Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

October 24, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 823530**
Sprint PCS Site ID: CT33XC603
Located at: 580 Chapel Street, Thomaston, CT 06787

Dear Ms. Bachman:

This letter and exhibits are submitted on behalf of Sprint PCS (Sprint). Sprint is making modifications to certain existing sites in its Connecticut system in order to implement their 2.5GHz LTE technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. Edmond V. Mone, First Selectman for the Town of Thomaston. The Town of Thomaston is also the Property Owner

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **580 Chapel Street, Thomaston, CT 06787.** Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in the R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Sprint's additional antennas will be located at the same elevation on the existing tower.

2. There will be no proposed modifications to the ground and no extension of boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. A Structural Modification Report confirming that the tower and foundation can support Sprint's proposed modifications is included as Exhibit-2.

5. The operation of the additional antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for Sprint's modified facility is included as Exhibit-3.

For the foregoing reasons, Sprint respectfully submits 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: Donna Neal.

Sincerely,

Susan Vale
Real Estate Specialist

Enclosures

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. Edmond V. Mone, First Selectman
Thomaston Town Hall
158 Main Street
Thomaston, CT 06787

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT33XC603

SITE NAME:

THOMASTON/VOICESTREAM

SITE ADDRESS:

583 CHAPEL STREET
THOMASTON, CT 06787

CROWN ID#: 823530

CROWN SITE NAME: CT364/CHAPEL ST. MONOPOLE

SHEET INFORMATION

SITE NUMBER:	CT33XC603
SITE NAME:	THOMASTON/VOICESTREAM
SITE ADDRESS:	583 CHAPEL STREET THOMASTON, CT 06787
COUNTY:	LITCHFIELD
COORDINATES: (NAD 83)	41° 39' 48.48" N 73° 4' 27.41" W
GROUND ELEV:	534'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	175'-0"± AGL
STRUCTURE RAD CENTER:	162'-0"± AGL
ZONING CLASSIFICATION:	RA 80
MAP-BLOCK-LOT:	55-03-08

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 PARK, KANSAS 66251
ENGINEER:	JAMES QUICKSELL (845) 567-6656 EXT. 2835 JQuicksell@tectonicengineering.com
SPRINT CM:	ANDY CLARK Andrew.Clark@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico@crowncastle.com

VICINITY MAP (NOT TO SCALE)

SHEET INDEX

SHT. NO.	SHEET DESCRIPTION
T-1	TITLE SHEET
SP-1	GENERAL NOTES
SP-2	GENERAL NOTES
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A-2	ELEVATION
A-3	ENLARGED EQUIPMENT LAYOUT PLANS
A-4	ANTENNA LAYOUT PLANS
A-5	RAN WIRING DIAGRAM
A-6	CABLE DETAILS
S-1	EQUIPMENT DETAILS
S-2	EQUIPMENT SCHEMATIC DETAILS
E-1	ELECTRICAL & GROUNDING PLANS
E-2	GROUNDING DETAILS & NOTES

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 1-1/4" HYBRID 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: _____

CALL TOLL FREE FOR CONNECTICUT
1-800-922-4455 OR DIAL 811
CALL TWO FULL WORKING DAYS IN ADVANCE TO LOCATE BURIED UTILITY PIPES AND CABLES

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 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.CT33XC603

NO	DATE	DESCRIPTION	BY
0	07/11/14	FOR COMMENT	MP
1	10/13/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
10/13/14	JMQ

SEAL
STATE OF CONNECTICUT
MANOJKUMAR
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

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._1572011104218554 92.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. AC1–301 – 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.

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
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TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
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SUBMITTALS

PROJECT NO: 7225.CT33XC603

NO	DATE	DESCRIPTION	BY
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DATE	REVIEWED BY
10/13/14	SMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

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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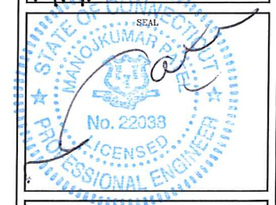
SUBMITTALS

PROJECT NO: 7225.CT33XC603

NO	DATE	DESCRIPTION	BY
0	07/11/14	FOR COMMENT	MP
1	10/13/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
10/13/14	JMQ

SEAL



SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

SHEET TITLE:
GENERAL NOTES

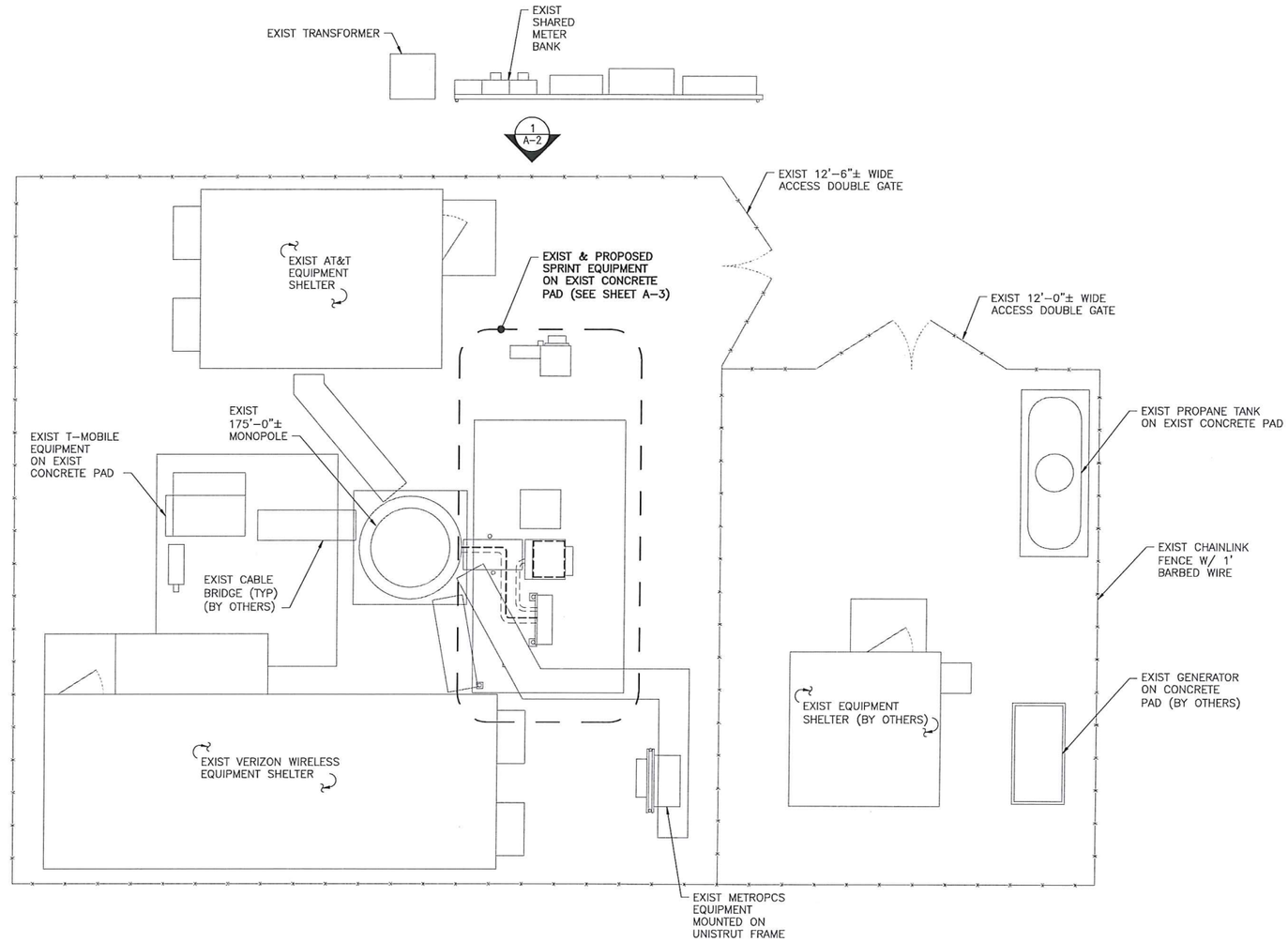
SHEET NO:
SP–2

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-1 SITE PLAN

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

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10/13/14	SMQ

STATE OF CONNECTICUT MANOJKUMAR PATEL No. 22033 LICENSED PROFESSIONAL ENGINEER

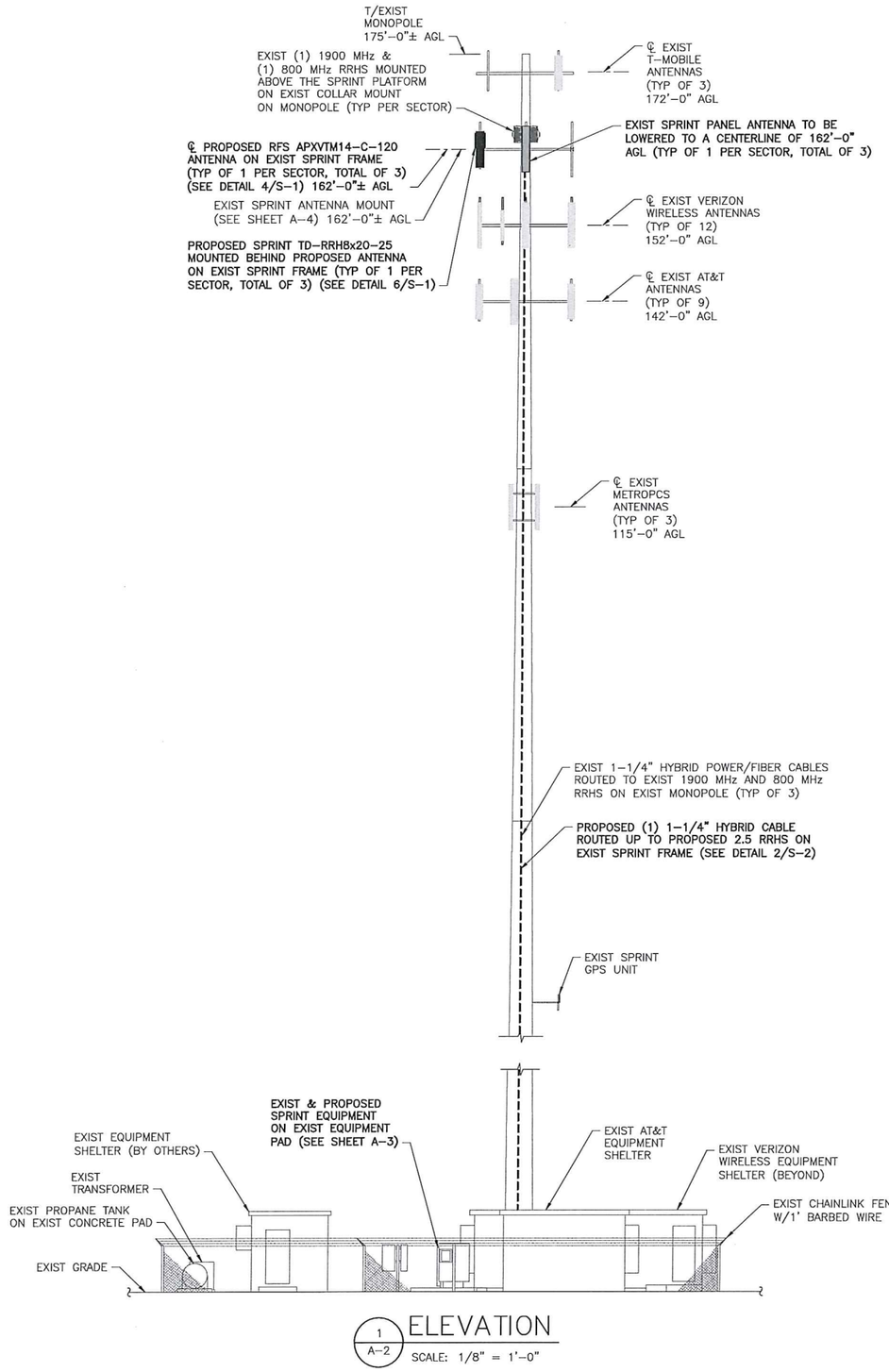
SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1



1 A-2 ELEVATION

SCALE: 1/8" = 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 ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 10/13/14.

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STATE OF CONNECTICUT
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

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583 CHAPEL STREET
THOMASTON, CT 06787

SHEET TITLE:
ELEVATION

SHEET NO:
A-2

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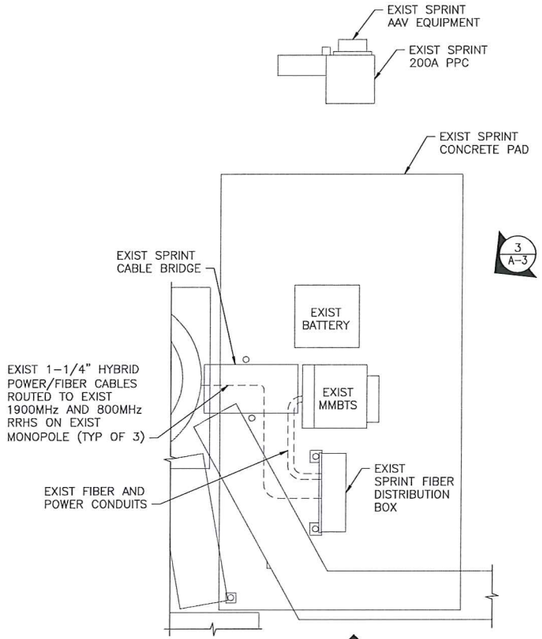
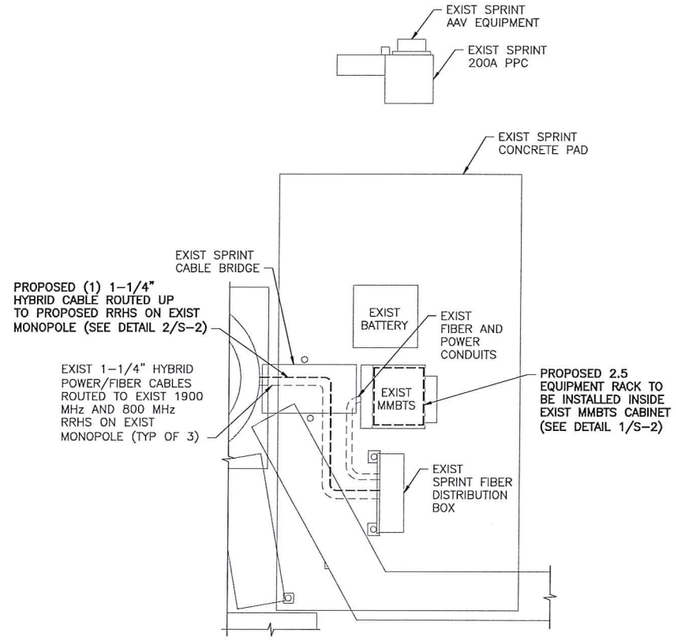
N

APPROX



1 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (EXIST)

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



2 A-3 ENLARGED EQUIPMENT LAYOUT PLAN (FINAL)

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

3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

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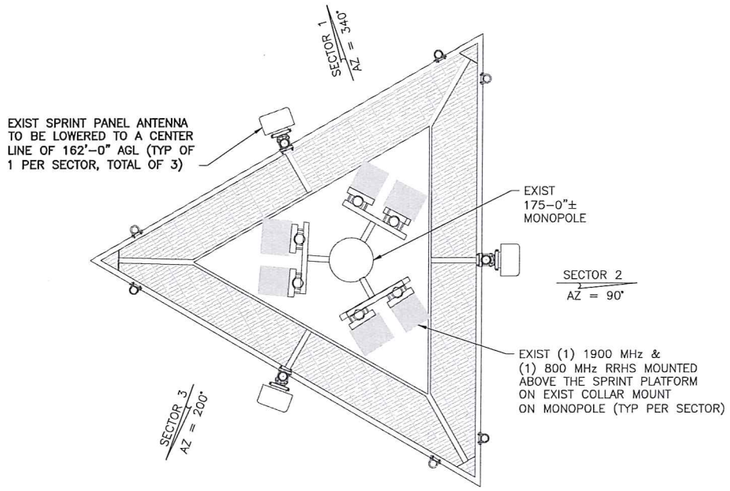
THOMASTON, CT 06787

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

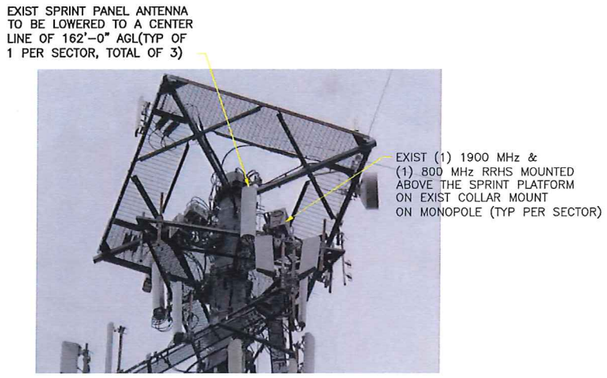
N

APPROX.



1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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



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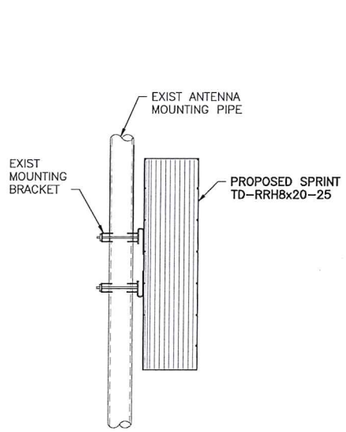
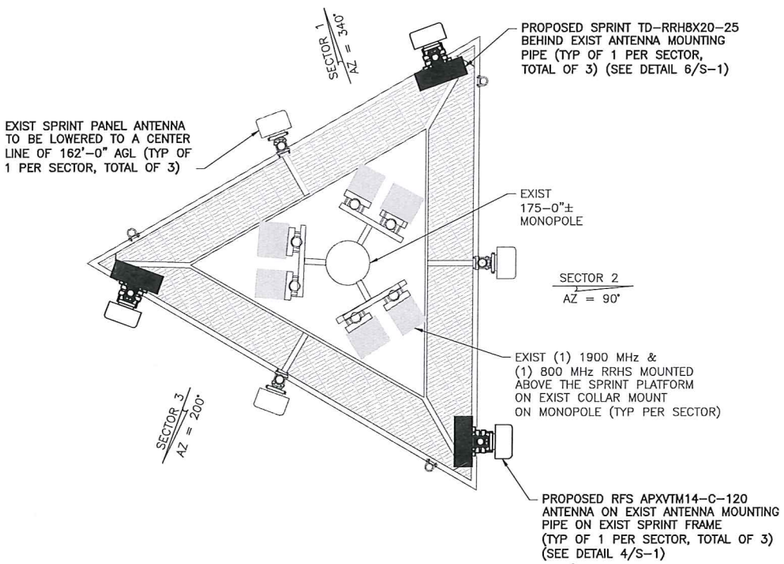


3 / A-4 RRH MOUNTING DETAIL

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



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

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

ANTENNA DATA

Status	Exist (Proposed)	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	162'-6" (162'-0")	162'-0"
Antenna Azimuth	340/90/200	340/90/200
Antenna RRH Model Number	1900MHz/800MHz RRHS	2.5GHz RRH-V3
Number of RRH	6	3

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SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
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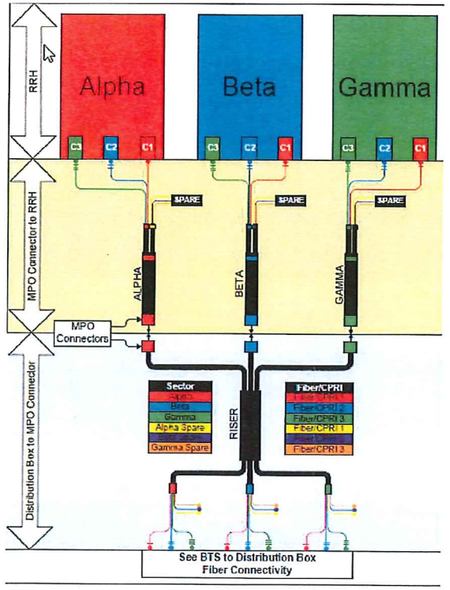
THOMASTON, CT 06787

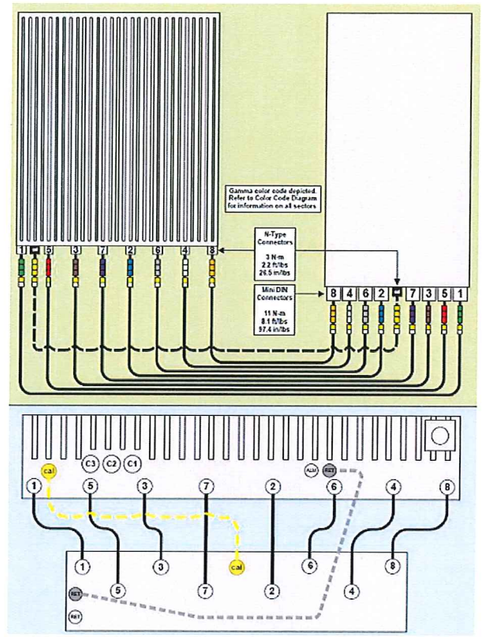
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



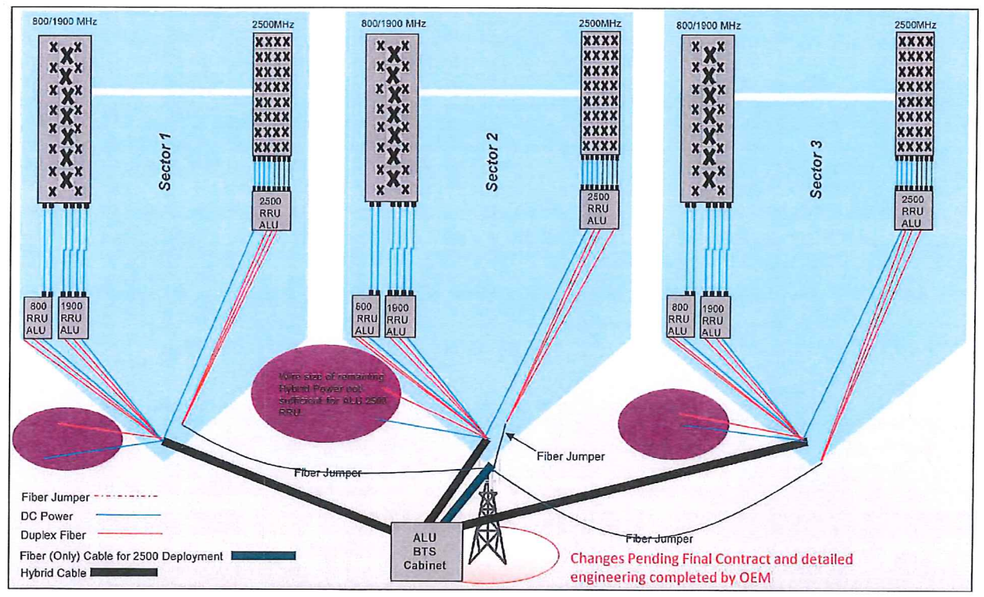
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



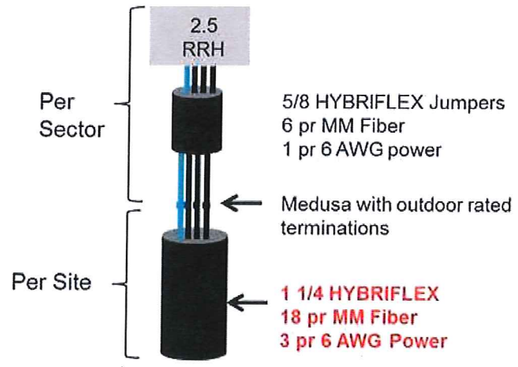
2 A–5 RRH CONNECTIVITY

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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SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22033
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

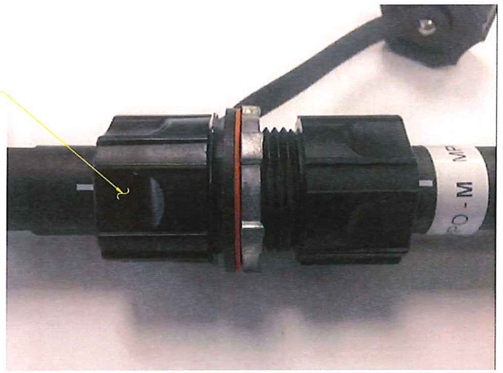
SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

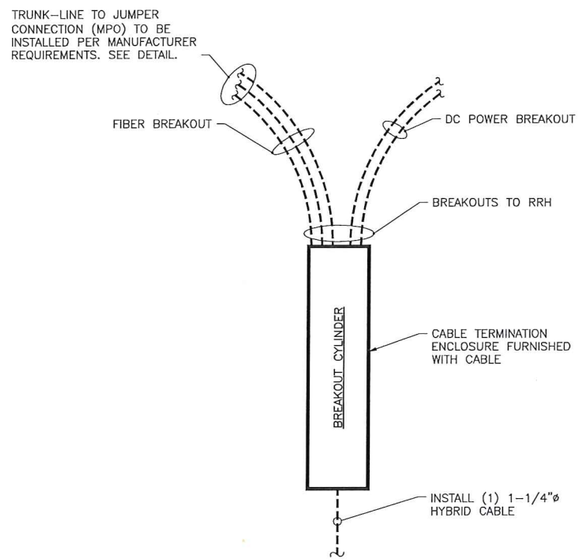
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

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

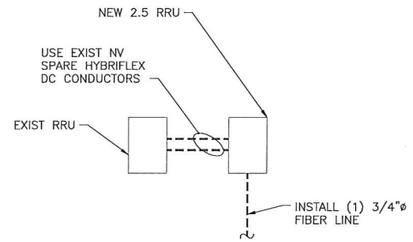


1 A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

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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SUBMITTALS

PROJECT NO: 7225.CT33XC603

NO	DATE	DESCRIPTION	BY
0	07/11/14	FOR COMMENT	MP
1	10/13/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
10/13/14	SMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

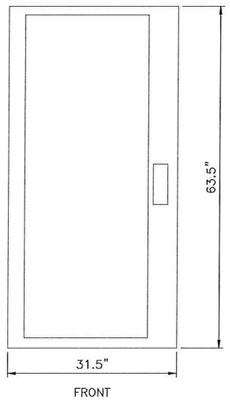
SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

SHEET TITLE:
CABLE DETAILS

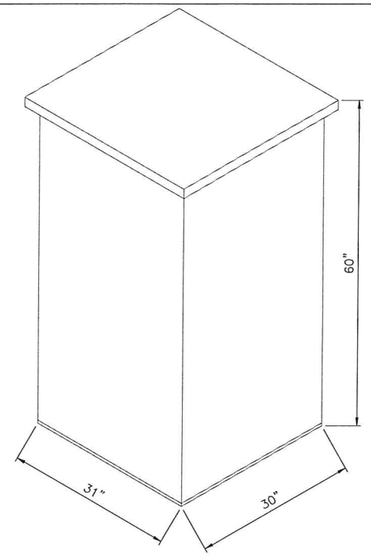
SHEET NO:
A-6



9927 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 63.5" WIDTH: 31.5" DEPTH: 38.0"

1/S-1 (EXIST) MMBTS CABINET

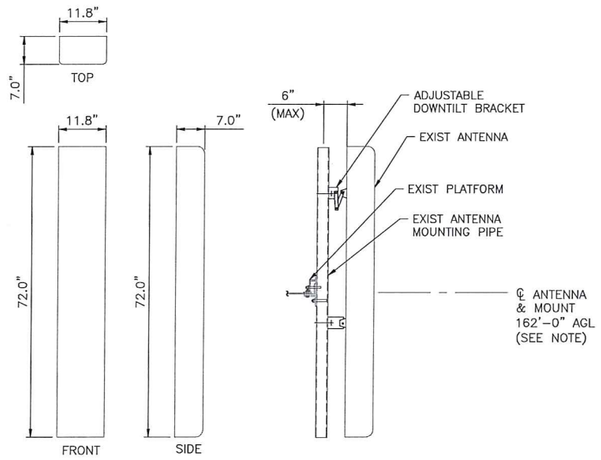
SCALE: 1" = 1'-0"



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

2/S-1 (EXIST) BATTERY CABINET

SCALE: 1" = 1'-0"

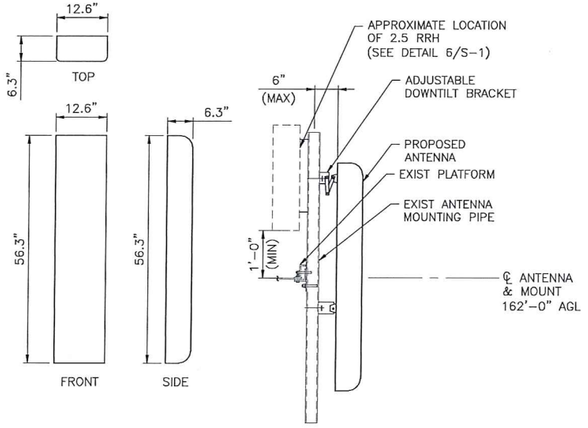


APXVSPP18-C-A20

NOTE:
THE CENTERLINE OF THE EXISTING ANTENNAS IS TO BE LOWERED TO MATCH THE CENTERLINE OF THE LOW PROFILE PLATFORM AS PER THE MOUNT ANALYSIS BY TECTONIC ENGINEERING DATED 10/13/14.

3/S-1 (EXIST) ANTENNA DETAIL

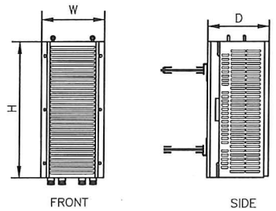
SCALE: 3/4" = 1'-0"



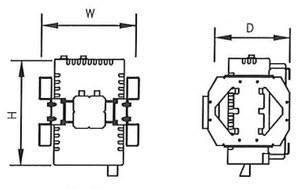
APXVTM14-C-120

4/S-1 (PROPOSED) ANTENNA DETAIL

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



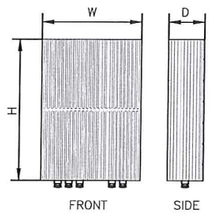
TYPE: 1900 MHz 4x45W
MODEL #: RRH 1900 4X45 65MHz
HEIGHT: 25.0"
WIDTH: 11.1"
DEPTH: 11.4"
WEIGHT: ±60 LBS.



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: 1" = 1'-0"

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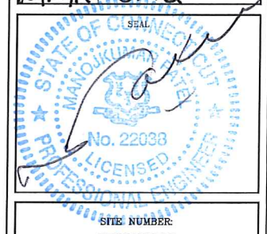

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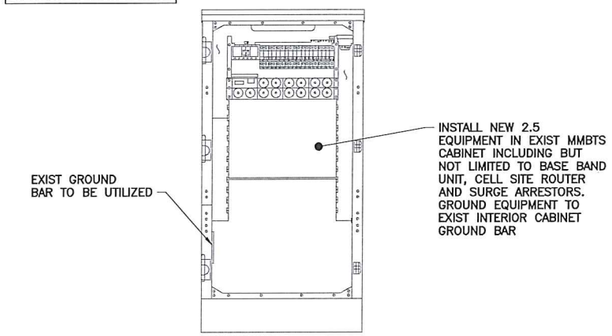
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

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.



FRONT ELEVATION
(CABINET INTERIOR)

1 S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

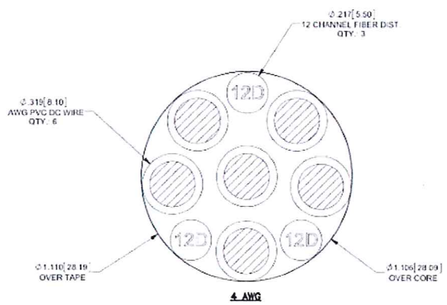
RFS HYBRIFLEX RISER CABLES SCHEDULE

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

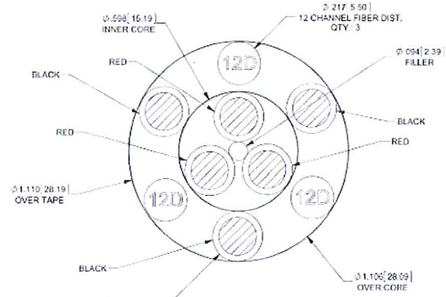
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

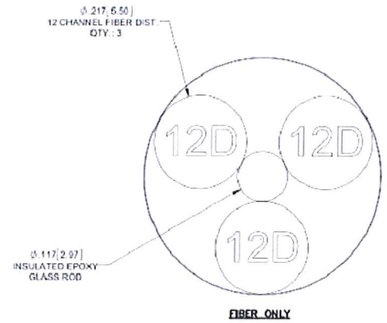
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG

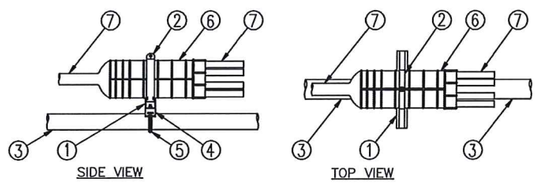


8 AWG & 6 AWG



FIBER ONLY

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

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

SCALE: NTS

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STATE OF CONNECTICUT · ANJOKUMAR PATEL · No. 22038 · LICENSED PROFESSIONAL ENGINEER · SEAL

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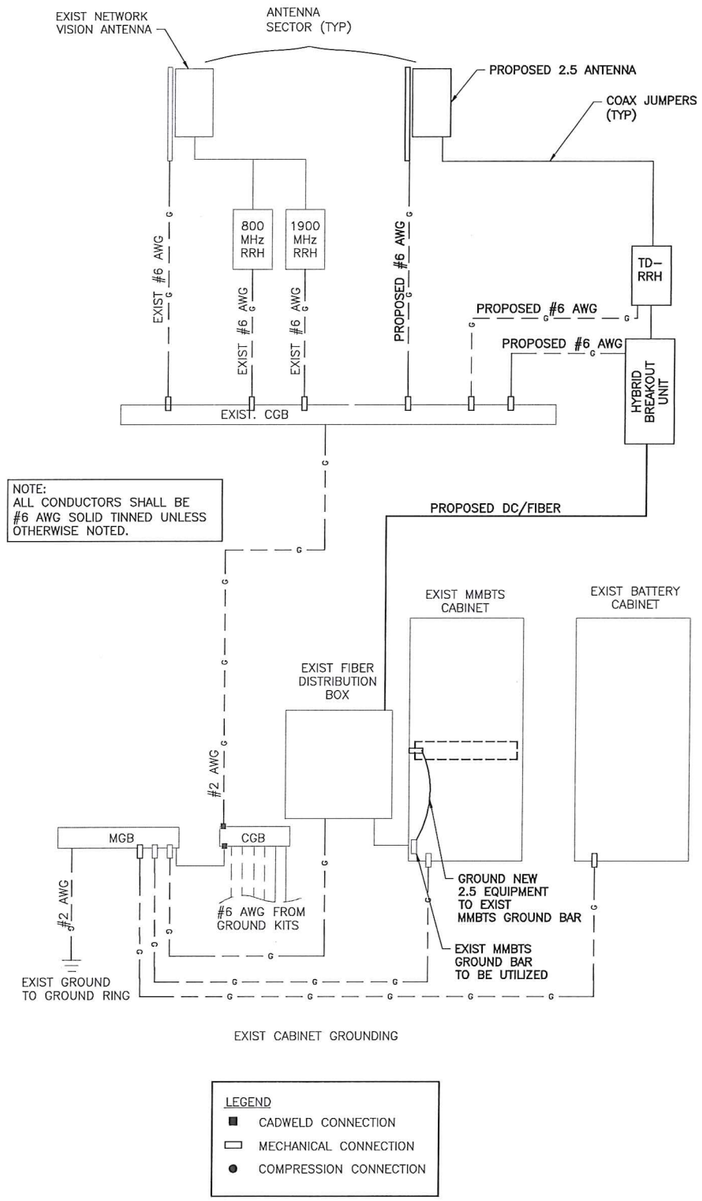
THOMASTON, CT 06787

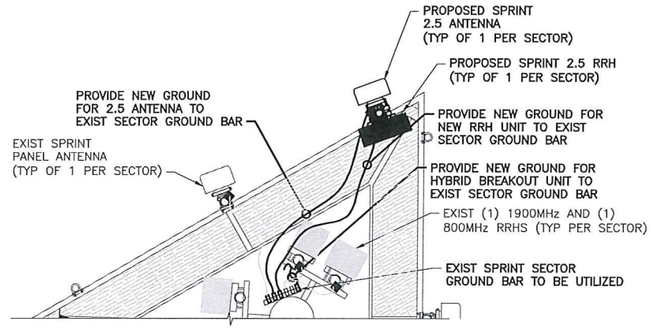
SHEET TITLE:
EQUIPMENT
SCHEMATIC DETAILS

SHEET NO:
S-2



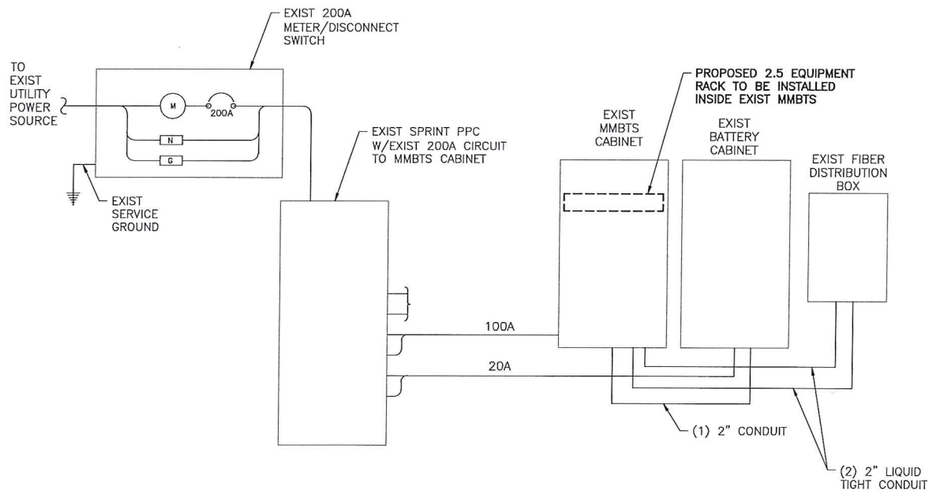
1 E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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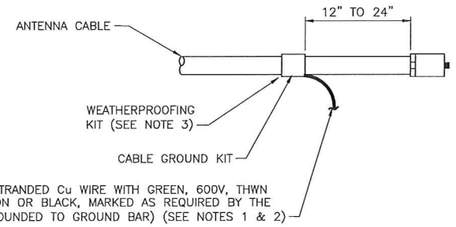
THOMASTON, CT 06787

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

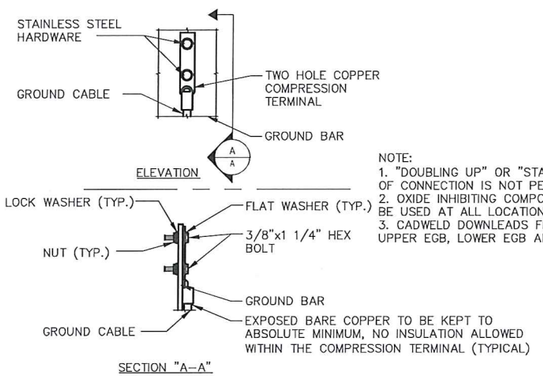
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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.

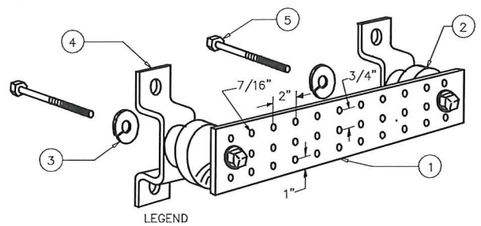


NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

SECTION "A-A"

2 / E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



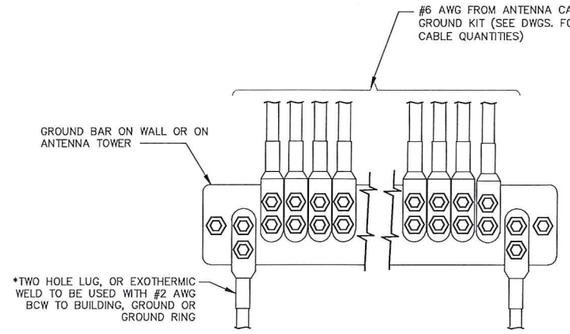
LEGEND

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.

Sprint
2.5 EQUIPMENT DEPLOYMENT
6850 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC • PLANNING • ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT
TECTONIC Engineering & Surveying Consultants P.C.
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Phone: (845) 567-6656
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SUBMITTALS

PROJECT NO: 7225.CT33XC603

NO	DATE	DESCRIPTION	BY
0	07/11/14	FOR COMMENT	MP
1	10/13/14	FOR CONSTRUCTION	MP

DATE	REVIEWED BY
10/13/14	JMQ

SEAL
STATE OF CONNECTICUT
MANJUKUMAR PATEL
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC603

SITE NAME:
THOMASTON/VOICESTREAM

SITE ADDRESS:
583 CHAPEL STREET
THOMASTON, CT 06787

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

Date: **September 16, 2014**

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

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	Scenario 2.5B
	Carrier Site Number:	CT33XC603
Crown Castle Designation:	**Crown Castle BU Number:**	823530
	Crown Castle Site Name:	CT364/Chapel St. Monopole
	Crown Castle JDE Job Number:	290763
	Crown Castle Work Order Number:	929627
	Crown Castle Application Number:	246019 Rev. 1
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	146DJ41400
Site Data:	**580 Chapel Street, Thomaston, Litchfield County, CT** **Latitude *41° 39' 48.48"*, Longitude *-73° 4' 27.41"*** **175 Foot - Monopole Tower**	

Dear Andrew Bazinet,

FDH Engineering, Inc. 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 706346, in accordance with application 246019, 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.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *FDH Engineering, Inc.* 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.

Respectfully submitted by:

Chip DeVoto, EI
Project Engineer

Reviewed by:

Bradley R. Newman, PE
Senior Project Engineer
CT PE License No. 29630

STATE OF CONNECTICUT · BRADLEY R. NEWMAN · 29630 · LICENSED PROFESSIONAL ENGINEER

9/16/14

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 175 ft Monopole tower designed by PIROD MANUFACTURES INC. in October of 2002. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28 mph with 0.75 inch ice thickness and 50 mph under service loads.

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
162.0	162.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	--
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

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
172.0	175.0	2	andrew	VHLP2.6	3	7/8	2
		1	bird technologies group	OA20-67-DIN			
	172.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	6	1-5/8	
		3	commscope	ATBT-BOTTOM-24V			
		1	andrew	ATJB200-A01-007	6	1-5/8	1
		2	andrew	ETW190VS12UB			
		1	crown mounts	Platform Mount [LP 701-1]			
		3	ems wireless	RR90-17-02DP w/ Mount Pipe			
	168.0	1	lone star electronics	LS-230C	1	7/8	2
162.0	162.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	3	1-1/4	1
		3	alcatel lucent	PCS 1900MHz 2x40W			
		1	crown mounts	Platform Mount [LP 712-1]			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
152.0	152.0	3	alcatel lucent	RRH2x40-AWS	1	1-5/8	2
		3	kathrein	742 213 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	antel	LPA-80080/4CF w/ Mount Pipe	18	1-5/8	1
		3	antel	BXA-171085-12BF w/ Mount Pipe			
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		1	crown mounts	Platform Mount [LP 403-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
142.0	142.0	1	andrew	APTDC-BDFDM-DB	12 1 2	1-5/8 5/8 1/2	1
		1	crown mounts	Platform Mount [LP 303-1]			
		6	ericsson	RRUS 11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F			
115.0	115.0	1	crown mounts	Pipe Mount [PM 501-3]	6	1-5/8	1
		3	rfs celwave	APXV18-206517S-C w/ Mount Pipe			
50.0	50.0	1	crown mounts	Side Arm Mount [SO 701-1]	1	1/2	1
		1	pctel	GPS-TMG-HR-26NCM			

Notes:
1) Existing Equipment
2) Reserved Equipment

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)
172	172	12	andrew	RR65-19-00XP	12	1-5/8
162	162	12	andrew	RR65-19-00XP	12	1-5/8
152	152	12	andrew	RR65-19-00XP	12	1-5/8
142	142	12	andrew	RR65-19-00XP	12	1-5/8
125	125	3	generic	Whip Antennas	3	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	ATC	3462674	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PiROD	3464631	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiROD	3462695	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures 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 the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Assumed that the top diameter of the pole shaft is 22" (flat-flat). Assumed that the base plate is 71" in diameter, 1.5" thick with 12"x4"x1" gusset plates welded to the base plate with a 0.5" fillet weld and the pole shaft with a 0.25" fillet weld.
6) Base plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

This analysis may be affected if any assumptions are not valid or have been made in error. FDH Engineering, Inc. 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 (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	175 - 164.25	Pole	TP26x22x0.25	1	-3.39	1017.41	7.1	Pass
L2	164.25 - 129.67	Pole	TP34.0625x24.4135x0.3125	2	-13.12	1689.48	49.8	Pass
L3	129.67 - 96	Pole	TP41.75x32.452x0.375	3	-20.13	2488.54	67.6	Pass
L4	96 - 63.17	Pole	TP49.0625x39.8421x0.375	4	-28.32	2928.99	81.1	Pass
L5	63.17 - 31.17	Pole	TP56.125x46.9602x0.375	5	-37.69	3355.16	88.5	Pass
L6	31.17 - 0	Pole	TP62.9375x53.8475x0.375	6	-49.96	3684.96	97.3	Pass
							Summary	
						Pole (L6)	97.3	Pass
						Rating =	97.3	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.9	Pass
1	Base Plate	0	OK	Pass
1	Base Foundation Soil Interaction	0	97.3	Pass

Structure Rating (max from all components) =	97.3%

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

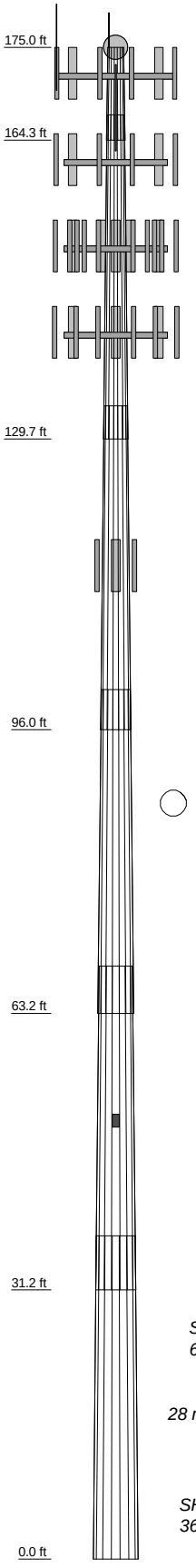
4.1) Recommendations

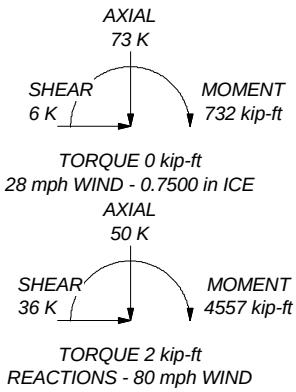
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	10.75	18	0.2500	2.92	22.0000	26.0000		0.7
2	37.50	18	0.3125	3.83	24.4135	34.0625		3.7
3	37.50	18	0.3750	4.67	32.4520	41.7500		5.6
4	37.50	18	0.3750	5.50	39.8421	49.0625		6.7
5	37.50	18	0.3750	6.25	46.9602	56.1250		7.8
6	37.42	18	0.3750		53.8475	62.9375		8.8
							A572-65	





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	175	BXA-70063-6CF-2 w/ Mount Pipe	152
RR90-17-02DP w/ Mount Pipe	172	BXA-70063-6CF-2 w/ Mount Pipe	152
RR90-17-02DP w/ Mount Pipe	172	(2) LPA-80080/4CF W/Mount Pipe	152
RR90-17-02DP w/ Mount Pipe	172	(2) LPA-80080/4CF W/Mount Pipe	152
LNX-6515DS-VTM w/ Mount Pipe	172	(2) LPA-80080/4CF W/Mount Pipe	152
LNX-6515DS-VTM w/ Mount Pipe	172	RRH2x40-AWS	152
LNX-6515DS-VTM w/ Mount Pipe	172	RRH2x40-AWS	152
ATBT-BOTTOM-24V	172	RRH2x40-AWS	152
ATBT-BOTTOM-24V	172	742 213 w/ Mount Pipe	152
ATBT-BOTTOM-24V	172	742 213 w/ Mount Pipe	152
ATJB200-A01-007	172	742 213 w/ Mount Pipe	152
ETW190VS12UB	172	DB-T1-6Z-8AB-0Z	152
ETW190VS12UB	172	Platform Mount [LP 403-1]	152
OA20-67-DIN	172	BXA-171085-12BF w/ Mount Pipe	152
LS-230C	172	BXA-171085-12BF w/ Mount Pipe	152
Empty Mount Pipe	172	AM-X-CD-16-65-00T-RET w/ Mount Pipe	142
Empty Mount Pipe	172		
Pipe Mount [PM 601-1]	172	(2) 7770.00 w/ Mount Pipe	142
Pipe Mount [PM 601-1]	172	(2) 7770.00 w/ Mount Pipe	142
Platform Mount [LP 701-1]	172	(2) 7770.00 w/ Mount Pipe	142
VHLP2.6	172	(2) LGP2140X	142
VHLP2.6	172	(2) LGP2140X	142
APXVTM14-C-120 w/ Mount Pipe	162	(2) LGP2140X	142
TD-RRH8x20-25	162	(2) RRUS 11	142
TD-RRH8x20-25	162	(2) RRUS 11	142
TD-RRH8x20-25	162	(2) RRUS 11	142
APXVSPP18-C-A20 w/ Mount Pipe	162	APTDC-BDFDM-DB	142
APXVSPP18-C-A20 w/ Mount Pipe	162	DC6-48-60-18-8F	142
APXVSPP18-C-A20 w/ Mount Pipe	162	Empty Pipe Mount	142
800MHz 2X50W RRH W/FILTER	162	Empty Pipe Mount	142
800MHz 2X50W RRH W/FILTER	162	Empty Pipe Mount	142
800MHz 2X50W RRH W/FILTER	162	Platform Mount [LP 303-1]	142
PCS 1900MHz 2x40W	162	AM-X-CD-16-65-00T-RET w/ Mount Pipe	142
PCS 1900MHz 2x40W	162	AM-X-CD-16-65-00T-RET w/ Mount Pipe	142
PCS 1900MHz 2x40W	162	APXV18-206517S-C w/ Mount Pipe	115
(2) Empty Pipe Mount	162	Pipe Mount [PM 501-3]	115
(2) Empty Pipe Mount	162	APXV18-206517S-C w/ Mount Pipe	115
(2) Empty Pipe Mount	162	APXV18-206517S-C w/ Mount Pipe	115
Platform Mount [LP 712-1]	162	GPS-TMG-HR-26NCM	50
APXVTM14-C-120 w/ Mount Pipe	162	Side Arm Mount [SO 701-1]	50
APXVTM14-C-120 w/ Mount Pipe	162		
BXA-171085-12BF w/ Mount Pipe	152		
BXA-70063-6CF-2 w/ Mount Pipe	152		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97.3%

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
Phone: (919) 755-1012
FAX: (919) 755-1031
Tower Analysis

Job: **BU:# 823530 CT364/CHAPEL ST. MONOPOLE**
Project: **146DJ41400**
Client: Crown Castle | Drawn by: Chip DeVoto, EI | App'd:
Code: TIA/EIA-222-F | Date: 09/16/14 | Scale: NTS
Path: | Dwg No. E-1

Tower Input Data

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

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

Tapered Pole Section Geometry

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*
L1	175.00-164.25	10.75	2.92	18	22.0000	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164.25-129.67	37.50	3.83	18	24.4135	34.0625	0.3125	1.2500	A572-65 (65 ksi)
L3	129.67-96.00	37.50	4.67	18	32.4520	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	96.00-63.17	37.50	5.50	18	39.8421	49.0625	0.3750	1.5000	A572-65 (65 ksi)
L5	63.17-31.17	37.50	6.25	18	46.9602	56.1250	0.3750	1.5000	A572-65

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
L6	31.17-0.00	37.42		18	53.8475	62.9375	0.3750	1.5000	(65 ksi) A572-65 (65 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	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	26.4011	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	25.5530	23.9052	1754.2802	8.5559	12.4021	141.4508	3510.8687	11.9549	3.7468	11.99
	34.5880	33.4758	4817.4335	11.9812	17.3038	278.4040	9641.2058	16.7411	5.4450	17.424
L3	33.9169	38.1797	4963.1506	11.3873	16.4856	301.0593	9932.8318	19.0935	5.0516	13.471
	42.3941	49.2466	10650.9822	14.6881	21.2090	502.1916	21315.9793	24.6280	6.6880	17.835
L4	41.6227	46.9757	9244.4481	14.0108	20.2398	456.7464	18501.0602	23.4923	6.3522	16.939
	49.8194	57.9503	17355.1378	17.2841	24.9238	696.3293	34733.1119	28.9807	7.9750	21.267
L5	49.0495	55.4480	15202.6322	16.5377	23.8558	637.2728	30425.2683	27.7293	7.6050	20.28
	56.9908	66.3564	26056.1506	19.7913	28.5115	913.8821	52146.5865	33.1845	9.2180	24.581
L6	56.2199	63.6457	22991.5268	18.9827	27.3545	840.5012	46013.3064	31.8289	8.8172	23.512
	63.9084	74.4650	36822.8946	22.2097	31.9722	1151.7142	73694.2417	37.2396	10.4170	27.779

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
L1 175.00-164.25				1	1	1		
L2 164.25-129.67				1	1	1		
L3 129.67-96.00				1	1	1		
L4 96.00-63.17				1	1	1		
L5 63.17-31.17				1	1	1		
L6 31.17-0.00				1	1	1		

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 klf
HB114-1-08U4-M5J(1 1/4")	C	Surface Ar (CaAa)	162.00 - 115.00	4	1	-0.450 -0.350	1.5400		0.00
LDF7-50A(1-5/8") **	A	Surface Ar (CaAa)	152.00 - 8.00	7	1	-0.250 0.000	1.9800		0.00
LDF7-50A(1-5/8") **	C	Surface Ar (CaAa)	115.00 - 8.00	6	1	-0.250 -0.050	1.9800		0.00
LDF4-50A(1/2") **	C	Surface Ar (CaAa)	50.00 - 8.00	1	1	-0.460 -0.450	0.6300		0.00

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
Safety Line 3/8	C	Surface Ar (CaAa)	175.00 - 8.00	1	1	0.000 0.000	0.3750		0.00
**									

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 klf
**								
AVA5-50(7/8")	A	No	Inside Pole	172.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
LDF7-50A(1-5/8")	A	No	Inside Pole	172.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
LDF7-50A(1-5/8")	A	No	Inside Pole	172.00 - 0.00	6	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
**								
**								
LDF7-50A(1-5/8")	C	No	Inside Pole	152.00 - 8.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
**								
LDF7-50A(1-5/8")	B	No	Inside Pole	142.00 - 8.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
AMR-S304(5/8)	B	No	Inside Pole	142.00 - 8.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
FSJ4P-50B-40(1/2")	B	No	Inside Pole	142.00 - 8.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
**								
**								

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	175.00-164.25	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.403	0.000	0.00
L2	164.25-129.67	A	0.000	0.000	4.421	0.000	0.53
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	6.276	0.000	0.23
L3	129.67-96.00	A	0.000	0.000	6.667	0.000	0.59
		B	0.000	0.000	0.000	0.000	0.35
		C	0.000	0.000	7.284	0.000	0.43
L4	96.00-63.17	A	0.000	0.000	6.500	0.000	0.57
		B	0.000	0.000	0.000	0.000	0.34
		C	0.000	0.000	7.731	0.000	0.49
L5	63.17-31.17	A	0.000	0.000	6.336	0.000	0.56
		B	0.000	0.000	0.000	0.000	0.33
		C	0.000	0.000	8.722	0.000	0.48
L6	31.17-0.00	A	0.000	0.000	4.588	0.000	0.50
		B	0.000	0.000	0.000	0.000	0.24
		C	0.000	0.000	6.916	0.000	0.35

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	175.00-164.25	A	0.913	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	2.365	0.000	0.02
L2	164.25-129.67	A	0.897	0.000	0.000	8.497	0.000	1.03
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	18.489	0.000	0.63
L3	129.67-96.00	A	0.869	0.000	0.000	12.705	0.000	1.33
		B		0.000	0.000	0.000	0.000	0.35
		C		0.000	0.000	19.361	0.000	1.00
L4	96.00-63.17	A	0.833	0.000	0.000	12.205	0.000	1.27
		B		0.000	0.000	0.000	0.000	0.34
		C		0.000	0.000	19.141	0.000	1.13
L5	63.17-31.17	A	0.783	0.000	0.000	11.669	0.000	1.20
		B		0.000	0.000	0.000	0.000	0.33
		C		0.000	0.000	22.526	0.000	1.10
L6	31.17-0.00	A	0.750	0.000	0.000	8.215	0.000	0.92
		B		0.000	0.000	0.000	0.000	0.24
		C		0.000	0.000	17.799	0.000	0.77

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	175.00-164.25	0.0000	0.0561	0.0000	0.2826
L2	164.25-129.67	-0.0767	0.1399	-0.0831	0.4164
L3	129.67-96.00	-0.2117	0.2148	-0.3221	0.5200
L4	96.00-63.17	-0.2324	0.2807	-0.3764	0.6195
L5	63.17-31.17	-0.1833	0.3066	-0.2261	0.6969
L6	31.17-0.00	-0.1135	0.2428	-0.1020	0.5653

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod	C	From Leg	0.00 0.00 2.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.25 0.66 0.97 1.49 2.68	0.25 0.66 0.97 1.49 2.68	0.03 0.03 0.04 0.06 0.14
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RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.59 5.09 5.58 6.59 8.73	3.32 4.09 4.78 6.23 9.31	0.03 0.07 0.12 0.22 0.56
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.08 0.17 0.27 0.51 1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.08 0.17 0.27 0.51 1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.08 0.17 0.27 0.51 1.15
ATBT-BOTTOM-24V	A	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.77	0.08 0.12 0.17 0.30 0.67	0.00 0.00 0.01 0.01 0.04
ATBT-BOTTOM-24V	B	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.12 0.17 0.23 0.38 0.77	0.08 0.12 0.17 0.30 0.67	0.00 0.00 0.01 0.01 0.04
ATBT-BOTTOM-24V	C	From Leg	4.00 0.00 0.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice	0.12 0.17 0.23	0.08 0.12 0.17	0.00 0.00 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	0.38	0.30	0.01
						4" Ice	0.77	0.67	0.04
ATJB200-A01-007	A	From Leg	4.00	0.0000	172.00	No Ice	0.44	0.14	0.00
			0.00			1/2" Ice	0.53	0.21	0.01
			0.00			1" Ice	0.63	0.28	0.01
						2" Ice	0.86	0.45	0.02
						4" Ice	1.42	0.90	0.07
ETW190VS12UB	B	From Leg	4.00	0.0000	172.00	No Ice	0.66	0.37	0.01
			0.00			1/2" Ice	0.78	0.46	0.02
			0.00			1" Ice	0.90	0.56	0.03
						2" Ice	1.17	0.80	0.04
						4" Ice	1.82	1.36	0.11
ETW190VS12UB	C	From Leg	4.00	0.0000	172.00	No Ice	0.66	0.37	0.01
			0.00			1/2" Ice	0.78	0.46	0.02
			0.00			1" Ice	0.90	0.56	0.03
						2" Ice	1.17	0.80	0.04
						4" Ice	1.82	1.36	0.11
OA20-67-DIN	C	From Leg	7.00	60.0000	172.00	No Ice	1.80	1.80	0.01
			0.00			1/2" Ice	2.50	2.50	0.01
			3.00			1" Ice	4.00	4.00	0.01
						2" Ice	5.50	5.50	0.02
						4" Ice	7.00	7.00	0.03
LS-230C	C	From Face	7.00	60.0000	172.00	No Ice	1.61	1.61	0.01
			0.00			1/2" Ice	2.34	2.34	0.02
			-4.00			1" Ice	2.80	2.80	0.04
						2" Ice	3.68	3.68	0.09
						4" Ice	5.55	5.55	0.25
Empty Mount Pipe	A	From Leg	4.00	0.0000	172.00	No Ice	1.40	1.40	0.03
			0.00			1/2" Ice	2.13	2.13	0.04
			0.00			1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Empty Mount Pipe	B	From Leg	4.00	0.0000	172.00	No Ice	1.40	1.40	0.03
			0.00			1/2" Ice	2.13	2.13	0.04
			0.00			1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Pipe Mount [PM 601-1]	A	From Leg	5.00	-20.0000	172.00	No Ice	3.00	0.90	0.07
			0.00			1/2" Ice	3.74	1.12	0.08
			2.00			1" Ice	4.48	1.34	0.09
						2" Ice	5.96	1.78	0.12
						4" Ice	8.92	2.66	0.18
Pipe Mount [PM 601-1]	A	From Leg	5.00	-6.0000	172.00	No Ice	3.00	0.90	0.07
			0.00			1/2" Ice	3.74	1.12	0.08
			2.00			1" Ice	4.48	1.34	0.09
						2" Ice	5.96	1.78	0.12
						4" Ice	8.92	2.66	0.18
Platform Mount [LP 701-1]	C	None		0.0000	172.00	No Ice	59.15	59.15	2.75
						1/2" Ice	71.12	71.12	3.42
						1" Ice	83.09	83.09	4.10
						2" Ice	107.03	107.03	5.45
						4" Ice	154.91	154.91	8.15
**									
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00	0.0000	162.00	No Ice	7.13	4.96	0.08
			0.00			1/2" Ice	7.66	5.75	0.13
			0.00			1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	11.53	11.41	0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.14 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.14 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.14 2.62 3.68	0.07 0.10 0.13 0.20 0.40
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
800MHz 2X50W RRH W/FILTER	Fro	From Leg	2.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 2x40W	A	From Leg	4.00	0.0000	162.00	No Ice	2.74	1.46	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	2.97	1.65	0.06
			0.00			1" Ice	3.21	1.84	0.08
						2" Ice	3.71	2.27	0.14
						4" Ice	4.82	3.22	0.28
PCS 1900MHz 2x40W	B	From Leg	4.00	0.0000	162.00	No Ice	2.74	1.46	0.04
			0.00			1/2" Ice	2.97	1.65	0.06
			0.00			1" Ice	3.21	1.84	0.08
						2" Ice	3.71	2.27	0.14
						4" Ice	4.82	3.22	0.28
PCS 1900MHz 2x40W	C	From Leg	4.00	0.0000	162.00	No Ice	2.74	1.46	0.04
			0.00			1/2" Ice	2.97	1.65	0.06
			0.00			1" Ice	3.21	1.84	0.08
						2" Ice	3.71	2.27	0.14
						4" Ice	4.82	3.22	0.28
(2) Empty Pipe Mount	A	From Face	4.00	0.0000	162.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
						4" Ice	3.93	3.93	0.20
(2) Empty Pipe Mount	B	From Face	4.00	0.0000	162.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
						4" Ice	3.93	3.93	0.20
(2) Empty Pipe Mount	C	From Face	4.00	0.0000	162.00	No Ice	1.20	1.20	0.02
			0.00			1/2" Ice	1.50	1.50	0.03
			0.00			1" Ice	1.81	1.81	0.04
						2" Ice	2.47	2.47	0.08
						4" Ice	3.93	3.93	0.20
Platform Mount [LP 712-1]	C	None		0.0000	162.00	No Ice	24.53	24.53	1.34
						1/2" Ice	29.94	29.94	1.65
						1" Ice	35.35	35.35	1.96
						2" Ice	46.17	46.17	2.58
						4" Ice	67.81	67.81	3.82
**									
BXA-171085-12BF w/ Mount Pipe	A	From Leg	4.00	0.0000	152.00	No Ice	4.97	5.23	0.04
			0.00			1/2" Ice	5.52	6.39	0.09
			0.00			1" Ice	6.04	7.26	0.14
						2" Ice	7.09	9.05	0.27
						4" Ice	9.36	12.82	0.67
BXA-171085-12BF w/ Mount Pipe	B	From Leg	4.00	0.0000	152.00	No Ice	4.97	5.23	0.04
			0.00			1/2" Ice	5.52	6.39	0.09
			0.00			1" Ice	6.04	7.26	0.14
						2" Ice	7.09	9.05	0.27
						4" Ice	9.36	12.82	0.67
BXA-171085-12BF w/ Mount Pipe	C	From Leg	4.00	0.0000	152.00	No Ice	4.97	5.23	0.04
			0.00			1/2" Ice	5.52	6.39	0.09
			0.00			1" Ice	6.04	7.26	0.14
						2" Ice	7.09	9.05	0.27
						4" Ice	9.36	12.82	0.67
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	152.00	No Ice	7.97	5.80	0.04
			0.00			1/2" Ice	8.61	6.95	0.10
			0.00			1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	152.00	No Ice	7.97	5.80	0.04
			0.00			1/2" Ice	8.61	6.95	0.10

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
			0.00			1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	152.00	No Ice	7.97	5.80	0.04
			0.00			1/2" Ice	8.61	6.95	0.10
			0.00			1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
(2) LPA-80080/4CF W/Mount Pipe	A	From Leg	4.00	0.0000	152.00	No Ice	2.62	6.06	0.01
			0.00			1/2" Ice	2.92	6.45	0.05
			0.00			1" Ice	3.23	6.86	0.08
						2" Ice	3.96	7.69	0.17
						4" Ice	5.53	9.47	0.41
(2) LPA-80080/4CF W/Mount Pipe	B	From Leg	4.00	0.0000	152.00	No Ice	2.62	6.06	0.01
			0.00			1/2" Ice	2.92	6.45	0.05
			0.00			1" Ice	3.23	6.86	0.08
						2" Ice	3.96	7.69	0.17
						4" Ice	5.53	9.47	0.41
(2) LPA-80080/4CF W/Mount Pipe	C	From Leg	4.00	0.0000	152.00	No Ice	2.62	6.06	0.01
			0.00			1/2" Ice	2.92	6.45	0.05
			0.00			1" Ice	3.23	6.86	0.08
						2" Ice	3.96	7.69	0.17
						4" Ice	5.53	9.47	0.41
RRH2x40-AWS	A	From Leg	4.00	0.0000	152.00	No Ice	2.52	1.59	0.04
			0.00			1/2" Ice	2.75	1.80	0.06
			0.00			1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
RRH2x40-AWS	B	From Leg	4.00	0.0000	152.00	No Ice	2.52	1.59	0.04
			0.00			1/2" Ice	2.75	1.80	0.06
			0.00			1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
RRH2x40-AWS	C	From Leg	4.00	0.0000	152.00	No Ice	2.52	1.59	0.04
			0.00			1/2" Ice	2.75	1.80	0.06
			0.00			1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
742 213 w/ Mount Pipe	A	From Leg	4.00	0.0000	152.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	B	From Leg	4.00	0.0000	152.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	C	From Leg	4.00	0.0000	152.00	No Ice	5.37	4.62	0.05
			0.00			1/2" Ice	5.95	6.00	0.09
			0.00			1" Ice	6.50	6.98	0.15
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.0000	152.00	No Ice	5.60	2.33	0.04
			0.00			1/2" Ice	5.92	2.56	0.08
			0.00			1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	8.37	4.37	0.45
Platform Mount [LP 403-1]	C	None		0.0000	152.00	No Ice	18.85	18.85	1.50
						1/2" Ice	24.30	24.30	1.80
						1" Ice	29.75	29.75	2.09
						2" Ice	40.65	40.65	2.69
						4" Ice	62.45	62.45	3.87
**									
AM-X-CD-16-65-00T-RET	A	From Leg	4.00	0.0000	142.00	No Ice	8.50	6.30	0.07
w/ Mount Pipe			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET	B	From Leg	4.00	0.0000	142.00	No Ice	8.50	6.30	0.07
w/ Mount Pipe			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
AM-X-CD-16-65-00T-RET	C	From Leg	4.00	0.0000	142.00	No Ice	8.50	6.30	0.07
w/ Mount Pipe			0.00			1/2" Ice	9.15	7.48	0.14
			0.00			1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	142.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	142.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	142.00	No Ice	6.12	4.25	0.06
			0.00			1/2" Ice	6.63	5.01	0.10
			0.00			1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) LGP2140X	A	From Leg	4.00	0.0000	142.00	No Ice	1.26	0.38	0.01
			0.00			1/2" Ice	1.42	0.49	0.02
			0.00			1" Ice	1.58	0.62	0.03
						2" Ice	1.94	0.89	0.05
						4" Ice	2.75	1.54	0.13
(2) LGP2140X	B	From Leg	4.00	0.0000	142.00	No Ice	1.26	0.38	0.01
			0.00			1/2" Ice	1.42	0.49	0.02
			0.00			1" Ice	1.58	0.62	0.03
						2" Ice	1.94	0.89	0.05
						4" Ice	2.75	1.54	0.13
(2) LGP2140X	C	From Leg	4.00	0.0000	142.00	No Ice	1.26	0.38	0.01
			0.00			1/2" Ice	1.42	0.49	0.02
			0.00			1" Ice	1.58	0.62	0.03
						2" Ice	1.94	0.89	0.05
						4" Ice	2.75	1.54	0.13
(2) RRUS 11	A	From Leg	4.00	0.0000	142.00	No Ice	1.91	1.47	0.04
			0.00			1/2" Ice	2.10	1.65	0.06
			0.00			1" Ice	2.30	1.83	0.08
						2" Ice	2.72	2.22	0.12
						4" Ice	3.68	3.10	0.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) RRUS 11	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.91 2.10 2.30 2.72 3.68	1.47 1.65 1.83 2.22 3.10	0.04 0.06 0.08 0.12 0.25
(2) RRUS 11	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.91 2.10 2.30 2.72 3.68	1.47 1.65 1.83 2.22 3.10	0.04 0.06 0.08 0.12 0.25
APTDC-BDFDM-DB	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.06 0.09 0.14 0.26 0.60	0.12 0.17 0.22 0.36 0.75	0.00 0.00 0.00 0.01 0.04
DC6-48-60-18-8F	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	4.32 4.60 4.88 5.49 6.80	0.03 0.06 0.10 0.18 0.40
Empty Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.20 1.50 1.81 2.47 3.93	1.20 1.50 1.81 2.47 3.93	0.02 0.03 0.04 0.08 0.20
Empty Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.20 1.50 1.81 2.47 3.93	1.20 1.50 1.81 2.47 3.93	0.02 0.03 0.04 0.08 0.20
Empty Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.20 1.50 1.81 2.47 3.93	1.20 1.50 1.81 2.47 3.93	0.02 0.03 0.04 0.08 0.20
Platform Mount [LP 303-1]	C	None		0.0000	142.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
**									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
Pipe Mount [PM 501-3]	C	None		0.0000	115.00	No Ice	5.78	5.78	0.16

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
						1/2" Ice	7.37	7.37	0.18
						1" Ice	8.96	8.96	0.20
						2" Ice	12.14	12.14	0.24
						4" Ice	18.50	18.50	0.32
**									
GPS-TMG-HR-26NCM	A	From Leg	2.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.21 0.28 0.44 0.86	0.16 0.21 0.28 0.44 0.86	0.00 0.00 0.01 0.01 0.05
Side Arm Mount [SO 701-1]	A	None		0.0000	50.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
**											
VHLP2.6	A	Paraboloid w/Shroud (HP)	From Leg	5.00 0.00 3.00	-20.0000		172.00	2.92	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.68 7.07 7.46 8.23 9.78	0.05 0.08 0.12 0.19 0.34
VHLP2.6	A	Paraboloid w/Shroud (HP)	From Leg	5.00 0.00 3.00	-6.0000		172.00	2.92	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.68 7.07 7.46 8.23 9.78	0.05 0.08 0.12 0.19 0.34
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice

Comb. No.	Description
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	175 - 164.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-6.54	-0.10	2.10
			Max. Mx	5	-3.44	-30.96	-0.43
			Max. My	2	-3.39	0.83	34.93
			Max. Vy	11	-6.23	30.95	2.55
			Max. Vx	8	6.75	-1.06	-33.62
			Max. Torque	11			-2.55
L2	164.25 - 129.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.09	1.09	2.38
			Max. Mx	11	-13.24	533.03	9.88
			Max. My	8	-13.12	-5.99	-556.17
			Max. Vy	11	-22.11	533.03	9.88
			Max. Vx	8	22.83	-5.99	-556.17
			Max. Torque	11			-2.80
L3	129.67 - 96	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.91	2.55	1.82
			Max. Mx	11	-20.23	1324.37	17.71
			Max. My	8	-20.13	-11.66	-1371.17
			Max. Vy	11	-26.20	1324.37	17.71
			Max. Vx	8	26.93	-11.66	-1371.17
			Max. Torque	11			-2.28

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	96 - 63.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.66	4.07	0.69
			Max. Mx	11	-28.38	2214.26	25.14
			Max. My	8	-28.32	-17.17	-2284.30
			Max. Vy	11	-29.34	2214.26	25.14
			Max. Vx	8	30.06	-17.17	-2284.30
			Max. Torque	11			-2.22
L5	63.17 - 31.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-57.63	5.58	-0.59
			Max. Mx	11	-37.73	3177.78	32.23
			Max. My	8	-37.69	-22.46	-3270.30
			Max. Vy	11	-32.20	3177.78	32.23
			Max. Vx	8	32.92	-22.46	-3270.30
			Max. Torque	11			-2.14
L6	31.17 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-72.67	7.00	-1.88
			Max. Mx	11	-49.96	4438.31	40.52
			Max. My	8	-49.96	-28.71	-4557.18
			Max. Vy	11	-35.09	4438.31	40.52
			Max. Vx	8	35.78	-28.71	-4557.18
			Max. Torque	11			-2.08

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	72.67	0.00	0.00
	Max. H_x	11	49.98	35.06	0.22
	Max. H_z	2	49.98	0.14	35.60
	Max. M_x	2	4529.92	0.14	35.60
	Max. M_z	5	4433.23	-35.05	-0.23
	Max. Torsion	4	1.87	-30.25	17.80
	Min. Vert	1	49.98	0.00	0.00
	Min. H_x	5	49.98	-35.05	-0.23
	Min. H_z	8	49.98	-0.17	-35.76
	Min. M_x	8	-4557.18	-0.17	-35.76
	Min. M_z	11	-4438.31	35.06	0.22
	Min. Torsion	11	-2.01	35.06	0.22

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49.98	0.00	0.00	-0.60	1.63	-0.00
Dead+Wind 0 deg - No Ice	49.98	-0.14	-35.60	-4529.92	26.86	-0.76
Dead+Wind 30 deg - No Ice	49.98	17.30	-30.84	-3926.38	-2176.07	-1.07
Dead+Wind 60 deg - No Ice	49.98	30.25	-17.80	-2265.87	-3819.99	-1.87
Dead+Wind 90 deg - No Ice	49.98	35.05	0.23	40.09	-4433.23	-1.86
Dead+Wind 120 deg - No Ice	49.98	30.39	18.16	2328.77	-3843.92	-0.87
Dead+Wind 150 deg - No Ice	49.98	17.65	31.06	3963.40	-2237.34	-0.20
Dead+Wind 180 deg - No Ice	49.98	0.17	35.76	4557.18	-28.71	0.50

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - No Ice	49.98	-17.29	30.98	3949.52	2176.39	0.77
Dead+Wind 240 deg - No Ice	49.98	-30.23	17.82	2269.67	3819.40	1.62
Dead+Wind 270 deg - No Ice	49.98	-35.06	-0.22	-40.52	4438.31	2.01
Dead+Wind 300 deg - No Ice	49.98	-30.35	-18.03	-2307.00	3841.08	0.88
Dead+Wind 330 deg - No Ice	49.98	-17.60	-30.91	-3936.90	2232.15	0.05
Dead+Ice+Temp	72.67	-0.00	-0.00	1.88	7.00	-0.00
Dead+Wind 0 deg+Ice+Temp	72.67	-0.02	-5.49	-724.48	11.03	-0.16
Dead+Wind 30 deg+Ice+Temp	72.67	2.67	-4.76	-627.46	-343.01	-0.15
Dead+Wind 60 deg+Ice+Temp	72.67	4.67	-2.74	-361.10	-606.62	-0.20
Dead+Wind 90 deg+Ice+Temp	72.67	5.41	0.03	7.88	-704.82	-0.16
Dead+Wind 120 deg+Ice+Temp	72.67	4.69	2.79	374.39	-610.27	-0.00
Dead+Wind 150 deg+Ice+Temp	72.67	2.72	4.79	636.93	-352.09	0.07
Dead+Wind 180 deg+Ice+Temp	72.67	0.02	5.51	732.29	2.69	0.12
Dead+Wind 210 deg+Ice+Temp	72.67	-2.67	4.77	634.69	357.04	0.10
Dead+Wind 240 deg+Ice+Temp	72.67	-4.67	2.75	365.62	620.51	0.17
Dead+Wind 270 deg+Ice+Temp	72.67	-5.41	-0.03	-3.95	719.51	0.18
Dead+Wind 300 deg+Ice+Temp	72.67	-4.69	-2.78	-367.35	623.84	0.01
Dead+Wind 330 deg+Ice+Temp	72.67	-2.72	-4.77	-629.23	365.33	-0.09
Dead+Wind 0 deg - Service	49.98	-0.06	-13.91	-1772.12	11.55	-0.30
Dead+Wind 30 deg - Service	49.98	6.76	-12.05	-1536.03	-850.02	-0.42
Dead+Wind 60 deg - Service	49.98	11.82	-6.95	-886.58	-1492.92	-0.74
Dead+Wind 90 deg - Service	49.98	13.69	0.09	15.27	-1732.74	-0.73
Dead+Wind 120 deg - Service	49.98	11.87	7.09	910.39	-1502.33	-0.34
Dead+Wind 150 deg - Service	49.98	6.90	12.13	1549.76	-874.03	-0.08
Dead+Wind 180 deg - Service	49.98	0.07	13.97	1782.01	-10.19	0.19
Dead+Wind 210 deg - Service	49.98	-6.75	12.10	1544.29	852.23	0.30
Dead+Wind 240 deg - Service	49.98	-11.81	6.96	887.24	1494.76	0.64
Dead+Wind 270 deg - Service	49.98	-13.70	-0.09	-16.26	1736.80	0.79
Dead+Wind 300 deg - Service	49.98	-11.86	-7.04	-902.69	1503.28	0.35
Dead+Wind 330 deg - Service	49.98	-6.88	-12.07	-1540.18	874.06	0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-49.98	0.00	0.00	49.98	0.00	0.000%
2	-0.14	-49.98	-35.60	0.14	49.98	35.60	0.000%
3	17.30	-49.98	-30.84	-17.30	49.98	30.84	0.000%
4	30.25	-49.98	-17.80	-30.25	49.98	17.80	0.000%
5	35.05	-49.98	0.23	-35.05	49.98	-0.23	0.000%
6	30.39	-49.98	18.16	-30.39	49.98	-18.16	0.000%
7	17.65	-49.98	31.06	-17.65	49.98	-31.06	0.000%
8	0.17	-49.98	35.76	-0.17	49.98	-35.76	0.000%
9	-17.29	-49.98	30.98	17.29	49.98	-30.98	0.000%
10	-30.23	-49.98	17.82	30.23	49.98	-17.82	0.000%
11	-35.06	-49.98	-0.22	35.06	49.98	0.22	0.000%
12	-30.35	-49.98	-18.03	30.35	49.98	18.03	0.000%
13	-17.60	-49.98	-30.91	17.60	49.98	30.91	0.000%
14	0.00	-72.67	0.00	0.00	72.67	0.00	0.000%
15	-0.02	-72.67	-5.49	0.02	72.67	5.49	0.000%
16	2.67	-72.67	-4.76	-2.67	72.67	4.76	0.000%
17	4.67	-72.67	-2.74	-4.67	72.67	2.74	0.000%
18	5.41	-72.67	0.03	-5.41	72.67	-0.03	0.000%
19	4.69	-72.67	2.79	-4.69	72.67	-2.79	0.000%
20	2.72	-72.67	4.79	-2.72	72.67	-4.79	0.000%
21	0.02	-72.67	5.51	-0.02	72.67	-5.51	0.000%
22	-2.67	-72.67	4.77	2.67	72.67	-4.77	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
23	-4.67	-72.67	2.75	4.67	72.67	-2.75	0.000%
24	-5.41	-72.67	-0.03	5.41	72.67	0.03	0.000%
25	-4.69	-72.67	-2.78	4.69	72.67	2.78	0.000%
26	-2.72	-72.67	-4.77	2.72	72.67	4.77	0.000%
27	-0.06	-49.98	-13.91	0.06	49.98	13.91	0.000%
28	6.76	-49.98	-12.05	-6.76	49.98	12.05	0.000%
29	11.82	-49.98	-6.95	-11.82	49.98	6.95	0.000%
30	13.69	-49.98	0.09	-13.69	49.98	-0.09	0.000%
31	11.87	-49.98	7.09	-11.87	49.98	-7.09	0.000%
32	6.90	-49.98	12.13	-6.90	49.98	-12.13	0.000%
33	0.07	-49.98	13.97	-0.07	49.98	-13.97	0.000%
34	-6.75	-49.98	12.10	6.75	49.98	-12.10	0.000%
35	-11.81	-49.98	6.96	11.81	49.98	-6.96	0.000%
36	-13.70	-49.98	-0.09	13.70	49.98	0.09	0.000%
37	-11.86	-49.98	-7.04	11.86	49.98	7.04	0.000%
38	-6.88	-49.98	-12.07	6.88	49.98	12.07	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005200
3	Yes	6	0.00000001	0.00006859
4	Yes	6	0.00000001	0.00007189
5	Yes	5	0.00000001	0.00005380
6	Yes	6	0.00000001	0.00007095
7	Yes	6	0.00000001	0.00007257
8	Yes	4	0.00000001	0.00064768
9	Yes	6	0.00000001	0.00007082
10	Yes	6	0.00000001	0.00006835
11	Yes	5	0.00000001	0.00013477
12	Yes	6	0.00000001	0.00007262
13	Yes	6	0.00000001	0.00007105
14	Yes	4	0.00000001	0.00002651
15	Yes	5	0.00000001	0.00026524
16	Yes	5	0.00000001	0.00028178
17	Yes	5	0.00000001	0.00027932
18	Yes	5	0.00000001	0.00025553
19	Yes	5	0.00000001	0.00028244
20	Yes	5	0.00000001	0.00028586
21	Yes	5	0.00000001	0.00026534
22	Yes	5	0.00000001	0.00028645
23	Yes	5	0.00000001	0.00028323
24	Yes	5	0.00000001	0.00026145
25	Yes	5	0.00000001	0.00028808
26	Yes	5	0.00000001	0.00028991
27	Yes	4	0.00000001	0.00026960
28	Yes	5	0.00000001	0.00015493
29	Yes	5	0.00000001	0.00016886
30	Yes	4	0.00000001	0.00040332
31	Yes	5	0.00000001	0.00016260
32	Yes	5	0.00000001	0.00017013
33	Yes	4	0.00000001	0.00022236
34	Yes	5	0.00000001	0.00016423
35	Yes	5	0.00000001	0.00015314

36	Yes	4	0.00000001	0.00055583
37	Yes	5	0.00000001	0.00017127
38	Yes	5	0.00000001	0.00016478

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 164.25	44.821	33	2.1746	0.0088
L2	167.17 - 129.67	41.257	33	2.1686	0.0067
L3	133.5 - 96	26.679	33	1.8943	0.0029
L4	100.67 - 63.17	15.091	33	1.4398	0.0015
L5	68.67 - 31.17	6.961	33	0.9558	0.0008
L6	37.42 - 0	2.086	33	0.5033	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
175.00	VHLP2.6	33	44.821	2.1746	0.0088	33157
172.00	RR90-17-02DP w/ Mount Pipe	33	43.454	2.1739	0.0080	33157
162.00	APXVTM14-C-120 w/ Mount Pipe	33	38.920	2.1519	0.0056	13419
152.00	BXA-171085-12BF w/ Mount Pipe	33	34.469	2.0886	0.0042	7865
142.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	33	30.168	1.9930	0.0033	5561
115.00	APXV18-206517S-C w/ Mount Pipe	33	19.759	1.6486	0.0021	4053
50.00	GPS-TMG-HR-26NCM	33	3.655	0.6815	0.0005	3531

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 164.25	114.536	8	5.5683	0.0218
L2	167.17 - 129.67	105.425	8	5.5504	0.0165
L3	133.5 - 96	68.177	8	4.8438	0.0071
L4	100.67 - 63.17	38.574	8	3.6811	0.0038
L5	68.67 - 31.17	17.796	8	2.4438	0.0020
L6	37.42 - 0	5.333	8	1.2870	0.0009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
175.00	VHLP2.6	8	114.536	5.5683	0.0224	13879
172.00	RR90-17-02DP w/ Mount Pipe	8	111.041	5.5655	0.0204	13879
162.00	APXVTM14-C-120 w/ Mount Pipe	8	99.450	5.5063	0.0145	5495
152.00	BXA-171085-12BF w/ Mount Pipe	8	88.078	5.3423	0.0108	3164
142.00	AM-X-CD-16-65-00T-RET w/ Mount Pipe	8	77.091	5.0967	0.0086	2211
115.00	APXV18-206517S-C w/ Mount Pipe	8	50.500	4.2150	0.0051	1599
50.00	GPS-TMG-HR-26NCM	8	9.345	1.7424	0.0013	1383

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	175 - 173.881	TP26x22x0.25	10.75	0.00	0.0	39.000	17.2586	-0.32	673.09	0.000*
	173.881 - 172.763					39.000	17.9192	-0.21	698.85	0.000
	172.763 - 171.644					39.000	18.2494	-3.09	711.73	0.004
	171.644 - 170.526					39.000	18.5797	-3.16	724.61	0.004
	170.526 - 169.407					39.000	18.9099	-3.24	737.49	0.004
	169.407 - 168.289					39.000	19.2402	-3.31	750.37	0.004
	168.289 - 167.17					39.000	19.5705	-3.39	763.25	0.004
	167.17 - 164.25					39.000	20.4326	-1.73	796.87	0.002
L2	167.17 - 164.25	TP34.0625x24.4135x0.3125	37.50	0.00	0.0	39.000	24.6504	-2.10	961.37	0.002
	164.25 - 162.542					39.000	25.0864	-4.01	978.37	0.004
	162.542 - 160.833					39.000	25.5224	-6.23	995.37	0.006
	160.833 - 159.125					39.000	25.9584	-6.41	1012.38	0.006
	159.125 - 157.417					39.000	26.3944	-6.58	1029.38	0.006
	157.417 - 155.708					39.000	26.8304	-6.77	1046.38	0.006
	155.708 - 154					39.000	27.2664	-6.96	1063.39	0.007
	154 - 152.292					39.000	27.7024	-7.16	1080.39	0.007
	152.292 - 150.583					39.000	28.1384	-9.03	1097.40	0.008
	150.583 - 148.875					39.000	28.5744	-9.23	1114.40	0.008
	148.875 - 147.167					39.000	29.0103	-9.44	1131.40	0.008
	147.167 - 145.458					39.000	29.4463	-9.66	1148.41	0.008
	145.458 - 143.75					39.000	29.8823	-9.87	1165.41	0.008
	143.75 -					39.000	30.3183	-10.09	1182.41	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	142.042									
	142.042 - 140.333					39.000	30.7543	-12.18	1199.42	0.010
	140.333 - 138.625					39.000	31.1903	-12.41	1216.42	0.010
	138.625 - 136.917					39.000	31.6263	-12.65	1233.43	0.010
	136.917 - 135.208					39.000	32.0623	-12.88	1250.43	0.010
	135.208 - 133.5					39.000	32.4983	-13.12	1267.43	0.010
	133.5 - 129.67					39.000	33.4758	-6.53	1305.56	0.005
L3	133.5 - 129.67	TP41.75x32.452x0.375	37.50	0.00	0.0	39.000	39.3100	-7.62	1533.09	0.005
	129.67 - 128.059					39.000	39.7854	-14.44	1551.63	0.009
	128.059 - 126.448					39.000	40.2609	-14.74	1570.18	0.009
	126.448 - 124.837					39.000	40.7364	-15.04	1588.72	0.009
	124.837 - 123.226					39.000	41.2118	-15.34	1607.26	0.010
	123.226 - 121.614					39.000	41.6873	-15.64	1625.81	0.010
	121.614 - 120.003					39.000	42.1628	-15.95	1644.35	0.010
	120.003 - 118.392					39.000	42.6382	-16.26	1662.89	0.010
	118.392 - 116.781					39.000	43.1137	-16.57	1681.43	0.010
	116.781 - 115.17					39.000	43.5892	-16.89	1699.98	0.010
	115.17 - 113.559					39.000	44.0646	-17.46	1718.52	0.010
	113.559 - 111.948					39.000	44.5401	-17.78	1737.06	0.010
	111.948 - 110.337					39.000	45.0156	-18.11	1755.61	0.010
	110.337 - 108.726					39.000	45.4911	-18.44	1774.15	0.010
	108.726 - 107.114					39.000	45.9665	-18.77	1792.69	0.010
	107.114 - 105.503					39.000	46.4420	-19.11	1811.24	0.011
	105.503 - 103.892					39.000	46.9175	-19.45	1829.78	0.011
	103.892 - 102.281					39.000	47.3929	-19.79	1848.32	0.011
	102.281 - 100.67					39.000	47.8684	-20.13	1866.87	0.011
	100.67 - 96					39.000	49.2466	-11.07	1920.62	0.006
L4	100.67 - 96	TP49.0625x39.8421x0.375	37.50	0.00	0.0	39.000	48.3424	-10.79	1885.35	0.006
	96 - 94.4817					39.000	48.7868	-22.20	1902.68	0.012
	94.4817 - 92.9633					39.000	49.2311	-22.54	1920.01	0.012
	92.9633 - 91.445					39.000	49.6755	-22.88	1937.34	0.012
	91.445 - 89.9267					39.000	50.1198	-23.23	1954.67	0.012
	89.9267 - 88.4083					39.000	50.5642	-23.57	1972.00	0.012
	88.4083 - 86.89					39.000	51.0085	-23.92	1989.33	0.012

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	86.89 - 85.3717					39.000	51.4529	-24.27	2006.66	0.012
	85.3717 - 83.8533					39.000	51.8972	-24.63	2023.99	0.012
	83.8533 - 82.335					39.000	52.3415	-24.99	2041.32	0.012
	82.335 - 80.8167					39.000	52.7859	-25.35	2058.65	0.012
	80.8167 - 79.2983					39.000	53.2302	-25.71	2075.98	0.012
	79.2983 - 77.78					39.000	53.6746	-26.07	2093.31	0.012
	77.78 - 76.2617					39.000	54.1189	-26.44	2110.64	0.013
	76.2617 - 74.7433					39.000	54.5633	-26.81	2127.97	0.013
	74.7433 - 73.225					39.000	55.0076	-27.18	2145.30	0.013
	73.225 - 71.7067					39.000	55.4520	-27.56	2162.63	0.013
	71.7067 - 70.1883					39.000	55.8963	-27.94	2179.96	0.013
	70.1883 - 68.67					39.000	56.3407	-28.32	2197.29	0.013
	68.67 - 63.17					39.000	57.9503	-15.52	2260.06	0.007
L5	68.67 - 63.17	TP56.125x46.9602x0.375	37.50	0.00	0.0	39.000	57.0479	-15.17	2224.87	0.007
	63.17 - 61.7394					39.000	57.4640	-31.07	2241.10	0.014
	61.7394 - 60.3089					39.000	57.8802	-31.44	2257.33	0.014
	60.3089 - 58.8783					39.000	58.2963	-31.81	2273.56	0.014
	58.8783 - 57.4478					39.000	58.7125	-32.19	2289.79	0.014
	57.4478 - 56.0172					39.000	59.1286	-32.56	2306.02	0.014
	56.0172 - 54.5867					39.000	59.5447	-32.94	2322.24	0.014
	54.5867 - 53.1561					39.000	59.9609	-33.32	2338.47	0.014
	53.1561 - 51.7256					39.000	60.3770	-33.70	2354.70	0.014
	51.7256 - 50.295					39.000	60.7931	-34.08	2370.93	0.014
	50.295 - 48.8644					39.000	61.2093	-34.53	2387.16	0.014
	48.8644 - 47.4339					39.000	61.6254	-34.92	2403.39	0.015
	47.4339 - 46.0033					39.000	62.0415	-35.31	2419.62	0.015
	46.0033 - 44.5728					39.000	62.4577	-35.70	2435.85	0.015
	44.5728 - 43.1422					39.000	62.8738	-36.10	2452.08	0.015
	43.1422 - 41.7117					39.000	63.2900	-36.49	2468.31	0.015
	41.7117 - 40.2811					39.000	63.7061	-36.89	2484.54	0.015
	40.2811 - 38.8506					39.000	64.1222	-37.29	2500.77	0.015
	38.8506 - 37.42					39.000	64.5384	-37.69	2517.00	0.015
	37.42 - 31.17					39.000	66.3564	-20.59	2587.90	0.008
L6	37.42 - 31.17	TP62.9375x53.8475x0.375	37.42	0.00	0.0	39.000	65.4528	-20.18	2552.66	0.008
	31.17 - 29.5295					39.000	65.9271	-41.24	2571.16	0.016
	29.5295 -					39.000	66.4014	-41.70	2589.66	0.016

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	27.8889									
	27.8889 - 26.2484					39.000	66.8757	-42.16	2608.15	0.016
	26.2484 - 24.6079					38.908	67.3501	-42.63	2620.48	0.016
	24.6079 - 22.9674					38.789	67.8244	-43.10	2630.86	0.016
	22.9674 - 21.3268					38.670	68.2987	-43.57	2641.14	0.016
	21.3268 - 19.6863					38.551	68.7731	-44.05	2651.30	0.017
	19.6863 - 18.0458					38.432	69.2474	-44.53	2661.34	0.017
	18.0458 - 16.4053					38.313	69.7217	-45.01	2671.28	0.017
	16.4053 - 14.7647					38.194	70.1961	-45.49	2681.10	0.017
	14.7647 - 13.1242					38.075	70.6704	-45.98	2690.81	0.017
	13.1242 - 11.4837					37.956	71.1447	-46.46	2700.40	0.017
	11.4837 - 9.84316					37.837	71.6190	-46.96	2709.88	0.017
	9.84316 - 8.20263					37.718	72.0934	-47.45	2719.25	0.017
	8.20263 - 6.5621					37.599	72.5677	-47.95	2728.51	0.018
	6.5621 - 4.92158					37.480	73.0420	-48.45	2737.65	0.018
	4.92158 - 3.28105					37.361	73.5164	-48.95	2746.68	0.018
	3.28105 - 1.64053					37.243	73.9907	-49.45	2755.60	0.018
	1.64053 - 0					37.124	74.4650	-49.96	2764.41	0.018

* DL controls

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	175 - 173.881	TP26x22x0.25	1.32	0.172	39.000	0.004	0.00	0.000	39.000	0.000
	173.881 - 172.763		2.12	0.256	39.000	0.007	0.00	0.000	39.000	0.000
	172.763 - 171.644		6.10	0.709	39.000	0.018	0.00	0.000	39.000	0.000
	171.644 - 170.526		13.19	1.478	39.000	0.038	0.00	0.000	39.000	0.000
	170.526 - 169.407		20.35	2.202	39.000	0.056	0.00	0.000	39.000	0.000
	169.407 - 168.289		27.60	2.884	39.000	0.074	0.00	0.000	39.000	0.000
	168.289 - 167.17		34.94	3.528	39.000	0.090	0.00	0.000	39.000	0.000
	167.17 -		25.46	2.357	39.000	0.060	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	164.25									
L2	167.17 - 164.25	TP34.0625x24.4135x0.3125	29.06	2.318	39.000	0.059	0.00	0.000	39.000	0.000
	164.25 - 162.542		66.29	5.104	39.000	0.131	0.00	0.000	39.000	0.000
	162.542 - 160.833		83.43	6.205	39.000	0.159	0.00	0.000	39.000	0.000
	160.833 - 159.125		103.20	7.417	39.000	0.190	0.00	0.000	39.000	0.000
	159.125 - 157.417		123.44	8.580	39.000	0.220	0.00	0.000	39.000	0.000
	157.417 - 155.708		143.96	9.682	39.000	0.248	0.00	0.000	39.000	0.000
	155.708 - 154		164.73	10.725	39.000	0.275	0.00	0.000	39.000	0.000
	154 - 152.292		185.75	11.714	39.000	0.300	0.00	0.000	39.000	0.000
	152.292 - 150.583		213.59	13.053	39.000	0.335	0.00	0.000	39.000	0.000
	150.583 - 148.875		243.28	14.415	39.000	0.370	0.00	0.000	39.000	0.000
	148.875 - 147.167		273.24	15.704	39.000	0.403	0.00	0.000	39.000	0.000
	147.167 - 145.458		303.44	16.925	39.000	0.434	0.00	0.000	39.000	0.000
	145.458 - 143.75		333.91	18.082	39.000	0.464	0.00	0.000	39.000	0.000
	143.75 - 142.042		364.64	19.179	39.000	0.492	0.00	0.000	39.000	0.000
	142.042 - 140.333		402.36	20.564	39.000	0.527	0.00	0.000	39.000	0.000
	140.333 - 138.625		440.42	21.882	39.000	0.561	0.00	0.000	39.000	0.000
	138.625 - 136.917		478.75	23.132	39.000	0.593	0.00	0.000	39.000	0.000
	136.917 - 135.208		517.34	24.318	39.000	0.624	0.00	0.000	39.000	0.000
	135.208 - 133.5		556.20	25.445	39.000	0.652	0.00	0.000	39.000	0.000
	133.5 - 129.67		303.28	13.072	39.000	0.335	0.00	0.000	39.000	0.000
L3	133.5 - 129.67	TP41.75x32.452x0.375	341.13	12.822	39.000	0.329	0.00	0.000	39.000	0.000
	129.67 - 128.059		681.99	25.022	39.000	0.642	0.00	0.000	39.000	0.000
	128.059 - 126.448		719.80	25.786	39.000	0.661	0.00	0.000	39.000	0.000
	126.448 - 124.837		757.87	26.516	39.000	0.680	0.00	0.000	39.000	0.000
	124.837 - 123.226		796.18	27.214	39.000	0.698	0.00	0.000	39.000	0.000
	123.226 - 121.614		834.74	27.881	39.000	0.715	0.00	0.000	39.000	0.000
	121.614 - 120.003		873.55	28.520	39.000	0.731	0.00	0.000	39.000	0.000
	120.003 - 118.392		912.62	29.131	39.000	0.747	0.00	0.000	39.000	0.000
	118.392 - 116.781		951.92	29.716	39.000	0.762	0.00	0.000	39.000	0.000
	116.781 - 115.17		991.49	30.276	39.000	0.776	0.00	0.000	39.000	0.000
	115.17 - 113.559		1032.53	30.849	39.000	0.791	0.00	0.000	39.000	0.000
	113.559 -		1073.97	31.403	39.000	0.805	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	111.948									
	111.948 - 110.337		1115.66	31.933	39.000	0.819	0.00	0.000	39.000	0.000
	110.337 - 108.726		1157.61	32.441	39.000	0.832	0.00	0.000	39.000	0.000
	108.726 - 107.114		1199.82	32.929	39.000	0.844	0.00	0.000	39.000	0.000
	107.114 - 105.503		1242.28	33.396	39.000	0.856	0.00	0.000	39.000	0.000
	105.503 - 103.892		1285.00	33.845	39.000	0.868	0.00	0.000	39.000	0.000
	103.892 - 102.281		1327.98	34.275	39.000	0.879	0.00	0.000	39.000	0.000
	102.281 - 100.67		1371.22	34.688	39.000	0.889	0.00	0.000	39.000	0.000
	100.67 - 96		770.18	18.404	39.000	0.472	0.00	0.000	39.000	0.000
L4	100.67 - 96	TP49.0625x39.8421x0.375	728.04	18.057	39.000	0.463	0.00	0.000	39.000	0.000
	96 - 94.4817		1540.05	37.500	39.000	0.962	0.00	0.000	39.000	0.000
	94.4817 - 92.9633		1582.09	37.828	39.000	0.970	0.00	0.000	39.000	0.000
	92.9633 - 91.445		1624.35	38.144	39.000	0.978	0.00	0.000	39.000	0.000
	91.445 - 89.9267		1666.83	38.448	39.000	0.986	0.00	0.000	39.000	0.000
	89.9267 - 88.4083		1709.53	38.739	39.000	0.993	0.00	0.000	39.000	0.000
	88.4083 - 86.89		1752.44	39.020	39.000	1.001	0.00	0.000	39.000	0.000
	86.89 - 85.3717		1795.57	39.290	39.000	1.007	0.00	0.000	39.000	0.000
	85.3717 - 83.8533		1838.92	39.549	39.000	1.014	0.00	0.000	39.000	0.000
	83.8533 - 82.335		1882.48	39.799	39.000	1.020	0.00	0.000	39.000	0.000
	82.335 - 80.8167		1926.26	40.039	39.000	1.027	0.00	0.000	39.000	0.000
	80.8167 - 79.2983		1970.26	40.270	39.000	1.033	0.00	0.000	39.000	0.000
	79.2983 - 77.78		2014.47	40.492	39.000	1.038	0.00	0.000	39.000	0.000
	77.78 - 76.2617		2058.92	40.705	39.000	1.044	0.00	0.000	39.000	0.000
	76.2617 - 74.7433		2103.57	40.911	39.000	1.049	0.00	0.000	39.000	0.000
	74.7433 - 73.225		2148.44	41.109	39.000	1.054	0.00	0.000	39.000	0.000
	73.225 - 71.7067		2193.53	41.299	39.000	1.059	0.00	0.000	39.000	0.000
	71.7067 - 70.1883		2238.83	41.482	39.000	1.064	0.00	0.000	39.000	0.000
	70.1883 - 68.67		2284.37	41.657	39.000	1.068	0.00	0.000	39.000	0.000
	68.67 - 63.17		1254.92	21.626	39.000	0.555	0.00	0.000	39.000	0.000
L5	68.67 - 63.17	TP56.125x46.9602x0.375	1196.47	21.279	39.000	0.546	0.00	0.000	39.000	0.000
	63.17 - 61.7394		2495.36	43.737	39.000	1.121	0.00	0.000	39.000	0.000
	61.7394 - 60.3089		2539.52	43.871	39.000	1.125	0.00	0.000	39.000	0.000
	60.3089 - 58.8783		2583.85	43.999	39.000	1.128	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	58.8783 - 57.4478		2628.36	44.122	39.000	1.131	0.00	0.000	39.000	0.000
	57.4478 - 56.0172		2673.04	44.241	39.000	1.134	0.00	0.000	39.000	0.000
	56.0172 - 54.5867		2717.91	44.354	39.000	1.137	0.00	0.000	39.000	0.000
	54.5867 - 53.1561		2762.94	44.463	39.000	1.140	0.00	0.000	39.000	0.000
	53.1561 - 51.7256		2808.15	44.568	39.000	1.143	0.00	0.000	39.000	0.000
	51.7256 - 50.295		2853.53	44.668	39.000	1.145	0.00	0.000	39.000	0.000
	50.295 - 48.8644		2899.15	44.765	39.000	1.148	0.00	0.000	39.000	0.000
	48.8644 - 47.4339		2944.96	44.858	39.000	1.150	0.00	0.000	39.000	0.000
	47.4339 - 46.0033		2990.94	44.947	39.000	1.152	0.00	0.000	39.000	0.000
	46.0033 - 44.5728		3037.09	45.032	39.000	1.155	0.00	0.000	39.000	0.000
	44.5728 - 43.1422		3083.42	45.114	39.000	1.157	0.00	0.000	39.000	0.000
	43.1422 - 41.7117		3129.91	45.192	39.000	1.159	0.00	0.000	39.000	0.000
	41.7117 - 40.2811		3176.57	45.266	39.000	1.161	0.00	0.000	39.000	0.000
	40.2811 - 38.8506		3223.39	45.337	39.000	1.162	0.00	0.000	39.000	0.000
	38.8506 - 37.42		3270.38	45.405	39.000	1.164	0.00	0.000	39.000	0.000
	37.42 - 31.17		1775.18	23.310	39.000	0.598	0.00	0.000	39.000	0.000
L6	37.42 - 31.17	TP62.9375x53.8475x0.375	1702.79	22.983	39.000	0.589	0.00	0.000	39.000	0.000
	31.17 - 29.5295		3533.04	47.000	39.000	1.205	0.00	0.000	39.000	0.000
	29.5295 - 27.8889		3588.31	47.053	39.000	1.207	0.00	0.000	39.000	0.000
	27.8889 - 26.2484		3643.76	47.103	39.000	1.208	0.00	0.000	39.000	0.000
	26.2484 - 24.6079		3699.41	47.149	38.908	1.212	0.00	0.000	38.908	0.000
	24.6079 - 22.9674		3755.24	47.191	38.789	1.217	0.00	0.000	38.789	0.000
	22.9674 - 21.3268		3811.27	47.230	38.670	1.221	0.00	0.000	38.670	0.000
	21.3268 - 19.6863		3867.48	47.266	38.551	1.226	0.00	0.000	38.551	0.000
	19.6863 - 18.0458		3923.89	47.298	38.432	1.231	0.00	0.000	38.432	0.000
	18.0458 - 16.4053		3980.49	47.328	38.313	1.235	0.00	0.000	38.313	0.000
	16.4053 - 14.7647		4037.28	47.355	38.194	1.240	0.00	0.000	38.194	0.000
	14.7647 - 13.1242		4094.28	47.379	38.075	1.244	0.00	0.000	38.075	0.000
	13.1242 - 11.4837		4151.46	47.400	37.956	1.249	0.00	0.000	37.956	0.000
	11.4837 - 9.84316		4208.84	47.419	37.837	1.253	0.00	0.000	37.837	0.000
	9.84316 - 8.20263		4266.42	47.435	37.718	1.258	0.00	0.000	37.718	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	8.20263 - 6.5621		4324.19	47.449	37.599	1.262	0.00	0.000	37.599	0.000
	6.5621 - 4.92158		4382.17	47.461	37.480	1.266	0.00	0.000	37.480	0.000
	4.92158 - 3.28105		4440.33	47.470	37.361	1.271	0.00	0.000	37.361	0.000
	3.28105 - 1.64053		4498.71	47.478	37.243	1.275	0.00	0.000	37.243	0.000
	1.64053 - 0		4557.27	47.483	37.124	1.279	0.00	0.000	37.124	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	175 - 173.881	TP26x22x0.25	0.00	0.000	26.000	0.000	0.00	0.000	26.000	0.000
	173.881 - 172.763		0.75	0.042	26.000	0.003	0.36	0.021	26.000	0.001
	172.763 - 171.644		6.30	0.345	26.000	0.027	0.36	0.020	26.000	0.001
	171.644 - 170.526		6.37	0.343	26.000	0.026	0.31	0.017	26.000	0.001
	170.526 - 169.407		6.45	0.341	26.000	0.026	0.31	0.016	26.000	0.001
	169.407 - 168.289		6.52	0.339	26.000	0.026	0.31	0.016	26.000	0.001
	168.289 - 167.17		6.59	0.337	26.000	0.026	0.31	0.015	26.000	0.001
	167.17 - 164.25		3.23	0.158	26.000	0.012	0.15	0.007	26.000	0.000
L2	167.17 - 164.25	TP34.0625x24.4135x0.3125	3.59	0.146	26.000	0.011	0.17	0.006	26.000	0.000
	164.25 - 162.542		6.96	0.277	26.000	0.021	0.31	0.012	26.000	0.000
	162.542 - 160.833		11.50	0.451	26.000	0.035	0.31	0.011	26.000	0.000
	160.833 - 159.125		11.64	0.448	26.000	0.034	0.31	0.011	26.000	0.000
	159.125 - 157.417		11.94	0.453	26.000	0.035	0.58	0.019	26.000	0.001
	157.417 - 155.708		12.09	0.451	26.000	0.035	0.58	0.019	26.000	0.001
	155.708 - 154		12.23	0.449	26.000	0.035	0.58	0.018	26.000	0.001
	154 - 152.292		12.38	0.447	26.000	0.034	0.57	0.018	26.000	0.001
	152.292 - 150.583		17.31	0.615	26.000	0.047	0.57	0.017	26.000	0.001
	150.583 - 148.875		17.46	0.611	26.000	0.047	0.57	0.017	26.000	0.001
	148.875 - 147.167		17.61	0.607	26.000	0.047	0.57	0.016	26.000	0.001
	147.167 - 145.458		17.76	0.603	26.000	0.046	0.57	0.016	26.000	0.001
	145.458 - 143.75		17.92	0.600	26.000	0.046	0.57	0.015	26.000	0.001
	143.75 - 142.042		18.07	0.596	26.000	0.046	0.57	0.015	26.000	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	142.042 - 140.333		22.21	0.722	26.000	0.056	0.57	0.014	26.000	0.001
	140.333 - 138.625		22.37	0.717	26.000	0.055	0.29	0.007	26.000	0.000
	138.625 - 136.917		22.52	0.712	26.000	0.055	0.29	0.007	26.000	0.000
	136.917 - 135.208		22.68	0.707	26.000	0.054	0.30	0.007	26.000	0.000
	135.208 - 133.5		22.83	0.703	26.000	0.054	0.30	0.007	26.000	0.000
	133.5 - 129.67		11.03	0.330	26.000	0.025	0.14	0.003	26.000	0.000
L3	133.5 - 129.67	TP41.75x32.452x0.375	12.22	0.311	26.000	0.024	0.16	0.003	26.000	0.000
	129.67 - 128.059		23.40	0.588	26.000	0.045	0.30	0.005	26.000	0.000
	128.059 - 126.448		23.55	0.585	26.000	0.045	0.30	0.005	26.000	0.000
	126.448 - 124.837		23.71	0.582	26.000	0.045	0.31	0.005	26.000	0.000
	124.837 - 123.226		23.86	0.579	26.000	0.045	0.31	0.005	26.000	0.000
	123.226 - 121.614		24.02	0.576	26.000	0.044	0.31	0.005	26.000	0.000
	121.614 - 120.003		24.17	0.573	26.000	0.044	0.31	0.005	26.000	0.000
	120.003 - 118.392		24.33	0.571	26.000	0.044	0.32	0.005	26.000	0.000
	118.392 - 116.781		24.49	0.568	26.000	0.044	0.32	0.005	26.000	0.000
	116.781 - 115.17		24.64	0.565	26.000	0.043	0.32	0.005	26.000	0.000
	115.17 - 113.559		25.65	0.582	26.000	0.045	0.32	0.005	26.000	0.000
	113.559 - 111.948		25.81	0.579	26.000	0.045	0.33	0.005	26.000	0.000
	111.948 - 110.337		25.97	0.577	26.000	0.044	0.33	0.005	26.000	0.000
	110.337 - 108.726		26.12	0.574	26.000	0.044	0.33	0.005	26.000	0.000
	108.726 - 107.114		26.28	0.572	26.000	0.044	0.33	0.004	26.000	0.000
	107.114 - 105.503		26.44	0.569	26.000	0.044	0.34	0.004	26.000	0.000
	105.503 - 103.892		26.61	0.567	26.000	0.044	0.34	0.004	26.000	0.000
	103.892 - 102.281		26.77	0.565	26.000	0.043	0.34	0.004	26.000	0.000
	102.281 - 100.67		26.93	0.563	26.000	0.043	0.35	0.004	26.000	0.000
	100.67 - 96		14.25	0.289	26.000	0.022	0.18	0.002	26.000	0.000
L4	100.67 - 96	TP49.0625x39.8421x0.375	13.24	0.274	26.000	0.021	0.17	0.002	26.000	0.000
	96 - 94.4817		27.63	0.566	26.000	0.044	0.36	0.004	26.000	0.000
	94.4817 - 92.9633		27.77	0.564	26.000	0.043	0.36	0.004	26.000	0.000
	92.9633 - 91.445		27.91	0.562	26.000	0.043	0.36	0.004	26.000	0.000
	91.445 - 89.9267		28.05	0.560	26.000	0.043	0.37	0.004	26.000	0.000
	89.9267 - 88.4083		28.20	0.558	26.000	0.043	0.37	0.004	26.000	0.000
	88.4083 -		28.34	0.556	26.000	0.043	0.37	0.004	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	86.89									
	86.89 - 85.3717		28.48	0.554	26.000	0.043	0.37	0.004	26.000	0.000
	85.3717 - 83.8533		28.63	0.552	26.000	0.042	0.38	0.004	26.000	0.000
	83.8533 - 82.335		28.77	0.550	26.000	0.042	0.38	0.004	26.000	0.000
	82.335 - 80.8167		28.91	0.548	26.000	0.042	0.38	0.004	26.000	0.000
	80.8167 - 79.2983		29.06	0.546	26.000	0.042	0.39	0.004	26.000	0.000
	79.2983 - 77.78		29.20	0.544	26.000	0.042	0.39	0.004	26.000	0.000
	77.78 - 76.2617		29.35	0.542	26.000	0.042	0.39	0.004	26.000	0.000
	76.2617 - 74.7433		29.49	0.540	26.000	0.042	0.39	0.004	26.000	0.000
	74.7433 - 73.225		29.63	0.539	26.000	0.041	0.40	0.004	26.000	0.000
	73.225 - 71.7067		29.78	0.537	26.000	0.041	0.40	0.004	26.000	0.000
	71.7067 - 70.1883		29.92	0.535	26.000	0.041	0.40	0.004	26.000	0.000
	70.1883 - 68.67		30.07	0.534	26.000	0.041	0.41	0.004	26.000	0.000
	68.67 - 63.17		15.86	0.274	26.000	0.021	0.22	0.002	26.000	0.000
L5	68.67 - 63.17	TP56.125x46.9602x0.375	14.85	0.260	26.000	0.020	0.20	0.002	26.000	0.000
	63.17 - 61.7394		30.81	0.536	26.000	0.041	0.42	0.004	26.000	0.000
	61.7394 - 60.3089		30.94	0.534	26.000	0.041	0.42	0.004	26.000	0.000
	60.3089 - 58.8783		31.06	0.533	26.000	0.041	0.42	0.004	26.000	0.000
	58.8783 - 57.4478		31.18	0.531	26.000	0.041	0.43	0.003	26.000	0.000
	57.4478 - 56.0172		31.31	0.529	26.000	0.041	0.43	0.003	26.000	0.000
	56.0172 - 54.5867		31.43	0.528	26.000	0.041	0.43	0.003	26.000	0.000
	54.5867 - 53.1561		31.55	0.526	26.000	0.040	0.43	0.003	26.000	0.000
	53.1561 - 51.7256		31.67	0.525	26.000	0.040	0.43	0.003	26.000	0.000
	51.7256 - 50.295		31.79	0.523	26.000	0.040	0.44	0.003	26.000	0.000
	50.295 - 48.8644		31.97	0.522	26.000	0.040	0.44	0.003	26.000	0.000
	48.8644 - 47.4339		32.09	0.521	26.000	0.040	0.44	0.003	26.000	0.000
	47.4339 - 46.0033		32.21	0.519	26.000	0.040	0.44	0.003	26.000	0.000
	46.0033 - 44.5728		32.33	0.518	26.000	0.040	0.45	0.003	26.000	0.000
	44.5728 - 43.1422		32.45	0.516	26.000	0.040	0.45	0.003	26.000	0.000
	43.1422 - 41.7117		32.57	0.515	26.000	0.040	0.45	0.003	26.000	0.000
	41.7117 - 40.2811		32.68	0.513	26.000	0.039	0.45	0.003	26.000	0.000
	40.2811 -		32.80	0.512	26.000	0.039	0.45	0.003	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	38.8506									
	38.8506 - 37.42		32.92	0.510	26.000	0.039	0.46	0.003	26.000	0.000
	37.42 - 31.17		17.27	0.260	26.000	0.020	0.24	0.002	26.000	0.000
L6	37.42 - 31.17	TP62.9375x53.8475x0.375	16.28	0.249	26.000	0.019	0.23	0.001	26.000	0.000
	31.17 - 29.5295		33.65	0.510	26.000	0.039	0.47	0.003	26.000	0.000
	29.5295 - 27.8889		33.76	0.508	26.000	0.039	0.47	0.003	26.000	0.000
	27.8889 - 26.2484		33.88	0.507	26.000	0.039	0.47	0.003	26.000	0.000
	26.2484 - 24.6079		33.99	0.505	26.000	0.039	0.47	0.003	26.000	0.000
	24.6079 - 22.9674		34.11	0.503	26.000	0.039	0.47	0.003	26.000	0.000
	22.9674 - 21.3268		34.23	0.501	26.000	0.039	0.47	0.003	26.000	0.000
	21.3268 - 19.6863		34.34	0.499	26.000	0.038	0.48	0.003	26.000	0.000
	19.6863 - 18.0458		34.46	0.498	26.000	0.038	0.48	0.003	26.000	0.000
	18.0458 - 16.4053		34.58	0.496	26.000	0.038	0.48	0.003	26.000	0.000
	16.4053 - 14.7647		34.70	0.494	26.000	0.038	0.48	0.003	26.000	0.000
	14.7647 - 13.1242		34.82	0.493	26.000	0.038	0.48	0.003	26.000	0.000
	13.1242 - 11.4837		34.93	0.491	26.000	0.038	0.48	0.003	26.000	0.000
	11.4837 - 9.84316		35.05	0.489	26.000	0.038	0.49	0.003	26.000	0.000
	9.84316 - 8.20263		35.17	0.488	26.000	0.038	0.49	0.003	26.000	0.000
	8.20263 - 6.5621		35.30	0.486	26.000	0.037	0.49	0.003	26.000	0.000
	6.5621 - 4.92158		35.42	0.485	26.000	0.037	0.49	0.003	26.000	0.000
	4.92158 - 3.28105		35.54	0.483	26.000	0.037	0.49	0.003	26.000	0.000
	3.28105 - 1.64053		35.66	0.482	26.000	0.037	0.49	0.003	26.000	0.000
	1.64053 - 0		35.78	0.481	26.000	0.037	0.50	0.003	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	175 - 173.881	0.000	0.004	0.000	0.000	0.000	0.005* ✔	1.000	H1-3+VT ✔
	173.881 - 172.763	0.000	0.007	0.000	0.003	0.001	0.007 ✔	1.333	H1-3+VT ✔
	172.763 - 171.644	0.004	0.018	0.000	0.027	0.001	0.023 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	171.644 - 170.526	0.004	0.038	0.000	0.026	0.001	0.042 ✔	1.333	H1-3+VT ✔
	170.526 - 169.407	0.004	0.056	0.000	0.026	0.001	0.061 ✔	1.333	H1-3+VT ✔
	169.407 - 168.289	0.004	0.074	0.000	0.026	0.001	0.079 ✔	1.333	H1-3+VT ✔
	168.289 - 167.17	0.004	0.090	0.000	0.026	0.001	0.095 ✔	1.333	H1-3+VT ✔
	167.17 - 164.25	0.002	0.060	0.000	0.012	0.000	0.063 ✔	1.333	H1-3+VT ✔
L2	167.17 - 164.25	0.002	0.059	0.000	0.011	0.000	0.062 ✔	1.333	H1-3+VT ✔
	164.25 - 162.542	0.004	0.131	0.000	0.021	0.000	0.135 ✔	1.333	H1-3+VT ✔
	162.542 - 160.833	0.006	0.159	0.000	0.035	0.000	0.166 ✔	1.333	H1-3+VT ✔
	160.833 - 159.125	0.006	0.190	0.000	0.034	0.000	0.197 ✔	1.333	H1-3+VT ✔
	159.125 - 157.417	0.006	0.220	0.000	0.035	0.001	0.227 ✔	1.333	H1-3+VT ✔
	157.417 - 155.708	0.006	0.248	0.000	0.035	0.001	0.255 ✔	1.333	H1-3+VT ✔
	155.708 - 154	0.007	0.275	0.000	0.035	0.001	0.282 ✔	1.333	H1-3+VT ✔
	154 - 152.292	0.007	0.300	0.000	0.034	0.001	0.307 ✔	1.333	H1-3+VT ✔
	152.292 - 150.583	0.008	0.335	0.000	0.047	0.001	0.344 ✔	1.333	H1-3+VT ✔
	150.583 - 148.875	0.008	0.370	0.000	0.047	0.001	0.378 ✔	1.333	H1-3+VT ✔
	148.875 - 147.167	0.008	0.403	0.000	0.047	0.001	0.412 ✔	1.333	H1-3+VT ✔
	147.167 - 145.458	0.008	0.434	0.000	0.046	0.001	0.443 ✔	1.333	H1-3+VT ✔
	145.458 - 143.75	0.008	0.464	0.000	0.046	0.001	0.473 ✔	1.333	H1-3+VT ✔
	143.75 - 142.042	0.009	0.492	0.000	0.046	0.001	0.501 ✔	1.333	H1-3+VT ✔
	142.042 - 140.333	0.010	0.527	0.000	0.056	0.001	0.538 ✔	1.333	H1-3+VT ✔
	140.333 - 138.625	0.010	0.561	0.000	0.055	0.000	0.572 ✔	1.333	H1-3+VT ✔
	138.625 - 136.917	0.010	0.593	0.000	0.055	0.000	0.604 ✔	1.333	H1-3+VT ✔
	136.917 - 135.208	0.010	0.624	0.000	0.054	0.000	0.635 ✔	1.333	H1-3+VT ✔
	135.208 - 133.5	0.010	0.652	0.000	0.054	0.000	0.664 ✔	1.333	H1-3+VT ✔
	133.5 - 129.67	0.005	0.335	0.000	0.025	0.000	0.340 ✔	1.333	H1-3+VT ✔
L3	133.5 - 129.67	0.005	0.329	0.000	0.024	0.000	0.334 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	129.67 - 128.059	0.009	0.642	0.000	0.045	0.000	0.651 ✔	1.333	H1-3+VT ✔
	128.059 - 126.448	0.009	0.661	0.000	0.045	0.000	0.671 ✔	1.333	H1-3+VT ✔
	126.448 - 124.837	0.009	0.680	0.000	0.045	0.000	0.690 ✔	1.333	H1-3+VT ✔
	124.837 - 123.226	0.010	0.698	0.000	0.045	0.000	0.708 ✔	1.333	H1-3+VT ✔
	123.226 - 121.614	0.010	0.715	0.000	0.044	0.000	0.725 ✔	1.333	H1-3+VT ✔
	121.614 - 120.003	0.010	0.731	0.000	0.044	0.000	0.741 ✔	1.333	H1-3+VT ✔
	120.003 - 118.392	0.010	0.747	0.000	0.044	0.000	0.757 ✔	1.333	H1-3+VT ✔
	118.392 - 116.781	0.010	0.762	0.000	0.044	0.000	0.772 ✔	1.333	H1-3+VT ✔
	116.781 - 115.17	0.010	0.776	0.000	0.043	0.000	0.787 ✔	1.333	H1-3+VT ✔
	115.17 - 113.559	0.010	0.791	0.000	0.045	0.000	0.802 ✔	1.333	H1-3+VT ✔
	113.559 - 111.948	0.010	0.805	0.000	0.045	0.000	0.816 ✔	1.333	H1-3+VT ✔
	111.948 - 110.337	0.010	0.819	0.000	0.044	0.000	0.830 ✔	1.333	H1-3+VT ✔
	110.337 - 108.726	0.010	0.832	0.000	0.044	0.000	0.843 ✔	1.333	H1-3+VT ✔
	108.726 - 107.114	0.010	0.844	0.000	0.044	0.000	0.855 ✔	1.333	H1-3+VT ✔
	107.114 - 105.503	0.011	0.856	0.000	0.044	0.000	0.867 ✔	1.333	H1-3+VT ✔
	105.503 - 103.892	0.011	0.868	0.000	0.044	0.000	0.879 ✔	1.333	H1-3+VT ✔
	103.892 - 102.281	0.011	0.879	0.000	0.043	0.000	0.890 ✔	1.333	H1-3+VT ✔
	102.281 - 100.67	0.011	0.889	0.000	0.043	0.000	0.901 ✔	1.333	H1-3+VT ✔
	100.67 - 96	0.006	0.472	0.000	0.022	0.000	0.478 ✔	1.333	H1-3+VT ✔
L4	100.67 - 96	0.006	0.463	0.000	0.021	0.000	0.469 ✔	1.333	H1-3+VT ✔
	96 - 94.4817	0.012	0.962	0.000	0.044	0.000	0.974 ✔	1.333	H1-3+VT ✔
	94.4817 - 92.9633	0.012	0.970	0.000	0.043	0.000	0.982 ✔	1.333	H1-3+VT ✔
	92.9633 - 91.445	0.012	0.978	0.000	0.043	0.000	0.990 ✔	1.333	H1-3+VT ✔
	91.445 - 89.9267	0.012	0.986	0.000	0.043	0.000	0.998 ✔	1.333	H1-3+VT ✔
	89.9267 - 88.4083	0.012	0.993	0.000	0.043	0.000	1.006 ✔	1.333	H1-3+VT ✔
	88.4083 - 86.89	0.012	1.001	0.000	0.043	0.000	1.013 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	86.89 - 85.3717	0.012	1.007	0.000	0.043	0.000	1.020 ✔	1.333	H1-3+VT ✔
	85.3717 - 83.8533	0.012	1.014	0.000	0.042	0.000	1.027 ✔	1.333	H1-3+VT ✔
	83.8533 - 82.335	0.012	1.020	0.000	0.042	0.000	1.033 ✔	1.333	H1-3+VT ✔
	82.335 - 80.8167	0.012	1.027	0.000	0.042	0.000	1.039 ✔	1.333	H1-3+VT ✔
	80.8167 - 79.2983	0.012	1.033	0.000	0.042	0.000	1.045 ✔	1.333	H1-3+VT ✔
	79.2983 - 77.78	0.012	1.038	0.000	0.042	0.000	1.051 ✔	1.333	H1-3+VT ✔
	77.78 - 76.2617	0.013	1.044	0.000	0.042	0.000	1.057 ✔	1.333	H1-3+VT ✔
	76.2617 - 74.7433	0.013	1.049	0.000	0.042	0.000	1.062 ✔	1.333	H1-3+VT ✔
	74.7433 - 73.225	0.013	1.054	0.000	0.041	0.000	1.067 ✔	1.333	H1-3+VT ✔
	73.225 - 71.7067	0.013	1.059	0.000	0.041	0.000	1.072 ✔	1.333	H1-3+VT ✔
	71.7067 - 70.1883	0.013	1.064	0.000	0.041	0.000	1.077 ✔	1.333	H1-3+VT ✔
	70.1883 - 68.67	0.013	1.068	0.000	0.041	0.000	1.081 ✔	1.333	H1-3+VT ✔
	68.67 - 63.17	0.007	0.555	0.000	0.021	0.000	0.561 ✔	1.333	H1-3+VT ✔
L5	68.67 - 63.17	0.007	0.546	0.000	0.020	0.000	0.553 ✔	1.333	H1-3+VT ✔
	63.17 - 61.7394	0.014	1.121	0.000	0.041	0.000	1.136 ✔	1.333	H1-3+VT ✔
	61.7394 - 60.3089	0.014	1.125	0.000	0.041	0.000	1.139 ✔	1.333	H1-3+VT ✔
	60.3089 - 58.8783	0.014	1.128	0.000	0.041	0.000	1.143 ✔	1.333	H1-3+VT ✔
	58.8783 - 57.4478	0.014	1.131	0.000	0.041	0.000	1.146 ✔	1.333	H1-3+VT ✔
	57.4478 - 56.0172	0.014	1.134	0.000	0.041	0.000	1.149 ✔	1.333	H1-3+VT ✔
	56.0172 - 54.5867	0.014	1.137	0.000	0.041	0.000	1.152 ✔	1.333	H1-3+VT ✔
	54.5867 - 53.1561	0.014	1.140	0.000	0.040	0.000	1.155 ✔	1.333	H1-3+VT ✔
	53.1561 - 51.7256	0.014	1.143	0.000	0.040	0.000	1.157 ✔	1.333	H1-3+VT ✔
	51.7256 - 50.295	0.014	1.145	0.000	0.040	0.000	1.160 ✔	1.333	H1-3+VT ✔
	50.295 - 48.8644	0.014	1.148	0.000	0.040	0.000	1.163 ✔	1.333	H1-3+VT ✔
	48.8644 - 47.4339	0.015	1.150	0.000	0.040	0.000	1.165 ✔	1.333	H1-3+VT ✔
	47.4339 - 46.0033	0.015	1.152	0.000	0.040	0.000	1.167 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	46.0033 - 44.5728	0.015	1.155	0.000	0.040	0.000	1.170 ✔	1.333	H1-3+VT ✔
	44.5728 - 43.1422	0.015	1.157	0.000	0.040	0.000	1.172 ✔	1.333	H1-3+VT ✔
	43.1422 - 41.7117	0.015	1.159	0.000	0.040	0.000	1.174 ✔	1.333	H1-3+VT ✔
	41.7117 - 40.2811	0.015	1.161	0.000	0.039	0.000	1.176 ✔	1.333	H1-3+VT ✔
	40.2811 - 38.8506	0.015	1.162	0.000	0.039	0.000	1.178 ✔	1.333	H1-3+VT ✔
	38.8506 - 37.42	0.015	1.164	0.000	0.039	0.000	1.180 ✔	1.333	H1-3+VT ✔
	37.42 - 31.17	0.008	0.598	0.000	0.020	0.000	0.606 ✔	1.333	H1-3+VT ✔
L6	37.42 - 31.17	0.008	0.589	0.000	0.019	0.000	0.597 ✔	1.333	H1-3+VT ✔
	31.17 - 29.5295	0.016	1.205	0.000	0.039	0.000	1.222 ✔	1.333	H1-3+VT ✔
	29.5295 - 27.8889	0.016	1.207	0.000	0.039	0.000	1.223 ✔	1.333	H1-3+VT ✔
	27.8889 - 26.2484	0.016	1.208	0.000	0.039	0.000	1.224 ✔	1.333	H1-3+VT ✔
	26.2484 - 24.6079	0.016	1.212	0.000	0.039	0.000	1.228 ✔	1.333	H1-3+VT ✔
	24.6079 - 22.9674	0.016	1.217	0.000	0.039	0.000	1.233 ✔	1.333	H1-3+VT ✔
	22.9674 - 21.3268	0.016	1.221	0.000	0.039	0.000	1.238 ✔	1.333	H1-3+VT ✔
	21.3268 - 19.6863	0.017	1.226	0.000	0.038	0.000	1.243 ✔	1.333	H1-3+VT ✔
	19.6863 - 18.0458	0.017	1.231	0.000	0.038	0.000	1.248 ✔	1.333	H1-3+VT ✔
	18.0458 - 16.4053	0.017	1.235	0.000	0.038	0.000	1.253 ✔	1.333	H1-3+VT ✔
	16.4053 - 14.7647	0.017	1.240	0.000	0.038	0.000	1.257 ✔	1.333	H1-3+VT ✔
	14.7647 - 13.1242	0.017	1.244	0.000	0.038	0.000	1.262 ✔	1.333	H1-3+VT ✔
	13.1242 - 11.4837	0.017	1.249	0.000	0.038	0.000	1.266 ✔	1.333	H1-3+VT ✔
	11.4837 - 9.84316	0.017	1.253	0.000	0.038	0.000	1.271 ✔	1.333	H1-3+VT ✔
	9.84316 - 8.20263	0.017	1.258	0.000	0.038	0.000	1.275 ✔	1.333	H1-3+VT ✔
	8.20263 - 6.5621	0.018	1.262	0.000	0.037	0.000	1.280 ✔	1.333	H1-3+VT ✔
	6.5621 - 4.92158	0.018	1.266	0.000	0.037	0.000	1.284 ✔	1.333	H1-3+VT ✔
	4.92158 - 3.28105	0.018	1.271	0.000	0.037	0.000	1.289 ✔	1.333	H1-3+VT ✔
	3.28105 - 1.64053	0.018	1.275	0.000	0.037	0.000	1.293 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	1.64053 - 0	0.018	1.279	0.000	0.037	0.000	1.297 ✔	1.333	H1-3+VT ✔

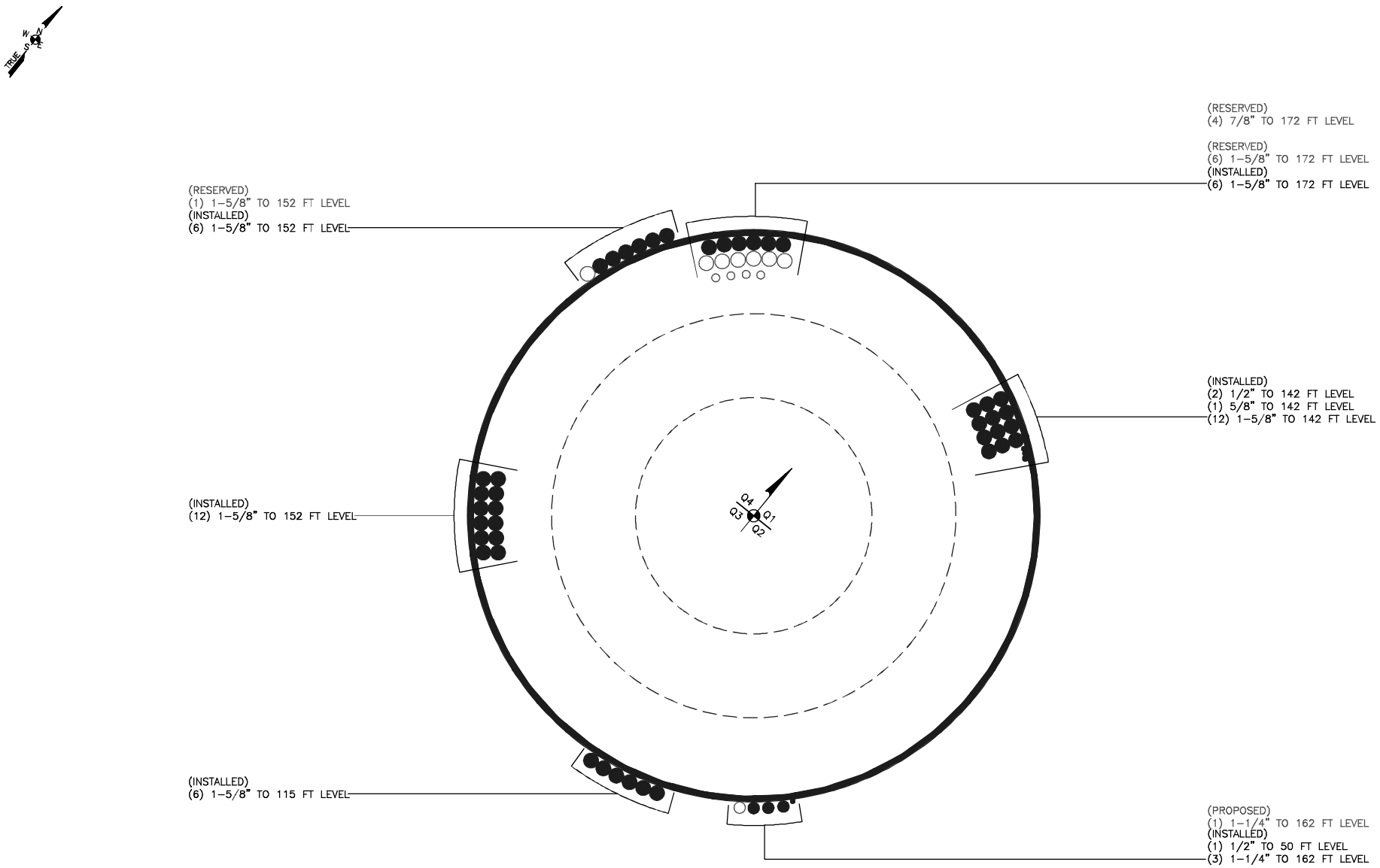
* DL controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	175 - 164.25	Pole	TP26x22x0.25	1	-3.39	1017.41	7.1	Pass
L2	164.25 - 129.67	Pole	TP34.0625x24.4135x0.3125	2	-13.12	1689.48	49.8	Pass
L3	129.67 - 96	Pole	TP41.75x32.452x0.375	3	-20.13	2488.54	67.6	Pass
L4	96 - 63.17	Pole	TP49.0625x39.8421x0.375	4	-28.32	2928.99	81.1	Pass
L5	63.17 - 31.17	Pole	TP56.125x46.9602x0.375	5	-37.69	3355.16	88.5	Pass
L6	31.17 - 0	Pole	TP62.9375x53.8475x0.375	6	-49.96	3684.96	97.3	Pass
							Summary	
						Pole (L6)	97.3	Pass
						RATING =	**97.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 823530 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

Project No.	
Site Name:	
Site ID:	
Pole Manufacturer:	*Pirod*

Reactions		
Moment:	4557	ft-kips
Axial:	50	kips
Shear:	36	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	45	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	68	in

Anchor Rod Results

Maximum Rod Tension:	70.4 Kips	Rigid
Allowable Tension:	81.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	86.9% **Pass**	Fty*ASIF

Plate Data		
Diam:	71	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.44	in

Base Plate Results

Base Plate Stress:	Flexural Check Rohn/Pirod, OK	Rigid Service ASD
Allowable Plate Stress:	50.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	Rohn/Pirod, OK	Y.L. Length: 25.75

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

n/a

Stiffener Results N/A for Rohn / Pirod

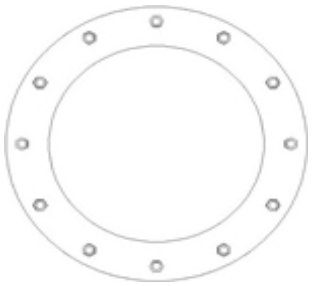
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A

Pole Data		
Diam:	62.9375	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



* 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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#:
Site Name:
App #:

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	8	ft
Pad Thickness, T:	2.75	ft
Pad Width=Length, L:	22.5	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	7.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	44.18	ft^2
Pier Height:	5.75	ft
Soil (above pad) Height:	5.25	ft

Soil Parameters		
Unit Weight, γ:	125.0	pcf
Ultimate Bearing Capacity, qn:	16.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	36.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	12.00	ksf
Passive Pres. Coeff., Kp	3.85	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	48.6	kips
Pad Force Location Above D:	1.28	ft
ϕ(Passive Pressure Moment):	62.20	ft-kips
Factored O.T. M(WL), "1.6W":	6565.1	ft-kips
Factored OT (MW-Msoil), M1	6502.85	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	3.81	ft
Sum of Soil Wedges Wt:	83.73	kips
Soil Wedges ecc, K1:	6.01	ft
Ftg+Soil above Pad wt:	550.2	kips
Unfactored (Total ftg-soil Wt):	633.90	kips
1.2D. **No Soil Wedges**.	720.20	kips
0.9D. **With Soil Wedges**	615.51	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	50	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	36	kips
Unfactored WL Moment, M:	4557	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	60	kips
0.90	0.9D+1.6W, Pu:	45	kips
1.35	Vu:	48.6	kips
	Mu:	6151.95	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	720.20	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	6502.85	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	9.03	ft
Orthogonal qu=	7.21	ksf
qu/ϕ*qn Ratio=	**60.06%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	6.38	ft
Diagonal qu=	7.60	ksf
qu/ϕ*qn Ratio=	**63.36%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	615.51	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	6049.93	ft-kips

Orthogonal ecc3 = M2/P2 =	9.83	ft
Ortho Non Bearing Length,NBL=	19.66	ft
Orthogonal qu=	9.63	ksf
Diagonal qu=	8.32	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	4557.00		
M Orthogonal:	4685.40	**97.26%**	**Pass**
M Diagonal:	4685.40	**97.26%**	**Pass**

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RADIO FREQUENCY FCC REGULATORY COMPLIANCE MAXIMUM PERMISSIBLE EXPOSURE (MPE) ASSESSMENT

Sprint Existing Facility

Site ID: CT33XC603

Thomaston Voicestream

583 Chapel Street
Thomaston, CT 06787

September 24, 2014

EBI Project Number: 62144694

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

EBI Consulting
environmental | engineering | due diligence

September 24, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT33XC603 - Thomaston Voicestream

Site Total: 51.13% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **583 Chapel Street, Thomaston, CT**, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades 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 µW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band (850 MHz Band) is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz and 2500 MHz 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 upgrades to the existing Sprint Wireless antenna facility located at **583 Chapel Street, Thomaston, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. 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 emissions were calculated using the following assumptions:

1) 2 channels in the 1900 MHz Band were considered for each sector of the proposed installation.

2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation.

3) 2 channels in the 2500 MHz Band were considered for each sector of the proposed installation.

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

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

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-I20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTM14-C-I20 has a 15.9 dBd gain value at its main lobe at 2500 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline for the proposed antennas is **162 feet** above ground level (AGL).

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

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

Site ID	CT33XC603 - Thomaston Voicestream
Site Addresss	583 Chapel Street, Thomaston, CT, 06787
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	162	156	1/2 "	0.5	0	138.69	0.20%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	162	156	1/2 "	0.5	0	39.00	0.10%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	162	156	1/2 "	0.5	0	138.69	0.36%
														Sector total Power Density Value:		0.67%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	162	156	1/2 "	0.5	0	138.69	0.20%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	162	156	1/2 "	0.5	0	39.00	0.10%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	162	156	1/2 "	0.5	0	138.69	0.36%
														Sector total Power Density Value:		0.67%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	162	156	1/2 "	0.5	0	138.69	0.20%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	162	156	1/2 "	0.5	0	39.00	0.10%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	162	156	1/2 "	0.5	0	138.69	0.36%
														Sector total Power Density Value:		0.67%

Site Composite MPE %	
Carrier	MPE %
Sprint	2.00%
Thomaston FD	1.72%
Thomaston PD	0.29%
Litch. Co. FD	1.72%
CT State Police	0.57%
T-Mobile	1.21%
MetroPCS	5.15%
Verizon Wireless	22.51%
AT&T	15.95%
Total Site MPE %	**51.13%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public Maximum Permissible Exposure (MPE) to radio frequency energy.

The anticipated Maximum Composite contributions from the Sprint facility are **2.00% (0.67% from sector 1, 0.67% from sector 2 and 0.67% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **51.13%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

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