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

October 27, 2017

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

RE: **Notice of Exempt Modification for Sprint 2.5 Rework Crown Site BU: 828540**
Sprint Site ID: CT33XC592
218 Wheeler Road, Torrington, CT 06790
Latitude: 41° 46′ 50.33″ / Longitude: -73° 8′ 10.02″

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 150-foot level of the existing 160-foot monopole at 218 Wheeler Road in Torrington, CT. The tower is owned by Crown Castle. The property is owned by Lucille Lefebvre. Sprint intends to install three (3) antennas, three (3) RRHs, and one (1) hybrid cable.

A request for original zoning documents was sent to the City of Torrington but has not been answered.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Elinor Carbone, Mayor, City of Torrington, the Planning & Zoning Commission, as well as the property owner.

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: The Honorable Elinor Carbone
Torrington City Hall
140 Main Street
Torrington, CT 06790

Planning & Zoning Commission
Torrington City Hall
140 Main Street Room 324
Torrington, CT 06790

Lucille Lefebvre
218 Wheeler Road
Litchfield, CT 06759

218 WHEELER RD

Location 218 WHEELER RD
Mblu 147/ 1A/ 3/ /
Acct# 012101
Owner LEFEBVRE LUCILLE G
Assessment $148,900
PID 1873
Building Count 1

Current Value

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$67,630	$81,270	$148,900

Owner of Record

Owner LEFEBVRE LUCILLE G
Co-Owner

Sale Price $0
Certificate
Book & Page 194/ 911
Sale Date 01/21/1988
Instrument 25

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
LEFEBVRE LUCILLE G	$0		194/ 911	25	01/21/1988
LEFEBVRE,LUCILLE G&ESTATE OF HENRY	$0		189/ 965		03/02/1987

Building Information

Building 1 : Section 1

Year Built: 1955
Living Area: 992
Replacement Cost: $138,022
Building Percent Good: 70
Replacement Cost Less Depreciation: $96,620

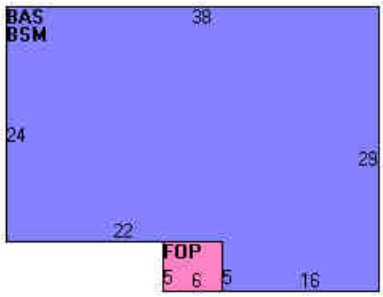
Building Attributes	
Field	**Description**
Style	Ranch
Model	Residential

Grade	C
Stories	1.00
Occupancy	1
Exterior Wall 1	Brick
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Hardwood
Interior Floor 2	
Heat Fuel	Oil
Heat Type	Hot Water
AC Type	None
Bedrooms	3 Bedrooms
Full Baths	1
Half Baths	0
Extra Fixtures	0
Total Rooms	5
Bath Style	Average
Kitchen Style	Average
Extra Kitchens	
Fireplace(s)	1
Bsmt Garage	
SF FBM	
FBM Quality	

Building Photo

(http://images.vgsi.com/photos/LitchfieldCTPhotos//\00\00\67/2

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	992	992
BSM	Basement	992	0
FOP	Open Porch	30	0
		2,014	992

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 101

Land Line Valuation

Size (Acres) 4

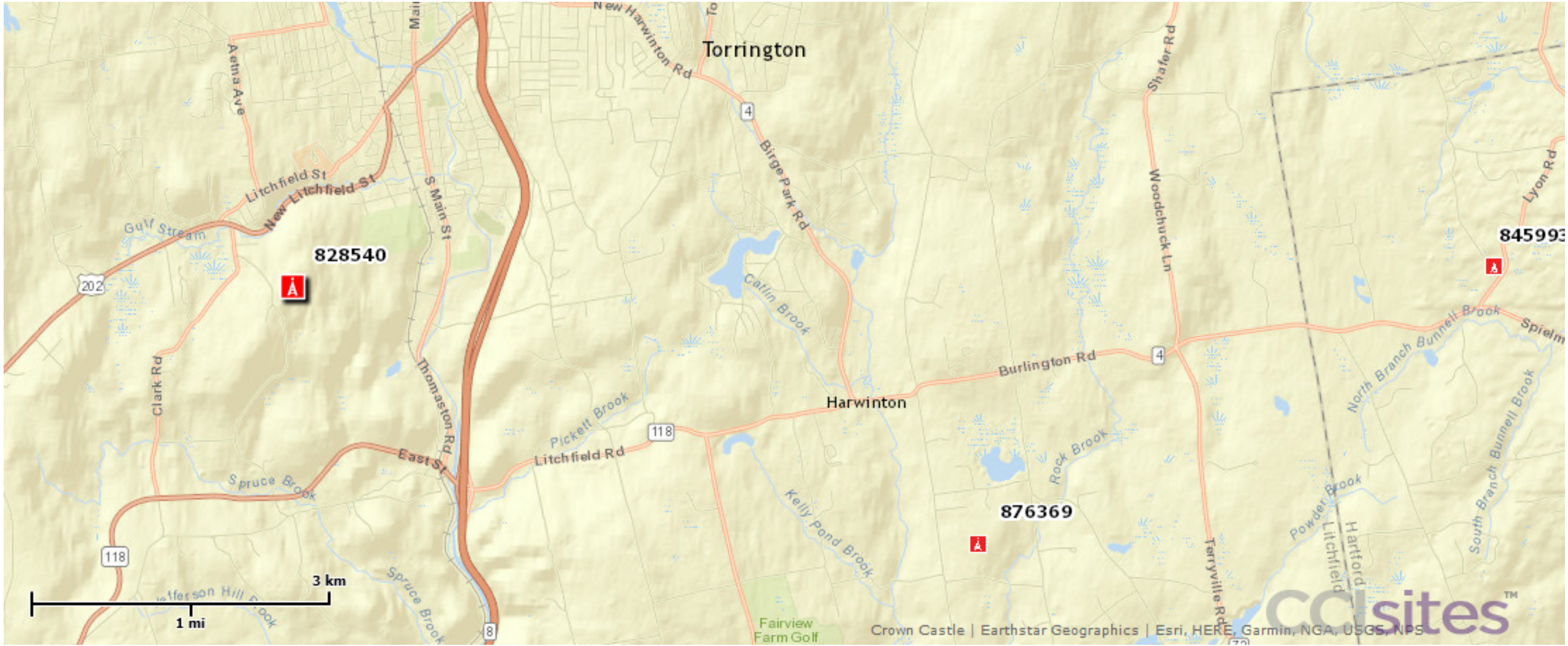
Description	Res Dwelling	**Frontage**	
Zone	5	**Depth**	
Neighborhood	170	**Assessed Value**	$81,270
Category			

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$67,630	$81,270	$148,900
2015	$67,630	$81,270	$148,900
2014	$67,630	$81,270	$148,900


Torrington
828540
876369
845993
Harwinton
New Harwinton Rd
Birge Park Rd
Litchfield St
New Litchfield St
Aetna Ave
S Main St
Gulf Stream
202
Clark Rd
Thomaston Rd
East St
Spruce Brook
118
Litchfield Rd
Pickett Brook
Catlin Brook
Kelly Pond Brook
Rock Brook
Burlington Rd
4
Shafer Rd
Woodchuck Ln
Terryville Rd
Lyon Rd
North Branch Bunnell Brook
South Branch Bunnell Brook
Powder Brook
Hartford
Litchfield
Fairview Farm Golf
8
3 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, Garmin, NGA, USGS, NPS
ccisites™

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT33XC592

SITE NAME:

E. LITCHFIELD/OMNIPOINT–LEFEBVRE PROP.

SITE ADDRESS:

218 WHEELER ROAD
TORRINGTON, CT 06790

CROWN ID#: 828540

CROWN SITE NAME: TORRINGTON/RT 8

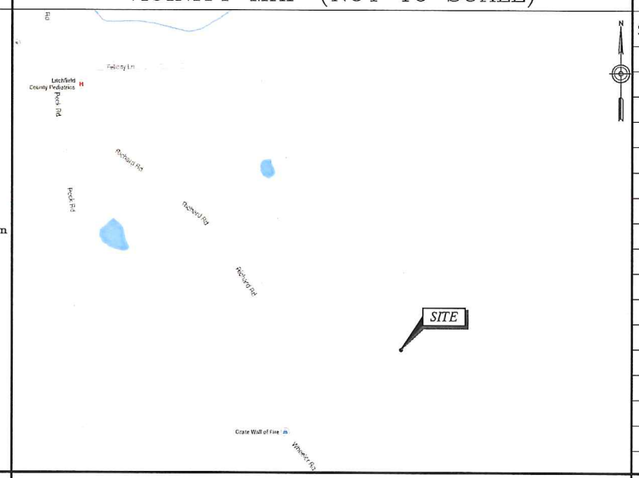
APPROVED
By Ray Perry at 10:16 am, Sep 18, 2014

SHEET INFORMATION

SITE NUMBER:	CT33XC592
SITE NAME:	E.LITCHFIELD/OMNIPOINT–LEFEBVRE PROP.
SITE ADDRESS:	218 WHEELER RD TORRINGTON, CT 06790
COUNTY:	LITCHFIELD
COORDINATES: (NAD 83)	41° 46' 50.33" N 73° 8' 10.02" W
GROUND ELEV:	1023'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	160'–0"± AGL
STRUCTURE RAD CENTER:	150'–0"± AGL
ZONING CLASSIFICATION:	5 RES DWELLING
PARCEL INFO:	147/1A/3//

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:	GARY WOOD (860) 940–9168 gary.wood@sprint.com
CROWN CM:	JASON D'AMICO (860) 209–0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

GENERAL NOTES

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

PROJECT DESCRIPTION

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

AERIAL VIEW (NOT TO SCALE)

APPROVALS

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

CONSTRUCTION: _____ DATE: _____

LEASING/ SITE ACQUISITION: _____ DATE: _____

LANDLORD/ PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

Sprint
2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, 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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT — JAMES M. QUICKSELL — No. 22003 — LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT–LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

SHEET TITLE:
TITLE SHEET

SHEET NO:
T–1

DIVISION 01000–GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE PROJECT OWNER'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1–800–788–7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.

9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.

12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.

13. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING AND EXCAVATION OF ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHICH INTERFERE WITH THE EXECUTION OF THE WORK SHALL BE REMOVED AND OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER.

14. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.

15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.

16. THE CONTRACTOR SHALL NOTIFY THE THE RF ENGINEER FOR ANTENNA AZIMUTH VERIFICATION (DURING ANTENNA INSTALLATION) PRIOR TO CONDUCTING SWEEP TESTS.

17. THE CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS–BUILT DRAWINGS TO THE CLIENT REPRESENTATIVE.

18. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT EXHIBIT A–STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV. 4.0– 02.15.2011.DOCM.

19. REFER TO: WEATHER PROOFING SPECS: EXCERPT EXH A–WIHRPRF–STD CONSTR SPECS._15720111042185549 2.DOCM.

20. REFER TO: COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF

21. REFER TO LATEST DOCUMENTATION REVISION.

DIVISION 03000–CONCRETE

1.03 APPLICABLE STANDARDS (USE LATEST EDITIONS)

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

1.04 QUALITY ASSURANCE

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

3.04 SURFACE FINISHES

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

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

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

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

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

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

3.05 PATCHING

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

3.06 DEFECTIVE CONCRETE

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

3.07 PROTECTION

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

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

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

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

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

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

1.02 REFERENCE STANDARDS

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

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

PART 2 – PRODUCTS

2.01 MATERIALS

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

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

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

2.02 WELDING

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

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

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

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

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

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

2.03 BOLTING

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

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

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

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

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

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

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

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

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

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

2.04 FABRICATION

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

2.05 FINISH

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

2.06 PROTECTION

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

PART 3 – ERECTION

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

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

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

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT
JOHN MICHAEL QUINLAN
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT–LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

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
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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMG

SEAL

STATE OF CONNECTICUT — No. 22003 — LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT–LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

SHEET TITLE:
GENERAL NOTES

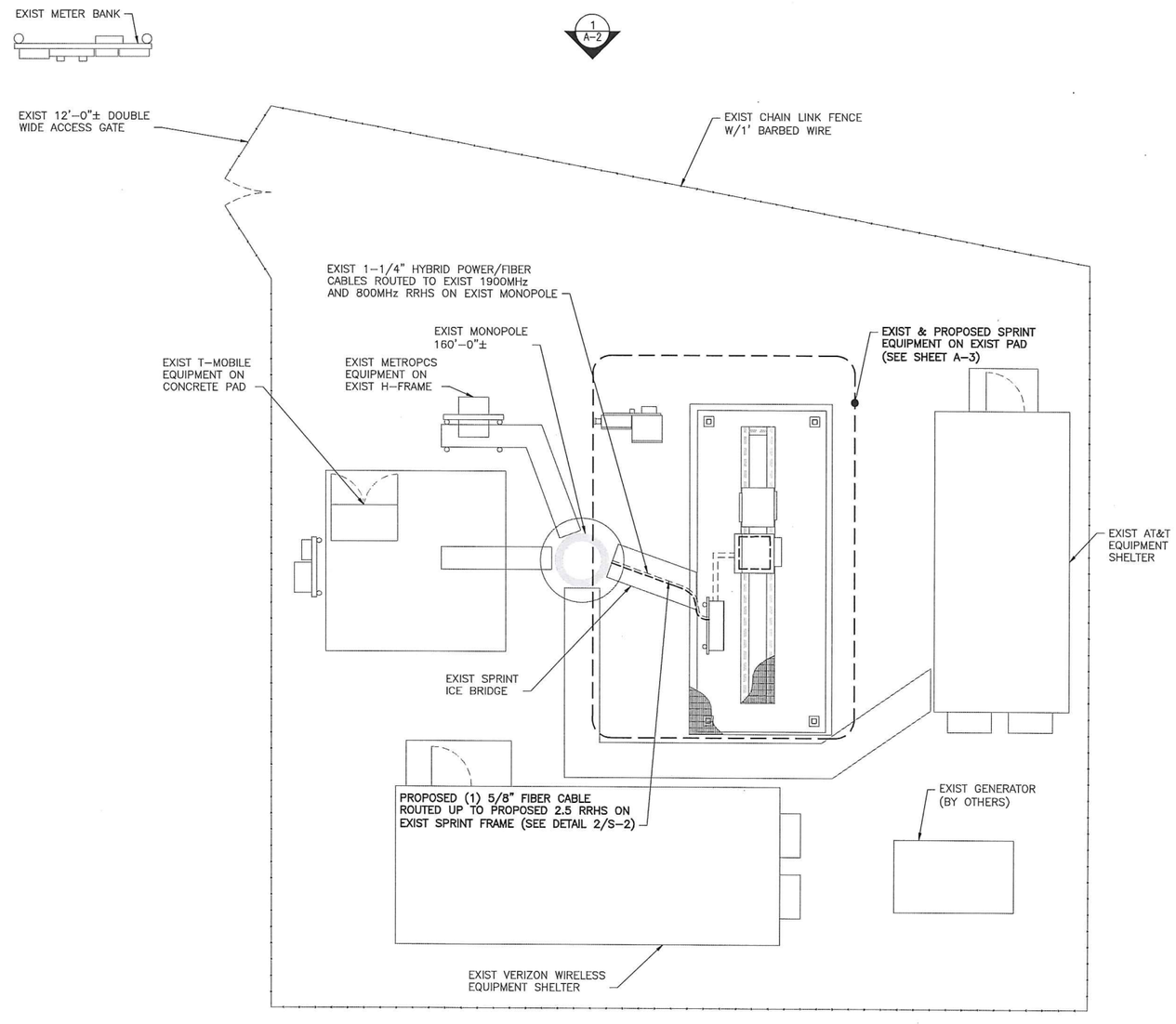
SHEET NO:
SP–2

NORTH NOTE:

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

N

APPROX



1 A-1 SITE PLAN

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

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT
JAMES M. QUINN
No. 22039
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

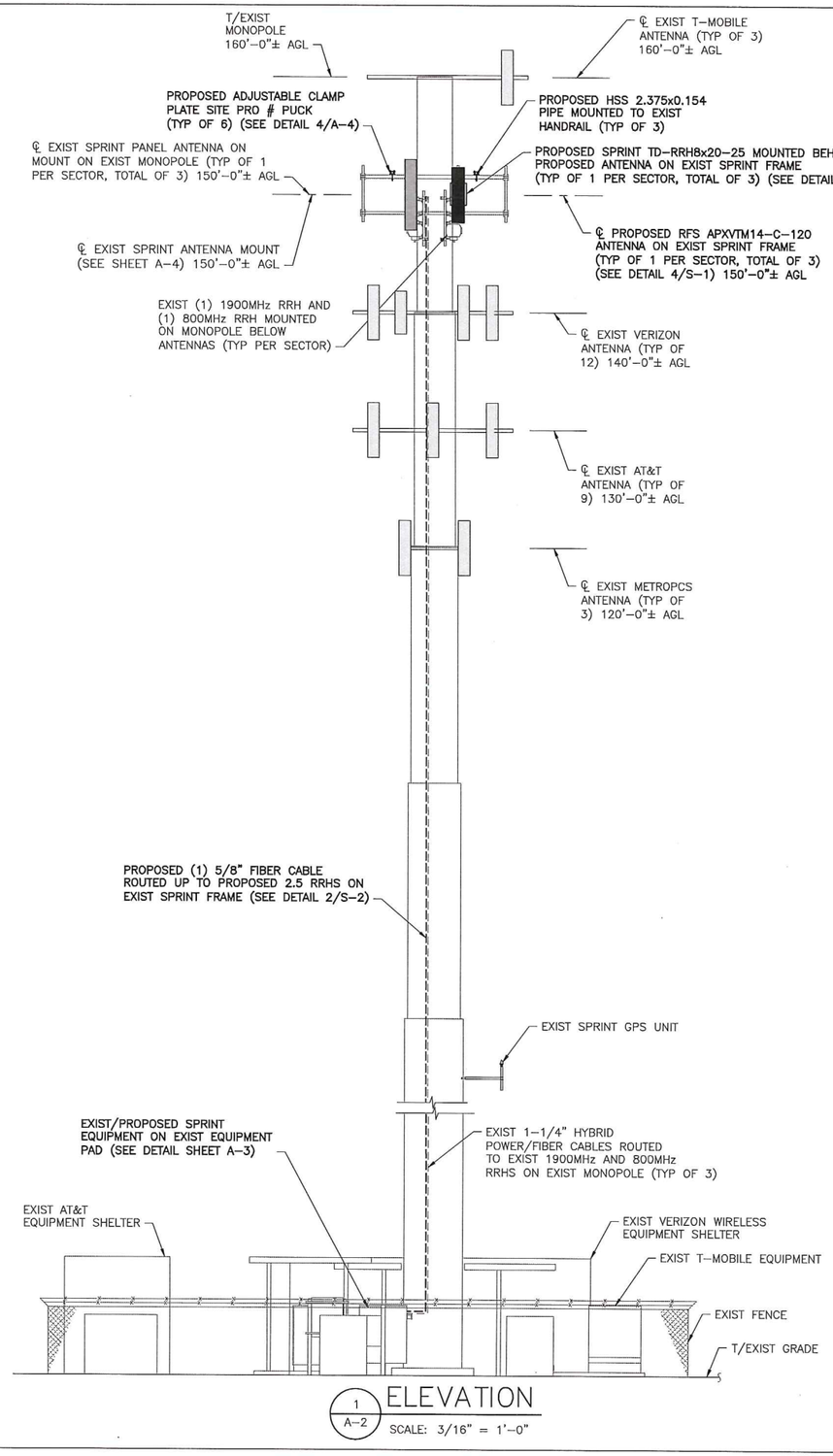
SITE ADDRESS:
218 WHEELER RD
TORRINGTON, CT 06759

SHEET TITLE:
SITE PLAN

SHEET NO:
A-1

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

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 09/10/14.



1 A-2 ELEVATION

SCALE: 3/16" = 1'-0"

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT · MANCHUNG PAUL CHOI · No. 22038 · LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

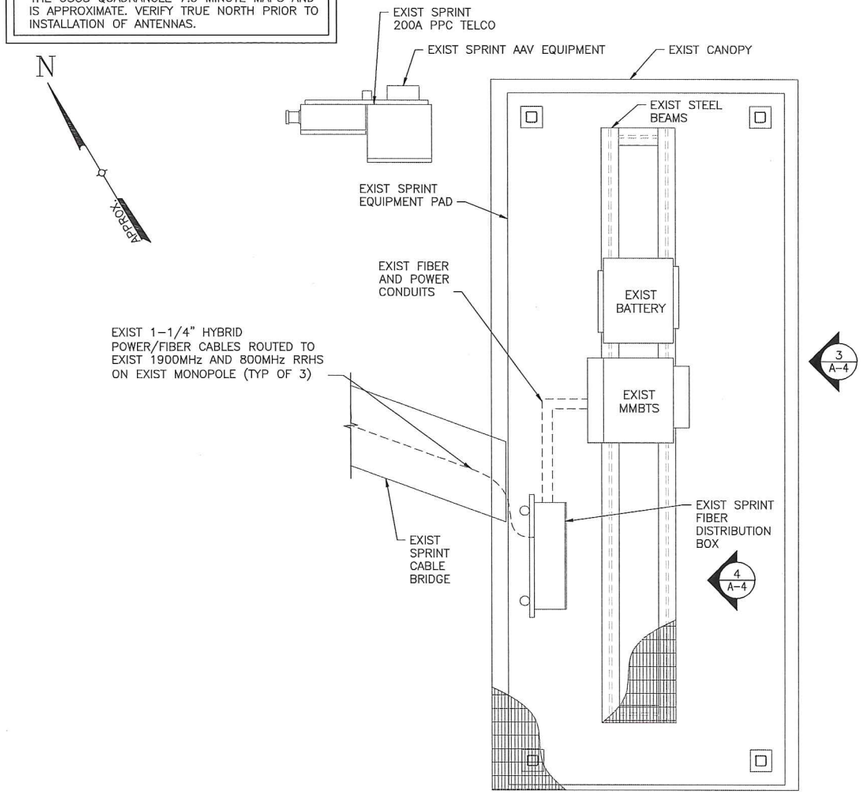
SITE ADDRESS:
218 WHEELER RD
TORRINGTON, CT 06759

SHEET TITLE:
ELEVATION

SHEET NO:
A-2

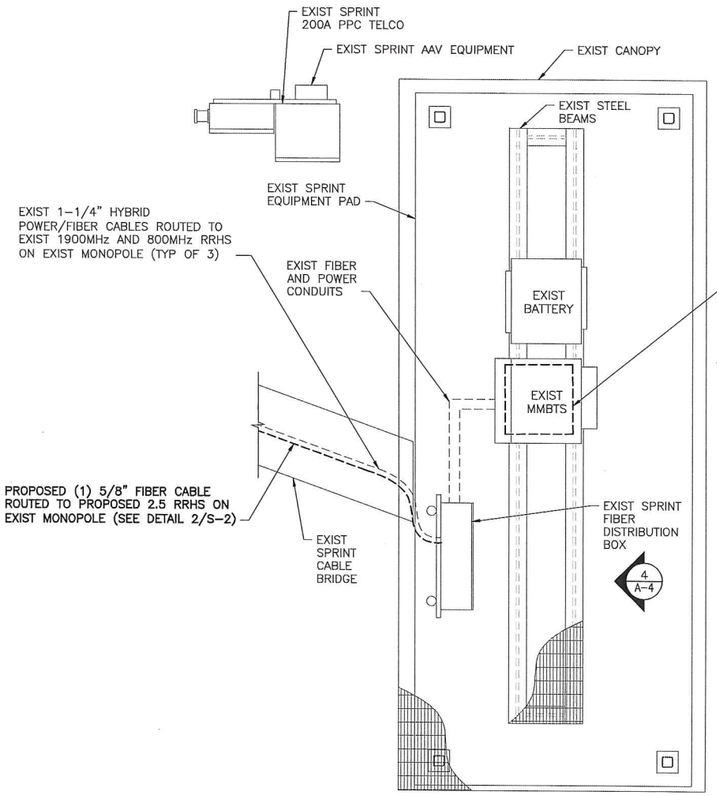
NORTH NOTE:

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



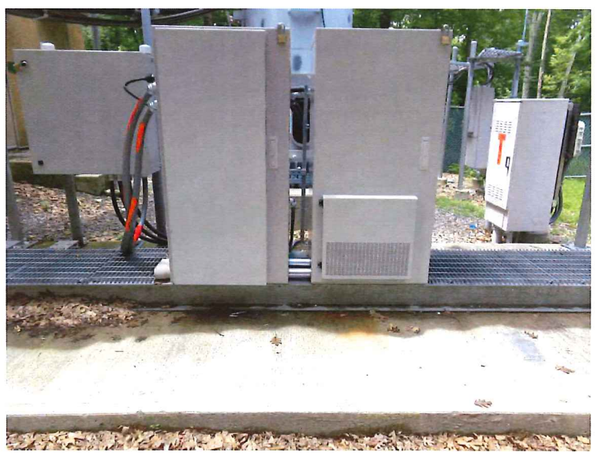
1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

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



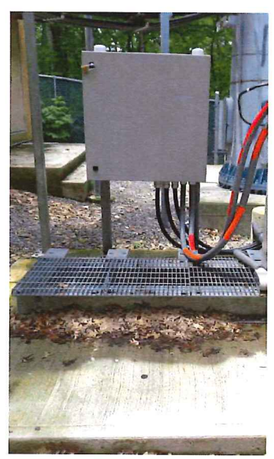
2 A-3 ENLARGED EQUIP. LAYOUT PLAN (FINAL)

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



3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS



4 A-3 EXIST FIBER DISTRIBTUION BOX

SCALE: NTS

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMG

SEAL:

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

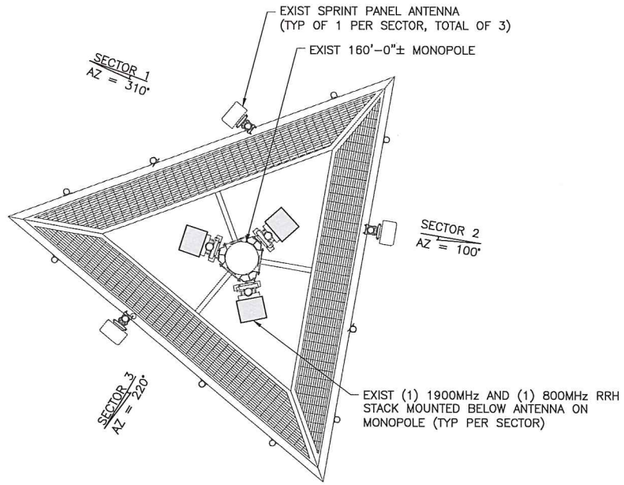
SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

SHEET TITLE:
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

N

APPROX.

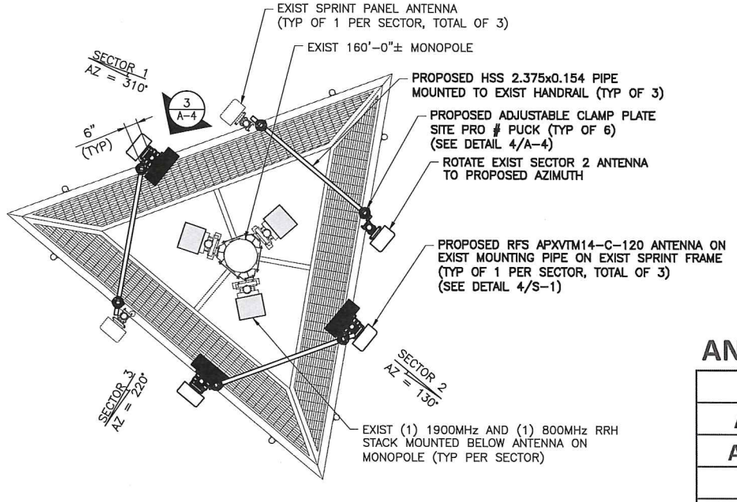


1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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

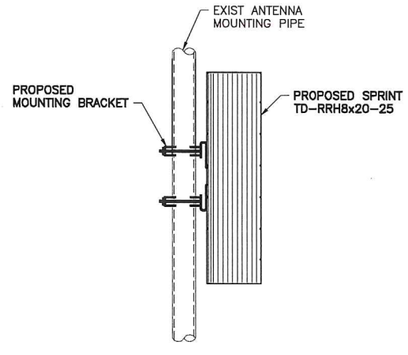
THE EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).

THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE ONCE THE PROPOSED MODIFICATIONS HAVE BEEN COMPLETED AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 09/10/14.



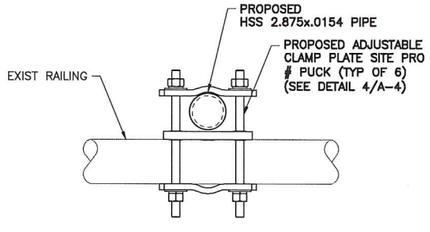
2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

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



3 / A-4 RRH MOUNTING DETAIL

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



4 / A-4 ATTACHMENT DETAIL

SCALE: 3" = 1'-0"

ANTENNA DATA

Status	Exist (Proposed)	Proposed
Antenna Manufacturer	RFS-CEL WAVE	RFS-CEL WAVE
Antenna Model Number	APXVSPP18C-A20	APXVTM14-C-120
Number of Antennas	3	3
Antenna RAD Center	150'	150'
Antenna Azimuth	310/100/220 (310/130/220)	310/130/220
Antenna RRH Model Number	1900MHz/800MHz RRHS	TD-RRH8x20-25
Number of RRH	6	3

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

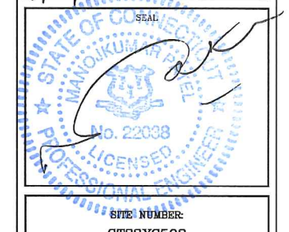
SUBMITTALS

PROJECT NO: 7225.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL



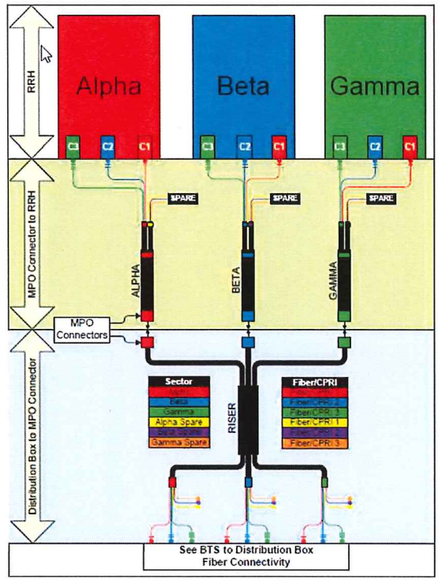
SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

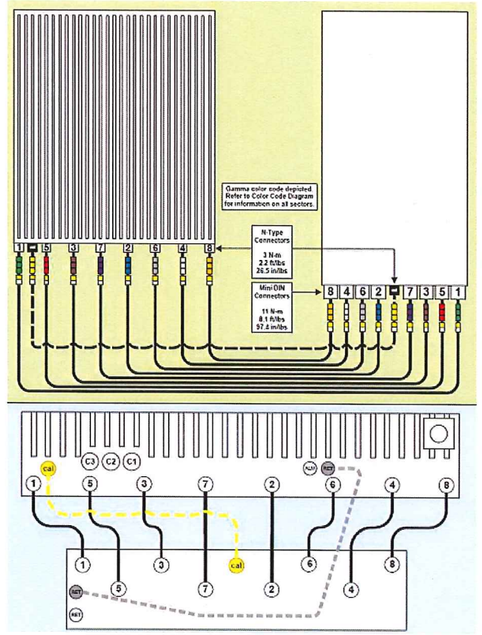
SHEET TITLE:
ANTENNA LAYOUT PLANS

SHEET NO:
A-4



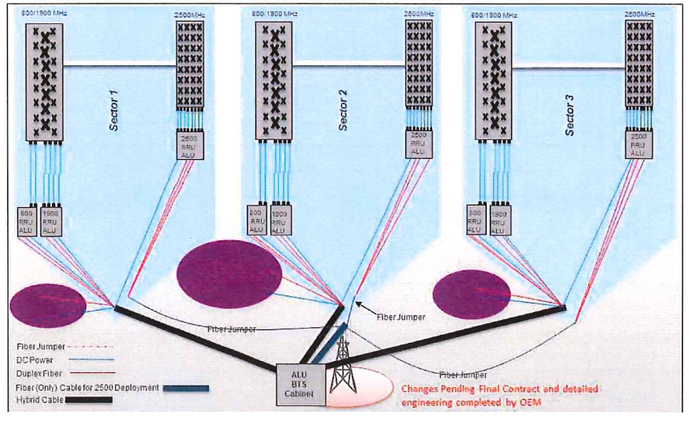
1 A-5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



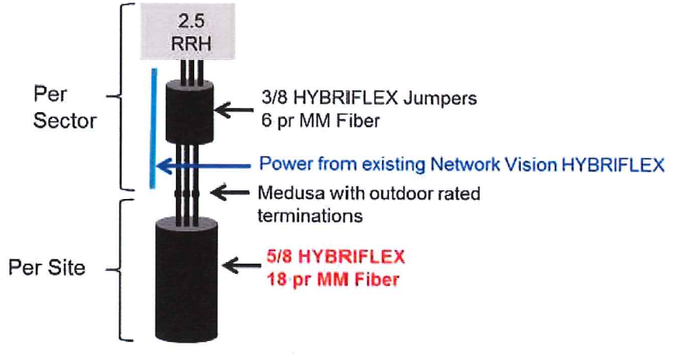
2 A-5 RRH CONNECTIVITY

SCALE: N.T.S.



3 A-5 RAN WIRING

SCALE: N.T.S.



4 A-5 CABLE SCENARIO

SCALE: N.T.S.

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

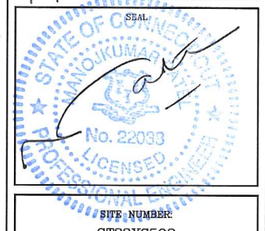
SUBMITTALS

PROJECT NO: 7225.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL:



SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

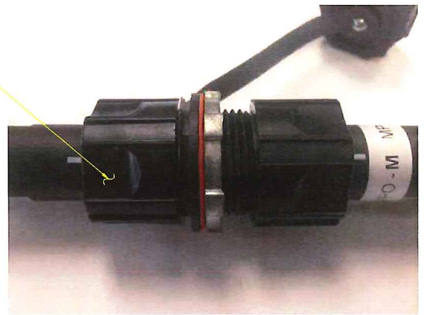
SITE ADDRESS:
218 WHEELER RD
TORRINGTON, CT 06759

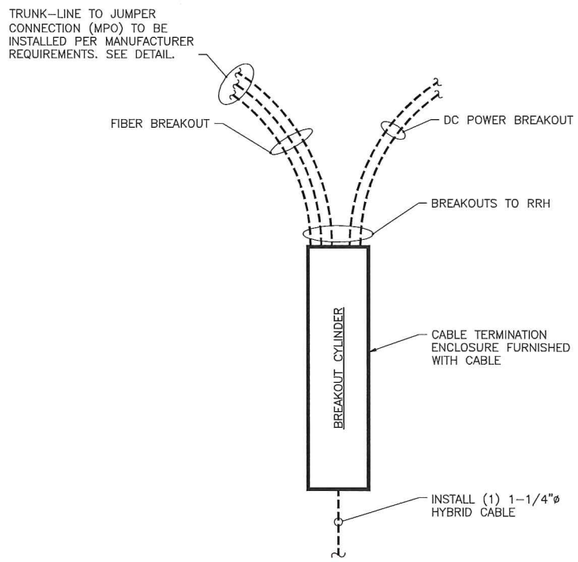
SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A-5

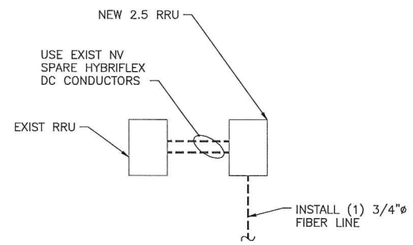
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

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





2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

1 / A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.

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.

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	SMQ

SEAL

STATE OF CONNECTICUT · MANOUKIAN · ERIC · No. 22033 · LICENSED PROFESSIONAL ENGINEER

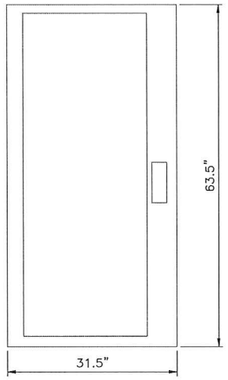
SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON, CT 06759

SHEET TITLE:
CABLE DETAILS

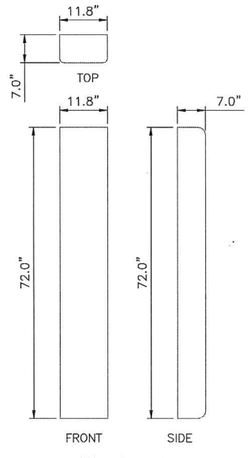
SHEET NO:
A-6



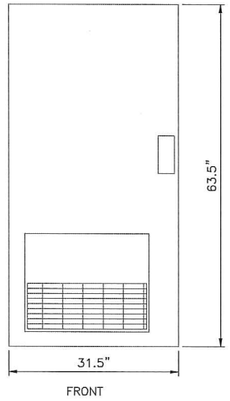
9927 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 63.5" WIDTH: 31.5" DEPTH: 38.0"

1/S-1 (EXIST) MMBTS CABINET

SCALE: 1" = 1'-0"



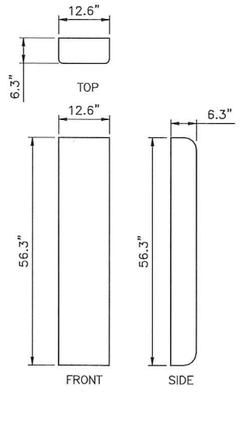
APXVSPP18-C-A20

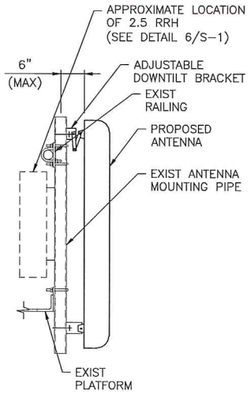


BATTERY
SPECIFICATIONS:
HEIGHT: 63.5" WIDTH: 31.5" DEPTH: 28.0"

2/S-1 (EXIST) BATTERY CABINET

SCALE: 1" = 1'-0"

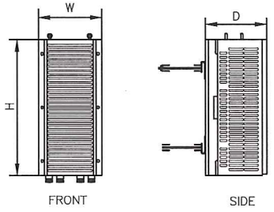




APXVTM14-C-120

3/S-1 (EXIST) ANTENNA DETAILS

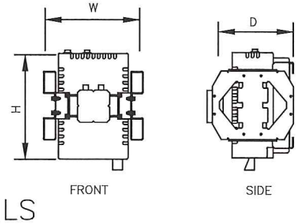
SCALE: 3/4"=1'-0"



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

4/S-1 (PROPOSED) ANTENNA DETAIL

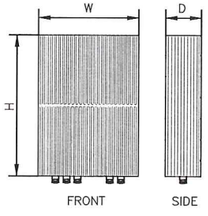
SCALE: 3/4"=1'-0"



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

5/S-1 (EXIST) RRH DETAILS

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



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

6/S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMQ

SEAL

STATE OF CONNECTICUT
ANJANKUMAR PATEL
No. 22033
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT33XC592

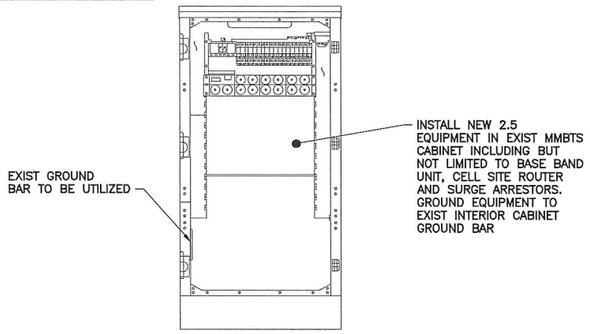
SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON, CT 06759

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

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

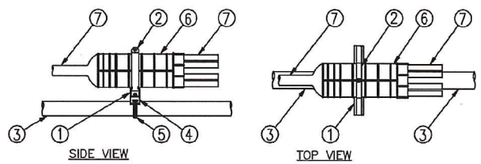


FRONT ELEVATION
(CABINET INTERIOR)

1 / S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

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



3 / S-2 MEDUSA HEAD DETAIL

SCALE: NTS

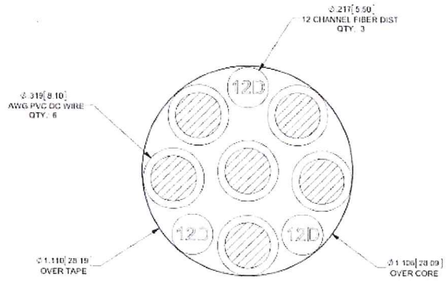
RFS HYBRIFLEX RISER CABLES SCHEDULE

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

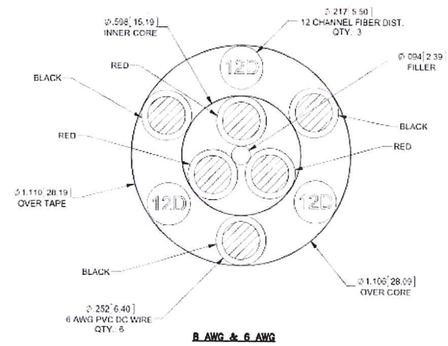
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

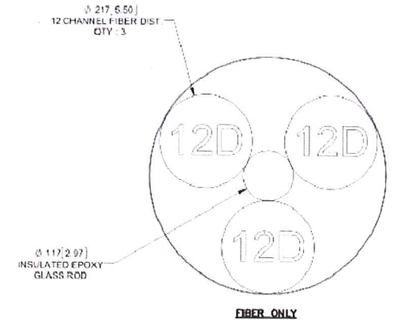
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



FIBER ONLY

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

SCALE: NTS

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	JMG

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

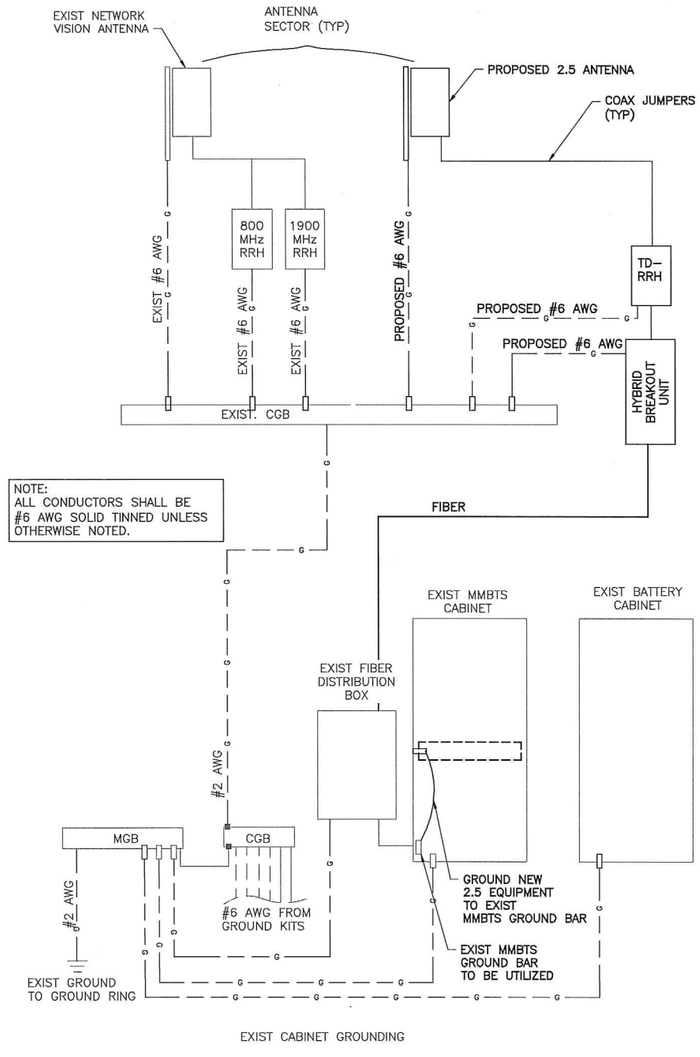
SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON, CT 06759

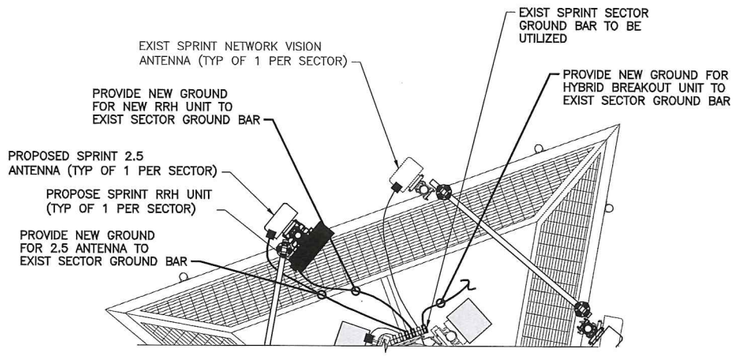
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



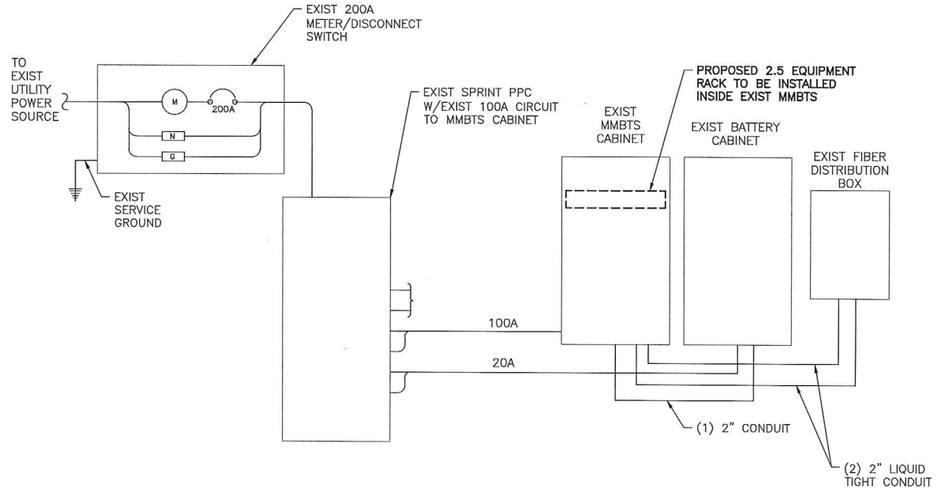
1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	SMQ

SEAL

STATE OF WASHINGTON · SOOKIMAX · No. 22035 · LICENSED · PROFESSIONAL ENGINEER

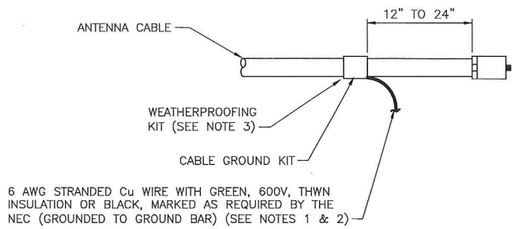
SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

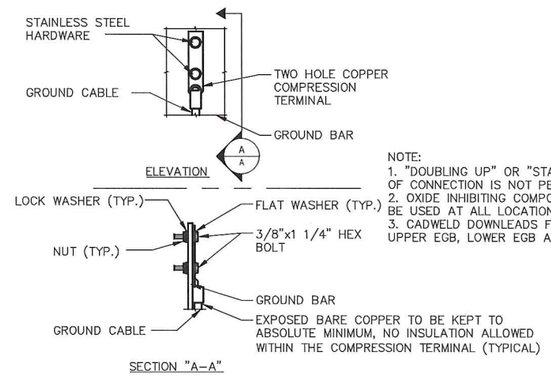
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

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

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

1 E-2 CABLE GROUNDING KIT DETAIL

SCALE: N.T.S.

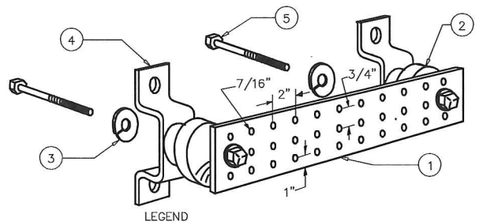


NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

SECTION "A-A"

2 E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



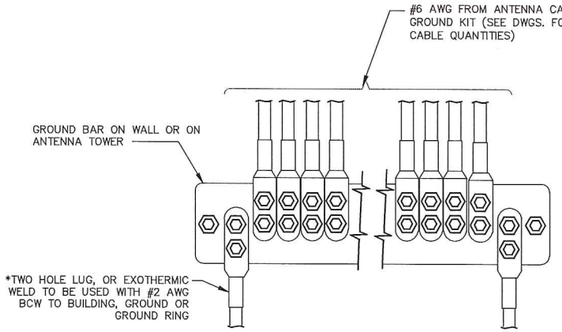
LEGEND

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

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

3 E-2 GROUNDING BAR DETAIL

SCALE: NTS



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

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

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

4 E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.

2. ALL GROUND WIRES SHALL BE #2 AWG UNLESS NOTED OTHERWISE.

3. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.

4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.

5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.

6. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.

7. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL AND SHALL BE PROVIDED WITH GROUNDING BUSHINGS.

8. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.

9. WHEN CABLE LENGTH IS OVER 20' THE MANUFACTURERS GROUND KIT MUST BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.

10. REFER TO "ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUNDING.

11. HOME RUN GROUNDS ARE NOT APPROVED BY CROWN CASTLE CONSTRUCTION STANDARDS AND THAT ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INSULATORS OR DOWN CONDUCTORS.

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

1. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.

2. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.

3. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH PROJECT MANAGER.

4. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.

5. INSTALL GROUND BUSHING ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANEL BOARD.

6. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.

7. GROUND HYBRID CABLE SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.

ELECTRICAL AND GROUNDING NOTES

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

Sprint

2.5 EQUIPMENT DEPLOYMENT
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.CT33XC592

NO	DATE	DESCRIPTION	BY
0	06/20/14	FOR COMMENT	JT
1	09/10/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
9/10/14	SMQ

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

SITE NUMBER:
CT33XC592

SITE NAME:
E. LITCHFIELD/OMNIPOINT-LEFEBVRE PROP.

SITE ADDRESS:
218 WHEELER RD
TORRINGTON. CT 06759

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

Date: **July 19, 2017**

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

JACOBS
Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT33XC592
	Carrier Site Name:	CT33XC592
Crown Castle Designation:	**Crown Castle BU Number:**	828540
	Crown Castle Site Name:	TORRINGTON/RT 8
	Crown Castle JDE Job Number:	444142
	Crown Castle Work Order Number:	1430545
	Crown Castle Application Number:	395035 Rev. 0
Engineering Firm Designation:	**Jacobs Engineering Group, Inc. Project Number:**	1430545
Site Data:	**218 Wheeler Road, Torrington, Litchfield County, CT** **Latitude *41° 46' 50.33"*, Longitude *-73° 8' 10.02"*** **160 Foot - Monopole Tower**	

Dear Marianne Dunst,

Jacobs Engineering Group, 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 1058477, in accordance with application 395035, revision 0.

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

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

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

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

We at *Jacobs Engineering Group, 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.

Structural analysis prepared by:

Miguel E. Maayo III
Structural Engineer

Reviewed by:

Matthew E. Watkins, P.E.
Engineering Project Manager

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by PIROD MANUFACTURES INC. in November of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 40 mph with 1 inch ice thickness and 60 mph under service loads, exposure category B.

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
150.0	150.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	-
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	170.0	1	rfi antennas	OA40-41	1 4 9	7/8 1-1/4 1-5/8	1
	160.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 405-1]			
150.0	150.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	3	1-1/4	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	tower mounts	Miscellaneous [NA 510-1]			
		1	tower mounts	Platform Mount [LP 1201-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	3	antel	BXA-171063/12CF w/ Mount Pipe	1 12	7/8 1-5/8	1
		2	antel	LPA-80063/6CF w/ Mount Pipe			
		1	gps	GPS_A			
		6	rfs celwave	FD9R6004/2C-3L			
		4	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
		3	swedcom	SLXW 5512 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 304-1]			
130.0	130.0	6	ericsson	RRUS 11	1 2 12	3/8 3/4 1-5/8	1
		3	kathrein	800 10764 w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP 21403			
		6	powerwave technologies	LGP21903			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 304-1]			
120.0	120.0	3	rfs celwave	APXV18-206517-C w/ Mount Pipe	6	1-5/8	2
100.0	100.0	2	maxrad	MPRC2449	4	1/4	1
		2	tower mounts	Side Arm Mount [SO 202-1]			
79.0	79.0	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Abandoned Equipment; Considered in this Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
185.0	185.0	12	ems wireless	RR65-19	12	1-5/8
175.0	175.0	12	ems wireless	RR65-19	12	1-5/8
160.0	160.0	12	ems wireless	RR65-19	12	1-5/8
150.0	150.0	12	ems wireless	RR65-19	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Jaworski Geotech, Inc.	3463255	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PiRod, Inc.	3464896	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, Inc.	3463264	CCISITES
4-STRUCTURAL ANALYSIS REPORT	Crown Castle	5123281	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.7.0), 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) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 140	Pole	P36x3/8	1	-11.41	1490.10	11.6	Pass
L2	140 - 120	Pole	P42x3/8	2	-21.25	1668.87	26.0	Pass
L3	120 - 100	Pole	P48x3/8	3	-27.17	1847.49	36.7	Pass
L4	100 - 80	Pole	P54x3/8	4	-33.84	2026.00	44.1	Pass
L5	80 - 60	Pole	P60x3/8	5	-40.88	2204.43	49.3	Pass
L6	60 - 40	Pole	P60x1/2	6	-49.77	3125.69	46.6	Pass
L7	40 - 20	Pole	P60x1/2	7	-58.70	3125.69	57.6	Pass
L8	20 - 0	Pole	P60x5/8	8	-69.54	4139.15	54.2	Pass
							Summary	
						Pole (L7)	57.6	Pass
						Rating =	57.6	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Flange Connection	140	11.6	Pass
1,2	Flange Connection	120	26.0	Pass
1,2	Flange Connection	100	37.7	Pass
1,2	Flange Connection	80	44.1	Pass
1,2	Flange Connection	60	49.3	Pass
1,2	Flange Connection	40	46.6	Pass
1,2	Flange Connection	20	57.6	Pass
1	Anchor Rods	0	40.7	Pass
1,2	Base Plate	0	54.2	Pass
1	Base Foundation Structural	0	50.1	Pass
1	Base Foundation Soil Interaction	0	46.9	Pass

Structure Rating (max from all components) =	**57.6%**

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Flange plates have the same capacity as their respective splice bolts or shaft (greater of the 2).

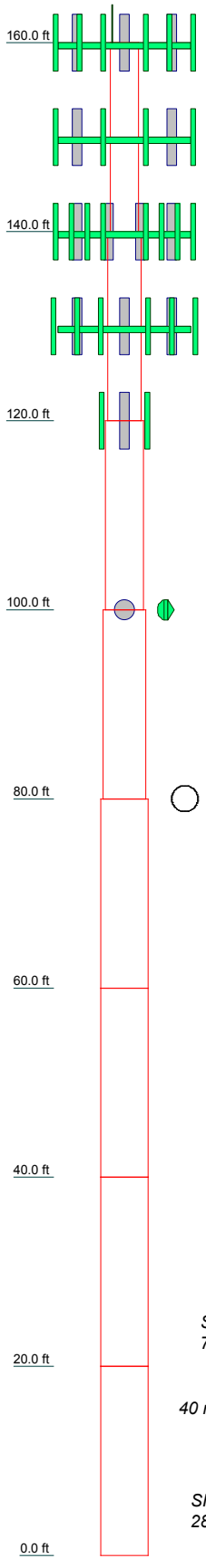
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P36x3/8	20.00	A53-B-42	2.9
2	P42x3/8	20.00		3.3
3	P48x3/8	20.00		3.8
4	P54x3/8	20.00		4.3
5	P60x3/8	20.00		4.8
6	P60x1/2	20.00		6.4
7	P60x1/2	20.00		6.4
8	P60x5/8	20.00		7.9
				39.7



ALL REACTIONS ARE FACTORED

AXIAL 133 K

SHEAR 7 K

MOMENT 826 kip-ft

TORQUE 1 kip-ft
40 mph WIND - 1.0000 in ICE

AXIAL 70 K

SHEAR 28 K

MOMENT 3257 kip-ft

TORQUE 4 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 3/4"x4'	160	SLXW 5512 w/ Mount Pipe	140
OA40-41	160	SLXW 5512 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	SLXW 5512 w/ Mount Pipe	140
		SC-E 6014 rev2 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	(2) SC-E 6014 rev2 w/ Mount Pipe	140
		SC-E 6014 rev2 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	LPA-80063/6CF w/ Mount Pipe	140
		LPA-80063/6CF w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	GPS_A	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	(2) FD9R6004/2C-3L	140
		(2) FD9R6004/2C-3L	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	(2) FD9R6004/2C-3L	140
		Platform Mount [LP 304-1]	140
KRY 112 144/1	160	(2) 7770.00 w/ Mount Pipe	130
KRY 112 144/1	160	(2) 7770.00 w/ Mount Pipe	130
KRY 112 144/1	160	(2) 7770.00 w/ Mount Pipe	130
RRUS 11 B12	160	800 10764 w/ Mount Pipe	130
RRUS 11 B12	160	800 10764 w/ Mount Pipe	130
RRUS 11 B12	160	800 10764 w/ Mount Pipe	130
Platform Mount [LP 405-1]	160	(2) LGP21903	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) LGP21903	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) LGP21903	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) LGP 21403	130
APXVTM14-ALU-I20 w/ Mount Pipe	150	(2) LGP 21403	130
APXVTM14-ALU-I20 w/ Mount Pipe	150	(2) LGP 21403	130
APXVTM14-ALU-I20 w/ Mount Pipe	150	(2) RRUS 11	130
PCS 1900MHz 4x45W-65MHz	150	(2) RRUS 11	130
PCS 1900MHz 4x45W-65MHz	150	(2) RRUS 11	130
PCS 1900MHz 4x45W-65MHz	150	DC6-48-60-18-8F	130
800MHz 2X50W RRH W/FILTER	150	Platform Mount [LP 304-1]	130
800MHz 2X50W RRH W/FILTER	150	APXV18-206517-C w/ Mount Pipe	120
800MHz 2X50W RRH W/FILTER	150	APXV18-206517-C w/ Mount Pipe	120
(3) TD-RRH8x20-25	150	APXV18-206517-C w/ Mount Pipe	120
(2) 5' x 2" Mount Pipe	150	Side Arm Mount [SO 202-1]	100
(2) 5' x 2" Mount Pipe	150	Side Arm Mount [SO 202-1]	100
(2) 5' x 2" Mount Pipe	150	MPRC2449	100
Miscellaneous [NA 510-1]	150	MPRC2449	100
Platform Mount [LP 1201-1]	150	GPS_A	79
		Side Arm Mount [SO 701-1]	79

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 57.6%

Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
Phone: 770-701-2500
FAX: 770-701-2501

Job: ***TORRINGTON/RT 8***			
Project: ***BU#828540 WO#1430545***			
Client: Crown Castle	Drawn by: Miguel Maayo III		App'd:
Code: TIA-222-G	Date: 07/17/17		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

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

3) Tower is located in Litchfield County, Connecticut.
4) Basic wind speed of 93 mph.
5) Structure Class II.
6) Exposure Category B.
7) Topographic Category 1.
8) Crest Height 0.00 ft.
9) Nominal ice thickness of 1.0000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 40 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.
18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	160.00-140.00	20.00	P36x3/8	A53-B-42 (42 ksi)	
L2	140.00-120.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	120.00-100.00	20.00	P48x3/8	A53-B-42 (42 ksi)	
L4	100.00-80.00	20.00	P54x3/8	A53-B-42 (42 ksi)	
L5	80.00-60.00	20.00	P60x3/8	A53-B-42 (42 ksi)	
L6	60.00-40.00	20.00	P60x1/2	A53-B-42 (42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L7	40.00-20.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L8	20.00-0.00	20.00	P60x5/8	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.00-140.00				1	1	1			
L2 140.00-120.00				1	1	1			
L3 120.00-100.00				1	1	1			
L4 100.00-80.00				1	1	1			
L5 80.00-60.00				1	1	1			
L6 60.00-40.00				1	1	1			
L7 40.00-20.00				1	1	1			
L8 20.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***									
Safety Line 3/8	B	Surface Ar (CaAa)	160.00 - 0.00	1	1	-0.300 -0.300	0.3750		0.22
Climbing Ladder	B	Surface Ar (CaAa)	160.00 - 0.00	1	1	-0.350 -0.350	2.5000		7.90
***									
LDF7-50A(1-5/8)	B	Surface Ar (CaAa)	120.00 - 0.00	6	6	-0.500 -0.350	1.9800		0.82
LDF4-50A(1/2)	B	Surface Ar (CaAa)	79.00 - 0.00	1	1	-0.100 -0.100	0.6250		0.15
***									
LDF5-50A(7/8)	C	Surface Ar (CaAa)	140.00 - 0.00	1	1	0.430 0.430	1.0300		0.33
LDF7-50A(1-5/8)	C	Surface Ar (CaAa)	140.00 - 0.00	12	12	0.100 0.425	1.9800		0.82
***									
810921-001(7/8)	C	Surface Ar (CaAa)	160.00 - 0.00	1	1	-0.350 -0.350	1.1120		0.40
CAT5E(1/4)	C	Surface Ar (CaAa)	100.00 - 0.00	4	4	-0.345 -0.340	0.2500		0.10
***									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf
***							

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF6-50A(1-1/4)	A	No	Inside Pole	160.00 - 0.00	4	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
LDF7-50A(1-5/8)	A	No	Inside Pole	160.00 - 0.00	8	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
MLE Hybrid 9Power/18Fiber RL 2(1-5/8) ***	A	No	Inside Pole	160.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
2" Flex Conduit	A	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	0.34
						1" Ice	0.00	0.34
AVA7-50(1-5/8)	A	No	Inside Pole	130.00 - 0.00	12	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
FB-L98-002-XXX(3/8)	A	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86T(3/4) ***	A	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	0.53
						1/2" Ice	0.00	0.53
						1" Ice	0.00	0.53
HB114-1-08U4-M5J(1-1/4)	C	No	Inside Pole	150.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
HB114-21U3M12-XXXF(1-1/4) ***	C	No	Inside Pole	150.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-140.00	A	0.000	0.000	0.000	0.000	0.20
		B	0.000	0.000	5.750	0.000	0.16
		C	0.000	0.000	2.224	0.000	0.05
L2	140.00-120.00	A	0.000	0.000	0.000	0.000	0.30
		B	0.000	0.000	5.750	0.000	0.16
		C	0.000	0.000	51.804	0.000	0.30
L3	120.00-100.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	29.510	0.000	0.26
		C	0.000	0.000	51.804	0.000	0.30
L4	100.00-80.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	29.510	0.000	0.26
		C	0.000	0.000	53.804	0.000	0.31
L5	80.00-60.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	30.697	0.000	0.26
		C	0.000	0.000	53.804	0.000	0.31
L6	60.00-40.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	30.760	0.000	0.26
		C	0.000	0.000	53.804	0.000	0.31
L7	40.00-20.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	30.760	0.000	0.26
		C	0.000	0.000	53.804	0.000	0.31
L8	20.00-0.00	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	30.760	0.000	0.26
		C	0.000	0.000	53.804	0.000	0.31

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	160.00-140.00	A	2.327	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	24.366	0.000	0.59
		C		0.000	0.000	11.532	0.000	0.25
L2	140.00-120.00	A	2.294	0.000	0.000	0.000	0.000	0.30
		B		0.000	0.000	24.101	0.000	0.58
		C		0.000	0.000	93.505	0.000	1.77
L3	120.00-100.00	A	2.256	0.000	0.000	0.000	0.000	0.40
		B		0.000	0.000	64.777	0.000	1.28
		C		0.000	0.000	93.011	0.000	1.74
L4	100.00-80.00	A	2.211	0.000	0.000	0.000	0.000	0.40
		B		0.000	0.000	64.194	0.000	1.25
		C		0.000	0.000	105.983	0.000	1.87
L5	80.00-60.00	A	2.156	0.000	0.000	0.000	0.000	0.40
		B		0.000	0.000	72.862	0.000	1.36
		C		0.000	0.000	104.996	0.000	1.82
L6	60.00-40.00	A	2.085	0.000	0.000	0.000	0.000	0.40
		B		0.000	0.000	72.143	0.000	1.32
		C		0.000	0.000	103.711	0.000	1.76
L7	40.00-20.00	A	1.981	0.000	0.000	0.000	0.000	0.40
		B		0.000	0.000	70.377	0.000	1.25
		C		0.000	0.000	101.843	0.000	1.67
L8	20.00-0.00	A	1.775	0.000	0.000	0.000	0.000	0.40
		B		0.000	0.000	66.874	0.000	1.12
		C		0.000	0.000	98.133	0.000	1.50

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-140.00	0.2314	-0.2697	0.7301	-0.6513
L2	140.00-120.00	-0.9953	1.6342	-0.7751	1.3812
L3	120.00-100.00	-0.7505	0.5601	-0.5267	0.2843
L4	100.00-80.00	-0.7310	0.6432	-0.3328	0.5097
L5	80.00-60.00	-0.7239	0.6368	-0.1928	0.3903
L6	60.00-40.00	-0.7217	0.6349	-0.1975	0.3894
L7	40.00-20.00	-0.7217	0.6349	-0.2177	0.4003
L8	20.00-0.00	-0.7217	0.6349	-0.2600	0.4231

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8	140.00 - 160.00	1.0000	1.0000
L1	3	Climbing Ladder	140.00 - 160.00	1.0000	1.0000
L1	23	810921-001(7/8)	140.00 - 160.00	1.0000	1.0000
L2	2	Safety Line 3/8	120.00 - 140.00	1.0000	1.0000
L2	3	Climbing Ladder	120.00 - 140.00	1.0000	1.0000
L2	20	LDF5-50A(7/8)	120.00 - 140.00	1.0000	1.0000
L2	21	LDF7-50A(1-5/8)	120.00 - 140.00	1.0000	1.0000
L2	23	810921-001(7/8)	120.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L3	2	Safety Line 3/8	140.00 100.00 - 120.00	1.0000	1.0000
L3	3	Climbing Ladder	100.00 - 120.00	1.0000	1.0000
L3	14	LDF7-50A(1-5/8)	100.00 - 120.00	1.0000	1.0000
L3	20	LDF5-50A(7/8)	100.00 - 120.00	1.0000	1.0000
L3	21	LDF7-50A(1-5/8)	100.00 - 120.00	1.0000	1.0000
L3	23	810921-001(7/8)	100.00 - 120.00	1.0000	1.0000
L4	2	Safety Line 3/8	80.00 - 100.00	1.0000	1.0000
L4	3	Climbing Ladder	80.00 - 100.00	1.0000	1.0000
L4	14	LDF7-50A(1-5/8)	80.00 - 100.00	1.0000	1.0000
L4	20	LDF5-50A(7/8)	80.00 - 100.00	1.0000	1.0000
L4	21	LDF7-50A(1-5/8)	80.00 - 100.00	1.0000	1.0000
L4	23	810921-001(7/8)	80.00 - 100.00	1.0000	1.0000
L4	24	CAT5E(1/4)	80.00 - 100.00	1.0000	1.0000
L5	2	Safety Line 3/8	60.00 - 80.00	1.0000	1.0000
L5	3	Climbing Ladder	60.00 - 80.00	1.0000	1.0000
L5	14	LDF7-50A(1-5/8)	60.00 - 80.00	1.0000	1.0000
L5	15	LDF4-50A(1/2)	60.00 - 79.00	1.0000	1.0000
L5	20	LDF5-50A(7/8)	60.00 - 80.00	1.0000	1.0000
L5	21	LDF7-50A(1-5/8)	60.00 - 80.00	1.0000	1.0000
L5	23	810921-001(7/8)	60.00 - 80.00	1.0000	1.0000
L5	24	CAT5E(1/4)	60.00 - 80.00	1.0000	1.0000
L6	2	Safety Line 3/8	40.00 - 60.00	1.0000	1.0000
L6	3	Climbing Ladder	40.00 - 60.00	1.0000	1.0000
L6	14	LDF7-50A(1-5/8)	40.00 - 60.00	1.0000	1.0000
L6	15	LDF4-50A(1/2)	40.00 - 60.00	1.0000	1.0000
L6	20	LDF5-50A(7/8)	40.00 - 60.00	1.0000	1.0000
L6	21	LDF7-50A(1-5/8)	40.00 - 60.00	1.0000	1.0000
L6	23	810921-001(7/8)	40.00 - 60.00	1.0000	1.0000
L6	24	CAT5E(1/4)	40.00 - 60.00	1.0000	1.0000
L7	2	Safety Line 3/8	20.00 - 40.00	1.0000	1.0000
L7	3	Climbing Ladder	20.00 - 40.00	1.0000	1.0000
L7	14	LDF7-50A(1-5/8)	20.00 - 40.00	1.0000	1.0000
L7	15	LDF4-50A(1/2)	20.00 - 40.00	1.0000	1.0000
L7	20	LDF5-50A(7/8)	20.00 - 40.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L7	21	LDF7-50A(1-5/8)	20.00 - 40.00	1.0000	1.0000
L7	23	810921-001(7/8)	20.00 - 40.00	1.0000	1.0000
L7	24	CAT5E(1/4)	20.00 - 40.00	1.0000	1.0000
L8	2	Safety Line 3/8	0.00 - 20.00	1.0000	1.0000
L8	3	Climbing Ladder	0.00 - 20.00	1.0000	1.0000
L8	14	LDF7-50A(1-5/8)	0.00 - 20.00	1.0000	1.0000
L8	15	LDF4-50A(1/2)	0.00 - 20.00	1.0000	1.0000
L8	20	LDF5-50A(7/8)	0.00 - 20.00	1.0000	1.0000
L8	21	LDF7-50A(1-5/8)	0.00 - 20.00	1.0000	1.0000
L8	23	810921-001(7/8)	0.00 - 20.00	1.0000	1.0000
L8	24	CAT5E(1/4)	0.00 - 20.00	1.0000	1.0000

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
Lightning Rod 3/4"x4'	C	From Leg	0.00 0.00 2.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.30 0.71 1.00	0.30 0.71 1.00	0.02 0.02 0.03
OA40-41	A	From Leg	4.00 0.00 10.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	9.55 14.83 20.11	9.55 14.83 20.11	0.07 0.11 0.15
*** 160 ft *** (T-Mobile)									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B4A	B	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11

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
B2P w/ Mount Pipe			0.00 0.00			1/2" Ice 1" Ice	6.78 7.21	6.43 7.13	0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.16 0.22 0.28	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.16 0.22 0.28	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.16 0.22 0.28	0.01 0.01 0.02
RRUS 11 B12	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
Platform Mount [LP 405-1]	C	None		0.0000	160.00	No Ice 1/2" Ice 1" Ice	20.80 28.10 35.40	20.80 28.10 35.40	1.80 2.07 2.33
*** 150 ft *** (Sprint)									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-	B	From Leg	4.00	0.0000	150.00	No Ice	2.32	2.24	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
65MHz			0.00				1/2" Ice	2.53	2.44	0.08
			0.00				1" Ice	2.74	2.65	0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00		0.0000	150.00	No Ice	2.32	2.24	0.06
			0.00				1/2" Ice	2.53	2.44	0.08
			0.00				1" Ice	2.74	2.65	0.11
800MHz 2X50W RRH W/FILTER	A	From Leg	4.00		0.0000	150.00	No Ice	2.06	1.93	0.06
			0.00				1/2" Ice	2.24	2.11	0.09
			0.00				1" Ice	2.43	2.29	0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	4.00		0.0000	150.00	No Ice	2.06	1.93	0.06
			0.00				1/2" Ice	2.24	2.11	0.09
			0.00				1" Ice	2.43	2.29	0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	4.00		0.0000	150.00	No Ice	2.06	1.93	0.06
			0.00				1/2" Ice	2.24	2.11	0.09
			0.00				1" Ice	2.43	2.29	0.11
(3) TD-RRH8x20-25	A	From Leg	4.00		0.0000	150.00	No Ice	4.05	1.53	0.07
			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
(2) 5' x 2" Mount Pipe	A	From Leg	4.00		0.0000	150.00	No Ice	1.19	1.19	0.02
			0.00				1/2" Ice	1.50	1.50	0.03
			0.00				1" Ice	1.81	1.81	0.04
(2) 5' x 2" Mount Pipe	B	From Leg	4.00		0.0000	150.00	No Ice	1.19	1.19	0.02
			0.00				1/2" Ice	1.50	1.50	0.03
			0.00				1" Ice	1.81	1.81	0.04
(2) 5' x 2" Mount Pipe	C	From Leg	4.00		0.0000	150.00	No Ice	1.19	1.19	0.02
			0.00				1/2" Ice	1.50	1.50	0.03
			0.00				1" Ice	1.81	1.81	0.04
Miscellaneous [NA 510-1]	C	None			0.0000	150.00	No Ice	6.00	6.00	0.26
							1/2" Ice	8.50	8.50	0.34
							1" Ice	8.60	8.60	0.34
Platform Mount [LP 1201-1]	C	None			0.0000	150.00	No Ice	23.10	23.10	2.10
							1/2" Ice	26.80	26.80	2.50
							1" Ice	30.50	30.50	2.90
*** 140 ft *** (Verizon)										
SLXW 5512 w/ Mount Pipe	A	From Leg	4.00		0.0000	140.00	No Ice	7.13	6.12	0.05
			0.00				1/2" Ice	7.59	6.91	0.11
			0.00				1" Ice	8.04	7.62	0.18
SLXW 5512 w/ Mount Pipe	B	From Leg	4.00		0.0000	140.00	No Ice	7.13	6.12	0.05
			0.00				1/2" Ice	7.59	6.91	0.11
			0.00				1" Ice	8.04	7.62	0.18
SLXW 5512 w/ Mount Pipe	C	From Leg	4.00		0.0000	140.00	No Ice	7.13	6.12	0.05
			0.00				1/2" Ice	7.59	6.91	0.11
			0.00				1" Ice	8.04	7.62	0.18
SC-E 6014 rev2 w/ Mount Pipe	A	From Leg	4.00		0.0000	140.00	No Ice	3.56	4.22	0.03
			0.00				1/2" Ice	3.91	4.78	0.07
			0.00				1" Ice	4.26	5.35	0.12
(2) SC-E 6014 rev2 w/ Mount Pipe	B	From Leg	4.00		0.0000	140.00	No Ice	3.56	4.22	0.03
			0.00				1/2" Ice	3.91	4.78	0.07
			0.00				1" Ice	4.26	5.35	0.12
SC-E 6014 rev2 w/ Mount	C	From Leg	4.00		0.0000	140.00	No Ice	3.56	4.22	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0.00				1/2" Ice	3.91	4.78	0.07
			0.00				1" Ice	4.26	5.35	0.12
LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.00		0.0000	140.00	No Ice	9.83	10.22	0.05
			0.00				1/2" Ice	10.40	11.38	0.14
			0.00				1" Ice	10.93	12.27	0.25
LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00		0.0000	140.00	No Ice	9.83	10.22	0.05
			0.00				1/2" Ice	10.40	11.38	0.14
			0.00				1" Ice	10.93	12.27	0.25
BXA-171063/12CF w/ Mount Pipe	A	From Leg	4.00		0.0000	140.00	No Ice	5.03	5.29	0.04
			0.00				1/2" Ice	5.58	6.46	0.09
			0.00				1" Ice	6.10	7.35	0.14
BXA-171063/12CF w/ Mount Pipe	B	From Leg	4.00		0.0000	140.00	No Ice	5.03	5.29	0.04
			0.00				1/2" Ice	5.58	6.46	0.09
			0.00				1" Ice	6.10	7.35	0.14
BXA-171063/12CF w/ Mount Pipe	C	From Leg	4.00		0.0000	140.00	No Ice	5.03	5.29	0.04
			0.00				1/2" Ice	5.58	6.46	0.09
			0.00				1" Ice	6.10	7.35	0.14
GPS_A	B	From Leg	4.00		0.0000	140.00	No Ice	0.26	0.26	0.00
			0.00				1/2" Ice	0.32	0.32	0.00
			0.00				1" Ice	0.39	0.39	0.01
(2) FD9R6004/2C-3L	A	From Leg	4.00		0.0000	140.00	No Ice	0.31	0.08	0.00
			0.00				1/2" Ice	0.39	0.12	0.01
			0.00				1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00		0.0000	140.00	No Ice	0.31	0.08	0.00
			0.00				1/2" Ice	0.39	0.12	0.01
			0.00				1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00		0.0000	140.00	No Ice	0.31	0.08	0.00
			0.00				1/2" Ice	0.39	0.12	0.01
			0.00				1" Ice	0.47	0.17	0.01
Platform Mount [LP 304-1]	C	None			0.0000	140.00	No Ice	17.46	17.46	1.35
							1/2" Ice	22.44	22.44	1.62
							1" Ice	27.42	27.42	1.90
*** 130 ft *** (AT&T)										
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00		0.0000	130.00	No Ice	5.75	4.25	0.06
			0.00				1/2" Ice	6.18	5.01	0.10
			0.00				1" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00		0.0000	130.00	No Ice	5.75	4.25	0.06
			0.00				1/2" Ice	6.18	5.01	0.10
			0.00				1" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00		0.0000	130.00	No Ice	5.75	4.25	0.06
			0.00				1/2" Ice	6.18	5.01	0.10
			0.00				1" Ice	6.61	5.71	0.16
800 10764 w/ Mount Pipe	A	From Leg	4.00		0.0000	130.00	No Ice	5.71	4.29	0.06
			0.00				1/2" Ice	6.13	4.99	0.11
			0.00				1" Ice	6.54	5.66	0.17
800 10764 w/ Mount Pipe	B	From Leg	4.00		0.0000	130.00	No Ice	5.71	4.29	0.06
			0.00				1/2" Ice	6.13	4.99	0.11
			0.00				1" Ice	6.54	5.66	0.17
800 10764 w/ Mount Pipe	C	From Leg	4.00		0.0000	130.00	No Ice	5.71	4.29	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	6.13	4.99	0.11
			0.00			1" Ice	6.54	5.66	0.17
(2) LGP21903	A	From Leg	4.00	0.0000	130.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.02
(2) LGP21903	B	From Leg	4.00	0.0000	130.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.02
(2) LGP21903	C	From Leg	4.00	0.0000	130.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.02
(2) LGP 21403	A	From Leg	4.00	0.0000	130.00	No Ice	0.82	0.35	0.02
			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP 21403	B	From Leg	4.00	0.0000	130.00	No Ice	0.82	0.35	0.02
			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP 21403	C	From Leg	4.00	0.0000	130.00	No Ice	0.82	0.35	0.02
			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) RRUS 11	A	From Leg	4.00	0.0000	130.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
(2) RRUS 11	B	From Leg	4.00	0.0000	130.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
(2) RRUS 11	C	From Leg	4.00	0.0000	130.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.10
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	130.00	No Ice	0.92	0.92	0.03
			0.00			1/2" Ice	1.46	1.46	0.05
			0.00			1" Ice	1.64	1.64	0.07
Platform Mount [LP 304-1]	C	None		0.0000	130.00	No Ice	17.46	17.46	1.35
						1/2" Ice	22.44	22.44	1.62
						1" Ice	27.42	27.42	1.90
*** 120 ft ***									
APXV18-206517-C w/ Mount Pipe	A	From Leg	1.00	0.0000	120.00	No Ice	5.40	4.70	0.05
			0.00			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
APXV18-206517-C w/ Mount Pipe	B	From Leg	1.00	0.0000	120.00	No Ice	5.40	4.70	0.05
			0.00			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
APXV18-206517-C w/ Mount Pipe	C	From Leg	1.00	0.0000	120.00	No Ice	5.40	4.70	0.05
			0.00			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
*** 100 ft ***									
Side Arm Mount [SO 202-1]	A	From Leg	1.00	0.0000	100.00	No Ice	2.96	2.53	0.11
			0.00			1/2" Ice	4.10	3.51	0.13
			0.00			1" Ice	5.24	4.49	0.16

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 202-1]	B	From Leg	1.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	2.96 4.10 5.24	2.53 3.51 4.49	0.11 0.13 0.16
*** 79 ft ***									
GPS_A	A	From Leg	3.00 0.00 0.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	From Leg	1.50 0.00 0.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									

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
MPRC2449	A	Paraboloid w/Radome	From Leg	2.00 0.00 0.00	-57.0000		100.00	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	0.02 0.04 0.06
MPRC2449	B	Paraboloid w/Radome	From Leg	2.00 0.00 0.00	-90.0000		100.00	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	0.02 0.04 0.06

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice

Comb. No.	Description
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 140	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.22	-0.42	6.24
			Max. Mx	8	-11.43	-139.83	2.02
			Max. My	2	-11.41	-0.07	144.40
			Max. Vy	20	-9.34	139.68	2.02
			Max. Vx	2	-9.59	-0.07	144.40
			Max. Torque	20			-3.11
L2	140 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.16	2.57	5.18
			Max. Mx	20	-21.26	434.04	1.89
			Max. My	2	-21.25	0.23	443.46
			Max. Vy	20	-16.94	434.04	1.89
			Max. Vx	2	-17.21	0.23	443.46
			Max. Torque	20			-3.62
L3	120 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.16	3.42	5.10
			Max. Mx	20	-27.18	801.24	2.05
			Max. My	2	-27.17	0.24	816.00
			Max. Vy	20	-19.28	801.24	2.05
			Max. Vx	2	-19.55	0.24	816.00
			Max. Torque	18			-3.59
L4	100 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.79	3.01	5.23
			Max. Mx	20	-33.85	1213.29	2.36
			Max. My	2	-33.84	-0.12	1233.62
			Max. Vy	8	21.58	-1213.21	2.59
			Max. Vx	14	21.89	-0.05	-1229.79
			Max. Torque	8			4.07
L5	80 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.75	3.44	5.68
			Max. Mx	20	-40.89	1665.68	2.75
			Max. My	2	-40.88	-0.07	1690.71
			Max. Vy	8	23.59	-1665.50	2.92
			Max. Vx	14	23.87	-0.24	-1687.30

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	8			4.35
L6	60 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-103.22	3.86	5.43
			Max. Mx	20	-49.78	2154.69	2.83
			Max. My	2	-49.77	-0.02	2184.05
			Max. Vy	8	25.30	-2154.40	2.92
			Max. Vx	14	25.58	-0.42	-2181.70
			Max. Torque	8			4.35
L7	40 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-117.36	4.28	5.19
			Max. Mx	20	-58.71	2674.07	2.89
			Max. My	2	-58.70	0.02	2707.72
			Max. Vy	8	26.62	-2673.68	2.91
			Max. Vx	14	26.90	-0.61	-2706.43
			Max. Torque	8			4.35
L8	20 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-132.77	4.72	4.98
			Max. Mx	20	-69.54	3218.86	2.94
			Max. My	2	-69.54	0.07	3256.72
			Max. Vy	8	27.84	-3218.37	2.89
			Max. Vx	14	28.12	-0.80	-3256.50
			Max. Torque	8			4.34

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	132.77	0.00	0.00
	Max. H_x	20	69.55	27.83	-0.01
	Max. H_z	2	69.55	-0.00	28.03
	Max. M_x	2	3256.72	-0.00	28.03
	Max. M_z	8	3218.37	-27.83	-0.01
	Max. Torsion	8	4.34	-27.83	-0.01
	Min. Vert	19	52.16	24.10	-14.04
	Min. H_x	8	69.55	-27.83	-0.01
	Min. H_z	14	69.55	-0.01	-28.11
	Min. M_x	14	-3256.50	-0.01	-28.11
	Min. M_z	20	-3218.86	27.83	-0.01
	Min. Torsion	20	-4.05	27.83	-0.01

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	57.96	0.00	0.00	-3.18	0.36	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	69.55	0.00	-28.03	-3256.72	0.07	-0.56
0.9 Dead+1.6 Wind 0 deg - No Ice	52.16	0.00	-28.03	-3234.23	-0.04	-0.56
1.2 Dead+1.6 Wind 30 deg - No Ice	69.55	13.92	-24.28	-2821.28	-1609.30	-2.51
0.9 Dead+1.6 Wind 30 deg - No Ice	52.16	13.92	-24.28	-2801.66	-1598.80	-2.50
1.2 Dead+1.6 Wind 60 deg - No Ice	69.55	24.11	-14.02	-1630.52	-2787.31	-3.88
0.9 Dead+1.6 Wind 60 deg - No Ice	52.16	24.11	-14.02	-1618.76	-2769.05	-3.87
1.2 Dead+1.6 Wind 90 deg - No Ice	69.55	27.83	0.01	-2.89	-3218.37	-4.34

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
0.9 Dead+1.6 Wind 90 deg - No Ice	52.16	27.83	0.01	-1.88	-3197.27	-4.33
1.2 Dead+1.6 Wind 120 deg - No Ice	69.55	24.15	14.08	1629.05	-2791.76	-3.54
0.9 Dead+1.6 Wind 120 deg - No Ice	52.16	24.15	14.08	1619.29	-2773.47	-3.53
1.2 Dead+1.6 Wind 150 deg - No Ice	69.55	13.93	24.35	2820.00	-1609.85	-1.79
0.9 Dead+1.6 Wind 150 deg - No Ice	52.16	13.93	24.35	2802.39	-1599.35	-1.78
1.2 Dead+1.6 Wind 180 deg - No Ice	69.55	0.01	28.11	3256.50	-0.80	0.36
0.9 Dead+1.6 Wind 180 deg - No Ice	52.16	0.01	28.11	3236.01	-0.91	0.36
1.2 Dead+1.6 Wind 210 deg - No Ice	69.55	-13.90	24.32	2817.54	1608.43	2.29
0.9 Dead+1.6 Wind 210 deg - No Ice	52.16	-13.90	24.32	2799.94	1597.72	2.29
1.2 Dead+1.6 Wind 240 deg - No Ice	69.55	-24.10	14.04	1624.89	2787.59	3.60
0.9 Dead+1.6 Wind 240 deg - No Ice	52.16	-24.10	14.04	1615.16	2769.11	3.58
1.2 Dead+1.6 Wind 270 deg - No Ice	69.55	-27.83	0.01	-2.94	3218.86	4.05
0.9 Dead+1.6 Wind 270 deg - No Ice	52.16	-27.83	0.01	-1.93	3197.54	4.04
1.2 Dead+1.6 Wind 300 deg - No Ice	69.55	-24.14	-14.03	-1632.43	2792.40	3.32
0.9 Dead+1.6 Wind 300 deg - No Ice	52.16	-24.14	-14.03	-1620.67	2773.88	3.31
1.2 Dead+1.6 Wind 330 deg - No Ice	69.55	-13.91	-24.27	-2820.73	1608.84	1.58
0.9 Dead+1.6 Wind 330 deg - No Ice	52.16	-13.91	-24.27	-2801.12	1598.12	1.57
1.2 Dead+1.0 Ice+1.0 Temp	132.77	-0.00	-0.00	-4.98	4.72	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	132.77	-0.00	-6.38	-752.96	5.22	-0.07
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	132.77	3.18	-5.53	-652.68	-366.68	-0.72
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	132.77	5.51	-3.19	-378.86	-639.01	-1.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	132.77	6.48	0.00	-4.78	-752.37	-1.36
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	132.77	6.33	3.67	406.52	-703.48	-1.16
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	132.77	3.19	5.54	643.51	-367.35	-0.63
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	132.77	0.00	6.39	743.62	4.41	0.04
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	132.77	-3.18	5.53	642.78	376.30	0.69
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	132.77	-5.51	3.19	368.66	648.80	1.15
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	132.77	-6.48	-0.00	-5.46	762.20	1.32
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	132.77	-6.33	-3.67	-416.37	713.33	1.12
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	132.77	-3.18	-5.53	-652.93	376.94	0.60
Dead+Wind 0 deg - Service	57.96	0.00	-6.52	-757.20	0.28	-0.13
Dead+Wind 30 deg - Service	57.96	3.24	-5.65	-656.27	-372.73	-0.58
Dead+Wind 60 deg - Service	57.96	5.61	-3.26	-380.28	-645.76	-0.90
Dead+Wind 90 deg - Service	57.96	6.48	0.00	-3.04	-745.67	-1.01
Dead+Wind 120 deg - Service	57.96	5.62	3.28	375.21	-646.80	-0.82
Dead+Wind 150 deg - Service	57.96	3.24	5.67	651.24	-372.86	-0.41
Dead+Wind 180 deg - Service	57.96	0.00	6.54	752.41	0.08	0.08

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	57.96	-3.24	5.66	650.67	373.07	0.53
Dead+Wind 240 deg - Service	57.96	-5.61	3.27	374.24	646.37	0.84
Dead+Wind 270 deg - Service	57.96	-6.48	0.00	-3.05	746.32	0.94
Dead+Wind 300 deg - Service	57.96	-5.62	-3.27	-380.72	647.48	0.77
Dead+Wind 330 deg - Service	57.96	-3.24	-5.65	-656.14	373.16	0.37

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	-57.96	0.00	0.00	57.96	0.00	0.000%
2	0.00	-69.55	-28.03	-0.00	69.55	28.03	0.000%
3	0.00	-52.16	-28.03	-0.00	52.16	28.03	0.000%
4	13.92	-69.55	-24.28	-13.92	69.55	24.28	0.000%
5	13.92	-52.16	-24.28	-13.92	52.16	24.28	0.000%
6	24.11	-69.55	-14.02	-24.11	69.55	14.02	0.000%
7	24.11	-52.16	-14.02	-24.11	52.16	14.02	0.000%
8	27.83	-69.55	0.01	-27.83	69.55	-0.01	0.000%
9	27.83	-52.16	0.01	-27.83	52.16	-0.01	0.000%
10	24.15	-69.55	14.08	-24.15	69.55	-14.08	0.000%
11	24.15	-52.16	14.08	-24.15	52.16	-14.08	0.000%
12	13.93	-69.55	24.35	-13.93	69.55	-24.35	0.000%
13	13.93	-52.16	24.35	-13.93	52.16	-24.35	0.000%
14	0.01	-69.55	28.11	-0.01	69.55	-28.11	0.000%
15	0.01	-52.16	28.11	-0.01	52.16	-28.11	0.000%
16	-13.90	-69.55	24.32	13.90	69.55	-24.32	0.000%
17	-13.90	-52.16	24.32	13.90	52.16	-24.32	0.000%
18	-24.10	-69.55	14.04	24.10	69.55	-14.04	0.000%
19	-24.10	-52.16	14.04	24.10	52.16	-14.04	0.000%
20	-27.83	-69.55	0.01	27.83	69.55	-0.01	0.000%
21	-27.83	-52.16	0.01	27.83	52.16	-0.01	0.000%
22	-24.14	-69.55	-14.03	24.14	69.55	14.03	0.000%
23	-24.14	-52.16	-14.03	24.14	52.16	14.03	0.000%
24	-13.91	-69.55	-24.27	13.91	69.55	24.27	0.000%
25	-13.91	-52.16	-24.27	13.91	52.16	24.27	0.000%
26	0.00	-132.77	0.00	0.00	132.77	0.00	0.000%
27	-0.00	-132.77	-6.38	0.00	132.77	6.38	0.000%
28	3.18	-132.77	-5.53	-3.18	132.77	5.53	0.000%
29	5.51	-132.77	-3.19	-5.51	132.77	3.19	0.000%
30	6.48	-132.77	0.00	-6.48	132.77	-0.00	0.000%
31	6.33	-132.77	3.67	-6.33	132.77	-3.67	0.000%
32	3.19	-132.77	5.54	-3.19	132.77	-5.54	0.000%
33	0.00	-132.77	6.39	-0.00	132.77	-6.39	0.000%
34	-3.18	-132.77	5.53	3.18	132.77	-5.53	0.000%
35	-5.51	-132.77	3.19	5.51	132.77	-3.19	0.000%
36	-6.48	-132.77	-0.00	6.48	132.77	0.00	0.000%
37	-6.33	-132.77	-3.67	6.33	132.77	3.67	0.000%
38	-3.18	-132.77	-5.53	3.18	132.77	5.53	0.000%
39	0.00	-57.96	-6.52	-0.00	57.96	6.52	0.000%
40	3.24	-57.96	-5.65	-3.24	57.96	5.65	0.000%
41	5.61	-57.96	-3.26	-5.61	57.96	3.26	0.000%
42	6.48	-57.96	0.00	-6.48	57.96	-0.00	0.000%
43	5.62	-57.96	3.28	-5.62	57.96	-3.28	0.000%
44	3.24	-57.96	5.67	-3.24	57.96	-5.67	0.000%
45	0.00	-57.96	6.54	-0.00	57.96	-6.54	0.000%
46	-3.24	-57.96	5.66	3.24	57.96	-5.66	0.000%
47	-5.61	-57.96	3.27	5.61	57.96	-3.27	0.000%
48	-6.48	-57.96	0.00	6.48	57.96	-0.00	0.000%
49	-5.62	-57.96	-3.27	5.62	57.96	3.27	0.000%
50	-3.24	-57.96	-5.65	3.24	57.96	5.65	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	0.00042434
3	Yes	4	0.00000001	0.00025018
4	Yes	5	0.00000001	0.00014791
5	Yes	5	0.00000001	0.00007383
6	Yes	5	0.00000001	0.00018532
7	Yes	5	0.00000001	0.00009355
8	Yes	5	0.00000001	0.00005060
9	Yes	5	0.00000001	0.00002584
10	Yes	5	0.00000001	0.00014484
11	Yes	5	0.00000001	0.00007246
12	Yes	5	0.00000001	0.00016945
13	Yes	5	0.00000001	0.00008527
14	Yes	4	0.00000001	0.00039400
15	Yes	4	0.00000001	0.00022542
16	Yes	5	0.00000001	0.00017506
17	Yes	5	0.00000001	0.00008824
18	Yes	5	0.00000001	0.00014355
19	Yes	5	0.00000001	0.00007182
20	Yes	5	0.00000001	0.00004818
21	Yes	5	0.00000001	0.00002457
22	Yes	5	0.00000001	0.00018075
23	Yes	5	0.00000001	0.00009109
24	Yes	5	0.00000001	0.00015266
25	Yes	5	0.00000001	0.00007630
26	Yes	4	0.00000001	0.00006257
27	Yes	5	0.00000001	0.00032938
28	Yes	5	0.00000001	0.00033487
29	Yes	5	0.00000001	0.00033213
30	Yes	5	0.00000001	0.00032498
31	Yes	5	0.00000001	0.00035149
32	Yes	5	0.00000001	0.00032663
33	Yes	5	0.00000001	0.00031974
34	Yes	5	0.00000001	0.00032987
35	Yes	5	0.00000001	0.00033107
36	Yes	5	0.00000001	0.00033101
37	Yes	5	0.00000001	0.00036363
38	Yes	5	0.00000001	0.00033856
39	Yes	4	0.00000001	0.00006474
40	Yes	4	0.00000001	0.00010930
41	Yes	4	0.00000001	0.00014881
42	Yes	4	0.00000001	0.00010213
43	Yes	4	0.00000001	0.00011149
44	Yes	4	0.00000001	0.00012163
45	Yes	4	0.00000001	0.00006350
46	Yes	4	0.00000001	0.00013025
47	Yes	4	0.00000001	0.00011341
48	Yes	4	0.00000001	0.00009903
49	Yes	4	0.00000001	0.00014059
50	Yes	4	0.00000001	0.00010763

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 140	8.871	39	0.4395	0.0026
L2	140 - 120	7.047	39	0.4265	0.0019
L3	120 - 100	5.322	39	0.3906	0.0014

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	100 - 80	3.785	39	0.3383	0.0010
L5	80 - 60	2.485	39	0.2786	0.0007
L6	60 - 40	1.440	39	0.2168	0.0005
L7	40 - 20	0.657	39	0.1549	0.0003
L8	20 - 0	0.166	39	0.0767	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 3/4"x4'	39	8.871	0.4395	0.0027	190599
150.00	APXVSPP18-C-A20 w/ Mount Pipe	39	7.952	0.4349	0.0023	95299
140.00	SLXW 5512 w/ Mount Pipe	39	7.047	0.4265	0.0020	47782
130.00	(2) 7770.00 w/ Mount Pipe	39	6.166	0.4114	0.0017	32486
120.00	APXV18-206517-C w/ Mount Pipe	39	5.322	0.3906	0.0014	24895
100.00	MPRC2449	39	3.785	0.3383	0.0010	19963
79.00	GPS_A	39	2.426	0.2755	0.0007	18543

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 140	38.109	2	1.8839	0.0112
L2	140 - 120	30.288	2	1.8306	0.0083
L3	120 - 100	22.885	2	1.6784	0.0058
L4	100 - 80	16.278	2	1.4543	0.0042
L5	80 - 60	10.687	2	1.1983	0.0030
L6	60 - 40	6.195	2	0.9323	0.0020
L7	40 - 20	2.824	2	0.6662	0.0013
L8	20 - 0	0.712	2	0.3300	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 3/4"x4'	2	38.109	1.8839	0.0115	46198
150.00	APXVSPP18-C-A20 w/ Mount Pipe	2	34.173	1.8655	0.0100	23099
140.00	SLXW 5512 w/ Mount Pipe	2	30.288	1.8306	0.0086	11548
130.00	(2) 7770.00 w/ Mount Pipe	2	26.508	1.7670	0.0073	7697
120.00	APXV18-206517-C w/ Mount Pipe	2	22.885	1.6784	0.0061	5833
100.00	MPRC2449	2	16.278	1.4543	0.0045	4660
79.00	GPS_A	2	10.436	1.1849	0.0031	4320

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 140 (1)	P36x3/8	20.00	0.00	0.0	41.9697	-11.41	1490.10	0.008
L2	140 - 120 (2)	P42x3/8	20.00	0.00	0.0	49.0383	-21.25	1668.87	0.013
L3	120 - 100 (3)	P48x3/8	20.00	0.00	0.0	56.1069	-27.17	1847.49	0.015
L4	100 - 80 (4)	P54x3/8	20.00	0.00	0.0	63.1755	-33.84	2026.00	0.017
L5	80 - 60 (5)	P60x3/8	20.00	0.00	0.0	70.2440	-40.88	2204.43	0.019
L6	60 - 40 (6)	P60x1/2	20.00	0.00	0.0	93.4624	-49.77	3125.69	0.016
L7	40 - 20 (7)	P60x1/2	20.00	0.00	0.0	93.4624	-58.70	3125.69	0.019
L8	20 - 0 (8)	P60x5/8	20.00	0.00	0.0	116.5830	-69.54	4139.15	0.017

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 140 (1)	P36x3/8	144.40	1338.81	0.108	0.00	1338.81	0.000
L2	140 - 120 (2)	P42x3/8	443.46	1796.56	0.247	0.00	1796.56	0.000
L3	120 - 100 (3)	P48x3/8	816.00	2321.11	0.352	0.00	2321.11	0.000
L4	100 - 80 (4)	P54x3/8	1233.63	2912.46	0.424	0.00	2912.46	0.000
L5	80 - 60 (5)	P60x3/8	1690.72	3570.61	0.474	0.00	3570.61	0.000
L6	60 - 40 (6)	P60x1/2	2184.05	4860.41	0.449	0.00	4860.41	0.000
L7	40 - 20 (7)	P60x1/2	2707.72	4860.41	0.557	0.00	4860.41	0.000
L8	20 - 0 (8)	P60x5/8	3256.72	6198.18	0.525	0.00	6198.18	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 140 (1)	P36x3/8	9.59	745.05	0.013	0.02	2189.07	0.000
L2	140 - 120 (2)	P42x3/8	17.21	834.44	0.021	1.05	2868.84	0.000
L3	120 - 100 (3)	P48x3/8	19.55	923.75	0.021	1.05	3637.70	0.000
L4	100 - 80 (4)	P54x3/8	21.82	1013.00	0.022	0.56	4495.63	0.000
L5	80 - 60 (5)	P60x3/8	23.79	1102.21	0.022	0.56	5442.62	0.000
L6	60 - 40 (6)	P60x1/2	25.51	1562.84	0.016	0.56	7685.07	0.000
L7	40 - 20 (7)	P60x1/2	26.82	1562.84	0.017	0.56	7685.07	0.000
L8	20 - 0 (8)	P60x5/8	28.04	2069.58	0.014	0.56	10134.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 140 (1)	0.008	0.108	0.000	0.013	0.000	0.116	1.000	4.8.2
L2	140 - 120 (2)	0.013	0.247	0.000	0.021	0.000	0.260	1.000	4.8.2

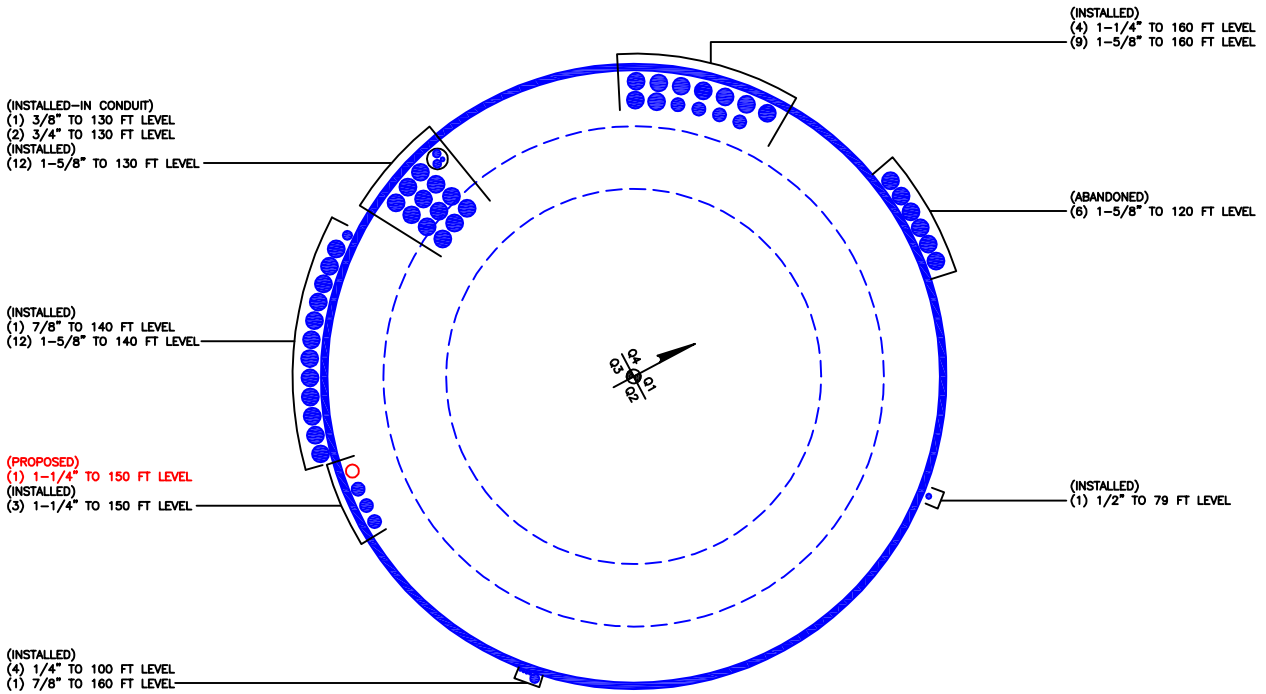
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	120 - 100 (3)	0.015	0.352	0.000	0.021	0.000	0.367	1.000	4.8.2
L4	100 - 80 (4)	0.017	0.424	0.000	0.022	0.000	0.441	1.000	4.8.2
L5	80 - 60 (5)	0.019	0.474	0.000	0.022	0.000	0.493	1.000	4.8.2
L6	60 - 40 (6)	0.016	0.449	0.000	0.016	0.000	0.466	1.000	4.8.2
L7	40 - 20 (7)	0.019	0.557	0.000	0.017	0.000	0.576	1.000	4.8.2
L8	20 - 0 (8)	0.017	0.525	0.000	0.014	0.000	0.542	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 140	Pole	P36x3/8	1	-11.41	1490.10	11.6	Pass
L2	140 - 120	Pole	P42x3/8	2	-21.25	1668.87	26.0	Pass
L3	120 - 100	Pole	P48x3/8	3	-27.17	1847.49	36.7	Pass
L4	100 - 80	Pole	P54x3/8	4	-33.84	2026.00	44.1	Pass
L5	80 - 60	Pole	P60x3/8	5	-40.88	2204.43	49.3	Pass
L6	60 - 40	Pole	P60x1/2	6	-49.77	3125.69	46.6	Pass
L7	40 - 20	Pole	P60x1/2	7	-58.70	3125.69	57.6	Pass
L8	20 - 0	Pole	P60x5/8	8	-69.54	4139.15	54.2	Pass
							Summary	
						Pole (L7)	57.6	Pass
						RATING =	**57.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 828540 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

07/08/14	UPDATED PER WORK ORDER # 907859	TDG
12/09/14	UPDATED PER WORK ORDER # 910305	BSH
10/11/14	UPDATED PER WORK ORDER # 958912	CJR
12/12/14	UPDATED PER WORK ORDER # 978546	CJR
16/7/2015	UPDATED PER WORK ORDER 1094891	DMB
17/12/2015	UPDATED PER WORK ORDER 1154550	CJR
25/02/16	UPDATED PER WORK ORDER 1199475	CRM
22/06/16	UPDATED PER WORK ORDER 1260831	ADE
14/07/17	UPDATED PER WORK ORDER 1430539	AT

DRAWN BY: AGT
CHECKED BY:
DRAWING DATE: 02/07/2013

SITE NUMBER:
SITE NAME:

SITE NAME

TORRINGTON/RT 8

BUSINESS UNIT NUMBER

828540

SITE ADDRESS

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING	1" = 1'-0"	1

PLOT DATE: 8/22/2016 FILE NAME: 828540_BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Reactions		
Mu	144.40	ft-kips
Axial, Pu:	11.41	kips
Shear, Vu:	9.59	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

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

Bolt Data				
Qty:	28			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	39			

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

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

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	
Max Bolt directly applied Tu:	5.94	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.017	in	
Min PL "treq" for actual **T w/ Pry**:	0.255	in	
Min PL "t1" for actual **T w/o Pry**:	0.336	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.94	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	10.9%	**Pass**	

Rigid
φ*Tn
φTn[(1-(Vu/φVn)^2]^0.5

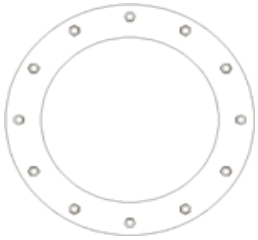
Exterior Flange Plate Results Flexural Check

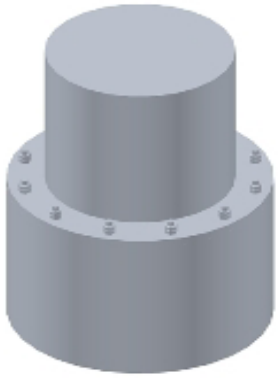
Compression Side Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress:	32.4	ksi
Compression Plate Stress Ratio:	Rohn/Piroc	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK

Rigid
TIA G
φ*Fy
Comp. Y.L. Length: 15.00

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Reactions		
Mu	443.46	ft-kips
Axial, Pu:	21.25	kips
Shear, Vu:	17.21	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

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

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	45		

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

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

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	14.12	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.006	in	
Min PL "treq" for actual **T w/ Pry**:	0.388	in	
Min PL "t1" for actual **T w/o Pry**:	0.512	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	14.12	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	25.9%	**Pass**	

Exterior Flange Plate Results Flexural Check

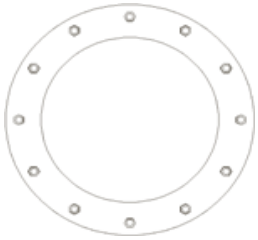
		Rigid
Compression Side Plate Stress:	Rohn/Piroc OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Piroc OK	Comp. Y.L. Length: 16.16

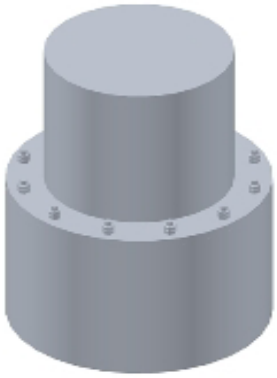
No Prying

Tension Side Stress Ratio, (treq/t)^2: Rohn/Pirod OK

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Reactions		
Mu	816.00	ft-kips
Axial, Pu:	27.17	kips
Shear, Vu:	19.55	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

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

Bolt Data				
Qty:	36			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	100	<-- Disregard		
N/A:	75	<-- Disregard		
Circle (in.):	51			

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

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

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

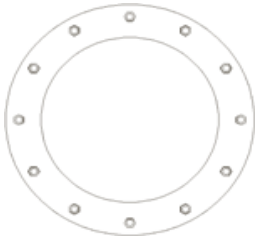
Flange Bolt Results

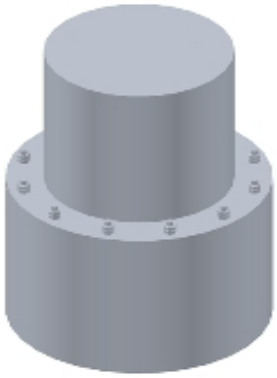
			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	20.58	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.998	in	
Min PL "treq" for actual **T w/ Pry**:	0.464	in	
Min PL "t1" for actual **T w/o Pry**:	0.613	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	20.58	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	37.7%	**Pass**	

Exterior Flange Plate Results	Flexural Check	Rigid
Compression Side Plate Stress:	Rohn/Piroc OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Piroc OK	Comp. Y.L. Length: 17.23
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod OK	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Reactions		
Mu	1233.62	ft-kips
Axial, Pu:	33.84	kips
Shear, Vu:	21.82	kips
Elevation:	80	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

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

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

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

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	
Max Bolt directly applied Tu:	20.94	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.087	in	
Min PL "treq" for actual **T w/ Pry**:	0.517	in	
Min PL "t1" for actual **T w/o Pry**:	0.673	in	
T allowable w/o Pry:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	20.94	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	38.4%	**Pass**	

Rigid
φ*Tn
φTn[(1-(Vu/φVn)^2]^0.5

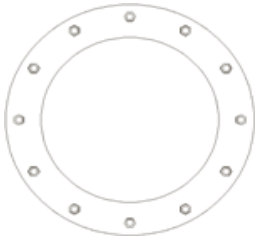
Exterior Flange Plate Results Flexural Check

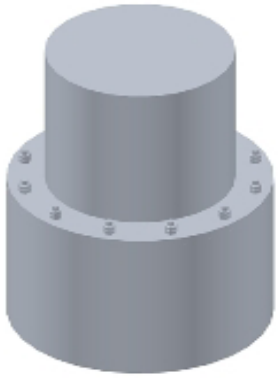
Compression Side Plate Stress:	Rohn/Piroc	OK
Allowable Plate Stress:	32.4	ksi
Compression Plate Stress Ratio:	Rohn/Piroc	OK
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Pirod	OK

Rigid
TIA G
φ*Fy
Comp. Y.L. Length: 18.25

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





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

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

Project Name:	TORRINGTON/RT 8
Project Number:	BU#828540
Job Number:	WO#1430545
Date:	7/19/2017

JACOBS
Jacobs Engineering Group. Inc.

Moment Distribution @ 60 ft

Anchor Bolts?	Yes	
Code:	G	

Total Moment of Inertia	19449.77	in^4

Moment (M)	**Axial (P)**	**Shear (V)**
1690.71	40.88	23.79
kip-ft	kips	kips

Outer Bolts		
Number of Bolts	32	
Bolt Circle	53	in
y	26.5	in
Moment of Inertia (I)	10887.684	in^4
Diameter (d)	1.25	in
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	946.4	kips-ft
Total Axial	20.44	kips
Total Shear	11.90	kips

Inner Bolts		
Number of Bolts	32	
Bolt Circle	47	in
y	23.5	in
Moment of Inertia (I)	8,562	in^4
Diameter (d)	1.25	
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	744.3	kips-ft
Total Axial	20.44	kips
Total Shear	11.90	kips

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Manufacturer:	Pirod

Reactions		
Moment:	946.40	ft-kips
Axial:	20.44	kips
Shear:	11.90	kips
Exterior Flange Run, T+q:	0.00	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	53	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	26.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	76.3	Kips
Bolt Stress Ratio:	34.3%	**Pass**

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	27.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

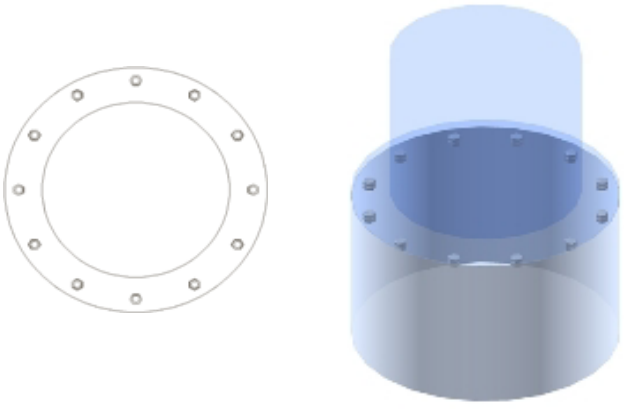
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



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

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

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Manufacturer:	Pirod

Reactions		
Moment:	744.30	ft-kips
Axial:	20.44	kips
Shear:	11.90	kips
Exterior Flange Run, T+q:	0.00	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	23.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	76.3	Kips
Bolt Stress Ratio:	30.3%	**Pass**

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	24.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

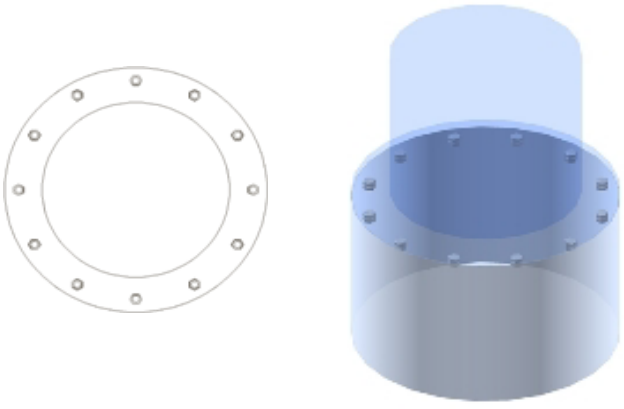
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



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

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

Project Name:	TORRINGTON/RT 8
Project Number:	BU#828540
Job Number:	WO#1430545
Date:	7/19/2017

JACOBS
Jacobs Engineering Group. Inc.

Moment Distribution @ 40 ft

Anchor Bolts?	Yes	
Code:	G	

Total Moment of Inertia	19449.77	in^4

Moment (M)	**Axial (P)**	**Shear (V)**
2184.05	49.77	25.51
kip-ft	kips	kips

Outer Bolts		
Number of Bolts	32	
Bolt Circle	53	in
y	26.5	in
Moment of Inertia (I)	10887.684	in^4
Diameter (d)	1.25	in
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1222.6	kips-ft
Total Axial	24.89	kips
Total Shear	12.76	kips

Inner Bolts		
Number of Bolts	32	
Bolt Circle	47	in
y	23.5	in
Moment of Inertia (I)	8,562	in^4
Diameter (d)	1.25	
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	961.5	kips-ft
Total Axial	24.89	kips
Total Shear	12.76	kips

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Manufacturer:	Pirod

Reactions		
Moment:	1222.60	ft-kips
Axial:	24.89	kips
Shear:	12.76	kips
Exterior Flange Run, T+q:	0.00	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	53	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	33.8	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	76.3	Kips
Bolt Stress Ratio:	44.3%	**Pass**

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	35.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

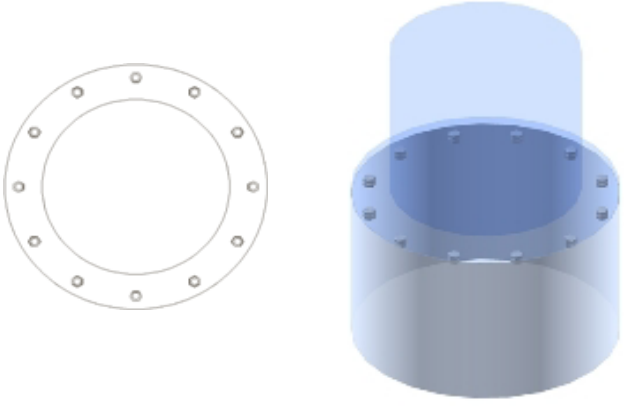
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



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

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

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	47	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

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

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Reactions		
Moment:	961.50	ft-kips
Axial:	24.89	kips
Shear:	12.76	kips
Exterior Flange Run, T+q:	0.00	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	29.9	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	76.3	Kips
Bolt Stress Ratio:	39.2%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	31.5	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

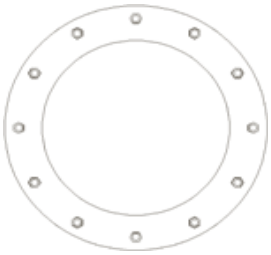
n/a

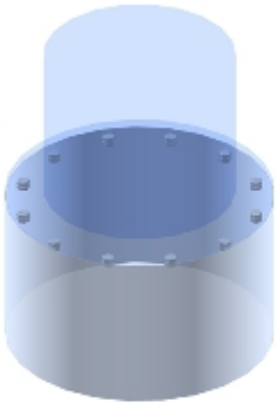
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A





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

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

Project Name:	TORRINGTON/RT 8
Project Number:	BU#828540
Job Number:	WO#1430545
Date:	7/19/2017

JACOBS
Jacobs Engineering Group. Inc.

Moment Distribution @ 20 ft

Anchor Bolts?	Yes	
Code:	G	

Total Moment of Inertia	19449.77	in^4

Moment (M)	**Axial (P)**	**Shear (V)**
2707.72	58.7	26.83
kip-ft	kips	kips

Outer Bolts		
Number of Bolts	32	
Bolt Circle	53	in
y	26.5	in
Moment of Inertia (I)	10887.684	in^4
Diameter (d)	1.25	in
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1515.7	kips-ft
Total Axial	29.35	kips
Total Shear	13.42	kips

Inner Bolts		
Number of Bolts	32	
Bolt Circle	47	in
y	23.5	in
Moment of Inertia (I)	8,562	in^4
Diameter (d)	1.25	
Ag	1.23	in^2
Ae	0.969	in^2
Total Moment	1192.0	kips-ft
Total Axial	29.35	kips
Total Shear	13.42	kips

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Manufacturer:	Pirod

Reactions		
Moment:	1515.70	ft-kips
Axial:	29.35	kips
Shear:	13.42	kips
Exterior Flange Run, T+q:	0.00	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	53	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	42.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	76.3	Kips
Bolt Stress Ratio:	55.0%	**Pass**

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	43.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

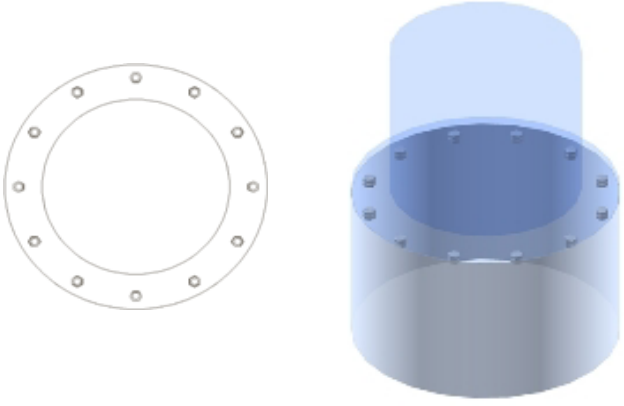
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



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

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

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

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Manufacturer:	Pirod

Reactions		
Moment:	1192.00	ft-kips
Axial:	29.35	kips
Shear:	13.42	kips
Exterior Flange Run, T+q:	0.00	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	37.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	76.3	Kips
Bolt Stress Ratio:	48.7%	**Pass**

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	39.0	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

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

n/a

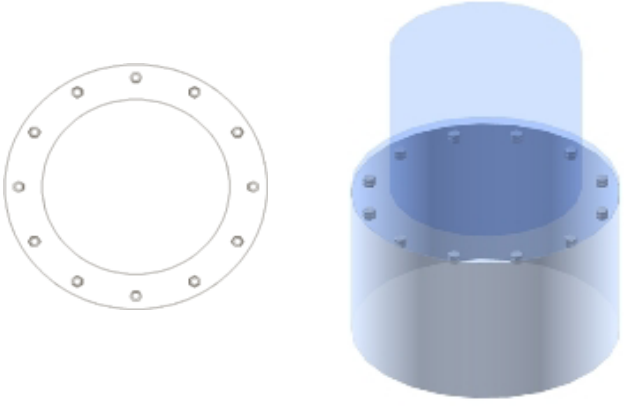
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi



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

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

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	*828540*
Site Name:	*TORRINGTON/RT 8*
App #:	*395035 Rev.0*
Pole Manufacturer:	*Pirod*

Reactions		
Mu:	3257	ft-kips
Axial, Pu:	70	kips
Shear, Vu:	28	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Anchor Rod Results

Max Rod (Cu+ Vu/ń):	47.3	Kips
Allowable Axial, Φ*Fu*Anet:	116.3	Kips
Anchor Rod Stress Ratio:	40.7%	**Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data		
Diam:	70	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Base Plate Results Flexural Check

Base Plate Stress:	Rohn/Pirod,	OK
Allowable Plate Stress:	32.4	ksi
Base Plate Stress Ratio:	Rohn/Pirod,	OK

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 29.82

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

n/a

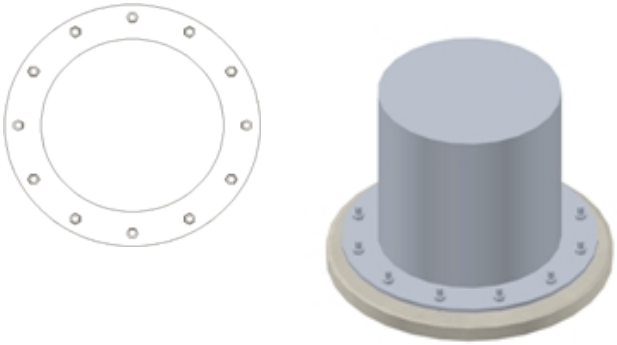
Stiffener Results N/A for Rohn / Pirod

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

Pole Results

Pole Punching Shear Check:	N/A

Pole Data		
Diam:	60	in
Thick:	0.625	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None



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

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

Pier and Pad Foundation

BU # :	828540
Site Name:	TORRINGTON/RT
App. Number:	395035 Rev.0

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?: ☐

Superstructure Analysis Reactions

Compression, P_{comp}:	70	kips
Base Shear, Vu_comp:	28	kips
Moment, M_u:	3257	ft-kips
Tower Height, **H**:	160	ft
BP Dist. Above Fdn, bp_{dist}:	0	in

Pier Properties

Pier Shape:	Circular	
Pier Diameter, **dpier**:	7.0	ft
Ext. Above Grade, **E**:	2.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	42	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	8	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	5.0	ft
Pad Width, **W**:	28.0	ft
Pad Thickness, **T**:	3.0	ft
Pad Rebar Size, **Sp**:	7	
Pad Rebar Quantity, **mp**:	45	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	16.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	0	
Base Friction, μ:		
Neglected Depth, **N**:	3.5	ft
Groundwater Depth, **gw**:	None	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	203.38	28.00	**13.8%**	**Pass**
Bearing Pressure (ksf)	12.00	1.62	**13.5%**	**Pass**
*Overturning (kip*ft)*	7384.63	3467.00	**46.9%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6749.57	3383.00	**50.1%**	**Pass**
Pier Compression (kip)	24494.62	101.17	**0.4%**	**Pass**
*Pad Flexure (kip*ft)*	3763.88	1241.90	**33.0%**	**Pass**
Pad Shear - 1-way (kips)	1010.06	170.18	**16.8%**	**Pass**
Pad Shear - 2-way (kips)	2185.12	101.17	**4.6%**	**Pass**

Soil Rating:	**46.9%**
Structural Rating:	**50.1%**

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *828540*
Site Name: *TORRINGTON/RT 8*
App #: *395035 Rev.0*

Loads Already Factored	
For M (WL):	1.00
For P (DL):	1.00

Pier Properties		
Concrete:		
Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2
Reinforcement:		
Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	6.32	ft
Vert. Cage Diameter =	75.87	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	42	
As Total=	42	in^2
A s/ Aconc, Rho:	0.0076	0.76%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0032
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.76%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	11033.99	kips
at Mu=(ϕ=0.65)Mn=	6742.63	ft-kips
Max Tu, (φ=0.9) Tn =	2268	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces		
TIA Revision:	G	
Max. Factored Shaft Mu:	3383	ft-kips **(* Note)**
Max. Factored Shaft Pu:	70	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

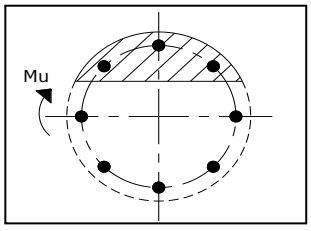
Load Factor	Shaft Factored Loads		
1.00	Mu:	3383	ft-kips
1.00	Pu:	70	kips

Material Properties		
Concrete Comp. strength, f'c =	4000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2005	

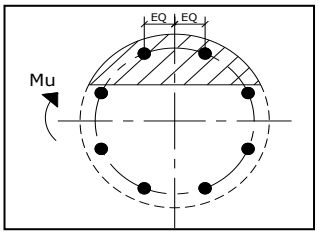
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.37**	in
Extreme Steel Strain, ϵt:	**0.0149**	
ϵt > 0.0050, Tension Controlled		
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	63.00	kips
Drilled Shaft Moment Capacity, φMn:	**6749.57**	ft-kips
Drilled Shaft Superimposed Mu:	**3383.00**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**50.1%**

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: CT33XC592

E. Litchfield / Omnipoint-Lefebvre Prop.
218 Wheeler Road
Torrington, CT 06790

October 17, 2017

EBI Project Number: 6217004510

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	7.92 %

EBI Consulting
environmental | engineering | due diligence

October 17, 2017

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

Emissions Analysis for Site: **CT33XC592 – E. Litchfield / Omnipoint-Lefebvre Prop.**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **218 Wheeler Road, Torrington, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **218 Wheeler Road, Torrington, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

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

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

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

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

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

8) The antennas used in this modeling are the **RFS APXVSPP18-C-A20 and the RFS APXVTM14-ALU-120** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **150 feet** above ground level (AGL) for **Sector A**, **150 feet** above ground level (AGL) for **Sector B** and **150 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**1.48 %**	Antenna B1 MPE%	**1.48 %**	Antenna C1 MPE%	**1.48 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-ALU-120	Make / Model:	RFS APXVTM14-ALU-120	Make / Model:	RFS APXVTM14-ALU-120
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**1.08 %**	Antenna B2 MPE%	**1.08 %**	Antenna C2 MPE%	**1.08 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.56 %**
T-Mobile	0.72 %
MetroPCS	0.94 %
Verizon Wireless	1.61 %
AT&T	2.09 %
Site Total MPE %:	**7.92 %**

SPRINT Sector A Total:	2.56 %
SPRINT Sector B Total:	2.56 %
SPRINT Sector C Total:	2.56 %
Site Total:	7.92 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	150	0.76	850 MHz	567	0.13%
Sprint 850 MHz LTE	2	437.55	150	1.52	850 MHz	567	0.27%
Sprint 1900 MHz (PCS) CDMA	5	622.47	150	5.40	1900 MHz (PCS)	1000	0.54%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	150	5.40	1900 MHz (PCS)	1000	0.54%
Sprint 2500 MHz (BRS) LTE	8	778.09	150	10.79	2500 MHz (BRS)	1000	1.08%
						Total:	**2.56%**

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	2.56 %
Sector B:	2.56 %
Sector C:	2.56 %
SPRINT Maximum Total (per sector):	2.56 %
Site Total:	7.92 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.92 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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