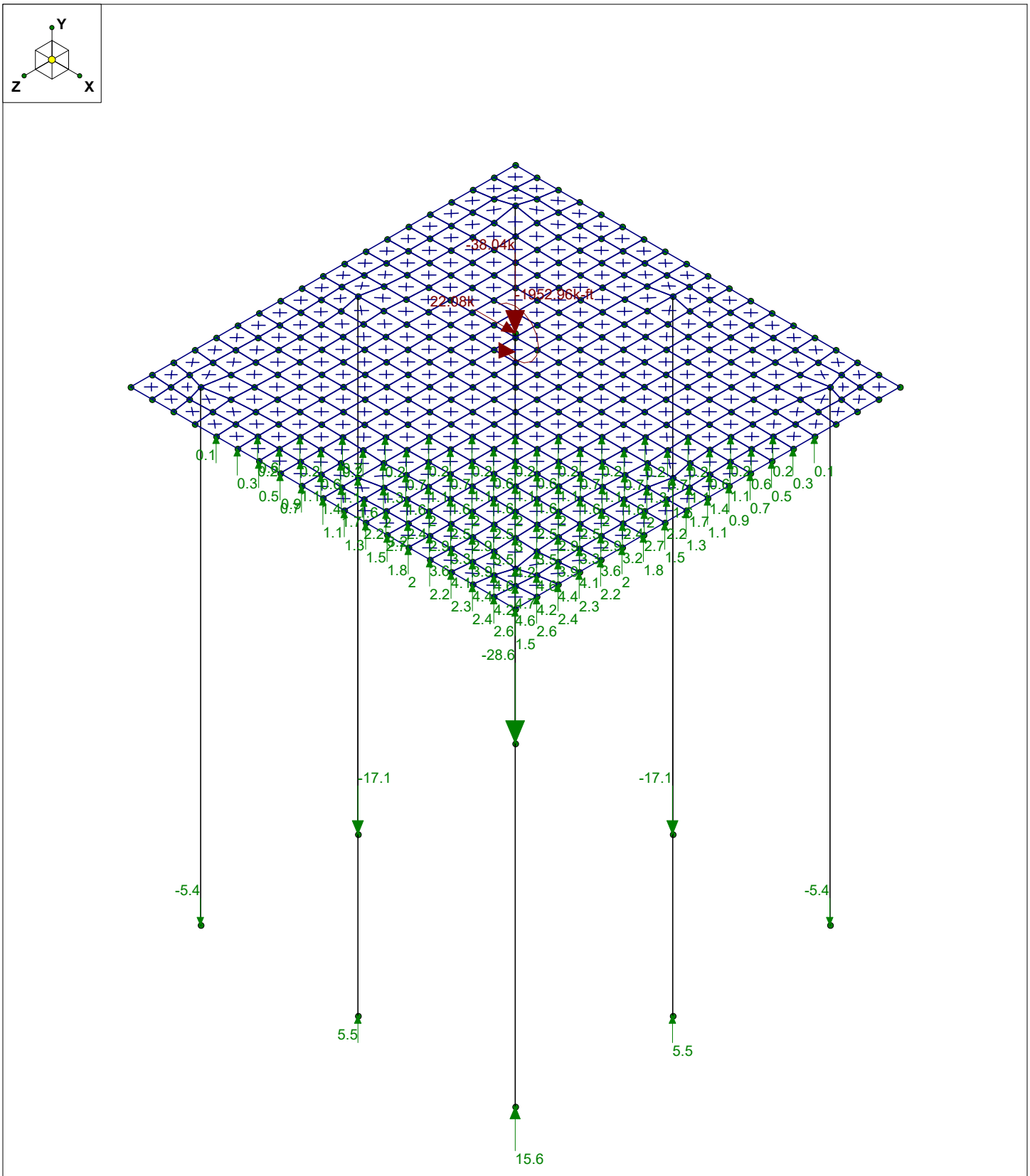






Results for LC 4, 0.9D+1.6Wind 0

Tower Engineering Profes...	Horse Hill (BU 876314)	SK - 5
Analysis By: ARF		June 21, 2017 at 1:08 PM
25675.122192		Foundation.r3d



Loads: LC 1, 1.2D+1.6Wind 0
Results for LC 6, 0.9D+1.6Wind 45
Y-direction Reaction Units are k and k-ft

Tower Engineering Profes...		SK - 4
Analysis By: ARF	Horse Hill (BU 876314)	June 21, 2017 at 1:02 PM
25675.122192		Foundation.r3d

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

SPRINT Existing Facility

Site ID: CT03XC017

Horse Hill
100 Russian Village Road
Southbury, CT 06488

July 28, 2017

EBI Project Number: 6217003227

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	12.13 %

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

EBI Consulting
environmental | engineering | due diligence

July 28, 2017

SPRINT
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Emissions Analysis for Site: **CT03XC017 – Horse Hill**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **100 Russian Village Road, Southbury, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT 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 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **100 Russian Village Road, Southbury, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APXVSPP18-C-A20 and RFS APXVTM14-C-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **120 feet** above ground level (AGL) for **Sector A**, **120 feet** above ground level (AGL) for **Sector B** and **120 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**120 feet**	Height (AGL):	**120 feet**	Height (AGL):	**120 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**2.36 %**	Antenna B1 MPE%	**2.36 %**	Antenna C1 MPE%	**2.36 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-C-I20	Make / Model:	RFS APXVTM14-C-I20	Make / Model:	RFS APXVTM14-C-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**120 feet**	Height (AGL):	**120 feet**	Height (AGL):	**120 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**1.72 %**	Antenna B2 MPE%	**1.72 %**	Antenna C2 MPE%	**1.72 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**4.08 %**
MetroPCS	0.96 %
T-Mobile	3.44 %
AT&T	3.65 %
Site Total MPE %:	**12.13 %**

SPRINT Sector A Total:	4.08 %
SPRINT Sector B Total:	4.08 %
SPRINT Sector C Total:	4.08 %
Site Total:	12.13 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	120	1.21	850 MHz	567	0.21%
Sprint 850 MHz LTE	2	437.55	120	2.42	850 MHz	567	0.43%
Sprint 1900 MHz (PCS) CDMA	5	622.47	120	8.61	1900 MHz (PCS)	1000	0.86%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	120	8.61	1900 MHz (PCS)	1000	0.86%
Sprint 2500 MHz (BRS) LTE	8	778.09	120	17.22	2500 MHz (BRS)	1000	1.72%
						Total:	**4.08%**

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 SPRINT 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:

SPRINT Sector	Power Density Value (%)
Sector A:	4.08 %
Sector B:	4.08 %
Sector C:	4.08 %
SPRINT Maximum Total (per sector):	4.08 %
Site Total:	12.13 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **12.13 %** 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.