Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

February 10, 2017

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

RE: **Notice of Exempt Modification for Sprint / 2016-207 Crown Site BU: 822779**
Sprint Site ID: CT54XC747
Located at: 1875 Nobel Avenue, Bridgeport, CT 06610
Latitude: 41° 12' 37.271" / Longitude: -73° 10' 52.259"

Dear Ms. Bachman,

Sprint currently maintains three (3) antennas at the 96-foot level of the existing 120-foot monopole at 1875 Nobel Avenue, Bridgeport, CT. The tower is owned by Crown Castle. The property is owned by The Connecticut Zoological Society. Sprint now intends to remove and replace the three (3) existing antennas with three (3) new antennas at the same 96-foot level and add: three (3) Nokia FWHR RRHs, three (3) diplexers, four (4) Belden fiber lines and one (1) Corning Ethernet line inside of 1" conduit, one (1) Southwire Power line inside of 1" conduit, and one (1) junction box.

This facility was approved by the Town of Bridgeport Zoning Department, File Number 2K-07 on March 31, 2000. This approval included the condition(s) that:

1. Stockade fencing not less than 6' high shall be installed to encompass & enclose the proposed equipment area.
2. No equipment shall exceed the height of the fencing required in condition No. 1 above.
3. Arborvitae trees no less than 6' high shall be planted at 6' intervals around the perimeter of the equipment enclosure area.
4. All required fencing & landscape trees are to be maintained at all times.

5. A “Removal Bond” as determined by the City Attorney’s Office shall be filed with the Bridgeport Zoning Department prior to the Certificate of an Application for Zoning Compliance.

This modification complies with the aforementioned condition(s).

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 Joseph P. Ganim, Mayor for the Town of Bridgeport, the Planning & Economic Department for the Town of Bridgeport, the property owner and the tower owner.

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

2. The proposed modification 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-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Amanda Goodall.

Sincerely,

Amanda Goodall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Goodall@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: Joseph P. Ganim, Mayor
Town of Bridgeport
999 Broad Street
Bridgeport, CT 06604

Thomas F. Gill, Director of OPED
Office of Planning and Economic Development
999 Broad Street
Bridgeport, CT 06604

Crown Castle (Tower Owner)
12 Gill Street, Suite 5800
Woburn, Ma 01801

Connecticut Zoological Society (Property Owner)
1875 Nobel Ave
Bridgeport, CT 06610

ZONING DEPARTMENT

DEVELOPMENT ADMINISTRATION

City of Bridgeport

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DATE: March 31, 2000

OUR FILE: # 2K-07

Attorney J. Brendan Sharkey
100 Filley Street
Bloomfield, CT 06002

RE: Site Plan Review
1875 Noble Avenue
Bridgeport, CT

Dear Attorney Sharkey:

At its meeting held on Monday, March 27, 2000, the Planning & Zoning Commission voted to approve conditionally the application submitted by you which sought a Site Plan Review under Sec. 14-2 of the Bridgeport Zoning Regulations to permit the installation of a 120' high flagpole which will house telecommunications antennas & associated equipment within the Beardsley Zoo pavilion in a ZOOLOGICAL PARK ZONE.

The Commission stipulated the following conditions for its approval:

1. Stockade fencing not less that 6' high shall be installed to encompass & enclose the proposed equipment area.
2. No equipment shall exceed the height of the fencing required in condition No. 1 above.
3. Arborvitae trees no less than 6' high shall be planted at 6' intervals around the perimeter of the equipment enclosure area.
4. All required fencing & landscape trees are to be maintained at all times.
5. A "Removal Bond" as determined by the City Attorney's Office shall be filed with the Bridgeport Zoning Department prior to the Certification Of An Application For Zoning Compliance.

The Commission assigned the following reason for its action:

1. As to the Site Plan Review, the project, as approved, complies with the standards of Sec. 14-2-5 of the Bridgeport Zoning Regulations.

Very truly yours,

William A. Shaw, Clerk
Planning & Zoning Commission

WAS:map

CT11-240A

CITY HALL
45 Lyon Terrace
Room No. 206
Bridgeport, Conn.

NO. .....

APPLICATION FOR CERTIFICATE OF ZONING COMPLIANCE

ZONING COMMISSION
CITY OF BRIDGEPORT, CONN.

Applicant Omnipoint Communications, Inc. Date 5/17/00 19.....

Address of Work 1875 Noble Ave (Owner or Tenant Only) 45 Lyons Terrace (Number) East Main St. (Street)

on the corner (North, South, East, West) of Noble Ave side of the above street about ..... feet

..... from Beardsley Zoo. (Street) Lot No. 9-9A-9B-9C.
(North, South, East, West)

Block No. 3000 as shown on Tax Assessor's Maps. C.A.M. Area NO (Yes - No) Wetlands NO (Yes - No)

Dimension of Lot: Entire City Block.

Size of Proposed Building or Addition ..... No. Stories .....

Wood Frame ..... Brick Veneer ..... Masonry .....

Other Work (Describe in Detail) Installation of telecommunication antennas and associated equipment. (flagpole)

Proposed Use of Above (Describe in Detail) Telecommunication antenna for cell phones, as approved by ZBA 1/11/00 PZ. approval 3/27/00

Presently Existing Use Zoo Zone ZP

Previous use and date discontinued (if applicable) .....

..... Is pre-existing right claimed yes (Yes — No)

Signature J. Brendan Sharkey Print Same J. Brendan Sharkey, Esq.

If signed by agent state capacity (attorney, builder, etc.) Attorney for Omnipoint Communications (TheApplicant)

Mailing Address 100 Filley Street, Bloomfield, CT 06002 Phone No. 860/692-7100

INSTRUCTIONS
Fill Out This Application In Ink or Type

A detailed plot plan must be submitted with this application showing the proposed or existing lot and building dimensions and the location of all buildings in relation to the street line, side lot lines and rear lot line. NOTE: *The occupancy and use of land, buildings and structures prior to the issuance of a Certificate of Zoning Compliance is prohibited.* This is not the said certificate. Fees, payable at the time of making application, are not returnable and, are in an amount established by the Zoning Commission.

Fee received 100 Date 5/17/00 19.... By mcd.

PLAN AND APPLICATION	C.A.M. APPROVAL	FINAL INSPECTION
APPROVED FOR ZONING COMPLIANCE ONLY ZONING DEPARTMENT CITY OF BRIDGEPORT, CONN. BY mcd DATE: 10/6/00		

Certificate Issued Date ..... 19.....

Form 144

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1875 Noble Ave

Map data ©2017 Google 200 ft

SPRINT SITE NUMBER: CT54XC747

SPRINT SITE NAME: ---
SITE TYPE: FLAGPOLE
TOWER HEIGHT: 120'-0"

CROWN CASTLE BU #: 822779
SITE ADDRESS: 1875 NOBLE AVENUE, BRIDGEPORT, CT 06610
COUNTY: FAIRFIELD
JURISDICTION: CITY OF BRIDGEPORT

SPRINT 2016-2017 LOCAL ASK INITIATIVE

SITE INFORMATION

CROWN CASTLE SITE NAME:	BRIDGEPORT/ RT 8
SITE ADDRESS:	1875 NOBLE AVENUE BRIDGEPORT,CT 06610
COUNTY:	FAIRFIELD
MAP/PARCEL #:	BRID-003000-000009A
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 12' 37.271"
LONGITUDE:	-73° 10' 52.259"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	102.0 FT.
CURRENT ZONING:	Z-P
JURISDICTION:	CITY OF BRIDGEPORT
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	VB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	CONNECTICUT ZOOLOGICAL SOCIETY 1875 NOBLE AVE C/O BEARDSLEY ZOO BRIDGEPORT, CT 16610-1646
TOWER OWNER:	CCTMO LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	SPRINT 6391 SPRINT PARKWAY OVERLAND PARK, KS 66251-2650
CROWN CASTLE APPLICATION ID:	368093
ELECTRIC PROVIDER:	CPL (800) 788-5456
TELCO PROVIDER:	AT&T (866) 620-6900

PROJECT TEAM

CROWN CASTLE A&E FIRM:
CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317
CROWNAE.APPROVAL@CROWNCASTLE.COM

CROWN CASTLE CONTACTS:
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

MARYELLEN PERROTTA - PROJECT MANAGER
(781) 970-0057
JASON D'AMICO - CONSTRUCTION MANAGER
(860) 209-0104

WILLIAM STONE - A&E PROJECT MANAGER
WILLIAM.STONE.CONTRACTOR@CROWNCASTLE.COM
(518) 373-3543

SPRINT CONTACT:
MICHELLE HISERT
MICHELLE.HISERT@SPRINT.COM

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
T-3	GENERAL NOTES
C-1	ENLARGED SITE PLAN
C-2	EXISTING AND NEW ELEVATION
C-3	ANTENNA PLANS AND SCHEMATIC
C-4	CONDUIT ROUTING SCHEMATIC
C-5	INSTALLATION SPECS AND DETAILS
C-6	EQUIPMENT SPECIFICATIONS
E-1	ELECTRICAL SPECIFICATIONS
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR FULL SIZE. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

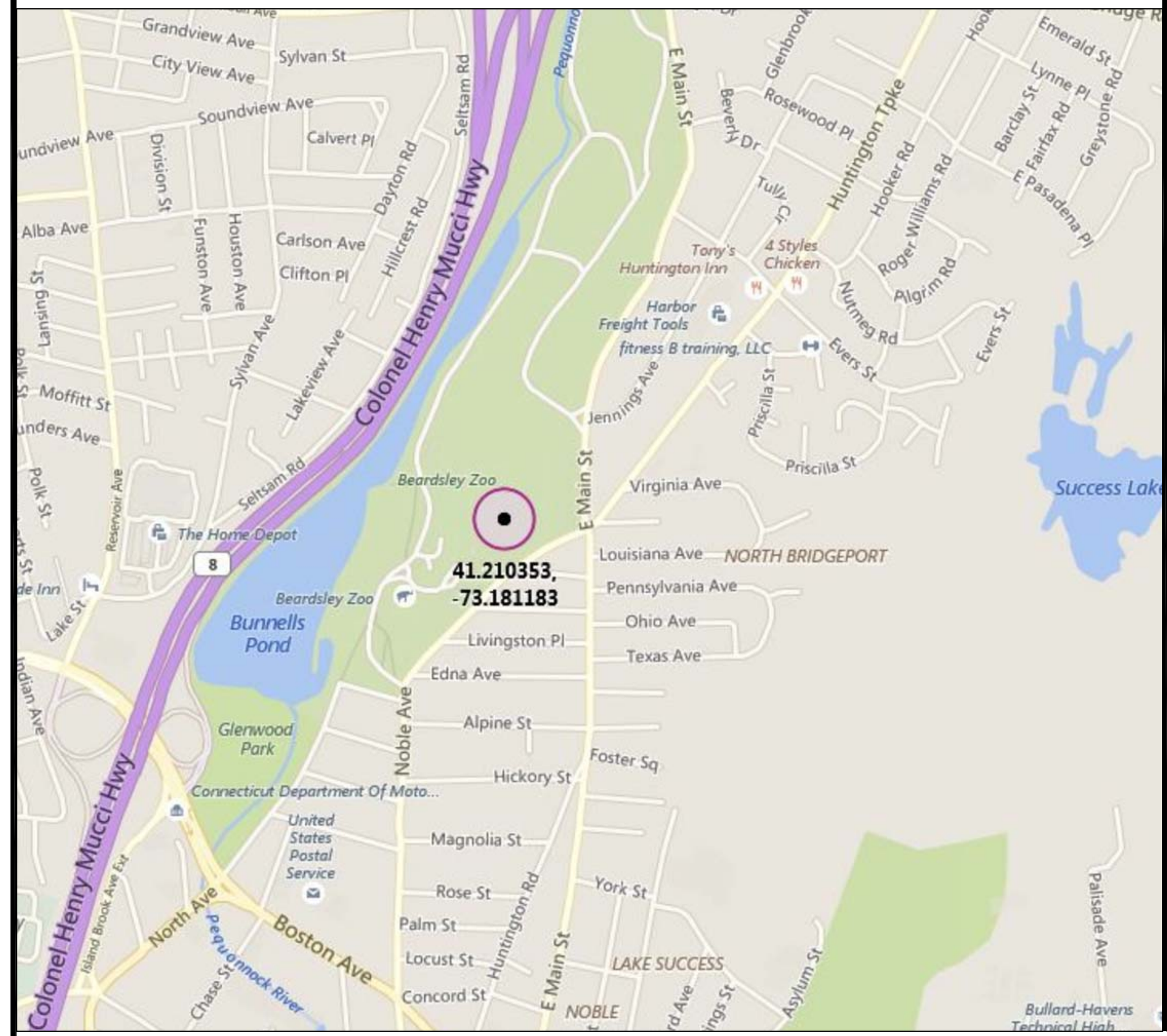
- REMOVE (3) ANTENNAS
- INSTALL (3) ANTENNAS
- INSTALL (3) RRHS
- INSTALL (3) DIPLEXERS
- INSTALL (1) JUNCTION BOX
- INSTALL (4) 17/64" FIBER LINES AND (1) 1/8" ETHERNET CABLE INSIDE 1" CONDUIT
- INSTALL (1) 7/8" POWER LINE INSIDE 1" CONDUIT

DESIGN PACKAGE BASED ON THE APPLICATION ID: 368093
REVISION: 5

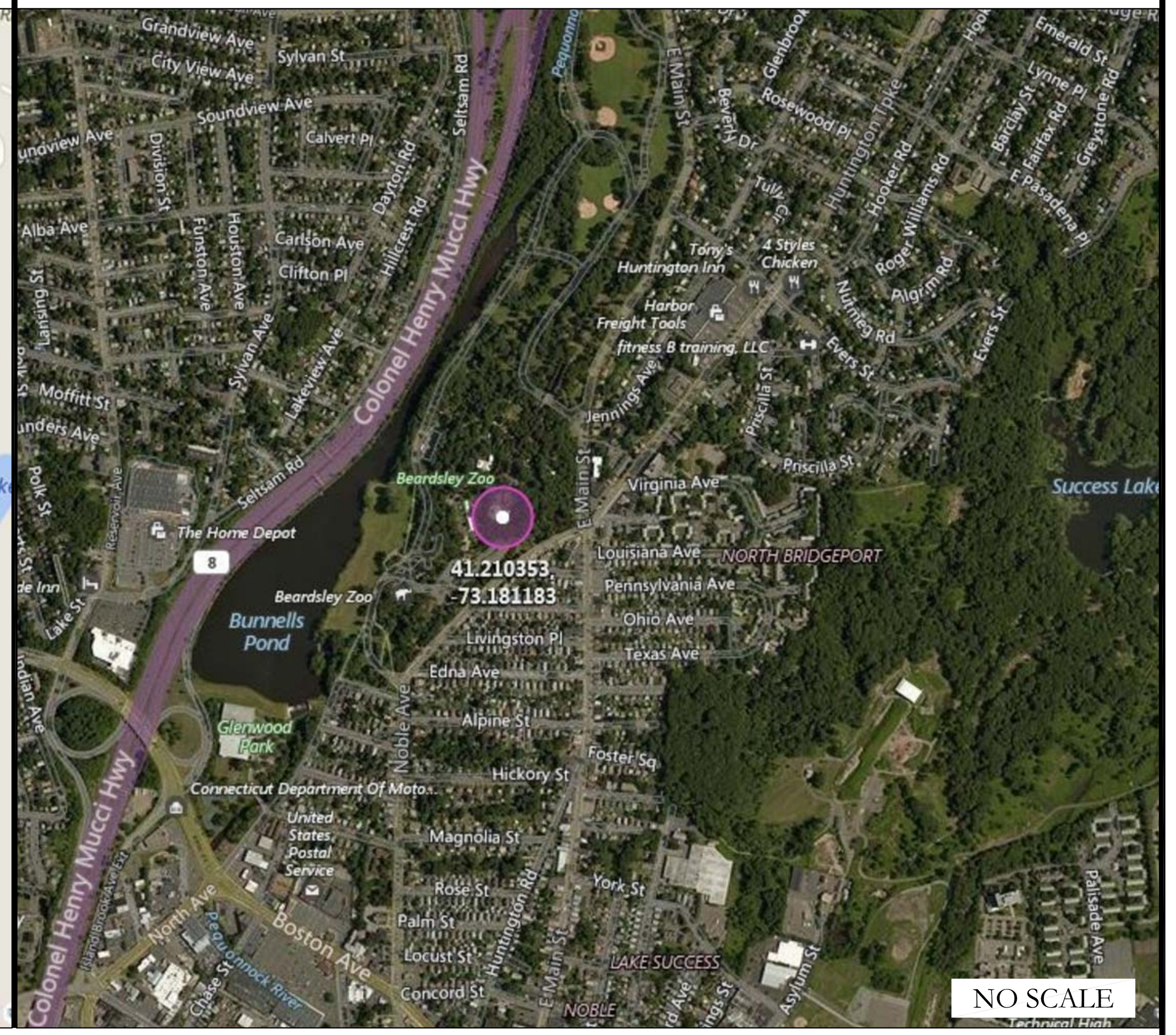
INSTALLER NOTE:
TOWER DOES NOT HAVE CLIMBING FACILITIES – MANLIFT REQUIRED FOR ELEVATED WORK.

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

VICINITY MAP



AERIAL MAP



DRIVING DIRECTIONS FROM BRADLEY INTERNATIONAL AIRPORT:

EXIT BRADLEY INTERNATIONAL AIRPORT VIA SCHOEPHOESTER RD TOWARD CT-20 E. CONTINUE ONTO CT-20 E/BRADLEY INTERNATIONAL AIRPORT CON, THEN USE THE RIGHT TWO LANES TO TAKE THE I-91S EXIT TOWARD HARTFORD. TAKE EXIT 17 FOR CT-15S/WILBUR CROSS PKWY. TAKE EXIT 52 FOR STATE ROUTE 108S/STATE ROUTE 8S TOWARD BRIDGEPORT. TAKE EXIT 7 FOR CT-127/WHITE PLAINS ROAD. TURN LEFT ONTO CT-127S/WHITE PLAINS ROAD. TURN RIGHT ONTO NOBLE AVE. TURN RIGHT TO ENTER BEARDSLEY ZOO PARKING LOT. UPON ENTERING, INFORM TICKET WINDOW OPERATOR THAT ACCESS TO FLAGPOLE IS REQUIRED.

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2016 CONNECTICUT STATE BUILDING CODE/2012 IBC W/ CT AMENDMENTS
MECHANICAL	2016 CONNECTICUT STATE BUILDING CODE/2012 IMC W/ CT AMENDMENTS
ELECTRICAL	2016 CONNECTICUT STATE BUILDING CODE/2014 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:
STRUCTURAL ANALYSIS: BY OTHERS

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS BEFORE YOU DIG!

811

APPROVALS

APPROVAL	SIGNATURE	DATE
SITE ACQ. & ZONING		
CONSTRUCTION MGR		
A&E MGR		
PLANNING CONSULTANT		
RF MGR		
PROPERTY OWNER		
SPRINT REP.		

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

EXISTING 120'-0" FLAGPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/23/16	CJ	PRELIMINARY	LMR
B	01/12/17	JRM	PRELIMINARY	LMR
0	01/17/17	JRM	CONSTRUCTION	LMR

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. 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 CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. 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 POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA 1019 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

SPRINT CONSTRUCTION NOTES

SECTION 01 100 – SCOPE OF WORK

THE WORK:

MUST COMPLY WITH ALL APPLICABLE ADOPTED CODES AND STANDARDS, AND PORTIONS THEREOF. SPRINT METHOD OF PROCEDURE (MOP) AND SPRINT STANDARDS AT THE TIME OF CONSTRUCTION START.

PRECEDENCE:

SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS. INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. ALONG WITH SPRINT CONSTRUCTION MANAGER APPROVAL.

SITE FAMILIARITY:

CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

ON-SITE SUPERVISION:

THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE:

THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO PROVIDE A COMPLETE FUNCTIONING SYSTEM. MODIFICATIONS MAY BE REQUIRED TO SUITE JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

B. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

C. MARK THE FIELD SET OF DRAWINGS IN RED, DOCUMENTING ANY CHANGES FROM THE CONSTRUCTION DOCUMENTS.

METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION:

CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS. CONTRACTOR IS RESPONSIBLE FOR DISTRIBUTION OF LATEST MOPS.

A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF FIBER CABLE
F. INSTALLATION OF RRU'S
G. CABLING
H. TS-0200 REV 5 – ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.
J. COMMISSIONING MOPS

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

A. COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DRAWINGS.

B. CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT TO ENSURE IT IS PROTECTED AND HANDLED PROPERLY THROUGHOUT THE CONSTRUCTION DURATION.

C. CONTRACTOR IS RESPONSIBLE FOR RECEIPT OF SPRINT FURNISHED EQUIPMENT AT CELL SITE OR CONTRACTORS LOCATION. CONTRACTOR TO COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE. CONTRACTOR MAY BE REQUIRED TO PICK UP MATERIAL AT LOCATION PRESCRIBED BY SPRINT.

SECTION 01 300 – CELL SITE CONSTRUCTION

NOTICE TO PROCEED:

NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF WORK ORDER.

SITE CLEANLINESS:

CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

SECTION 01 400 – SUBMITTALS AND TESTS

ALTERNATIVES:

AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED.

TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. COAX SWEEPS AND FIBER TESTS PER TS-200 REV 5 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT: PROVIDE AN AUTOMATED REPORT UPLOADED TO SITERRA USING A COMMERCIAL MADE-FOR PURPOSE ELECTRONIC ANTENNA ALIGNMENT TOOL (AAT). INSTALLED AZIMUTH, CENTERLINE AND DOWNTILT MUST CONFORM WITH RF CONFIGURATION DATA.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
4. ALL TESTING REQUIRED BY APPLICABLE INSTALLATION MOPS.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:
1. AZIMUTH, DOWNTILT, AGL FROM SUNSIGHT INSTRUMENTS – ANTENNA ALIGNMENT TOOL (AAT)
2. SWEEP AND FIBER TESTS.
3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT.
4. ALL AVAILABLE JURISDICTIONAL PERMIT AND OCCUPANCY INFORMATION.
5. PDF SCAN OF REDLINES PRODUCED IN FIELD.
6. A PDF SCAN OF REDLINE MARK-UPS SUITABLE FOR USE IN ELECTRONIC AS-BUILT DRAWING PRODUCTION.
7. LIEN WAIVERS.
8. FINAL PAYMENT APPLICATION.
9. REQUIRED FINAL CONSTRUCTION PHOTOS.
10. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS.
11. APPLICABLE POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINT'S DOCUMENT REPOSITORY OF RECORD).
12. CLOSEOUT PHOTOGRAPHS AND CLOSEOUT CHECKLIST: SPRINT WILL PROVIDE SEPARATE GUIDANCE.

a. PROVIDE PHOTOGRAPHS OF FINAL PROJECT PER THE FOLLOWING LIST. ADDITIONAL PHOTOS MAY BE REQUIRED TO SUPPORT ACCEPTANCE PROCESSES
(i) BACK MAIN FIBER CABLE ROUTE (MINIMUM TWO PHOTOS)
(ii) OF EACH ANTENNA AND RRU
(iii) MANUFACTURERS NAME TAG FOR ALL SERIALIZED EQUIPMENT
(iv) PULL AND DISTRIBUTION BOXES INTERMEDIATE BETWEEN RRU'S AND RBS (DOOR OPEN)
(v) RBS CABINET WITH DOOR OPEN SHOWING MODIFICATIONS
(vi) POWER CABINET, DOORS OPEN, BATTERIES INSTALLED
(vii) BREAK OUT CYLINDERS
(viii) ASR SIGNAGE FOR SPRINT OWNED TOWERS
(ix) RADIATION EXPOSURE WARNING SIGNS
(x) PHOTOGRAPH FROM EACH SECTOR FROM APPROXIMATELY RAD CENTER OF ANY NEW ANTENNA AT HORIZON.

b. LOAD PHOTOS TO SITERRA PROJECT LIBRARY 15. IN 15 CREATE NEW CATEGORY; 2.5 DEPLOYMENT, AND SECTION; PERMANENT CONSTRUCTION. LABEL PHOTOS WITH SITE CASCADE AND VIEW BEING DEPICTED. CAMERAS USED TO TAKE PHOTOS SHALL BE GPS ENABLED SUCH THAT THE GPS COORDINATES ARE INCLUDED IN THE PHOTO MEDIA-FILE INFORMATION.

COMMISSIONING:

PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

INTEGRATION:

PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

SECTION 09 900 – PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED PROVIDE PREMIUM GRADE, PROFESSIONAL-QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTION WHENEVER POSSIBLE.

B. WATER TANKS: TOUCH UP – PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX," "DRY GALV," OR "ZINC-IT."
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 – ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

NV FIBER CABLE:

EXISTING NV FIBER CABLE WILL BE USED AT EACH SITE. CABLE SHALL BE USED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTIONS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2" FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MINIMUM LENGTH FOR JUMPER SHALL BE SO AS TO ALLOW FOR THE PROPER BEND RADIUS PER MANUFACTURER OR SPRINT SPECIFICATIONS.

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH AND FEED ORIENTATION INFORMATION SHALL BE AS DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE CONSTRUCTION DRAWINGS.

FIBER CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAT THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN FIBER CABLES:

a. LATTICE AND GUYED TOWERS:

ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS. HOISTING GRIPS SHOULD BE INSTALLED AT MID-POINT IF CABLE RUN EXCEEDS 200' AS WELL AS TOP SIDE.

a. MONOPOLE:

ALL CABLES SHALL BE PERMANENTLY SUPPORTED WITH HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200' (ONE HOISTING GRIP PER COAX).

1. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA). WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES.

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

2. FASTENING OR SECURING JUMPERS SHOULD CONSIST OF STAINLESS STEEL CLIPS, 18" FROM REAR OF CONNECTOR AND 24" THEREAFTER AND AT NO TIME SHALL THEY CONTACT TOWER OR STRUCTURAL STEEL.

3. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE. NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOPE AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 5.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY A ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

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BRIDGEPORT/ RT 8

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EXISTING 120'-0" FLAGPOLE

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STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
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1/17/2017 | 10:03:37 AM EST

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Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: T-2

REVISION: 0

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER AND COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF AMALGAMATING TAPE.
2. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
3. JMA-WPS SERIES ENCLOSURE.
4. BUTYL AND TAPE, 1 COMPLETE WRAP OF 3/4" PRE-TAPE, BUTYL WRAPPED IN HALF INCH LAP LAYERS, ENDED WITH SHINGLED DOWNWARD 3 WRAPS OF 2" TAPE, 3 WRAPS OF 3/4" TAPE SHINGLED DOWNWARD, FREE OF WRINKLES, BUCKLES AND FLAGGING.
5. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

C. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE CONSTRUCTION DRAWINGS.

FIBER CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAT THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN FIBER CABLES:

a. LATTICE AND GUYED TOWERS:

ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS. HOISTING GRIPS SHOULD BE INSTALLED AT MID-POINT IF CABLE RUN EXCEEDS 200' AS WELL AS TOP SIDE.

b. MONOPOLE:

ALL CABLES SHALL BE PERMANENTLY SUPPORTED WITH HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200' (ONE HOISTING GRIP PER COAX).

2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA). WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES.

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING OR SECURING JUMPERS SHOULD CONSIST OF STAINLESS STEEL CLIPS, 18" FROM REAR OF CONNECTOR AND 24" THEREAFTER AND AT NO TIME SHALL THEY CONTACT TOWER OR STRUCTURAL STEEL.

4. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE. NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOPE AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.

6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 5.

7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER AND COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF AMALGAMATING TAPE.
2. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
3. JMA-WPS SERIES ENCLOSURE.
4. BUTYL AND TAPE, 1 COMPLETE WRAP OF 3/4" PRE-TAPE, BUTYL WRAPPED IN HALF INCH LAP LAYERS, ENDED WITH SHINGLED DOWNWARD 3 WRAPS OF 2" TAPE, 3 WRAPS OF 3/4" TAPE SHINGLED DOWNWARD, FREE OF WRINKLES, BUCKLES AND FLAGGING.
5. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 – INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BUT NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING:

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

SECTION 26 100 – BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS.

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTING ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE NEW USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY THE FOLLOWING:

1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS

B. FASTENERS: TYPES, MATERIALS AND CONSTRUCTION FEATURES AS FOLLOWS:

1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL. DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS IN WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
2. USE VIBRATION AND SHOCK-RESISTANT FASTNERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 – ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED – SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. ALL UNDERGROUND CONDUIT OR CONDUIT IN CONCRETE SHOULD BE PVC. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATIONS C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED HUB SHALL INCLUDE LOCK NUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO – CL2075, OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION, PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMET. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO-HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CONSTRUCTION MANAGER FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

ADDITIONAL REQUIRED NOTES:

- GC IS RESPONSIBLE FOR HIRING ALL 3RD PARTY SPECIAL INSPECTIONS AS REQUIRED PER MUNICIPALITY
- GC IS RESPONSIBLE FOR VERIFYING ALL FIELD MEASUREMENTS PRIOR TO STARTING CONSTRUCTION
- DO NOT OPEN RRU PACKAGES IN THE RAIN
- NO OPEN FLAME ON SITE
- GC TO ENSURE HYBRIDS ARE SUPPORTED EVERY 3'-0" ON HORIZONTAL AND 4'-0" ON VERTICAL RUNS

Sprint

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STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
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Justin Peter Linette, P.E.
Professional Engineer License: 31965
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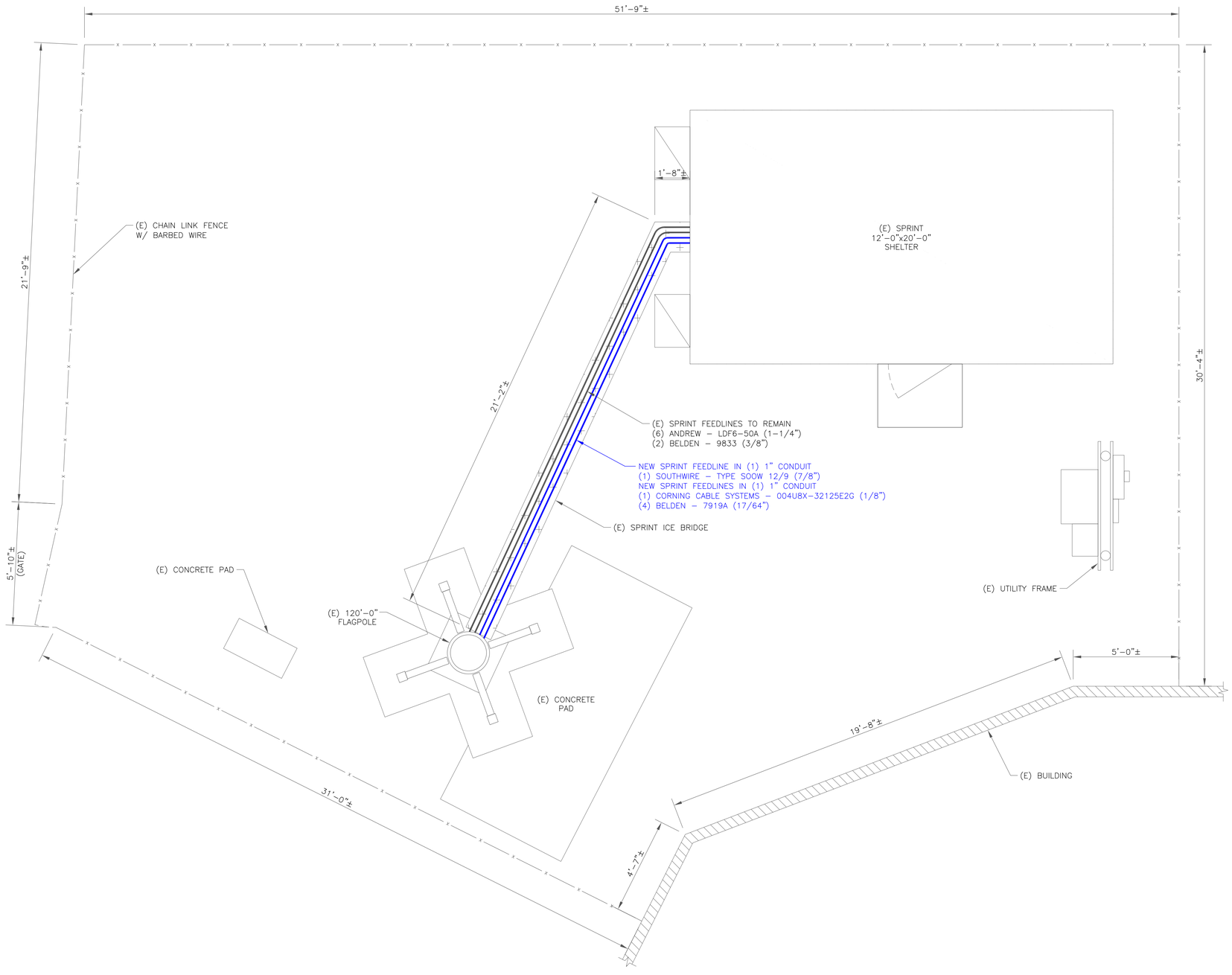

1 ENLARGED SITE PLAN

SCALE: 2' 1' 0 2'
3/8"=1'-0" (FULL SIZE)
3/16"=1'-0" (11x17)

N

Sprint

CROWN CASTLE
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No. 31965
LICENSED
PROFESSIONAL ENGINEER
1/17/2017 | 10:01:34 AM EST

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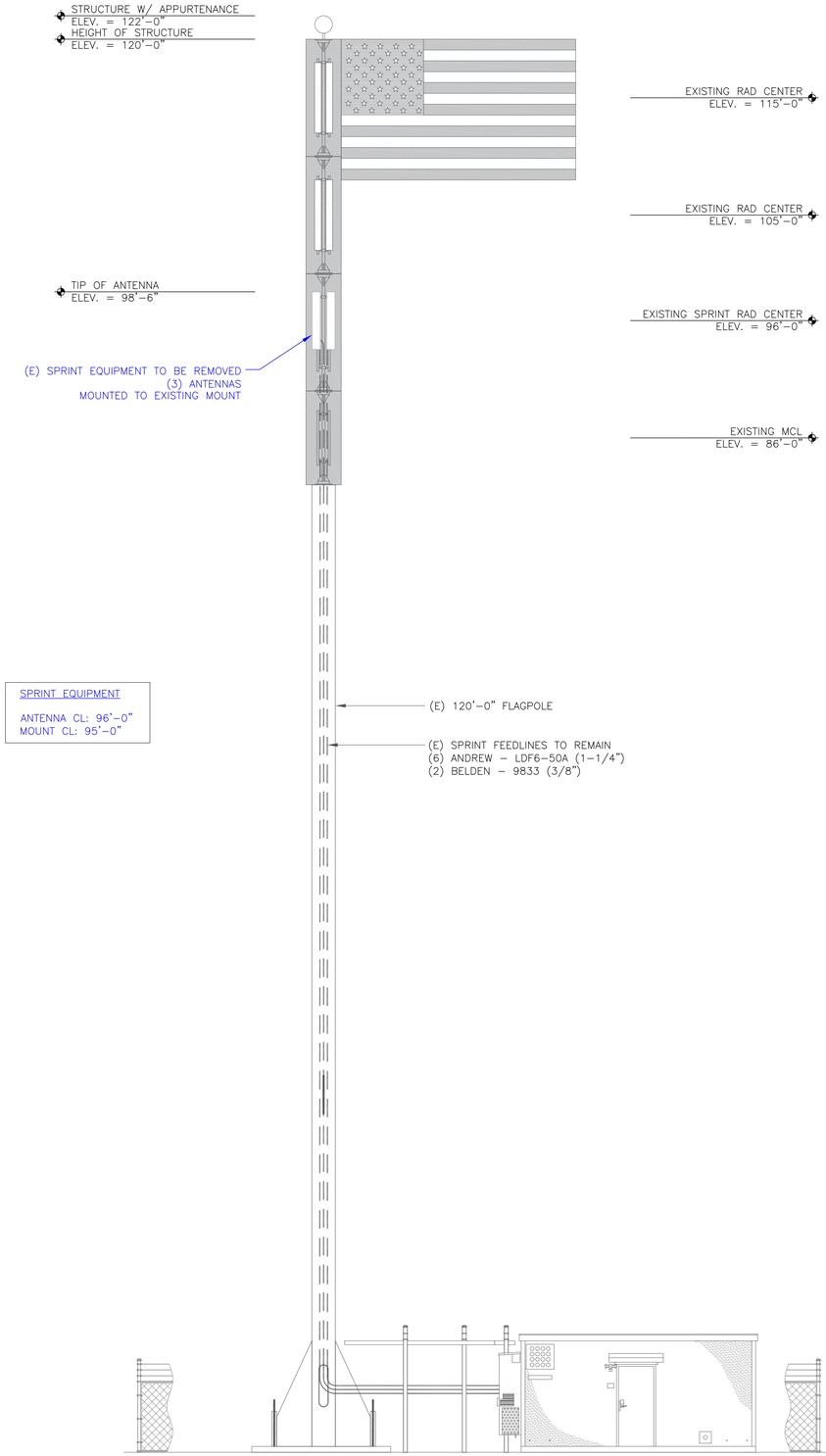
SHEET NUMBER: C-1

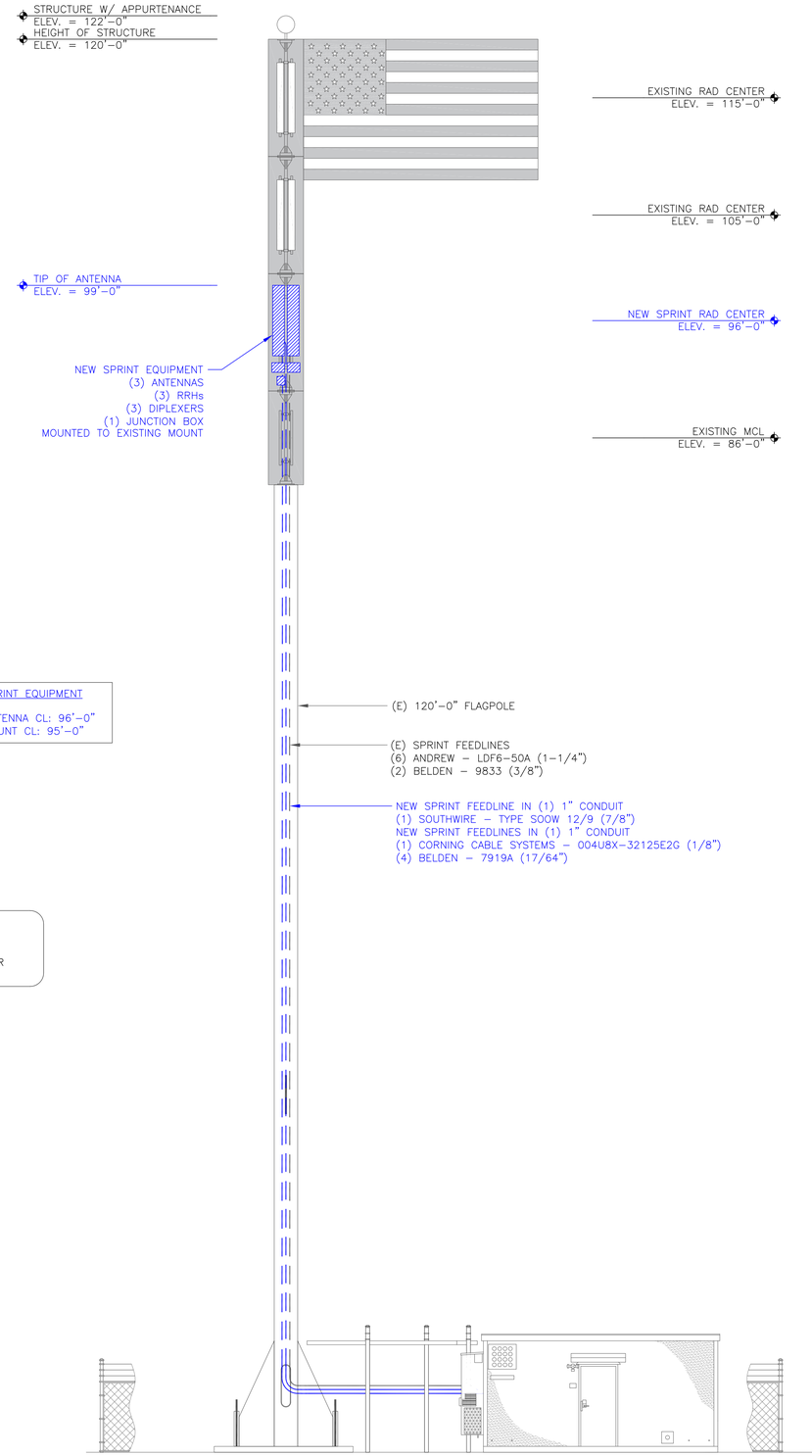
REVISION: 0



INSTALLER NOTE:

TOWER DOES NOT HAVE CLIMBING FACILITIES - MANLIFT REQUIRED FOR ELEVATED WORK.

1 EXISTING ELEVATION
SCALE: NOT TO SCALE



2 FINAL ELEVATION
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

EXISTING 120'-0" FLAGPOLE

ISSUED FOR:

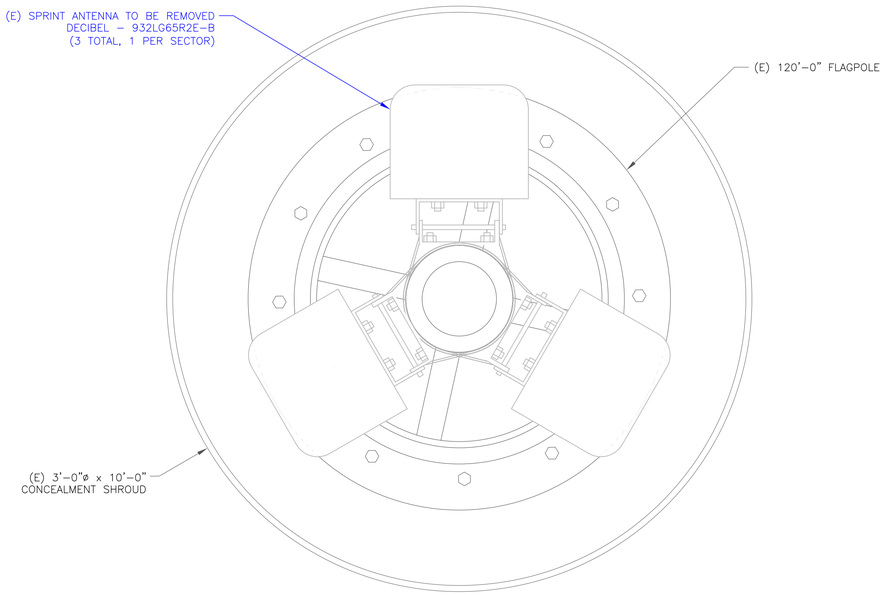
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/23/16	CJ	PRELIMINARY	LMR
B	01/12/17	JRM	PRELIMINARY	LMR
0	01/17/17	JRM	CONSTRUCTION	LMR

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
DocuSigned by: Justin Linette
1/17/2017 | 10:20:34 AM EST

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: C-2

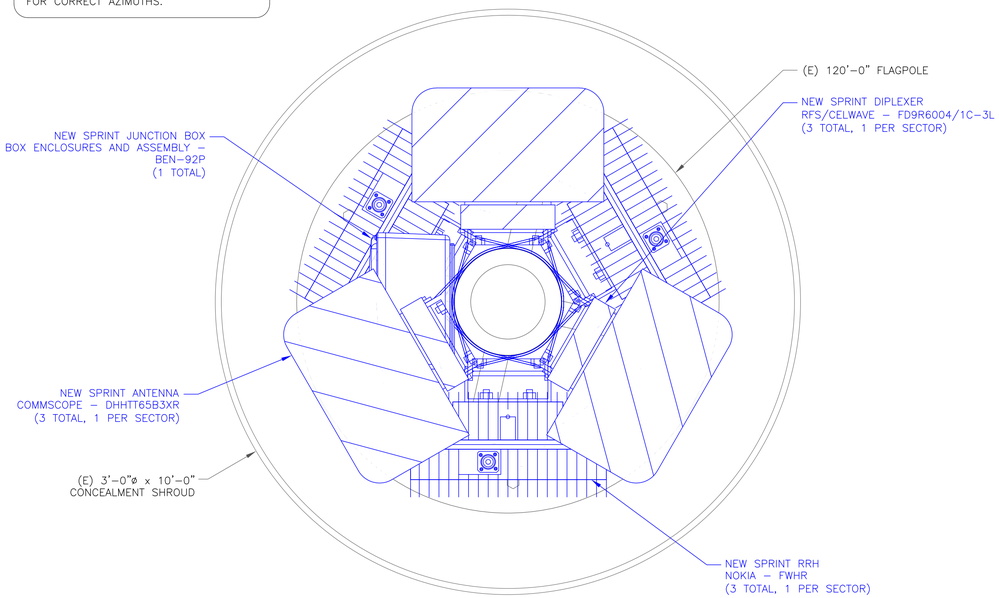
REVISION: 0



1 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE

INSTALLER NOTE:

CONTRACTOR TO REFERENCE LATEST RFDS FOR CORRECT AZIMUTHS.

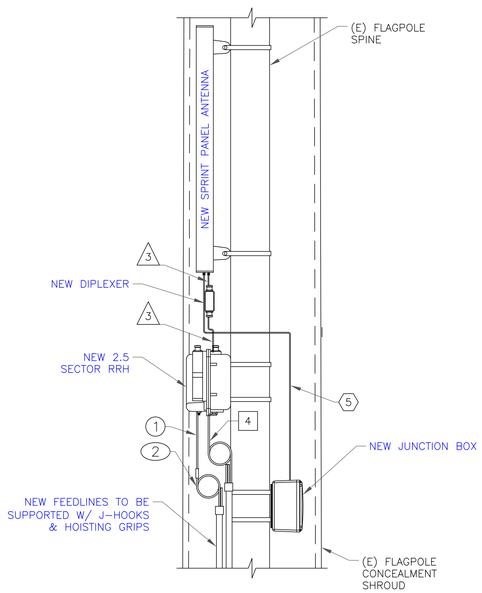


2 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

3 NOT USED
SCALE: NOT TO SCALE

KEYED CABLE LEGEND

1. OEM PROPRIETARY
2. SOOW
3. 1/2" RF JUMPERS
4. ETHERNET/FIBER
5. RET



4 ANTENNA SCHEMATIC
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

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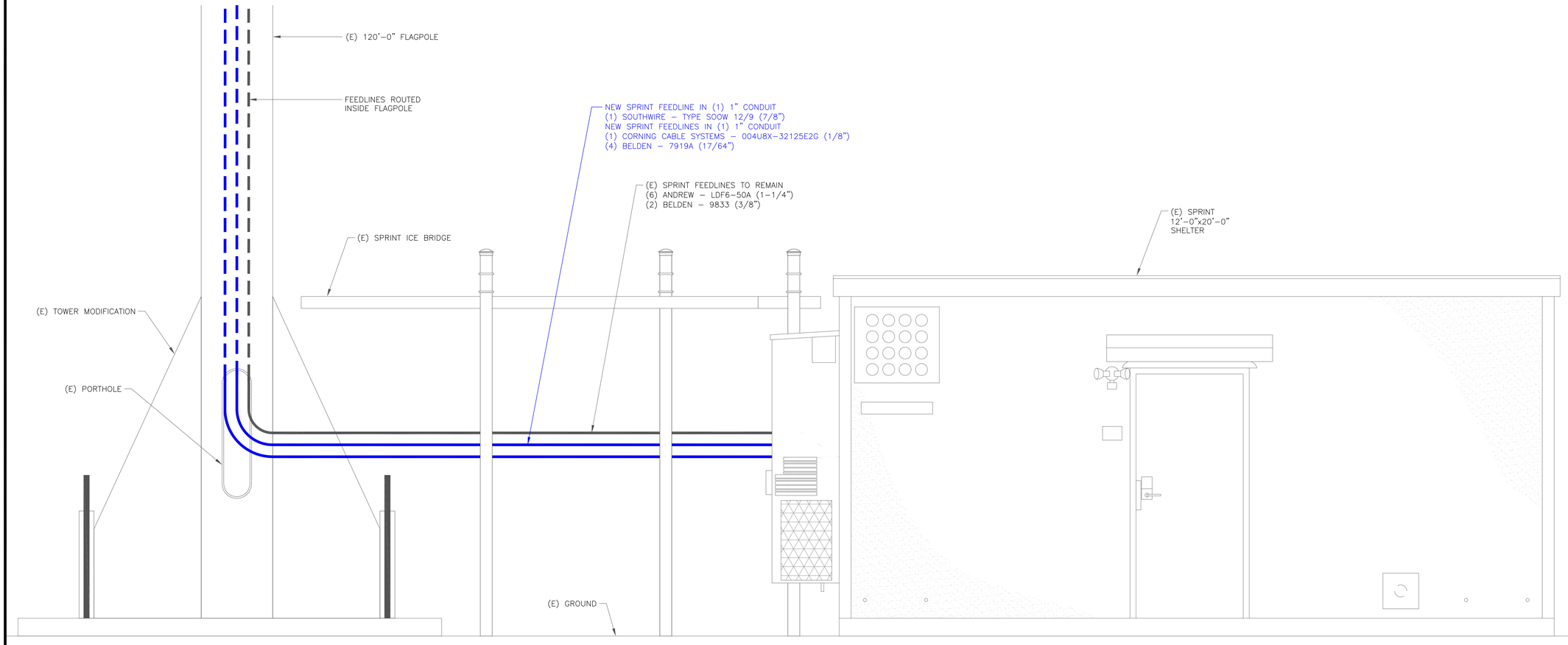
0	01/17/17	JRM	CONSTRUCTION	LMR

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
DocuSigned by: Justin Linette
1/17/2017 | 10:01:34 AM EST

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: C-3
REVISION: 0



1 CONDUIT ROUTING SCHEMATIC
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

EXISTING 120'-0" FLAGPOLE

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STATE OF CONNECTICUT
JUSTIN PETER LINETTE
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LICENSED PROFESSIONAL ENGINEER
1/17/2017

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: C-4
REVISION: 0

REV. 0 7/25/16

SPRINT CONSTRUCTION SPECIFICATIONS
MINI–MACRO CELL SITES

1) BASIC REQUIREMENTS
- a) MEET ALL REQUIREMENTS OF JURISDICTIONS.
- b) IF EQUIPMENT FURNISHED BY THE COMPANY DOES NOT MATCH THE EQUIPMENT LISTED ON THE RFDS AND SHOWN ON THE PERMITTING DRAWINGS, RESOLVE DISCREPANCY THROUGH INSTALLER'S CONSTRUCTION MANAGER AND COMPANY'S POINT OF CONTACT
- c) CABLE INSTALLATIONS
  - i) ALL CABLES MUST BE OUTDOOR RATED AND HAVE UV RESISTANT OUTER JACKETS
  - ii) CABLE BENDS MUST NOT EXCEED MANUFACTURER'S ALLOWABLE CABLE BEND RADII
  - iii) AT RADIOS INSTALL SERVICE LOOPS FOR POWER, FIBER, AND ETHERNET SECURED AT LEAST TWICE 180° TO THE STRUCTURE
  - iv) SPARE FIBERS MUST BE ENCASED IN A LOW PROFILE WEATHERTIGHT ASSEMBLY
- d) FIBERS MUST BE FIELD–TERMINATED WITH LC TYPE CONNECTORS
- e) CONDUITS IN EARTH: PROVIDE PVC. CONDUITS EXPOSED IN FACILITIES: PROVIDE RGS. HAND DIG TRENCHES IN COMPOUNDS
- f) SECURE AND SUPPORT CONDUITS AND CABLES ON NO MORE THAN 48" INTERVALS
- g) ON TOWER SITES RGS CONDUITS MAY BE SURFACE MOUNTED AWAY FROM WALKWAYS AND ACCESS/EGRESS PATHS. IF INSTALLATIONS IN WALKWAYS AND ACCESS/EGRESS PATHS CANNOT BE AVOIDED, IDENTIFY THE CONDUIT ENVELOPE/TRIP HAZARD BY ALTERNATING YELLOW AND BLACK STRIPES PAINTED ON CONCRETE AND CONDUIT.

2) SPRINT – FURNISHED EQUIPMENT
- a) INSTALL THE FOLLOWING EQUIPMENT AT LOCATIONS AND AZIMUTHS SHOWN ON THE CONSTRUCTION DRAWINGS.
  - i) PANEL ANTENNAS
  - ii) RADIOS
  - iii) GPS ANTENNAS
  - iv) FILTERS
  - v) 120 VOLT DIN–RAIL CIRCUIT BREAKER ASSEMBLY

3) TOWER INSTALLATIONS
- a)MEET ALL REQUIREMENTS OF THE TOWER OWNER
- b) INSTALL CORRUGATED FLEXIBLE CONDUIT UP THE TOWER TO COMPANY'S RAD CENTER
- c) PROVIDE HANGING GRIPS OR CONDUIT CLAMPS AND ENSURE CONDUITS AS WELL AS INNER CABLES ARE SUPPORTED
- d) CONDUIT RISERS: AT THE TOP OF THE TOWER TURN CONDUIT DOWN AND PROVIDE CABLE TERMINATION FITTINGS. EXTEND CABLES TO RADIOS EXPOSED AND SECURED TO THE STRUCTURE, AT CONDUIT EXIT FROM TOWER, PROVIDE DRIP LOOPS AND WEEP HOLES.
- e) AT THE ICE BRIDGE RUN CABLES IN RGS CONDUIT. UTILIZE CONDULETS TO MAKE COMPACT 90 DEGREE TURNS

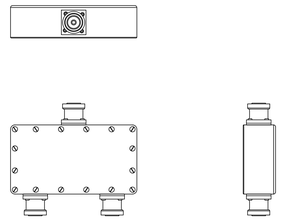
4) AC POWER TIE–IN
- a) INSTALL SPRINT'S 120 VOLT DIN–RAIL CIRCUIT BREAKER ASSEMBLY IN THE EXISTING POWER PROTECTION CABINET TELCO SECTION
- b) INSTALL A 20 AMPERE MOLDED CASE CIRCUIT BREAKER IN AVAILABLE SPACE IN THE ADJACENT PPC POWER SECTION LOAD CENTER

5) GROUNDING
- a) 120 VOLT CIRCUITS: POWER CABLES MUST BE 3–WIRE WITH EQUIPMENT GROUNDING CONDUCTOR
- b) SUPPLEMENTAL GROUNDING: ALL GROUNDING HARDWARE MUST BE UL STAMPED AS SUITABLE FOR GROUNDING HARDWARE
- c) RADIOS: BOND RADIO TO THE TOWER TOP OR SECTOR GROUND BAR WITH #6 BARE TINNED COPPER WIRE (GREEN INSULATED ON ROOFTOPS)
- d) DIN–RAIL CIRCUIT BREAKER ASSEMBLY: BOND SURGE ARRESTOR TO PPC TELCO BOARD GROUND BAR

6) MINOR MATERIALS
- a) CONDUIT
  - i) RIGID GALVANIZED STEEL CONDUIT (RGS): UL LISTED, COMPLIANT WITH ANSI STANDARD C80, HOT–DIP GALVANIZED, WITH THREADED FITTINGS. MANUFACTURERS: ALLIED, REPUBLIC, WHEATLAND, OR EQUAL.
  - ii)CORRUGATED FLEXIBLE CONDUIT: DURALINE OR EQUAL.
  - iii) LIQUID–TIGHT FLEXIBLEMETALLIC CONDUIT (LFMC): UL LABLED, UC RESISTANT, FLAME RETARDANT PVC JACKET, HOT–DIP GALVANIZED, GREY. MANUFACTURERS: AFC, ANACONDA, SOUTHWIRE, OR EQUAL.
  - iv) PVC CONDUIT: SCHEDULE 40. CARLON OR EQUAL
  - v) CABINET HUBS AND CABLE TERMINATION FITTINGS: OZ GEDNEY OR ROXTEC
- b) COAXIAL CABLE JUMPERS: ½" LDF–4 MANUFACTURERS: COMMSCOPE, RFS OR FCT.
- c)FASTENERS AND HARDWARE
  - i) TO SECURE RACEWAYS, UTILIZE NON CORRODING NON–MAGNETS METALLIC FASTENERS AND HARDWARE SUITABLE FOR THE PURPOSE
- d) POWER CABLES – 3/C #12 SOOW BY SOUTHWIRE OR EQUAL
- e) ETHERNET CABLES AND CONNECTORS: OUTDOOR RATED, CAT 5E, BELDEN OR EQUAL
- f) FIBER CABLES: CORNING "FREEDOM FAN OUT" OUTDOOR RISER CABLE, 4F, SINGLE MODE, OR EQUAL
- g) RF TRANSPARENT PAINT FOR ANTENNA CONCEALMENT: SELECT NO/LOW CARBON PAINTS, WITH NO/LOW TITANIUM DIOXIDE, AND WITHOUT SUSPENDED METAL PARTICLES (ALUMINUM, ZINC, COPPER, ETC)

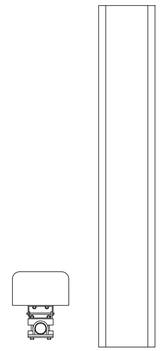
7) COLOR CODING
- a) COLOR CODE CABLES AND CONDUITS AS REQUIRED BY SPRINT STANDARD TS–0200

8) TESTING AND CONSTRUCTION COMPLETE
- a) SWEEP ALL COAXIAL CABLES ACCORDING TO SPRINT STANDARD TS–0200
- b) PANEL ANTENNA ALIGNMENT – USING ELECTRONIC ALIGNMENT TOOL. AZIMUTH/DOWNTILT +/– 1 DEGREE
- c) LEAVE EQUIPMENT DE–ENERGIZED UNTIL INSTRUCTED BY THE COMMISSIONING AND INTEGRATION TEAM TO ENERGIZE
- d) OTHER REQUIREMENTS AND DELIVERABLES MAY BE REQUIRED BEFORE THE CONSTRUCTION COMPLETE MILESTONE CAN BE ACTUALIZED IN SITERRA (SPRINT'S DATABASE–OF–RECORD).



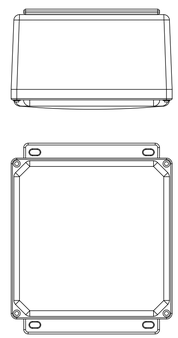
RFS/CELWAVE – FD9R6004/1C–3L
WEIGHT (WITHOUT MOUNTING HARDWARE): 2.6LBS
SIZE (HxWxD): 5.8X6.5X1.5 IN.

1 RFS/CELWAVE – FD9R6004/1C–3L
SCALE: NOT TO SCALE



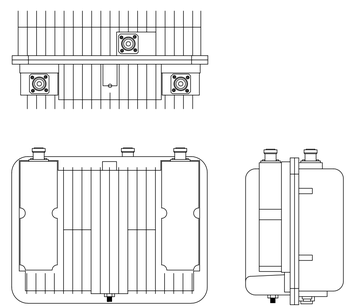
COMMSCOPE – DHHTT65B–3XR
WEIGHT (WITHOUT MOUNTING HARDWARE): 45.4 LBS
SIZE (HxWxD): 72.10x11.90x7.10 IN.
RATED WIND VELOCITY: 149.8 MPH

2 COMMSCOPE – DHHTT65B–3XR
SCALE: NOT TO SCALE



BOX ENCLOSURES AND ASSEMBLY – BEN–92P
WEIGHT (WITHOUT MOUNTING HARDWARE): 2.2 LBS
SIZE (HxWxD): 9.7x12.8"x6.3 IN.

3 BOX ENCLOSURES AND ASSEMBLY – BEN–92P
SCALE: NOT TO SCALE



NOKIA – FWHR
WEIGHT: 24.7 LBS
SIZE (HxWxD): 9.7x12.9x6.3 IN.

4 NOKIA – FWHR
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

EXISTING 120'-0" FLAGPOLE

ISSUED FOR:

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A	12/23/16	CJ	PRELIMINARY	LMR
B	01/12/17	JRM	PRELIMINARY	LMR
0	01/17/17	JRM	CONSTRUCTION	LMR

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
1/17/2017 | 10:03:37 AM EST

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: C-5

REVISION: 0

1 NOT USED
SCALE: NOT TO SCALE

ALL MATERIALS ON THIS PAGE SHALL BE SUPPLIED BY THE CONTRACTOR

3-9 SOOW ROYAL® MULTI-CONDUCTOR SOOW

Royal® 90°C Rubber Cord. 600 Volts.
Flexible Stranding. Flame and Ozone Resistant.
Black Jacket. Rated -40°C to 90°C.
RoHS Compliant. UL Listed and CSA Certified for Indoor and Outdoor Use.
Provides Premium Oil Resistance, Water Resistant and High Flexibility.
Excellent Abrasion Resistance. Rated Extra-Hard Usage.

VIPER RUBBER TYPE MULTI-CONDUCTOR TYPE SOOW CONTROL

CONDUCTOR SIZE (AWG)	CONDUCTOR STRANDING (#AWG)	NOMINAL INSULATION THICKNESS (mils)	NOMINAL JACKET WALL (mils)	NOMINAL OVERALL DIAMETER (mils)	WEIGHT (lbs/1000ft)	AMPACITY
12/9	65 x 30	45	95	880	510	14

2 SOOW POWER CABLE
SCALE: NOT TO SCALE

Detailed Specifications & Technical Data

BELDEN

ENGLISH MEASUREMENT VERSION

7919A Multi-Conductor - Category 5e DataTuff® Twisted Pair Cable

For more information please call
1-800-Belden1

Description:
24 AWG solid bare copper conductors, twisted pairs, polyolefin insulation, overall Beldfoil shield (100% coverage), 24 AWG stranded TC drain wire, industrial grade sunlight- and oil-resistant PVC jacket, rip cord. Sequential marking at two foot intervals

Usage (Overall)
Suitable Applications: Industrial Ethernet Cable. Harsh Environments, 100MHz Category 5e, Gigabit Ethernet, 100BaseTX, 100BaseVG ANYLAN, 155ATM, 622ATM, NTSC/PAL Component or Composite Video, AES/EBU Digital Audio, RS-422, CMX - Outdoor, RJ-45 Compatible, Noisy Environments

Physical Characteristics (Overall)

Conductor
AWG:

# Pairs	AWG	Stranding	Conductor Material
4	24	Solid	BC - Bare Copper

Insulation
Insulation Material:

Insulation Material	Wall Thickness (in.)
PO - Polyolefin	.010

Outer Shield
Outer Shield Material:

Outer Shield Trade Name	Type	Outer Shield Material	Coverage (%)
Beldfoil®	Tape	Aluminum Foil-Polyester Tape	100

Outer Shield Drain Wire AWG:

AWG	Stranding	Drain Wire Conductor Material
24	7x32	TC - Tinned Copper

Outer Jacket
Outer Jacket Material:

Outer Jacket Material
Industrial Grade PVC - Polyvinyl Chloride

Outer Jacket Ripcord: No

Overall Cable
Overall Nominal Diameter: 0.265 in.

Pair
Pair Color Code Chart:

Number	Color
1	White/Blue Stripe & Blue
2	White/Orange Stripe & Orange
3	White/Green Stripe & Green
4	White/Brown Stripe & Brown

Mechanical Characteristics (Overall)
Installation Temperature Range: +25°C To +75°C

Distributed By: INTERSTATE WIRE CO. INCORPORATED

1-800-527-0010
01-06-2012

3 CAT5 CABLE
SCALE: NOT TO SCALE

Connectors

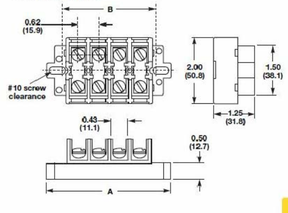
COOPER Bussmann

Base Mount Double Row Terminal Blocks

Series KU

Specifications
Description: Base mount double row terminal blocks.
Ratings:
Volts:— 600V
Amps:— 60A*
Center Spacing: 0.625" (15.88mm)
Number of Poles: 2- to 12-poles
Wire Range: #6-22 AWG Cu
Screw Size: #10-32
Torque Rating: 20 lb-in.
Distance Between Barriers: 0.437" (11.09mm)
Mounting: Base mount
Material: Molded base: Black, UL rated 94V1 Nuclear Grade Noryl
Terminal plating: Nickel over brass
Operating Temperature: 105°C max.
Agency Information: UL File E62622, CSA File 47235
* 60A rating achieved with #6 copper wire crimped to ring terminal.

Series KU - in (mm)



Dimensions - in

Poles	KU A	KU B	KUX Only A
02	2.50	1.62	2.00
03	3.12	2.25	2.62
04	3.75	2.87	3.25
05	4.37	3.50	3.87
06	5.00	4.12	4.50
07	5.62	4.75	5.12
08	6.25	5.37	5.75
09	6.87	6.00	6.37
10	7.50	6.62	7.00
11	8.12	7.25	7.62
12	8.75	7.87	8.25

1" = 25.4mm.

Catalog Number Build-A-Code

Series	Poles	Screw Options	Covers	Marking Strip
□□□□□□	□□ - □□		□□	□□□
KU = Standard block KUH = Block KUX = Short block KURL = Standard w/removable link KUXRL = Short block w/removable link	02 to 12	00 = Screws shipped bulk W = Brass washer head, nickel-plated P = Steel screw w/pressure plate zinc-plated B = Brass washer head, no plating BP = Brass philslot, nickel-plated	WC = Top cover & 2 end plates	MT = Matte finish NU = Numbered 1 to 12, horizontal NUV = Numbered 1 to 12, vertical PT = Marker strip for cover

Connectors

4 TERMINAL BLOCK
SCALE: NOT TO SCALE

CORRUGATED

www.duraline.com

ISO 9001 REGISTERED

Customer Service
800-847-7661

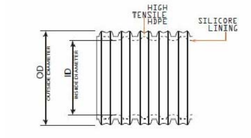
FEATURES:
- Available in 1 ", 1 ¼", 1 ½", 2 "
- Manufactured from flexible HDPE
- Continuous lengths on reels or in coils
- Rugged corrugated design is flexible and light weight, yet provides excellent crush resistance
- Outstanding long term cable protection from shifting ground, rock and root impingement
- Provides a permanent pathway, simplifies future cable repairs or replacement
- Available with UV protectant for above ground applications
- Plenum and Riser products available

CORRUGATED – SPECS

Customer Service 800-847-7661 www.duraline.com

SPECIFICATIONS:

Nominal Size	OD (in.)	Wall Thick. (min. in.)	Wall Thick. (max. in.)	ID Ref.	Safe Working Pull Strength	Weight lb/ft	Bend Radius	Brittleness Temp.
1"	1.330±0.010	0.045	0.065	1.220	500 lbs	0.121	14	-75°C
1 ¼"	1.550±0.010	0.045	0.065	1.440	500 lbs	0.141	16	-75°C
1 ½"	1.800±0.010	0.055	0.075	1.670	500 lbs	0.165	19	-75°C
2"	2.265±0.010	0.055	0.075	2.135	500 lbs	0.196	22	-75°C



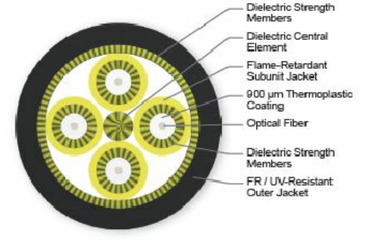
5 CORRUGATED CONDUIT
SCALE: NOT TO SCALE

FREEDM® Fan-Out Tight-Buffered Cable, Riser

4 F, Single-mode (OS2)

CORNING

Part Number: 004E6F-31331-29



Cross Section of Part Number: 004E6F-31331-29

6 FIBER CABLE
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

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Justin Peter Linette, P.E.
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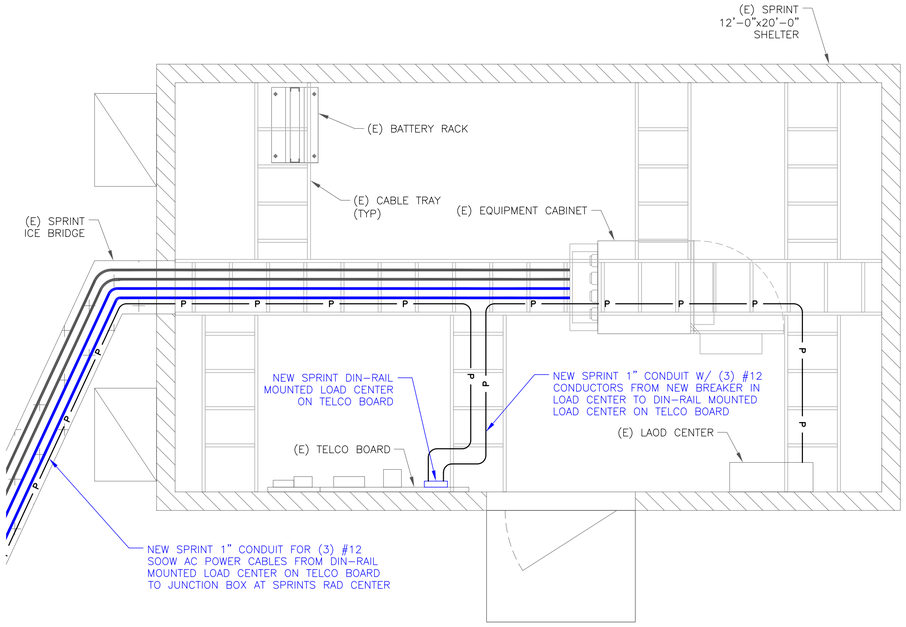
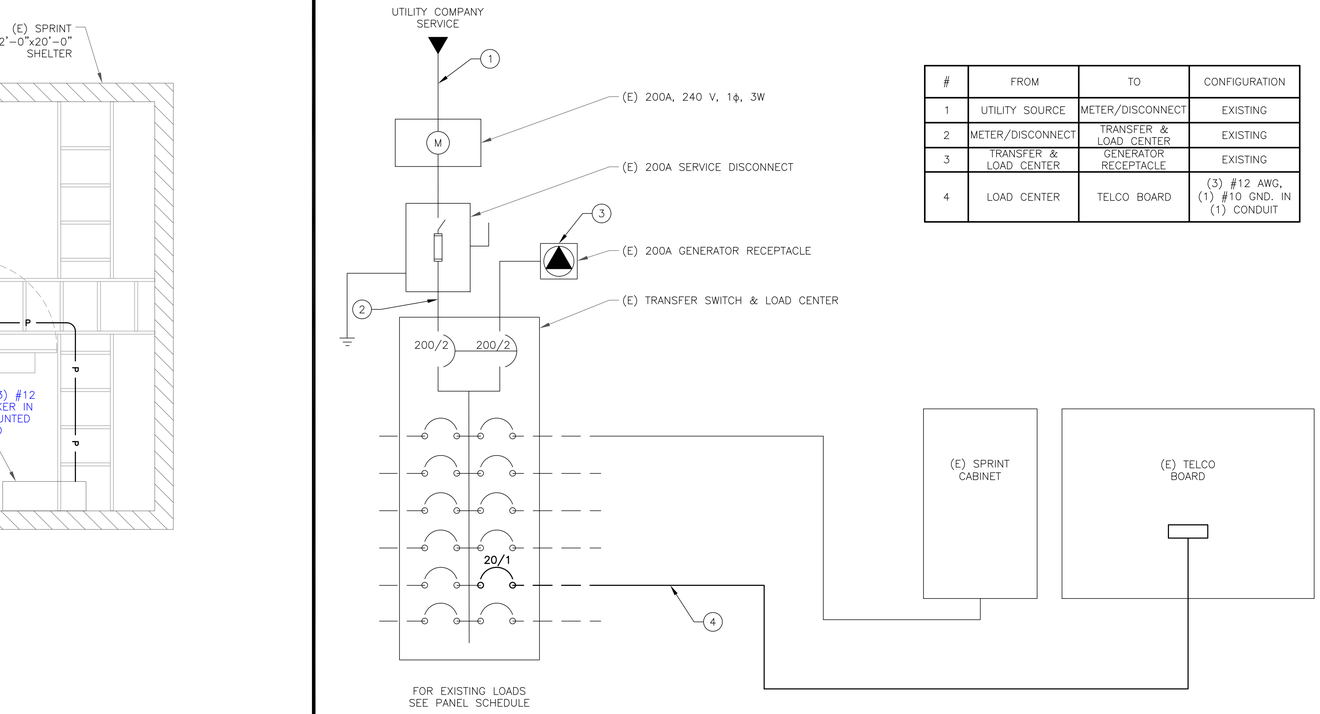
SHEET NUMBER: C-6

REVISION: 0



1 ELECTRICAL AND GROUNDING PLAN
SCALE: NOT TO SCALE



#	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	LOAD CENTER	TELCO BOARD	(3) #12 AWG, (1) #10 GND. IN (1) CONDUIT

2 ELECTRICAL ONE-LINE DIAGRAM
SCALE: NOT TO SCALE

EXISTING PANEL PANEL

MAIN: 200 AMP MAIN BREAKER | **VOLTAGE/PHASE**: 120/240V, 1-PHASE, 3-WIRE | **SHORT CIRCUIT CURRENT RATING**: 22,000 AMPS
MOUNTING: SURFACE | **ENCLOSURE**: NEMA 1 | **SURGE PROTECTION DEVICE**: YES
SERVICE FROM: N/A | **MANUFACTURER**: NORTHERN TECHNOLOGIES, INC (SQUARE D) | **MODEL NUMBER**: QO142M200

DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	LOAD (VA) A-PHASE	LOAD (VA) B-PHASE	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
RECTIFIER CKT #1	1924	C	30	1	3848		2	30	C	1924	RECTIFIER CKT #2
RECTIFIER CKT #1	1924	C	-	3		3848	4	-	C	1924	RECTIFIER CKT #2
RECTIFIER CKT #3	1924	C	30	5	3848		6	30	C	1924	RECTIFIER CKT #4
RECTIFIER CKT #3	1924	C	-	7		3848	8	-	C	1924	RECTIFIER CKT #4
RECTIFIER CKT #5	1924	C	30	9	3848		10	30	C	1924	RECTIFIER CKT #6
RECTIFIER CKT #5	1924	C	-	11		3848	12	-	C	1924	RECTIFIER CKT #6
RECTIFIER CKT #7	1924	C	30	13	3848		14	30	C	1924	RECTIFIER CKT #8
RECTIFIER CKT #7	1924	C	-	15		3848	16	-	C	1924	RECTIFIER CKT #8
SPARE		NC	30	17	0		18	30	NC		SPARE
SPARE		NC	-	19		0	20	-	NC		SPARE
HVAC UNIT #1	1060	C	60	21	2120		22	60	C	1060	HVAC UNIT #2
HVAC UNIT #1	1060	C	-	23		2120	24	-	C	1060	HVAC UNIT #2
SPARE		NC	15	25	0		26	60	NC		SPARE
VENT FAN	150	NC	15	27		150	28	-	NC		SPARE
RECEPTACLE	180	C	20	29	500		30	20	NC	320	LIGHTING
RECEPTACLE	180	C	20	31		360	32	20	C	180	SMOKE DETECTOR
RECEPTACLE	180	C	20	33	180		34	60	NC		SPARE
RECEPTACLE	180	C	20	35		180	36	-	NC		SPARE
SURGE ARRESTOR	0	C	60	37	180		38	20	C	180	EXT. RECEPTABLE
SURGE ARRESTOR	0	C	-	39		180	40	20	NC	180	GAS DETECTOR
				BASE LOAD (VA) =	18372	18382					
				25% OF CONTINUOUS LOAD (VA) =	4513	4513					
				TOTAL LOAD (VA) =	22885	22895					
				TOTAL LOAD (A) =	191	191					

"C" DESIGNATION IDENTIFIES CONTINUOUS LOADS AND MOTOR LOADS AS REQUIRED BY SECTIONS 230.42 AND 430.24 OF THE NEC

PROPOSED PANEL PANEL

MAIN: 200 AMP MAIN BREAKER | **VOLTAGE/PHASE**: 120/240V, 1-PHASE, 3-WIRE | **SHORT CIRCUIT CURRENT RATING**: 22,000 AMPS
MOUNTING: SURFACE | **ENCLOSURE**: NEMA 1 | **SURGE PROTECTION DEVICE**: YES
SERVICE FROM: N/A | **MANUFACTURER**: NORTHERN TECHNOLOGIES, INC (SQUARE D) | **MODEL NUMBER**: QO142M200

DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	LOAD (VA) A-PHASE	LOAD (VA) B-PHASE	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
RECTIFIER CKT #1	1924	C	30	1	3848		2	30	C	1924	RECTIFIER CKT #2
RECTIFIER CKT #1	1924	C	-	3		3848	4	-	C	1924	RECTIFIER CKT #2
RECTIFIER CKT #3	1924	C	30	5	3848		6	30	C	1924	RECTIFIER CKT #4
RECTIFIER CKT #3	1924	C	-	7		3848	8	-	C	1924	RECTIFIER CKT #4
RECTIFIER CKT #5	1924	C	30	9	3848		10	30	C	1924	RECTIFIER CKT #6
RECTIFIER CKT #5	1924	C	-	11		3848	12	-	C	1924	RECTIFIER CKT #6
RECTIFIER CKT #7	1924	C	30	13	3848		14	30	C	1924	RECTIFIER CKT #8
RECTIFIER CKT #7	1924	C	-	15		3848	16	-	C	1924	RECTIFIER CKT #8
SPARE		NC	30	17	0		18	30	NC		SPARE
SPARE		NC	-	19		0	20	-	NC		SPARE
HVAC UNIT #1	1060	C	60	21	2120		22	60	C	1060	HVAC UNIT #2
HVAC UNIT #1	1060	C	-	23		2120	24	-	C	1060	HVAC UNIT #2
DIN-RAIL MOUNTED LOAD CENTER	**1200**	**C**	**20**	25	1200		26	60	NC		SPARE
VENT FAN	150	NC	15	27		150	28	-	NC		SPARE
RECEPTACLE	180	C	20	29	500		30	20	NC	320	LIGHTING
RECEPTACLE	180	C	20	31		360	32	20	C	180	SMOKE DETECTOR
RECEPTACLE	180	C	20	33	180		34	60	NC		SPARE
RECEPTACLE	180	C	20	35		180	36	-	NC		SPARE
SURGE ARRESTOR	0	C	60	37	180		38	20	C	180	EXT. RECEPTABLE
SURGE ARRESTOR	0	C	-	39		180	40	20	NC	180	GAS DETECTOR
				BASE LOAD (VA) =	19572	18382					
				25% OF CONTINUOUS LOAD (VA) =	4813	4513					
				TOTAL LOAD (VA) =	24385	22895					
				TOTAL LOAD (A) =	204	191					

"C" DESIGNATION IDENTIFIES CONTINUOUS LOADS AND MOTOR LOADS AS REQUIRED BY SECTIONS 230.42 AND 430.24 OF THE NEC

3 EXISTING/NEW PANEL SCHEDULE AND NOTES
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

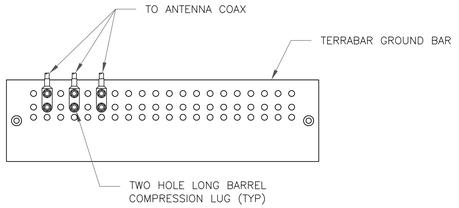
EXISTING 120'-0" FLAGPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/23/16	CJ	PRELIMINARY	LMR
B	01/12/17	JRM	PRELIMINARY	LMR
0	01/17/17	JRM	CONSTRUCTION	LMR

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

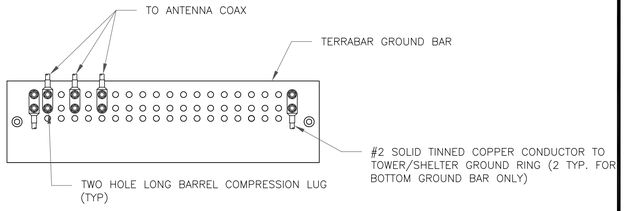
SHEET NUMBER: E-1
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

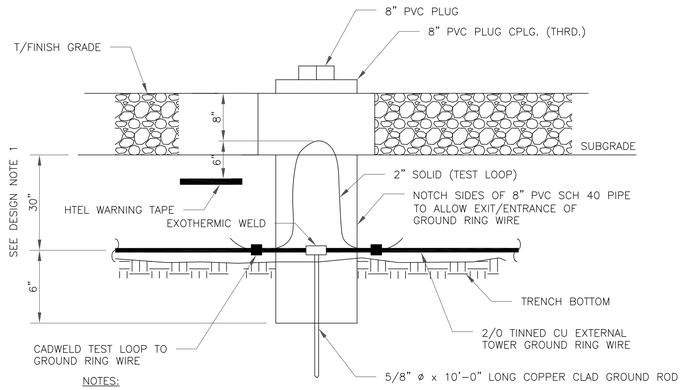
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. INSTALL GROUND BARS AT 75 FT. INTERVAL MAXIMUM.
4. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

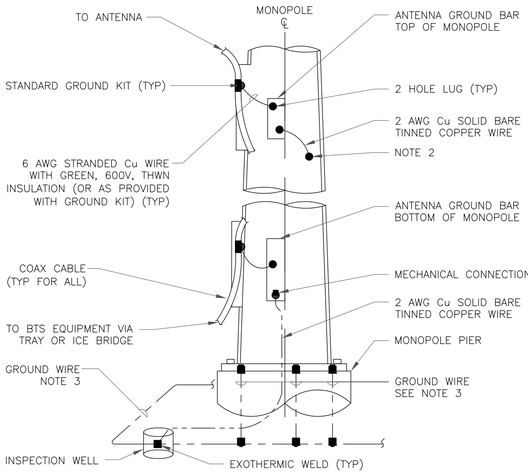
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

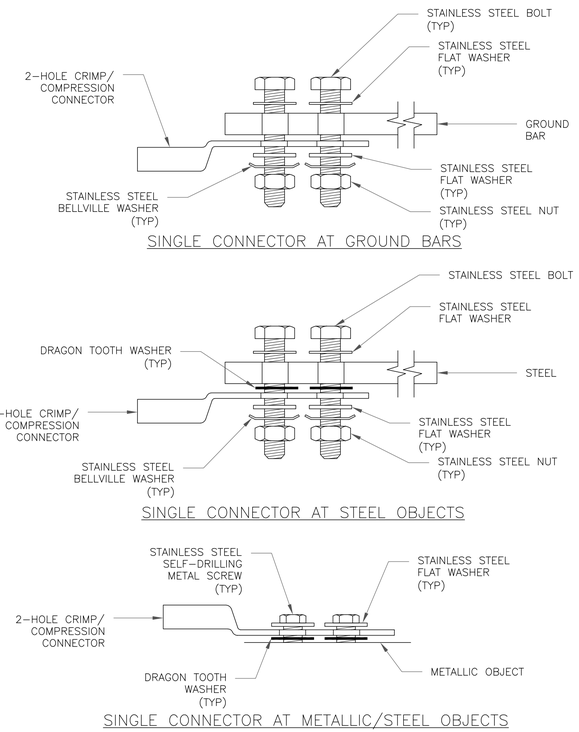
3 INSPECTION PORT DETAIL
SCALE: NOT TO SCALE



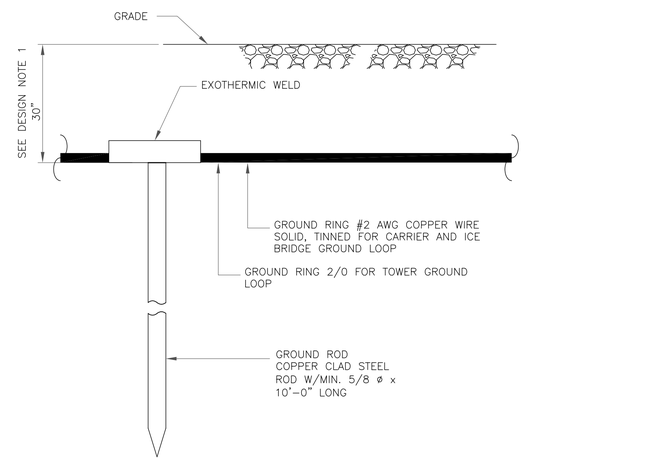
NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF MONOPOLE, ANTENNA LOCATION AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET IN/ON THE POLE SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE 2/0 AWG. STRANDED IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM 8 FEET TO 10 FEET.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

Sprint

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EXISTING 120'-0" FLAGPOLE

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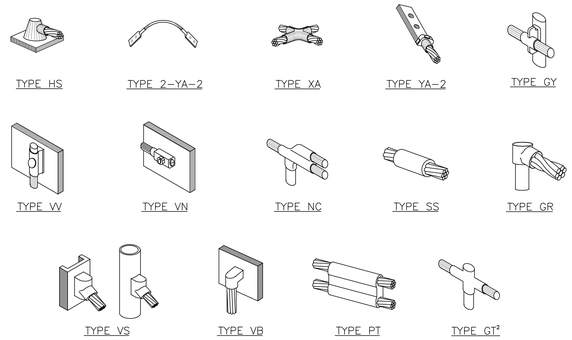
0	01/17/17	JRM	CONSTRUCTION	LMR

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER
DocuSigned by: Justin Linette
1/17/2017 | 10:00:34 AM EST

Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: G-1

REVISION: 0

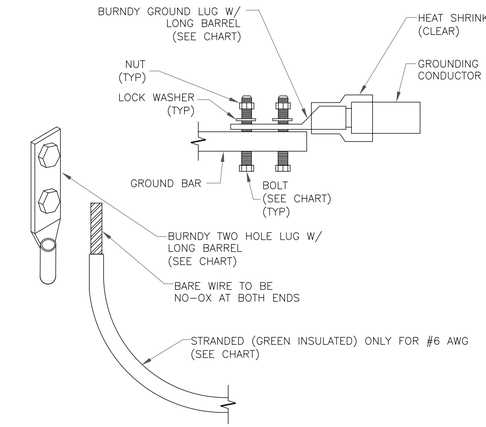


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

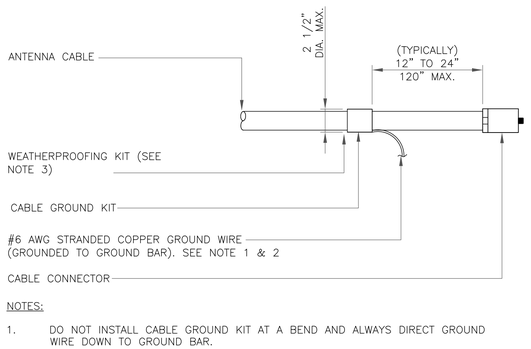
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" – 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" – 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" – 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" – 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" – 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

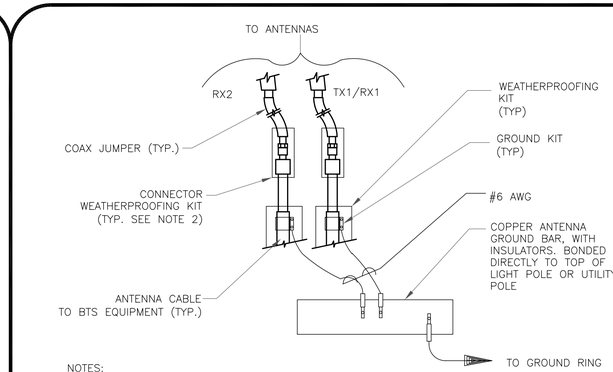
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

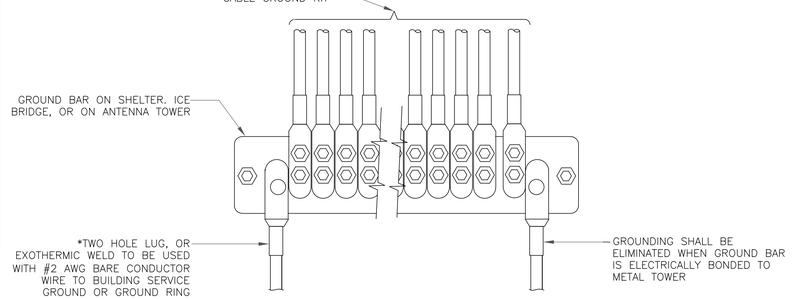
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



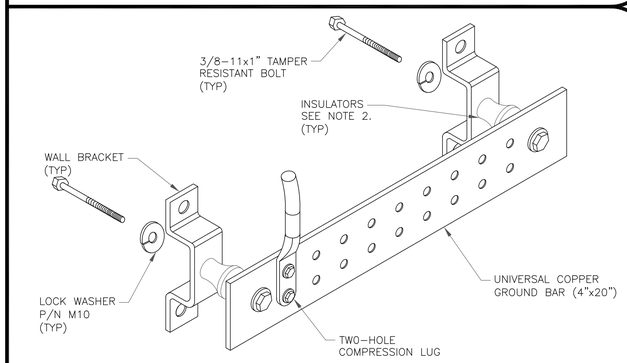
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



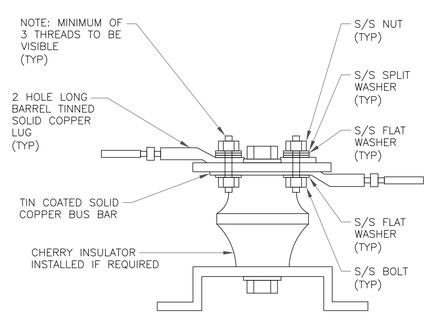
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



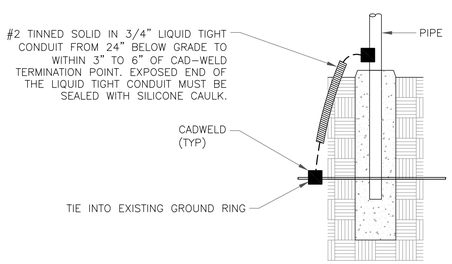
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT54XC747

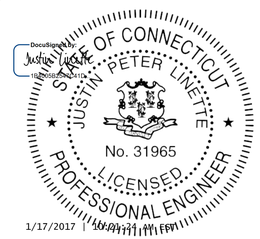
BU #: **822779**
BRIDGEPORT/ RT 8

1875 NOBLE AVENUE
BRIDGEPORT, CT 06610

EXISTING 120'-0" FLAGPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/23/16	CJ	PRELIMINARY	LMR
B	01/12/17	JRM	PRELIMINARY	LMR
0	01/17/17	JRM	CONSTRUCTION	LMR



Justin Peter Linette, P.E.
Professional Engineer License: 31965
Crown Castle USA, Inc. Firm Registration #PEC.0001101

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: G-2
REVISION: 0

PAUL J. FORD & COMPANY

Date: **November 21, 2016**

Andrew Bazinet
Crown Castle
3 Corporate Park Drive Suite 101
Clifton Park, NY 12065
585.370.4766

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
stschanen@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT54XC747
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	822779
	Crown Castle Site Name:	Bridgeport/ Rt 8
	Crown Castle JDE Job Number:	408063
	Crown Castle Work Order Number:	1327701
	Crown Castle Application Number:	368093 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-3608.001.7805
Site Data:	**1875 Noble Avenue, Bridgeport, Fairfield County, CT** **Latitude *41° 12' 37.271"*, Longitude *-73° 10' 52.259"*** **120 Foot - Monopole Tower**	

Dear Andrew Bazinet,

Paul J Ford and Company 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 972394, in accordance with application 368093, revision 1.

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

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 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

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

Respectfully submitted by:

Seth Tschanen, E.I.
Structural Designer

STATE OF CONNECTICUT JUSTIN T. DUNNE No. 30301 LICENSED PROFESSIONAL ENGINEER

11-21-16

tnxTower Report - version 7.0.5.1

Date: **November 21, 2016**

Andrew Bazinet
Crown Castle
3 Corporate Park Drive Suite 101
Clifton Park, NY 12065
585.370.4766

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
stschanen@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT54XC747
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	822779
	Crown Castle Site Name:	Bridgeport/ Rt 8
	Crown Castle JDE Job Number:	408063
	Crown Castle Work Order Number:	1327701
	Crown Castle Application Number:	368093 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-3608.001.7805
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Seth Tschanen, E.I.
Structural Designer

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1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by PIROD MANUFACTURES INC. in June of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 were used in this analysis.

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
95.0	96.0	3	commscope	DHHTT65B-3XR	1 4 1	1/8 17/64 7/8	--
	92.0	3	nokia	FWHR			
	91.0	1	box enclosures and assembly	BEN-92P			

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
115.0	117.0	3	ericsson	KRY 112 144/1	6	1 5/8	1
		3	rfs celwave	APXV18-206517S-C-ACU			
		3	rfs celwave	ATMAA1412D-1A20			
105.0	107.0	3	ericsson	KRY 112 144/1	6	1 5/8	1
		3	rfs celwave	APXV18-206517S-C-ACU			
95.0	95.0	--	--	--	2 6	3/8 1 1/4	1
		3	decibel	932LG65R2E-B	--	--	2

Notes:
1) Existing Equipment
2) Equipment To Be Removed

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)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Velocitel, 15BZKS1600, 10/7/15	3584592	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 61158.32797, 4/29/16	6261360	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod, A-116835, 6/1/00	3914232	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod, A-116835, 6/1/00	3584593	CCISITES

3.1) Analysis Method

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

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) Monopole was modified in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company 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	120 - 110	Pole	P10.75x0.349	1	-0.71	431.06	11.6	Pass
L2	110 - 100	Pole	P10.75x0.349	2	-1.79	431.06	32.1	Pass
L3	100 - 90	Pole	P10.75x0.349	3	-3.13	431.06	61.4	Pass
L4	90 - 82	Pole	P10.75x0.349	4	-4.12	431.06	90.5	Pass
L5	82 - 60	Pole	P24x0.375	5	-7.29	1052.07	36.6	Pass
L6	60 - 30	Pole	P24x0.375	6	-11.30	1052.07	69.8	Pass
L7	30 - 8.5	Pole	P24x0.375	7	-14.32	1052.07	97.3	Pass
L8	8.5 - 0	Pole	P24x0.5	8	-15.84	1313.94	82.9	Pass
							Summary	
						Pole (L7)	97.3	Pass
						Rating =	97.3	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	17.5	Pass
1	Base Plate	0	19.9	Pass
1	Base Foundation	0	60.2	Pass
1	Flange Connection	110	9.9	Pass
1	Flange Connection	100	27.7	Pass
1	Flange Connection	90	53.1	Pass
1	Flange Connection	82	92.4	Pass
1	Flange Connection	60	63.2	Pass
1	Flange Connection	30	96.9	Pass

Structure Rating (max from all components) =	97.3%

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) 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*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	120.0000-110.0000	10.0000	P10.75x0.349	A500-42 (42 ksi)	
L2	110.0000-100.0000	10.0000	P10.75x0.349	A500-42 (42 ksi)	
L3	100.0000-90.0000	10.0000	P10.75x0.349	A500-42 (42 ksi)	
L4	90.0000-82.0000	8.0000	P10.75x0.349	A500-42 (42 ksi)	
L5	82.0000-60.0000	22.0000	P24x0.375	A53-B-42 (42 ksi)	
L6	60.0000-30.0000	30.0000	P24x0.375	A53-B-42 (42 ksi)	
L7	30.0000-8.5000	21.5000	P24x0.375	A53-B-42	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L8	8.5000-0.0000	8.5000	P24x0.5	(42 ksi) Reinf 39.55 ksi (40 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 120.0000-110.0000				1	0	1			
L2 110.0000-100.0000				1	0	1			
L3 100.0000-90.0000				1	0	1			
L4 90.0000-82.0000				1	0	1			
L5 82.0000-60.0000				1	1	1			
L6 60.0000-30.0000				1	1	1			
L7 30.0000-8.5000				1	1	1			
L8 8.5000-0.0000				1	1	1			

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
LDF7-50A(1-5/8")	C	No	Inside Pole	115.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	105.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	95.0000 - 0.0000	6	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
9833(3/8")	C	No	Inside Pole	95.0000 - 0.0000	2	No Ice	0.0000	0.07
						1/2" Ice	0.0000	0.07
						1" Ice	0.0000	0.07
7919A(17/64")	C	No	Inside Pole	95.0000 - 0.0000	4	No Ice	0.0000	0.03
						1/2" Ice	0.0000	0.03
						1" Ice	0.0000	0.03
004U8X-32125E2G(1/8)	C	No	Inside Pole	95.0000 - 0.0000	1	No Ice	0.0000	0.01
						1/2" Ice	0.0000	0.01
						1" Ice	0.0000	0.01
TYPE SOOW 12/9(7/8")	C	No	Inside Pole	95.0000 - 0.0000	1	No Ice	0.0000	0.51
						1/2" Ice	0.0000	0.51
						1" Ice	0.0000	0.51

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	120.0000-110.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L2	110.0000-	A	0.000	0.000	0.000	0.000	0.00

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
	100.0000	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L3	100.0000-	A	0.000	0.000	0.000	0.000	0.00
	90.0000	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.12
L4	90.0000-82.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.12
L5	82.0000-60.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.32
L6	60.0000-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.44
L7	30.0000-8.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.31
L8	8.5000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.12

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	120.0000-	A	1.699	0.000	0.000	0.000	0.000	0.00
	110.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.02
L2	110.0000-	A	1.684	0.000	0.000	0.000	0.000	0.00
	100.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.07
L3	100.0000-	A	1.667	0.000	0.000	0.000	0.000	0.00
	90.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.12
L4	90.0000-82.0000	A	1.651	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.12
L5	82.0000-60.0000	A	1.619	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.32
L6	60.0000-30.0000	A	1.547	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.44
L7	30.0000-8.5000	A	1.421	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.31
L8	8.5000-0.0000	A	1.222	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.12

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.0000- 110.0000	0.0000	0.0000	0.0000	0.0000
L2	110.0000- 100.0000	0.0000	0.0000	0.0000	0.0000
L3	100.0000-90.0000	0.0000	0.0000	0.0000	0.0000
L4	90.0000-82.0000	0.0000	0.0000	0.0000	0.0000
L5	82.0000-60.0000	0.0000	0.0000	0.0000	0.0000
L6	60.0000-30.0000	0.0000	0.0000	0.0000	0.0000
L7	30.0000-8.5000	0.0000	0.0000	0.0000	0.0000
L8	8.5000-0.0000	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

User Defined Loads

Description	Elevation	Offset From Centroid	Azimuth Angle		Weight	F_x	F_z	Wind Force	C_AA_C
	ft	ft	°		K	K	K	K	ft^2
Flag	120.0000	0.00	0.00	No Ice	0.02	0.00	0.00	0.48	**14.5606**
				Ice	0.25	0.00	0.00	0.08	**8.8835**
				Service	0.02	0.00	0.00	0.11	**9.7996**

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
***									
***									
***									
APXV18-206517S-C-ACU	A	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.03 0.05 0.09
APXV18-206517S-C-ACU	B	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.03 0.05 0.09
APXV18-206517S-C-ACU	C	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.03 0.05 0.09
KRY 112 144/1	A	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.01 0.01 0.02
ATMAA1412D-1A20	A	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.01 0.02 0.03
ATMAA1412D-1A20	B	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.01 0.02 0.03
ATMAA1412D-1A20	C	From Leg	0.5000 0.00 2.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.01 0.02 0.03
***									
APXV18-206517S-C-ACU	A	From Leg	0.5000 0.00	0.00	105.0000	No Ice 1/2"	0.0000 0.0000	0.0000 0.0000	0.03 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice	0.0000	0.0000	0.09
						1" Ice			
APXV18-206517S-C-ACU	B	From Leg	0.5000	0.00	105.0000	No Ice	0.0000	0.0000	0.03
			0.00			1/2"	0.0000	0.0000	0.05
			2.00			Ice	0.0000	0.0000	0.09
						1" Ice			
APXV18-206517S-C-ACU	C	From Leg	0.5000	0.00	105.0000	No Ice	0.0000	0.0000	0.03
			0.00			1/2"	0.0000	0.0000	0.05
			2.00			Ice	0.0000	0.0000	0.09
						1" Ice			
KRY 112 144/1	A	From Leg	0.5000	0.00	105.0000	No Ice	0.0000	0.0000	0.01
			0.00			1/2"	0.0000	0.0000	0.01
			2.00			Ice	0.0000	0.0000	0.02
						1" Ice			
KRY 112 144/1	B	From Leg	0.5000	0.00	105.0000	No Ice	0.0000	0.0000	0.01
			0.00			1/2"	0.0000	0.0000	0.01
			2.00			Ice	0.0000	0.0000	0.02
						1" Ice			
KRY 112 144/1	C	From Leg	0.5000	0.00	105.0000	No Ice	0.0000	0.0000	0.01
			0.00			1/2"	0.0000	0.0000	0.01
			2.00			Ice	0.0000	0.0000	0.02
						1" Ice			
***									
DHHTT65B-3XR	A	From Leg	0.5000	0.00	95.0000	No Ice	0.0000	0.0000	0.05
			0.00			1/2"	0.0000	0.0000	0.10
			1.00			Ice	0.0000	0.0000	0.16
						1" Ice			
DHHTT65B-3XR	B	From Leg	0.5000	0.00	95.0000	No Ice	0.0000	0.0000	0.05
			0.00			1/2"	0.0000	0.0000	0.10
			1.00			Ice	0.0000	0.0000	0.16
						1" Ice			
DHHTT65B-3XR	C	From Leg	0.5000	0.00	95.0000	No Ice	0.0000	0.0000	0.05
			0.00			1/2"	0.0000	0.0000	0.10
			1.00			Ice	0.0000	0.0000	0.16
						1" Ice			
FWHR	A	From Leg	0.5000	0.00	95.0000	No Ice	0.0000	0.0000	0.03
			0.00			1/2"	0.0000	0.0000	0.04
			-3.00			Ice	0.0000	0.0000	0.05
						1" Ice			
FWHR	B	From Leg	0.5000	0.00	95.0000	No Ice	0.0000	0.0000	0.03
			0.00			1/2"	0.0000	0.0000	0.04
			-3.00			Ice	0.0000	0.0000	0.05
						1" Ice			
FWHR	C	From Leg	0.5000	0.00	95.0000	No Ice	0.0000	0.0000	0.03
			0.00			1/2"	0.0000	0.0000	0.04
			-3.00			Ice	0.0000	0.0000	0.05
						1" Ice			
BEN-92P	C	From Leg	4.0000	0.00	95.0000	No Ice	0.0000	0.0000	0.00
			0.00			1/2"	0.0000	0.0000	0.01
			-4.00			Ice	0.0000	0.0000	0.02
						1" Ice			
***									
Canister Load1	C	None		0.00	120.0000	No Ice	9.0000	9.0000	0.09
						1/2"	18.5000	18.5000	0.21
						Ice	19.0000	19.0000	0.32
						1" Ice			
Canister Load2	C	None		0.00	110.0000	No Ice	18.0000	18.0000	0.40
						1/2"	37.0000	37.0000	0.63
						Ice	38.0000	38.0000	0.86
						1" Ice			
Canister Load3	C	None		0.00	100.0000	No Ice	18.0000	18.0000	0.40
						1/2"	37.0000	37.0000	0.63
						Ice	38.0000	38.0000	0.86
						1" Ice			
Canister Load4	C	None		0.00	90.0000	No Ice	16.2000	16.2000	0.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	33.3000	33.3000	0.59
						1" Ice	34.2000	34.2000	0.79
Canister Load5	C	None		0.00	82.0000	No Ice	7.2000	7.2000	0.29
						1/2" Ice	14.8000	14.8000	0.38
						1" Ice	15.2000	15.2000	0.47
Truck Ball	C	None		0.00	120.7500	No Ice	0.8836	0.8836	0.05
						1/2" Ice	1.3783	1.3783	0.07
						1" Ice	1.5272	1.5272	0.09

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.0000-110.0000	115.0000	1.303	29.826	8.958	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L2 110.0000-100.0000	105.0000	1.279	29.260	8.958	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L3 100.0000-90.0000	95.0000	1.252	28.650	8.958	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L4 90.0000-82.0000	86.0000	1.226	28.056	7.167	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L5 82.0000-60.0000	71.0000	1.178	26.946	44.000	A	0.000	44.000	44.000	100.00	0.000	0.000
					B	0.000	44.000		100.00	0.000	0.000
					C	0.000	44.000		100.00	0.000	0.000
L6 60.0000-30.0000	45.0000	1.07	24.479	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L7 30.0000-8.5000	19.2500	0.895	20.472	43.000	A	0.000	43.000	43.000	100.00	0.000	0.000
					B	0.000	43.000		100.00	0.000	0.000
					C	0.000	43.000		100.00	0.000	0.000
L8 8.5000-0.0000	4.2500	0.85	19.450	17.000	A	0.000	17.000	17.000	100.00	0.000	0.000
					B	0.000	17.000		100.00	0.000	0.000
					C	0.000	17.000		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.0000-110.0000	115.0000	1.303	7.925	1.6995	11.791	A	0.000	0.000	0.000	0.00	0.000	0.000
						B	0.000	0.000		0.00	0.000	0.000
						C	0.000	0.000		0.00	0.000	0.000
L2 110.0000-100.0000	105.0000	1.279	7.774	1.6841	11.765	A	0.000	0.000	0.000	0.00	0.000	0.000
						B	0.000	0.000		0.00	0.000	0.000
						C	0.000	0.000		0.00	0.000	0.000
L3 100.0000-90.0000	95.0000	1.252	7.612	1.6673	11.737	A	0.000	0.000	0.000	0.00	0.000	0.000
						B	0.000	0.000		0.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	0.000		0.00	0.000	0.000
L4 90.0000-82.0000	86.0000	1.226	7.454	1.6508	9.368	A	0.000	0.000	0.000	0.00	0.000	0.000
						B	0.000	0.000		0.00	0.000	0.000
						C	0.000	0.000		0.00	0.000	0.000
L5 82.0000-60.0000	71.0000	1.178	7.160	1.6194	49.938	A	0.000	49.938	49.938	100.00	0.000	0.000
						B	0.000	49.938		100.00	0.000	0.000
						C	0.000	49.938		100.00	0.000	0.000
L6 60.0000-30.0000	45.0000	1.07	6.504	1.5473	67.736	A	0.000	67.736	67.736	100.00	0.000	0.000
						B	0.000	67.736		100.00	0.000	0.000
						C	0.000	67.736		100.00	0.000	0.000
L7 30.0000-8.5000	19.2500	0.895	5.440	1.4213	48.093	A	0.000	48.093	48.093	100.00	0.000	0.000
						B	0.000	48.093		100.00	0.000	0.000
						C	0.000	48.093		100.00	0.000	0.000
L8 8.5000-0.0000	4.2500	0.85	5.168	1.2220	18.731	A	0.000	18.731	18.731	100.00	0.000	0.000
						B	0.000	18.731		100.00	0.000	0.000
						C	0.000	18.731		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 120.0000-110.0000	115.0000	1.303	10.210	8.958	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L2 110.0000-100.0000	105.0000	1.279	10.017	8.958	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L3 100.0000-90.0000	95.0000	1.252	9.808	8.958	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L4 90.0000-82.0000	86.0000	1.226	9.604	7.167	A	0.000	0.000	0.000	0.00	0.000	0.000
					B	0.000	0.000		0.00	0.000	0.000
					C	0.000	0.000		0.00	0.000	0.000
L5 82.0000-60.0000	71.0000	1.178	9.225	44.000	A	0.000	44.000	44.000	100.00	0.000	0.000
					B	0.000	44.000		100.00	0.000	0.000
					C	0.000	44.000		100.00	0.000	0.000
L6 60.0000-30.0000	45.0000	1.07	8.380	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	0.000
L7 30.0000-8.5000	19.2500	0.895	7.008	43.000	A	0.000	43.000	43.000	100.00	0.000	0.000
					B	0.000	43.000		100.00	0.000	0.000
					C	0.000	43.000		100.00	0.000	0.000
L8 8.5000-0.0000	4.2500	0.85	6.659	17.000	A	0.000	17.000	17.000	100.00	0.000	0.000
					B	0.000	17.000		100.00	0.000	0.000
					C	0.000	17.000		100.00	0.000	0.000

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

Comb. No.	Description
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
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	120 - 110	Pole	Max Tension	20	0.00	-0.00	0.00
			Max. Compression	26	-2.33	0.00	-0.00
			Max. Mx	20	-0.71	13.54	-0.00
			Max. My	14	-0.71	0.00	-13.54
			Max. Vy	20	-1.39	13.54	-0.00
			Max. Vx	14	1.39	0.00	-13.54
			Max. Torque	32			0.00
L2	110 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-4.94	0.00	-0.00
			Max. Mx	20	-1.79	37.69	-0.00
			Max. My	14	-1.79	0.00	-37.69
			Max. Vy	20	-2.45	37.69	-0.00
			Max. Vx	14	2.45	0.00	-37.69
			Max. Torque	32			0.00
L3	100 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-8.08	0.12	-0.07
			Max. Mx	20	-3.13	72.12	-0.01
			Max. My	14	-3.13	0.01	-72.11
			Max. Vy	20	-3.47	65.20	-0.01
			Max. Vx	14	3.47	0.01	-65.19
			Max. Torque	38			0.00
L4	90 - 82	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-9.94	0.12	-0.07
			Max. Mx	20	-4.12	106.45	-0.01
			Max. My	14	-4.12	0.01	-106.44
			Max. Vy	20	-4.31	76.43	-0.01
			Max. Vx	14	4.31	0.01	-76.42
			Max. Torque	38			0.00
L5	82 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-14.60	0.12	-0.07
			Max. Mx	20	-7.29	223.99	-0.01
			Max. My	14	-7.29	0.01	-223.99
			Max. Vy	20	-6.03	223.99	-0.01
			Max. Vx	14	6.03	0.01	-223.99
			Max. Torque	38			0.00
L6	60 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.98	0.12	-0.07
			Max. Mx	20	-11.30	428.55	-0.01
			Max. My	14	-11.30	0.01	-428.55
			Max. Vy	20	-7.56	428.55	-0.01
			Max. Vx	14	7.56	0.01	-428.55
			Max. Torque	38			0.00
L7	30 - 8.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.75	0.12	-0.07
			Max. Mx	20	-14.32	598.24	-0.01
			Max. My	14	-14.32	0.01	-598.24
			Max. Vy	20	-8.20	598.24	-0.01
			Max. Vx	14	8.20	0.01	-598.24
			Max. Torque	38			0.00
L8	8.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.50	0.12	-0.07
			Max. Mx	20	-15.84	668.72	-0.01
			Max. My	14	-15.84	0.01	-668.71
			Max. Vy	20	-8.40	668.72	-0.01
			Max. Vx	14	8.40	0.01	-668.71
			Max. Torque	38			0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	25.50	0.00	-0.00
	Max. H_x	21	11.88	8.39	0.00
	Max. H_z	3	11.88	-0.00	8.39
	Max. M_x	2	668.70	-0.00	8.39
	Max. M_z	8	668.69	-8.39	0.00
	Max. Torsion	38	0.00	1.44	2.50
	Min. Vert	21	11.88	8.39	0.00
	Min. H_x	9	11.88	-8.39	0.00
	Min. H_z	15	11.88	-0.00	-8.39
	Min. M_x	14	-668.71	-0.00	-8.39
	Min. M_z	20	-668.72	8.39	0.00
	Min. Torsion	32	-0.00	-1.44	-2.50

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	13.20	0.00	0.00	0.00	0.01	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	15.84	0.00	-8.39	-668.70	0.01	-0.00
0.9 Dead+1.6 Wind 0 deg - No Ice	11.88	0.00	-8.39	-658.10	0.01	-0.00
1.2 Dead+1.6 Wind 30 deg -	15.84	4.19	-7.27	-579.39	-334.50	-0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
No Ice						
0.9 Dead+1.6 Wind 30 deg - No Ice	11.88	4.19	-7.27	-570.18	-329.19	-0.00
1.2 Dead+1.6 Wind 60 deg - No Ice	15.84	7.27	-4.19	-334.51	-579.38	-0.00
0.9 Dead+1.6 Wind 60 deg - No Ice	11.88	7.27	-4.19	-329.19	-570.18	-0.00
1.2 Dead+1.6 Wind 90 deg - No Ice	15.84	8.39	-0.00	0.01	-668.69	0.00
0.9 Dead+1.6 Wind 90 deg - No Ice	11.88	8.39	-0.00	0.00	-658.10	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice	15.84	7.27	4.19	334.52	-579.38	0.00
0.9 Dead+1.6 Wind 120 deg - No Ice	11.88	7.27	4.19	329.20	-570.18	0.00
1.2 Dead+1.6 Wind 150 deg - No Ice	15.84	4.19	7.27	579.40	-334.50	0.00
0.9 Dead+1.6 Wind 150 deg - No Ice	11.88	4.19	7.27	570.19	-329.19	0.00
1.2 Dead+1.6 Wind 180 deg - No Ice	15.84	0.00	8.39	668.71	0.01	0.00
0.9 Dead+1.6 Wind 180 deg - No Ice	11.88	0.00	8.39	658.11	0.01	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice	15.84	-4.19	7.27	579.40	334.52	0.00
0.9 Dead+1.6 Wind 210 deg - No Ice	11.88	-4.19	7.27	570.19	329.20	0.00
1.2 Dead+1.6 Wind 240 deg - No Ice	15.84	-7.27	4.19	334.52	579.40	-0.00
0.9 Dead+1.6 Wind 240 deg - No Ice	11.88	-7.27	4.19	329.20	570.19	-0.00
1.2 Dead+1.6 Wind 270 deg - No Ice	15.84	-8.39	-0.00	0.01	668.72	-0.00
0.9 Dead+1.6 Wind 270 deg - No Ice	11.88	-8.39	-0.00	0.00	658.11	-0.00
1.2 Dead+1.6 Wind 300 deg - No Ice	15.84	-7.27	-4.19	-334.51	579.40	-0.00
0.9 Dead+1.6 Wind 300 deg - No Ice	11.88	-7.27	-4.19	-329.19	570.19	-0.00
1.2 Dead+1.6 Wind 330 deg - No Ice	15.84	-4.19	-7.27	-579.39	334.52	-0.00
0.9 Dead+1.6 Wind 330 deg - No Ice	11.88	-4.19	-7.27	-570.18	329.20	-0.00
1.2 Dead+1.0 Ice+1.0 Temp	25.50	-0.00	0.00	0.07	0.12	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	25.50	0.00	-2.89	-233.80	0.15	-0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	25.50	1.44	-2.50	-202.47	-116.79	-0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	25.50	2.50	-1.44	-116.86	-202.40	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	25.50	2.89	-0.00	0.09	-233.74	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	25.50	2.50	1.44	117.03	-202.40	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	25.50	1.44	2.50	202.64	-116.79	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	25.50	0.00	2.89	233.98	0.15	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	25.50	-1.44	2.50	202.64	117.10	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	25.50	-2.50	1.44	117.03	202.71	-0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	25.50	-2.89	-0.00	0.09	234.04	-0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	25.50	-2.50	-1.44	-116.86	202.71	-0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	25.50	-1.44	-2.50	-202.47	117.10	-0.00
Dead+Wind 0 deg - Service	13.20	0.00	-1.74	-134.91	0.01	-0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg - Service	13.20	0.87	-1.51	-116.84	-67.45	-0.00
Dead+Wind 60 deg - Service	13.20	1.51	-0.87	-67.45	-116.83	-0.00
Dead+Wind 90 deg - Service	13.20	1.74	-0.00	0.01	-134.91	0.00
Dead+Wind 120 deg - Service	13.20	1.51	0.87	67.47	-116.83	0.00
Dead+Wind 150 deg - Service	13.20	0.87	1.51	116.85	-67.45	0.00
Dead+Wind 180 deg - Service	13.20	0.00	1.74	134.92	0.01	0.00
Dead+Wind 210 deg - Service	13.20	-0.87	1.51	116.85	67.47	0.00
Dead+Wind 240 deg - Service	13.20	-1.51	0.87	67.47	116.85	-0.00
Dead+Wind 270 deg - Service	13.20	-1.74	-0.00	0.01	134.93	-0.00
Dead+Wind 300 deg - Service	13.20	-1.51	-0.87	-67.45	116.85	-0.00
Dead+Wind 330 deg - Service	13.20	-0.87	-1.51	-116.84	67.47	-0.00

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	-13.20	0.00	0.00	13.20	0.00	0.000%
2	0.00	-15.84	-8.39	-0.00	15.84	8.39	0.019%
3	0.00	-11.88	-8.39	-0.00	11.88	8.39	0.022%
4	4.19	-15.84	-7.27	-4.19	15.84	7.27	0.001%
5	4.19	-11.88	-7.27	-4.19	11.88	7.27	0.001%
6	7.27	-15.84	-4.19	-7.27	15.84	4.19	0.001%
7	7.27	-11.88	-4.19	-7.27	11.88	4.19	0.001%
8	8.39	-15.84	0.00	-8.39	15.84	0.00	0.019%
9	8.39	-11.88	0.00	-8.39	11.88	0.00	0.022%
10	7.27	-15.84	4.19	-7.27	15.84	-4.19	0.001%
11	7.27	-11.88	4.19	-7.27	11.88	-4.19	0.001%
12	4.19	-15.84	7.27	-4.19	15.84	-7.27	0.001%
13	4.19	-11.88	7.27	-4.19	11.88	-7.27	0.001%
14	0.00	-15.84	8.39	-0.00	15.84	-8.39	0.019%
15	0.00	-11.88	8.39	-0.00	11.88	-8.39	0.022%
16	-4.19	-15.84	7.27	4.19	15.84	-7.27	0.001%
17	-4.19	-11.88	7.27	4.19	11.88	-7.27	0.001%
18	-7.27	-15.84	4.19	7.27	15.84	-4.19	0.001%
19	-7.27	-11.88	4.19	7.27	11.88	-4.19	0.001%
20	-8.39	-15.84	0.00	8.39	15.84	0.00	0.019%
21	-8.39	-11.88	0.00	8.39	11.88	0.00	0.022%
22	-7.27	-15.84	-4.19	7.27	15.84	4.19	0.001%
23	-7.27	-11.88	-4.19	7.27	11.88	4.19	0.001%
24	-4.19	-15.84	-7.27	4.19	15.84	7.27	0.001%
25	-4.19	-11.88	-7.27	4.19	11.88	7.27	0.001%
26	0.00	-25.50	0.00	0.00	25.50	-0.00	0.000%
27	0.00	-25.50	-2.89	-0.00	25.50	2.89	0.004%
28	1.44	-25.50	-2.50	-1.44	25.50	2.50	0.004%
29	2.50	-25.50	-1.44	-2.50	25.50	1.44	0.004%
30	2.89	-25.50	0.00	-2.89	25.50	0.00	0.004%
31	2.50	-25.50	1.44	-2.50	25.50	-1.44	0.004%
32	1.44	-25.50	2.50	-1.44	25.50	-2.50	0.004%
33	0.00	-25.50	2.89	-0.00	25.50	-2.89	0.004%
34	-1.44	-25.50	2.50	1.44	25.50	-2.50	0.004%
35	-2.50	-25.50	1.44	2.50	25.50	-1.44	0.004%
36	-2.89	-25.50	0.00	2.89	25.50	0.00	0.004%
37	-2.50	-25.50	-1.44	2.50	25.50	1.44	0.004%
38	-1.44	-25.50	-2.50	1.44	25.50	2.50	0.004%
39	0.00	-13.20	-1.74	-0.00	13.20	1.74	0.004%
40	0.87	-13.20	-1.51	-0.87	13.20	1.51	0.004%
41	1.51	-13.20	-0.87	-1.51	13.20	0.87	0.004%
42	1.74	-13.20	0.00	-1.74	13.20	0.00	0.004%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
43	1.51	-13.20	0.87	-1.51	13.20	-0.87	0.004%
44	0.87	-13.20	1.51	-0.87	13.20	-1.51	0.004%
45	0.00	-13.20	1.74	-0.00	13.20	-1.74	0.004%
46	-0.87	-13.20	1.51	0.87	13.20	-1.51	0.004%
47	-1.51	-13.20	0.87	1.51	13.20	-0.87	0.004%
48	-1.74	-13.20	0.00	1.74	13.20	0.00	0.004%
49	-1.51	-13.20	-0.87	1.51	13.20	0.87	0.004%
50	-0.87	-13.20	-1.51	0.87	13.20	1.51	0.004%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	26	0.00013715	0.00009074
3	Yes	25	0.00012571	0.00010109
4	Yes	35	0.00000001	0.00011798
5	Yes	34	0.00000001	0.00011991
6	Yes	35	0.00000001	0.00011798
7	Yes	34	0.00000001	0.00011991
8	Yes	26	0.00013715	0.00009074
9	Yes	25	0.00012571	0.00010109
10	Yes	35	0.00000001	0.00011800
11	Yes	34	0.00000001	0.00011993
12	Yes	35	0.00000001	0.00011798
13	Yes	34	0.00000001	0.00011991
14	Yes	26	0.00013715	0.00009075
15	Yes	25	0.00012571	0.00010109
16	Yes	35	0.00000001	0.00011802
17	Yes	34	0.00000001	0.00011994
18	Yes	35	0.00000001	0.00011801
19	Yes	34	0.00000001	0.00011993
20	Yes	26	0.00013715	0.00009075
21	Yes	25	0.00012571	0.00010109
22	Yes	35	0.00000001	0.00011799
23	Yes	34	0.00000001	0.00011992
24	Yes	35	0.00000001	0.00011801
25	Yes	34	0.00000001	0.00011993
26	Yes	6	0.00000001	0.00000001
27	Yes	31	0.00011749	0.00003419
28	Yes	31	0.00011727	0.00006478
29	Yes	31	0.00011727	0.00006482
30	Yes	31	0.00011748	0.00003417
31	Yes	31	0.00011727	0.00006502
32	Yes	31	0.00011728	0.00006490
33	Yes	31	0.00011750	0.00003425
34	Yes	31	0.00011729	0.00006525
35	Yes	31	0.00011730	0.00006521
36	Yes	31	0.00011751	0.00003427
37	Yes	31	0.00011729	0.00006501
38	Yes	31	0.00011728	0.00006513
39	Yes	26	0.00011282	0.00002103
40	Yes	26	0.00011273	0.00001804
41	Yes	26	0.00011273	0.00001804
42	Yes	26	0.00011282	0.00002103
43	Yes	26	0.00011273	0.00001804
44	Yes	26	0.00011273	0.00001804
45	Yes	26	0.00011282	0.00002103
46	Yes	26	0.00011273	0.00001805
47	Yes	26	0.00011273	0.00001805
48	Yes	26	0.00011282	0.00002103
49	Yes	26	0.00011273	0.00001804
50	Yes	26	0.00011273	0.00001805

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 110	18.51	48	1.37	0.00
L2	110 - 100	15.65	48	1.35	0.00
L3	100 - 90	12.89	48	1.27	0.00
L4	90 - 82	10.41	48	1.08	0.00
L5	82 - 60	8.80	48	0.83	0.00
L6	60 - 30	5.19	47	0.73	0.00
L7	30 - 8.5	1.42	47	0.44	0.00
L8	8.5 - 0	0.11	47	0.12	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.7500	Truck Ball	48	18.51	1.37	0.00	24383
120.0000	Canister Load1	48	18.51	1.37	0.00	24383
115.0000	APXV18-206517S-C-ACU	48	17.07	1.37	0.00	24383
110.0000	Canister Load2	48	15.65	1.35	0.00	11844
105.0000	APXV18-206517S-C-ACU	48	14.25	1.32	0.00	7273
100.0000	Canister Load3	48	12.89	1.27	0.00	4695
95.0000	DHHTT65B-3XR	48	11.59	1.19	0.00	2713
90.0000	Canister Load4	48	10.41	1.08	0.00	2081
82.0000	Canister Load5	48	8.80	0.83	0.00	4148

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 110	93.53	20	7.08	0.00
L2	110 - 100	78.83	20	6.96	0.00
L3	100 - 90	64.72	20	6.49	0.00
L4	90 - 82	52.11	20	5.47	0.00
L5	82 - 60	43.98	20	4.16	0.00
L6	60 - 30	25.91	18	3.63	0.00
L7	30 - 8.5	7.08	18	2.22	0.00
L8	8.5 - 0	0.54	18	0.60	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.7500	Truck Ball	20	93.53	7.08	0.00	4382
120.0000	Canister Load1	20	93.53	7.08	0.00	4382
115.0000	APXV18-206517S-C-ACU	20	86.15	7.05	0.00	4382
110.0000	Canister Load2	20	78.83	6.96	0.00	2144
105.0000	APXV18-206517S-C-ACU	20	71.66	6.77	0.00	1343
100.0000	Canister Load3	20	64.72	6.49	0.00	882
95.0000	DHHTT65B-3XR	20	58.12	6.09	0.00	519
90.0000	Canister Load4	20	52.11	5.47	0.00	401
82.0000	Canister Load5	20	43.98	4.16	0.00	803

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	120 - 110 (1)	P10.75x0.349	10.0000	0.0000	0.0	11.4038	-0.71	431.06	0.002
L2	110 - 100 (2)	P10.75x0.349	10.0000	0.0000	0.0	11.4038	-1.79	431.06	0.004
L3	100 - 90 (3)	P10.75x0.349	10.0000	0.0000	0.0	11.4038	-3.13	431.06	0.007
L4	90 - 82 (4)	P10.75x0.349	8.0000	0.0000	0.0	11.4038	-4.12	431.06	0.010
L5	82 - 60 (5)	P24x0.375	22.0000	0.0000	0.0	27.8325	-7.29	1052.07	0.007
L6	60 - 30 (6)	P24x0.375	30.0000	0.0000	0.0	27.8325	-11.30	1052.07	0.011
L7	30 - 8.5 (7)	P24x0.375	21.5000	0.0000	0.0	27.8325	-14.32	1052.07	0.014
L8	8.5 - 0 (8)	P24x0.5	8.5000	0.0000	0.0	36.9137	-15.84	1313.94	0.012

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	120 - 110 (1)	P10.75x0.349	13.54	118.97	0.114	0.00	118.97	0.000
L2	110 - 100 (2)	P10.75x0.349	37.70	118.97	0.317	0.00	118.97	0.000
L3	100 - 90 (3)	P10.75x0.349	72.16	118.97	0.607	0.00	118.97	0.000
L4	90 - 82 (4)	P10.75x0.349	106.51	118.97	0.895	0.00	118.97	0.000
L5	82 - 60 (5)	P24x0.375	224.11	623.72	0.359	0.00	623.72	0.000
L6	60 - 30 (6)	P24x0.375	428.77	623.72	0.687	0.00	623.72	0.000
L7	30 - 8.5 (7)	P24x0.375	598.54	623.72	0.960	0.00	623.72	0.000
L8	8.5 - 0 (8)	P24x0.5	669.04	819.18	0.817	0.00	819.18	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	120 - 110 (1)	P10.75x0.349	1.39	215.53	0.006	0.00	180.95	0.000
L2	110 - 100 (2)	P10.75x0.349	2.45	215.53	0.011	0.00	180.95	0.000
L3	100 - 90 (3)	P10.75x0.349	3.47	215.53	0.016	0.00	180.95	0.000
L4	90 - 82 (4)	P10.75x0.349	4.27	215.53	0.020	0.00	180.95	0.000
L5	82 - 60 (5)	P24x0.375	6.04	526.03	0.011	0.00	1019.71	0.000
L6	60 - 30 (6)	P24x0.375	7.56	526.03	0.014	0.00	1019.71	0.000
L7	30 - 8.5 (7)	P24x0.375	8.20	526.03	0.016	0.00	1019.71	0.000
L8	8.5 - 0 (8)	P24x0.5	8.40	656.97	0.013	0.00	1260.33	0.000

Pole Interaction Design Data

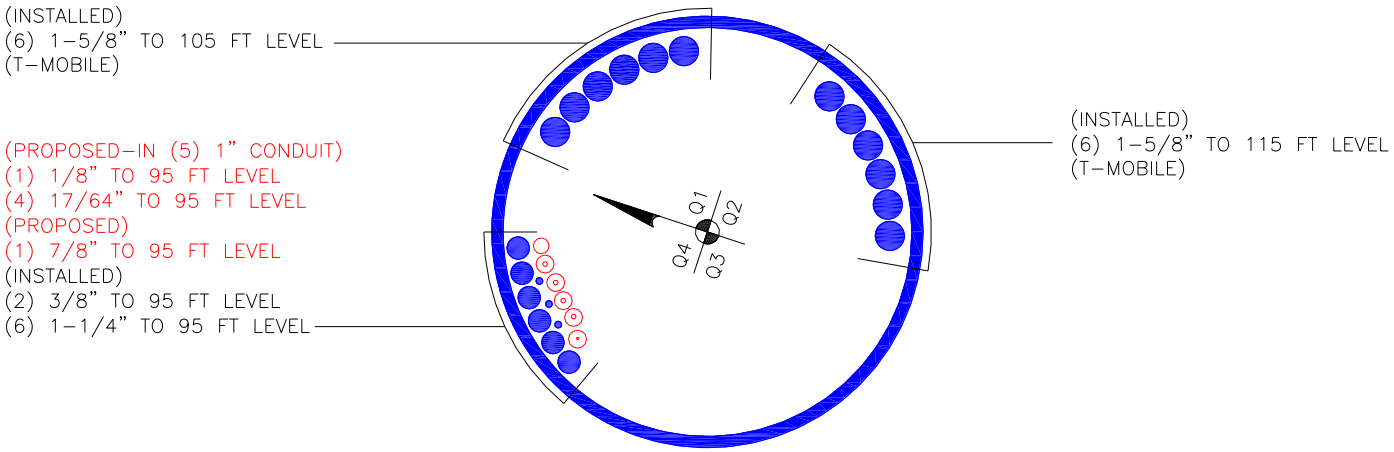
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 110 (1)	0.002	0.114	0.000	0.006	0.000	0.116 ✔	1.000	4.8.2 ✔
L2	110 - 100 (2)	0.004	0.317	0.000	0.011	0.000	0.321 ✔	1.000	4.8.2 ✔
L3	100 - 90 (3)	0.007	0.607	0.000	0.016	0.000	0.614 ✔	1.000	4.8.2 ✔
L4	90 - 82 (4)	0.010	0.895	0.000	0.020	0.000	0.905 ✔	1.000	4.8.2 ✔
L5	82 - 60 (5)	0.007	0.359	0.000	0.011	0.000	0.366 ✔	1.000	4.8.2 ✔
L6	60 - 30 (6)	0.011	0.687	0.000	0.014	0.000	0.698 ✔	1.000	4.8.2 ✔
L7	30 - 8.5 (7)	0.014	0.960	0.000	0.016	0.000	0.973 ✔	1.000	4.8.2 ✔
L8	8.5 - 0 (8)	0.012	0.817	0.000	0.013	0.000	0.829 ✔	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	120 - 110	Pole	P10.75x0.349	1	-0.71	431.06	11.6	Pass
L2	110 - 100	Pole	P10.75x0.349	2	-1.79	431.06	32.1	Pass
L3	100 - 90	Pole	P10.75x0.349	3	-3.13	431.06	61.4	Pass
L4	90 - 82	Pole	P10.75x0.349	4	-4.12	431.06	90.5	Pass
L5	82 - 60	Pole	P24x0.375	5	-7.29	1052.07	36.6	Pass
L6	60 - 30	Pole	P24x0.375	6	-11.30	1052.07	69.8	Pass
L7	30 - 8.5	Pole	P24x0.375	7	-14.32	1052.07	97.3	Pass
L8	8.5 - 0	Pole	P24x0.5	8	-15.84	1313.94	82.9	Pass
							Summary	
						Pole (L7)	97.3	Pass
						RATING =	**97.3**	**Pass**

APPENDIX B

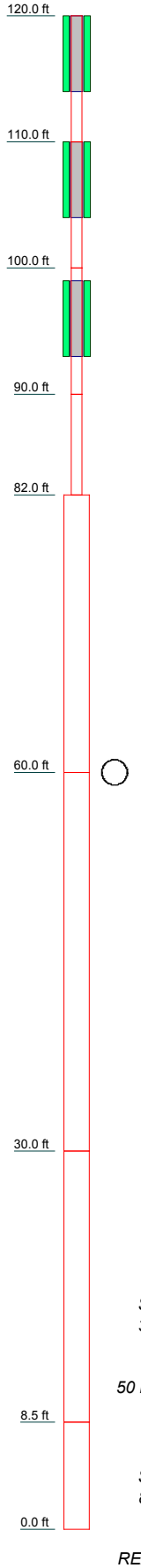
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Grade	Weight (K)
1	P10.75x0.349	10.0000	A500-42	0.4
2	P10.75x0.349	10.0000		0.4
3	P10.75x0.349	10.0000		0.4
4	P10.75x0.349	8.0000		0.3
5	P24x0.375	22.0000	A53-B-42	2.1
6	P24x0.375	30.0000		2.8
7	P24x0.375	21.5000		2.0
8	P24x0.5	8.5000	Reinf 39.55 ksi	1.1
				9.5



ALL REACTIONS ARE FACTORED

AXIAL 25 K

SHEAR 3 K — *MOMENT 234 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 0.7500 in ICE

AXIAL 16 K

SHEAR 8 K — *MOMENT 669 kip-ft*

TORQUE 0 kip-ft

REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Truck Ball	120.75	APXV18-206517S-C-ACU	105
Canister Load1	120	KRY 112 144/1	105
Flag	120	APXV18-206517S-C-ACU	105
KRY 112 144/1	115	APXV18-206517S-C-ACU	105
KRY 112 144/1	115	Canister Load3	100
KRY 112 144/1	115	FWHR	95
ATMAA1412D-1A20	115	BEN-92P	95
ATMAA1412D-1A20	115	DHHTT65B-3XR	95
ATMAA1412D-1A20	115	DHHTT65B-3XR	95
APXV18-206517S-C-ACU	115	FWHR	95
APXV18-206517S-C-ACU	115	DHHTT65B-3XR	95
APXV18-206517S-C-ACU	115	FWHR	95
Canister Load2	110	Canister Load4	90
KRY 112 144/1	105	Canister Load5	82
KRY 112 144/1	105		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	Reinf 39.55 ksi	40 ksi	50 ksi
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 97.3%

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	120' Monopole / Bridgeport, CT		
Project:	37516-3608.001.7805 / BU 822779		
Client: Crown Castle	Drawn by: Seth Tschanen	App'd:	
Code: TIA-222-G	Date: 11/21/16	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

v4.4 - Effective 7-12-13

Date: 11/21/2016
PJF Project: 37516-3608.001.7805
Client Ref. # BU 822779
Site Name: Bridgeport
Description: 120' Monopole
Owner: Crown Castle
Engineer: SJT

Asymmetric Anchor Rod Analysis

Moment =	669	k-ft	TIA Ref.	G	Location =	Base Plate	
Axial =	16.0	kips	ASIF =	N/A	η =	0.50	for BP, Rev. G Sect. 4.9.9
Shear =	8.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	24						

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.000	A687	105	125	0.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
2	1.000	A687	105	125	18.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
3	1.000	A687	105	125	36.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
4	1.000	A687	105	125	54.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
5	1.000	A687	105	125	72.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
6	1.000	A687	105	125	90.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
7	1.000	A687	105	125	108.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
8	1.000	A687	105	125	126.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
9	1.000	A687	105	125	144.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
10	1.000	A687	105	125	162.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
11	1.000	A687	105	125	180.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
12	1.000	A687	105	125	198.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
13	1.000	A687	105	125	216.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
14	1.000	A687	105	125	234.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
15	1.000	A687	105	125	252.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
16	1.000	A687	105	125	270.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
17	1.000	A687	105	125	288.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
18	1.000	A687	105	125	306.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
19	1.000	A687	105	125	324.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
20	1.000	A687	105	125	342.0	27.00	0.00	0.79	10.03	8.91	10.60	0.00	60.60	17.5%
21		Other	0	0	0.0	96.00	1.64	1.64	71.49	69.13	71.49	118.72	118.72	60.2%
22		Other	0	0	90.0	96.00	1.64	1.64	71.49	69.13	71.49	118.72	118.72	60.2%
23		Other	0	0	180.0	96.00	1.64	1.64	71.49	69.13	71.49	118.72	118.72	60.2%
24		Other	0	0	270.0	96.00	1.64	1.64	71.49	69.13	71.49	118.72	118.72	60.2%
								22.27						

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#:	*822779*
Site Name:	*Bridgeport / Rt 8*
App #:	
Pole Manufacturer:	*Other*

Reactions

Mu:	106.5	ft-kips
Axial, Pu:	11.3	kips
Shear, Vu:	5.6	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:	20	
Diam:	1	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	27	in

Plate Data

Diam:	30.375	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at both sides)

Config:	2	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data

Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Anchor Rod Results

			Rigid
Max Rod (Cu+ Vu/ή):	10.6	Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	60.6	Kips	φ*Tn
Anchor Rod Stress Ratio:	17.5%	**Pass**	

Base Plate Results

Flexural Check

			Rigid
Base Plate Stress:	6.4	ksi	AISC LRFD
Allowable Plate Stress:	32.4	ksi	φ*Fy
Base Plate Stress Ratio:	19.9%	**Pass**	Y.L. Length: 12.37

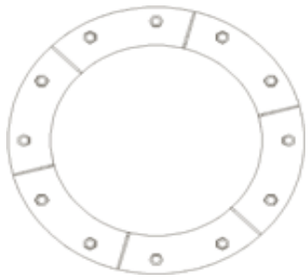
b/Le>2, Stiffeners are not fully effective

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a



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

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

Factored Foundation Loads:

	LC1	LC2	
Factored Axial Load (+Comp, -Ten) =	**11.3**	**8.475**	kips
Factored Horiz. Load at Top of Pier =	**5.6**	**5.6**	kips
Factored OTM at Top of Pier =	**106.5**	**106.5**	kips

LRFD Resistance and Load Factors:

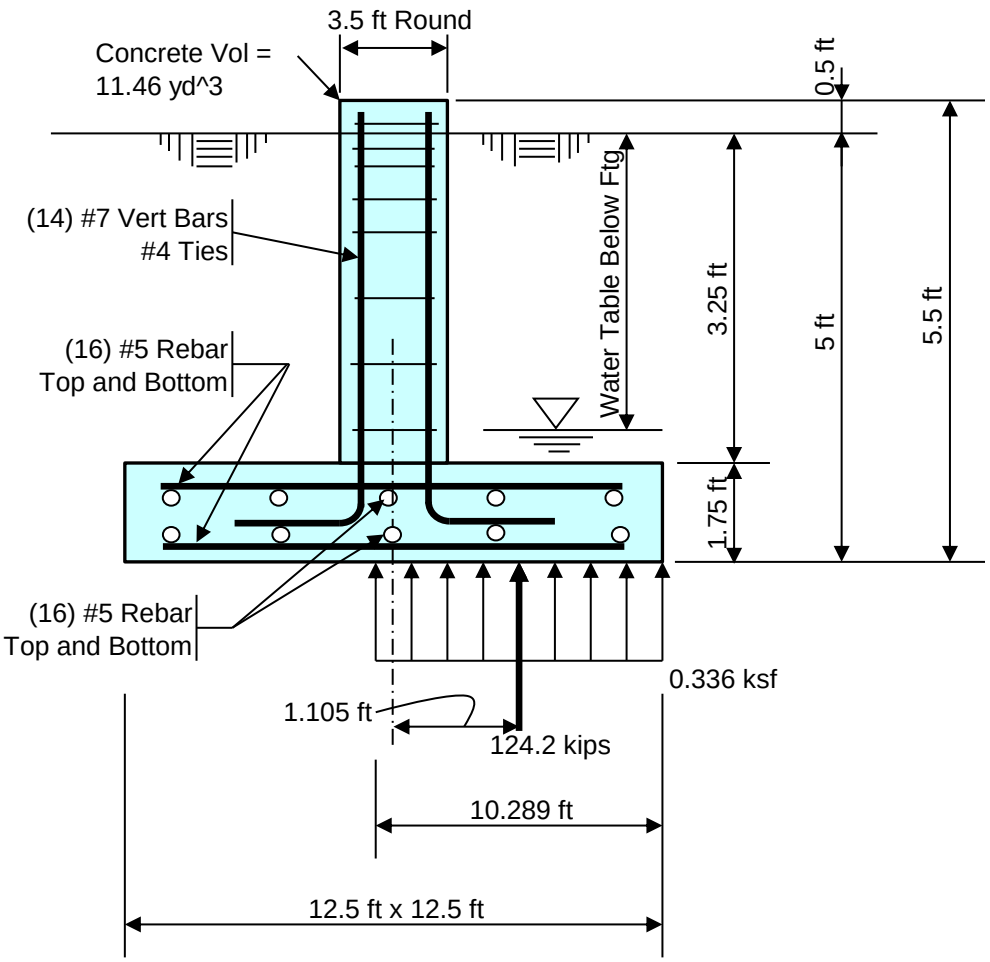
	Φ	Dead Load Factors	
Soil Bearing =	**0.75**		
Soil Weight =	**0.75**	1.2	0.9
Concrete Weight =	**0.75**	1.2	0.9

Soil Properties:

Depth to Water Table = **99** ft

Uplift Cone from **Top** of footing

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
2	**100**	**0**	**34**		**2.00**
2	**100**	**0**	**34**		**4.00**
2	**125**	**0**	**34**	**30**	**6.00**



Dimensions:

Pier Shape =	**Round**	
Pier Width =	**3.5**	ft Diameter
Pier Height above Grade =	**0.5**	ft
Depth to Bottom of Footing =	**5**	ft
Footing Thickness =	**1.75**	ft
Footing Width, B =	**12.5**	ft
Footing Length, L =	**12.5**	ft

Concrete:

Concrete Strength =	**3**	ksi
Rebar Strength =	**60**	ksi

Total Pad Reinf Stl =	**9.92**	in^2 >= 5.67 in^2 = Min Stl, OK
Total Pier Reinf Stl =	**8.40**	in^2 >= 6.93 in^2 = Min Stl, OK
Footing Thickness =	**1.75**	ft >= 1.37 ft = Min Ftg Thk, OK

Summary Results:

	Required		Available		
Maximum Net Soil Bearing =	**0.336**	ksf	**22.500**	ksf	Stress Ratio = **1.5%** in Soil Bearing
Uplift =	**0.0**	kips	**85.5**	kips	Stress Ratio = **0.0%** in Uplift
Punching Shear Stress =	**0.012**	ksi	**0.164**	ksi	Stress Ratio = **7.5%** in Punching Shear
Bending Shear Stress =	**15.7**	kips	**210.3**	kips	Stress Ratio = **7.5%** in Bending Shear
Bending Moment =	**51.945**	k-ft	**372.2**	k-ft	Stress Ratio = **14.0%** in Bending Moment
Conc Pier Reinforcing Steel =	**127.5**	k-ft	**641.5**	k-ft	Stress Ratio = **19.9%** in Pier Rebar

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Mu	13.54	ft-kips
Axial, Pu:	0.71	kips
Shear, Vu:	1.39	kips
Elevation:	110	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	14.75		

Plate Data		
Diam:	17.75	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.22	in

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

Pole Data		
Diam:	10.75	in
Thick:	0.349	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**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	5.42	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.218	in	
Min PL "treq" for actual **T w/ Pry**:	0.290	in	
Min PL "t1" for actual **T w/o Pry**:	0.384	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.42	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	9.9%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	1.5	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	4.6%	**Pass**	Comp. Y.L. Length:
No Prying			10.10
Tension Side Stress Ratio, (treq/t)^2:	2.1%	**Pass**	

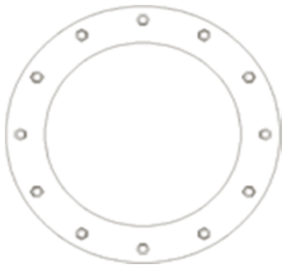
n/a

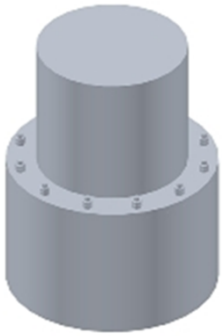
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Mu	13.54	ft-kips
Axial, Pu:	0.71	kips
Shear, Vu:	1.39	kips
Elevation:	110	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	14.75		

Plate Data		
Diam:	17.75	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.22	in

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

Pole Data		
Diam:	10.75	in
Thick:	0.349	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**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	5.42	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.218	in	
Min PL "treq" for actual **T w/ Pry**:	0.290	in	
Min PL "t1" for actual **T w/o Pry**:	0.384	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.42	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	9.9%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	1.5	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	4.6%	**Pass**	Comp. Y.L. Length:
No Prying			10.10
Tension Side Stress Ratio, (treq/t)^2:	2.1%	**Pass**	

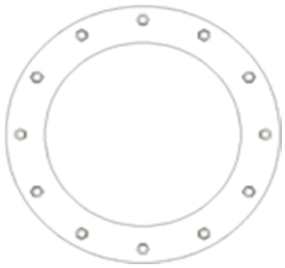
n/a

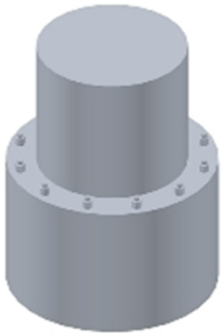
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Mu	37.7	ft-kips
Axial, Pu:	1.79	kips
Shear, Vu:	2.45	kips
Elevation:	100	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	14.75		

Plate Data		
Diam:	17.75	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.22	in

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

Pole Data		
Diam:	10.75	in
Thick:	0.349	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**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	15.11	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.218	in	
Min PL "treq" for actual **T w/ Pry**:	0.485	in	
Min PL "t1" for actual **T w/o Pry**:	0.641	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	15.11	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	27.7%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	4.1	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	12.7%	**Pass**	Comp. Y.L. Length:
No Prying			10.10
Tension Side Stress Ratio, (treq/t)^2:	5.9%	**Pass**	

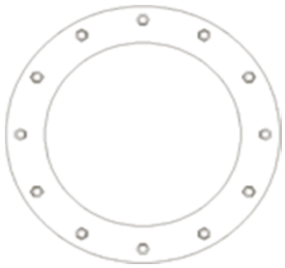
n/a

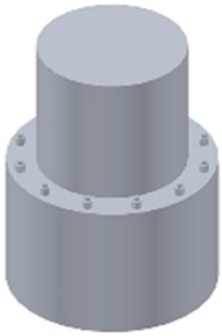
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Mu	37.7	ft-kips
Axial, Pu:	1.79	kips
Shear, Vu:	2.45	kips
Elevation:	100	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	14.75		

Plate Data		
Diam:	17.75	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.22	in

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

Pole Data		
Diam:	10.75	in
Thick:	0.349	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**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	15.11	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.218	in	
Min PL "treq" for actual **T w/ Pry**:	0.485	in	
Min PL "t1" for actual **T w/o Pry**:	0.641	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	15.11	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	27.7%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	4.1	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	12.7%	**Pass**	Comp. Y.L. Length:
No Prying			10.10
Tension Side Stress Ratio, (treq/t)^2:	5.9%	**Pass**	

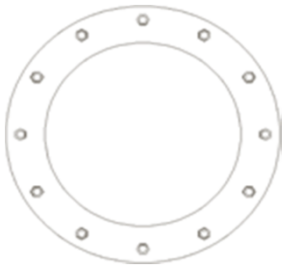
n/a

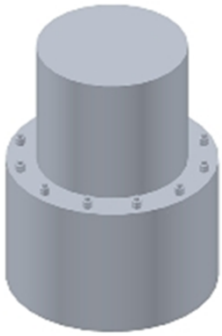
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Mu	72.16	ft-kips
Axial, Pu:	3.13	kips
Shear, Vu:	3.47	kips
Elevation:	90	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	14.75		

Plate Data		
Diam:	17.75	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.22	in

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

Pole Data		
Diam:	10.75	in
Thick:	0.349	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**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	28.96	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.218	in	
Min PL "treq" for actual **T w/ Pry**:	0.671	in	
Min PL "t1" for actual **T w/o Pry**:	0.888	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	28.96	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	53.1%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	7.8	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	24.2%	**Pass**	Comp. Y.L. Length:
No Prying			10.10
Tension Side Stress Ratio, (treq/t)^2:	11.3%	**Pass**	

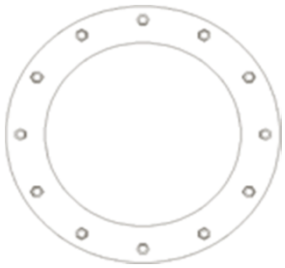
n/a

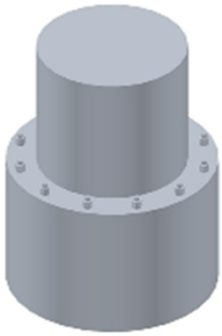
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Mu	72.16	ft-kips
Axial, Pu:	3.13	kips
Shear, Vu:	3.47	kips
Elevation:	90	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	14.75		

Plate Data		
Diam:	17.75	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.22	in

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

Pole Data		
Diam:	10.75	in
Thick:	0.349	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**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	28.96	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.218	in	
Min PL "treq" for actual **T w/ Pry**:	0.671	in	
Min PL "t1" for actual **T w/o Pry**:	0.888	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	28.96	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	53.1%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	7.8	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	24.2%	**Pass**	Comp. Y.L. Length:
No Prying			10.10
Tension Side Stress Ratio, (treq/t)^2:	11.3%	**Pass**	

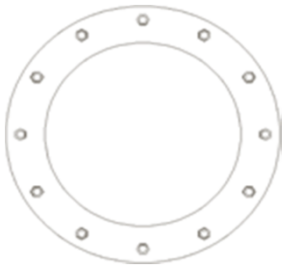
n/a

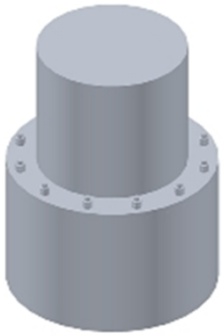
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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Job Number:	37516-3608.001.7805	**Page:**	1 / 1
By:	SJT	**Date:**	11/21/2016
Site Number:	822779	**Version:**	0.6
Site Name:	BRIDGEPORT/ RT 8	**Effective:**	2/1/2016

CODE:	TIA-222-G
ASIF:	1.00

EEI FLANGE CONCEALMENT CALCULATIONS (82 Ft)

EEI Kit Number	Custom	
Flange Elevation	82.00	ft

STIFFENER INFORMATION

		Overrides
Stiffener Quantity	4	4
Width (in)	6.75	6.75
Height (in)	13.5	13.50
Thickness (in)	0.75	0.75
Horizontal Fillet Weld	0.375	0.375
Vertical Fillet Weld	0.375	0.375
Stiffener Grade (ksi)	36	36

RING PLATE INFORMATION

Thickness (in)	2.5	2.50
ID (in)	18	18.00
OD (in)	25	25.00
Ring Plate Grade (ksi)	36	36

BOLT INFORMATION

Bolt Quantity	8	8
Size (in)	1	1.00
Bolt Circle (in)	21	21.0
Bolt Specification	A325	A325

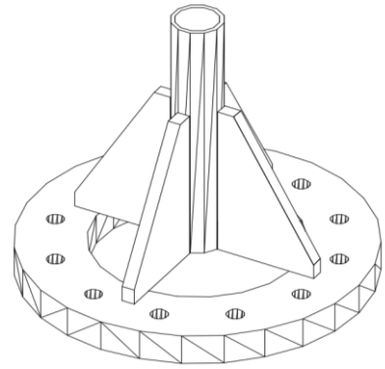
SPINE INFORMATION

Size	HSS10.75	HSS10.75
Pipe Grade	A500-42	A500-42
Fy (ksi)	42	42
Fu (ksi)	60	60
Pipe OD (in)	10.75	10.75
Pipe Thickness (in)	0.349	0.349

FLANGE CONNECTION REACTIONS

Moment	106.51	kip*ft
Shear	4.27	kips
Axial	4.12	kips

Max Allowable Capacity	105%
Electrode (ksi)	E70



FLANGE CONNECTION RESULTS

Bolts	54.9% Passing
Ring Plate	69.6% Passing
Weld - Stiffener & Ring Plate	92.4% Passing
Weld - Spine & Stiffener	44.5% Passing
Spine Wall Tear Out / Punching Shear	32.9% Passing
Max Tension In Stiffeners	59.8 kips
Max Compression in Stiffeners	61.9 kips
Stiffener Bending	38.6% Passing
Stiffener Shear	67.9% Passing
Stiffener Combined Shear & Bending	78.5% Passing

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Manufacturer:	Other

Bolt Data			
Qty:	8		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	21	in	

Plate Data		
Plate Outer Diam:	23.25	in
Plate Inner Diam:	18.25	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.50	in

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

Pole Data		
Pole OuterDiam:	24	in
Thick:	0.375	in
Pole Inner Diam:	23.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Reactions		
Moment:	106.51	ft-kips
Axial:	4.12	kips
Shear:	4.27	kips
Exterior Flange Run, T+q:	0	kips

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

Elevation: 82 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	29.9	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	54.9%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	30.9	Kips, Ext. Cu=Interior Cu
Plate Stress:	16.2	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	50.0%	**Pass**

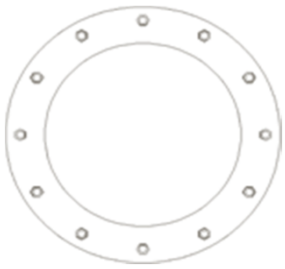
n/a

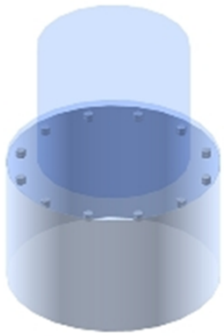
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Reactions		
Moment:	224.11	ft-kips
Axial:	7.29	kips
Shear:	6.04	kips
Exterior Flange Run, T+q:		kips

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

Elevation: 60 feet

Manufacturer:	Other

Bolt Data

Qty:	21		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	21	in	

Plate Data

Plate Outer Diam:	23.25	in
Plate Inner Diam:	18.25	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.48	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data

Pole OuterDiam:	24	in
Thick:	0.375	in
Pole Inner Diam:	23.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	24.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	44.1%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	24.7	Kips, Ext. Cu=Interior Cu
Plate Stress:	20.5	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	63.2%	**Pass**

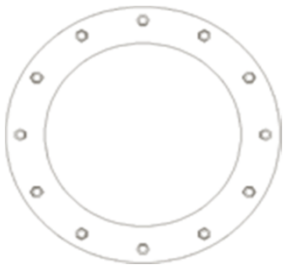
n/a

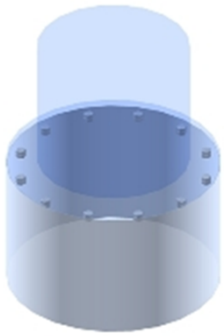
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Manufacturer:	Other

Bolt Data			
Qty:	21		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	21	in	

Plate Data		
Plate Outer Diam:	23.25	in
Plate Inner Diam:	18.25	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.48	in

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

Pole Data		
Pole OuterDiam:	24	in
Thick:	0.375	in
Pole Inner Diam:	23.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Reactions		
Moment:	224.11	ft-kips
Axial:	7.29	kips
Shear:	6.04	kips
Exterior Flange Run, T+q:	0	kips

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

Elevation: 60 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	24.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	44.1%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	24.7	Kips, Ext. Cu=Interior Cu
Plate Stress:	20.5	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	63.2%	**Pass**

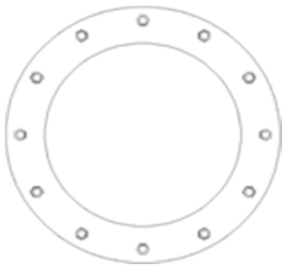
n/a

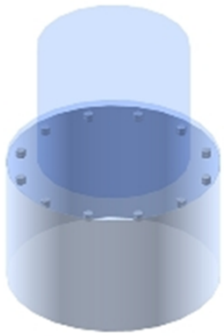
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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v4.4 - Effective 7-12-13

Date: 11/21/2016
PJF Project: 37516-3608.001.7805
Client Ref. # BU 822779
Site Name: Bridgeport
Description: 30' Flange
Owner: Crown Castle
Engineer: SJT

Asymmetric Bolt Analysis

Moment =	429	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	11.3	kips	ASIF =	N/A	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	7.6	kips	Max Ratio =	100.0%	Threads =	X-Excluded	for FP, Rev. G	
Anchor Qty =	20							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.000	A325	92	120	0.0	21.00	0.00	0.79	26.39	25.67	25.67	0.00	54.54	47.1%
2	1.000	A325	92	120	22.5	21.00	0.00	0.79	23.01	22.28	22.28	0.00	54.54	40.9%
3	1.000	A325	92	120	45.0	21.00	0.00	0.79	22.79	22.07	22.07	0.00	54.54	40.5%
4	1.000	A325	92	120	67.5	21.00	0.00	0.79	25.94	25.21	25.21	0.00	54.54	46.2%
5	1.000	A325	92	120	90.0	21.00	0.00	0.79	29.98	29.26	29.26	0.00	54.54	53.7%
6	1.000	A325	92	120	112.5	21.00	0.00	0.79	32.65	31.92	31.92	0.00	54.54	58.5%
7	1.000	A325	92	120	135.0	21.00	0.00	0.79	32.80	32.08	32.08	0.00	54.54	58.8%
8	1.000	A325	92	120	157.5	21.00	0.00	0.79	30.38	29.66	29.66	0.00	54.54	54.4%
9	1.000	A325	92	120	180.0	21.00	0.00	0.79	26.39	25.67	25.67	0.00	54.54	47.1%
10	1.000	A325	92	120	202.5	21.00	0.00	0.79	23.01	22.28	22.28	0.00	54.54	40.9%
11	1.000	A325	92	120	225.0	21.00	0.00	0.79	22.79	22.07	22.07	0.00	54.54	40.5%
12	1.000	A325	92	120	247.5	21.00	0.00	0.79	25.94	25.21	25.21	0.00	54.54	46.2%
13	1.000	A325	92	120	270.0	21.00	0.00	0.79	29.98	29.26	29.26	0.00	54.54	53.7%
14	1.000	A325	92	120	292.5	21.00	0.00	0.79	32.65	31.92	31.92	0.00	54.54	58.5%
15	1.000	A325	92	120	315.0	21.00	0.00	0.79	32.80	32.08	32.08	0.00	54.54	58.8%
16	1.000	A325	92	120	337.5	21.00	0.00	0.79	30.38	29.66	29.66	0.00	54.54	54.4%
17	0.000	CCI 4 x 0.75 (65 ksi)	65	80	0.0	24.75	3.00	3.00	118.57	115.81	118.57	122.34	122.34	96.9%
18	0.000	CCI 4 x 0.75 (65 ksi)	65	80	70.0	24.75	3.00	3.00	118.57	115.81	118.57	122.34	122.34	96.9%
19	0.000	CCI 4 x 0.75 (65 ksi)	65	80	180.0	24.75	3.00	3.00	118.57	115.81	118.57	122.34	122.34	96.9%
20	0.000	CCI 4 x 0.75 (65 ksi)	65	80	250.0	24.75	3.00	3.00	118.57	115.81	118.57	122.34	122.34	96.9%
								24.57						

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Manufacturer:	Other

Bolt Data			
Qty:	16		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	21	in	

Plate Data		
Plate Outer Diam:	23.25	in
Plate Inner Diam:	18.25	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.57	in

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

Pole Data		
Pole OuterDiam:	24	in
Thick:	0.375	in
Pole Inner Diam:	23.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Reactions		
Moment:	227.1	ft-kips
Axial:	5.8	kips
Shear:	3.9	kips
Exterior Flange Run, T+q:		kips

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

Elevation: 30 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	32.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	58.8%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	32.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	20.7	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	63.9%	**Pass**

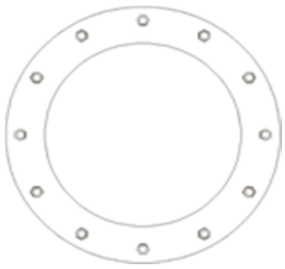
n/a

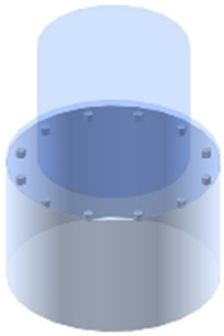
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *822779*
Site Name: *Bridgeport*
App #:

Manufacturer:	Other

Bolt Data			
Qty:	16		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	21	in	

Plate Data		
Plate Outer Diam:	23.25	in
Plate Inner Diam:	18.25	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.57	in

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

Pole Data		
Pole OuterDiam:	24	in
Thick:	0.375	in
Pole Inner Diam:	23.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Reactions		
Moment:	227.1	ft-kips
Axial:	5.8	kips
Shear:	3.9	kips
Exterior Flange Run, T+q:	0	kips

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

Elevation: 30 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	32.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	58.8%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	32.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	20.7	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	63.9%	**Pass**

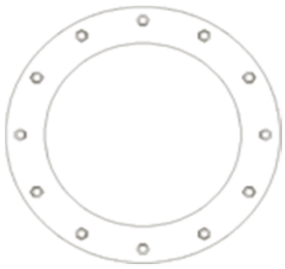
n/a

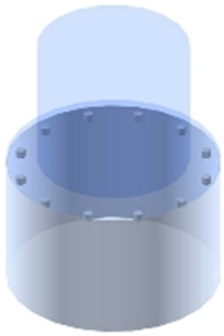
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

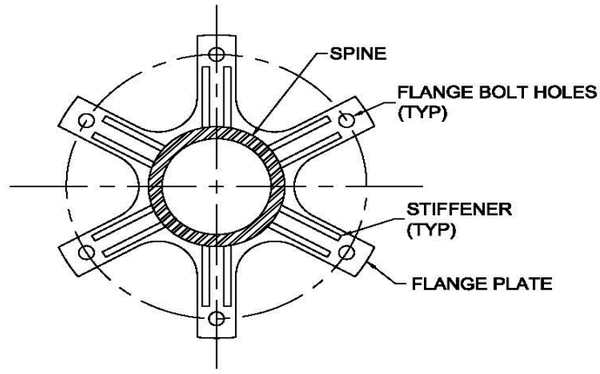
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

CCI Flagpole Tool

Site Data	
BU#:	822779
Site Name:	Bridgeport
App #:	

Code		
Code:	TIA-222-G	
Ice Thickness:	0.5	in
Windspeed (V):	125	mph
Ice Wind Speed (V):	50	mph
Exposure Category:	C	
Topographic Feature:	N/A	
Structure Class:	II	

Tower Information		
Total Tower Height:	120	ft
Base Tower Height:	82	ft
Total Canister Length:	38	ft
Number of Canister Assembly Sections:	4	



FLANGE PLATE
(TYPE 3: SOLIDITY RATIO 0.5)

Canister Section Number *:	Canister Assembly Length (ft):	Canister Assembly Diameter (in):	Number of Sides Canister Section	Plate Type:	Mating Flange Plate Thickness (in)**:	Mating Flange Plate Diameter (in):	Solidity Ratio	Plate Weight (Kip):	Canister Weight (Kip)
1	10	36	Round	3	0.75	36	0.5	0.216	0.188
2	10	36	Round	3	0.75	36	0.5	0.216	0.188
3	10	36	Round	3	0.75	36	0.5	0.216	0.188
4	8	36	Round	3	0.75	36	0.5	0.216	0.151

* Sections are numbered from the top of the tower down

** Mating Flange Plate Thickness at the bottom of canister section

Flag on Tower:	Yes	
Flag Width:	18	ft
Flag Height:	12	ft
Flag Elevation(z):	120	ft

Truck Ball on Tower:	Yes	
Diameter of Ball:	18	in

Geometry : Base Tower + Spine

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Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material	Delete
120	10		0	10.75	10.75	0.349	n/a	A500-42	[x]
110	10		0	10.75	10.75	0.349	n/a	A500-42	[x]
100	10		0	10.75	10.75	0.349	n/a	A500-42	[x]
90	8		0	10.75	10.75	0.349	n/a	A500-42	[x]

82	22		0	24	24	0.375	n/a	A53-B-42	[x]
60	30		0	24	24	0.375	n/a	A53-B-42	[x]
30	30		0	24	24	0.375	n/a	A53-B-42	[x]

Discrete Loads: Truck Ball	Apply C_aA_A at Elevation(z) (ft)	C_aA_A No Ice (ft^2)	C_aA_A 1/2" Ice (ft^2)	C_aA_A 1" Ice (ft^2)	C_aA_A 2" Ice (ft^2)	C_aA_A 4" Ice (ft^2)	Weight No Ice (Kip)	Weight 1/2" Ice (Kip)
	120.75	0.884	1.378	1.527	1.848	2.581	0.05	0.067

Discrete Loads : C_FA_F for Canister Assembly								
Canister Loading	Apply C_FA_F at Elevation(z) (ft)	C_FA_F No Ice (ft^2)	C_FA_F 1/2" Ice (ft^2)	C_FA_F 1" Ice (ft^2)	C_FA_F 2" Ice (ft^2)	C_FA_F 4" Ice (ft^2)	Canister Assembly Weight No Ice (Kip)	Canister Assembly Weight 1/2" Ice (Kip)
Canister Load 1	120	9.000	18.500	19.000	20.000	22.000	0.094	0.206
Canister Load 2	110	18.000	37.000	38.000	40.000	44.000	0.405	0.628
Canister Load 3	100	18.000	37.000	38.000	40.000	44.000	0.405	0.628
Canister Load 4	90	16.200	33.300	34.200	36.000	39.600	0.386	0.587
Canister Load 5	82	7.200	14.800	15.200	16.000	17.600	0.292	0.381

User Forces: Flag Force Calculation Per ANSI/NAAMM FP 1001-07	
$Wind_{FORCE}$=	0.482 Kip
Weight=	0.023 Kip
$Wind_{FORCE, ICE}$=	0.078 Kip
Weight $_{ICE}$=	0.252 Kip
$W_{FORCE, SERVICE WIND}$=	0.111 Kip
Weight=	0.023 Kip

←Flag force should be included at the top of the flag attachment elevation. If the attachment of the flag to the halyard distributes forces equally to the pole, apply flag forces accordingly in tnx file.

Deflection Check Required:	**Yes**	Import Deflection Results
3% Spine Deflection Check		
Allowable (3%) Horizontal Spine Deflection (inches)	Actual Deflection ***(inches)	Sufficient/ Insufficient
13.680	9.707	Sufficient

*** Relative deflection under service level wind speed

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

SPRINT Existing Facility

Site ID: CT54XC747

Bridgeport_Rt 8
1875 Noble Ave
Bridgeport, CT 06610

January 20, 2017

EBI Project Number: 6217000228

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.87 %

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

EBI Consulting
environmental | engineering | due diligence

January 20, 2017

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

Emissions Analysis for Site: **CT54XC747 – Bridgeport_Rt 8**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1875 Noble Ave, Bridgeport, 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 public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure 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 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 **1875 Noble Ave, Bridgeport, 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) 2 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 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 60 Watts per Channel.

3) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 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.

6) 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.

7) The antennas used in this modeling are the **Commscope DHHTT65B-3XT** 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.

8) The antenna mounting height centerlines of the proposed antennas are **96 feet** above ground level (AGL) for **Sector A**, **96 feet** above ground level (AGL) for **Sector B** and **96 feet** above ground level (AGL) for Sector C.

9) 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 public threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope DHHTT65B-3XT	Make / Model:	Commscope DHHTT65B-3XT	Make / Model:	Commscope DHHTT65B-3XT
Gain:	13.35 / 15.25/15.05 dBd	Gain:	13.35 / 15.25/15.05 dBd	Gain:	13.35 / 15.25/15.05 dBd
Height (AGL):	**96 feet**	Height (AGL):	**96 feet**	Height (AGL):	**96 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	420 Watts	Total TX Power(W):	420 Watts	Total TX Power(W):	420 Watts
ERP (W):	11,751.15	ERP (W):	11,751.15	ERP (W):	11,751.15
Antenna A1 MPE%	**6.54 %**	Antenna B1 MPE%	**6.54 %**	Antenna C1 MPE%	**6.54 %**
Antenna A3 MPE%	**0.00 %**	Antenna B3 MPE%	**0.00 %**	Antenna C3 MPE%	**0.00 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**6.54 %**
T-Mobile / Voicestream	0.86 %
Clearwire	0.24 %
Nextel	1.23 %
Site Total MPE %:	**8.87 %**

SPRINT Sector A Total:	6.54 %
SPRINT Sector B Total:	6.54 %
SPRINT Sector C Total:	6.54 %
Site Total:	8.87 %

SPRINT Max Values Per Sector:

SPRINT _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	2	648.82	96	5.76	850 MHz	567	1.02%
Sprint 850 MHz LTE	2	1,297.63	96	11.52	850 MHz	567	2.03%
Sprint 1900 MHz (PCS) LTE	2	2,009.79	96	17.84	1900 MHz (PCS)	1000	1.78%
Sprint 2500 MHz (BRS) LTE	2	1,919.34	96	17.04	2500 MHz (BRS)	1000	1.70%
						Total:	6.54%

Summary

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

SPRINT Sector	Power Density Value (%)
Sector A:	6.54 %
Sector B:	6.54 %
Sector C:	6.54 %
SPRINT Maximum Total (per sector):	6.54 %
Site Total:	8.87 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.87 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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