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

February 13, 2015

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 807133**
Sprint PCS Site ID: CT43XC860
Located at: 50 Rockland Road, Norwalk, CT 06854

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 The Honorable Harry W. Rilling, Mayor for the City of Norwalk, and Connecticut Light and Power Company, Property Owner.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **50 Rockland Road, Norwalk, CT 06854**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2), a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3), and structural analysis evaluation letter (Exhibit-4).

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)
Tab 4: Exhibit-4: Structural Analysis Evaluation Letter

cc: The Honorable Harry W. Rilling, Mayor
City of Norwalk
125 East Avenue
Norwalk, CT 06856

Connecticut Light & Power Company
Northeast Utilities
P.O. Box 2957
Hartford, CT 06141

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT43XC860

SITE NAME:

SOUTH NORWALK–CROWN TOWER

SITE ADDRESS:

50 ROCKLAND ROAD
NORWALK, CT 06854

CROWN ID#: 807133

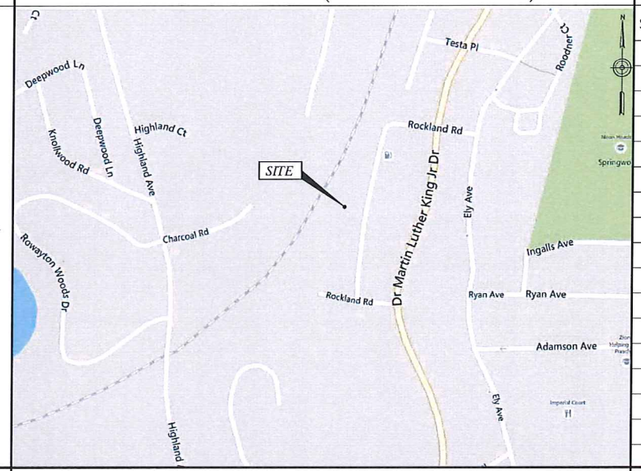
CROWN SITE NAME: BRG 134 943057

SHEET INFORMATION

SITE NUMBER:	CT43XC860
SITE NAME:	SOUTH NORWALK–CROWN TOWER
SITE ADDRESS:	50 ROCKLAND ROAD NORWALK, CT 06854
COUNTY:	FAIRFIELD
COORDINATES: (NAD 83)	41° 4' 54.44" N 73° 25' 49.52" W
GROUND ELEV:	49'± AMSL
STRUCTURE TYPE:	SELF SUPPORT TOWER
STRUCTURE HEIGHT:	180'–0"± AGL
STRUCTURE RAD CENTER:	145'–0"± AGL (EXIST) 148'–0"± AGL (PROPOSED)
ZONING CLASSIFICATION:	OS60
PARCEL ID:	025–036

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:	PETER CULBERT (603) 203–6446 Peter.Culbert@sprint.com
CROWN CM:	JASON D'AMICO (860) 209–0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

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SP–2	GENERAL NOTES
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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.
   - BUILDING CODE OF CONNECTICUT, LATEST EDITION.
   - ANSI/TIA/EIA–222–F–1996.
   - NATIONAL ELECTRICAL CODE, LATEST EDITION.

PROJECT DESCRIPTION

1. (1) NEW ALU 9929 EXPANSION CABINET.
2. (3) NEW RFS APXVTM14–C–I20 ANTENNAS.
3. (3) NEW TD–RRH8x20–25 RRH.
4. (1) NEW 5/8" FIBER CABLE.
5. (3) NEW SITE PRO VFA12–U ANTENNA MOUNTS.

AERIAL VIEW (NOT TO SCALE)

APPROVALS

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

CONSTRUCTION: _____ DATE: _____

LEASING/ SITE ACQUISITION: _____ DATE: _____

LANDLORD/ PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

Sprint
2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, 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.CT43XC860

NO	DATE	DESCRIPTION	BY
0	7/8/14	FOR COMMENT	JT
1	7/17/14	PER COMMENTS	MP
2	2/4/15	FOR CONSTRUCTION	DC
3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	JMQ

SEAL

STATE OF CONNECTICUT
JASON M. QUICKSELL
No. 22000
REGISTERED PROFESSIONAL ENGINEER

SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK–CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

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 TO 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._15720111004218554 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. ACI–301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
B. ACI–347 GUIDE TO FORM WORK FOR CONCRETE.
C. ASTM C33– CONCRETE AGGREGATE
D. ASTM C94 – READY MIXED CONCRETE e. ASTM C150 – PORTLAND CEMENT.
E. ASTM C260 – AIR–ENTRAINING ADMIXTURES FOR CONCRETE
F. ASTM C309– LIQUID MEMBRANE FORMING COMPOUNDS FOR CURING CONCRETE.
H. ASTM C494 – CHEMICAL ADMIXTURES FOR CONCRETE
I. ASTM A615– DEFORMED AND PLAIN BILLET–STEEL BARS FOR CONCRETE REINFORCEMENT
J. ASTM A185– STEEL WELDED WIRE FABRIC (PLAIN) FOR CONCRETE REINFORCEMENT

1.04 QUALITY ASSURANCE

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

3.04 SURFACE FINISHES

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

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

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

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

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

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

3.05 PATCHING

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

3.06 DEFECTIVE CONCRETE

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

3.07 PROTECTION

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

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

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

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

1.02 REFERENCE STANDARDS

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

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

PART 2 – PRODUCTS

2.01 MATERIALS

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

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

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

2.02 WELDING

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

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

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

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

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

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

2.03 BOLTING

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

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

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

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

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

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

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

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

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

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

2.04 FABRICATION

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

2.05 FINISH

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

2.06 PROTECTION

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

PART 3 – ERECTION

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

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

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

Sprint
2.5 EQUIPMENT DEPLOYMENT
6580 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
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SUBMITTALS

PROJECT NO: 7225.CT43XC860

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DATE	REVIEWED BY
2/11/15	SMG

SEAL

STATE OF CONNECTICUT
ANILKUMAR R. PATEL
No. 22035
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK–CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

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
—OHW—OHW—OHW—OHW—OHW—	OVERHEAD WIRE
——— — — ———	PROPERTY LINE
—X———X———X———	CHAIN LINK FENCE
A–1	ANTENNA MARK
(E)	EXISTING
(P)	PROPOSED DETAIL
DET # / SHT #	REFERENCE
	SURFACE ELEVATION

Sprint

2.5 EQUIPMENT DEPLOYMENT
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OVERLAND PARK, KANSAS 66251

CROWN CASTLE

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Newburgh, NY 12550

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SUBMITTALS

PROJECT NO: 7225.CT43XC860

NO	DATE	DESCRIPTION	BY
0	7/8/14	FOR COMMENT	JT
1	7/17/14	PER COMMENTS	MP
2	2/4/15	FOR CONSTRUCTION	DC
3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	SMC

SEAL

STATE OF CONNECTICUT
MANOJ KUMAR PATEL
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK–CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

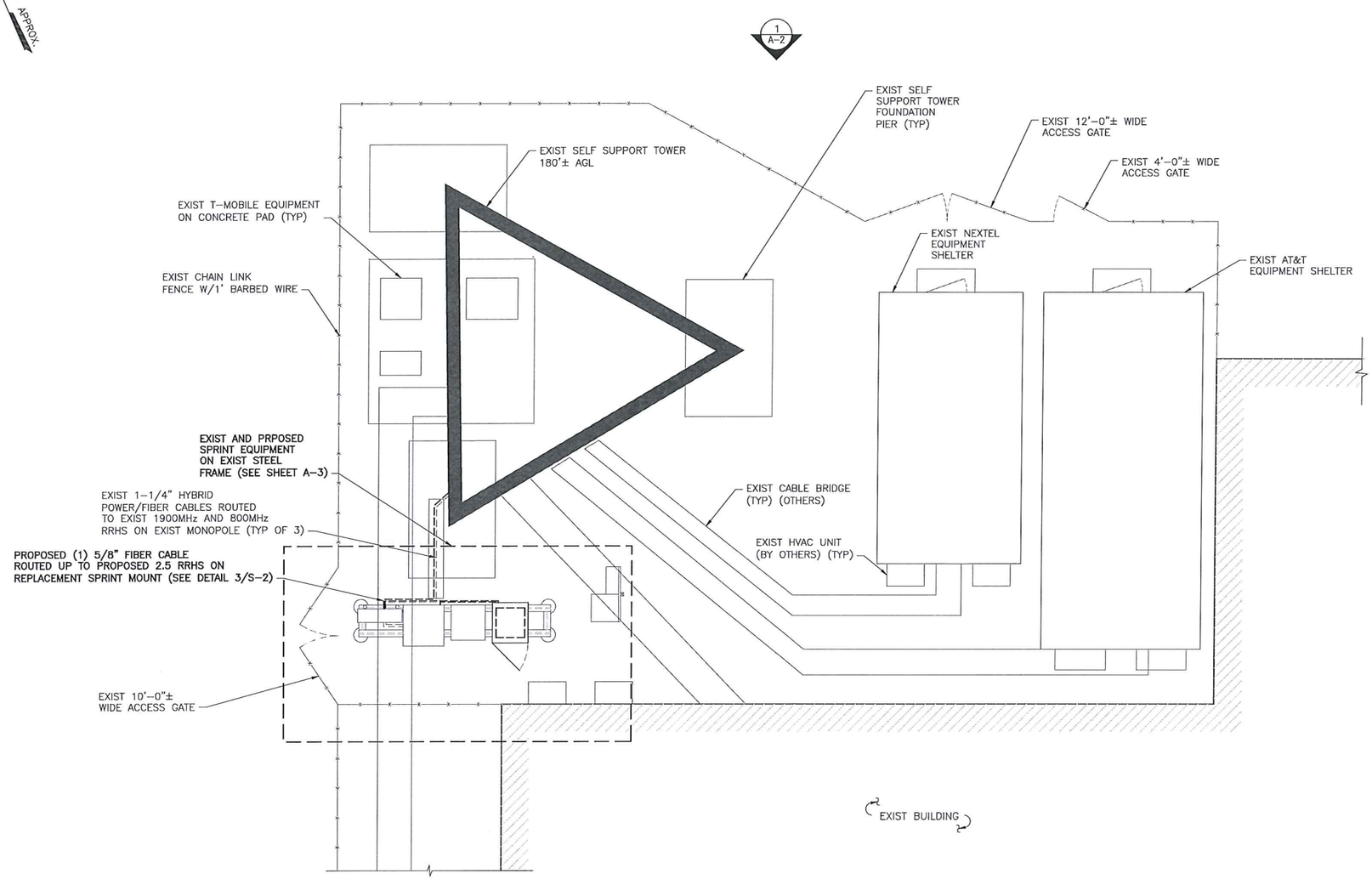
SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–2

N

APPROX.

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



1 / A-1 SITE PLAN
SCALE: 1/4" = 1'-0"

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3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	SMR

SEAL
STATE OF CONNECTICUT
MANOJKUMAR RAVEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

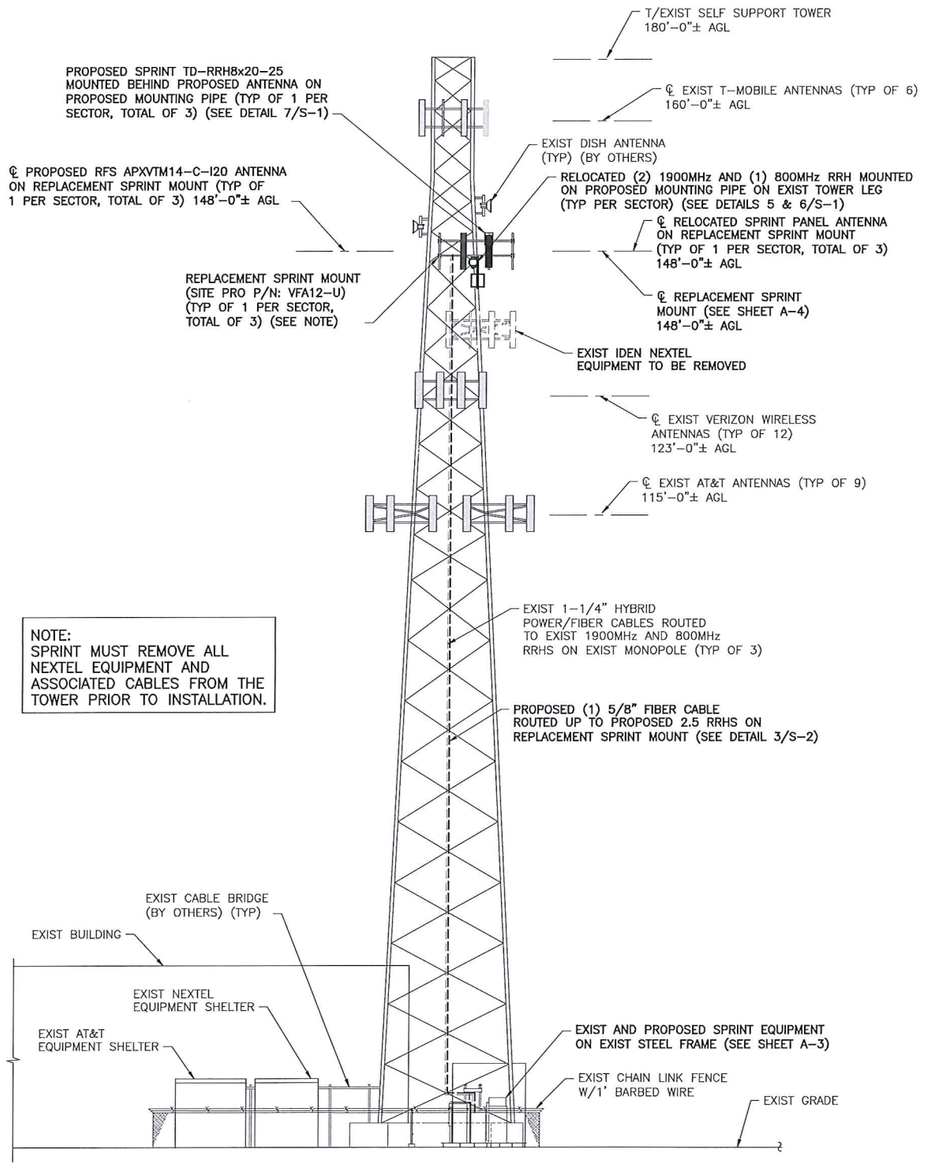
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1



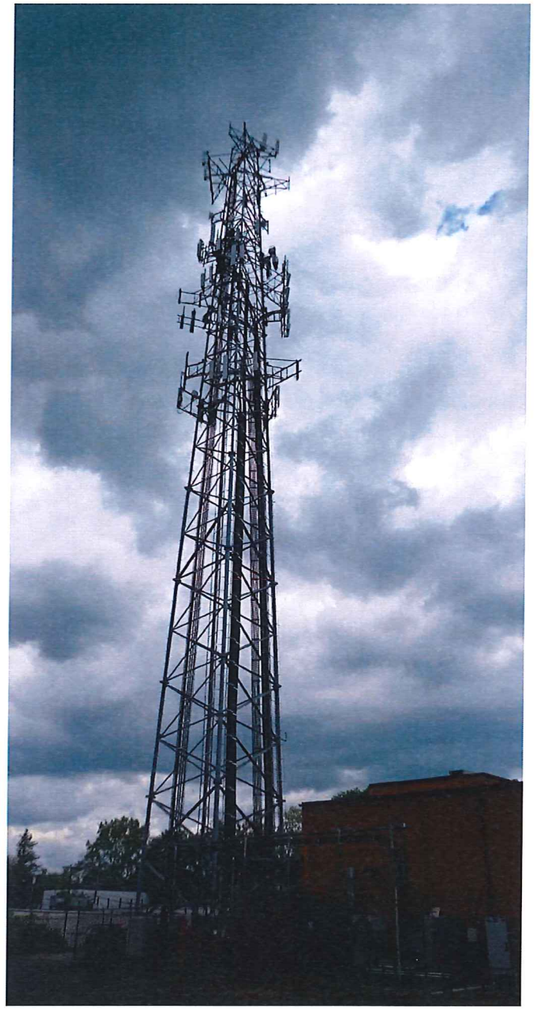
NOTE:
SPRINT MUST REMOVE ALL NEXTEL EQUIPMENT AND ASSOCIATED CABLES FROM THE TOWER PRIOR TO INSTALLATION.

1 / A-2 ELEVATION

SCALE: 3/32" = 1'-0"

THE EXISTING SELF SUPPORT TOWER 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 PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 2/4/15.



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DATE	REVIEWED BY
2/11/15	JMQ

SEAL:

STATE OF CONNECTICUT
MANOJKUMAR QUTE
No. 22039
LICENSED
PROFESSIONAL ENGINEER

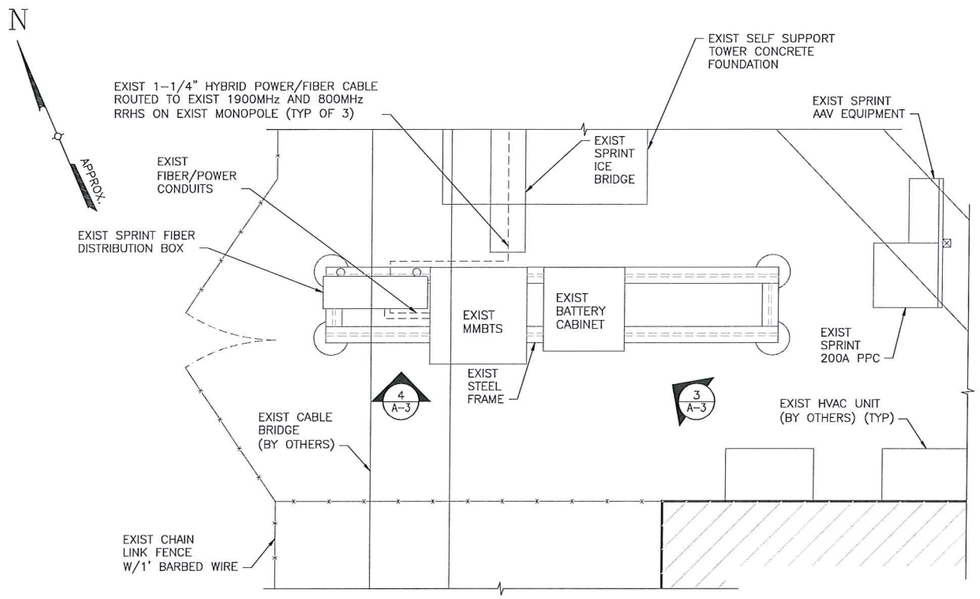
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

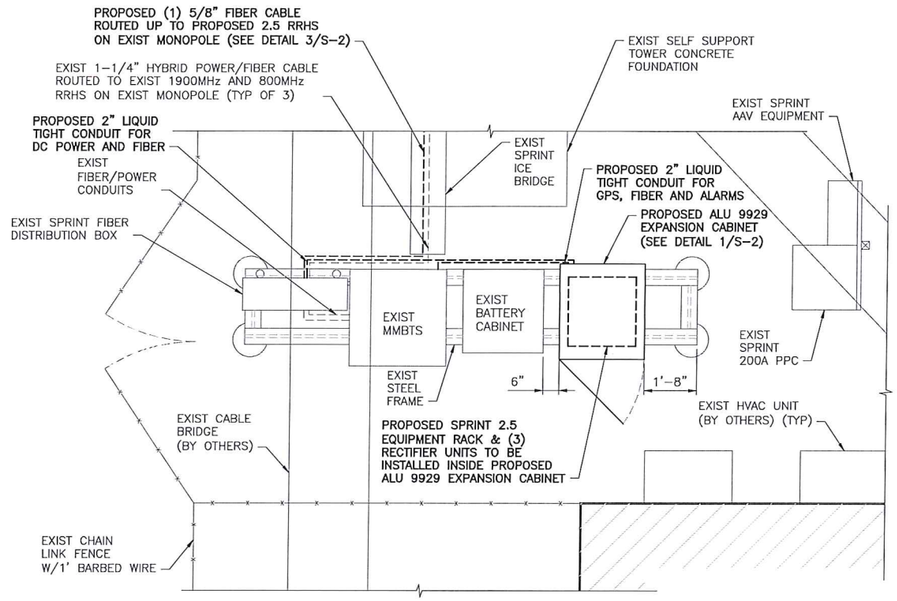
SHEET TITLE:
ELEVATION

SHEET NO:
A-2



1 A-3 EQUIPMENT PLAN (EXIST)

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

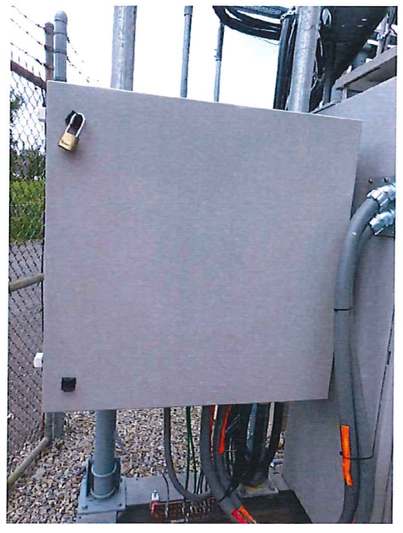


2 A-3 EQUIPMENT PLAN (FINAL)

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

3 A-3 EXIST EQUIPMENT FRAME

SCALE: N.T.S.



4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

Sprint

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2/11/15	JMQ

SEAL

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

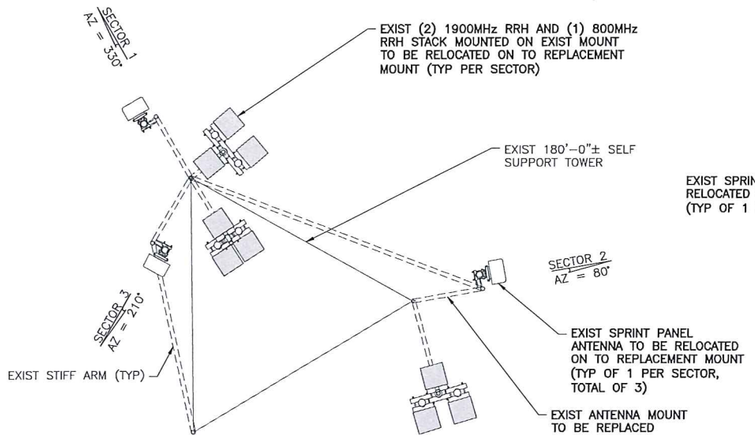
SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

N

APPROX.

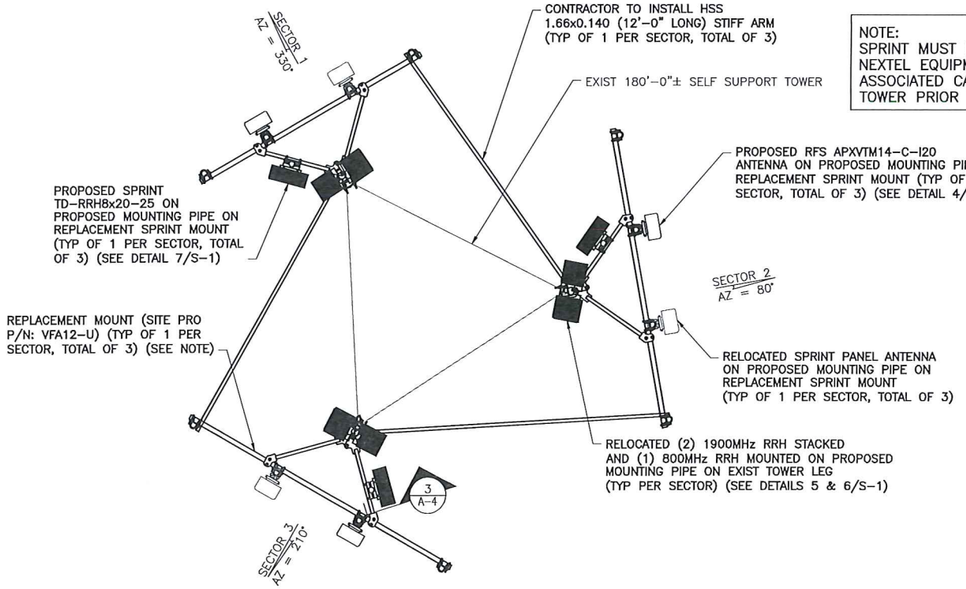


1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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

EXIST SPRINT PANEL ANTENNA TO BE RELOCATED ON TO REPLACEMENT MOUNT (TYP OF 1 PER SECTOR, TOTAL OF 3)

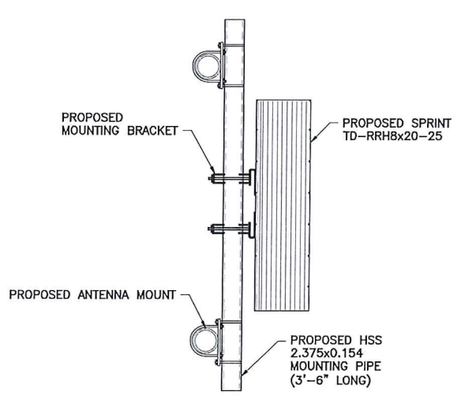
EXIST (2) 1900MHz RRH AND (1) 800MHz RRH STACK MOUNTED ON EXIST MOUNT TO BE RELOCATED (TYP PER SECTOR)



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

2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

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



3 / A-4 RRH MOUNTING DETAIL

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

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	RFS-CELWAVE	RFS-CELWAVE
Antenna Model Number	APXVSPP18-C-A20	APXVTM14-C-I20
Number of Antennas	3	3
Antenna RAD Center	148'	148'
Antenna Azimuth	330/80/210	330/80/210
Antenna RRH Model Number	800MHz/1900MHz	TD-RRH8x20-25
Number of RRH	9	3

THE EXISTING SELF SUPPORT TOWER 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 PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 2/4/15.

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3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	JMQ

SEAL

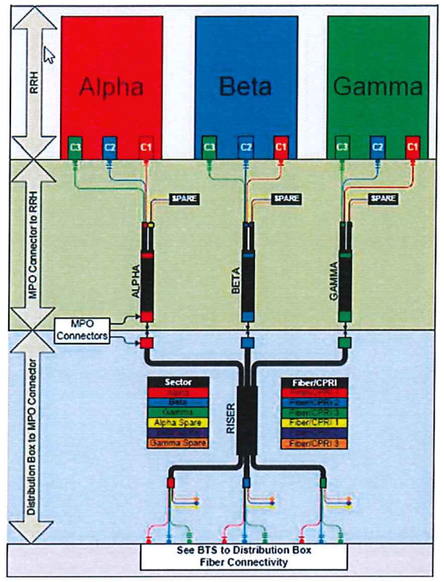
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

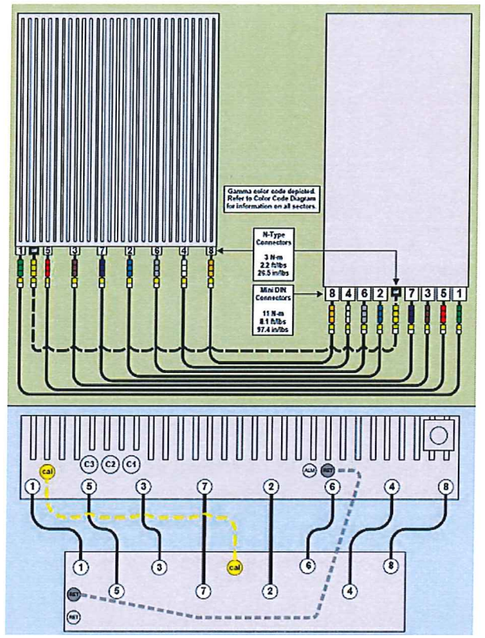
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



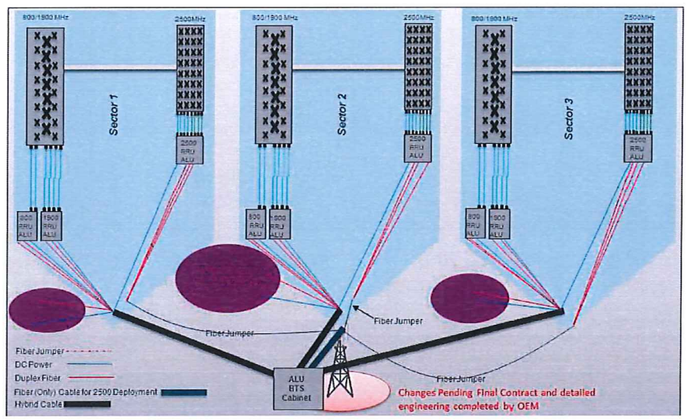
1 A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



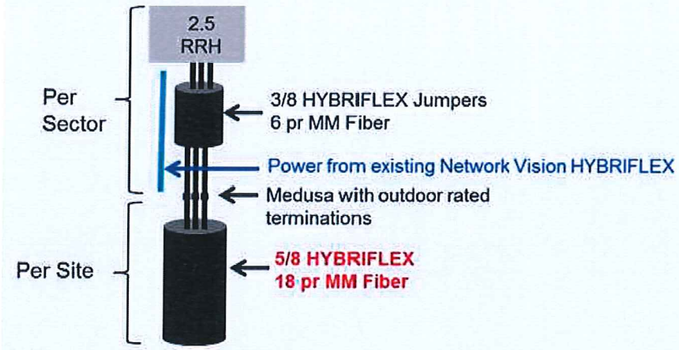
2 A–5 RRH CONNECTIVITY

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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SUBMITTALS

PROJECT NO: 7225.CT43XC860

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3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	JMQ

SEAL
STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK–CROWN TOWER

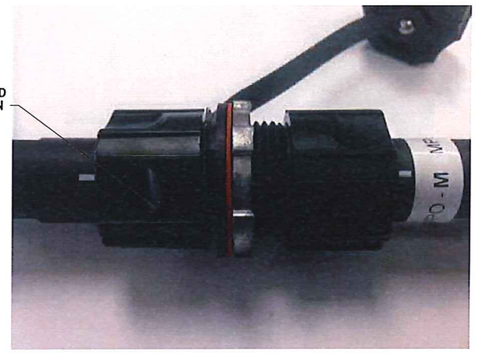
SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

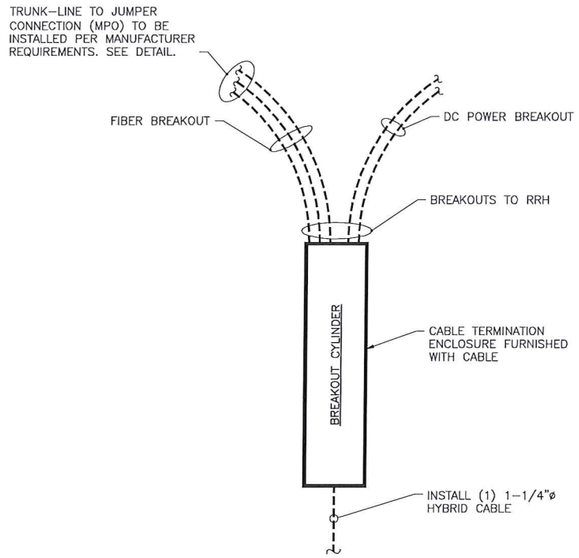
IMPORTANTII LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

IMPORTANTII ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL A CLICK SOUND IS HEARD TO ESURE A GOOD CONNECTION

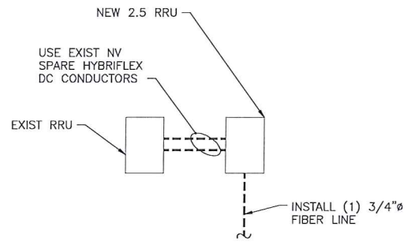


1 A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

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.CT43XC860

NO	DATE	DESCRIPTION	BY
0	7/8/14	FOR COMMENT	JT
1	7/17/14	PER COMMENTS	MP
2	2/4/15	FOR CONSTRUCTION	DC
3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	MP

STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER
SEAL

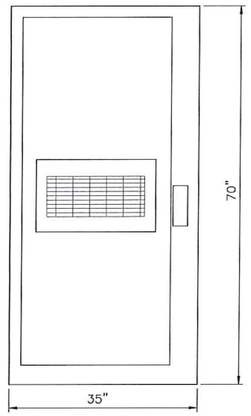
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
CABLE DETAILS

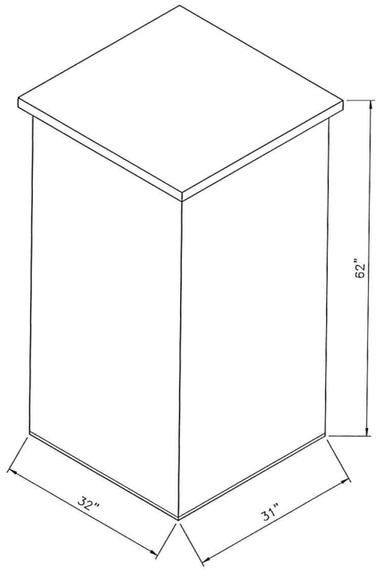
SHEET NO:
A-6



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

1/S-1 (EXIST) MMBTS CABINET

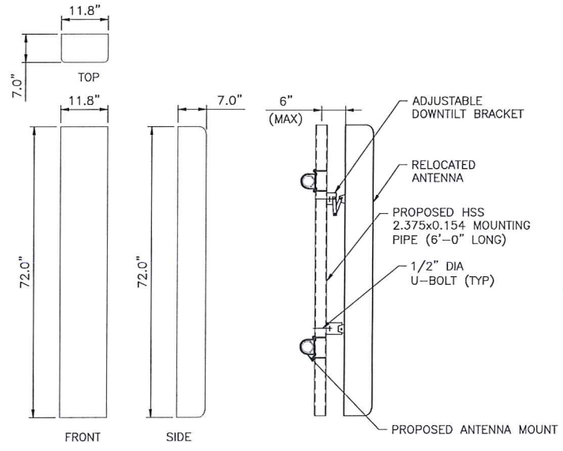
SCALE: 1" = 1'-0"



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

2/S-1 (EXIST) BATTERY CABINET

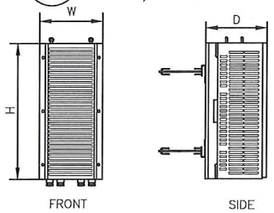
SCALE: 1" = 1'-0"



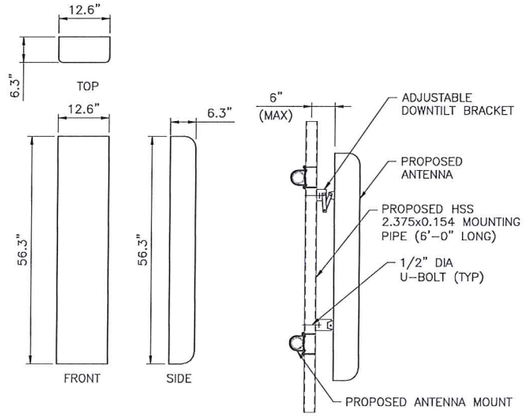
APXVSPP18-C-A20

3/S-1 (EXIST) ANTENNA DETAIL

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



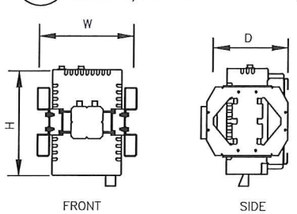
TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.



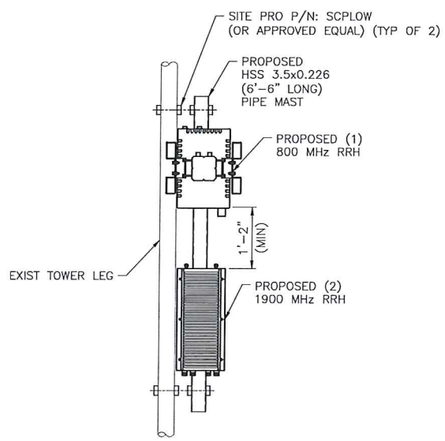
APXVTM14-C-120

4/S-1 (PROPOSED) ANTENNA DETAIL

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

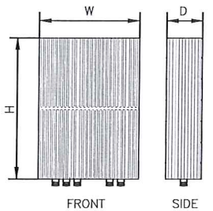


TYPE: 800 MHz 2x50W MODEL #: FD-RRH-2x50-800 HEIGHT: 19.7" WIDTH: 13" DEPTH: 10.8" WEIGHT: ±53 LBS



5/S-1 RRH MOUNTING DETAIL

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



TYPE: 2.5 RRH MODEL #: TD-RRH8x20-25 HEIGHT: 26.1" WIDTH: 18.6" DEPTH: 6.71" WEIGHT: ±70 LBS

6/S-1 (EXIST) RRH DETAILS

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

7/S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.

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SEAL

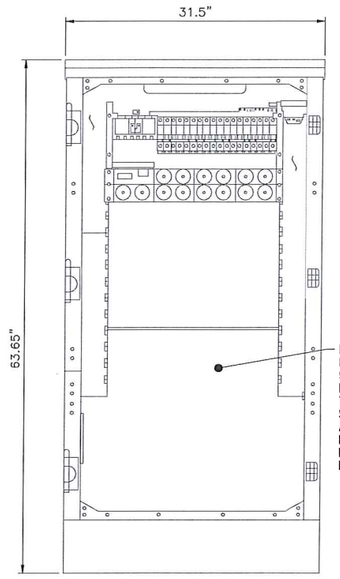
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1



INSTALL NEW 2.5 EQUIPMENT IN PROPOSED 9929 EXPANSION CABINET INCLUDING BUT NOT LIMITED TO BASE BAND UNIT, CELL SITE ROUTER AND SURGE ARRESTORS. GROUND EQUIPMENT TO PROPOSED INTERIOR CABINET GROUND BAR

9929 EXPANSION CABINET
CABINET SPECIFICATIONS
EXPANSION CABINET: – HEIGHT – 63.65" – WIDTH – 31.5" – DEPTH – 35.5" WEIGHT: 1,600 LBS.

FRONT ELEVATION
(CABINET INTERIOR)

1 / S–2 9929 INTERIOR DETAIL

SCALE: N.T.S.

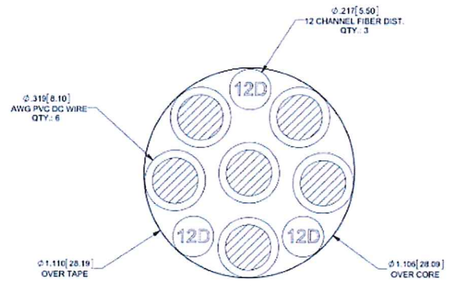
RFS HYBRIFLEX RISER CABLES SCHEDULE

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

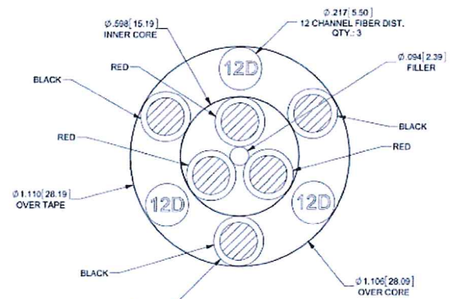
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

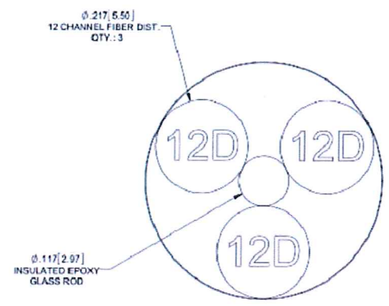
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG

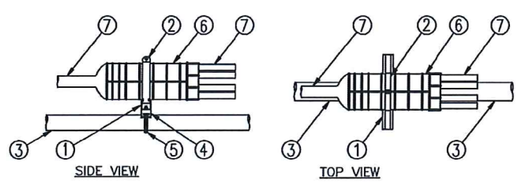


8 AWG & 6 AWG



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.



SIDE VIEW

TOP VIEW

2 / S–2 MEDUSA HEAD DETAIL

SCALE: NTS

3 / S–2 2.5 HYBRID CABLE X–SECTION AND DATA

SCALE: NTS

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SEAL
STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED PROFESSIONAL ENGINEER

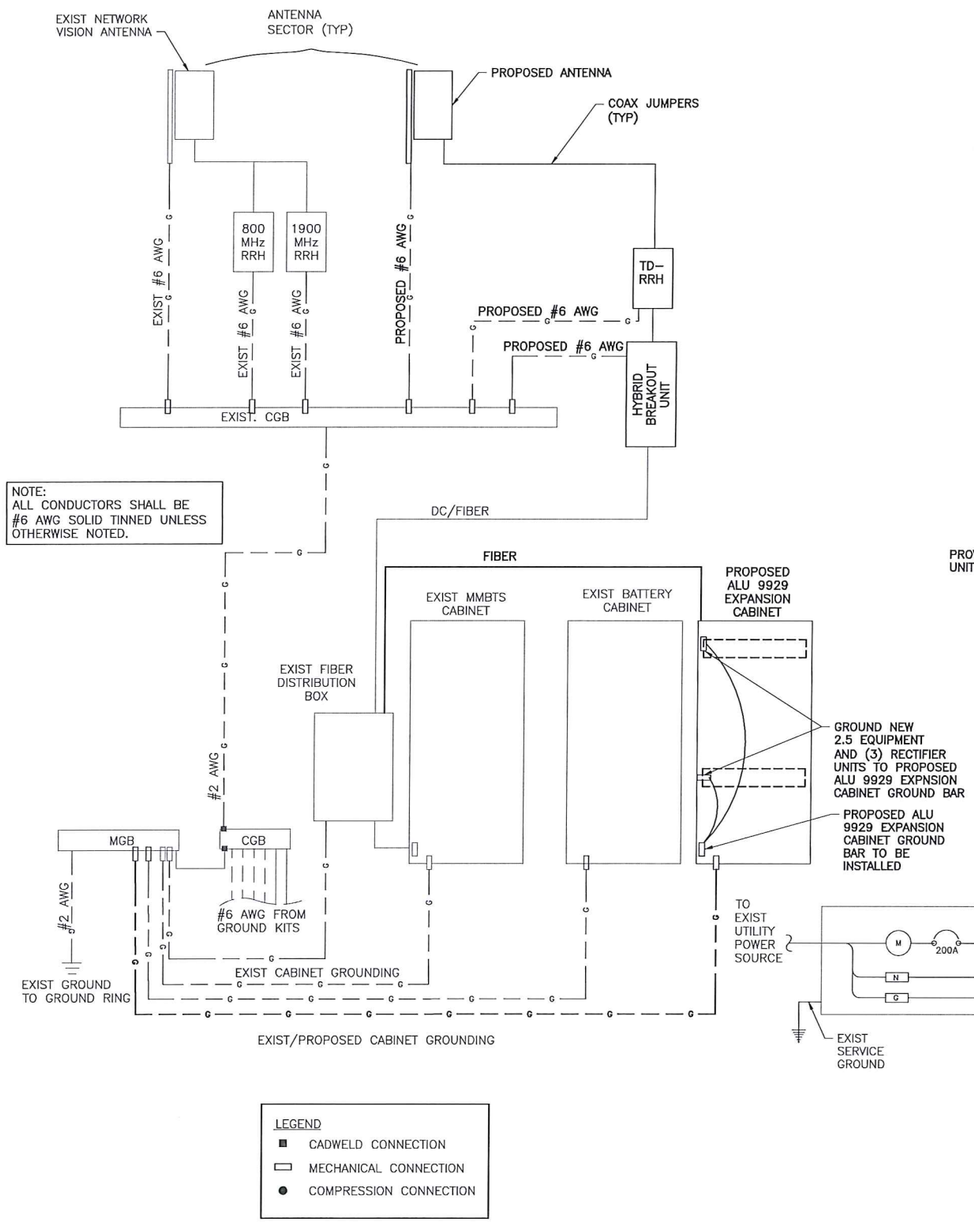
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK–CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

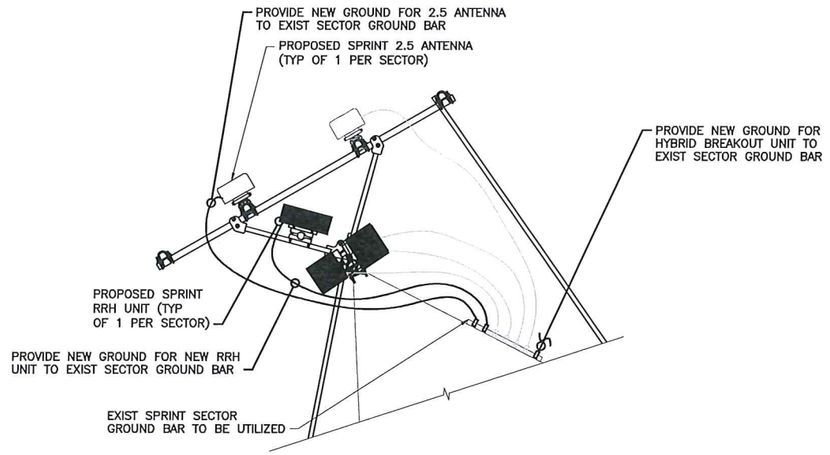
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S–2



1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS

NOTE: FINAL ELECTRICAL DESIGN TO BE DETERMINED BY OTHER.

3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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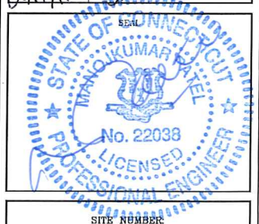
2/11/15	JMG

SEAL



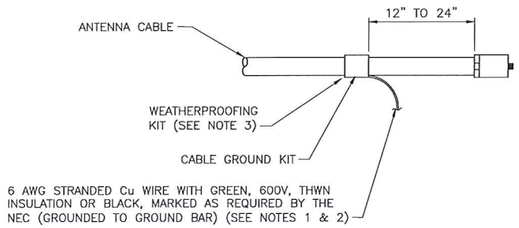
SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

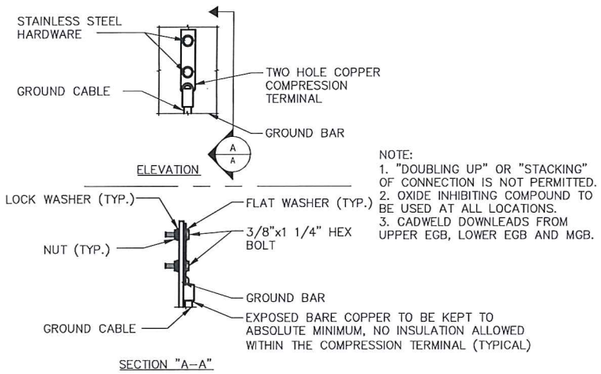
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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

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

1 E-2 CABLE GROUNDING KIT DETAIL

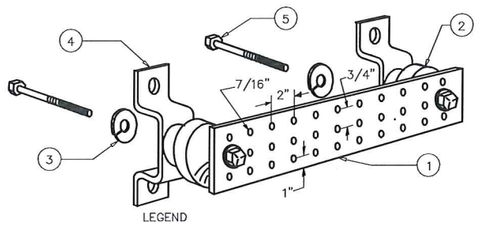
SCALE: N.T.S.



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

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS

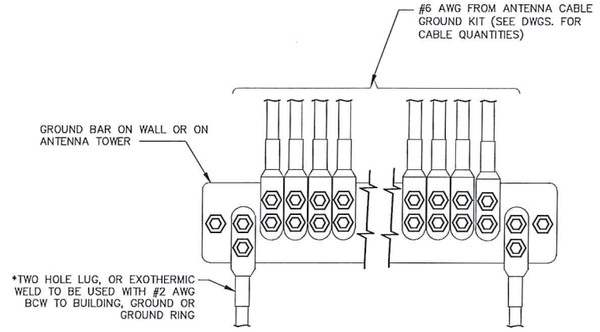


1- COPPER TINNED GROUND BAR, 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED, HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3- 5/8" LOCKWASHERS OR EQUAL
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5- 5/8-11 X 1" H.H.C.S.BOLTS

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
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.
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Newburgh, NY 12550
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SUBMITTALS

PROJECT NO: 7225.CT43XC860

NO	DATE	DESCRIPTION	BY
0	7/8/14	FOR COMMENT	JT
1	7/17/14	PER COMMENTS	MP
2	2/4/15	FOR CONSTRUCTION	DC
3	2/11/15	PER COMMENTS	MP

DATE	REVIEWED BY
2/11/15	JMQ

SEAL
STATE OF CONNECTICUT
MANOJKUMAR PATEL
No. 22038
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT43XC860

SITE NAME:
SOUTH NORWALK-CROWN TOWER

SITE ADDRESS:
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

Date: **December 17, 2014**

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

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

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	Scenario 2.5 A
	Carrier Site Number:	CT43XC860
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	288219
	Crown Castle Work Order Number:	923923
	Crown Castle Application Number:	246025 Rev. 7
Engineering Firm Designation:	**FDH Engineering, Inc. Project Number:**	146D6Y1400

Site Data: **50 Rockland Road Norwalk OFC - MTSO, So Norwalk, Fairfield County, CT**
Latitude *41° 4' 54.44"*, Longitude *-73° 25' 49.52"*
180 Foot - Self Support Tower

Dear Sean Dempsey,

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 703021, in accordance with application 246025, revision 7.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standards and local code requirements based upon a wind speed of 85 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:

Jarel Duncan

Jarel Duncan, EI
Project Engineer

Reviewed by:

Dennis D. Abel, PE
Director of Structural Engineering
CT PE License No. 23247

STATE OF CONNECTICUT DENNIS D. ABEL No. 23247 LICENSED PROFESSIONAL ENGINEER

12-17-2014

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN in July of 1987. The tower was originally designed for E.I.A. Zone A. This tower has been modified per reinforcement drawings prepared by Vertical Structures in November of 2004. Modifications include installation of diagonal reinforcement. These modifications were considered in this analysis.

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 85 mph with no ice, 37.6 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
148.0	148.0	3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe	1	1-1/4	-
		3	site pro	VFA12-U w/ 12' Stiff Arm			
		3	alcatel lucent	TD-RRH8x20-25			

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
178.0	178.0	2	crown mounts	Side Arm Mount [SO 306-1]	-	-	1
172.0	173.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	172.0	1	crown mounts	Sector Mount [SM 602-3]			
157.0	157.0	2	andrew	VHLP2-18	2	1/2	1
		2	crown mounts	Side Arm Mount [SO 311-1]			
143.0	145.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-	1
		3	alcatel lucent	TME-800MHZ 2X50W RRH			
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	2
	143.0	9	rfs celwave	ACU-A20-N			
		1	crown mounts	Side Arm Mount [SO 312-3]	-	-	1
	142.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
134.0	135.0	1	andrew	VHLP2-23	9 6 1	1-1/4 5/16 1/2	3
		3	argus technologies	LLPX310R w/ Mount Pipe			
		9	decibel	DB844H90-XY w/ Mount Pipe			
		3	samsung telecommunications	FDD_R6_RRH			
	134.0	1	crown mounts	Pipe Mount [PM 601-1]			
		1	crown mounts	Sector Mount [SM 502-3]			
126.0	130.0	1	gps	GPS_A	19 1	1-5/8 1/2	1
	128.0	3	alcatel lucent	RRH2X40-AWS			
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		2	decibel	DB844H80-XY w/ Mount Pipe			
		1	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		2	andrew	LNX-6514DS-T4M w/ Mount Pipe			
		3	rymsa wireless	MG D3-800TV w/ Mount Pipe			
		4	decibel	DB844G65ZAXY w/ Mount Pipe			
	126.0	1	crown mounts	Sector Mount [SM 411-3]			
112.0	112.0	1	crown mounts	Sector Mount [SM 104-3]	6	1-5/8	1
		3	kathrein	800 10504 w/ Mount Pipe			
102.0	102.0	1	crown mounts	Sector Mount [SM 301-3]	12 2 1	1-5/8 5/8 3/8	1
		6	ericsson	RRUS-11			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		6	powerwave technologies	LGP2140X			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
30.0	30.0	2	crown mounts	Side Arm Mount [SO 701-1]	2	1/2	1
		2	gps	GPS_A			
12.0	12.0	1	astron wireless	VG-1060	2	1/4	1
		1	crown mounts	Pipe Mount [PM 601-1]			
		1	gps	GPS_A			

Notes:
1) Existing Equipment
2) Existing Equipment to be Relocated to 148'
3) Existing Equipment to be Removed, Not considered in this Analysis.

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
217	217	4	celwave	PD10017	--	--
207	207	6	celwave	PD1132	--	--
180	180	3	generic	8' Dish	--	--
170	170	1	generic	8' Dish	--	--
156	156	1	generic	8' Dish	--	--
150	150	1	generic	8' Dish	--	--
130	130	1	celwave	PD1109	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2311843	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Arcnet/ Paul J. Ford	821566	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn	392878	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures, Inc.	1257479	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Structures, Inc.	4065020	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.

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
T1	180 - 160	Leg	ROHN 3 EH	3	-7.91	96.06	8.2	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	36	-11.67	139.07	8.4	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	43	-17.43	139.07	12.5	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	55	-24.48	139.07	17.6	Pass
T5	140 - 120	Leg	ROHN 5 EH	67	-50.87	206.29	24.7	Pass
T6	120 - 100	Leg	ROHN 6 EHS	88	-83.40	236.06	35.3	Pass
T7	100 - 80	Leg	ROHN 6 EH	109	-115.62	264.29	43.7	Pass
T8	80 - 70	Leg	ROHN 8 EHS	124	-132.39	332.54	39.8	Pass
T9	70 - 60	Leg	ROHN 8 EHS	133	-149.47	332.54	44.9	Pass
T10	60 - 40	Leg	ROHN 8 EHS	142	-182.77	332.54	55.0	Pass
T11	40 - 20	Leg	ROHN 8 EH	157	-215.48	435.22	49.5	Pass
T12	20 - 0	Leg	ROHN 8 EH	172	-247.94	435.22	57.0	Pass
T1	180 - 160	Diagonal	L2x2x3/16	15	-1.68	6.68	25.2 28.1 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	42	-2.18	13.09	16.6 23.3 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	54	-2.77	11.83	23.4 28.9 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	66	-4.17	10.74	38.9 45.0 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	75	-5.86	8.26	71.0	Pass
T6	120 - 100	Diagonal	L3x3x1/4	95	-7.33	11.62	63.1 72.0 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	112	-8.98	12.51	71.8 73.9 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	127	-9.43	11.68	80.7	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	136	-10.10	17.97	56.2 57.5 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	145	-10.50	13.64	77.0 83.6 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	160	-11.04	14.28	77.3	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	175	-12.00	20.68	58.0 68.5 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	6	-0.08	2.79	2.8	Pass
T3	153.333 - 146.667	Top Girt	L2x2x1/8	46	-0.15	1.36	11.0	Pass
T4	146.667 - 140	Top Girt	L2x2x1/8	60	0.11	8.50	1.3 2.7 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	7	-0.17	2.05	8.3	Pass
							Summary	
						Leg (T12)	57.0	Pass
						Diagonal (T10)	83.6	Pass
						Top Girt (T3)	11.0	Pass
						Mid Girt (T1)	8.3	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						Bolt Checks	83.6	Pass
						RATING =	**83.6**	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation	0	92.7	Pass

Structure Rating (max from all components) =	**92.7%**

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

4.1) Recommendations

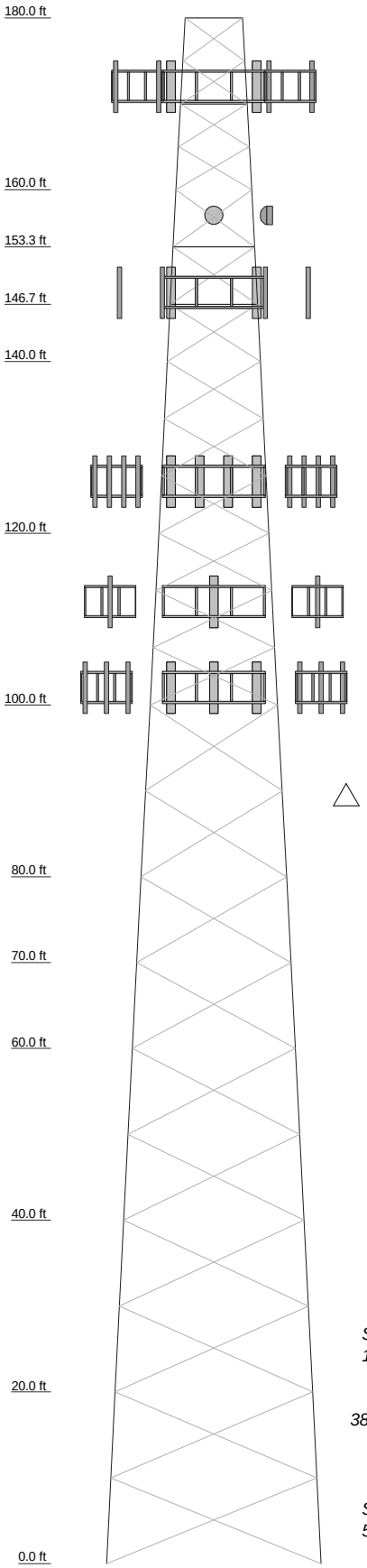
The tower and its foundations have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
Legs	ROHN 3 EH	ROHN 4 EH			ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH		ROHN 8 EHS		ROHN 8 EH	
Leg Grade	A572-50											
Diagonals	L2x2x3/16				L2 1/2x2 1/2x1/4	L3x3x1/4	L3 1/2x3 1/2x1/4		A	L4x4x1/4	L4x4x5/16	2L4x4x5/16x3/8
Diagonal Grade	A36						A572-50		A36		A572-50	A36
Top Girts	L2x2x1/8	N.A.	L2x2x1/8					N.A.				
Mid Girts	L2x2x1/8											
Face Width (ft)	6.6875	8.76042	9.45052	10.1432	10.8333	12.9167	14.8542	16.9896	17.9948	19	21	23
# Panels @ (ft)	4 @ 5				9 @ 6.66667					10 @ 10		
Weight (K)	1.2	0.6	0.6	0.7	2.2	2.7	3.0	1.7	2.4	3.8	5.0	7.7

31.7



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 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: 83.6%

MAX. CORNER REACTIONS AT BASE:
DOWN: 256 K
SHEAR: 32 K

UPLIFT: -208 K
SHEAR: 27 K

AXIAL
102 K

SHEAR
15 K

MOMENT
1517 kip-ft

TORQUE 8 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
56 K

SHEAR
52 K

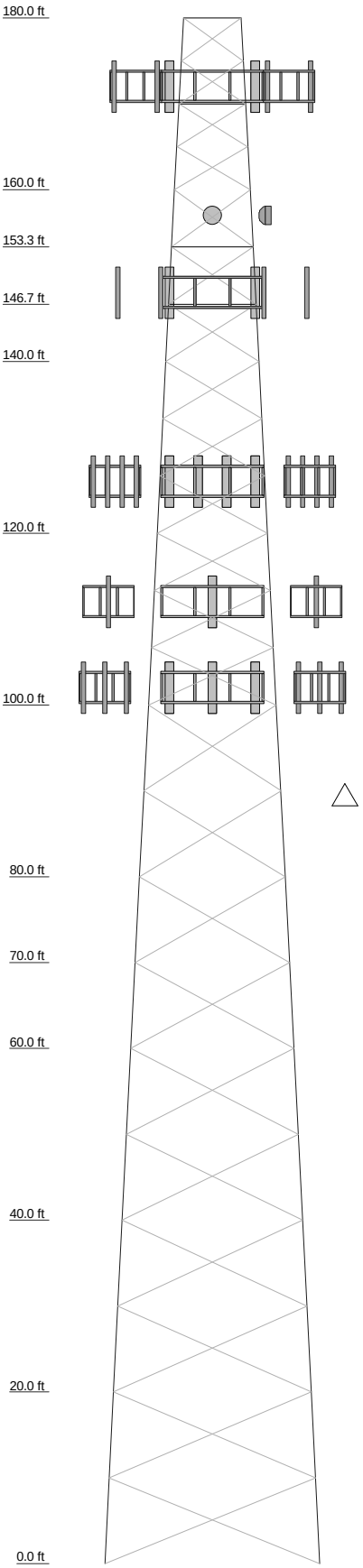
MOMENT
5139 kip-ft

TORQUE 33 kip-ft
REACTIONS - 85 mph WIND

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

Job: ***BRG 134 943057 (BU# 807133)***			
Project: ***146D6Y1400***			
Client: Crown Castle	Drawn by: Jarel Duncan	App'd:	
Code: TIA/EIA-222-F	Date: 12/17/14	Scale: NTS	
Path:		Dwg No. E-1	

Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS	ROHN 6 EH	ROHN 6 EHS	ROHN 5 EH	ROHN 4 EH	ROHN 4 EH	ROHN 4 EH	ROHN 3 EH
Leg Grade	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50
Diagonals	2L4x4x5/16x3/8	L4x4x5/16	L4x4x1/4	A	L3 1/2x3 1/2x1/4	L3 1/2x3 1/2x1/4	L3x3x1/4	L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x1/4	L2x2x3/16
Diagonal Grade	A36	A572-50	A572-50	A36	A572-50	A572-50	A572-50	A572-50	A36	A36	A36	A36
Top Girts				N.A.					L2x2x1/8	L2x2x1/8	N.A.	L2x2x1/8
Mid Girts					N.A.							L2x2x1/8
Face Width (ft)	25	23	21	19	17.9948	16.9896	14.8542	12.9167	10.8333	10.1432	9.45052	8.76042	6.6875
# Panels @ (ft)	31.7	7.7	5.0	3.8	2.4	1.7	3.0	2.7	2.2	0.7	0.6	0.6	1.2
Weight (K)				10 @ 10				9 @ 6.66667				4 @ 5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Empty Pipe Mount	178	(2) DB844G65ZAXY w/ Mount Pipe	126
Empty Pipe Mount	178	(2) DB844H80-XY w/ Mount Pipe	126
Side Arm Mount [SO 306-1]	178	(2) DB844G65ZAXY w/ Mount Pipe	126
Side Arm Mount [SO 306-1]	178	MG D3-800TV w/ Mount Pipe	126
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	172	MG D3-800TV w/ Mount Pipe	126
		MG D3-800TV w/ Mount Pipe	126
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	172	P65.16.XL.2 w/ Mount Pipe	126
		GPS_A	126
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	172	RRH2X40-AWS	126
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	172	RRH2X40-AWS	126
		RRH2X40-AWS	126
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	172	MG D3-800Tx w/ Mount Pipe	126
		MG D3-800Tx w/ Mount Pipe	126
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	172	MG D3-800Tx w/ Mount Pipe	126
		DB-T1-6Z-8AB-0Z	126
KRY 112 144/1	172	Sector Mount [SM 411-3]	126
KRY 112 144/1	172	LNX-6514DS-T4M w/ Mount Pipe	126
KRY 112 144/1	172	LNX-6514DS-T4M w/ Mount Pipe	126
(2) Empty Pipe Mount	172	800 10504 w/ Mount Pipe	112
(2) Empty Pipe Mount	172	Empty Mount Pipe	112
(2) Empty Pipe Mount	172	Empty Mount Pipe	112
Sector Mount [SM 602-3]	172	Empty Mount Pipe	112
Side Arm Mount [SO 311-1]	157	Sector Mount [SM 104-3]	112
Side Arm Mount [SO 311-1]	157	800 10504 w/ Mount Pipe	112
VHLP2-18	157	800 10504 w/ Mount Pipe	112
VHLP2-18	157	(2) 7770.00 w/ Mount Pipe	102
(3) ACU-A20-N	148	(2) LGP13519	102
(3) ACU-A20-N	148	(2) LGP13519	102
(3) ACU-A20-N	148	(2) LGP13519	102
APXVSPP18-C-A20 w/ Mount Pipe	148	(2) LGP2140X	102
APXVSPP18-C-A20 w/ Mount Pipe	148	(2) LGP2140X	102
APXVSPP18-C-A20 w/ Mount Pipe	148	(2) LGP2140X	102
APXVTM14-C-120 w/ Mount Pipe	148	(2) RRUS-11	102
APXVTM14-C-120 w/ Mount Pipe	148	(2) RRUS-11	102
APXVTM14-C-120 w/ Mount Pipe	148	(2) RRUS-11	102
TD-RRH8x20-25	148	P65-16-XLH-RR w/ Mount Pipe	102
TD-RRH8x20-25	148	P65-16-XLH-RR w/ Mount Pipe	102
TD-RRH8x20-25	148	P65-16-XLH-RR w/ Mount Pipe	102
Site Pro VFA12-U w/ 12' Stiff Arm	148	DC6-48-60-18-8F	102
800MHZ 2X50W RRH	143	Empty Mount Pipe	102
PCS 1900MHz 4x45W-65MHz	143	Empty Mount Pipe	102
PCS 1900MHz 4x45W-65MHz	143	Empty Mount Pipe	102
Side Arm Mount [SO 312-3]	143	Sector Mount [SM 301-3]	102
PCS 1900MHz 4x45W-65MHz	143	(2) 7770.00 w/ Mount Pipe	102
PCS 1900MHz 4x45W-65MHz	143	(2) 7770.00 w/ Mount Pipe	102
PCS 1900MHz 4x45W-65MHz	143	Side Arm Mount [SO 701-1]	30
PCS 1900MHz 4x45W-65MHz	143	Side Arm Mount [SO 701-1]	30
800 EXTERNAL NOTCH FILTER	143	GPS_A	30
800MHZ 2X50W RRH	143	GPS_A	30
800MHZ 2X50W RRH	143	Pipe Mount [PM 601-1]	12
800 EXTERNAL NOTCH FILTER	143	VG-1060	12
800 EXTERNAL NOTCH FILTER	143	GPS_A	12

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 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.

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

Job: ***BRG 134 943057 (BU# 807133)***			
Project: ***146D6Y1400***			
Client: Crown Castle	Drawn by: Jarel Duncan	App'd:	
Code: TIA/EIA-222-F	Date: 12/17/14	Scale: NTS	
Path:		Dwg No. E-1	

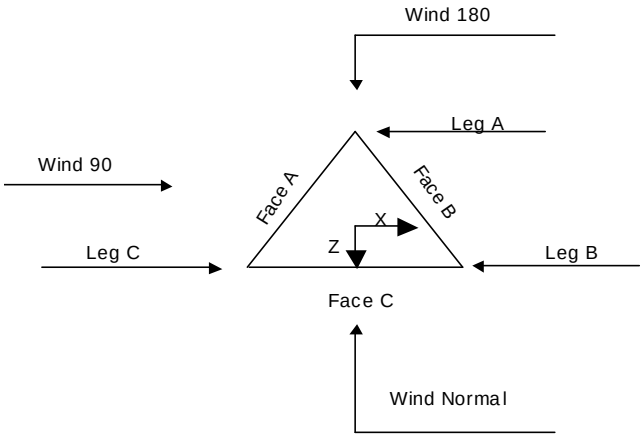
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 6'8-1/4" at the top and 25' at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 85 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 38 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 tower member 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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180'-160'			6'8-9/32"	1	20'
T2	160'-153'3-31/32"			8'9-1/8"	1	6'8-1/32"
T3	153'3-31/32"-146' 8-1/32"			9'5-13/32"	1	6'8-1/32"
T4	146'8-1/32"-140'			10'1-11/16"	1	6'8-1/32"
T5	140'-120'			10'9-31/32"	1	20'
T6	120'-100'			12'11-1/32"	1	20'
T7	100'-80'			14'10-3/16"	1	20'
T8	80'-70'			16'11-7/8"	1	10'
T9	70'-60'			17'11-7/8"	1	10'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180'-160'	5'	X Brace	No	No	0.0000	0.0000
T2	160'-153'3-31/32"	6'8-1/32"	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T3	153'3-31/32"-146' 8-1/32"	6'8-1/32"	X Brace	No	No	0.0000	0.0000
T4	146'8-1/32"-140'	6'8-1/32"	X Brace	No	No	0.0000	0.0000
T5	140'-120'	6'8-1/32"	X Brace	No	No	0.0000	0.0000
T6	120'-100'	6'8-1/32"	X Brace	No	No	0.0000	0.0000
T7	100'-80'	10'	X Brace	No	No	0.0000	0.0000
T8	80'-70'	10'	X Brace	No	No	0.0000	0.0000
T9	70'-60'	10'	X Brace	No	No	0.0000	0.0000
T10	60'-40'	10'	X Brace	No	No	0.0000	0.0000
T11	40'-20'	10'	X Brace	No	No	0.0000	0.0000
T12	20'-0'	10'	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180'-160'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-153'3-31/32"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153'3-31/32"-146' 8-1/32"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146'8-1/32"-140'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140'-120'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120'-100'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100'-80'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80'-70'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70'-60'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60'-40'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40'-20'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20'-0'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180'-160'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153'3-31/32"-146'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
8-1/32" T4 146'8-1/32"-140'	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180'-160'	1	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 180'-160'	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 160'-153'3-31/32"	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T3 153'3-31/32"-146'8-1/32"	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T4 146'8-1/32"-140'	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T5 140'-120'	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T6 120'-100'	0.00	0.2500	A36 (36 ksi)	1	1	1	30.0000	30.0000
T7 100'-80'	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T8 80'-70'	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T9 70'-60'	0.00	0.3750	A36 (36 ksi)	1	1	1	123.1250	30.0000
T10 60'-40'	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T11 40'-20'	0.00	0.3750	A36 (36 ksi)	1	1	1	30.0000	30.0000
T12 20'-0'	0.00	0.3750	A36 (36 ksi)	1	1	1	155.6250	30.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180'-160'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 160'-153'3-31/32"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 153'3-31/32"-146'8-1/32"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 146'8-1/32"-140'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 140'-120'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 120'-100'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 100'-80'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 80'-70'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 70'-60'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T12 20'-0'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 180'-160'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160'-153'3-31/32"	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 153'3-31/32"-146'8-1/32"	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 146'8-1/32"-140'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 140'-120'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120'-100'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T7 100'-80'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80'-70'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 70'-60'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 60'-40'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 40'-20'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 20'-0'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180'-160'	Flange	0.8750 A325X	4	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325N	0
T2 160'-153'3-31/32"	Flange	0.0000 A325X	0	0.6250 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T3 153'3-31/32"-146'8-1/32"	Flange	0.0000 A325X	0	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T4 146'8-1/32"-140'	Flange	1.0000 A325X	4	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T5 140'-120'	Flange	1.0000 A325X	6	0.6250 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T6 120'-100'	Flange	1.0000 A325X	6	0.6250 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T7 100'-80'	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T8 80'-70'	Flange	0.0000 A325X	0	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T9 70'-60'	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T10 60'-40'	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T11 40'-20'	Flange	1.0000 A325X	8	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0
T12 20'-0'	Flange	1.0000 A449	10	0.7500 A325X	1	0.0000 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*												

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Face A												
7983A(1/2")	A	Yes	Ar (CfAe)	157' - 0'	0.0000	-0.45	2	2	0.5000	0.5800		0.00
Feedline Ladder (Af) *	A	Yes	Af (CfAe)	157' - 0'	0.0000	-0.4	1	1	3.0000	3.0000	12.0000	0.01
MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4') *	A	Yes	Ar (CfAe)	148' - 0'	0.0000	-0.4	4	4	0.5000	1.2500		0.00
LCF158-50JA-A0(1 5/8")	A	Yes	Ar (CfAe)	172' - 0'	0.0500	0	7	3	0.5000	1.9800		0.00
LCF158-50JA-A0(1 5/8")	A	Yes	Ar (CfAe)	172' - 0'	0.0000	0	6	6	0.5000	1.9800		0.00
Feedline Ladder (Af) *	A	Yes	Af (CfAe)	172' - 0'	0.0000	0	1	1	3.0000	3.0000	12.0000	0.01
LDF1-50A(1/4")	A	Yes	Ar (CfAe)	12' - 0'	0.0000	0.42	2	2	0.3450	0.3450		0.00
Face B												
LDF7-50A(1-5/8")	B	Yes	Ar (CfAe)	112' - 0'	0.0000	0.35	6	6	0.5000	1.9800		0.00
Feedline Ladder (Af)	B	Yes	Af (CfAe)	113' - 0'	0.0000	0.35	1	1	3.0000	3.0000	12.0000	0.01
Safety Line 3/8	B	No	Ar (Leg)	180' - 0'	0.0000	0	1	1	0.3750	0.3750		0.00
Face C												
561(1-5/8")	C	Yes	Ar (CfAe)	126' - 0'	-3.0000	-0.3	19	10	0.5000	1.6250		0.00
Feedline Ladder (Af)	C	Yes	Af (CfAe)	128' - 0'	-1.0000	-0.3	2	1	3.0000	3.0000	12.0000	0.01
LDF4-50A(1/2") *	C	Yes	Ar (CaAa)	128' - 0'	0.0000	-0.3	1	1	0.5000	0.6300		0.00
LDF4-50A(1/2") *	C	Yes	Ar (CfAe)	30' - 0'	0.0000	0.15	2	2	0.5000	0.6300		0.00
CR 50 1873(1-5/8")	C	Yes	Ar (CfAe)	102' - 0'	0.0000	0.4	12	8	0.5000	1.9800		0.00
FB-L98-002-XXX(3/8)	C	Yes	Ar (CfAe)	102' - 0'	0.0000	0.4	1	1	0.3937	0.0000		0.00
WR-VG82ST-BRDA(5/8")	C	Yes	Ar (CfAe)	102' - 0'	0.0000	0.4	2	2	0.5000	0.0000		0.00
2" Rigid Conduit **	C	Yes	Ar (CfAe)	102' - 0'	0.0000	0.4	1	1	2.0000	2.0000		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
*							
**							

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
T1	180'-160'	A	17.820	3.000	0.000	0.000	0.21
		B	0.625	0.000	0.000	0.000	0.00
		C	0.625	0.000	0.000	0.000	0.00
T2	160'-153'3-31/32"	A	10.254	2.583	0.000	0.000	0.15
		B	0.208	0.000	0.000	0.000	0.00
		C	0.208	0.000	0.000	0.000	0.00
T3	153'3-31/32"-146' 8-1/32"	A	11.100	3.333	0.000	0.000	0.18
		B	0.208	0.000	0.000	0.000	0.00
		C	0.208	0.000	0.000	0.000	0.00
T4	146'8-1/32"-140'	A	13.322	3.333	0.000	0.000	0.19
		B	0.208	0.000	0.000	0.000	0.00
		C	0.208	0.000	0.000	0.000	0.00
T5	140'-120'	A	39.967	10.000	0.000	0.000	0.56
		B	0.625	0.000	0.000	0.000	0.00
		C	8.750	2.000	0.504	0.000	0.29
T6	120'-100'	A	39.967	10.000	0.000	0.000	0.56
		B	12.505	3.250	0.000	0.000	0.17
		C	30.682	5.000	1.260	0.000	0.88
T7	100'-80'	A	39.967	10.000	0.000	0.000	0.56
		B	20.425	5.000	0.000	0.000	0.27
		C	57.442	5.000	1.260	0.000	1.12
T8	80'-70'	A	19.983	5.000	0.000	0.000	0.28
		B	10.213	2.500	0.000	0.000	0.14
		C	28.721	2.500	0.630	0.000	0.56
T9	70'-60'	A	19.983	5.000	0.000	0.000	0.28
		B	10.213	2.500	0.000	0.000	0.14
		C	28.721	2.500	0.630	0.000	0.56
T10	60'-40'	A	39.967	10.000	0.000	0.000	0.56
		B	20.425	5.000	0.000	0.000	0.27
		C	57.442	5.000	1.260	0.000	1.12
T11	40'-20'	A	39.967	10.000	0.000	0.000	0.56
		B	20.425	5.000	0.000	0.000	0.27
		C	58.492	5.000	1.260	0.000	1.12
T12	20'-0'	A	40.657	10.000	0.000	0.000	0.56
		B	20.425	5.000	0.000	0.000	0.27
		C	59.542	5.000	1.260	0.000	1.13

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
T1	180'-160'	A	0.913	7.612	21.577	0.000	0.000	0.65
		B		3.668	0.000	0.000	0.000	0.03
		C		3.668	0.000	0.000	0.000	0.00
T2	160'-153'3-31/32"	A	0.904	4.939	13.596	0.000	0.000	0.42
		B		1.213	0.000	0.000	0.000	0.01
		C		1.213	0.000	0.000	0.000	0.00
T3	153'3-31/32"-146' 8-1/32"	A	0.899	5.859	15.494	0.000	0.000	0.48
		B		1.208	0.000	0.000	0.000	0.01
		C		1.208	0.000	0.000	0.000	0.00
T4	146'8-1/32"-140'	A	0.895	7.192	17.820	0.000	0.000	0.53
		B		1.202	0.000	0.000	0.000	0.01
		C		1.202	0.000	0.000	0.000	0.00
T5	140'-120'	A	0.884	21.438	53.413	0.000	0.000	1.57

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		3.572	0.000	0.000	0.000	0.03
		C		5.269	12.348	1.919	0.000	0.57
T6	120'-100'	A	0.867	21.204	53.335	0.000	0.000	1.55
		B		7.227	16.902	0.000	0.000	0.45
		C		10.929	41.777	4.726	0.000	1.77
T7	100'-80'	A	0.846	20.929	53.243	0.000	0.000	1.53
		B		9.565	27.547	0.000	0.000	0.69
		C		26.886	68.522	4.644	0.000	2.54
T8	80'-70'	A	0.828	10.343	26.581	0.000	0.000	0.75
		B		4.721	13.753	0.000	0.000	0.34
		C		13.260	34.240	2.285	0.000	1.26
T9	70'-60'	A	0.814	10.249	26.550	0.000	0.000	0.75
		B		4.674	13.737	0.000	0.000	0.34
		C		13.119	34.225	2.257	0.000	1.25
T10	60'-40'	A	0.788	20.161	52.987	0.000	0.000	1.47
		B		9.181	27.419	0.000	0.000	0.66
		C		25.734	68.394	4.413	0.000	2.46
T11	40'-20'	A	0.750	19.650	52.817	0.000	0.000	1.43
		B		8.925	27.333	0.000	0.000	0.64
		C		26.742	69.250	4.260	0.000	2.44
T12	20'-0'	A	0.750	21.495	53.507	0.000	0.000	1.45
		B		8.925	27.333	0.000	0.000	0.64
		C		28.517	70.192	4.260	0.000	2.46

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	180'-160'	A	0.000	2.619	2.004	2.868
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	160'-153'3-31/32"	A	0.000	1.067	0.994	1.476
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	153'3-31/32"-146'8-1/32"	A	0.000	1.693	1.452	2.215
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	146'8-1/32"-140'	A	0.000	1.935	1.650	2.543
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000
T5	140'-120'	A	0.000	3.897	3.584	5.510
		B	0.000	0.000	0.000	0.000
		C	0.000	0.814	0.756	1.150
T6	120'-100'	A	0.000	3.677	4.159	6.364
		B	0.000	1.021	1.259	1.768
		C	0.000	2.601	3.005	4.502
T7	100'-80'	A	0.000	2.533	3.443	5.241
		B	0.000	1.153	1.709	2.385
		C	0.000	3.224	4.332	6.669
T8	80'-70'	A	0.000	1.203	1.679	2.543
		B	0.000	0.548	0.833	1.159
		C	0.000	1.531	2.112	3.237
T9	70'-60'	A	0.000	1.162	1.657	2.500
		B	0.000	0.530	0.822	1.140
		C	0.000	1.480	2.084	3.183
T10	60'-40'	A	0.000	2.201	3.725	5.584

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
		B	0.000	1.006	1.849	2.551
		C	0.000	2.804	4.687	7.114
T11	40'-20'	A	0.000	2.036	3.659	5.429
		B	0.000	0.933	1.816	2.488
		C	0.000	2.671	4.681	7.122
T12	20'-0'	A	0.000	2.077	3.659	5.538
		B	0.000	0.920	1.791	2.453
		C	0.000	2.708	4.692	7.220

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180'-160'	-4.7141	-2.7217	-1.4837	-0.8566
T2	160'-153'3-31/32"	-8.7413	-3.5230	-4.4589	-1.5128
T3	153'3-31/32"-146'8-1/32"	-9.5489	-2.4480	-4.6753	-0.8045
T4	146'8-1/32"-140'	-11.8423	-1.4562	-5.9352	-0.2747
T5	140'-120'	-9.9542	0.9639	-4.8782	1.7255
T6	120'-100'	-0.1371	7.0750	1.8570	6.3886
T7	100'-80'	-4.6088	13.6395	-2.3073	11.9831
T8	80'-70'	-4.6251	13.7447	-2.4035	12.3790
T9	70'-60'	-4.8393	14.4143	-2.5408	13.0079
T10	60'-40'	-4.9294	14.7376	-2.6135	13.4539
T11	40'-20'	-5.3979	16.0583	-2.9233	14.6061
T12	20'-0'	-5.8686	17.0076	-3.1620	15.4093

Discrete Tower Loads

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
Empty Pipe Mount	A	From Leg	4.00 0' 0'	0.0000	178'	No Ice	1.00	1.00	0.01
						1/2" Ice	1.39	1.39	0.02
						1" Ice	1.70	1.70	0.03
						2" Ice	2.35	2.35	0.06
						4" Ice	3.78	3.78	0.18
Empty Pipe Mount	B	From Leg	4.00 0' 0'	0.0000	178'	No Ice	1.00	1.00	0.01
						1/2" Ice	1.39	1.39	0.02
						1" Ice	1.70	1.70	0.03
						2" Ice	2.35	2.35	0.06
						4" Ice	3.78	3.78	0.18
Side Arm Mount [SO 306-1]	A	From Leg	2.00 0' 0'	0.0000	178'	No Ice	0.98	2.18	0.04
						1/2" Ice	1.70	3.80	0.06
						1" Ice	2.42	5.42	0.08
						2" Ice	3.86	8.66	0.12
						4" Ice	6.74	15.14	0.20

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
Side Arm Mount [SO 306-1]	B	From Leg	2.00 0' 0'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	2.18 3.80 5.42 8.66 15.14	0.04 0.06 0.08 0.12 0.20
*									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
KRY 112 144/1	A	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	B	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Leg	4.00 0' 1'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.60 0.82 1.36	0.19 0.26 0.33 0.51 0.97	0.01 0.01 0.02 0.03 0.08
(2) Empty Pipe Mount	A	From Leg	4.00 0' 0'	0.0000	172'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.05 1.67 2.09 2.85 4.48	1.05 1.67 2.09 2.85 4.48	0.02 0.03 0.04 0.08 0.21
(2) Empty Pipe Mount	B	From Leg	4.00	0.0000	172'	No Ice	1.05	1.05	0.02

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
			0'			1/2" Ice	1.67	1.67	0.03
			0'			1" Ice	2.09	2.09	0.04
						2" Ice	2.85	2.85	0.08
						4" Ice	4.48	4.48	0.21
(2) Empty Pipe Mount	C	From Leg	4.00	0.0000	172'	No Ice	1.05	1.05	0.02
			0'			1/2" Ice	1.67	1.67	0.03
			0'			1" Ice	2.09	2.09	0.04
						2" Ice	2.85	2.85	0.08
						4" Ice	4.48	4.48	0.21
Sector Mount [SM 602-3]	C	None		0.0000	172'	No Ice	33.11	33.11	1.54
						1/2" Ice	44.90	44.90	2.16
						1" Ice	56.69	56.69	2.78
						2" Ice	80.27	80.27	4.01
						4" Ice	127.43	127.43	6.49
*									
Side Arm Mount [SO 311-1]	A	From Leg	0.50	0.0000	157'	No Ice	2.97	3.51	0.06
			0'			1/2" Ice	4.39	5.33	0.09
			0'			1" Ice	5.81	7.15	0.13
						2" Ice	8.65	10.79	0.19
						4" Ice	14.33	18.07	0.32
Side Arm Mount [SO 311-1]	B	From Leg	0.50	0.0000	157'	No Ice	2.97	3.51	0.06
			0'			1/2" Ice	4.39	5.33	0.09
			0'			1" Ice	5.81	7.15	0.13
						2" Ice	8.65	10.79	0.19
						4" Ice	14.33	18.07	0.32
*									
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00	0.0000	143'	No Ice	0.77	0.37	0.01
			0'			1/2" Ice	0.89	0.46	0.02
			2'			1" Ice	1.02	0.56	0.02
						2" Ice	1.30	0.79	0.04
						4" Ice	1.97	1.34	0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00	0.0000	143'	No Ice	0.77	0.37	0.01
			0'			1/2" Ice	0.89	0.46	0.02
			2'			1" Ice	1.02	0.56	0.02
						2" Ice	1.30	0.79	0.04
						4" Ice	1.97	1.34	0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00	0.0000	143'	No Ice	0.77	0.37	0.01
			0'			1/2" Ice	0.89	0.46	0.02
			2'			1" Ice	1.02	0.56	0.02
						2" Ice	1.30	0.79	0.04
						4" Ice	1.97	1.34	0.11
800MHZ 2X50W RRH	A	From Leg	4.00	0.0000	143'	No Ice	2.49	2.07	0.05
			0'			1/2" Ice	2.71	2.27	0.07
			2'			1" Ice	2.93	2.48	0.10
						2" Ice	3.41	2.93	0.16
						4" Ice	4.46	3.93	0.32
800MHZ 2X50W RRH	B	From Leg	4.00	0.0000	143'	No Ice	2.49	2.07	0.05
			0'			1/2" Ice	2.71	2.27	0.07
			2'			1" Ice	2.93	2.48	0.10
						2" Ice	3.41	2.93	0.16
						4" Ice	4.46	3.93	0.32
800MHZ 2X50W RRH	C	From Leg	4.00	0.0000	143'	No Ice	2.49	2.07	0.05
			0'			1/2" Ice	2.71	2.27	0.07
			2'			1" Ice	2.93	2.48	0.10
						2" Ice	3.41	2.93	0.16
						4" Ice	4.46	3.93	0.32
PCS 1900MHz	A	From Leg	4.00	0.0000	143'	No Ice	2.71	2.61	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4x45W-65MHz			0'			1/2" Ice	2.95	2.85	0.08
			-1'			1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz	B	From Leg	4.00	0.0000	143'	No Ice	2.71	2.61	0.06
4x45W-65MHz			0'			1/2" Ice	2.95	2.85	0.08
			-1'			1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz	C	From Leg	4.00	0.0000	143'	No Ice	2.71	2.61	0.06
4x45W-65MHz			0'			1/2" Ice	2.95	2.85	0.08
			-1'			1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz	A	From Leg	4.00	0.0000	143'	No Ice	2.71	2.61	0.06
4x45W-65MHz			0'			1/2" Ice	2.95	2.85	0.08
			2'			1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz	B	From Leg	4.00	0.0000	143'	No Ice	2.71	2.61	0.06
4x45W-65MHz			0'			1/2" Ice	2.95	2.85	0.08
			2'			1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz	C	From Leg	4.00	0.0000	143'	No Ice	2.71	2.61	0.06
4x45W-65MHz			0'			1/2" Ice	2.95	2.85	0.08
			2'			1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
(3) ACU-A20-N	A	From Leg	4.00	0.0000	148'	No Ice	0.08	0.14	0.00
			0'			1/2" Ice	0.12	0.19	0.00
			0'			1" Ice	0.17	0.25	0.00
						2" Ice	0.30	0.40	0.01
						4" Ice	0.67	0.80	0.04
(3) ACU-A20-N	B	From Leg	4.00	0.0000	148'	No Ice	0.08	0.14	0.00
			0'			1/2" Ice	0.12	0.19	0.00
			0'			1" Ice	0.17	0.25	0.00
						2" Ice	0.30	0.40	0.01
						4" Ice	0.67	0.80	0.04
(3) ACU-A20-N	C	From Leg	4.00	0.0000	148'	No Ice	0.08	0.14	0.00
			0'			1/2" Ice	0.12	0.19	0.00
			0'			1" Ice	0.17	0.25	0.00
						2" Ice	0.30	0.40	0.01
						4" Ice	0.67	0.80	0.04
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	148'	No Ice	8.50	6.95	0.08
			0'			1/2" Ice	9.15	8.13	0.15
			0'			1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	148'	No Ice	8.50	6.95	0.08
			0'			1/2" Ice	9.15	8.13	0.15
			0'			1" Ice	9.77	9.02	0.23
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	148'	No Ice	8.50	6.95	0.08
			0'			1/2" Ice	9.15	8.13	0.15
			0'			1" Ice	9.77	9.02	0.23

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" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
Side Arm Mount [SO 312-3]	C	None		0.0000	143'	No Ice	7.87	7.87	0.21
						1/2" Ice	11.82	11.82	0.32
						1" Ice	15.77	15.77	0.43
						2" Ice	23.67	23.67	0.65
						4" Ice	39.47	39.47	1.08
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	148'	No Ice	7.13	4.96	0.08
						1/2" Ice	7.66	5.75	0.13
						1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34
						4" Ice	11.53	11.41	0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	148'	No Ice	7.13	4.96	0.08
						1/2" Ice	7.66	5.75	0.13
						1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34
						4" Ice	11.53	11.41	0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	148'	No Ice	7.13	4.96	0.08
						1/2" Ice	7.66	5.75	0.13
						1" Ice	8.18	6.47	0.19
						2" Ice	9.26	8.01	0.34
						4" Ice	11.53	11.41	0.75
TD-RRH8x20-25	A	From Leg	4.00 0' 0'	0.0000	148'	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
TD-RRH8x20-25	B	From Leg	4.00 0' 0'	0.0000	148'	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
TD-RRH8x20-25	C	From Leg	4.00 0' 0'	0.0000	148'	No Ice	4.72	1.70	0.07
						1/2" Ice	5.01	1.92	0.10
						1" Ice	5.32	2.14	0.13
						2" Ice	5.95	2.62	0.20
						4" Ice	7.31	3.68	0.40
Site Pro VFA12-U w/ 12' Stiff Arm	C	None		0.0000	148'	No Ice	33.02	33.02	1.67
						1/2" Ice	47.36	47.36	2.22
						1" Ice	61.70	61.70	2.77
						2" Ice	90.38	90.38	3.88
						4" Ice	147.74	147.74	6.08
*									
*									
LNX-6514DS-T4M w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice	8.57	7.00	0.06
						1/2" Ice	9.22	8.19	0.13
						1" Ice	9.84	9.08	0.20
						2" Ice	11.10	10.90	0.38
						4" Ice	13.75	14.93	0.89
LNX-6514DS-T4M w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice	8.57	7.00	0.06
						1/2" Ice	9.22	8.19	0.13
						1" Ice	9.84	9.08	0.20
						2" Ice	11.10	10.90	0.38
						4" Ice	13.75	14.93	0.89
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice	4.90	4.92	0.03
						1/2" Ice	5.35	5.60	0.08
						1" Ice	5.80	6.28	0.13

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	6.73	7.71	0.26
						4" Ice	8.73	10.83	0.62
(2) DB844H80-XY w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice	3.10	5.15	0.03
						1/2" Ice	3.48	5.83	0.07
						1" Ice	3.88	6.52	0.11
						2" Ice	4.76	7.96	0.22
						4" Ice	6.66	11.09	0.55
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice	4.90	4.92	0.03
						1/2" Ice	5.35	5.60	0.08
						1" Ice	5.80	6.28	0.13
						2" Ice	6.73	7.71	0.26
						4" Ice	8.73	10.83	0.62
MG D3-800TV w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice	3.57	3.42	0.04
						1/2" Ice	3.98	4.12	0.07
						1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800TV w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice	3.57	3.42	0.04
						1/2" Ice	3.98	4.12	0.07
						1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
MG D3-800TV w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice	3.57	3.42	0.04
						1/2" Ice	3.98	4.12	0.07
						1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52
P65.16.XL.2 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice	8.64	5.78	0.06
						1/2" Ice	9.29	6.95	0.12
						1" Ice	9.91	7.83	0.19
						2" Ice	11.18	9.63	0.36
						4" Ice	13.83	13.44	0.84
GPS_A	B	From Leg	4.00 0' 4'	0.0000	126'	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00
						1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
RRH2X40-AWS	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						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' 2'	0.0000	126'	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						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' 2'	0.0000	126'	No Ice	2.52	1.59	0.04
						1/2" Ice	2.75	1.80	0.06
						1" Ice	2.99	2.01	0.08
						2" Ice	3.50	2.46	0.13
						4" Ice	4.61	3.48	0.28
MG D3-800Tx w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice	3.57	3.42	0.03
						1/2" Ice	3.98	4.12	0.07
						1" Ice	4.39	4.78	0.11
						2" Ice	5.33	6.16	0.21
						4" Ice	7.34	9.18	0.52

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
MG D3-800Tx w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	0.03 0.07 0.11 0.21 0.52
MG D3-800Tx w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.57 3.98 4.39 5.33 7.34	3.42 4.12 4.78 6.16 9.18	0.03 0.07 0.11 0.21 0.52
DB-T1-6Z-8AB-0Z	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
Sector Mount [SM 411-3]	C	None		0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	21.88 30.68 39.48 57.08 92.28	21.88 30.68 39.48 57.08 92.28	1.07 1.48 1.90 2.73 4.40
*									
800 10504 w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.04 0.07 0.11 0.21 0.51
800 10504 w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.04 0.07 0.11 0.21 0.51
800 10504 w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.59 4.01 4.42 5.34 7.38	3.18 3.91 4.58 5.98 8.98	0.04 0.07 0.11 0.21 0.51
Empty Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 2.13 2.68 3.56 5.42	1.40 2.13 2.68 3.56 5.42	0.03 0.04 0.06 0.10 0.26
Empty Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 2.13 2.68 3.56 5.42	1.40 2.13 2.68 3.56 5.42	0.03 0.04 0.06 0.10 0.26
Empty Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.40 2.13 2.68 3.56 5.42	1.40 2.13 2.68 3.56 5.42	0.03 0.04 0.06 0.10 0.26
Sector Mount [SM 104-3]	C	None		0.0000	112'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	30.02 40.48 50.94 71.86 113.70	30.02 40.48 50.94 71.86 113.70	0.95 1.40 1.86 2.76 4.57
*									

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) 7770.00 w/ Mount Pipe	A	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) LGP13519	A	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	0.01 0.01 0.01 0.02 0.07
(2) LGP13519	B	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	0.01 0.01 0.01 0.02 0.07
(2) LGP13519	C	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	0.01 0.01 0.01 0.02 0.07
(2) LGP2140X	A	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	B	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	C	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(2) RRUS-11	A	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	0.06 0.07 0.10 0.15 0.30
(2) RRUS-11	B	From Leg	1.00 0' 0'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.94 3.17 3.41 3.91 5.02	1.25 1.41 1.59 1.96 2.82	0.06 0.07 0.10 0.15 0.30
(2) RRUS-11	C	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	0.06 0.07

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'			1" Ice	3.41	1.59	0.10
						2" Ice	3.91	1.96	0.15
						4" Ice	5.02	2.82	0.30
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	8.64 9.29	6.36 7.54	0.08 0.14
			0'			1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	8.64 9.29	6.36 7.54	0.08 0.14
			0'			1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	8.64 9.29	6.36 7.54	0.08 0.14
			0'			1" Ice	9.91	8.43	0.22
						2" Ice	11.18	10.24	0.39
						4" Ice	13.83	14.10	0.89
DC6-48-60-18-8F	B	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	2.57 2.80	4.32 4.60	0.03 0.06
			0'			1" Ice	3.04	4.88	0.10
						2" Ice	3.54	5.49	0.18
						4" Ice	4.66	6.80	0.40
Empty Mount Pipe	A	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	1.40 2.13	1.40 2.13	0.03 0.04
			0'			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	1.00 0'	0.0000	102'	No Ice 1/2" Ice	1.40 2.13	1.40 2.13	0.03 0.04
			0'			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	C	From Leg	1.00 0'	0.0000	102'	No Ice 1/2" Ice	1.40 2.13	1.40 2.13	0.03 0.04
			0'			1" Ice	2.68	2.68	0.06
						2" Ice	3.56	3.56	0.10
						4" Ice	5.42	5.42	0.26
Sector Mount [SM 301-3]	C	None		0.0000	102'	No Ice	29.61	1.00	1.30
						1/2" Ice	39.80	1.20	1.84
						1" Ice	49.99	1.40	2.38
						2" Ice	70.37	1.80	3.46
						4" Ice	111.13	2.60	5.63
*									
GPS_A	B	From Leg	2.00 0'	0.0000	30'	No Ice 1/2" Ice	0.30 0.37	0.30 0.37	0.00 0.00
			0'			1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
GPS_A	C	From Leg	2.00 0'	0.0000	30'	No Ice 1/2" Ice	0.30 0.37	0.30 0.37	0.00 0.00
			0'			1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Side Arm Mount [SO 701-1]	B	From Leg	1.00 0'	0.0000	30'	No Ice 1/2" Ice	0.85 1.14	1.67 2.34	0.07 0.08
			0'			1" Ice	1.43	3.01	0.09

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" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0' 0'	0.0000	30'	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18
*									
VG-1060	A	From Face	1.00 0' 0'	0.0000	12'	No Ice	0.13	0.13	0.00
						1/2" Ice	0.22	0.22	0.00
						1" Ice	0.31	0.31	0.01
						2" Ice	0.53	0.53	0.01
						4" Ice	1.11	1.11	0.05
GPS_A	A	From Face	1.00 0' 0'	0.0000	12'	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00
						1" Ice	0.46	0.46	0.01
						2" Ice	0.65	0.65	0.02
						4" Ice	1.15	1.15	0.08
Pipe Mount [PM 601-1]	A	From Face	0.00 0' 0'	0.0000	12'	No Ice	3.00	0.90	0.07
						1/2" Ice	3.74	1.12	0.08
						1" Ice	4.48	1.34	0.09
						2" Ice	5.96	1.78	0.12
						4" Ice	8.92	2.66	0.18
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0' 0'	-10.0000		157'	2.17	No Ice	3.72	0.03
									1/2" Ice	4.01	0.05
									1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP2-18	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0' 0'	-40.0000		157'	2.17	No Ice	3.72	0.03
									1/2" Ice	4.01	0.05
									1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
*											

Tower Pressures - No Ice

G_H = 1.121

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		ksf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1 180'-160'	170'	1.597	0	160.320	A	15.113	29.508	11.688	26.19	0.000	0.000
					B	14.117	12.313		44.22	0.000	0.000
					C	14.117	12.313		44.22	0.000	0.000
T2 160'-153'3-31/32"	156'8-1/32"	1.561	0	63.206	A	6.120	15.263	5.009	23.42	0.000	0.000
					B	4.531	5.217		51.38	0.000	0.000
					C	4.531	5.217		51.38	0.000	0.000
T3 153'3-31/32"-146'8-1/32"	150'	1.541	0	67.816	A	8.143	16.109	5.009	20.65	0.000	0.000
					B	6.262	5.217		43.64	0.000	0.000
					C	6.262	5.217		43.64	0.000	0.000
T4 146'8-1/32"-140'	143'3-31/32"	1.521	0	72.425	A	8.305	18.331	5.009	18.80	0.000	0.000
					B	6.622	5.217		42.31	0.000	0.000
					C	6.622	5.217		42.31	0.000	0.000
T5 140'-120'	130'	1.48	0	246.784	A	22.801	58.544	18.577	22.84	0.000	0.000
					B	16.385	19.202		52.20	0.000	0.000
					C	17.628	27.327		41.32	0.504	0.000
T6 120'-100'	110'	1.411	0	288.763	A	28.056	62.085	22.118	24.54	0.000	0.000
					B	24.205	34.623		37.60	0.000	0.000
					C	24.209	52.800		28.72	1.260	0.000
T7 100'-80'	90'	1.332	0	329.495	A	27.737	62.092	22.125	24.63	0.000	0.000
					B	24.471	42.550		33.01	0.000	0.000
					C	21.848	79.567		21.82	1.260	0.000
T8 80'-70'	75'	1.264	0	182.118	A	14.649	34.383	14.399	29.37	0.000	0.000
					B	12.995	24.612		38.29	0.000	0.000
					C	11.716	43.120		26.26	0.630	0.000
T9 70'-60'	65'	1.214	0	192.171	A	15.134	34.383	14.399	29.08	0.000	0.000
					B	13.468	24.612		37.81	0.000	0.000
					C	12.206	43.120		26.03	0.630	0.000
T10 60'-40'	50'	1.126	0	414.393	A	35.022	68.765	28.798	27.75	0.000	0.000
					B	31.898	49.223		35.50	0.000	0.000
					C	29.060	86.240		24.98	1.260	0.000
T11 40'-20'	30'	1	0	454.393	A	37.513	68.765	28.798	27.10	0.000	0.000
					B	34.356	49.223		34.46	0.000	0.000
					C	31.491	87.290		24.24	1.260	0.000
T12 20'-0'	10'	1	0	494.393	A	39.973	69.455	28.798	26.32	0.000	0.000
					B	36.840	49.223		33.46	0.000	0.000
					C	33.939	88.340		23.55	1.260	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		ksf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1 180'-160'	170'	1.597	0	0.9130	163.368	A	32.826	35.668	17.785	25.97	0.000	0.000
						B	14.117	34.344		36.70	0.000	0.000
						C	14.117	34.344		36.70	0.000	0.000
T2 160'-153'3-31/32"	156'8-1/32"	1.561	0	0.9041	64.212	A	16.651	14.170	7.022	22.78	0.000	0.000
						B	4.531	11.512		43.77	0.000	0.000
						C	4.531	11.512		43.77	0.000	0.000
T3 153'3-31/32"-146'8-1/32"	150'	1.541	0	0.8994	68.817	A	19.540	15.955	7.011	19.75	0.000	0.000
						B	6.262	12.997		36.41	0.000	0.000
						C	6.262	12.997		36.41	0.000	0.000
T4	143'3-31/32'	1.521	0	0.8945	73.420	A	21.898	17.288	7.000	17.86	0.000	0.000

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		ksf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
146'8-1/32"-140'	'					B	6.622	13.233		35.26	0.000	0.000
						C	6.622	13.233		35.26	0.000	0.000
T5 140'-120'	130'	1.48	0	0.8841	249.735	A	64.288	53.612	24.482	20.76	0.000	0.000
						B	16.385	39.643		43.70	0.000	0.000
						C	27.583	40.526		35.94	1.919	0.000
T6 120'-100'	110'	1.411	0	0.8666	291.655	A	69.185	58.265	27.904	21.89	0.000	0.000
						B	37.348	46.943		33.10	0.000	0.000
						C	59.490	49.066		25.70	4.726	0.000
T7 100'-80'	90'	1.332	0	0.8460	332.319	A	69.182	56.410	27.776	22.12	0.000	0.000
						B	46.342	46.426		29.94	0.000	0.000
						C	83.033	61.676		19.19	4.644	0.000
T8 80'-70'	75'	1.264	0	0.8277	183.500	A	35.366	31.660	17.163	25.61	0.000	0.000
						B	23.922	26.693		33.91	0.000	0.000
						C	42.331	34.249		22.41	2.285	0.000
T9 70'-60'	65'	1.214	0	0.8136	193.528	A	35.840	31.683	17.116	25.35	0.000	0.000
						B	24.388	26.741		33.48	0.000	0.000
						C	42.832	34.236		22.21	2.257	0.000
T10 60'-40'	50'	1.126	0	0.7883	417.024	A	76.150	63.354	34.062	24.42	0.000	0.000
						B	53.614	53.568		31.78	0.000	0.000
						C	90.026	68.323		21.51	4.413	0.000
T11 40'-20'	30'	1	0	0.7500	456.896	A	78.559	63.110	33.806	23.86	0.000	0.000
						B	56.018	53.488		30.87	0.000	0.000
						C	93.300	69.566		20.76	4.260	0.000
T12 20'-0'	10'	1	0	0.7500	496.896	A	81.601	65.836	33.806	22.93	0.000	0.000
						B	58.511	54.423		29.93	0.000	0.000
						C	96.603	72.227		20.02	4.260	0.000

Tower Pressure - Service

G_H = 1.121

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		ksf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1 180'-160'	170'	1.597	0	160.320	A	15.113	29.508	11.688	26.19	0.000	0.000
					B	14.117	12.313		44.22	0.000	0.000
					C	14.117	12.313		44.22	0.000	0.000
T2 160'-153'3-31/32"	156'8-1/32"	1.561	0	63.206	A	6.120	15.263	5.009	23.42	0.000	0.000
	'				B	4.531	5.217		51.38	0.000	0.000
					C	4.531	5.217		51.38	0.000	0.000
T3 153'3-31/32"-146'8-1/32"	150'	1.541	0	67.816	A	8.143	16.109	5.009	20.65	0.000	0.000
					B	6.262	5.217		43.64	0.000	0.000
					C	6.262	5.217		43.64	0.000	0.000
T4 146'8-1/32"-140'	143'3-31/32"	1.521	0	72.425	A	8.305	18.331	5.009	18.80	0.000	0.000
					B	6.622	5.217		42.31	0.000	0.000
					C	6.622	5.217		42.31	0.000	0.000
T5 140'-120'	130'	1.48	0	246.784	A	22.801	58.544	18.577	22.84	0.000	0.000
					B	16.385	19.202		52.20	0.000	0.000
					C	17.628	27.327		41.32	0.504	0.000
T6 120'-100'	110'	1.411	0	288.763	A	28.056	62.085	22.118	24.54	0.000	0.000
					B	24.205	34.623		37.60	0.000	0.000
					C	24.209	52.800		28.72	1.260	0.000
T7 100'-80'	90'	1.332	0	329.495	A	27.737	62.092	22.125	24.63	0.000	0.000
					B	24.471	42.550		33.01	0.000	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		ksf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
					C	21.848	79.567		21.82	1.260	0.000
T8 80'-70'	75'	1.264	0	182.118	A	14.649	34.383	14.399	29.37	0.000	0.000
					B	12.995	24.612		38.29	0.000	0.000
					C	11.716	43.120		26.26	0.630	0.000
T9 70'-60'	65'	1.214	0	192.171	A	15.134	34.383	14.399	29.08	0.000	0.000
					B	13.468	24.612		37.81	0.000	0.000
					C	12.206	43.120		26.03	0.630	0.000
T10 60'-40'	50'	1.126	0	414.393	A	35.022	68.765	28.798	27.75	0.000	0.000
					B	31.898	49.223		35.50	0.000	0.000
					C	29.060	86.240		24.98	1.260	0.000
T11 40'-20'	30'	1	0	454.393	A	37.513	68.765	28.798	27.10	0.000	0.000
					B	34.356	49.223		34.46	0.000	0.000
					C	31.491	87.290		24.24	1.260	0.000
T12 20'-0'	10'	1	0	494.393	A	39.973	69.455	28.798	26.32	0.000	0.000
					B	36.840	49.223		33.46	0.000	0.000
					C	33.939	88.340		23.55	1.260	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	R_R	D_F	D_R	A_E	F	w	Ctrl. Face
ft	K	K							ft^2	K	klf	
T1 180'-160'	0.22	1.23	A	0.278	2.355	0.61	1	1	33.098	2.58	0.13	A
			B	0.165	2.718	0.584	1	1	21.306			
			C	0.165	2.718	0.584	1	1	21.306			
T2 160'-153'3-31/32"	0.15	0.57	A	0.338	2.199	0.628	1	1	15.711	1.12	0.17	A
			B	0.154	2.756	0.582	1	1	7.568			
			C	0.154	2.756	0.582	1	1	7.568			
T3 153'3-31/32"-146'8-1/32"	0.18	0.64	A	0.358	2.154	0.635	1	1	18.376	1.26	0.19	A
			B	0.169	2.702	0.585	1	1	9.312			
			C	0.169	2.702	0.585	1	1	9.312			
T4 146'8-1/32"-140'	0.19	0.65	A	0.368	2.131	0.639	1	1	20.019	1.35	0.20	A
			B	0.163	2.723	0.584	1	1	9.667			
			C	0.163	2.723	0.584	1	1	9.667			
T5 140'-120'	0.86	2.24	A	0.33	2.22	0.625	1	1	59.415	4.06	0.20	A
			B	0.144	2.793	0.581	1	1	27.533			
			C	0.182	2.657	0.587	1	1	33.667			
T6 120'-100'	1.61	2.73	A	0.312	2.264	0.62	1	1	66.529	4.44	0.22	A
			B	0.204	2.584	0.591	1	1	44.673			
			C	0.267	2.388	0.606	1	1	56.220			
T7 100'-80'	1.95	3.02	A	0.273	2.371	0.608	1	1	65.483	4.50	0.22	C
			B	0.203	2.585	0.591	1	1	49.622			
			C	0.308	2.275	0.618	1	1	71.045			
T8 80'-70'	0.98	1.69	A	0.269	2.381	0.607	1	1	35.518	2.32	0.23	C
			B	0.206	2.574	0.592	1	1	27.558			
			C	0.301	2.293	0.616	1	1	38.288			
T9 70'-60'	0.98	2.45	A	0.258	2.415	0.604	1	1	35.896	2.28	0.23	C
			B	0.198	2.602	0.59	1	1	27.990			
			C	0.288	2.329	0.612	1	1	38.607			
T10 60'-40'	1.95	3.76	A	0.25	2.436	0.602	1	1	76.417	4.52	0.23	C
			B	0.196	2.61	0.59	1	1	60.917			
			C	0.278	2.355	0.609	1	1	81.622			
T11 40'-20'	1.96	4.98	A	0.234	2.487	0.598	1	1	78.627	4.23	0.21	C
			B	0.184	2.651	0.587	1	1	63.262			
			C	0.261	2.404	0.605	1	1	84.288			
T12 20'-0'	1.96	7.71	A	0.221	2.526	0.595	1	1	81.297	4.44	0.22	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
			B	0.174	2.685	0.585	1	1	65.658			
			C	0.247	2.446	0.601	1	1	87.049			
Sum Weight:	12.99	31.66						OTM	3137.09 kip-ft	37.09		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.22	1.23	A	0.278	2.355	0.61	0.8	1	30.076	2.35	0.12	A
			B	0.165	2.718	0.584	0.8	1	18.483			
			C	0.165	2.718	0.584	0.8	1	18.483			
T2 160'-153'3-31/32"	0.15	0.57	A	0.338	2.199	0.628	0.8	1	14.487	1.03	0.15	A
			B	0.154	2.756	0.582	0.8	1	6.662			
			C	0.154	2.756	0.582	0.8	1	6.662			
T3 153'3-31/32"-146'8-1/32"	0.18	0.64	A	0.358	2.154	0.635	0.8	1	16.747	1.15	0.17	A
			B	0.169	2.702	0.585	0.8	1	8.060			
			C	0.169	2.702	0.585	0.8	1	8.060			
T4 146'8-1/32"-140'	0.19	0.65	A	0.368	2.131	0.639	0.8	1	18.358	1.23	0.19	A
			B	0.163	2.723	0.584	0.8	1	8.342			
			C	0.163	2.723	0.584	0.8	1	8.342			
T5 140'-120'	0.86	2.24	A	0.33	2.22	0.625	0.8	1	54.854	3.75	0.19	A
			B	0.144	2.793	0.581	0.8	1	24.257			
			C	0.182	2.657	0.587	0.8	1	30.142			
T6 120'-100'	1.61	2.73	A	0.312	2.264	0.62	0.8	1	60.918	4.07	0.20	A
			B	0.204	2.584	0.591	0.8	1	39.832			
			C	0.267	2.388	0.606	0.8	1	51.378			
T7 100'-80'	1.95	3.02	A	0.273	2.371	0.608	0.8	1	59.935	4.22	0.21	C
			B	0.203	2.585	0.591	0.8	1	44.728			
			C	0.308	2.275	0.618	0.8	1	66.676			
T8 80'-70'	0.98	1.69	A	0.269	2.381	0.607	0.8	1	32.588	2.18	0.22	C
			B	0.206	2.574	0.592	0.8	1	24.960			
			C	0.301	2.293	0.616	0.8	1	35.945			
T9 70'-60'	0.98	2.45	A	0.258	2.415	0.604	0.8	1	32.869	2.13	0.21	C
			B	0.198	2.602	0.59	0.8	1	25.296			
			C	0.288	2.329	0.612	0.8	1	36.166			
T10 60'-40'	1.95	3.76	A	0.25	2.436	0.602	0.8	1	69.413	4.20	0.21	C
			B	0.196	2.61	0.59	0.8	1	54.537			
			C	0.278	2.355	0.609	0.8	1	75.810			
T11 40'-20'	1.96	4.98	A	0.234	2.487	0.598	0.8	1	71.124	3.91	0.20	C
			B	0.184	2.651	0.587	0.8	1	56.391			
			C	0.261	2.404	0.605	0.8	1	77.990			
T12 20'-0'	1.96	7.71	A	0.221	2.526	0.595	0.8	1	73.303	4.10	0.20	C
			B	0.174	2.685	0.585	0.8	1	58.290			
			C	0.247	2.446	0.601	0.8	1	80.261			
Sum Weight:	12.99	31.66						OTM	2895.90 kip-ft	34.33		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.22	1.23	A	0.278	2.355	0.61	0.85	1	30.831	2.40	0.12	A
			B	0.165	2.718	0.584	0.85	1	19.189			
			C	0.165	2.718	0.584	0.85	1	19.189			
T2 160'-153'3-31/32"	0.15	0.57	A	0.338	2.199	0.628	0.85	1	14.793	1.05	0.16	A
			B	0.154	2.756	0.582	0.85	1	6.888			
			C	0.154	2.756	0.582	0.85	1	6.888			
T3 153'3-31/32"-146'8-1/32"	0.18	0.64	A	0.358	2.154	0.635	0.85	1	17.155	1.18	0.18	A
			B	0.169	2.702	0.585	0.85	1	8.373			
			C	0.169	2.702	0.585	0.85	1	8.373			
T4 146'8-1/32"-140'	0.19	0.65	A	0.368	2.131	0.639	0.85	1	18.773	1.26	0.19	A
			B	0.163	2.723	0.584	0.85	1	8.673			
			C	0.163	2.723	0.584	0.85	1	8.673			
T5 140'-120'	0.86	2.24	A	0.33	2.22	0.625	0.85	1	55.994	3.83	0.19	A
			B	0.144	2.793	0.581	0.85	1	25.076			
			C	0.182	2.657	0.587	0.85	1	31.023			
T6 120'-100'	1.61	2.73	A	0.312	2.264	0.62	0.85	1	62.321	4.16	0.21	A
			B	0.204	2.584	0.591	0.85	1	41.042			
			C	0.267	2.388	0.606	0.85	1	52.589			
T7 100'-80'	1.95	3.02	A	0.273	2.371	0.608	0.85	1	61.322	4.29	0.21	C
			B	0.203	2.585	0.591	0.85	1	45.952			
			C	0.308	2.275	0.618	0.85	1	67.768			
T8 80'-70'	0.98	1.69	A	0.269	2.381	0.607	0.85	1	33.321	2.21	0.22	C
			B	0.206	2.574	0.592	0.85	1	25.609			
			C	0.301	2.293	0.616	0.85	1	36.531			
T9 70'-60'	0.98	2.45	A	0.258	2.415	0.604	0.85	1	33.626	2.17	0.22	C
			B	0.198	2.602	0.59	0.85	1	25.970			
			C	0.288	2.329	0.612	0.85	1	36.776			
T10 60'-40'	1.95	3.76	A	0.25	2.436	0.602	0.85	1	71.164	4.28	0.21	C
			B	0.196	2.61	0.59	0.85	1	56.132			
			C	0.278	2.355	0.609	0.85	1	77.263			
T11 40'-20'	1.96	4.98	A	0.234	2.487	0.598	0.85	1	73.000	3.99	0.20	C
			B	0.184	2.651	0.587	0.85	1	58.109			
			C	0.261	2.404	0.605	0.85	1	79.564			
T12 20'-0'	1.96	7.71	A	0.221	2.526	0.595	0.85	1	75.301	4.18	0.21	C
			B	0.174	2.685	0.585	0.85	1	60.132			
			C	0.247	2.446	0.601	0.85	1	81.958			
Sum Weight:	12.99	31.66						OTM	2956.20 kip-ft	35.02		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.68	2.61	A	0.419	2.027	0.66	1	1	56.355	0.74	0.04	A
			B	0.297	2.305	0.615	1	1	35.234			
			C	0.297	2.305	0.615	1	1	35.234			
T2 160'-153'3-31/32"	0.43	1.02	A	0.48	1.927	0.687	1	1	26.393	0.32	0.05	A
			B	0.25	2.438	0.602	1	1	11.459			
			C	0.25	2.438	0.602	1	1	11.459			
T3 153'3-31/32"-146'8-1/32"	0.49	1.20	A	0.516	1.88	0.706	1	1	30.800	0.36	0.05	A
			B	0.28	2.351	0.61	1	1	14.189			
			C	0.28	2.351	0.61	1	1	14.189			
T4 146'8-1/32"-1	0.54	1.24	A	0.534	1.86	0.715	1	1	34.264	0.39	0.06	A
			B	0.27	2.378	0.607	1	1	14.658			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
40'			C	0.27	2.378	0.607	1	1	14.658			
T5 140'-120'	2.16	3.80	A	0.472	1.939	0.684	1	1	100.940	1.19	0.06	A
			B	0.224	2.517	0.596	1	1	39.999			
			C	0.273	2.371	0.608	1	1	52.220			
T6 120'-100'	3.76	4.65	A	0.437	1.995	0.667	1	1	108.071	1.26	0.06	A
			B	0.289	2.326	0.613	1	1	66.106			
			C	0.372	2.122	0.641	1	1	90.924			
T7 100'-80'	4.75	4.77	A	0.378	2.109	0.643	1	1	105.445	1.37	0.07	C
			B	0.279	2.353	0.61	1	1	74.650			
			C	0.435	1.998	0.667	1	1	124.153			
T8 80'-70'	2.35	2.65	A	0.365	2.137	0.638	1	1	55.567	0.69	0.07	C
			B	0.276	2.362	0.609	1	1	40.173			
			C	0.417	2.031	0.659	1	1	64.896			
T9 70'-60'	2.33	3.78	A	0.349	2.174	0.632	1	1	55.867	0.67	0.07	C
			B	0.264	2.396	0.606	1	1	40.582			
			C	0.398	2.068	0.651	1	1	65.115			
T10 60'-40'	4.59	5.88	A	0.335	2.208	0.627	1	1	115.877	1.31	0.07	C
			B	0.257	2.417	0.604	1	1	85.953			
			C	0.38	2.106	0.644	1	1	133.994			
T11 40'-20'	4.51	7.10	A	0.31	2.27	0.619	1	1	117.626	1.22	0.06	C
			B	0.24	2.469	0.599	1	1	88.073			
			C	0.356	2.157	0.635	1	1	137.461			
T12 20'-0'	4.55	10.91	A	0.297	2.305	0.615	1	1	122.083	1.28	0.06	C
			B	0.227	2.507	0.596	1	1	90.966			
			C	0.34	2.196	0.629	1	1	142.025			
Sum Weight:	31.14	49.60						OTM	914.02 kip-ft	10.81		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.68	2.61	A	0.419	2.027	0.66	0.8	1	49.790	0.65	0.03	A
			B	0.297	2.305	0.615	0.8	1	32.411			
			C	0.297	2.305	0.615	0.8	1	32.411			
T2 160'-153'3-31/32"	0.43	1.02	A	0.48	1.927	0.687	0.8	1	23.063	0.28	0.04	A
			B	0.25	2.438	0.602	0.8	1	10.553			
			C	0.25	2.438	0.602	0.8	1	10.553			
T3 153'3-31/32"-146'8-1/32"	0.49	1.20	A	0.516	1.88	0.706	0.8	1	26.892	0.32	0.05	A
			B	0.28	2.351	0.61	0.8	1	12.937			
			C	0.28	2.351	0.61	0.8	1	12.937			
T4 146'8-1/32"-140'	0.54	1.24	A	0.534	1.86	0.715	0.8	1	29.884	0.34	0.05	A
			B	0.27	2.378	0.607	0.8	1	13.334			
			C	0.27	2.378	0.607	0.8	1	13.334			
T5 140'-120'	2.16	3.80	A	0.472	1.939	0.684	0.8	1	88.083	1.04	0.05	A
			B	0.224	2.517	0.596	0.8	1	36.722			
			C	0.273	2.371	0.608	0.8	1	46.703			
T6 120'-100'	3.76	4.65	A	0.437	1.995	0.667	0.8	1	94.234	1.10	0.06	A
			B	0.289	2.326	0.613	0.8	1	58.636			
			C	0.372	2.122	0.641	0.8	1	79.026			
T7 100'-80'	4.75	4.77	A	0.378	2.109	0.643	0.8	1	91.609	1.19	0.06	C
			B	0.279	2.353	0.61	0.8	1	65.381			
			C	0.435	1.998	0.667	0.8	1	107.546			
T8 80'-70'	2.35	2.65	A	0.365	2.137	0.638	0.8	1	48.493	0.60	0.06	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
			B	0.276	2.362	0.609	0.8	1	35.389			
			C	0.417	2.031	0.659	0.8	1	56.429			
T9 70'-60'	2.33	3.78	A	0.349	2.174	0.632	0.8	1	48.699	0.59	0.06	C
			B	0.264	2.396	0.606	0.8	1	35.705			
			C	0.398	2.068	0.651	0.8	1	56.549			
T10 60'-40'	4.59	5.88	A	0.335	2.208	0.627	0.8	1	100.647	1.14	0.06	C
			B	0.257	2.417	0.604	0.8	1	75.230			
			C	0.38	2.106	0.644	0.8	1	115.989			
T11 40'-20'	4.51	7.10	A	0.31	2.27	0.619	0.8	1	101.914	1.06	0.05	C
			B	0.24	2.469	0.599	0.8	1	76.869			
			C	0.356	2.157	0.635	0.8	1	118.801			
T12 20'-0'	4.55	10.91	A	0.297	2.305	0.615	0.8	1	105.763	1.11	0.06	C
			B	0.227	2.507	0.596	0.8	1	79.264			
			C	0.34	2.196	0.629	0.8	1	122.704			
Sum Weight:	31.14	49.60						OTM	798.25 kip-ft	9.42		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.68	2.61	A	0.419	2.027	0.66	0.85	1	51.431	0.68	0.03	A
			B	0.297	2.305	0.615	0.85	1	33.117			
			C	0.297	2.305	0.615	0.85	1	33.117			
T2 160'-153'3-31/32"	0.43	1.02	A	0.48	1.927	0.687	0.85	1	23.895	0.29	0.04	A
			B	0.25	2.438	0.602	0.85	1	10.779			
			C	0.25	2.438	0.602	0.85	1	10.779			
T3 153'3-31/32"-146'8-1/32"	0.49	1.20	A	0.516	1.88	0.706	0.85	1	27.869	0.33	0.05	A
			B	0.28	2.351	0.61	0.85	1	13.250			
			C	0.28	2.351	0.61	0.85	1	13.250			
T4 146'8-1/32"-140'	0.54	1.24	A	0.534	1.86	0.715	0.85	1	30.979	0.36	0.05	A
			B	0.27	2.378	0.607	0.85	1	13.665			
			C	0.27	2.378	0.607	0.85	1	13.665			
T5 140'-120'	2.16	3.80	A	0.472	1.939	0.684	0.85	1	91.297	1.08	0.05	A
			B	0.224	2.517	0.596	0.85	1	37.541			
			C	0.273	2.371	0.608	0.85	1	48.082			
T6 120'-100'	3.76	4.65	A	0.437	1.995	0.667	0.85	1	97.693	1.14	0.06	A
			B	0.289	2.326	0.613	0.85	1	60.503			
			C	0.372	2.122	0.641	0.85	1	82.001			
T7 100'-80'	4.75	4.77	A	0.378	2.109	0.643	0.85	1	95.068	1.23	0.06	C
			B	0.279	2.353	0.61	0.85	1	67.698			
			C	0.435	1.998	0.667	0.85	1	111.698			
T8 80'-70'	2.35	2.65	A	0.365	2.137	0.638	0.85	1	50.262	0.62	0.06	C
			B	0.276	2.362	0.609	0.85	1	36.585			
			C	0.417	2.031	0.659	0.85	1	58.546			
T9 70'-60'	2.33	3.78	A	0.349	2.174	0.632	0.85	1	50.491	0.61	0.06	C
			B	0.264	2.396	0.606	0.85	1	36.924			
			C	0.398	2.068	0.651	0.85	1	58.691			
T10 60'-40'	4.59	5.88	A	0.335	2.208	0.627	0.85	1	104.455	1.18	0.06	C
			B	0.257	2.417	0.604	0.85	1	77.911			
			C	0.38	2.106	0.644	0.85	1	120.490			
T11 40'-20'	4.51	7.10	A	0.31	2.27	0.619	0.85	1	105.842	1.10	0.05	C
			B	0.24	2.469	0.599	0.85	1	79.670			
			C	0.356	2.157	0.635	0.85	1	123.466			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T12 20'-0'	4.55	10.91	A	0.297	2.305	0.615	0.85	1	109.843	1.15	0.06	C
			B	0.227	2.507	0.596	0.85	1	82.190			
			C	0.34	2.196	0.629	0.85	1	127.534			
Sum Weight:	31.14	49.60						OTM	827.19 kip-ft	9.77		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.22	1.23	A	0.278	2.355	0.61	1	1	33.098	0.89	0.04	A
			B	0.165	2.718	0.584	1	1	21.306			
			C	0.165	2.718	0.584	1	1	21.306			
T2 160'-153'3-31/32"	0.15	0.57	A	0.338	2.199	0.628	1	1	15.711	0.39	0.06	A
			B	0.154	2.756	0.582	1	1	7.568			
			C	0.154	2.756	0.582	1	1	7.568			
T3 153'3-31/32"-146'8-1/32"	0.18	0.64	A	0.358	2.154	0.635	1	1	18.376	0.44	0.07	A
			B	0.169	2.702	0.585	1	1	9.312			
			C	0.169	2.702	0.585	1	1	9.312			
T4 146'8-1/32"-140'	0.19	0.65	A	0.368	2.131	0.639	1	1	20.019	0.47	0.07	A
			B	0.163	2.723	0.584	1	1	9.667			
			C	0.163	2.723	0.584	1	1	9.667			
T5 140'-120'	0.86	2.24	A	0.33	2.22	0.625	1	1	59.415	1.41	0.07	A
			B	0.144	2.793	0.581	1	1	27.533			
			C	0.182	2.657	0.587	1	1	33.667			
T6 120'-100'	1.61	2.73	A	0.312	2.264	0.62	1	1	66.529	1.54	0.08	A
			B	0.204	2.584	0.591	1	1	44.673			
			C	0.267	2.388	0.606	1	1	56.220			
T7 100'-80'	1.95	3.02	A	0.273	2.371	0.608	1	1	65.483	1.56	0.08	C
			B	0.203	2.585	0.591	1	1	49.622			
			C	0.308	2.275	0.618	1	1	71.045			
T8 80'-70'	0.98	1.69	A	0.269	2.381	0.607	1	1	35.518	0.80	0.08	C
			B	0.206	2.574	0.592	1	1	27.558			
			C	0.301	2.293	0.616	1	1	38.288			
T9 70'-60'	0.98	2.45	A	0.258	2.415	0.604	1	1	35.896	0.79	0.08	C
			B	0.198	2.602	0.59	1	1	27.990			
			C	0.288	2.329	0.612	1	1	38.607			
T10 60'-40'	1.95	3.76	A	0.25	2.436	0.602	1	1	76.417	1.56	0.08	C
			B	0.196	2.61	0.59	1	1	60.917			
			C	0.278	2.355	0.609	1	1	81.622			
T11 40'-20'	1.96	4.98	A	0.234	2.487	0.598	1	1	78.627	1.46	0.07	C
			B	0.184	2.651	0.587	1	1	63.262			
			C	0.261	2.404	0.605	1	1	84.288			
T12 20'-0'	1.96	7.71	A	0.221	2.526	0.595	1	1	81.297	1.54	0.08	C
			B	0.174	2.685	0.585	1	1	65.658			
			C	0.247	2.446	0.601	1	1	87.049			
Sum Weight:	12.99	31.66						OTM	1085.50 kip-ft	12.83		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.22	1.23	A	0.278	2.355	0.61	0.8	1	30.076	0.81	0.04	A
			B	0.165	2.718	0.584	0.8	1	18.483			
			C	0.165	2.718	0.584	0.8	1	18.483			
T2 160'-153'3-31/32"	0.15	0.57	A	0.338	2.199	0.628	0.8	1	14.487	0.36	0.05	A
			B	0.154	2.756	0.582	0.8	1	6.662			
			C	0.154	2.756	0.582	0.8	1	6.662			
T3 153'3-31/32"-146'8-1/32"	0.18	0.64	A	0.358	2.154	0.635	0.8	1	16.747	0.40	0.06	A
			B	0.169	2.702	0.585	0.8	1	8.060			
			C	0.169	2.702	0.585	0.8	1	8.060			
T4 146'8-1/32"-140'	0.19	0.65	A	0.368	2.131	0.639	0.8	1	18.358	0.43	0.06	A
			B	0.163	2.723	0.584	0.8	1	8.342			
			C	0.163	2.723	0.584	0.8	1	8.342			
T5 140'-120'	0.86	2.24	A	0.33	2.22	0.625	0.8	1	54.854	1.30	0.06	A
			B	0.144	2.793	0.581	0.8	1	24.257			
			C	0.182	2.657	0.587	0.8	1	30.142			
T6 120'-100'	1.61	2.73	A	0.312	2.264	0.62	0.8	1	60.918	1.41	0.07	A
			B	0.204	2.584	0.591	0.8	1	39.832			
			C	0.267	2.388	0.606	0.8	1	51.378			
T7 100'-80'	1.95	3.02	A	0.273	2.371	0.608	0.8	1	59.935	1.46	0.07	C
			B	0.203	2.585	0.591	0.8	1	44.728			
			C	0.308	2.275	0.618	0.8	1	66.676			
T8 80'-70'	0.98	1.69	A	0.269	2.381	0.607	0.8	1	32.588	0.75	0.08	C
			B	0.206	2.574	0.592	0.8	1	24.960			
			C	0.301	2.293	0.616	0.8	1	35.945			
T9 70'-60'	0.98	2.45	A	0.258	2.415	0.604	0.8	1	32.869	0.74	0.07	C
			B	0.198	2.602	0.59	0.8	1	25.296			
			C	0.288	2.329	0.612	0.8	1	36.166			
T10 60'-40'	1.95	3.76	A	0.25	2.436	0.602	0.8	1	69.413	1.45	0.07	C
			B	0.196	2.61	0.59	0.8	1	54.537			
			C	0.278	2.355	0.609	0.8	1	75.810			
T11 40'-20'	1.96	4.98	A	0.234	2.487	0.598	0.8	1	71.124	1.35	0.07	C
			B	0.184	2.651	0.587	0.8	1	56.391			
			C	0.261	2.404	0.605	0.8	1	77.990			
T12 20'-0'	1.96	7.71	A	0.221	2.526	0.595	0.8	1	73.303	1.42	0.07	C
			B	0.174	2.685	0.585	0.8	1	58.290			
			C	0.247	2.446	0.601	0.8	1	80.261			
Sum Weight:	12.99	31.66						OTM	1002.04 kip-ft	11.88		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
T1 180'-160'	0.22	1.23	A	0.278	2.355	0.61	0.85	1	30.831	0.83	0.04	A
			B	0.165	2.718	0.584	0.85	1	19.189			
			C	0.165	2.718	0.584	0.85	1	19.189			
T2 160'-153'3-31/32"	0.15	0.57	A	0.338	2.199	0.628	0.85	1	14.793	0.36	0.05	A
			B	0.154	2.756	0.582	0.85	1	6.888			
			C	0.154	2.756	0.582	0.85	1	6.888			
T3 153'3-31/32"-146'8-1/32"	0.18	0.64	A	0.358	2.154	0.635	0.85	1	17.155	0.41	0.06	A
			B	0.169	2.702	0.585	0.85	1	8.373			
			C	0.169	2.702	0.585	0.85	1	8.373			
T4	0.19	0.65	A	0.368	2.131	0.639	0.85	1	18.773	0.44	0.07	A

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
146'8-1/32"-140'			B	0.163	2.723	0.584	0.85	1	8.673			
			C	0.163	2.723	0.584	0.85	1	8.673			
T5 140'-120'	0.86	2.24	A	0.33	2.22	0.625	0.85	1	55.994	1.32	0.07	A
			B	0.144	2.793	0.581	0.85	1	25.076			
			C	0.182	2.657	0.587	0.85	1	31.023			
T6 120'-100'	1.61	2.73	A	0.312	2.264	0.62	0.85	1	62.321	1.44	0.07	A
			B	0.204	2.584	0.591	0.85	1	41.042			
			C	0.267	2.388	0.606	0.85	1	52.589			
T7 100'-80'	1.95	3.02	A	0.273	2.371	0.608	0.85	1	61.322	1.49	0.07	C
			B	0.203	2.585	0.591	0.85	1	45.952			
			C	0.308	2.275	0.618	0.85	1	67.768			
T8 80'-70'	0.98	1.69	A	0.269	2.381	0.607	0.85	1	33.321	0.77	0.08	C
			B	0.206	2.574	0.592	0.85	1	25.609			
			C	0.301	2.293	0.616	0.85	1	36.531			
T9 70'-60'	0.98	2.45	A	0.258	2.415	0.604	0.85	1	33.626	0.75	0.08	C
			B	0.198	2.602	0.59	0.85	1	25.970			
			C	0.288	2.329	0.612	0.85	1	36.776			
T10 60'-40'	1.95	3.76	A	0.25	2.436	0.602	0.85	1	71.164	1.48	0.07	C
			B	0.196	2.61	0.59	0.85	1	56.132			
			C	0.278	2.355	0.609	0.85	1	77.263			
T11 40'-20'	1.96	4.98	A	0.234	2.487	0.598	0.85	1	73.000	1.38	0.07	C
			B	0.184	2.651	0.587	0.85	1	58.109			
			C	0.261	2.404	0.605	0.85	1	79.564			
T12 20'-0'	1.96	7.71	A	0.221	2.526	0.595	0.85	1	75.301	1.45	0.07	C
			B	0.174	2.685	0.585	0.85	1	60.132			
			C	0.247	2.446	0.601	0.85	1	81.958			
Sum Weight:	12.99	31.66						OTM	1022.91 kip-ft	12.12		

Discrete Appurtenance Pressures - No Ice $G_H = 1.121$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Empty Pipe Mount	0.0000	0.01	0'	-7'11-3/4"	178'	1.619	0	1.00	1.00
Empty Pipe Mount	120.0000	0.01	6'10-29/32"	3'11-7/8"	178'	1.619	0	1.00	1.00
Side Arm Mount [SO 306-1]	0.0000	0.04	0'	-5'11-3/4"	178'	1.619	0	0.98	2.18
Side Arm Mount [SO 306-1]	120.0000	0.04	5'2-5/32"	2'11-7/8"	178'	1.619	0	0.98	2.18
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	0.0000	0.11	0'	-8'4-3/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120.0000	0.11	7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	240.0000	0.11	-7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	0.0000	0.11	0'	-8'4-3/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120.0000	0.11	7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	240.0000	0.11	-7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
KRY 112 144/1	0.0000	0.01	0'	-8'4-3/32"	173'	1.605	0	0.41	0.19
KRY 112 144/1	120.0000	0.01	7'2-5/8"	4'2-1/32"	173'	1.605	0	0.41	0.19
KRY 112 144/1	240.0000	0.01	-7'2-5/8"	4'2-1/32"	173'	1.605	0	0.41	0.19

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Empty Pipe Mount	0.0000	0.04	0'	-8'4-3/32"	172'	1.603	0	2.10	2.10
Empty Pipe Mount	120.0000	0.04	7'2-5/8"	4'2-1/32"	172'	1.603	0	2.10	2.10
Empty Pipe Mount	240.0000	0.04	-7'2-5/8"	4'2-1/32"	172'	1.603	0	2.10	2.10
Sector Mount [SM 602-3]	0.0000	1.54	0'	0'	172'	1.603	0	33.11	33.11
Side Arm Mount [SO 311-1]	0.0000	0.06	0'	-5'8-7/8"	157'	1.561	0	2.97	3.51
Side Arm Mount [SO 311-1]	120.0000	0.06	4'11-5/8"	2'10-7/16"	157'	1.561	0	2.97	3.51
800 EXTERNAL NOTCH FILTER	0.0000	0.01	0'	-10'31/32"	145'	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	120.0000	0.01	8'8-3/4"	5'15/32"	145'	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	240.0000	0.01	-8'8-3/4"	5'15/32"	145'	1.526	0	0.77	0.37
800MHZ 2X50W RRH	0.0000	0.05	0'	-10'31/32"	145'	1.526	0	2.49	2.07
800MHZ 2X50W RRH	120.0000	0.05	8'8-3/4"	5'15/32"	145'	1.526	0	2.49	2.07
800MHZ 2X50W RRH	240.0000	0.05	-8'8-3/4"	5'15/32"	145'	1.526	0	2.49	2.07
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0'	-10'31/32"	142'	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8'8-3/4"	5'15/32"	142'	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8'8-3/4"	5'15/32"	142'	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0'	-10'31/32"	145'	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8'8-3/4"	5'15/32"	145'	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8'8-3/4"	5'15/32"	145'	1.526	0	2.71	2.61
ACU-A20-N	0.0000	0.00	0'	-9'9-3/8"	148'	1.535	0	0.23	0.41
ACU-A20-N	120.0000	0.00	8'5-5/8"	4'10-11/16"	148'	1.535	0	0.23	0.41
ACU-A20-N	240.0000	0.00	-8'5-5/8"	4'10-11/16"	148'	1.535	0	0.23	0.41
APXVSPP18-C-A20 w/ Mount Pipe	0.0000	0.08	0'	-9'9-3/8"	148'	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/ Mount Pipe	120.0000	0.08	8'5-5/8"	4'10-11/16"	148'	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/ Mount Pipe	240.0000	0.08	-8'5-5/8"	4'10-11/16"	148'	1.535	0	8.50	6.95
Side Arm Mount [SO 312-3]	0.0000	0.21	0'	0'	143'	1.520	0	7.87	7.87
APXVTM14-C-120 w/ Mount Pipe	0.0000	0.08	0'	-9'9-3/8"	148'	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	120.0000	0.08	8'5-5/8"	4'10-11/16"	148'	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	240.0000	0.08	-8'5-5/8"	4'10-11/16"	148'	1.535	0	7.13	4.96
TD-RRH8x20-25	0.0000	0.07	0'	-9'9-3/8"	148'	1.535	0	4.72	1.70
TD-RRH8x20-25	120.0000	0.07	8'5-5/8"	4'10-11/16"	148'	1.535	0	4.72	1.70
TD-RRH8x20-25	240.0000	0.07	-8'5-5/8"	4'10-11/16"	148'	1.535	0	4.72	1.70
Site Pro VFA12-U w/ 12' Stiff Arm	0.0000	1.67	0'	0'	148'	1.535	0	33.02	33.02
LNX-6514DS-T4M w/ Mount Pipe	0.0000	0.06	0'	-11'1-3/16"	128'	1.473	0	8.57	7.00
LNX-6514DS-T4M w/ Mount Pipe	120.0000	0.06	9'7-5/16"	5'6-19/32"	128'	1.473	0	8.57	7.00

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
DB844G65ZAXY w/ Mount Pipe	0.0000	0.06	0'	-11'1-3/16"	128'	1.473	0	9.81	9.84
DB844H80-XY w/ Mount Pipe	120.0000	0.06	9'7-5/16"	5'6-19/32"	128'	1.473	0	6.21	10.31
DB844G65ZAXY w/ Mount Pipe	240.0000	0.06	-9'7-5/16"	5'6-19/32"	128'	1.473	0	9.81	9.84
MG D3-800TV w/ Mount Pipe	0.0000	0.04	0'	-11'1-3/16"	128'	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	120.0000	0.04	9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	240.0000	0.04	-9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
P65.16.XL.2 w/ Mount Pipe	240.0000	0.06	-9'7-5/16"	5'6-19/32"	128'	1.473	0	8.64	5.78
GPS_A	120.0000	0.00	9'7-5/16"	5'6-19/32"	130'	1.480	0	0.30	0.30
RRH2X40-AWS	0.0000	0.04	0'	-11'1-3/16"	128'	1.473	0	2.52	1.59
RRH2X40-AWS	120.0000	0.04	9'7-5/16"	5'6-19/32"	128'	1.473	0	2.52	1.59
RRH2X40-AWS	240.0000	0.04	-9'7-5/16"	5'6-19/32"	128'	1.473	0	2.52	1.59
MG D3-800Tx w/ Mount Pipe	0.0000	0.03	0'	-11'1-3/16"	128'	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	120.0000	0.03	9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	240.0000	0.03	-9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
DB-T1-6Z-8AB-0Z	120.0000	0.04	9'7-5/16"	5'6-19/32"	128'	1.473	0	5.60	2.33
Sector Mount [SM 411-3]	0.0000	1.07	0'	0'	126'	1.466	0	21.88	21.88
800 10504 w/ Mount Pipe	0.0000	0.04	0'	-11'10-13/16"	112'	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	120.0000	0.04	10'3-23/32"	5'11-13/32"	112'	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	240.0000	0.04	-10'3-23/32"	5'11-13/32"	112'	1.418	0	3.59	3.18
Empty Mount Pipe	0.0000	0.03	0'	-11'10-13/16"	112'	1.418	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	10'3-23/32"	5'11-13/32"	112'	1.418	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-10'3-23/32"	5'11-13/32"	112'	1.418	0	1.40	1.40
Sector Mount [SM 104-3]	0.0000	0.95	0'	0'	112'	1.418	0	30.02	30.02
7770.00 w/ Mount Pipe	0.0000	0.12	0'	-9'5-17/32"	102'	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	120.0000	0.12	8'2-13/32"	4'8-3/4"	102'	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	240.0000	0.12	-8'2-13/32"	4'8-3/4"	102'	1.380	0	12.24	8.51
LGP13519	0.0000	0.01	0'	-9'5-17/32"	102'	1.380	0	0.68	0.41
LGP13519	120.0000	0.01	8'2-13/32"	4'8-3/4"	102'	1.380	0	0.68	0.41
LGP13519	240.0000	0.01	-8'2-13/32"	4'8-3/4"	102'	1.380	0	0.68	0.41
LGP2140X	0.0000	0.02	0'	-9'5-17/32"	102'	1.380	0	2.52	0.76
LGP2140X	120.0000	0.02	8'2-13/32'	4'8-3/4"	102'	1.380	0	2.52	0.76

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
LGP2140X	240.0000	0.02	-8'2-13/32"	4'8-3/4"	102'	1.380	0	2.52	0.76
RRUS-11	0.0000	0.12	0'	-9'5-17/32"	102'	1.380	0	5.88	2.49
RRUS-11	120.0000	0.12	8'2-13/32"	4'8-3/4"	102'	1.380	0	5.88	2.49
RRUS-11	240.0000	0.12	-8'2-13/32"	4'8-3/4"	102'	1.380	0	5.88	2.49
P65-16-XLH-RR w/ Mount Pipe	0.0000	0.08	0'	-9'5-17/32"	102'	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	120.0000	0.08	8'2-13/32"	4'8-3/4"	102'	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	240.0000	0.08	-8'2-13/32"	4'8-3/4"	102'	1.380	0	8.64	6.36
DC6-48-60-18-8F	120.0000	0.03	8'2-13/32"	4'8-3/4"	102'	1.380	0	2.57	4.32
Empty Mount Pipe	0.0000	0.03	0'	-9'5-17/32"	102'	1.380	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	8'2-13/32"	4'8-3/4"	102'	1.380	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-8'2-13/32"	4'8-3/4"	102'	1.380	0	1.40	1.40
Sector Mount [SM 301-3]	0.0000	1.30	0'	0'	102'	1.380	0	29.61	1.00
GPS_A	120.0000	0.00	12'8-3/4"	7'4-3/16"	30'	1.000	0	0.30	0.30
GPS_A	240.0000	0.00	-12'8-3/4"	7'4-3/16"	30'	1.000	0	0.30	0.30
Side Arm Mount [SO 701-1]	120.0000	0.07	11'10-7/16"	6'10-3/16"	30'	1.000	0	0.85	1.67
Side Arm Mount [SO 701-1]	240.0000	0.07	-11'10-7/16"	6'10-3/16"	30'	1.000	0	0.85	1.67
VG-1060	300.0000	0.00	-6'9-27/32"	-3'11-9/32"	12'	1.000	0	0.13	0.13
GPS_A	300.0000	0.00	-6'9-27/32"	-3'11-9/32"	12'	1.000	0	0.30	0.30
Pipe Mount [PM 601-1]	300.0000	0.07	-5'11-13/32"	-3'5-9/32"	12'	1.000	0	3.00	0.90
	Sum Weight:	11.34							

Discrete Appurtenance Pressures - With Ice $G_H = 1.121$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
Empty Pipe Mount	0.0000	0.03	0'	-7'11-3/4"	178'	1.619	0	1.65	1.65	0.9181
Empty Pipe Mount	120.0000	0.03	6'10-29/32"	3'11-7/8"	178'	1.619	0	1.65	1.65	0.9181
Side Arm Mount [SO 306-1]	0.0000	0.08	0'	-5'11-3/4"	178'	1.619	0	2.30	5.15	0.9181
Side Arm Mount [SO 306-1]	120.0000	0.08	5'2-5/32"	2'11-7/8"	178'	1.619	0	2.30	5.15	0.9181
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	0.0000	0.22	0'	-8'4-3/32"	173'	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120.0000	0.22	7'2-5/8"	4'2-1/32"	173'	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	240.0000	0.22	-7'2-5/8"	4'2-1/32"	173'	1.605	0	7.77	7.12	0.9143

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	0.0000	0.22	0'	-8'4-3/32"	173'	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120.0000	0.22	7'2-5/8"	4'2-1/32"	173'	1.605	0	7.77	7.12	0.9143
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	240.0000	0.22	-7'2-5/8"	4'2-1/32"	173'	1.605	0	7.77	7.12	0.9143
KRY 112 144/1	0.0000	0.02	0'	-8'4-3/32"	173'	1.605	0	0.58	0.32	0.9143
KRY 112 144/1	120.0000	0.02	7'2-5/8"	4'2-1/32"	173'	1.605	0	0.58	0.32	0.9143
KRY 112 144/1	240.0000	0.02	-7'2-5/8"	4'2-1/32"	173'	1.605	0	0.58	0.32	0.9143
Empty Pipe Mount	0.0000	0.08	0'	-8'4-3/32"	172'	1.603	0	4.03	4.03	0.9143
Empty Pipe Mount	120.0000	0.08	7'2-5/8"	4'2-1/32"	172'	1.603	0	4.03	4.03	0.9143
Empty Pipe Mount	240.0000	0.08	-7'2-5/8"	4'2-1/32"	172'	1.603	0	4.03	4.03	0.9143
Sector Mount [SM 602-3]	0.0000	2.67	0'	0'	172'	1.603	0	54.67	54.67	0.9143
Side Arm Mount [SO 311-1]	0.0000	0.12	0'	-5'8-7/8"	157'	1.561	0	5.54	6.80	0.9044
Side Arm Mount [SO 311-1]	120.0000	0.12	4'11-5/8"	2'10-7/16"	157'	1.561	0	5.54	6.80	0.9044
800 EXTERNAL NOTCH FILTER	0.0000	0.02	0'	-10'31/32"	145'	1.526	0	0.99	0.54	0.8943
800 EXTERNAL NOTCH FILTER	120.0000	0.02	8'8-3/4"	5'15/32"	145'	1.526	0	0.99	0.54	0.8943
800 EXTERNAL NOTCH FILTER	240.0000	0.02	-8'8-3/4"	5'15/32"	145'	1.526	0	0.99	0.54	0.8943
800MHZ 2X50W RRH	0.0000	0.09	0'	-10'31/32"	145'	1.526	0	2.88	2.44	0.8943
800MHZ 2X50W RRH	120.0000	0.09	8'8-3/4"	5'15/32"	145'	1.526	0	2.88	2.44	0.8943
800MHZ 2X50W RRH	240.0000	0.09	-8'8-3/4"	5'15/32"	145'	1.526	0	2.88	2.44	0.8943
PCS 1900MHz 4x45W-65MHz	0.0000	0.10	0'	-10'31/32"	142'	1.517	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	120.0000	0.10	8'8-3/4"	5'15/32"	142'	1.517	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	240.0000	0.10	-8'8-3/4"	5'15/32"	142'	1.517	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	0.0000	0.10	0'	-10'31/32"	145'	1.526	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	120.0000	0.10	8'8-3/4"	5'15/32"	145'	1.526	0	3.14	3.04	0.8943
PCS 1900MHz 4x45W-65MHz	240.0000	0.10	-8'8-3/4"	5'15/32"	145'	1.526	0	3.14	3.04	0.8943
ACU-A20-N	0.0000	0.01	0'	-9'9-3/8"	148'	1.535	0	0.49	0.71	0.8980
ACU-A20-N	120.0000	0.01	8'5-5/8"	4'10-11/16"	148'	1.535	0	0.49	0.71	0.8980
ACU-A20-N	240.0000	0.01	-8'5-5/8"	4'10-11/16"	148'	1.535	0	0.49	0.71	0.8980
APXVSPP18-C-A20 w/ Mount Pipe	0.0000	0.21	0'	-9'9-3/8"	148'	1.535	0	9.64	8.84	0.8980
APXVSPP18-C-A20 w/ Mount Pipe	120.0000	0.21	8'5-5/8"	4'10-11/16"	148'	1.535	0	9.64	8.84	0.8980
APXVSPP18-C-A20 w/ Mount Pipe	240.0000	0.21	-8'5-5/8"	4'10-11/16"	148'	1.535	0	9.64	8.84	0.8980
Side Arm Mount [SO 312-3]	0.0000	0.41	0'	0'	143'	1.520	0	14.93	14.93	0.8943
APXVTM14-C-120 w/ Mount Pipe	0.0000	0.18	0'	-9'9-3/8"	148'	1.535	0	8.08	6.33	0.8980
APXVTM14-C-120 w/ Mount Pipe	120.0000	0.18	8'5-5/8"	4'10-11/16"	148'	1.535	0	8.08	6.33	0.8980
APXVTM14-C-120 w/ Mount Pipe	240.0000	0.18	-8'5-5/8"	4'10-11/16"	148'	1.535	0	8.08	6.33	0.8980
TD-RRH8x20-25	0.0000	0.12	0'	-9'9-3/8"	148'	1.535	0	5.25	2.10	0.8980
TD-RRH8x20-25	120.0000	0.12	8'5-5/8"	4'10-11/1	148'	1.535	0	5.25	2.10	0.8980

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
TD-RRH8x20-25	240.0000	0.12	-8'5-5/8"	4'10-11/16"	148'	1.535	0	5.25	2.10	0.8980
Site Pro VFA12-U w/ 12' Stiff Arm	0.0000	2.66	0'	0'	148'	1.535	0	58.77	58.77	0.8980
LNX-6514DS-T4M w/ Mount Pipe	0.0000	0.18	0'	-11'1-3/16"	128'	1.473	0	9.69	8.87	0.8808
LNX-6514DS-T4M w/ Mount Pipe	120.0000	0.18	9'7-5/16"	5'6-19/32"	128'	1.473	0	9.69	8.87	0.8808
DB844G65ZAXY w/ Mount Pipe	0.0000	0.24	0'	-11'1-3/16"	128'	1.473	0	11.38	12.24	0.8808
DB844H80-XY w/ Mount Pipe	120.0000	0.20	9'7-5/16"	5'6-19/32"	128'	1.473	0	7.57	12.72	0.8808
DB844G65ZAXY w/ Mount Pipe	240.0000	0.24	-9'7-5/16"	5'6-19/32"	128'	1.473	0	11.38	12.24	0.8808
MG D3-800TV w/ Mount Pipe	0.0000	0.10	0'	-11'1-3/16"	128'	1.473	0	4.29	4.63	0.8808
MG D3-800TV w/ Mount Pipe	120.0000	0.10	9'7-5/16"	5'6-19/32"	128'	1.473	0	4.29	4.63	0.8808
MG D3-800TV w/ Mount Pipe	240.0000	0.10	-9'7-5/16"	5'6-19/32"	128'	1.473	0	4.29	4.63	0.8808
P65.16.XL.2 w/ Mount Pipe	240.0000	0.18	-9'7-5/16"	5'6-19/32"	128'	1.473	0	9.76	7.62	0.8808
GPS_A	120.0000	0.01	9'7-5/16"	5'6-19/32"	130'	1.480	0	0.44	0.44	0.8808
RRH2X40-AWS	0.0000	0.08	0'	-11'1-3/16"	128'	1.473	0	2.94	1.96	0.8808
RRH2X40-AWS	120.0000	0.08	9'7-5/16"	5'6-19/32"	128'	1.473	0	2.94	1.96	0.8808
RRH2X40-AWS	240.0000	0.08	-9'7-5/16"	5'6-19/32"	128'	1.473	0	2.94	1.96	0.8808
MG D3-800Tx w/ Mount Pipe	0.0000	0.10	0'	-11'1-3/16"	128'	1.473	0	4.29	4.63	0.8808
MG D3-800Tx w/ Mount Pipe	120.0000	0.10	9'7-5/16"	5'6-19/32"	128'	1.473	0	4.29	4.63	0.8808
MG D3-800Tx w/ Mount Pipe	240.0000	0.10	-9'7-5/16"	5'6-19/32"	128'	1.473	0	4.29	4.63	0.8808
DB-T1-6Z-8AB-0Z	120.0000	0.11	9'7-5/16"	5'6-19/32"	128'	1.473	0	6.16	2.74	0.8808
Sector Mount [SM 411-3]	0.0000	1.80	0'	0'	126'	1.466	0	37.38	37.38	0.8808
800 10504 w/ Mount Pipe	0.0000	0.10	0'	-11'10-13/16"	112'	1.418	0	4.31	4.40	0.8685
800 10504 w/ Mount Pipe	120.0000	0.10	10'3-23/32"	5'11-13/32"	112'	1.418	0	4.31	4.40	0.8685
800 10504 w/ Mount Pipe	240.0000	0.10	-10'3-23/32"	5'11-13/32"	112'	1.418	0	4.31	4.40	0.8685
Empty Mount Pipe	0.0000	0.05	0'	-11'10-13/16"	112'	1.418	0	2.53	2.53	0.8685
Empty Mount Pipe	120.0000	0.05	10'3-23/32"	5'11-13/32"	112'	1.418	0	2.53	2.53	0.8685
Empty Mount Pipe	240.0000	0.05	-10'3-23/32"	5'11-13/32"	112'	1.418	0	2.53	2.53	0.8685
Sector Mount [SM 104-3]	0.0000	1.74	0'	0'	112'	1.418	0	48.19	48.19	0.8685
7770.00 w/ Mount Pipe	0.0000	0.28	0'	-9'5-17/32"	102'	1.380	0	13.97	11.03	0.8588
7770.00 w/ Mount Pipe	120.0000	0.28	8'2-13/32"	4'8-3/4"	102'	1.380	0	13.97	11.03	0.8588
7770.00 w/ Mount Pipe	240.0000	0.28	-8'2-13/32"	4'8-3/4"	102'	1.380	0	13.97	11.03	0.8588

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
LGP13519	0.0000	0.02	0'	-9'5-17/32"	102'	1.380	0	0.98	0.68	0.8588
LGP13519	120.0000	0.02	8'2-13/32"	4'8-3/4"	102'	1.380	0	0.98	0.68	0.8588
LGP13519	240.0000	0.02	-8'2-13/32"	4'8-3/4"	102'	1.380	0	0.98	0.68	0.8588
LGP2140X	0.0000	0.06	0'	-9'5-17/32"	102'	1.380	0	3.07	1.16	0.8588
LGP2140X	120.0000	0.06	8'2-13/32"	4'8-3/4"	102'	1.380	0	3.07	1.16	0.8588
LGP2140X	240.0000	0.06	-8'2-13/32"	4'8-3/4"	102'	1.380	0	3.07	1.16	0.8588
RRUS-11	0.0000	0.18	0'	-9'5-17/32"	102'	1.380	0	6.69	3.08	0.8588
RRUS-11	120.0000	0.18	8'2-13/32"	4'8-3/4"	102'	1.380	0	6.69	3.08	0.8588
RRUS-11	240.0000	0.18	-8'2-13/32"	4'8-3/4"	102'	1.380	0	6.69	3.08	0.8588
P65-16-XLH-RR w/ Mount Pipe	0.0000	0.20	0'	-9'5-17/32"	102'	1.380	0	9.73	8.18	0.8588
P65-16-XLH-RR w/ Mount Pipe	120.0000	0.20	8'2-13/32"	4'8-3/4"	102'	1.380	0	9.73	8.18	0.8588
P65-16-XLH-RR w/ Mount Pipe	240.0000	0.20	-8'2-13/32"	4'8-3/4"	102'	1.380	0	9.73	8.18	0.8588
DC6-48-60-18-8F	120.0000	0.09	8'2-13/32"	4'8-3/4"	102'	1.380	0	2.97	4.80	0.8588
Empty Mount Pipe	0.0000	0.05	0'	-9'5-17/32"	102'	1.380	0	2.52	2.52	0.8588
Empty Mount Pipe	120.0000	0.05	8'2-13/32"	4'8-3/4"	102'	1.380	0	2.52	2.52	0.8588
Empty Mount Pipe	240.0000	0.05	-8'2-13/32"	4'8-3/4"	102'	1.380	0	2.52	2.52	0.8588
Sector Mount [SM 301-3]	0.0000	2.23	0'	0'	102'	1.380	0	47.11	1.34	0.8588
GPS_A	120.0000	0.01	12'8-3/4"	7'4-3/16"	30'	1.000	0	0.42	0.42	0.7500
GPS_A	240.0000	0.01	-12'8-3/4"	7'4-3/16"	30'	1.000	0	0.42	0.42	0.7500
Side Arm Mount [SO 701-1]	120.0000	0.09	11'10-7/16"	6'10-3/16"	30'	1.000	0	1.28	2.67	0.7500
Side Arm Mount [SO 701-1]	240.0000	0.09	-11'10-7/16"	6'10-3/16"	30'	1.000	0	1.28	2.67	0.7500
VG-1060	300.0000	0.00	-6'9-27/32"	-3'11-9/32"	12'	1.000	0	0.26	0.26	0.7500
GPS_A	300.0000	0.01	-6'9-27/32"	-3'11-9/32"	12'	1.000	0	0.42	0.42	0.7500
Pipe Mount [PM 601-1]	300.0000	0.09	-5'11-13/32"	-3'5-9/32"	12'	1.000	0	4.11	1.23	0.7500
	Sum Weight:	21.50								

Discrete Appurtenance Pressures - Service $G_H = 1.121$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Empty Pipe Mount	0.0000	0.01	0'	-7'11-3/4"	178'	1.619	0	1.00	1.00
Empty Pipe Mount	120.0000	0.01	6'10-29/32"	3'11-7/8"	178'	1.619	0	1.00	1.00
Side Arm Mount [SO	0.0000	0.04	0'	-5'11-3/4"	178'	1.619	0	0.98	2.18

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
306-1]									
Side Arm Mount [SO 306-1]	120.0000	0.04	5'2-5/32"	2'11-7/8"	178'	1.619	0	0.98	2.18
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	0.0000	0.11	0'	-8'4-3/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120.0000	0.11	7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	240.0000	0.11	-7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	0.0000	0.11	0'	-8'4-3/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120.0000	0.11	7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	240.0000	0.11	-7'2-5/8"	4'2-1/32"	173'	1.605	0	6.83	5.64
KRY 112 144/1	0.0000	0.01	0'	-8'4-3/32"	173'	1.605	0	0.41	0.19
KRY 112 144/1	120.0000	0.01	7'2-5/8"	4'2-1/32"	173'	1.605	0	0.41	0.19
KRY 112 144/1	240.0000	0.01	-7'2-5/8"	4'2-1/32"	173'	1.605	0	0.41	0.19
Empty Pipe Mount	0.0000	0.04	0'	-8'4-3/32"	172'	1.603	0	2.10	2.10
Empty Pipe Mount	120.0000	0.04	7'2-5/8"	4'2-1/32"	172'	1.603	0	2.10	2.10
Empty Pipe Mount	240.0000	0.04	-7'2-5/8"	4'2-1/32"	172'	1.603	0	2.10	2.10
Sector Mount [SM 602-3]	0.0000	1.54	0'	0'	172'	1.603	0	33.11	33.11
Side Arm Mount [SO 311-1]	0.0000	0.06	0'	-5'8-7/8"	157'	1.561	0	2.97	3.51
Side Arm Mount [SO 311-1]	120.0000	0.06	4'11-5/8"	2'10-7/16"	157'	1.561	0	2.97	3.51
800 EXTERNAL NOTCH FILTER	0.0000	0.01	0'	-10'31/32"	145'	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	120.0000	0.01	8'8-3/4"	5'15/32"	145'	1.526	0	0.77	0.37
800 EXTERNAL NOTCH FILTER	240.0000	0.01	-8'8-3/4"	5'15/32"	145'	1.526	0	0.77	0.37
800MHZ 2X50W RRH	0.0000	0.05	0'	-10'31/32"	145'	1.526	0	2.49	2.07
800MHZ 2X50W RRH	120.0000	0.05	8'8-3/4"	5'15/32"	145'	1.526	0	2.49	2.07
800MHZ 2X50W RRH	240.0000	0.05	-8'8-3/4"	5'15/32"	145'	1.526	0	2.49	2.07
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0'	-10'31/32"	142'	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8'8-3/4"	5'15/32"	142'	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8'8-3/4"	5'15/32"	142'	1.517	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	0.0000	0.06	0'	-10'31/32"	145'	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	120.0000	0.06	8'8-3/4"	5'15/32"	145'	1.526	0	2.71	2.61
PCS 1900MHz 4x45W-65MHz	240.0000	0.06	-8'8-3/4"	5'15/32"	145'	1.526	0	2.71	2.61
ACU-A20-N	0.0000	0.00	0'	-9'9-3/8"	148'	1.535	0	0.23	0.41
ACU-A20-N	120.0000	0.00	8'5-5/8"	4'10-11/16"	148'	1.535	0	0.23	0.41
ACU-A20-N	240.0000	0.00	-8'5-5/8"	4'10-11/16"	148'	1.535	0	0.23	0.41
APXVSPP18-C-A20 w/ Mount Pipe	0.0000	0.08	0'	-9'9-3/8"	148'	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/ Mount Pipe	120.0000	0.08	8'5-5/8"	4'10-11/16"	148'	1.535	0	8.50	6.95
APXVSPP18-C-A20 w/ Mount Pipe	240.0000	0.08	-8'5-5/8"	4'10-11/16"	148'	1.535	0	8.50	6.95
Side Arm Mount [SO	0.0000	0.21	0'	0'	143'	1.520	0	7.87	7.87

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
312-3]									
APXVTM14-C-120 w/ Mount Pipe	0.0000	0.08	0'	-9'9-3/8"	148'	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	120.0000	0.08	8'5-5/8"	4'10-11/16"	148'	1.535	0	7.13	4.96
APXVTM14-C-120 w/ Mount Pipe	240.0000	0.08	-8'5-5/8"	4'10-11/16"	148'	1.535	0	7.13	4.96
TD-RRH8x20-25	0.0000	0.07	0'	-9'9-3/8"	148'	1.535	0	4.72	1.70
TD-RRH8x20-25	120.0000	0.07	8'5-5/8"	4'10-11/16"	148'	1.535	0	4.72	1.70
TD-RRH8x20-25	240.0000	0.07	-8'5-5/8"	4'10-11/16"	148'	1.535	0	4.72	1.70
Site Pro VFA12-U w/ 12' Stiff Arm	0.0000	1.67	0'	0'	148'	1.535	0	33.02	33.02
LNX-6514DS-T4M w/ Mount Pipe	0.0000	0.06	0'	-11'1-3/16"	128'	1.473	0	8.57	7.00
LNX-6514DS-T4M w/ Mount Pipe	120.0000	0.06	9'7-5/16"	5'6-19/32"	128'	1.473	0	8.57	7.00
DB844G65ZAXY w/ Mount Pipe	0.0000	0.06	0'	-11'1-3/16"	128'	1.473	0	9.81	9.84
DB844H80-XY w/ Mount Pipe	120.0000	0.06	9'7-5/16"	5'6-19/32"	128'	1.473	0	6.21	10.31
DB844G65ZAXY w/ Mount Pipe	240.0000	0.06	-9'7-5/16"	5'6-19/32"	128'	1.473	0	9.81	9.84
MG D3-800TV w/ Mount Pipe	0.0000	0.04	0'	-11'1-3/16"	128'	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	120.0000	0.04	9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
MG D3-800TV w/ Mount Pipe	240.0000	0.04	-9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
P65.16.XL.2 w/ Mount Pipe	240.0000	0.06	-9'7-5/16"	5'6-19/32"	128'	1.473	0	8.64	5.78
GPS_A	120.0000	0.00	9'7-5/16"	5'6-19/32"	130'	1.480	0	0.30	0.30
RRH2X40-AWS	0.0000	0.04	0'	-11'1-3/16"	128'	1.473	0	2.52	1.59
RRH2X40-AWS	120.0000	0.04	9'7-5/16"	5'6-19/32"	128'	1.473	0	2.52	1.59
RRH2X40-AWS	240.0000	0.04	-9'7-5/16"	5'6-19/32"	128'	1.473	0	2.52	1.59
MG D3-800Tx w/ Mount Pipe	0.0000	0.03	0'	-11'1-3/16"	128'	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	120.0000	0.03	9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
MG D3-800Tx w/ Mount Pipe	240.0000	0.03	-9'7-5/16"	5'6-19/32"	128'	1.473	0	3.57	3.42
DB-T1-6Z-8AB-0Z	120.0000	0.04	9'7-5/16"	5'6-19/32"	128'	1.473	0	5.60	2.33
Sector Mount [SM 411-3]	0.0000	1.07	0'	0'	126'	1.466	0	21.88	21.88
800 10504 w/ Mount Pipe	0.0000	0.04	0'	-11'10-13/16"	112'	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	120.0000	0.04	10'3-23/32"	5'11-13/32"	112'	1.418	0	3.59	3.18
800 10504 w/ Mount Pipe	240.0000	0.04	-10'3-23/32"	5'11-13/32"	112'	1.418	0	3.59	3.18
Empty Mount Pipe	0.0000	0.03	0'	-11'10-13/16"	112'	1.418	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	10'3-23/32"	5'11-13/32"	112'	1.418	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-10'3-23/	5'11-13/3	112'	1.418	0	1.40	1.40

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
Sector Mount [SM 104-3]	0.0000	0.95	32" 0'	2" 0'	112'	1.418	0	30.02	30.02
7770.00 w/ Mount Pipe	0.0000	0.12	0'	-9'5-17/32"	102'	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	120.0000	0.12	8'2-13/32"	4'8-3/4"	102'	1.380	0	12.24	8.51
7770.00 w/ Mount Pipe	240.0000	0.12	-8'2-13/32"	4'8-3/4"	102'	1.380	0	12.24	8.51
LGP13519	0.0000	0.01	0'	-9'5-17/32"	102'	1.380	0	0.68	0.41
LGP13519	120.0000	0.01	8'2-13/32"	4'8-3/4"	102'	1.380	0	0.68	0.41
LGP13519	240.0000	0.01	-8'2-13/32"	4'8-3/4"	102'	1.380	0	0.68	0.41
LGP2140X	0.0000	0.02	0'	-9'5-17/32"	102'	1.380	0	2.52	0.76
LGP2140X	120.0000	0.02	8'2-13/32"	4'8-3/4"	102'	1.380	0	2.52	0.76
LGP2140X	240.0000	0.02	-8'2-13/32"	4'8-3/4"	102'	1.380	0	2.52	0.76
RRUS-11	0.0000	0.12	0'	-9'5-17/32"	102'	1.380	0	5.88	2.49
RRUS-11	120.0000	0.12	8'2-13/32"	4'8-3/4"	102'	1.380	0	5.88	2.49
RRUS-11	240.0000	0.12	-8'2-13/32"	4'8-3/4"	102'	1.380	0	5.88	2.49
P65-16-XLH-RR w/ Mount Pipe	0.0000	0.08	0'	-9'5-17/32"	102'	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	120.0000	0.08	8'2-13/32"	4'8-3/4"	102'	1.380	0	8.64	6.36
P65-16-XLH-RR w/ Mount Pipe	240.0000	0.08	-8'2-13/32"	4'8-3/4"	102'	1.380	0	8.64	6.36
DC6-48-60-18-8F	120.0000	0.03	8'2-13/32"	4'8-3/4"	102'	1.380	0	2.57	4.32
Empty Mount Pipe	0.0000	0.03	0'	-9'5-17/32"	102'	1.380	0	1.40	1.40
Empty Mount Pipe	120.0000	0.03	8'2-13/32"	4'8-3/4"	102'	1.380	0	1.40	1.40
Empty Mount Pipe	240.0000	0.03	-8'2-13/32"	4'8-3/4"	102'	1.380	0	1.40	1.40
Sector Mount [SM 301-3]	0.0000	1.30	0'	0'	102'	1.380	0	29.61	1.00
GPS_A	120.0000	0.00	12'8-3/4"	7'4-3/16"	30'	1.000	0	0.30	0.30
GPS_A	240.0000	0.00	-12'8-3/4"	7'4-3/16"	30'	1.000	0	0.30	0.30
Side Arm Mount [SO 701-1]	120.0000	0.07	11'10-7/16"	6'10-3/16"	30'	1.000	0	0.85	1.67
Side Arm Mount [SO 701-1]	240.0000	0.07	-11'10-7/16"	6'10-3/16"	30'	1.000	0	0.85	1.67
VG-1060	300.0000	0.00	-6'9-27/32"	-3'11-9/32"	12'	1.000	0	0.13	0.13
GPS_A	300.0000	0.00	-6'9-27/32"	-3'11-9/32"	12'	1.000	0	0.30	0.30
Pipe Mount [PM 601-1]	300.0000	0.07	-5'11-13/32"	-3'5-9/32"	12'	1.000	0	3.00	0.90
	Sum Weight:	11.34							

Dish Pressures - No Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf
157'	VHLP2-18	-10.0000	0.03	0'	-6'2-7/8"	1.561	3.72	0
157'	VHLP2-18	80.0000	0.03	5'4-13/16"	3'1-7/16"	1.561	3.72	0
		Sum Weight:	0.06					

Dish Pressures - With Ice

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf	t_z in
157'	VHLP2-18	-10.0000	0.07	0'	-6'2-7/8"	1.561	4.24	0	0.9044
157'	VHLP2-18	80.0000	0.07	5'4-13/16"	3'1-7/16"	1.561	4.24	0	0.9044
		Sum Weight:	0.13						

Dish Pressures - Service

Elevation ft	Dish Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	K_z	A_A ft^2	q_z ksf
157'	VHLP2-18	-10.0000	0.03	0'	-6'2-7/8"	1.561	3.72	0
157'	VHLP2-18	80.0000	0.03	5'4-13/16"	3'1-7/16"	1.561	3.72	0
		Sum Weight:	0.06					

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	15.06					
Bracing Weight	16.60					
Total Member Self-Weight	31.66			39.92	-7.47	
Total Weight	56.05			39.92	-7.47	
Wind 0 deg - No Ice		0.07	-51.71	-5057.71	-20.27	-13.17
Wind 30 deg - No Ice		24.88	-43.01	-4222.77	-2476.51	3.83
Wind 60 deg - No Ice		42.42	-24.54	-2398.95	-4219.61	18.41
Wind 90 deg - No Ice		49.65	-0.04	31.82	-4926.73	28.68
Wind 120 deg - No Ice		44.77	25.84	2585.07	-4420.29	33.06
Wind 150 deg - No Ice		24.80	42.99	4296.82	-2462.45	25.11
Wind 180 deg - No Ice		-0.06	48.98	4900.70	3.21	11.91
Wind 210 deg - No Ice		-24.91	43.05	4307.52	2466.03	-3.93
Wind 240 deg - No Ice		-44.84	25.94	2603.09	4417.16	-19.78
Wind 270 deg - No Ice		-49.69	0.04	47.64	4917.33	-28.79
Wind 300 deg - No Ice		-42.40	-24.43	-2380.61	4200.19	-30.73

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 330 deg - No Ice		-24.81	-42.94	-4210.46	2448.38	-25.26
Member Ice	17.94					
Total Weight Ice	102.37			83.99	7.80	
Wind 0 deg - Ice		0.02	-14.83	-1371.60	4.03	-1.25
Wind 30 deg - Ice		6.91	-11.95	-1102.89	-680.32	2.83
Wind 60 deg - Ice		11.65	-6.74	-589.09	-1155.37	5.69
Wind 90 deg - Ice		13.80	-0.01	81.27	-1362.66	7.39
Wind 120 deg - Ice		12.85	7.41	810.17	-1252.90	7.79
Wind 150 deg - Ice		6.89	11.94	1268.66	-675.60	4.63
Wind 180 deg - Ice		-0.02	13.44	1424.77	11.10	0.95
Wind 210 deg - Ice		-6.92	11.95	1271.96	696.93	-2.85
Wind 240 deg - Ice		-12.87	7.44	815.78	1272.05	-6.51
Wind 270 deg - Ice		-13.80	0.01	86.62	1379.51	-7.42
Wind 300 deg - Ice		-11.64	-6.71	-583.41	1169.07	-6.73
Wind 330 deg - Ice		-6.89	-11.93	-1099.23	691.40	-4.66
Total Weight	56.05			39.92	-7.47	
Wind 0 deg - Service		0.03	-17.89	-1763.28	-5.42	-4.56
Wind 30 deg - Service		8.61	-14.88	-1474.38	-855.33	1.32
Wind 60 deg - Service		14.68	-8.49	-843.30	-1458.48	6.37
Wind 90 deg - Service		17.18	-0.02	-2.20	-1703.16	9.92
Wind 120 deg - Service		15.49	8.94	881.28	-1527.92	11.44
Wind 150 deg - Service		8.58	14.87	1473.58	-850.47	8.69
Wind 180 deg - Service		-0.02	16.95	1682.54	2.70	4.12
Wind 210 deg - Service		-8.62	14.89	1477.28	854.89	-1.36
Wind 240 deg - Service		-15.52	8.98	887.51	1530.02	-6.84
Wind 270 deg - Service		-17.19	0.01	3.27	1703.09	-9.96
Wind 300 deg - Service		-14.67	-8.45	-836.95	1454.95	-10.63
Wind 330 deg - Service		-8.58	-14.86	-1470.12	848.78	-8.74

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
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

Comb. No.	Description
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
T1	180 - 160	Leg	Max Tension	4	5.19	0.09	0.01
			Max. Compression	2	-7.91	0.13	-0.01
			Max. Mx	8	-0.04	0.75	-0.01
			Max. My	7	-0.96	-0.02	0.75
			Max. Vy	8	0.58	-0.39	-0.01
			Max. Vx	13	-0.57	-0.02	0.37
		Diagonal	Max Tension	9	1.71	0.00	0.00
			Max. Compression	9	-1.73	0.00	0.00
			Max. Mx	25	0.38	0.02	-0.00
			Max. My	19	0.04	0.02	0.00
			Max. Vy	24	0.02	0.02	-0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	8	0.06	0.00	0.00
			Max. Compression	6	-0.08	0.00	0.00
			Max. Mx	14	-0.02	-0.03	0.00
			Max. My	24	-0.04	0.00	0.00
			Max. Vy	14	0.02	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Mid Girt	Max Tension	6	0.19	0.00	0.00
			Max. Compression	8	-0.17	0.00	0.00
			Max. Mx	14	0.02	-0.04	0.00
			Max. My	24	0.06	0.00	0.00
			Max. Vy	14	-0.02	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
T2	160 - 153.333	Leg	Max Tension	4	8.43	-0.13	0.01
			Max. Compression	2	-11.67	0.27	-0.00
			Max. Mx	8	8.10	-0.30	0.01
			Max. My	11	-1.54	-0.02	-0.34
			Max. Vy	8	0.14	-0.30	0.01
			Max. Vx	11	0.16	-0.02	-0.34
		Diagonal	Max Tension	9	2.11	0.00	0.00
			Max. Compression	9	-2.18	0.00	0.00
			Max. Mx	25	0.46	0.03	0.00
			Max. My	19	0.02	0.03	0.00
			Max. Vy	25	0.03	0.03	-0.00
			Max. Vx	19	-0.00	0.00	0.00
T3	153.333 - 146.667	Leg	Max Tension	4	12.62	-0.30	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-17.43	0.58	-0.03
			Max. Mx	4	11.74	-0.63	0.02
			Max. My	13	-2.55	-0.03	0.60
			Max. Vy	4	0.86	-0.63	0.02
			Max. Vx	13	-0.83	-0.03	0.60
		Diagonal	Max Tension	9	2.62	0.00	0.00
			Max. Compression	10	-2.77	0.00	0.00
			Max. Mx	25	0.54	0.03	0.00
			Max. My	20	0.35	0.03	0.01
			Max. Vy	24	0.03	0.03	-0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	4	0.26	0.00	0.00
			Max. Compression	2	-0.15	0.00	0.00
			Max. Mx	14	0.12	-0.06	0.00
			Max. My	19	0.14	0.00	0.00
			Max. Vy	14	-0.03	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T4	146.667 - 140	Leg	Max Tension	12	17.60	-0.62	0.01
			Max. Compression	10	-24.48	0.21	-0.02
			Max. Mx	4	17.57	-0.63	0.02
			Max. My	13	-2.77	-0.03	0.60
			Max. Vy	4	-0.26	-0.63	0.02
			Max. Vx	7	-0.27	-0.03	-0.60
		Diagonal	Max Tension	9	4.08	0.00	0.00
			Max. Compression	9	-4.17	0.00	0.00
			Max. Mx	25	0.89	0.04	0.00
			Max. My	25	-0.93	0.03	-0.01
			Max. Vy	25	0.03	0.04	-0.01
			Max. Vx	24	0.00	0.00	0.00
		Top Girt	Max Tension	23	0.11	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	0.11	-0.07	0.00
			Max. My	19	0.11	0.00	0.00
			Max. Vy	14	0.03	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T5	140 - 120	Leg	Max Tension	12	39.52	-0.44	0.01
			Max. Compression	10	-50.87	0.34	-0.00
			Max. Mx	4	39.31	-0.45	0.01
			Max. My	7	-4.85	-0.01	-0.66
			Max. Vy	4	-1.03	-0.45	0.01
			Max. Vx	3	-0.96	-0.02	-0.12
		Diagonal	Max Tension	3	5.83	0.00	0.00
			Max. Compression	9	-5.86	0.00	0.00
			Max. Mx	24	0.77	0.05	0.01
			Max. My	17	-1.26	0.05	0.01
			Max. Vy	25	0.04	0.05	0.01
			Max. Vx	17	-0.00	0.00	0.00
T6	120 - 100	Leg	Max Tension	8	66.23	-0.66	0.01
			Max. Compression	10	-83.40	1.08	0.04
			Max. Mx	4	65.13	-1.11	-0.04
			Max. My	9	-6.14	-0.02	0.90
			Max. Vy	4	0.90	-1.11	-0.04
			Max. Vx	3	0.82	-0.03	-0.77
		Diagonal	Max Tension	3	7.31	0.00	0.00
			Max. Compression	3	-7.33	0.00	0.00
			Max. Mx	21	1.63	0.08	0.01
			Max. My	23	0.20	0.07	0.01
			Max. Vy	21	0.05	0.08	0.01
			Max. Vx	23	0.00	0.00	0.00
T7	100 - 80	Leg	Max Tension	8	93.45	-0.21	-0.03
			Max. Compression	10	-115.62	0.47	0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	4	77.79	-1.11	-0.04
			Max. My	7	-7.83	-0.03	-0.77
			Max. Vy	12	-0.18	-1.11	0.05
			Max. Vx	6	-0.14	-0.13	-0.56
		Diagonal	Max Tension	11	9.00	0.00	0.00
			Max. Compression	11	-8.98	0.00	0.00
			Max. Mx	21	2.01	0.12	0.02
			Max. My	23	-0.02	0.12	0.02
			Max. Vy	21	0.06	0.12	0.02
			Max. Vx	23	0.00	0.00	0.00
T8	80 - 70	Leg	Max Tension	8	108.04	-0.54	-0.01
			Max. Compression	10	-132.39	1.74	0.07
			Max. Mx	2	-130.69	1.75	0.06
			Max. My	7	-10.05	0.05	-1.58
			Max. Vy	2	-0.22	1.75	0.06
			Max. Vx	7	0.25	0.05	-1.58
		Diagonal	Max Tension	11	9.26	0.00	0.00
			Max. Compression	11	-9.43	0.00	0.00
			Max. Mx	21	1.81	0.14	0.02
			Max. My	19	-0.03	0.12	-0.02
			Max. Vy	21	0.06	0.14	0.02
			Max. Vx	19	-0.00	0.00	0.00
T9	70 - 60	Leg	Max Tension	8	122.45	-1.53	-0.05
			Max. Compression	10	-149.47	0.13	0.00
			Max. Mx	2	-147.39	1.75	0.06
			Max. My	7	-10.73	0.05	-1.58
			Max. Vy	2	0.26	1.75	0.06
			Max. Vx	13	0.25	0.05	1.57
		Diagonal	Max Tension	11	9.90	0.00	0.00
			Max. Compression	11	-10.10	0.00	0.00
			Max. Mx	21	2.10	-0.25	-0.03
			Max. My	25	-1.95	-0.21	-0.03
			Max. Vy	21	-0.12	-0.25	-0.03
			Max. Vx	25	0.01	0.00	0.00
T10	60 - 40	Leg	Max Tension	8	150.47	-0.95	-0.02
			Max. Compression	10	-182.77	1.28	0.05
			Max. Mx	17	18.53	-2.45	-0.02
			Max. My	7	-12.81	-0.02	-1.05
			Max. Vy	17	0.37	-2.45	-0.02
			Max. Vx	13	-0.19	-0.02	1.04
		Diagonal	Max Tension	11	10.19	0.00	0.00
			Max. Compression	11	-10.50	0.00	0.00
			Max. Mx	21	1.75	0.19	0.02
			Max. My	19	0.43	0.17	-0.02
			Max. Vy	21	0.08	0.18	0.02
			Max. Vx	19	-0.00	0.00	0.00
T11	40 - 20	Leg	Max Tension	8	177.25	-0.67	-0.01
			Max. Compression	10	-215.48	2.18	0.10
			Max. Mx	17	21.08	-5.85	-0.02
			Max. My	7	-15.07	-0.16	-1.12
			Max. Vy	17	0.98	-5.85	-0.02
			Max. Vx	7	-0.17	-0.16	-1.12
		Diagonal	Max Tension	11	10.70	0.00	0.00
			Max. Compression	11	-11.04	0.00	0.00
			Max. Mx	21	0.91	0.27	0.03
			Max. My	19	-1.44	0.26	-0.03
			Max. Vy	21	0.10	0.27	0.03
			Max. Vx	19	0.01	0.00	0.00
T12	20 - 0	Leg	Max Tension	8	202.06	-0.90	-0.01
			Max. Compression	10	-247.94	0.00	-0.00
			Max. Mx	17	27.50	-5.85	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	7	-18.34	-0.22	-2.22
			Max. Vy	17	-1.16	-5.85	-0.02
			Max. Vx	7	-0.33	-0.22	-2.22
		Diagonal	Max Tension	11	11.79	0.00	0.00
			Max. Compression	11	-12.00	0.00	0.00
			Max. Mx	21	-1.62	-0.67	0.06
			Max. My	5	-11.41	-0.23	0.07
			Max. Vy	21	-0.20	-0.67	0.06
			Max. Vx	24	0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	10	256.04	27.89	-15.54
	Max. H_x	10	256.04	27.89	-15.54
	Max. H_z	3	-178.36	-19.32	13.46
	Min. Vert	4	-206.03	-23.54	13.13
	Min. H_x	4	-206.03	-23.54	13.13
	Min. H_z	10	256.04	27.89	-15.54
Leg B	Max. Vert	6	255.75	-27.99	-15.25
	Max. H_x	12	-204.83	23.64	12.85
	Max. H_z	13	-176.95	19.51	12.99
	Min. Vert	12	-204.83	23.64	12.85
	Min. H_x	6	255.75	-27.99	-15.25
	Min. H_z	6	255.75	-27.99	-15.25
Leg A	Max. Vert	2	252.84	-0.30	31.82
	Max. H_x	11	16.48	3.44	1.63
	Max. H_z	2	252.84	-0.30	31.82
	Min. Vert	8	-208.20	0.29	-26.98
	Min. H_x	5	17.21	-3.42	1.69
	Min. H_z	8	-208.20	0.29	-26.98

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	56.05	0.00	0.00	39.92	-7.47	0.00
Dead+Wind 0 deg - No Ice	56.05	0.07	-51.71	-5069.56	-20.29	-13.16
Dead+Wind 30 deg - No Ice	56.05	24.88	-43.01	-4232.69	-2482.32	3.86
Dead+Wind 60 deg - No Ice	56.05	42.42	-24.54	-2404.58	-4229.51	18.49
Dead+Wind 90 deg - No Ice	56.05	49.65	-0.04	31.89	-4938.28	28.79
Dead+Wind 120 deg - No Ice	56.05	44.77	25.84	2591.12	-4430.62	33.13
Dead+Wind 150 deg - No Ice	56.05	24.80	42.99	4306.88	-2468.19	25.12
Dead+Wind 180 deg - No Ice	56.05	-0.06	48.98	4912.17	3.24	11.89
Dead+Wind 210 deg - No Ice	56.05	-24.91	43.05	4317.59	2471.81	-3.96
Dead+Wind 240 deg - No Ice	56.05	-44.84	25.94	2609.18	4427.51	-19.86
Dead+Wind 270 deg - No Ice	56.05	-49.69	0.04	47.75	4928.87	-28.89
Dead+Wind 300 deg - No Ice	56.05	-42.40	-24.43	-2386.18	4210.07	-30.80
Dead+Wind 330 deg - No Ice	56.05	-24.81	-42.94	-4220.33	2454.16	-25.28
Dead+Ice+Temp	102.37	0.00	-0.00	84.04	7.81	0.00

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 0 deg+Ice+Temp	102.37	0.02	-14.83	-1377.46	4.06	-1.26
Dead+Wind 30 deg+Ice+Temp	102.37	6.91	-11.95	-1107.66	-683.20	2.84
Dead+Wind 60 deg+Ice+Temp	102.37	11.65	-6.74	-591.69	-1160.28	5.73
Dead+Wind 90 deg+Ice+Temp	102.37	13.80	-0.01	81.51	-1368.44	7.44
Dead+Wind 120 deg+Ice+Temp	102.37	12.85	7.41	813.48	-1258.15	7.83
Dead+Wind 150 deg+Ice+Temp	102.37	6.89	11.94	1273.94	-678.45	4.66
Dead+Wind 180 deg+Ice+Temp	102.37	-0.02	13.44	1430.73	11.16	0.96
Dead+Wind 210 deg+Ice+Temp	102.37	-6.92	11.95	1277.26	699.90	-2.86
Dead+Wind 240 deg+Ice+Temp	102.37	-12.87	7.44	819.11	1277.41	-6.55
Dead+Wind 270 deg+Ice+Temp	102.37	-13.80	0.01	86.90	1385.38	-7.47
Dead+Wind 300 deg+Ice+Temp	102.37	-11.64	-6.71	-585.98	1174.06	-6.78
Dead+Wind 330 deg+Ice+Temp	102.37	-6.89	-11.93	-1103.98	694.35	-4.69
Dead+Wind 0 deg - Service	56.05	0.03	-17.89	-1728.04	-11.92	-4.56
Dead+Wind 30 deg - Service	56.05	8.61	-14.88	-1438.44	-863.82	1.34
Dead+Wind 60 deg - Service	56.05	14.68	-8.49	-805.89	-1468.40	6.40
Dead+Wind 90 deg - Service	56.05	17.18	-0.02	37.19	-1713.63	9.96
Dead+Wind 120 deg - Service	56.05	15.49	8.94	922.74	-1538.00	11.47
Dead+Wind 150 deg - Service	56.05	8.58	14.87	1516.41	-858.94	8.69
Dead+Wind 180 deg - Service	56.05	-0.02	16.95	1725.87	-3.78	4.12
Dead+Wind 210 deg - Service	56.05	-8.62	14.89	1520.12	850.41	-1.37
Dead+Wind 240 deg - Service	56.05	-15.52	8.98	928.99	1527.14	-6.87
Dead+Wind 270 deg - Service	56.05	-17.19	0.01	42.67	1700.59	-10.00
Dead+Wind 300 deg - Service	56.05	-14.67	-8.45	-799.53	1451.88	-10.66
Dead+Wind 330 deg - Service	56.05	-8.58	-14.86	-1434.17	844.28	-8.75

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	-56.05	0.00	0.00	56.05	0.00	0.000%
2	0.07	-56.05	-51.71	-0.07	56.05	51.71	0.000%
3	24.88	-56.05	-43.01	-24.88	56.05	43.01	0.000%
4	42.42	-56.05	-24.54	-42.42	56.05	24.54	0.000%
5	49.65	-56.05	-0.04	-49.65	56.05	0.04	0.000%
6	44.77	-56.05	25.84	-44.77	56.05	-25.84	0.000%
7	24.80	-56.05	42.99	-24.80	56.05	-42.99	0.000%
8	-0.06	-56.05	48.98	0.06	56.05	-48.98	0.000%
9	-24.91	-56.05	43.05	24.91	56.05	-43.05	0.000%
10	-44.84	-56.05	25.94	44.84	56.05	-25.94	0.000%
11	-49.69	-56.05	0.04	49.69	56.05	-0.04	0.000%
12	-42.40	-56.05	-24.43	42.40	56.05	24.43	0.000%
13	-24.81	-56.05	-42.94	24.81	56.05	42.94	0.000%
14	0.00	-102.37	0.00	0.00	102.37	0.00	0.000%
15	0.02	-102.37	-14.83	-0.02	102.37	14.83	0.000%
16	6.91	-102.37	-11.95	-6.91	102.37	11.95	0.000%
17	11.65	-102.37	-6.74	-11.65	102.37	6.74	0.000%
18	13.80	-102.37	-0.01	-13.80	102.37	0.01	0.000%
19	12.85	-102.37	7.41	-12.85	102.37	-7.41	0.000%
20	6.89	-102.37	11.94	-6.89	102.37	-11.94	0.000%
21	-0.02	-102.37	13.44	0.02	102.37	-13.44	0.000%
22	-6.92	-102.37	11.95	6.92	102.37	-11.95	0.000%
23	-12.87	-102.37	7.44	12.87	102.37	-7.44	0.000%
24	-13.80	-102.37	0.01	13.80	102.37	-0.01	0.000%
25	-11.64	-102.37	-6.71	11.64	102.37	6.71	0.000%
26	-6.89	-102.37	-11.93	6.89	102.37	11.93	0.000%
27	0.03	-56.05	-17.89	-0.03	56.05	17.89	0.000%
28	8.61	-56.05	-14.88	-8.61	56.05	14.88	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
29	14.68	-56.05	-8.49	-14.68	56.05	8.49	0.000%
30	17.18	-56.05	-0.02	-17.18	56.05	0.02	0.000%
31	15.49	-56.05	8.94	-15.49	56.05	-8.94	0.000%
32	8.58	-56.05	14.87	-8.58	56.05	-14.87	0.000%
33	-0.02	-56.05	16.95	0.02	56.05	-16.95	0.000%
34	-8.62	-56.05	14.89	8.62	56.05	-14.89	0.000%
35	-15.52	-56.05	8.98	15.52	56.05	-8.98	0.000%
36	-17.19	-56.05	0.01	17.19	56.05	-0.01	0.000%
37	-14.67	-56.05	-8.45	14.67	56.05	8.45	0.000%
38	-8.58	-56.05	-14.86	8.58	56.05	14.86	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	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
T1	180 - 160	2.965	35	0.1217	0.0066
T2	160 - 153.333	2.447	35	0.1198	0.0072
T3	153.333 - 146.667	2.278	35	0.1179	0.0073
T4	146.667 - 140	2.110	35	0.1155	0.0074
T5	140 - 120	1.944	31	0.1121	0.0073
T6	120 - 100	1.469	31	0.1010	0.0070
T7	100 - 80	1.044	31	0.0854	0.0064
T8	80 - 70	0.685	31	0.0690	0.0053
T9	70 - 60	0.531	31	0.0609	0.0046
T10	60 - 40	0.403	31	0.0519	0.0042
T11	40 - 20	0.190	31	0.0328	0.0025
T12	20 - 0	0.053	31	0.0170	0.0009

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
178'	Empty Pipe Mount	35	2.913	0.1217	0.0067	Inf
172'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	35	2.757	0.1213	0.0069	671795
157'	VHLP2-18	35	2.371	0.1190	0.0073	216757
148'	(3) ACU-A20-N	35	2.144	0.1160	0.0074	671332
143'	800 EXTERNAL NOTCH FILTER	35	2.019	0.1137	0.0073	268175
126'	LNX-6514DS-T4M w/ Mount Pipe	31	1.608	0.1047	0.0072	109855
112'	800 10504 w/ Mount Pipe	31	1.292	0.0951	0.0068	81176
102'	(2) 7770.00 w/ Mount Pipe	31	1.083	0.0871	0.0064	65824
30'	GPS_A	31	0.110	0.0247	0.0016	51889
12'	VG-1060	35	0.025	0.0105	0.0005	76002

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
T1	180 - 160	8.531	10	0.3503	0.0191
T2	160 - 153.333	7.041	10	0.3444	0.0209
T3	153.333 - 146.667	6.553	10	0.3391	0.0212
T4	146.667 - 140	6.072	10	0.3319	0.0213
T5	140 - 120	5.594	10	0.3223	0.0210
T6	120 - 100	4.224	10	0.2903	0.0203
T7	100 - 80	3.000	10	0.2452	0.0184
T8	80 - 70	1.970	10	0.1979	0.0154
T9	70 - 60	1.528	10	0.1746	0.0134
T10	60 - 40	1.160	10	0.1488	0.0121
T11	40 - 20	0.546	10	0.0939	0.0072
T12	20 - 0	0.153	10	0.0488	0.0026

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Empty Pipe Mount	10	8.381	0.3500	0.0193	383139
172'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	10	7.932	0.3490	0.0199	239461
157'	VHLP2-18	10	6.821	0.3422	0.0210	76600
148'	(3) ACU-A20-N	10	6.168	0.3336	0.0213	238815
143'	800 EXTERNAL NOTCH FILTER	10	5.808	0.3268	0.0212	93978
126'	LNX-6514DS-T4M w/ Mount Pipe	10	4.623	0.3009	0.0207	38341
112'	800 10504 w/ Mount Pipe	10	3.713	0.2735	0.0197	28261
102'	(2) 7770.00 w/ Mount Pipe	10	3.114	0.2501	0.0186	22874
30'	GPS_A	10	0.316	0.0708	0.0047	18062
12'	VG-1060	10	0.073	0.0300	0.0014	26439

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325X	0.8750	4	1.30	26.46	0.049	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	1.71	4.55	0.375	1.333	Member Block Shear
		Top Girt	A325X	0.6250	1	0.06	3.04	0.019	1.333	Member Block Shear
		Mid Girt	A325X	0.6250	1	0.19	3.04	0.062	1.333	Member Block Shear
T2	160	Diagonal	A325X	0.6250	1	2.11	6.80	0.310	1.333	Member Bearing
T3	153.333	Diagonal	A325X	0.6250	1	2.62	6.80	0.385	1.333	Member Bearing
		Top Girt	A325X	0.6250	1	0.26	3.04	0.087	1.333	Member Block Shear
T4	146.667	Leg	A325X	1.0000	4	4.40	34.56	0.127	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	4.08	6.80	0.600	1.333	Member Bearing
		Top Girt	A325X	0.6250	1	0.11	3.04	0.037	1	Member Block Shear
T5	140	Leg	A325X	1.0000	6	6.59	34.56	0.191	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	5.83	6.80	0.858	1.333	Member Bearing
T6	120	Leg	A325X	1.0000	6	11.04	34.56	0.319	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	7.31	7.62	0.960	1.333	Member Bearing
T7	100	Leg	A325X	1.0000	8	11.68	34.56	0.338	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	9.00	9.14	0.985	1.333	Member Bearing
T8	80	Diagonal	A325X	0.7500	1	9.26	9.14	1.013	1.333	Member Bearing
T9	70	Leg	A325X	1.0000	8	15.31	34.56	0.443	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	9.90	12.91	0.766	1.333	Gusset Bearing
T10	60	Leg	A325X	1.0000	8	18.81	34.56	0.544	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	10.19	9.14	1.114	1.333	Member Bearing
T11	40	Leg	A325X	1.0000	8	22.16	34.56	0.641	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	10.70	11.43	0.937	1.333	Member Bearing
T12	20	Leg	A449	1.0000	10	20.21	31.10	0.650	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	11.79	12.91	0.913	1.333	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 160	ROHN 3 EH	20'15/32"	5'1/8"	52.9 K=1.00	23.893	3.0159	-7.91	72.06	0.110
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	23.671	4.4074	-11.67	104.33	0.112
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	23.671	4.4074	-17.43	104.33	0.167
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	23.671	4.4074	-24.48	104.33	0.235
T5	140 - 120	ROHN 5 EH	20'15/32"	6'8-5/32"	43.6 K=1.00	25.320	6.1120	-50.87	154.75	0.329
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-5/32"	36.0 K=1.00	26.380	6.7133	-83.40	177.09	0.471
T7	100 - 80	ROHN 6 EH	20'15/32"	10'1/4"	54.8 K=1.00	23.589	8.4049	-115.62	198.26	0.583
T8	80 - 70	ROHN 8 EHS	10'1/4"	10'1/4"	41.2 K=1.00	25.667	9.7193	-132.39	249.47	0.531
T9	70 - 60	ROHN 8 EHS	10'1/4"	10'1/4"	41.2 K=1.00	25.667	9.7193	-149.47	249.47	0.599
T10	60 - 40	ROHN 8 EHS	20'3/8"	10'1/4"	41.2 K=1.00	25.667	9.7193	-182.77	249.47	0.733
T11	40 - 20	ROHN 8 EH	20'3/8"	10'1/4"	41.8 K=1.00	25.582	12.7627	-215.48	326.50	0.660
T12	20 - 0	ROHN 8 EH	20'3/8"	10'1/4"	41.8 K=1.00	25.582	12.7627	-247.94	326.50	0.759

Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 160	L2x2x3/16	9'10-5/16"	4'9-15/32"	146.0 K=1.00	7.007	0.7150	-1.68	5.01	0.335
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-15/32"	5'6-1/8"	134.5 K=1.00	8.249	1.1900	-2.18	9.82	0.222
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-3/16"	5'9-15/32"	141.5 K=1.00	7.461	1.1900	-2.77	8.88	0.312
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'31/32"	148.5 K=1.00	6.769	1.1900	-4.17	8.06	0.518
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-5/32"	169.3 K=1.00	5.207	1.1900	-5.86	6.20	0.946
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'9"	157.1 K=1.00	6.053	1.4400	-7.33	8.72	0.841
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-1/8"	9'5-3/4"	164.0 K=1.00	5.554	1.6900	-8.98	9.39	0.957
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-27/32"	169.7 K=1.00	5.184	1.6900	-9.43	8.76	1.076

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 $\frac{P}{P_a}$
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'3/8"	10'3-1/8"	193.5 K=1.00	3.988	3.3800	-10.10	13.48	0.749
		2L 'a' > 59.6944 in - 136								
T10	60 - 40	L4x4x1/4	22'9-23/32"	11'1-13/16"	168.3 K=1.00	5.274	1.9400	-10.50	10.23	1.026
T11	40 - 20	L4x4x5/16	24'7-7/16'	12'23/32"	182.9 K=1.00	4.463	2.4000	-11.04	10.71	1.031
T12	20 - 0	2L4x4x5/16x3/8	26'5-17/32"	12'11-3/4'	214.9 K=1.00	3.233	4.8000	-12.00	15.52	0.773
		2L 'a' > 74.5105 in - 175								

Top Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	6'8-9/32"	6'1-29/32'	185.8 K=1.00	4.324	0.4844	-0.08	2.09	0.037
T3	153.333 - 146.667	L2x2x1/8	9'5-13/32'	8'10-3/32'	266.7 K=1.00	2.099	0.4844	-0.15	1.02	0.147
		KL/R > 200 (C) - 46								

Mid Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	7'8-5/8"	7'2-9/32"	217.1 K=1.00	3.168	0.4844	-0.17	1.53	0.111
		KL/R > 200 (C) - 7								

Tension Checks

Leg Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 160	ROHN 3 EH	20'15/32"	5'1/8"	52.9	30.000	3.0159	5.19	90.48	0.057
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	30.000	4.4074	8.43	132.22	0.064
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	30.000	4.4074	12.62	132.22	0.095
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	30.000	4.4074	17.60	132.22	0.133
T5	140 - 120	ROHN 5 EH	20'15/32"	6'8-5/32"	43.6	30.000	6.1120	39.52	183.36	0.216
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-5/32"	36.0	30.000	6.7133	66.23	201.40	0.329
T7	100 - 80	ROHN 6 EH	20'15/32"	10'1/4"	54.8	30.000	8.4049	93.45	252.15	0.371

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 $\frac{P}{P_a}$
T8	80 - 70	ROHN 8 EHS	10'1/4"	10'1/4"	41.2	30.000	9.7193	108.04	291.58	0.371
T9	70 - 60	ROHN 8 EHS	10'1/4"	10'1/4"	41.2	30.000	9.7193	122.45	291.58	0.420
T10	60 - 40	ROHN 8 EHS	20'3/8"	10'1/4"	41.2	30.000	9.7193	150.47	291.58	0.516
T11	40 - 20	ROHN 8 EH	20'3/8"	10'1/4"	41.8	30.000	12.7627	177.25	382.88	0.463
T12	20 - 0	ROHN 8 EH	20'3/8"	10'1/4"	41.8	30.000	12.7627	202.06	382.88	0.528

Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 160	L2x2x3/16	9'10-5/16"	4'9-15/32"	95.6	29.000	0.4308	1.71	12.49	0.137
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-15/32"	5'6-1/8"	87.8	29.000	0.7519	2.11	21.80	0.097
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-3/16"	5'9-15/32"	92.2	29.000	0.7519	2.62	21.80	0.120
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'31/32"	96.7	29.000	0.7519	4.08	21.80	0.187
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-5/32"	110.0	29.000	0.7519	5.83	21.80	0.267
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'9"	101.5	32.500	0.9394	7.31	30.53	0.239
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-1/8"	9'5-3/4"	105.9	32.500	1.1034	9.00	35.86	0.251
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-27/32"	109.6	32.500	1.1034	9.26	35.86	0.258
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 59.6944 in - 137	21'3/8"	10'3-1/8"	114.4	29.000	2.2069	9.90	64.00	0.155
T10	60 - 40	L4x4x1/4	22'9-23/32"	11'1-13/16"	108.3	32.500	1.2909	10.19	41.96	0.243
T11	40 - 20	L4x4x5/16	24'7-7/16"	12'23/32"	118.0	32.500	1.5949	10.70	51.84	0.207
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.5105 in - 176	26'5-17/32"	12'11-3/4"	126.9	29.000	3.1898	11.79	92.51	0.127

Top Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	6'8-9/32"	6'1-29/32"	122.6	29.000	0.2930	0.06	8.50	0.007
T3	153.333 - 146.667	L2x2x1/8	9'5-13/32"	8'10-3/32"	173.9	29.000	0.2930	0.26	8.50	0.031
T4	146.667 - 140	L2x2x1/8	10'1-11/16"	9'6-3/8"	187.2	29.000	0.2930	0.11	8.50	0.013*

* DL controls

Mid Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	180 - 160	L2x2x1/8	7'8-5/8"	7'2-9/32"	142.4	29.000	0.2930	0.19	8.50	0.022

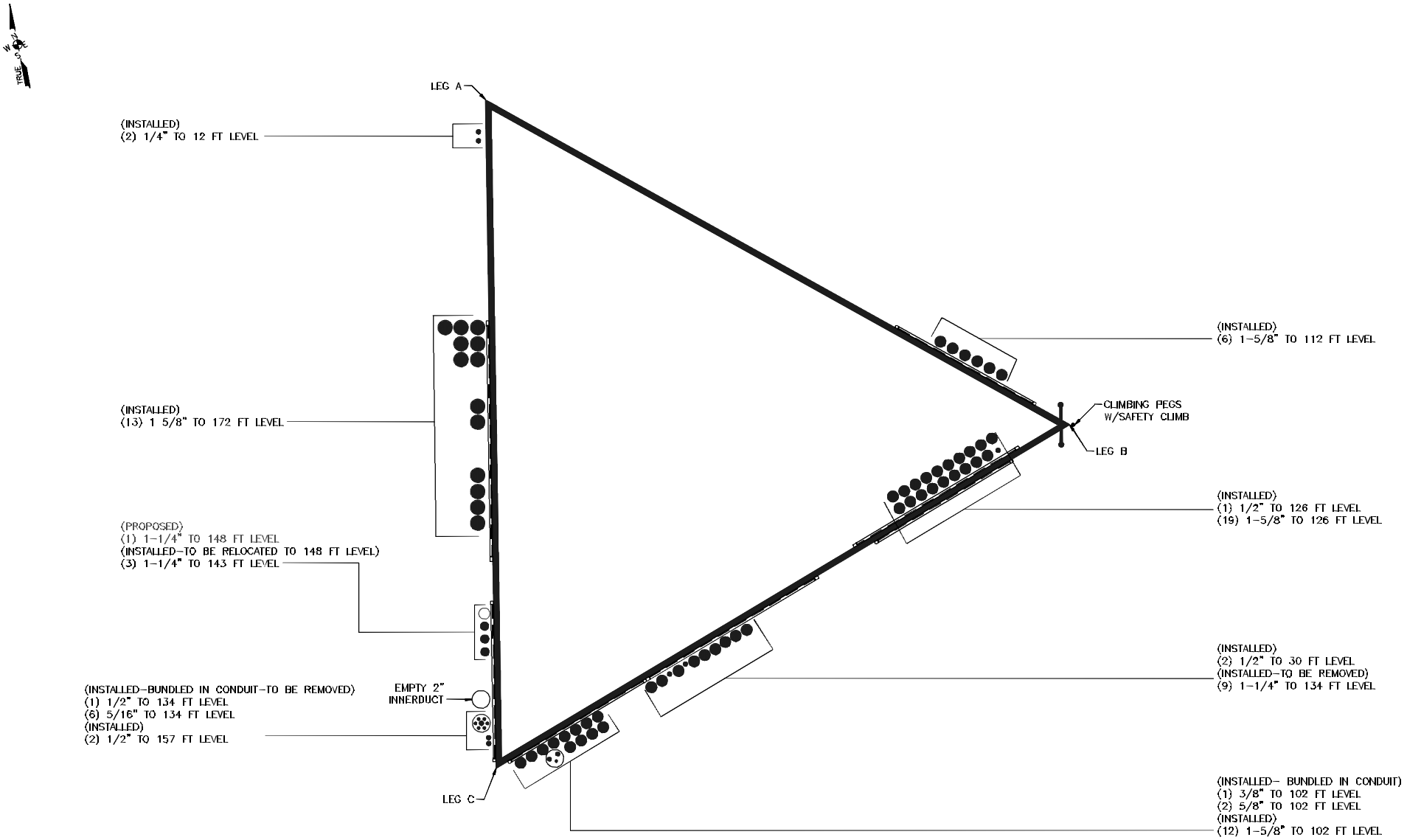
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	3	-7.91	96.06	8.2	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	36	-11.67	139.07	8.4	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	43	-17.43	139.07	12.5	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	55	-24.48	139.07	17.6	Pass
T5	140 - 120	Leg	ROHN 5 EH	67	-50.87	206.29	24.7	Pass
T6	120 - 100	Leg	ROHN 6 EHS	88	-83.40	236.06	35.3	Pass
T7	100 - 80	Leg	ROHN 6 EH	109	-115.62	264.29	43.7	Pass
T8	80 - 70	Leg	ROHN 8 EHS	124	-132.39	332.54	39.8	Pass
T9	70 - 60	Leg	ROHN 8 EHS	133	-149.47	332.54	44.9	Pass
T10	60 - 40	Leg	ROHN 8 EHS	142	-182.77	332.54	55.0	Pass
T11	40 - 20	Leg	ROHN 8 EH	157	-215.48	435.22	49.5	Pass
T12	20 - 0	Leg	ROHN 8 EH	172	-247.94	435.22	57.0	Pass
T1	180 - 160	Diagonal	L2x2x3/16	15	-1.68	6.68	25.2 28.1 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	42	-2.18	13.09	16.6 23.3 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	54	-2.77	11.83	23.4 28.9 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	66	-4.17	10.74	38.9 45.0 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	75	-5.86	8.26	71.0	Pass
T6	120 - 100	Diagonal	L3x3x1/4	95	-7.33	11.62	63.1 72.0 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	112	-8.98	12.51	71.8 73.9 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	127	-9.43	11.68	80.7	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	136	-10.10	17.97	56.2 57.5 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	145	-10.50	13.64	77.0 83.6 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	160	-11.04	14.28	77.3	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	175	-12.00	20.68	58.0 68.5 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	6	-0.08	2.79	2.8	Pass
T3	153.333 - 146.667	Top Girt	L2x2x1/8	46	-0.15	1.36	11.0	Pass
T4	146.667 - 140	Top Girt	L2x2x1/8	60	0.11	8.50	1.3 2.7 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	7	-0.17	2.05	8.3	Pass
							Summary	
						Leg (T12)	57.0	Pass
						Diagonal (T10)	83.6	Pass
						Top Girt (T3)	11.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Mid Girt (T1)	8.3	Pass
						Bolt Checks	83.6	Pass
						RATING =	**83.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

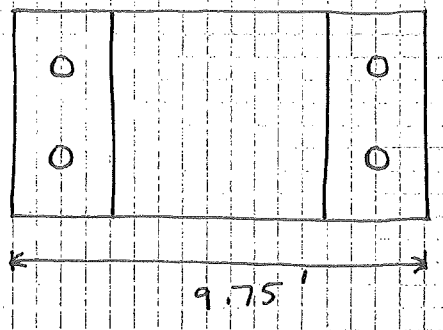


BUSINESS UNIT: 867133 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Project: 807133 BRG 134 943057
Sheet ____ of ____ Date: ____
By: ____ FDH Project #: ____
Checked By: ____ Drawing #: ____



TNX Reactions
uplift = 208
Down = 256

$W_c = \{6.25' \cdot 9.75' \cdot 9'\} \cdot 150\ kcf = 82.27\ K$

Compression — ultimate Bearing capacity = 30 ksf per Geo

Bearing Area = $6.25' \cdot 9.75' = 60.9375\ ft^2$

total down load = $256\ K + 82.27\ K = 338.27$

Actual Bearing stress = $338.27^K / 60.9375\ ft^2 = 5.55\ ksf$

Capacity = $5.55\ ksf / (.5)(30\ ksf)$

$= 37.0\ \%$

6521 Meridien Drive, Raleigh, NC 27616 (919) 755-1012 Fax: (919) 755-1031 www.fdh-inc.com

Project: _____

Sheet _____ of _____ Date: _____

By: _____ FDH Project #: _____

Checked By: _____ Drawing #: _____

Uplift Anchor = #11 BAR A615 Gr 60

Tensile strength of BAR

$$P_N = \frac{F_y A_g}{\Omega} = \frac{(60\ ksi)\ \pi/4 \cdot (1.410)^2}{1.67} = 56.1\ k$$

$P_u = 208\ k/4 = 52\ k$

Capacity = $52/56.1 = 92.7\ \%$

Soil - Grout interaction

ultimate skin friction = 16.0 ksf

$$\frac{P_N}{\Omega} = \frac{\pi (2.25'' \times 1/12'')(15.5')(16\ k/ft^2)}{2}$$

$= 73.04\ k$

$P_u = 208\ k/4 = 52\ k$

Capacity = $52\ k/73.04\ k = 71.2\ \%$

EBI Consulting
environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT43XC860

South Norwalk Crown Twr
50 Rockland Road
Norwalk, CT 06854

September 09, 2012

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

EBI Consulting
environmental | engineering | due diligence

September 9, 2012

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

Re: Emissions Values for Site **CT43XC860 - South Norwalk Crown Twr**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 50 Rockland Road, Norwalk, CT, for the purpose of determining whether the emissions 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 is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band 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 50 Rockland Road, Norwalk, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. 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) 5 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) 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.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna 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. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **145 feet** above ground level (AGL)
7) 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	CT43XC860 - South Norwalk Crown Twr
Site Addresss	50 Rockland Road, Norwalk, CT 06854
Site Type	Self Support Tower

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	5	100	15.9	145	139	1/2 "	0.5	0	3467.3685	64.51733	6.45173%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	145	139	1/2 "	0.5	0	389.96892	7.256152	1.27974%
														Sector total Power Density Value:		7.731%	

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	5	100	15.9	145	139	1/2 "	0.5	0	3467.3685	64.51733	6.45173%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	145	139	1/2 "	0.5	0	389.96892	7.256152	1.27974%
														Sector total Power Density Value:		7.731%	

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	5	100	15.9	145	139	1/2 "	0.5	0	3467.3685	64.51733	6.45173%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	145	139	1/2 "	0.5	0	389.96892	7.256152	1.27974%
														Sector total Power Density Value:		7.731%	

Site Composite MPE %	
Carrier	MPE %
Sprint	23.194%
AT&T	16.440%
Metro PCS	13.980%
Clearwire	1.020%
Nextel	7.620%
Verizon Wireless	17.330%
T-Mobile	3.200%
Total Site MPE %	**82.784%**

Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **23.194% (7.731% from each sector)** 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 **82.784%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

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

Scott Heffernan
RF Engineering Director

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Burlington, MA 01803

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February, 4, 2015

STRUCTURAL ANALYSIS EVALUATION LETTER

Michelle Hisert
Real Estate Manager III
Upstate NY and Southern Connecticut
Sprint, Regional Site Development
Michelle.Hisert@sprint.com

Site Number: CT43XC860
Site Name: SOUTH NORWALK- CROWN TOWER
Site Address: 50 Rockland Road, Norwalk, CT 06854
Crown ID#: 807133

Project Number: 7225-Crown-Sprint 2.5
Project Name: Sprint 2.5 Equipment Deployment
Work Order: 7225.CT43XC860

Dear Ms. Hisert,

This letter is to confirm Tectonic Engineering and Surveying Consultants P.C.'s (TECTONIC) structural assessment of the proposed Sprint antenna mounting system on the site noted above. The intent of the review is to determine if the load from the proposed of antennas and equipment will exceed the structural capacity of the proposed antenna mounting system.

The existing antenna mounting system consists of antenna pipes on standoff antenna mounts. Currently there are three (3) antennas located on the existing mounting system. Sprint is proposing to remove the existing antenna mounts, relocate the existing antennas to a new sector mounting system, and install three (3) new panel antennas and associated appurtenances as part of this upgrade at a RAD elevation of approximately one hundred forty eight (148'-0") above ground level. The final configuration upon this installation will be as follows:

3 (E) RFS APXVSPP18-C-A20 (72.0"Hx11.8"Wx7.0"D, 57 lbs.) panel antennas, one (1) per sector, mounted to steel pipes.
3 (P) RFS APX-VTM-14-C-120 (56.3"Hx12.6"Wx6.3"D, 56 lbs.) panel antennas, one (1) per sector, mounted to steel pipes.
3 (P) Alcatel Lucent TD-RRH8x20-25 (26.1"Hx18.6"Wx6.7"D, 70 lbs.), one (1) per sector, mounted to steel pipes.
3 (E) 800 MHz RRH's, one (1) per sector, relocated to the tower leg
6 (E) 1900 MHz RRH's, two (2) per sector, relocated to the tower leg
3 (E) 1-1/4" diameter Hybrid Power/Fiber cables routed along the interior of the pole up to the antennas.
1 (P) 5/8" diameter Hybrid Power/Fiber cable routed along the existing cables up to the antennas.

Proposed and relocated antennas are to be located at a RAD elevation of one hundred forty eight (148'-0"). Centerline of the existing and proposed antennas are to match the centerline of the proposed mounts.

The proposed mount, SITEPRO Model VFA12-U is to have the following characteristics:

- Sector mount with a nominal face width of about twelve and a half feet (12'-6").
- Antenna mounting pipes are made from 2 inch standard pipe stock (2.375" OD).
- Main horizontal members are made from 2 inch standard pipe stock (2.375" OD).
- Supporting standoff members are made 1 inch standard pipe stock (1.320" OD).
- Bracing members are made from 1/2 inch solid rod.

The review and the analysis is based on ANSI/TIA-222-F-1996 "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", using a basic wind speed of eighty five (85) mph with no ice and thirty eight (74) mph with half inch (0.50") of radial ice at one hundred forty eight feet (148'-0") above ground level.

By engineering analysis and comparison, the proposed antenna mounting system is capable of supporting the proposed Sprint upgrade.

This certification is solely based on the information provided by the client and a limited visual inspection from the ground. This certification also assumes that all structural members are in good condition.

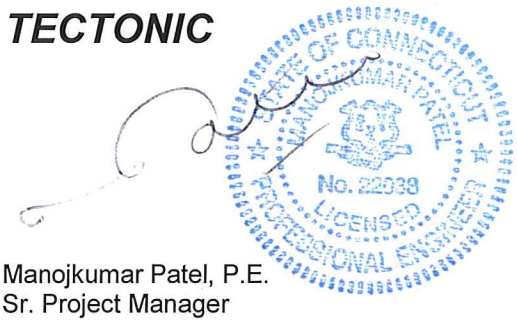
A detailed mapping of the mount was not performed. Therefore the contractor shall field verify existing conditions and notify the design engineer of any discrepancies prior to installation of the proposed upgrade. Any further changes to the antenna or other appurtenances configuration and location should be reviewed with respect to their effect on structural loads prior to implementation.

The existing structure analysis is completed by others and therefore not part of this assessment.

Should you have any questions, please do not hesitate to contact us.

Sincerely,

TECTONIC



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