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

June 26, 2014

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

RE: **Sprint PCS-Exempt Modification - Crown Site BU: 876364**
Sprint PCS Site ID: CT23XC558
Located at: 201 Main Street, Cromwell, CT 06416

Dear Ms. Bachman:

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

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **201 Main Street, Cromwell, CT 06416**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

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

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

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

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

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

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

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

Sincerely,

Jeff Barbadora
Real Estate Specialist

Enclosures

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

cc: Mr. Jonathan Sistare, Manager
Town of Cromwell
41 West Street
Town Hall, 1st Floor
Cromwell, CT 06416

Sprint

CROWN CASTLE

PROJECT:	2.5 EQUIPMENT DEPLOYMENT
SITE NAME:	CROMWELL / FIRST LINE EMERGENCY
SITE CASCADE:	CT23XC558
SITE NUMBER:	876364
SITE ADDRESS:	201 MAIN ST CROMWELL, CT 06416
SITE TYPE:	MONOPOLE TOWER
MARKET:	NORTHERN CONNECTICUT

SITE INFORMATION

TOWER OWNER:
CROWN ATLANTIC COMPANY LLC
2000 CORPORATE DRIVE
CANONSBURG, PA 15317
(704) 405-6555

LATITUDE (NAD83):
41° 35' 0.11" N
41.583364°

LONGITUDE (NAD83):
72° 38' 59.14" W
-72.649761°

COUNTY:
MIDDLESEX

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

ZONING DISTRICT:
IND

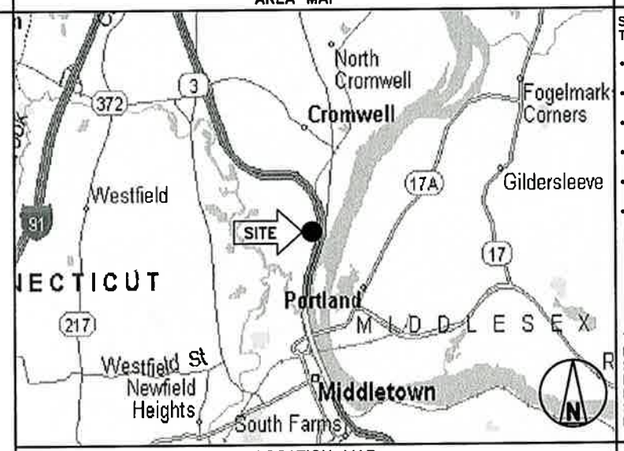
POWER COMPANY:
CONNECTICUT LIGHT & POWER
(860) 947-2000

SPRINT PM:
PETER GIARD
(508) 801-0074
PETER.GIARD@SPRINT.COM

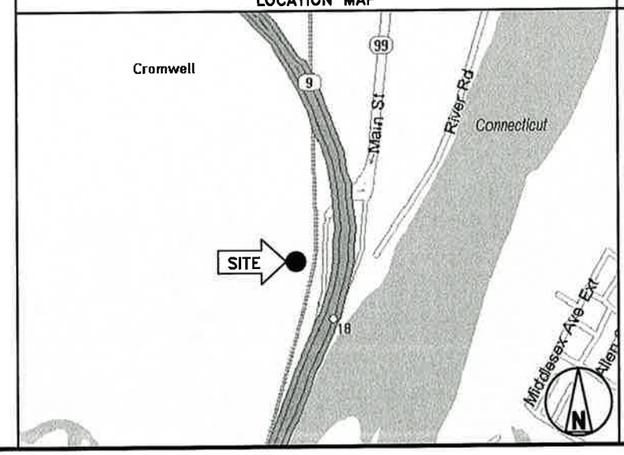
SPRINT CM:
PETER CULBERT
(603) 203-6446
(603) 969-0686
peter.culbert@sprint.com

CROWN CASTLE CM:
JASON D'AMICO
(860) 209-0104
JASON.D'AMICO@CROWNCASTLE.COM

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- INSTALL 2.5 EQUIPMENT IN EXISTING N.V. MMBS CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRU'S TO TOWER
- INSTALL (27) JUMPER CABLES
- INSTALL (1) FIBER CABLE
- INSTALL (4) BATTERIES IN EXISTING BBU CABINET

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY SPRINT IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY SPRINT. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.

APPLICABLE CODES

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALL 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.

1. INTERNATIONAL BUILDING CODE (2012 IBC)
2. TIA-EIA-222-G OR LATEST EDITION
3. NFPA 780 – LIGHTNING PROTECTION CODE
4. 2011 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES, MOST RECENT EDITIONS
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

811 Know what's **below.** **Call** before you dig. www.call811.com

DRAWING INDEX

SHEET NO:	SHEET TITLE	REV:
T-1	TITLE SHEET & PROJECT DATA	0
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SP-2	SPRINT SPECIFICATIONS	0
SP-3	SPRINT SPECIFICATIONS	0
A-1	SITE PLAN	0
A-2	TOWER ELEVATION & CABLE PLAN	0
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	0
A-4	COLOR CODING & NOTES	0
A-5	EQUIPMENT & MOUNTING DETAILS	0
A-6	CIVIL DETAILS	0
A-7	PLUMBING DIAGRAM	0
E-1	ELECTRICAL & GROUNDING PLAN	0
E-2	ELECTRICAL & GROUNDING DETAILS	0

PLANS PREPARED FOR:
Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:
INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 353-000

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:
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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	5/29/14	JDV	0

SITE NAME:
CROMWELL / FIRST LINE EMERGENCY

SITE CASCADE:
CT23XC558

SITE ADDRESS:
201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:
TITLE SHEET & PROJECT DATA

SHEET NUMBER:
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:

1. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
5. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
3. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
4. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
5. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
6. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
7. AMERICAN CONCRETE INSTITUTE (ACI)
8. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
9. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
10. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
11. PORTLAND CEMENT ASSOCIATION (PCA)
12. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
13. BRICK INDUSTRY ASSOCIATION (BIA)
14. AMERICAN WELDING SOCIETY (AWS)
15. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
16. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
17. DOOR AND HARDWARE INSTITUTE (DHI)
18. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
19. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.

B. COMPANY: SPRINT CORPORATION

C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.

D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.

E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.

G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 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. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.

C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

NOTE: IN SHORT-FORM SPECIFICATIONS ON THE DRAWINGS, A/E TO INSERT LIST OF APPLICABLE MOPS INCLUDING EN-2012-001, EN-2013-002, EL-0568, AND TS-0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

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

B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

1 ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.

2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.

3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.

4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.

5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.

6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 – CELL SITE CONSTRUCTION CO.

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 NOTICE TO PROCEED

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

B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.

B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	5/29/14	JDV	0

SITE NAME:

CROMWELL / FIRST LINE EMERGENCY

SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-1

CONTINUE FROM SP-1

1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H-FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND-OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

A. 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.

B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.

1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.

1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 SUBMITTALS:

A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.

1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
5. CHEMICAL GROUNDING DESIGN

D. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 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-0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
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.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;

1. AZIMUTH, DOWNTILT, AGL – UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 485. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD
5. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS "CLOUDS" IDENTIFIED AS THE "AS-BUILT" CONDITION.
6. LIEN WAIVERS
7. FINAL PAYMENT APPLICATION
8. REQUIRED FINAL CONSTRUCTION PHOTOS
9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPs

1.6 INTEGRATION: PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPs

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY:

1. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
2. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
4. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

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Albany, NY 12205
Office # (518) 690-0790
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JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 21765
LICENSED PROFESSIONAL ENGINEER

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	5/29/14	JDV	0

SITE NAME:

CROMWELL / FIRST LINE EMERGENCY

SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

SP-2

CONTINUE FROM SP-2

7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN–ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

C. THE 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.

D. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 DELIVERABLES: TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.

1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
2. STRUCTURAL BACKFILL COMPACTION REPORTS.
3. SITE RESISTANCE TO EARTH TEST.
4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;

1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING––TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
5. ROOF TOPS: PRE–CONSTRUCTION AND POST–CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
7. FINISHED UTILITIES: CLOSE–UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE–UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE–UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.
9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 400 – SUBMITTALS & TESTS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:

1. 1SHELTER AND TOWER OVERVIEW.
2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
5. PHOTOS OF TOWER SECTION STACKING.
6. CONCRETE TESTING / SAMPLES.
7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
9. SHELTER FOUNDATION––FORMS AND STEEL BEFORE POURING.
10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
11. COAX CABLE ENTRY INTO SHELTER.
12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
19. ELECTRICAL TRENCH(S) WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
21. TELCO TRENCH WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
22. SHELTER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
23. TOWER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
24. FENCE GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
25. ALL BTS GROUND CONNECTIONS.
26. ALL GROUND TEST WELLS.
27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
30. GPS ANTENNAS.
31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
32. DOGHOUSE/CABLE EXIT FROM ROOF.
33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
34. MASTER BUS BAR.
35. TELCO BOARD AND NIU.
36. ELECTRICAL DISTRIBUTION WALL.
37. CABLE ENTRY WITH SURGE SUPPRESSION.
38. ENTRANCE TO EQUIPMENT ROOM.
39. COAX WEATHERPROOFING–TOP AND BOTTOM OF TOWER.
40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.
41. ANTENNA AND MAST GROUNDING.
42. LANDSCAPING – WHERE APPLICABLE.

3.6 FINAL PROJECT ACCEPTANCE: COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
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Office # (518) 690-0790
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JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	5/29/14	JDV	0

SITE NAME:

CROMWELL /
FIRST LINE EMERGENCY

SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

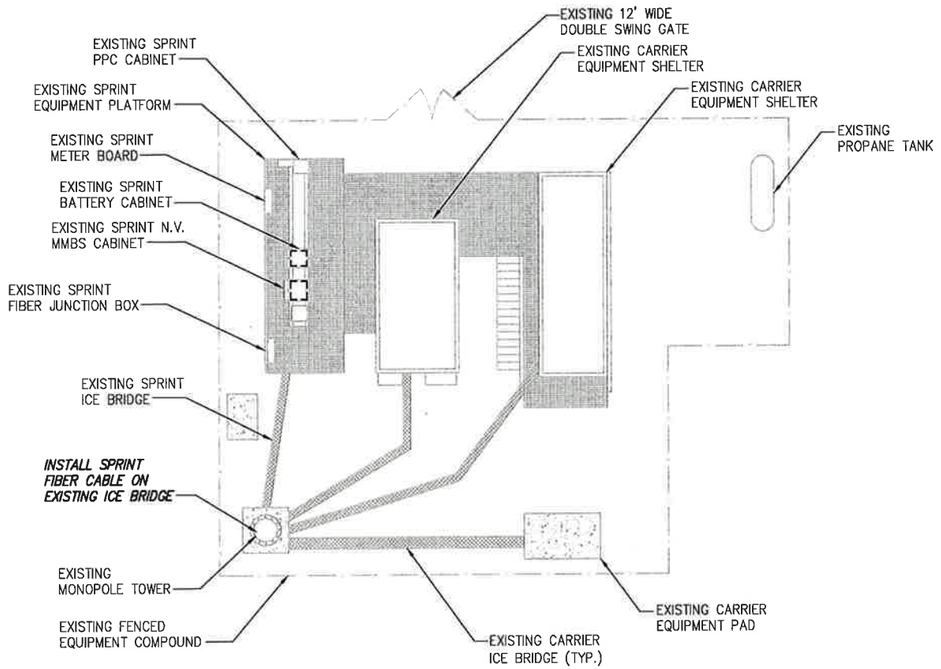
SHEET DESCRIPTION:

SPRINT SPECIFICATIONS

SHEET NUMBER:

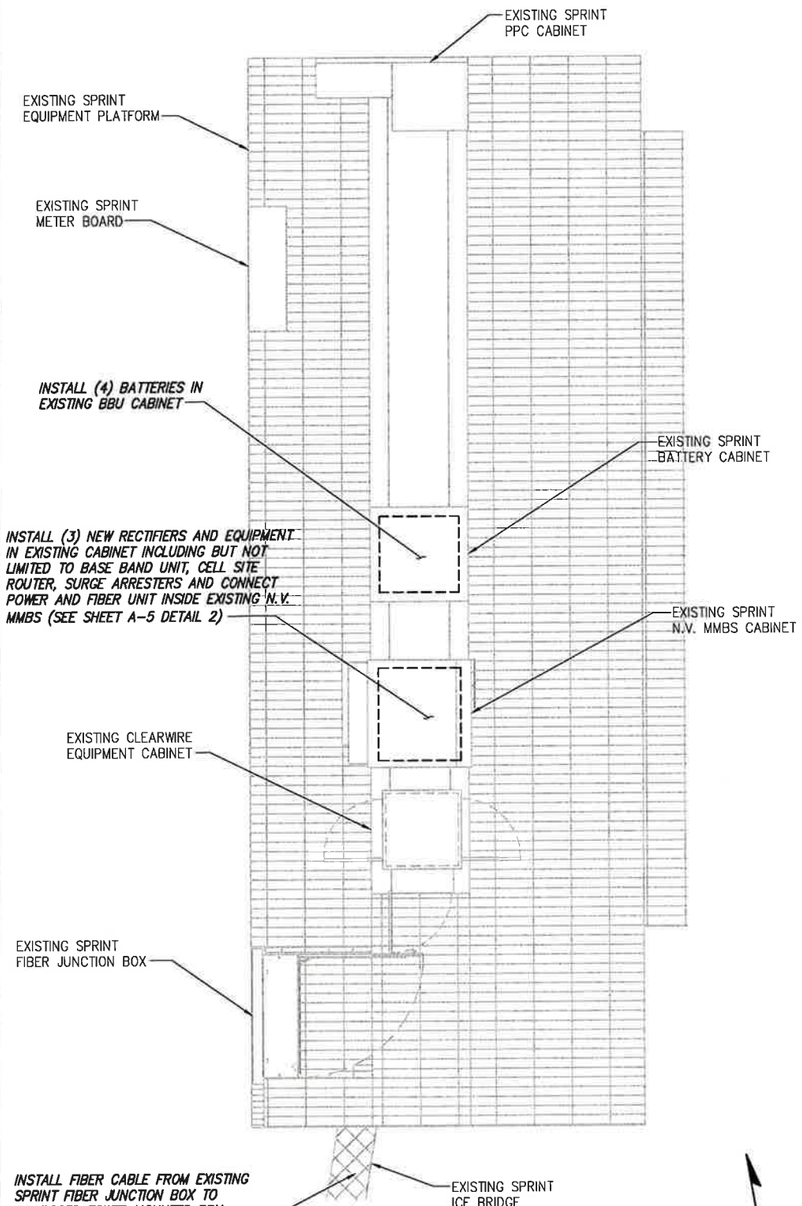
SP-3

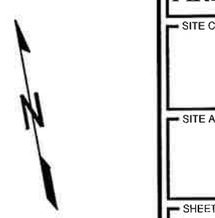
INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.



2.5' 0 2.5' 5' 10'
(IN FEET)
SCALE: 24"x36" SHEET 1" = 5'-0"
SCALE: 11"x17" SHEET 1" = 10'-0"

OVERALL SITE PLAN | SCALE: AS NOTED | 1





1' 0 1' 2' 4'
(IN FEET)
SCALE: 24"x36" SHEET 1" = 2'-0"
SCALE: 11"x17" SHEET 1" = 4'-0"

SPRINT EQUIPMENT PLAN | SCALE: AS NOTED | 2

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793
JOB NUMBER 353-000

MLA PARTNER:

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ENGINEERING LICENSE:

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REVISIONS:

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SITE NAME:

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SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

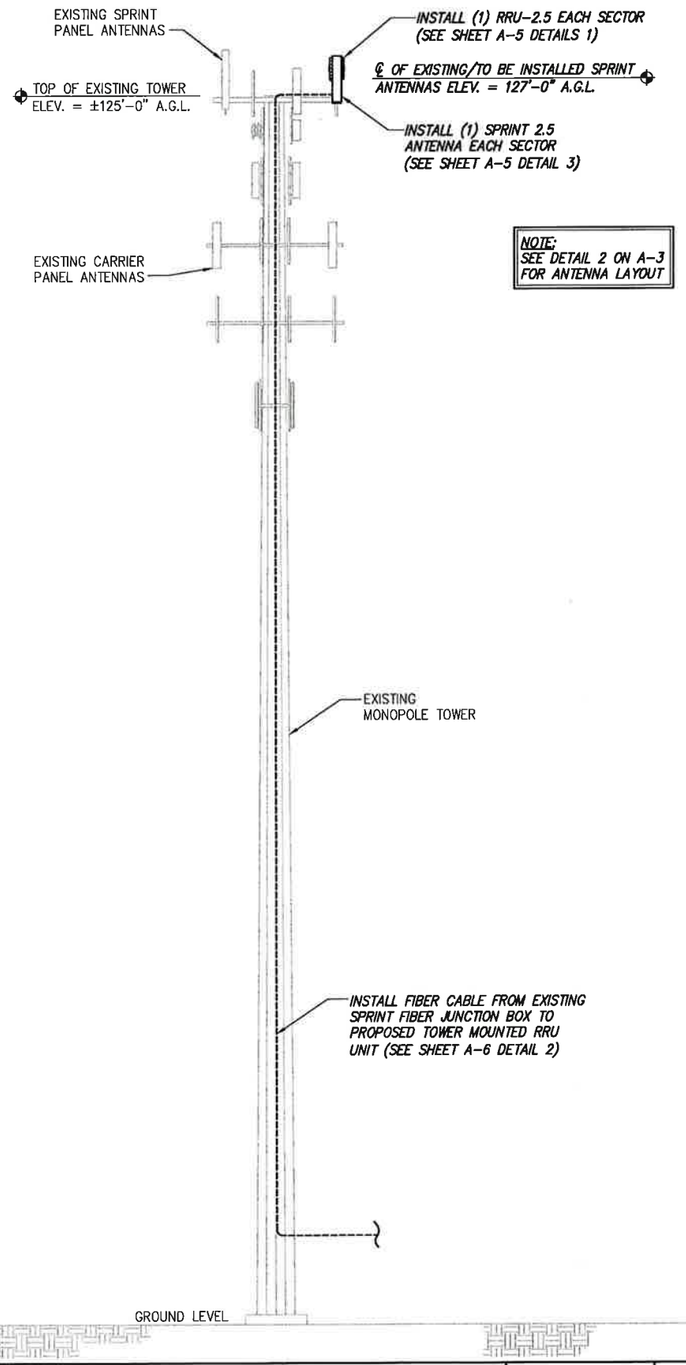
SITE PLAN

SHEET NUMBER:

A-1

NOTE:
INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING TOWER OR MOUNT FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ANY CONSTRUCTION.

NOTE:
SPRINT TOWER TOP WORK CONTINGENT ON FOLLOWING: COMPLETION OF STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, COMPLETION OF ANTENNA/RRU MOUNTING ASSESSMENT (PROVIDED BY AE)



TOWER ELEVATION | NO SCALE | 1

DETAIL NOT USED | NO SCALE | 3

DETAIL NOT USED | NO SCALE | 4

DETAIL NOT USED | NO SCALE | 2

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CT23XC558

SITE ADDRESS:

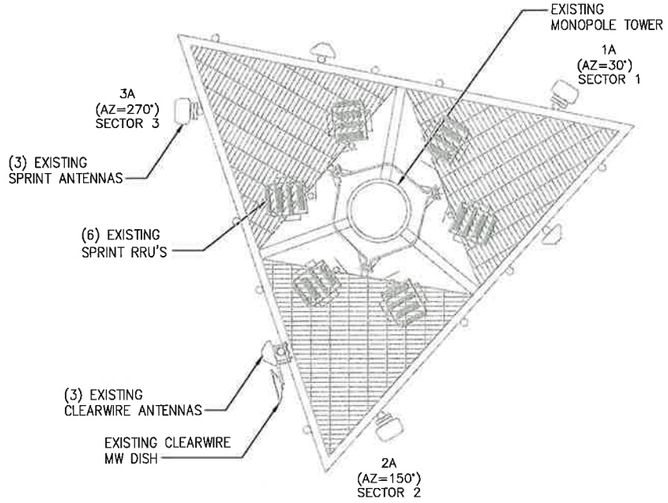
201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

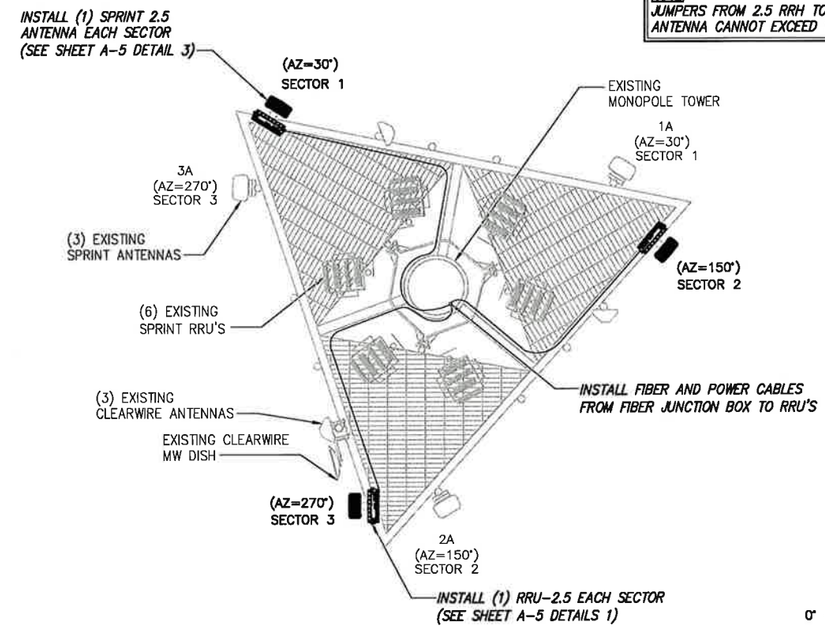
TOWER ELEVATION
& CABLE PLAN

SHEET NUMBER:

A-2



EXISTING ANTENNA & RRU LAYOUT | NO SCALE | 1

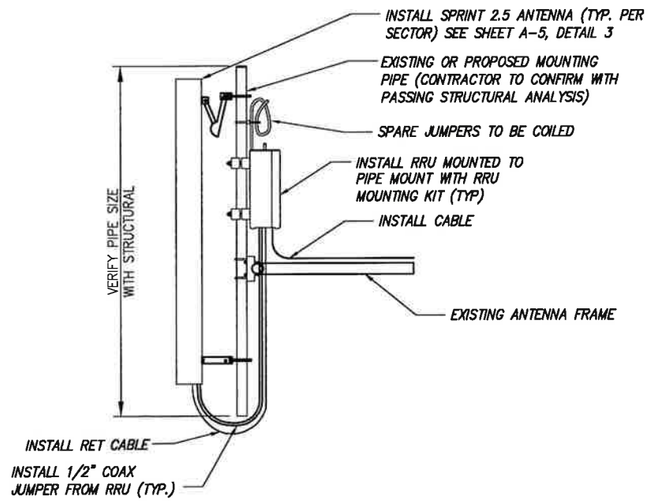


THE CONFIGURATION PLANS ARE BASED ON PROVIDED INFORMATION AND ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO CONSTRUCTION.

NOTE:
JUMPERS FROM 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15 FEET

FINAL ANTENNA LAYOUT | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3



NOTES:

1. CUT DC CONDUCTORS TO LENGTH.
2. COIL FIBER CABLE AND SECURE AT SIDE OF RRU.
3. DO NO EXCEED BEND RADIUS.

NOTE:
CONTRACTOR TO POSITION RRU ON MOUNT BEHIND ANTENNA SUCH THAT THE RRU DOES NOT INTERFERE WITH THE EXISTING PLATFORM/T-ARM MOUNTING HARDWARE.

NOTE:
SPARE DC CABLES ARE COILED UP ON NV RRHS AT SPRINT ARRAY. THESE ARE TO BE USED TO POWER UP THE 2.5 RRHS AND TIED INTO EXISTING DC BREAKERS INSIDE THE FIBER JUNCTION BOX LOCATED AT EQUIPMENT.

NOTE:
THE DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO REFER TO PASSING STRUCTURAL ANALYSIS FOR ANTENNA AND RRU MOUNTING DETAILS

TYPICAL ANTENNA & RRU MOUNTING DETAILS | NO SCALE | 4

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

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DESCRIPTION	DATE	BY	REV
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SITE NAME:

CROMWELL /
FIRST LINE EMERGENCY

SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

ANTENNA LAYOUT
& MOUNTING DETAILS

SHEET NUMBER:

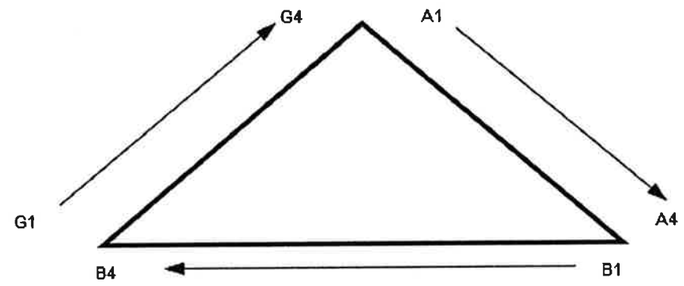
A-3

NV CABLES			
BAND	INDICATOR	PORT	COLOR
800-1	YEL GRN	NV-1	GRN
1900-1	YEL RED	NV-2	BLU
1900-2	YEL BRN	NV-3	BRN
1900-3	YEL BLU	NV-4	WHT
1900-4	YEL SLT	NV-5	RED
800-2	YEL ORG	NV-6	SLT
SPARE	YEL WHT	NV-7	PPL
2500	YEL PPL	NV-8	ORG

HYBRID	
HYBRID	COLOR
1	GRN
2	BLU
3	BRN
4	WHT
5	RED
6	SLT
7	PPL
8	ORG

2.5 Band		
2500 Radio 1		COLOR
YEL	WHT	GRN
YEL	WHT	BLU
YEL	WHT	BRN
YEL	WHT	WHT
YEL	WHT	RED
YEL	WHT	SLT
YEL	WHT	PPL
YEL	WHT	ORG

Figure 1: Antenna Orientation



NOTES:

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.

2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER. THERE SHALL BE A 1" SPACE BETWEEN EACH RING FOR THE CABLE IDENTIFIER, AND NO SPACES BETWEEN THE FREQUENCY BANDS.

3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.

4. THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.

5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE NEXT COLOR IN THE SEQUENCE FOR ADDITIONAL CABLES IN EACH SECTOR.

6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.

7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.

8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

Example – Sector 2, Cable 2, 800mhz Radio #1

Example – Sector 3, Cable 1, 1900mhz Radio #1

Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

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CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

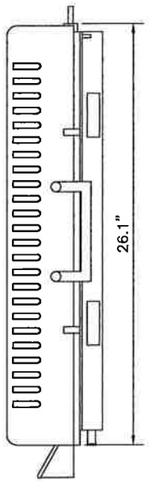
SHEET DESCRIPTION:

COLOR CODING AND NOTES

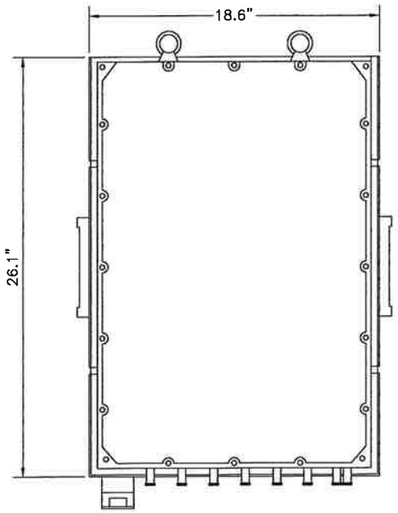
SHEET NUMBER:

A-4

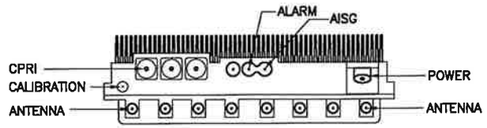
RRU: ALCATEL LUCENT TD-RRH8X20
COLOR: LIGHT GREY
WEIGHT: 70 LBS.



SIDE VIEW



FRONT VIEW

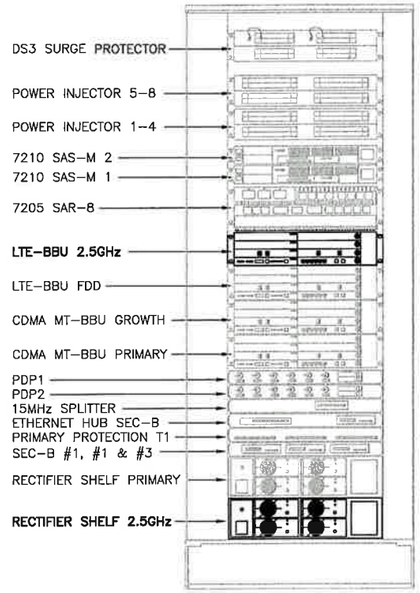


PLAN VIEW

NOTES

COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRU'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRU PACKAGES IN THE RAIN

2.5 RRU	NO SCALE	1

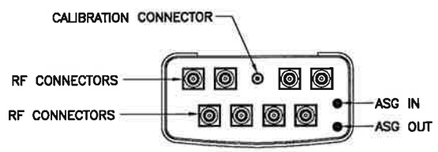


FRONT VIEW

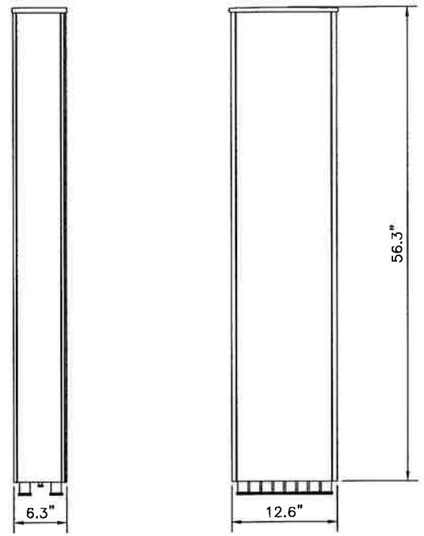
NEW EQUIPMENT IN EXISTING CABINET	NO SCALE	2

ANTENNA: RFS APXVTM14-C-I20

RADOME MATERIAL:	ASA
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD.in(mim):	56.3"x12.6"x6.3" (1430x320x160mm)
WEIGHT:	52.9 lbs
CONNECTORS:	(8) 4.1/9.5 DIN FEMALE (1) NF - CALIBRATION CONNECTOR



PLAN VIEW



2.5 ANTENNA	NO SCALE	3

DETAIL NOT USED	NO SCALE	4

PLANS PREPARED FOR:

Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353-000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
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SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

EQUIPMENT &
MOUNTING DETAILS

SHEET NUMBER:

A-5

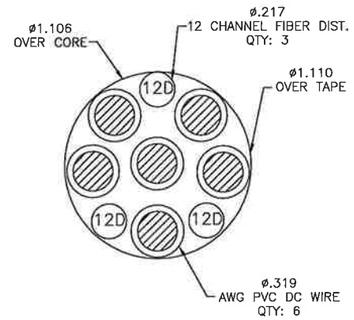
RFS HYBRIFLEX RISER CABLE SCHEDULE

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

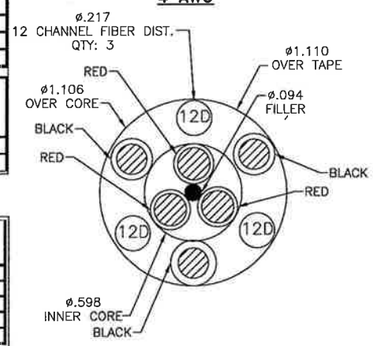
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

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

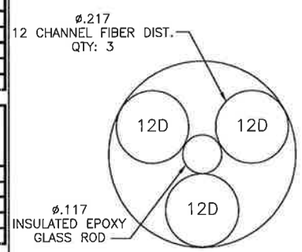
NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



4 AWG

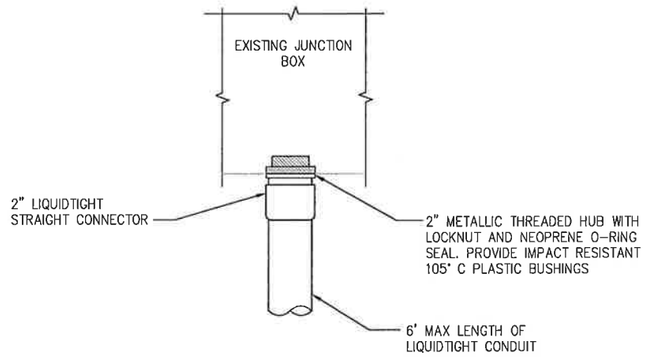


8 & 6 AWG



FIBER ONLY

2.5 CABLE CROSS SECTION DATA | NO SCALE | 1



FIBER JUNCTION BOX PENETRATION | NO SCALE | 2

DETAIL NOT USED | NO SCALE | 3

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Sprint
6580 Sprint Parkway
Overland Park, Kansas 66251

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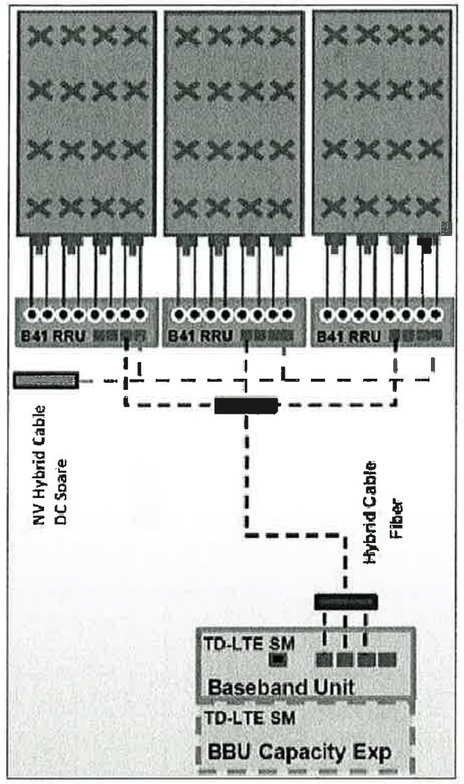
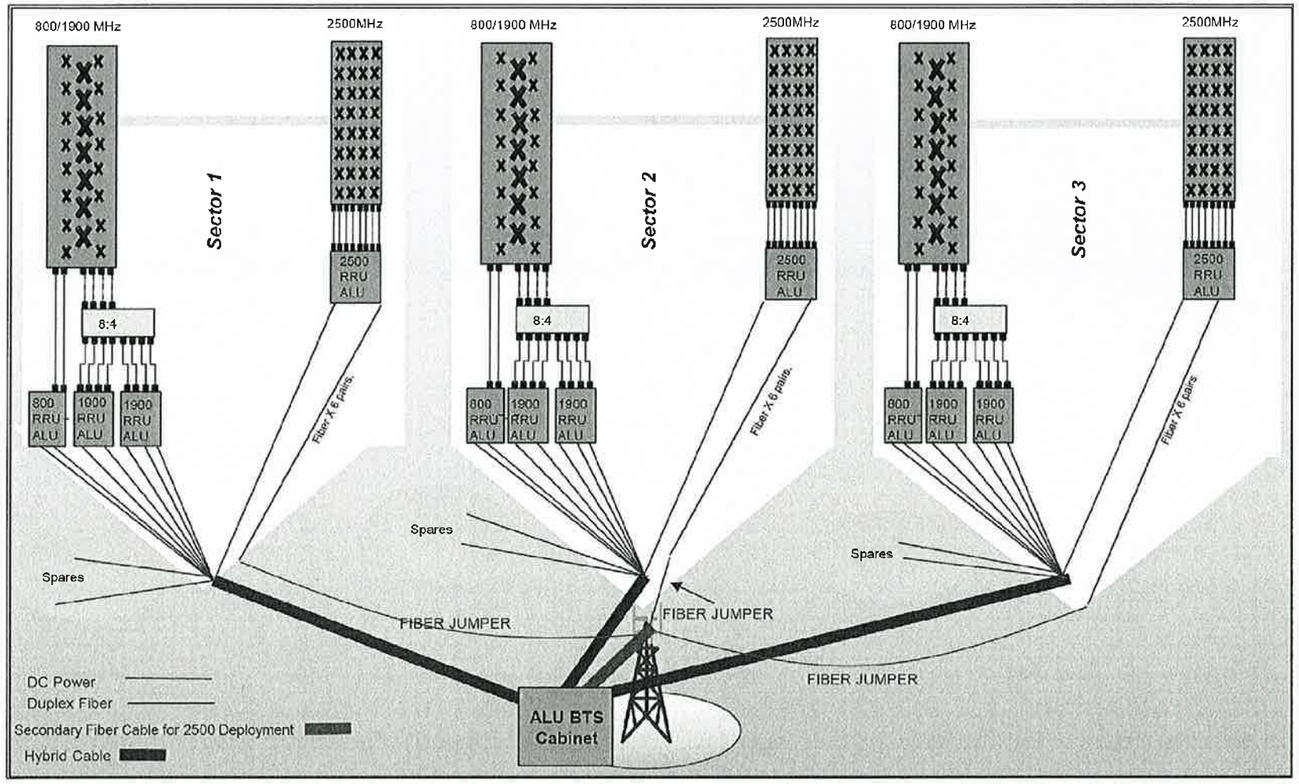
201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:
CIVIL DETAILS

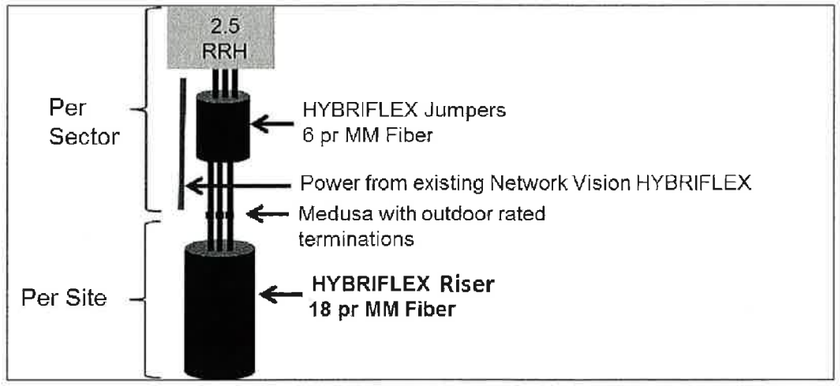
SHEET NUMBER:
A-6



ALU 2.5 ALU SCENARIO 1



RAN WIRING DIAGRAM



RF 2.5 ALU SCENARIO 1

PLUMBING DIAGRAM

NO SCALE

1

PLANS PREPARED FOR:

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Overland Park, Kansas 66251

PLANS PREPARED BY:

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CROMWELL, CT 06416

SHEET DESCRIPTION:

CIVIL DETAILS

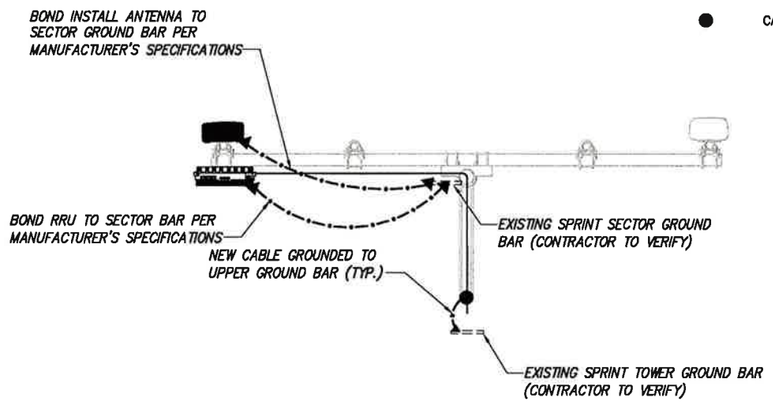
SHEET NUMBER:

A-7

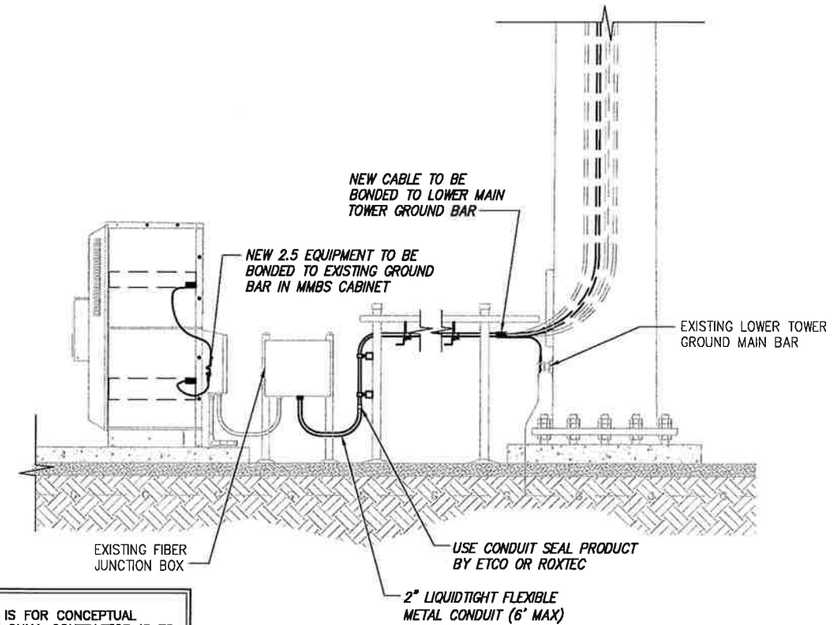
PLAN NOT USED | NO SCALE | 1

LEGEND:

- G — EXISTING GROUND RING
- ■ CADWELD CONNECTION (EXOTHERMIC WELD)
- ▲ MECHANICAL CONNECTION
- ⊗ GROUND ROD
- ● CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2



NOTE:
DEPICTION IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO FIELD VERIFY PRIOR TO CONSTRUCTION

TYPICAL EQUIPMENT GROUNDING PLAN (ELEVATION) | NO SCALE | 3

PLANS PREPARED FOR:

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	5/29/14	JDV	0

SITE NAME:

CROMWELL / FIRST LINE EMERGENCY

SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

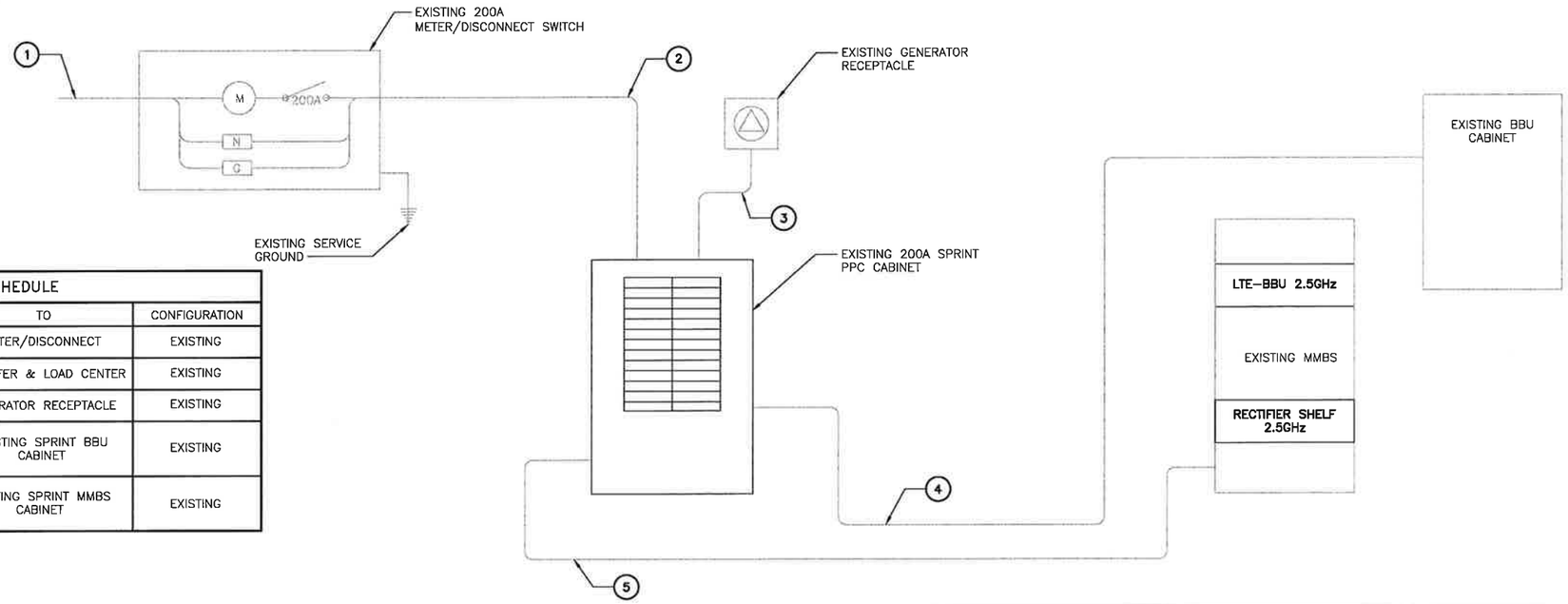
ELECTRICAL & GROUNDING PLAN

SHEET NUMBER:

E-1

NOTES

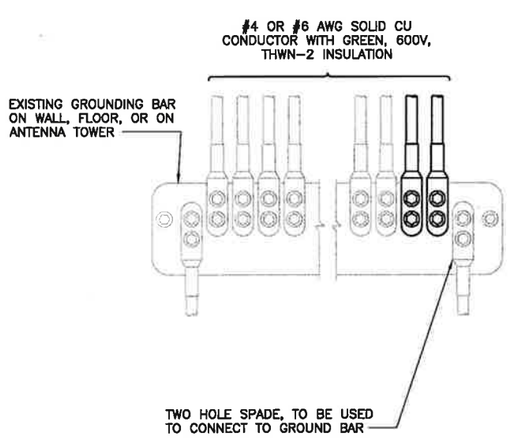
CG SHALL REFERENCE ALL SPECS FOR "CONNECTING THE POWER SUPPLY" OF THE NEW INSTALLATION DOCUMENTS, FOR ALL CONNECTION SPECIFICATIONS.



CIRCUIT SCHEDULE

NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BBU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT MMBS CABINET	EXISTING

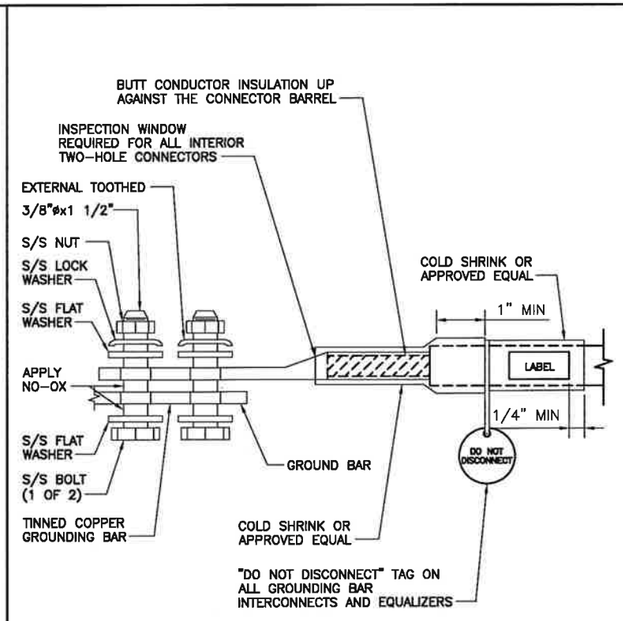
ELECTRICAL ONE–LINE DIAGRAM — NO SCALE — 1



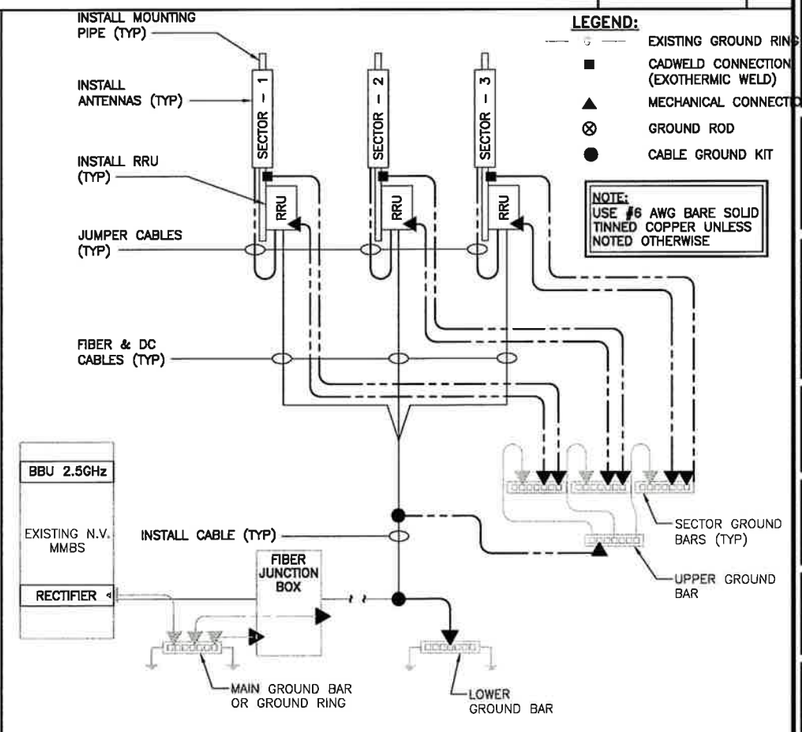
NOTES

1. APPLY NO–OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR — NO SCALE — 2



TWO HOLE LUG — NO SCALE — 3



GROUNDING RISER DIAGRAM — NO SCALE — 4

PLANS PREPARED FOR:

Sprint

6580 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:

INFINIGY Design. Build. Deliver.

1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

JOB NUMBER 353–000

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT · JOHN S. STEVENS · No. 24705 · LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

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REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	5/29/14	JDV	0

SITE NAME:

CROMWELL /
FIRST LINE EMERGENCY

SITE CASCADE:

CT23XC558

SITE ADDRESS:

201 MAIN ST
CROMWELL, CT 06416

SHEET DESCRIPTION:

ELECTRICAL &
GROUNDING DETAILS

SHEET NUMBER:

E-2

Date: **May 14, 2014**

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

AW Solutions Inc.
300 Crown Oak Centre Dr
Longwood, Florida
(407) 260-0231

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	Scenario 2.5B
	Carrier Site Number:	CT23XC558
Crown Castle Designation:	**Crown Castle BU Number:**	876364
	Crown Castle Site Name:	CROMWELL / FIRST LINE EMERGENC
	Crown Castle JDE Job Number:	286438
	Crown Castle Work Order Number:	758571
	Crown Castle Application Number:	245691 Rev. 1
Engineering Firm Designation:	**AW Solutions Inc. Project Number:**	876364
Site Data:	**201 Main St., CROMWELL, Middlesex County, CT** **Latitude *41° 35' 0.11"*, Longitude *-72° 38' 59.14"*** **125 Foot - Monopole Tower**	

Dear Charles Trask,

AW Solutions Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 645698, in accordance with application 245691, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

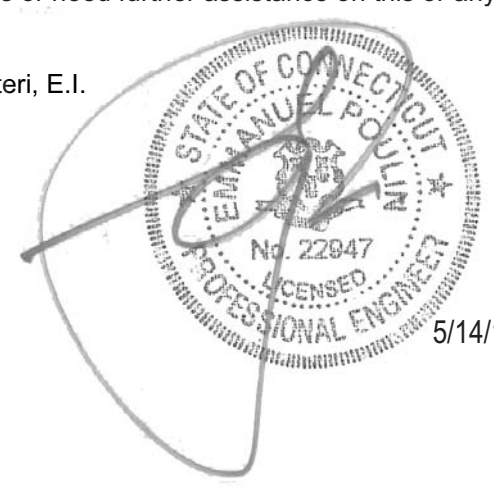
The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 Connecticut State Building code based upon a wind speed of 85 mph fastest mile.

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

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

Structural analysis prepared by: Nick Alteri, E.I.

Respectfully submitted by:



Emmanuel Poulin, P.E.
VP of Engineering

5/14/14

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 125 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in February of 2002. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower was reinforced in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
125.0	127.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	1
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Notes:
1) Proposed Equipment

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
125.0	129.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe	3 3 3 2	1/4 5/16 1-1/4 1/2	1
		3	samsung telecommunications	WIMAX DAP HEAD			
	127.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	125.0	1	tower mounts-new	Platform Mount [LP 712-1]			
	124.0	1	andrew	VHLP2-11			
		1	andrew	VHLP2-18			
		2	dragonwave	HORIZON COMPACT			
123.0	123.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]			
115.0	117.0	6	communication components inc.	DTMABP7819VG12A	12 1 2	1-1/4 3/8 3/4	1
		3	ericsson	RRUS-11			
		9	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
105.0	105.0	6	andrew	DB846F65ZAXY w/ Mount Pipe	-	-	3
		3	andrew	HBX-6517DS-VTM w/ Mount Pipe	1	1-5/8	2
		3	andrew	LNX-6514DS-VTM w/ Mount Pipe			
		3	alcatel lucent	RRH2X40-AWS			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	12	1-5/8	1
		3	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts-new	Platform Mount [LP 401-1]			
95.0	95.0	12	decibel	DB844H65E-XY w/ Mount Pipe	12	1-5/8	1
		1	tower mounts	Platform Mount [LP 303-1]			
85.0	85.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts-new	Pipe Mount [PM 601-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) 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)
125	125	6	Unknown	DB980H65	-	-
		3	Unknown	DB980H90		
115	115	6	Allgon	7250	-	-
105	105	12	Unknown	DB844	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E.	1532312	CCISITES
4-POST-MODIFICATION INSPECTION	TEP	4009982	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI	1613909	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI	2068958	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B+T Group	3669962	CCISITES
4-POST-MODIFICATION INSPECTION	B+T Group	3394680	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Base plate is assumed to be 1.75" thick although, some documents reference it as 1.5" thick. This thickness should be verified.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	125 - 94	Pole	TP25.164x18.5x0.1875	1	-9.11	772.74	95.3	Pass
L2	94 - 85.04	Pole	TP27.09x25.164x0.492	2	-9.94	2014.75	46.3	Pass
L3	85.04 - 73	Pole	TP29.264x25.264x0.461	3	-13.56	2176.67	67.7	Pass
L4	73 - 60.5	Pole	TP31.921x29.264x0.363	4	-15.96	1876.52	97.2	Pass
L5	60.5 - 40.457	Pole	TP36.18x31.921x0.445	5	-19.20	2779.26	79.8	Pass
L6	40.457 - 3.5	Pole	TP43.57x34.2099x0.454	6	-30.61	3196.33	98.1	Pass
L7	3.5 - 0	Pole	TP44.25x43.57x0.673	7	-31.52	4802.55	67.4	Pass
							Summary	
						Pole (L6)	98.1	Pass
						Rating =	98.1	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	91.8	Pass
1	Base Plate	0	90.1	Pass
1	Base Foundation	0	102.4	Pass[2]
1	Reinforcement plates	0.5 to 60.5	96.8	Pass
1	Reinforcement plates	60.5 to 75.5	96.3	Pass
1	Reinforcement plates	70.0 to 96.0	88.9	Pass

Structure Rating (max from all components) =	102.4%[2]

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

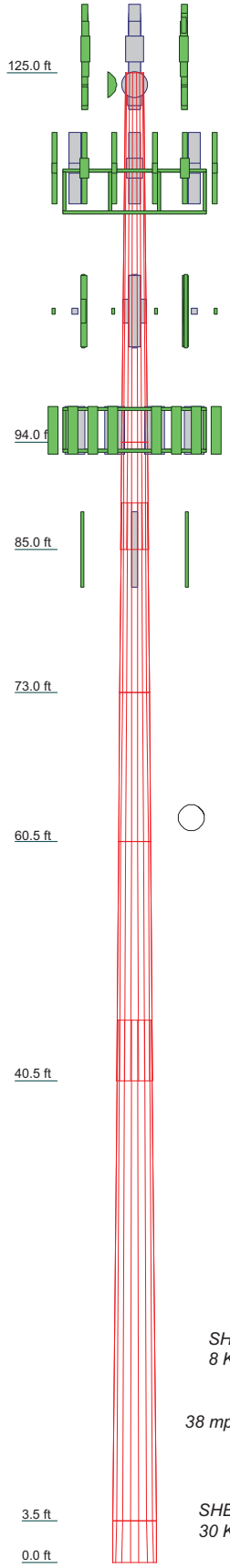
4.1) Recommendations

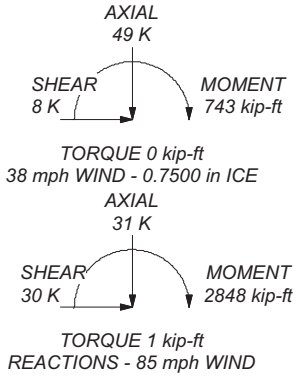
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	31.00	18	0.1875		18.5000	25.1640	A572-65	1.4
2	8.96	18	0.4920		25.1640	27.0900		0.5
3	15.96	18	0.4610		25.2640	29.2640	62.631	1.2
4	12.50	18	0.3630		29.2640	31.9210	64.575	1.0
5	20.04	18	0.4450	5.08	31.9210	36.1800	64.5278	1.8
6	42.04	18	0.4540		34.2099	43.5700	70.993387	5.5
7	3.50	18	0.6730		43.5700	44.2500	64.3236	0.5
							64.50765	11.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	125
APXVSPP18-C-A20 w/ Mount Pipe	125
APXVSPP18-C-A20 w/ Mount Pipe	125
LLPX310R-V1 w/ Mount Pipe	125
LLPX310R-V1 w/ Mount Pipe	125
LLPX310R-V1 w/ Mount Pipe	125
WIMAX DAP HEAD	125
WIMAX DAP HEAD	125
WIMAX DAP HEAD	125
HORIZON COMPACT	125
HORIZON COMPACT	125
Platform Mount [LP 712-1]	125
APXVTM14-C-120 w/ Mount Pipe	125
APXVTM14-C-120 w/ Mount Pipe	125
APXVTM14-C-120 w/ Mount Pipe	125
TD-RRH8x20-25	125
TD-RRH8x20-25	125
TD-RRH8x20-25	125
VHLP2-11	125
VHLP2-18	125
PCS 1900MHz 4x45W-65MHz	123
Side Arm Mount [SO 102-3]	123
PCS 1900MHz 4x45W-65MHz	123
PCS 1900MHz 4x45W-65MHz	123
800MHz 2X50W RRH W/FILTER	123
800MHz 2X50W RRH W/FILTER	123
800MHz 2X50W RRH W/FILTER	123
RRUS-11	115
Platform Mount [LP 303-1]	115
RRUS-11	115
RRUS-11	115
(2) DTMABP7819VG12A	115
(2) DTMABP7819VG12A	115
(2) DTMABP7819VG12A	115
DC6-48-60-18-8F	115
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	115

TYPE	ELEVATION
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
HBX-6517DS-VTM w/ Mount Pipe	105
LNX-6514DS-VTM w/ Mount Pipe	105
LNX-6514DS-VTM w/ Mount Pipe	105
LNX-6514DS-VTM w/ Mount Pipe	105
RRH2X40-AWS	105
RRH2X40-AWS	105
RRH2X40-AWS	105
DB-T1-6Z-8AB-0Z	105
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	105
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	105
Platform Mount [LP 401-1]	105
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	105
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	105
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	105
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	105
(2) FD9R6004/2C-3L	105
(2) FD9R6004/2C-3L	105
(2) FD9R6004/2C-3L	105
HBX-6517DS-VTM w/ Mount Pipe	105
HBX-6517DS-VTM w/ Mount Pipe	105
(4) DB844H65E-XY w/ Mount Pipe	95
(4) DB844H65E-XY w/ Mount Pipe	95
Platform Mount [LP 303-1]	95
(4) DB844H65E-XY w/ Mount Pipe	95
742 213 w/ Mount Pipe	85
742 213 w/ Mount Pipe	85
Pipe Mount [PM 601-3]	85
742 213 w/ Mount Pipe	85

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	70.993387	71 ksi	87 ksi
62.631	63 ksi	77 ksi	64.3236	64 ksi	79 ksi
64.575	65 ksi	79 ksi	64.50765	65 ksi	79 ksi
64.5278	65 ksi	79 ksi			

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.1%

AW Solutions Inc.
300 Crown Oak Centre Dr
Longwood, Florida
Phone: (407) 260-0231
FAX:

Job: ***BU876364***			
Project: ***WO758571***			
Client: Crown Castle	Drawn by: Nicholas.Alteri, E.I.	App'd:	
Code: TIA/EIA-222-F	Date: 05/14/14	Scale: NTS	
Path: R:\Central_Data\CROWN CASTLE\CRC - STRUCTURAL\BU876364 - WO758571\ENGINEERING\BU876364 - WO758571.eri		Dwg No. E-1	

Tower Input Data

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

1) Tower is located in Middlesex County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	125.00-94.00	31.00	0.00	18	18.5000	25.1640	0.1875	0.7500	A572-65 (65 ksi)
L2	94.00-85.04	8.96	3.92	18	25.1640	27.0900	0.4920	1.9680	62.631 (63 ksi)
L3	85.04-73.00	15.96	0.00	18	25.2640	29.2640	0.4610	1.8440	64.575 (65 ksi)
L4	73.00-60.50	12.50	0.00	18	29.2640	31.9210	0.3630	1.4520	64.5278 (65 ksi)
L5	60.50-40.46	20.04	5.08	18	31.9210	36.1800	0.4450	1.7800	70.993387 (71 ksi)
L6	40.46-3.50	42.04	0.00	18	34.2099	43.5700	0.4540	1.8160	64.3236 (64 ksi)
L7	3.50-0.00	3.50		18	43.5700	44.2500	0.6730	2.6920	64.50765 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.7854	10.8982	461.7305	6.5009	9.3980	49.1307	924.0685	5.4501	2.9260	15.605
	25.5522	14.8641	1171.4949	8.8667	12.7833	91.6425	2344.5312	7.4335	4.0989	21.861
L2	25.5522	38.5280	2962.9379	8.7586	12.7833	231.7817	5929.7744	19.2677	3.5629	7.242
	27.5079	41.5356	3712.4142	9.4423	13.7617	269.7638	7429.7132	20.7718	3.9019	7.931
L3	26.6508	36.2921	2820.7136	8.8051	12.8341	219.7824	5645.1387	18.1495	3.6351	7.885
	29.7154	42.1450	4417.3160	10.2251	14.8661	297.1400	8840.4445	21.0765	4.3391	9.412
L4	29.7154	33.2986	3513.9017	10.2599	14.8661	236.3699	7032.4271	16.6525	4.5116	12.429
	32.4134	36.3599	4574.8769	11.2031	16.2159	282.1235	9155.7736	18.1834	4.9792	13.717
L5	32.4134	44.4576	5564.7159	11.1740	16.2159	343.1648	11136.7539	22.2330	4.8349	10.865
	36.7381	50.4732	8143.0245	12.6859	18.3794	443.0507	16296.7639	25.2414	5.5845	12.549
L6	35.8868	48.6421	7002.4366	11.9833	17.3786	402.9338	14014.0872	24.3257	5.2219	11.502
	44.2421	62.1300	14592.0267	15.3062	22.1336	659.2716	29203.2539	31.0709	6.8693	15.131
L7	44.2421	91.6324	21302.9721	15.2284	22.1336	962.4738	42633.9753	45.8249	6.4838	9.634
	44.9326	93.0849	22332.1956	15.4698	22.4790	993.4693	44693.7764	46.5513	6.6035	9.812

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 125.00-94.00				1	1	1		
L2 94.00-85.04				1	1	0.5		
L3 85.04-73.00				1	1	0.5714		
L4 73.00-60.50				1	1	0.667		
L5 60.50-40.46				1	1	0.5625		
L6 40.46-3.50				1	1	0.696		
L7 3.50-0.00				1	1	0.5		

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
ATCB-B01-005(5/16)	A	No	CaAa (Out Of Face)	125.00 - 0.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.57
						1" Ice	0.00	1.68
						2" Ice	0.00	5.73
						4" Ice	0.00	21.16
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	125.00 - 0.00	1	No Ice	0.05	0.14
						1/2" Ice	0.15	0.76
						1" Ice	0.25	2.00
						2" Ice	0.45	6.30
						4" Ice	0.85	22.23
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	125.00 - 0.00	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.76
						1" Ice	0.00	2.00
						2" Ice	0.00	6.30
						4" Ice	0.00	22.23
LDF1-50A(1/4")	A	No	CaAa (Out Of Face)	125.00 - 0.00	3	No Ice	0.00	0.06
						1/2" Ice	0.00	0.58

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	1.70
						2" Ice	0.00	5.79
						4" Ice	0.00	21.29
HB114-1-08U4-M5J(1 1/4")	A	No	Inside Pole	125.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
						2" Ice	0.00	1.08
						4" Ice	0.00	1.08
HB114-1-08U4-M5J(1 1/4")	A	No	Inside Pole	125.00 - 0.00	1	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
						2" Ice	0.00	1.08
						4" Ice	0.00	1.08
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	115.00 - 0.00	10	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	115.00 - 0.00	2	No Ice	0.16	0.66
						1/2" Ice	0.25	1.91
						1" Ice	0.35	3.78
						2" Ice	0.55	9.33
						4" Ice	0.95	27.78
FB-L98B-002-75000(3/8")	C	No	CaAa (Out Of Face)	115.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.60
						1" Ice	0.00	1.76
						2" Ice	0.00	5.91
						4" Ice	0.00	21.53
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	115.00 - 0.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	1.37
						1" Ice	0.00	2.76
						2" Ice	0.00	7.37
						4" Ice	0.00	23.92
LDF7-50A(1-5/8")	B	No	Inside Pole	105.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	105.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30
LDF7-50A(1-5/8")	B	No	Inside Pole	95.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
AVA7-50(1-5/8)	A	No	Inside Pole	85.00 - 0.00	6	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
						2" Ice	0.00	0.70
						4" Ice	0.00	0.70
Miscl 2" Rigid Conduit	C	No	CaAa (Out Of Face)	115.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
MS 600 (6" x 1") Flat Plate	A	No	CaAa (Out Of Face)	96.00 - 71.00	1	No Ice	0.10	20.40
						1/2" Ice	0.20	21.74
						1" Ice	0.30	23.42
						2" Ice	0.50	27.83
						4" Ice	0.90	40.80
MS 600 (6" x 1") Flat Plate	B	No	CaAa (Out Of Face)	96.00 - 71.00	1	No Ice	0.10	20.40
						1/2" Ice	0.20	21.74
						1" Ice	0.30	23.42
						2" Ice	0.50	27.83
						4" Ice	0.90	40.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
MS 600 (6" x 1") Flat Plate	C	No	CaAa (Out Of Face)	96.00 - 71.00	1	No Ice	0.00	20.40
						1/2" Ice	0.00	21.74
						1" Ice	0.00	23.42
						2" Ice	0.00	27.83
						4" Ice	0.00	40.80
Flat Plate 4.75" x 0.75"	A	No	CaAa (Out Of Face)	75.50 - 60.50	1	No Ice	0.13	12.12
						1/2" Ice	0.17	13.20
						1" Ice	0.28	14.63
						2" Ice	0.47	18.52
						4" Ice	0.88	30.44
Flat Plate 4.75" x 0.75"	B	No	CaAa (Out Of Face)	75.50 - 60.50	1	No Ice	0.13	12.12
						1/2" Ice	0.17	13.20
						1" Ice	0.28	14.63
						2" Ice	0.47	18.52
						4" Ice	0.88	30.44
Flat Plate 4.75" x 0.75"	C	No	CaAa (Out Of Face)	75.50 - 60.50	1	No Ice	0.00	12.12
						1/2" Ice	0.00	13.20
						1" Ice	0.00	14.63
						2" Ice	0.00	18.52
						4" Ice	0.00	30.44
Flat Plate 4.875" x 1.25"	A	No	CaAa (Out Of Face)	60.50 - 0.50	1	No Ice	0.21	20.70
						1/2" Ice	0.32	21.99
						1" Ice	0.43	23.63
						2" Ice	0.65	27.94
						4" Ice	1.10	40.71
Flat Plate 4.875" x 1.25"	B	No	CaAa (Out Of Face)	60.50 - 0.50	1	No Ice	0.21	20.70
						1/2" Ice	0.32	21.99
						1" Ice	0.43	23.63
						2" Ice	0.65	27.94
						4" Ice	1.10	40.71
Flat Plate 4.875" x 1.25"	C	No	CaAa (Out Of Face)	60.50 - 0.50	1	No Ice	0.00	20.70
						1/2" Ice	0.00	21.99
						1" Ice	0.00	23.63
						2" Ice	0.00	27.94
						4" Ice	0.00	40.71

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	125.00-94.00	A	0.000	0.000	0.000	1.812	0.20
		B	0.000	0.000	0.000	0.200	0.17
		C	0.000	0.000	0.000	6.510	0.29
L2	94.00-85.04	A	0.000	0.000	0.000	1.362	0.23
		B	0.000	0.000	0.000	0.896	0.37
		C	0.000	0.000	0.000	2.778	0.29
L3	85.04-73.00	A	0.000	0.000	0.000	2.143	0.39
		B	0.000	0.000	0.000	1.517	0.53
		C	0.000	0.000	0.000	3.732	0.42
L4	73.00-60.50	A	0.000	0.000	0.000	2.413	0.31
		B	0.000	0.000	0.000	1.763	0.45
		C	0.000	0.000	0.000	3.875	0.34
L5	60.50-40.46	A	0.000	0.000	0.000	5.218	0.60
		B	0.000	0.000	0.000	4.176	0.84
		C	0.000	0.000	0.000	6.213	0.65
L6	40.46-3.50	A	0.000	0.000	0.000	9.621	1.11
		B	0.000	0.000	0.000	7.699	1.54
		C	0.000	0.000	0.000	11.457	1.21
L7	3.50-0.00	A	0.000	0.000	0.000	0.807	0.09
		B	0.000	0.000	0.000	0.625	0.14
		C	0.000	0.000	0.000	1.085	0.10

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	125.00-94.00	A	0.866	0.000	0.000	0.000	7.524	0.54
		B		0.000	0.000	0.000	0.546	0.18
		C		0.000	0.000	0.000	13.780	1.06
L2	94.00-85.04	A	0.845	0.000	0.000	0.000	4.392	0.35
		B		0.000	0.000	0.000	2.411	0.39
		C		0.000	0.000	0.000	5.807	0.63
L3	85.04-73.00	A	0.833	0.000	0.000	0.000	6.512	0.55
		B		0.000	0.000	0.000	3.850	0.56
		C		0.000	0.000	0.000	7.804	0.88
L4	73.00-60.50	A	0.816	0.000	0.000	0.000	6.194	0.46
		B		0.000	0.000	0.000	3.504	0.48
		C		0.000	0.000	0.000	7.955	0.79
L5	60.50-40.46	A	0.789	0.000	0.000	0.000	11.894	0.84
		B		0.000	0.000	0.000	7.689	0.88
		C		0.000	0.000	0.000	12.538	1.35
L6	40.46-3.50	A	0.750	0.000	0.000	0.000	21.931	1.54
		B		0.000	0.000	0.000	14.178	1.62
		C		0.000	0.000	0.000	23.118	2.48
L7	3.50-0.00	A	0.750	0.000	0.000	0.000	1.832	0.13
		B		0.000	0.000	0.000	1.125	0.14
		C		0.000	0.000	0.000	2.135	0.22

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	125.00-94.00	-0.2403	0.0710	-0.3953	-0.0020
L2	94.00-85.04	-0.2168	0.0632	-0.2878	-0.0276
L3	85.04-73.00	-0.1878	0.0468	-0.2473	-0.0508
L4	73.00-60.50	-0.1759	0.0393	-0.2890	-0.0340
L5	60.50-40.46	-0.1036	-0.0014	-0.1950	-0.0827
L6	40.46-3.50	-0.1068	-0.0014	-0.2057	-0.0872
L7	3.50-0.00	-0.1429	0.0173	-0.2621	-0.0603

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice	8.50 9.15 9.77 11.03	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	13.68	14.85	0.91
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
WIMAX DAP HEAD	A	From Leg	4.00 0.00 4.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	B	From Leg	4.00 0.00 4.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	C	From Leg	4.00 0.00 4.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
HORIZON COMPACT	A	From Leg	4.00 0.00 -1.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.84 0.97 1.10 1.39 2.08	0.43 0.52 0.63 0.86 1.43	0.01 0.02 0.03 0.05 0.12
HORIZON COMPACT	B	From Leg	4.00 0.00 -1.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.84 0.97 1.10 1.39 2.08	0.43 0.52 0.63 0.86 1.43	0.01 0.02 0.03 0.05 0.12
123									
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00 0.00	0.0000	123.00	No Ice 1/2"	2.71 2.95	2.61 2.85	0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
800MHz 2X50W RRH W/FILTER	A	From Leg	4.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	4.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	4.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
115									
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.07 0.14 0.21 0.38 0.87
RRUS-11	A	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
RRUS-11	B	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
RRUS-11	C	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
(2) DTMABP7819VG12A	A	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14

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) DTMABP7819VG12A	B	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
(2) DTMABP7819VG12A	C	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
DC6-48-60-18-8F	A	From Leg	4.00 0.00 2.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.27 1.46 1.66 2.09 3.10	1.27 1.46 1.66 2.09 3.10	0.02 0.04 0.05 0.10 0.21
105									
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0.03 0.06 0.10 0.19 0.49
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	0.37 0.45 0.54 0.75	0.08 0.14 0.20 0.34	0.00 0.01 0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	105.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			0.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
HBX-6517DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	105.00	No Ice	5.32	4.86	0.04
			0.00			1/2"	5.82	5.95	0.08
			0.00			Ice	6.32	6.81	0.13
						1" Ice	7.33	8.57	0.26
						2" Ice	9.50	12.31	0.66
						4" Ice			
HBX-6517DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.0000	105.00	No Ice	5.32	4.86	0.04
			0.00			1/2"	5.82	5.95	0.08
			0.00			Ice	6.32	6.81	0.13
						1" Ice	7.33	8.57	0.26
						2" Ice	9.50	12.31	0.66
						4" Ice			
HBX-6517DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.0000	105.00	No Ice	5.32	4.86	0.04
			0.00			1/2"	5.82	5.95	0.08
			0.00			Ice	6.32	6.81	0.13
						1" Ice	7.33	8.57	0.26
						2" Ice	9.50	12.31	0.66
						4" Ice			
LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	105.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			0.00			Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.0000	105.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			0.00			Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
LNX-6514DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.0000	105.00	No Ice	8.65	7.08	0.06
			0.00			1/2"	9.31	8.27	0.13
			0.00			Ice	9.93	9.18	0.21
						1" Ice	11.20	11.02	0.39
						2" Ice	13.87	15.06	0.90
						4" Ice			
RRH2X40-AWS	A	From Leg	4.00	0.0000	105.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			0.00			Ice	2.99	2.01	0.08
						1" Ice	3.50	2.46	0.13
						2" Ice	4.61	3.48	0.28
						4" Ice			
RRH2X40-AWS	B	From Leg	4.00	0.0000	105.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			0.00			Ice	2.99	2.01	0.08
						1" Ice	3.50	2.46	0.13
						2" Ice	4.61	3.48	0.28
						4" Ice			
RRH2X40-AWS	C	From Leg	4.00	0.0000	105.00	No Ice	2.52	1.59	0.04
			0.00			1/2"	2.75	1.80	0.06
			0.00			Ice	2.99	2.01	0.08
						1" Ice	3.50	2.46	0.13
						2" Ice	4.61	3.48	0.28
						4" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.0000	105.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			0.00			Ice	6.24	2.79	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice	6.91	3.28	0.21
							2" Ice	8.37	4.37	0.45
							4" Ice			
Mounts										
Platform Mount [LP 712-1]	C	None			0.0000	125.00	No Ice	24.53	24.53	1.34
							1/2" Ice	29.94	29.94	1.65
							1" Ice	35.35	35.35	1.96
							2" Ice	46.17	46.17	2.58
							4" Ice	67.81	67.81	3.82
Platform Mount [LP 303-1]	C	None			0.0000	115.00	No Ice	14.66	14.66	1.25
							1/2" Ice	18.87	18.87	1.48
							1" Ice	23.08	23.08	1.71
							2" Ice	31.50	31.50	2.18
							4" Ice	48.34	48.34	3.10
Platform Mount [LP 401-1]	C	None			0.0000	105.00	No Ice	24.33	24.33	1.65
							1/2" Ice	30.22	30.22	2.03
							1" Ice	36.11	36.11	2.41
							2" Ice	47.89	47.89	3.18
							4" Ice	71.45	71.45	4.72
95										
(4) DB844H65E-XY w/ Mount Pipe	A	From Leg	4.00	0.00 0.00	0.0000	95.00	No Ice	9.80	5.39	0.04
							1/2" Ice	10.31	6.07	0.11
							1" Ice	10.83	6.76	0.18
							2" Ice	11.90	8.20	0.35
							4" Ice	14.18	11.35	0.81
(4) DB844H65E-XY w/ Mount Pipe	B	From Leg	4.00	0.00 0.00	0.0000	95.00	No Ice	9.80	5.39	0.04
							1/2" Ice	10.31	6.07	0.11
							1" Ice	10.83	6.76	0.18
							2" Ice	11.90	8.20	0.35
							4" Ice	14.18	11.35	0.81
(4) DB844H65E-XY w/ Mount Pipe	C	From Leg	4.00	0.00 0.00	0.0000	95.00	No Ice	9.80	5.39	0.04
							1/2" Ice	10.31	6.07	0.11
							1" Ice	10.83	6.76	0.18
							2" Ice	11.90	8.20	0.35
							4" Ice	14.18	11.35	0.81
85										
742 213 w/ Mount Pipe	A	From Leg	4.00	0.00 0.00	0.0000	85.00	No Ice	5.37	4.62	0.05
							1/2" Ice	5.95	6.00	0.09
							1" Ice	6.50	6.98	0.15
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	B	From Leg	4.00	0.00 0.00	0.0000	85.00	No Ice	5.37	4.62	0.05
							1/2" Ice	5.95	6.00	0.09
							1" Ice	6.50	6.98	0.15
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	C	From Leg	4.00	0.00 0.00	0.0000	85.00	No Ice	5.37	4.62	0.05
							1/2" Ice	5.95	6.00	0.09
							1" Ice	6.50	6.98	0.15
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
**										
Platform Mount [LP 303-1]	C	None			0.0000	95.00	No Ice	14.66	14.66	1.25
							1/2" Ice	18.87	18.87	1.48
							1" Ice	23.08	23.08	1.71
							2" Ice	31.50	31.50	2.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	48.34	48.34	3.10
Pipe Mount [PM 601-3]	C	None		0.0000	85.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.39 5.48 6.57 8.75 13.11	4.39 5.48 6.57 8.75 13.11	0.20 0.24 0.28 0.36 0.53
Side Arm Mount [SO 102-3]	C	None		0.0000	123.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
**									
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 2.00	0.0000	125.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft^2	Weight K

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	A	Paraboloid w/o Radome	From Leg	1.00 0.00 -1.00	0.0000		125.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.20
VHLP2-18	C	Paraboloid w/o Radome	From Leg	1.00 0.00 -1.00	0.0000		125.00	2.17	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.72 4.01 4.30 4.88 6.04	0.03 0.05 0.07 0.11 0.20

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	125 - 94	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.53	0.91	0.75

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	5	-9.15	-368.07	4.24
			Max. My	2	-9.11	-6.41	372.61
			Max. Vy	5	21.44	-368.07	4.24
			Max. Vx	8	21.69	0.84	-372.55
			Max. Torque	5			0.99
L2	94 - 85.04	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.72	1.15	0.68
			Max. Mx	5	-9.98	-477.20	4.91
			Max. My	8	-9.94	1.01	-483.00
			Max. Vy	5	21.88	-477.20	4.91
			Max. Vx	8	22.12	1.01	-483.00
			Max. Torque	5			0.99
L3	85.04 - 73	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.99	1.95	0.46
			Max. Mx	5	-13.60	-847.62	7.03
			Max. My	8	-13.56	1.55	-857.59
			Max. Vy	5	24.15	-847.62	7.03
			Max. Vx	8	24.39	1.55	-857.59
			Max. Torque	5			0.98
L4	73 - 60.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.11	2.61	0.27
			Max. Mx	5	-15.99	-1155.45	8.67
			Max. My	8	-15.96	1.99	-1168.72
			Max. Vy	5	25.15	-1155.45	8.67
			Max. Vx	8	25.40	1.99	-1168.72
			Max. Torque	5			0.98
L5	60.5 - 40.457	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.24	3.45	0.01
			Max. Mx	5	-19.22	-1540.53	10.60
			Max. My	8	-19.20	2.54	-1557.77
			Max. Vy	5	26.39	-1540.53	10.60
			Max. Vx	8	26.63	2.54	-1557.77
			Max. Torque	5			0.97
L6	40.457 - 3.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.40	5.99	-0.80
			Max. Mx	5	-30.61	-2715.89	15.86
			Max. My	8	-30.61	4.13	-2744.24
			Max. Vy	5	29.50	-2715.89	15.86
			Max. Vx	8	29.74	4.13	-2744.24
			Max. Torque	5			0.97
L7	3.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.54	6.22	-0.88
			Max. Mx	5	-31.52	-2819.46	16.28
			Max. My	8	-31.52	4.27	-2848.73
			Max. Vy	5	29.76	-2819.46	16.28
			Max. Vx	8	29.99	4.27	-2848.73
			Max. Torque	5			0.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	49.54	-0.00	-0.00
	Max. H_x	11	31.54	29.66	0.00
	Max. H_z	2	31.54	-0.21	29.97
	Max. M_x	2	2846.11	-0.21	29.97
	Max. M_z	5	2819.46	-29.74	0.13
	Max. Torsion	5	0.97	-29.74	0.13
	Min. Vert	8	31.54	0.02	-29.98
	Min. H_x	5	31.54	-29.74	0.13
	Min. H_z	8	31.54	0.02	-29.98
	Min. M_x	8	-2848.73	0.02	-29.98
	Min. M_z	11	-2812.57	29.66	0.00

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Torsion	11	-0.79	29.66	0.00

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	31.54	-0.00	0.00	0.47	1.61	0.00
Dead+Wind 0 deg - No Ice	31.54	0.21	-29.97	-2846.11	-25.81	-0.09
Dead+Wind 30 deg - No Ice	31.54	15.02	-25.90	-2458.11	-1427.95	-0.57
Dead+Wind 60 deg - No Ice	31.54	25.82	-15.01	-1426.10	-2448.60	-0.90
Dead+Wind 90 deg - No Ice	31.54	29.74	-0.13	-16.28	-2819.46	-0.97
Dead+Wind 120 deg - No Ice	31.54	25.82	14.99	1424.54	-2449.44	-0.67
Dead+Wind 150 deg - No Ice	31.54	14.76	25.96	2467.44	-1394.37	-0.18
Dead+Wind 180 deg - No Ice	31.54	-0.02	29.98	2848.73	4.27	0.24
Dead+Wind 210 deg - No Ice	31.54	-14.80	26.03	2475.55	1402.68	0.57
Dead+Wind 240 deg - No Ice	31.54	-25.71	15.17	1447.64	2437.85	0.76
Dead+Wind 270 deg - No Ice	31.54	-29.66	-0.00	0.24	2812.57	0.79
Dead+Wind 300 deg - No Ice	31.54	-25.70	-14.92	-1414.67	2437.35	0.66
Dead+Wind 330 deg - No Ice	31.54	-14.83	-25.83	-2449.22	1407.37	0.36
Dead+Ice+Temp	49.54	0.00	0.00	0.88	6.22	0.00
Dead+Wind 0 deg+Ice+Temp	49.54	0.05	-7.65	-739.08	0.01	-0.04
Dead+Wind 30 deg+Ice+Temp	49.54	3.83	-6.61	-638.38	-365.14	-0.17
Dead+Wind 60 deg+Ice+Temp	49.54	6.59	-3.83	-369.87	-631.09	-0.25
Dead+Wind 90 deg+Ice+Temp	49.54	7.60	-0.03	-3.06	-727.77	-0.26
Dead+Wind 120 deg+Ice+Temp	49.54	6.60	3.83	371.02	-631.29	-0.17
Dead+Wind 150 deg+Ice+Temp	49.54	3.77	6.63	642.09	-357.25	-0.04
Dead+Wind 180 deg+Ice+Temp	49.54	-0.00	7.65	741.27	7.08	0.08
Dead+Wind 210 deg+Ice+Temp	49.54	-3.78	6.64	644.00	371.36	0.17
Dead+Wind 240 deg+Ice+Temp	49.54	-6.57	3.87	376.45	640.72	0.22
Dead+Wind 270 deg+Ice+Temp	49.54	-7.58	-0.00	0.82	738.31	0.22
Dead+Wind 300 deg+Ice+Temp	49.54	-6.57	-3.81	-367.17	640.58	0.17
Dead+Wind 330 deg+Ice+Temp	49.54	-3.79	-6.60	-636.27	372.45	0.08
Dead+Wind 0 deg - Service	31.54	0.07	-10.37	-986.05	-7.86	-0.03
Dead+Wind 30 deg - Service	31.54	5.20	-8.96	-851.63	-493.82	-0.20
Dead+Wind 60 deg - Service	31.54	8.93	-5.19	-493.95	-847.55	-0.32
Dead+Wind 90 deg - Service	31.54	10.29	-0.05	-5.34	-975.97	-0.34
Dead+Wind 120 deg - Service	31.54	8.93	5.19	494.03	-847.84	-0.23
Dead+Wind 150 deg - Service	31.54	5.11	8.98	855.48	-482.17	-0.06
Dead+Wind 180 deg - Service	31.54	-0.01	10.37	987.65	2.57	0.08
Dead+Wind 210 deg - Service	31.54	-5.12	9.01	858.30	487.24	0.20
Dead+Wind 240 deg - Service	31.54	-8.89	5.25	502.04	846.00	0.26
Dead+Wind 270 deg - Service	31.54	-10.26	-0.00	0.39	975.78	0.28
Dead+Wind 300 deg - Service	31.54	-8.89	-5.16	-489.98	845.80	0.23
Dead+Wind 330 deg - Service	31.54	-5.13	-8.94	-848.53	488.85	0.13

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-31.54	0.00	0.00	31.54	0.00	0.000%
2	0.21	-31.54	-29.97	-0.21	31.54	29.97	0.003%
3	15.02	-31.54	-25.90	-15.02	31.54	25.90	0.000%
4	25.82	-31.54	-15.01	-25.82	31.54	15.01	0.000%
5	29.74	-31.54	-0.13	-29.74	31.54	0.13	0.001%
6	25.82	-31.54	14.99	-25.82	31.54	-14.99	0.000%
7	14.76	-31.54	25.96	-14.76	31.54	-25.96	0.000%
8	-0.02	-31.54	29.98	0.02	31.54	-29.98	0.008%
9	-14.80	-31.54	26.03	14.80	31.54	-26.03	0.000%
10	-25.71	-31.54	15.17	25.71	31.54	-15.17	0.000%
11	-29.67	-31.54	-0.00	29.66	31.54	0.00	0.003%
12	-25.70	-31.54	-14.92	25.70	31.54	14.92	0.000%
13	-14.83	-31.54	-25.83	14.83	31.54	25.83	0.000%
14	0.00	-49.54	0.00	-0.00	49.54	-0.00	0.003%
15	0.05	-49.54	-7.65	-0.05	49.54	7.65	0.000%
16	3.83	-49.54	-6.61	-3.83	49.54	6.61	0.000%
17	6.59	-49.54	-3.83	-6.59	49.54	3.83	0.000%
18	7.60	-49.54	-0.03	-7.60	49.54	0.03	0.000%
19	6.60	-49.54	3.83	-6.60	49.54	-3.83	0.000%
20	3.77	-49.54	6.63	-3.77	49.54	-6.63	0.000%
21	-0.00	-49.54	7.65	0.00	49.54	-7.65	0.000%
22	-3.78	-49.54	6.64	3.78	49.54	-6.64	0.000%
23	-6.57	-49.54	3.87	6.57	49.54	-3.87	0.000%
24	-7.58	-49.54	-0.00	7.58	49.54	0.00	0.000%
25	-6.57	-49.54	-3.81	6.57	49.54	3.81	0.000%
26	-3.79	-49.54	-6.60	3.79	49.54	6.60	0.000%
27	0.07	-31.54	-10.37	-0.07	31.54	10.37	0.004%
28	5.20	-31.54	-8.96	-5.20	31.54	8.96	0.001%
29	8.93	-31.54	-5.19	-8.93	31.54	5.19	0.001%
30	10.29	-31.54	-0.05	-10.29	31.54	0.05	0.004%
31	8.93	-31.54	5.19	-8.93	31.54	-5.19	0.001%
32	5.11	-31.54	8.98	-5.11	31.54	-8.98	0.001%
33	-0.01	-31.54	10.37	0.01	31.54	-10.37	0.004%
34	-5.12	-31.54	9.01	5.12	31.54	-9.01	0.001%
35	-8.89	-31.54	5.25	8.89	31.54	-5.25	0.001%
36	-10.27	-31.54	-0.00	10.26	31.54	0.00	0.004%
37	-8.89	-31.54	-5.16	8.89	31.54	5.16	0.001%
38	-5.13	-31.54	-8.94	5.13	31.54	8.94	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00002658	0.00009486
3	Yes	18	0.00000001	0.00007784
4	Yes	18	0.00000001	0.00007892
5	Yes	15	0.00000001	0.00006379
6	Yes	18	0.00000001	0.00007709
7	Yes	18	0.00000001	0.00007696
8	Yes	13	0.00006995	0.00013720
9	Yes	18	0.00000001	0.00007821
10	Yes	18	0.00000001	0.00007799
11	Yes	14	0.00002664	0.00008982
12	Yes	18	0.00000001	0.00007749
13	Yes	18	0.00000001	0.00007628
14	Yes	7	0.00000001	0.00002670
15	Yes	15	0.00000001	0.00013137
16	Yes	16	0.00000001	0.00007489

17	Yes	16	0.00000001	0.00007527
18	Yes	15	0.00000001	0.00012926
19	Yes	16	0.00000001	0.00007452
20	Yes	16	0.00000001	0.00007418
21	Yes	15	0.00000001	0.00013138
22	Yes	16	0.00000001	0.00007647
23	Yes	16	0.00000001	0.00007632
24	Yes	15	0.00000001	0.00013099
25	Yes	16	0.00000001	0.00007578
26	Yes	16	0.00000001	0.00007554
27	Yes	13	0.00007525	0.00006029
28	Yes	15	0.00000001	0.00009651
29	Yes	15	0.00000001	0.00010133
30	Yes	13	0.00000001	0.00007755
31	Yes	15	0.00000001	0.00009502
32	Yes	15	0.00000001	0.00009692
33	Yes	13	0.00007524	0.00006080
34	Yes	15	0.00000001	0.00010021
35	Yes	15	0.00000001	0.00009664
36	Yes	13	0.00000001	0.00006812
37	Yes	15	0.00000001	0.00009892
38	Yes	15	0.00000001	0.00009477

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	125 - 94 (1)	TP25.164x18.5x0.1875	31.00	0.00	0.0	39.000	14.8641	-9.11	579.70	0.016
L2	94 - 85.04 (2)	TP27.09x25.164x0.492	8.96	0.00	0.0	37.579	40.2208	-9.94	1511.44	0.007
L3	85.04 - 73 (3)	TP29.264x25.264x0.461	15.96	0.00	0.0	38.745	42.1450	-13.56	1632.91	0.008
L4	73 - 60.5 (4)	TP31.921x29.264x0.363	12.50	0.00	0.0	38.717	36.3599	-15.96	1407.74	0.011
L5	60.5 - 40.457 (5)	TP36.18x31.921x0.445	20.04	0.00	0.0	42.596	48.9476	-19.20	2084.97	0.009
L6	40.457 - 3.5 (6)	TP43.57x34.2099x0.454	42.04	0.00	0.0	38.594	62.1300	-30.61	2397.85	0.013
L7	3.5 - 0 (7)	TP44.25x43.57x0.673	3.50	0.00	0.0	38.705	93.0849	-31.52	3602.81	0.009

Pole Bending Design Data

Section No.	Elevation	Size	Actual M_x	Actual f_{bx}	Allow. F_{bx}	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y	Actual f_{by}	Allow. F_{by}	Ratio $\frac{f_{by}}{F_{by}}$
	ft		kip-ft	ksi	ksi		kip-ft	ksi	ksi	
L1	125 - 94 (1)	TP25.164x18.5x0.1875	372.67	48.799	39.000	1.251	0.00	0.000	39.000	0.000
L2	94 - 85.04 (2)	TP27.09x25.164x0.492	483.00	22.927	37.579	0.610	0.00	0.000	37.579	0.000
L3	85.04 - 73 (3)	TP29.264x25.264x0.461	857.59	34.634	38.745	0.894	0.00	0.000	38.745	0.000
L4	73 - 60.5 (4)	TP31.921x29.264x0.363	1168.72	49.711	38.717	1.284	0.00	0.000	38.717	0.000
L5	60.5 - 40.457 (5)	TP36.18x31.921x0.445	1557.78	44.880	42.596	1.054	0.00	0.000	42.596	0.000
L6	40.457 - 3.5 (6)	TP43.57x34.2099x0.454	2744.25	49.950	38.594	1.294	0.00	0.000	38.594	0.000
L7	3.5 - 0 (7)	TP44.25x43.57x0.673	2848.73	34.410	38.705	0.889	0.00	0.000	38.705	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	125 - 94 (1)	TP25.164x18.5x0.1875	21.67	1.458	26.000	0.112	0.01	0.000	26.000	0.000
L2	94 - 85.04 (2)	TP27.09x25.164x0.492	22.12	0.550	25.052	0.044	0.15	0.003	25.052	0.000
L3	85.04 - 73 (3)	TP29.264x25.264x0.461	24.39	0.579	25.830	0.045	0.17	0.003	25.830	0.000
L4	73 - 60.5 (4)	TP31.921x29.264x0.363	25.40	0.699	25.811	0.054	0.19	0.004	25.811	0.000
L5	60.5 - 40.457 (5)	TP36.18x31.921x0.445	26.63	0.544	28.397	0.038	0.20	0.003	28.397	0.000
L6	40.457 - 3.5 (6)	TP43.57x34.2099x0.454	29.74	0.479	25.729	0.037	0.23	0.002	25.729	0.000
L7	3.5 - 0 (7)	TP44.25x43.57x0.673	29.99	0.322	25.803	0.025	0.24	0.001	25.803	0.000

Pole Interaction Design Data

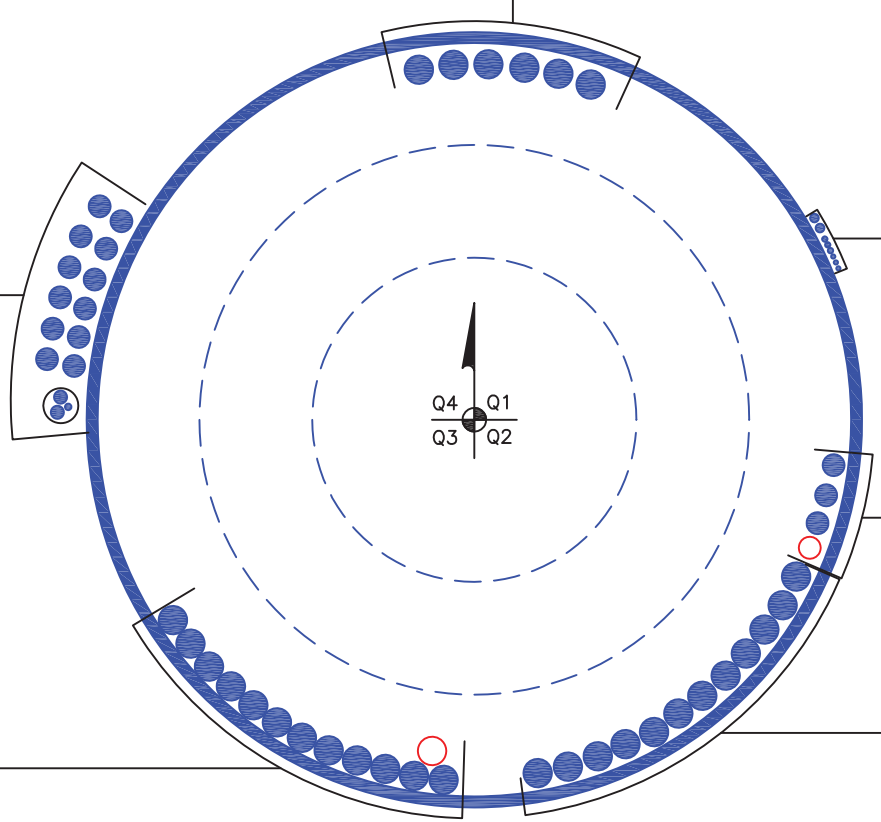
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	125 - 94 (1)	0.016	1.251	0.000	0.112	0.000	1.270 ✔	1.333	H1-3+VT ✔
L2	94 - 85.04 (2)	0.007	0.610	0.000	0.044	0.000	0.617 ✔	1.333	H1-3+VT ✔
L3	85.04 - 73 (3)	0.008	0.894	0.000	0.045	0.000	0.903 ✔	1.333	H1-3+VT ✔
L4	73 - 60.5 (4)	0.011	1.284	0.000	0.054	0.000	1.296 ✔	1.333	H1-3+VT ✔
L5	60.5 - 40.457 (5)	0.009	1.054	0.000	0.038	0.000	1.063 ✔	1.333	H1-3+VT ✔
L6	40.457 - 3.5 (6)	0.013	1.294	0.000	0.037	0.000	1.307 ✔	1.333	H1-3+VT ✔
L7	3.5 - 0 (7)	0.009	0.889	0.000	0.025	0.000	0.898 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	125 - 94	Pole	TP25.164x18.5x0.1875	1	-9.11	772.74	95.3	Pass
L2	94 - 85.04	Pole	TP27.09x25.164x0.492	2	-9.94	2014.75	46.3	Pass
L3	85.04 - 73	Pole	TP29.264x25.264x0.461	3	-13.56	2176.67	67.7	Pass
L4	73 - 60.5	Pole	TP31.921x29.264x0.363	4	-15.96	1876.52	97.2	Pass
L5	60.5 - 40.457	Pole	TP36.18x31.921x0.445	5	-19.20	2779.26	79.8	Pass
L6	40.457 - 3.5	Pole	TP43.57x34.2099x0.454	6	-30.61	3196.33	98.1	Pass
L7	3.5 - 0	Pole	TP44.25x43.57x0.673	7	-31.52	4802.55	67.4	Pass
							Summary	
						Pole (L6)	98.1	Pass
						RATING =	**98.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



(INSTALLED)
(6) 1–5/8" TO 85 FT LEVEL

(INSTALLED)
(3) 1/4" TO 125 FT LEVEL
(3) 5/16" TO 125 FT LEVEL
(2) 1/2" TO 125 FT LEVEL

(PROPOSED)
(1) 1–1/4" TO 125 FT LEVEL
(INSTALLED)
(3) 1 1/4" TO 125 FT LEVEL

(INSTALLED)
(12) 1–5/8" TO 95 FT LEVEL

(RESERVED)
(1) 1–5/8" TO 105 FT LEVEL
(INSTALLED)
(12) 1–5/8" TO 105 FT LEVEL

(INSTALLED–IN 2" CONDUIT)
(1) 3/8" TO 115 FT LEVEL
(2) 3/4" TO 115 FT LEVEL
(INSTALLED)
(12) 1–1/4" TO 115 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Project	BU876364
Site	

Designed by:	NA
Checked by:	EP
Date	5/14/2014

Pole Properties

Height=	125	ft
Sides=	18	
F_y=	65	ksi
F_u=	80	ksi
E=	29000	ksi

Reinforcement Properties

	A		B		C		D
Group	A		B		C		D
Reinforcement Type	Plates	MS600	Plates	MP404	Plates	MP406	Stiffeners
Quantity	3		3		3		3
E=	29000	ksi	29000	ksi	29000		29000
F_y=	65	ksi	100	ksi	100		65
F_u=	80	ksi	100	ksi	100		80
I=	0.5	in^4	0.167	in^4	0.793		50.86
Area=	6	in^2	3.5625	in^2	6.09375		15.625
Centroid=	0.5	in	0.375	in	0.625		3.125
Start height above base	71	ft	60.50	ft	0.50		0
End height above base	96	ft	75.50	ft	60.5		3.75
W/t=	6		6.33		3.9		0.2

Pole Design Data

Section Number	Length (ft)	Lap Splice Length (ft)	Top Diameter (in)	Bottom Diameter (in)	Thickness (in)
1	39.96	3.9167	18.5	27.09	0.1875
2	48.50	5.083	25.87304672	36.18	0.25
3	45.54	0	34.59978879	44.25	0.3125
4					
5					
6					
7					
8					
9					
10					

Section Properties

Section	Elevation above Base (ft)	Applied Reinforcement	Diameter (in)	Width of side (in)[1]	a (in)[2]	Total Area (in^2)[3]	$I_{monopole}$ (in^4)	$I_{reinforcement}$ (in^4)	I Total (in^4)[4]	Overall Section modulus (in^3)	w/t	$(Fy)^{1/2}(w/t)$	F_b
1	125		18.500	NA	NA	10.787	452.2198253	0	452.220	48.889	98.667	795.4760978	39.000
1	94.01		25.162	NA	NA	14.711	1147.000864	0	1147.001	91.170	134.196	1081.923354	39.000
1	94	A	25.164	NA	NA	32.712	1147.297062	1424.750768	2572.048	204.424	134.208	1082.015786	39.000
2	88.92	A	25.881	NA	NA	38.130	1653.217654	1507.090927	3160.309	244.220	103.523	834.6322049	39.000
2	85	A	26.714	NA	NA	38.785	1819.702244	1605.673362	3425.376	256.449	106.856	861.4974808	39.000
2	73.01	A	29.262	NA	NA	40.786	2397.524089	1926.58909	4324.113	295.545	117.048	943.6695876	39.000
2	73	B	29.264	NA	NA	33.475	2398.050962	1144.078431	3542.129	242.080	117.056	943.7381214	39.000
2	60.501	B	31.920	NA	NA	35.561	3118.7697	1361.19376	4479.963	280.697	127.681	1029.398602	39.000
2	60.5	C	31.921	NA	NA	43.155	3118.832481	2328.388751	5447.221	341.299	127.682	1029.405455	39.000
3	45.58	C	34.591	NA	NA	51.934	4943.344652	2734.314006	7677.659	443.908	110.692	892.4274081	39.000
3	40.5	C	35.668	NA	NA	52.991	5423.815885	2907.146445	8330.962	467.143	114.137	920.1998561	39.000
3	3.501	C	43.508	NA	NA	60.688	9891.217235	4325.687989	14216.905	653.530	139.226	1122.474029	39.000
3	3.5	D	43.508	NA	NA	89.282	9891.362802	11091.61571	20982.979	964.551	139.226	1122.479496	39.000
3	0	D	44.250	NA	NA	90.010	10409.64737	11472.9895	21882.637	989.047	141.600	1141.614057	39.000

Design Analysis

Elevation Above Base (ft)	Vu (Kips)	Mu (kip-ft)	Pu (Kips)	f_b	f_a	Unity[9]
125	0	0	0	0.00	0.00	0.00%
94.01	21.67	372.67	9.11	49.05	0.62	95.76%
94	21.67	372.67	9.11	21.88	0.28	42.71%
88.92	22.12	483	9.94	23.73	0.26	46.26%
85	22.12	483	9.94	22.60	0.26	44.07%
73.01	24.39	857.59	13.56	34.82	0.33	67.77%
73	24.39	857.59	13.56	42.51	0.41	82.74%
60.501	25.4	1168.72	15.96	49.96	0.45	97.19%
60.5	25.4	1168.72	15.96	41.09	0.37	79.93%
45.58	26.63	1557.78	19.2	42.11	0.37	81.90%
40.5	26.63	1557.78	19.2	40.02	0.36	77.85%
3.501	29.74	2744.25	30.61	50.39	0.50	98.12%
3.5	29.74	2744.25	30.61	34.14	0.34	66.48%
0	29.99	2848.73	31.52	34.56	0.35	67.31%

TNX Pole Properties

Elevation Above Base	I	Atotal	Effective Thickness	$I_{effective}$	$A_{effective}$	Difference	Ratio
125	452.22	10.79	0.187	452.22	10.79	0	1.00
94.01	1147.00	14.71	0.187	1147.00	14.71	0	1.00
94	2572.05	32.71	0.433	2572.05	33.63	0	1.03
88.92	3160.31	38.13	0.492	3160.31	39.21	0	1.03
85	3425.38	38.78	0.483	3425.38	39.81	0	1.03
73.01	4324.11	40.79	0.461	4324.11	41.69	0	1.02
73	3542.13	33.48	0.374	3542.13	33.95	0	1.01
60.501	4479.96	35.56	0.363	4479.96	35.98	0	1.01
60.5	5447.22	43.16	0.445	5447.22	43.98	0	1.02
45.58	7677.66	51.93	0.493	7677.66	52.82	0	1.02
40.5	8330.96	52.99	0.487	8330.96	53.84	0	1.02
3.501	14216.91	60.69	0.454	14216.91	61.35	0	1.01
3.5	20982.98	89.28	0.680	20982.98	91.49	0	1.02
0	21882.64	90.01	0.673	21882.64	92.17	0	1.02

Run

Project	BU876364
Site	

Designed by:	NA
Checked by:	EP
Date	5/14/2014

Connector Data

Bolt	Ajax M20	
Bolt Size	1.14	in
Bolt Capacity	37000	lbs
Bolt Spacing		in

Connectors

Section	Elevation Above Base (ft)	Applied Reinforcement	Shear Flow (lbs/in)[1]	Bearing Capacity on Ex. of monopole (lbs)	Maximum Spacing (in)	Allowable Capacity	Pu (kip)	Check
1	125							
1	94.01							
1	94	A	661.308	32832.000	49.647	245.300	138.145	56.32%
2	88.92	A	564.443	43776.000	65.551	245.300	149.462	60.93%
2	85	A	536.903	43776.000	68.914	245.300	142.220	57.98%
2	73.01	A	512.074	43776.000	72.255	245.300	218.059	88.89%
2	73	B	368.127	43776.000	100.509	190.750	156.770	82.19%
2	60.501	B	329.942	43776.000	112.141	190.750	183.777	96.34%
2	60.5	C	471.265	43776.000	78.512	329.500	262.463	79.66%
3	45.58	C	378.774	54720.000	97.684	329.500	268.139	81.38%
3	40.5	C	359.555	54720.000	102.905	329.500	254.604	77.27%
3	3.501	C	285.274	54720.000	129.700	329.500	318.956	96.80%

Reinforcement Development

Section	Elevation Above Base (ft)	Applied Reinforcement	Bolts Provided	Bolt Spacing (in)	Edge Distance (in)	Force in Reinforcement (kip)	4.9.6.2 Bearing Capacity (lbs)	Bolts Required	Check

Welds

Elevation Above Base (ft)	Applied Reinforcement	Weld Size	Base Weld Length	Weld Length up pole	Weld Strength	Fw	Nominal Capacity of Weld	Check

REFERENCES

(1) $\frac{VQ}{I}$

Project: BU 876364
Site:

Designed By: NA
Date: 05/13/2014
Checked by: EP

ANCHOR BOLTS ANALYSIS - 2 BOLT CIRCLES

1.0 BASE REACTIONS:

M= Moment at the base
Q= Axial load at the base
V= Shear load at the base

$M := 2848 \cdot kip \cdot ft$ (from structural analysis)

$Q := 31 \cdot kip$ (from structural analysis)

$V := 30 \cdot kip$ (from structural analysis)

2.0 BOLT PARAMETERS:

n= Number of bolts
d= Bolt diameter
D= Circle diameter
F_b= Yield strength of bolt
F_u= Ultimate strength of bolt

(inner bolt circle)

$n_1 := 12$
$D_1 := 53 \cdot in$
$F_{b1} := 75 \cdot ksi$
$d_1 := 2.25 \cdot in$
$F_{u1} := 100 \cdot ksi$
$TPI_1 := 4.5$

(outer bolt circle)

$n_2 := 3$
$D_2 := 59.75 \cdot in$
$F_{b2} := 105 \cdot ksi$
$d_2 := 1.75 \cdot in$
$F_{u2} := 125 \cdot ksi$
$TPI_2 := 5$

3.0 VERIFY STRESS IN BOLTS:

θ= Angle between bolts
r= Distance from centroid of pole to extreme bolt
I_b= Inertia of one bolt
a= Area of one bolt
y= Distance from bolt to center
I_x= moment of inertia of bolt system
Q.e= Axial load on existing bolts
M.e= Moment on existing bolts
Q.n.= Axial load on new bolts
M.n= Moment on new bolts

$\theta_1 := \frac{360deg}{n_1}$ $i := 1 .. n_1$ $\phi_1(i) := i \cdot \theta_1$

$\theta_2 := \frac{360deg}{n_2}$ $j := 1 .. n_2$ $\phi_2(j) := j \cdot \theta_2$

$a_1 := \frac{\pi}{4} \cdot \left(d_1 - \frac{0.9743in}{TPI_1} \right)^2 = 3.248 \cdot in^2$ $y_1(i) := \frac{D_1 \cdot \cos(\phi_1(i))}{2}$

$a_2 := \frac{\pi}{4} \cdot \left(d_2 - \frac{0.9743in}{TPI_2} \right)^2 = 1.899 \cdot in^2$ $y_2(j) := \frac{D_2 \cdot \cos(\phi_2(j))}{2}$

$Ix_1(i) := a_1 \cdot y_1(i)^2$

$Ix_2(j) := a_2 \cdot y_2(j)^2$

$Ix := \sum_{i=1}^{n_1} Ix_1(i) + \sum_{j=1}^{n_2} Ix_2(j)$ $Ix = 16227 \cdot in^4$

$M_e := M \cdot \frac{\left(\sum_{i=1}^{n_1} Ix_1(i) \right)}{Ix} = 2402 \cdot kip \cdot ft$

$Q_e := Q \cdot \frac{n_1 \cdot a_1}{n_1 \cdot a_1 + n_2 \cdot a_2} = 27 \cdot kip$

$V_e := V \cdot \frac{n_1 \cdot a_1}{n_1 \cdot a_1 + n_2 \cdot a_2} = 26 \cdot kip$

$M_n := M \cdot \frac{\left(\sum_{j=1}^{n_2} Ix_2(j) \right)}{Ix} = 446 \cdot kip \cdot ft$

$Q_n := Q \cdot \frac{n_2 \cdot a_2}{n_1 \cdot a_1 + n_2 \cdot a_2} = 4 \cdot kip$

$V_n := V \cdot \frac{n_2 \cdot a_2}{n_1 \cdot a_1 + n_2 \cdot a_2} = 4 \cdot kip$

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - New Anchors

TIA Rev F

Site Data

BU#:	*876364*
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	446	ft-kips
Axial:	4	kips
Shear:	0	kips

Anchor Rod Data		
Qty:	3	
Diam:	1.75	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	59.75	in

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

Anchor Rod Results

Maximum Rod Tension:	118.1 Kips
Allowable Tension:	132.3 Kips
Anchor Rod Stress Ratio:	89.3% **Pass**

Plate Data		
Diam:		in
Thick:		in
Grade:		ksi
Single-Rod B-eff:		in

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

n/a

Stiffener Results

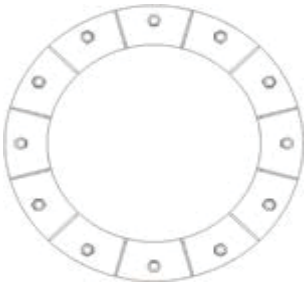
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a

Pole Data		
Diam:	44.25	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



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

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

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Existing Anchors

TIA Rev F

Site Data

BU#:	*876364*
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	2403	ft-kips
Axial:	28	kips
Shear:	30	kips

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	53	in

Plate Data		
Diam:	59	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:		in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	22	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	44.25	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

Maximum Rod Tension:	179.0	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	91.8%	**Pass**

Base Plate Results

Flexural Check

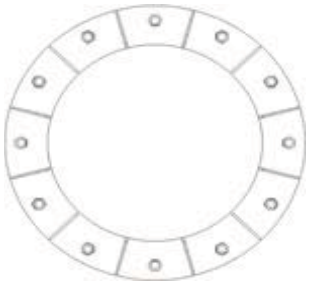
Base Plate Stress:	54.0	ksi
Allowable Plate Stress:	60.0	ksi
Base Plate Stress Ratio:	90.1%	**Pass**

Stiffener Results

Horizontal Weld :	79.9%	**Pass**
Vertical Weld:	63.8%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.5%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	70.1%	**Pass**
Plate Comp. (AISC Bracket):	70.2%	**Pass**

Pole Results

Pole Punching Shear Check:	13.3%	**Pass**



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

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

Version 3.1
Rev. Date: 02.18.2014

Project: BU876364
Site:

MP - SQUARE PIER AND PAD - INDIVIDUAL FOUNDATION ANALYSIS
TIA-222-F

Designed by: NA
Checked by : EP
Date: 05/13/2014

1.0 FOUNDATION GEOMETRY & MATERIALS:

L_{ftg}= Length of footing (parallel to wind direction)
L_{pier}= Length/Diameter of pier
D_{ftg}= Depth of footing
D_{soil}= Depth of soil above footing
D_{ext}= Height of pier above soil grade line
B_{ftg}= Width of footing (perpendicular to wind direction)
ρ_{conc}= Concrete density
A_{ftg} = Bearing area of spread footing
V_{ftg} = Volume of spread footing (does not include piers)
D_{pier} = Depth (height) of pier
A_{pier} = Cross-sectional area of pier

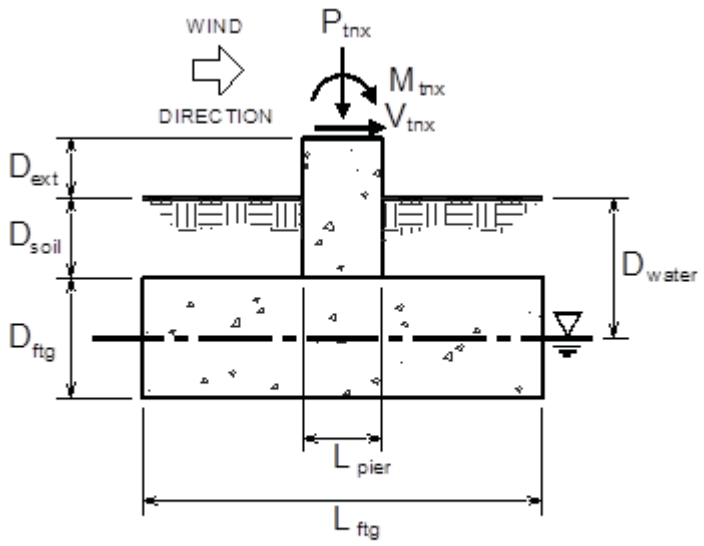
$L_{ftg} := 24\,ft$ $\quad B_{ftg} := L_{ftg} = 24\,ft$ $\quad L_{pier} := 6\,ft$

$D_{ext} := 1\,ft$

$D_{soil} := 2\,ft$

$D_{ftg} := 3\,ft$ $\quad \rho_{conc} := 150\cdot pcf$

○ Square Pier
◉ Round Pier



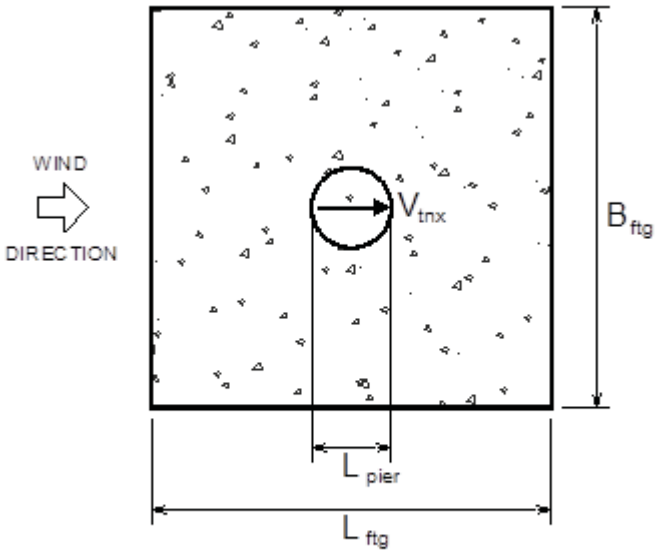
SECTION

$A_{ftg} := L_{ftg}\cdot B_{ftg} = 576\,ft^2$

$V_{ftg} := A_{ftg}\cdot D_{ftg} = 1728\,ft^3$

$D_{pier} := D_{soil} + D_{ext} = 3\,ft$

$$A_{pier} := \begin{cases} (L_{pier})^2 & \text{if } R = 1 \\ \dfrac{\pi\cdot(L_{pier})^2}{4} & \text{otherwise} \end{cases} \quad = 28.27\,ft^2$$



PLAN

2.0 SOIL PARAMETERS:

Data obtained from Geotechnical report:
D_{water}= Depth of water table below soil grade line
$D_{neglect}$= Depth of soil below grade line that is neglected
γ_{soil}= Moist density of soil
ϕ= Angle of friction of soil
K_p = Passive earth pressure coefficient
q_{brg_allow}= Allowable gross bearing capacity of soil
FOS_{coh}= Factor of Safety for cohesion
FOS_{lat}= Factor of Safety for lateral bearing
μ= Coefficient of friction - concrete & soil (sand)
c= Cohesion (clay)

$D_{water} := 7\,ft$ $\quad$ ☐ Check here if Groundwater is not present $\quad D_{neglect} := 3.5\,ft$

$\phi := 30\,deg$ $\quad K_p := \left(\tan\left(45\cdot deg + \frac{\phi}{2}\right)\right)^2 = 3.00$ $\quad FOS_{lat} := 2.0$ $\quad \mu := 0.6$

$\gamma_{soil} := 125\,pcf$ $\quad FOS_{brg} := 2.0$ $\quad c := 0\cdot psf$ If c is unknown, use 0

$q_{brg\_allow} := 4000\,psf$ $\quad q_{brg} := q_{brg\_allow}\cdot FOS_{brg} = 8000\cdot psf$ $\quad FOS_{coh} := 1.0$

3.0 LOADS:

Load combinations based on TIA-222-F (1.0D + 1.0W):

P = Unactored downward load from tnxTower (1.0D + 1.0W)
V = Unfactored shear from tnxTower (1.0W)
M = Unfactored tower moment from tnxTower (1.0D)

$P := 32 \cdot kip$

$V := 30 \cdot kip$

$M := 2849 \cdot kip \cdot ft$

ρ'_{conc_pier} = Density of concrete pier considering ground water depth
ρ'_{conc_ftg} = Density of concrete footing considering ground water depth
WT_{ftg} = Weight of footing, including piers

$\rho'_{conc\_pier} = 150 \cdot pcf$

$\rho'_{conc\_ftg} = 150 \cdot pcf$

$WT_{ftg} := \rho_{conc} \cdot A_{pier} \cdot D_{ext} + \rho'_{conc\_pier} \cdot A_{pier} \cdot D_{soil} + \rho'_{conc\_ftg} \cdot V_{ftg} = 271.92 \cdot kip$

4.0 ANALYSIS

4.1 BEARING CHECK:

Considering 1.0D+1.0W TIA-222-F Load Combination:

M_{over} = Overturning moment due to wind
P_{tot} = Axial dead load, self-weight of footing, and weight of soil directly above footing
e_{brg} = Eccentricity in the direction of the wind (L_{ftg})
q_{min} = Minimum bearing pressure due to applied loads
q_{max} = Maximum bearing pressure due to applied loads

$M_{over} := M + V \cdot (D_{pier} + D_{ftg}) = 3029 \cdot kip \cdot ft$

$P_{tot} := P + \left[WT_{ftg} + \gamma'_{soil} \cdot (A_{ftg} - A_{pier}) D_{soil} \right] = 440.85 \cdot kip$

$e_{brg} := \frac{M_{over}}{P_{tot}} = 6.87\ ft$ $\quad \frac{L_{ftg}}{6} = 4\ ft$ $\quad \frac{L_{ftg}}{2} = 12\ ft$

$q_{min} := if\left(e_{brg} \le \frac{L_{ftg}}{6}, \frac{P_{tot}}{L_{ftg} \cdot B_{ftg}} - \frac{6 \cdot M_{over}}{B_{ftg} \cdot L_{ftg}^2}, if\left(e_{brg} \ge \frac{L_{ftg}}{2}, "NO\ GOOD", 0 \cdot psf \right) \right) = 0 \cdot psf$

$q_{max} := if\left[e_{brg} \le \frac{L_{ftg}}{6}, \frac{P_{tot}}{L_{ftg} \cdot B_{ftg}} + \frac{6 \cdot M_{over}}{B_{ftg} \cdot L_{ftg}^2}, if\left[e_{brg} \ge \frac{L_{ftg}}{2}, "NO\ GOOD", \frac{2 \cdot P_{tot}}{3 \cdot B_{ftg} \cdot \left(\frac{L_{ftg}}{2} - e_{brg} \right)} \right] \right] = 2387 \cdot psf$

$q_{brg\_allow} = 4000 \cdot psf$

$if(1.10 \cdot q_{brg\_allow} > q_{max}, "OK", "NO\ GOOD") = "OK"$

$\frac{q_{max}}{q_{brg\_allow}} = 59.7 \cdot \%$

4.2 OVERTURNING CHECK:

Considering 1.0D+1.0W Load Combination with Factor of Safety (FS) = 1.5 per TIA-222-F, Sect. 7.2.4.5:

L_{brg} = Length of soil bearing area due to applied factored loads

γ'_{soil} = Density of soil above top of footing considering ground water depth

WT_{soil1} = Weight of soil centered over centroid of footing (A)

WT_{soil2} = Weight of soil extending beyond sides of the half of the footing in uplift "tension" (B)

WT_{soil3} = Weight of soil extending beyond back edge of footing (C + D)

V_{coh} = Vertical shear resistance due to soil cohesion above "non-bearing" portion of footing

M_{resist} = Resisting moment due to axial dead load, footing self-weight and weight of soil above footing and extending beyond top of footing at ϕ°

$e_{OT} := e_{brg} = 6.87\,ft$

$L_{ftg} = 24\,ft$

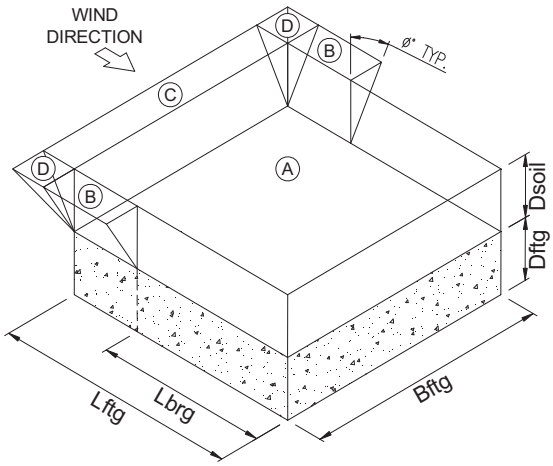
$\frac{L_{ftg}}{6} = 4\,ft$

$L_{brg} := \begin{cases} L_{ftg} & \text{if } e_{OT} < \frac{L_{ftg}}{6} \\ 3\cdot\left(\frac{L_{ftg}}{2} - e_{OT}\right) & \text{otherwise} \end{cases} = 15.39\cdot ft$

$q_{min} = 0\cdot psf$

$q_{max} = 2387\cdot psf$

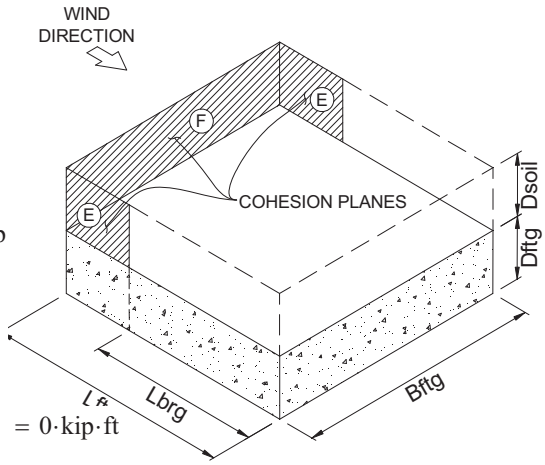
$\gamma'_{soil} = 125\cdot pcf$



$WT_{soil_1} := \gamma'_{soil}\cdot\left(A_{ftg} - A_{pier}\right)D_{soil} = 136.93\cdot kip$ (A)

$WT_{soil_2} := \begin{cases} 0\cdot kip & \text{if } \left(L_{ftg} - L_{brg}\right) \le 0\cdot ft \\ \gamma'_{soil}\cdot\left[\left(L_{ftg} - L_{brg}\right)\cdot D_{soil}^{2}\cdot\tan(\phi)\right] & \text{otherwise} \end{cases} = 2.49\cdot kip$ (B x 2)

$WT_{soil_3} := \begin{cases} 0\cdot kip & \text{if } \left(L_{ftg} - L_{brg}\right) \le 0\cdot ft \\ \gamma'_{soil}\cdot\left(\frac{B_{ftg}}{2}\cdot D_{soil}^{2}\cdot\tan(\phi) + \frac{2}{3}\cdot D_{soil}^{3}\cdot\tan(\phi)^{2}\right) & \text{otherwise} \end{cases} = 3.69\cdot kip$ (C) (D x 2)



$V_{coh} := \begin{cases} 0\cdot kip\cdot ft & \text{if } \left(L_{ftg} - L_{brg}\right) \le 0\cdot ft \\ \left(\frac{c}{2\cdot FOS_{coh}}\right)\cdot\left[2\cdot\left(L_{ftg} - L_{brg}\right)\cdot\left(L_{ftg} - \frac{L_{brg}}{2}\right) + B_{ftg}\cdot L_{ftg}\right]\cdot D_{soil} & \text{otherwise} \end{cases} = 0\cdot kip\cdot ft$ (E x 2) (F)

$M_{resist} := \left[P + \left(WT_{soil_1} + WT_{ftg}\right)\right]\cdot\frac{L_{ftg}}{2} + \left(WT_{soil_2}\right)\cdot\left(\frac{L_{ftg} + L_{brg}}{2}\right) + \left(WT_{soil_3}\right)\cdot\left(L_{ftg} + \frac{D_{soil}\cdot\tan(\phi)}{3}\right) + V_{coh} = 5429\cdot kip\cdot ft$

$M_{over} = 3029\cdot kip\cdot ft$

$\frac{M_{resist}}{M_{over}} = 1.79$

$\text{if}\left(1.10\cdot\frac{M_{resist}}{M_{over}} > 1.5, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$

$\frac{1.5\cdot M_{over}}{M_{resist}} = 83.7\cdot\%$

4.3 SLIDING RESISTANCE CHECK:

Considering 1.0D+1.0W Load Combination with Factor of Safety (FS) = 1.5 per TIA-222-F:

q_{lat_allow} = Allowable lateral bearing capacity of soil
$R_{s\_lat\_brg}$ = Nominal soil resistance to bearing
$R_{s\_lat\_sliding}$ = Nominal soil resistance to sliding
R_s = Total nominal soil resistance to resist sliding (bearing + sliding)
R_{s_allow} = Allowable strength of soil to resist sliding

$$q_{lat\_allow\_pier} := \frac{K_p \cdot \gamma'_{soil\_pier}}{FOS_{lat}} = 187 \cdot \frac{psf}{ft} \qquad q_{lat\_allow\_ftg} := \frac{K_p \cdot \gamma'_{soil\_ftg}}{FOS_{lat}} = 187 \cdot \frac{psf}{ft}$$

$$R_{s\_lat\_brg} := \underbrace{q_{lat\_allow\_pier} \cdot \left(\frac{D_{soil}^{2} \cdot L_{pier}}{2} \right) + q_{lat\_allow\_ftg} \cdot \left[\left(D_{soil} + \frac{D_{ftg}}{2} \right) \cdot D_{ftg} \cdot B_{ftg} \right]}_{\text{Lateral Bearing - Soil Pressure (sand)}} + \underbrace{\left(2 \cdot c \cdot \sqrt{K_p} \right) \cdot \left(D_{soil} \cdot L_{pier} + D_{ftg} \cdot B_{ftg} \right)}_{\text{Lateral Bearing - Cohesion (clay)}} = 49.5 \cdot kip$$

$$R_{s\_lat\_sliding} := \underbrace{(\mu) \cdot \left(P + WT_{soil_1} \right)}_{\substack{\text{Lateral Sliding} \\ \text{Friction (sand)}}} + \underbrace{c \cdot \left[A_{ftg} + 2 \cdot \left(D_{ftg} \cdot L_{ftg} \right) \right]}_{\substack{\text{Lateral Sliding} \\ \text{Cohesion (clay)}}} = 101.4 \cdot kip$$

$$R_{s\_allow} := R_{s\_lat\_brg} + R_{s\_lat\_sliding} = 150.86 \cdot kip$$

$$V = 30 \cdot kip$$

$$\frac{R_{s\_allow}}{V} = 5.03$$

$$if\left(1.10 \cdot \frac{R_{s\_allow}}{V} > 1.5, \text{"OK"}, \text{"NO GOOD"} \right) = \text{"OK"}$$

$$\frac{1.5 \cdot V}{R_{s\_allow}} = 29.8 \cdot \%$$

5.0 CONCRETE DESIGN (ACI 318-05):

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

d = Distance from extreme compression fiber to center of longitudinal reinforcement
No_rebar = Number of longitudinal reinforcement at steel depth "d" in direction of wind
Size_rebar = (#) size of longitudinal reinforcement at steel depth "d" in direction of wind
dia_s = Diameter of single longitudinal reinforcement (in^2) at steel depth "d" in direction of wind
A_s = Total area of longitudinal reinforcement at steel depth "d" in direction of wind
f_y = Specified yield strength of reinforcement (psi)
f_c = Specified compressive strength of concrete (psi)
M_{over}= Overturning moment due to wind
P_{tot}= Axial dead load, self-weight of footing, and weight of soil directly above footing
e_{ult}= Eccentricity in the direction of the wind (L_{ftg}) caused by ultimate loads
L_{brg_ult} = Length of soil bearing area due to applied factored loads
q_{u_min}= Minimum bearing pressure due to factored loads
q_{u_max}= Maximum bearing pressure due to factored loads

$d := 32 \cdot in$ $f_y := 60000 \cdot psi$

$No\_rebar := 30$ $f_c := 3000 \cdot psi$

$Size\_rebar := 8$

$dia_s = 1.000 \cdot in$ $A_s := No\_rebar\left(dia_s\right)^2 \cdot \frac{\pi}{4} = 23.56 \cdot in^2$

$M_{u\_over} := 1.6 \cdot M_{over} = 4846 \cdot kip \cdot ft$

$P_{u\_tot} := 1.2 \cdot P_{tot} = 529 \cdot kip$

$P_{ult} := 1.2 \cdot P = 38 \cdot kip$

$e_{ult} := \frac{M_{u\_over}}{P_{u\_tot}} = 9.16\,ft$ $\frac{L_{ftg}}{6} = 4\,ft$ $\frac{L_{ftg}}{2} = 12\,ft$ $L_{brg\_ult} := \begin{cases} L_{ftg} & \text{if } e_{ult} < \frac{L_{ftg}}{6} \\ 3 \cdot \left(\frac{L_{ftg}}{2} - e_{ult}\right) & \text{otherwise} \end{cases} = 8.52\,ft$

$q_{min} := \text{if}\left(e_{ult} \le \frac{L_{ftg}}{6}, \frac{P_{u\_tot}}{L_{ftg} \cdot B_{ftg}} - \frac{6 \cdot M_{u\_over}}{B_{ftg} \cdot L_{ftg}^2}, \text{if}\left(e_{ult} \ge \frac{L_{ftg}}{2}, \text{"NO GOOD"}, 0 \cdot psf\right)\right) = 0 \cdot psf$

$q_{max} := \text{if}\left[e_{ult} \le \frac{L_{ftg}}{6}, \frac{P_{u\_tot}}{L_{ftg} \cdot B_{ftg}} + \frac{6 \cdot M_{u\_over}}{B_{ftg} \cdot L_{ftg}^2}, \text{if}\left[e_{ult} \ge \frac{L_{ftg}}{2}, \text{"NO GOOD"}, \frac{2 \cdot P_{u\_tot}}{3 \cdot B_{ftg} \cdot \left(\frac{L_{ftg}}{2} - e_{ult}\right)}\right]\right] = 5176 \cdot psf$

$q_{min\_net} := q_{min} - \left(\gamma'_{soil\_pier} \cdot D_{soil} + \rho'_{conc\_ftg} \cdot D_{ftg}\right) = -700 \cdot psf$

$q_{u\_min} := \begin{cases} 0 \cdot psf & \text{if } q_{min\_net} < 0 \cdot psf \\ q_{min\_net} & \text{otherwise} \end{cases} = 0 \cdot psf$

$q_{u\_max} := q_{max} - \left(\gamma'_{soil\_pier} \cdot D_{soil} + \rho'_{conc\_ftg} \cdot D_{ftg}\right) = 4476 \cdot psf$

$L_{u\_brg} := \begin{cases} \frac{\left(q_{u\_max} \cdot L_{brg}\right)}{\left(q_{u\_max} - q_{min\_net}\right)} & \text{if } q_{u\_min} = 0 \cdot psf \\ L_{brg} & \text{otherwise} \end{cases} = 13.31 \cdot ft$

5.1 DESIGN FOR FLEXURAL (ONE-WAY) SHEAR:

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

ϕ_v= Shear resistance factor (ACI 318-05, Sect. 9.3.1)
x_1= Distance from the edge of the footing to the critical section for flexural shear
q_{x1}= Bearing pressure at critical section for flexural shear due to factored loads
V_{u1}= Ultimate factored flexural (one-way) shear force due to factored loads
V_{c1}= Nominal strength of concrete to resist flexural (one-way) shear (ACI 318-05, Section 11.3.1.1)
$\phi_v V_{c1}$= Design strength of concrete to resist flexural (one-way) shear

$$\phi_v := 0.75$$

$$x_1 := \frac{L_{ftg}}{2} - \frac{L_{pier}}{2} - d = 6.33\ ft$$

$$q_{x1} := \frac{(q_{u\_max} - q_{u\_min})\cdot(L_{u\_brg} - x_1)}{L_{u\_brg}} + q_{u\_min} = 2346\cdot psf$$

$$V_{u1} := \begin{cases} \frac{q_{u\_max}\cdot B_{ftg}\cdot L_{u\_brg}}{2} & \text{if } L_{u\_brg} < x_1 \\ \left(\frac{q_{u\_max} + q_{x1}}{2}\right)\cdot B_{ftg}\cdot x_1 & \text{otherwise} \end{cases} = 518\cdot kip$$

$$V_{c1} := 2\cdot d\cdot B_{ftg}\cdot\sqrt{f_c\cdot psi} = 1010\cdot kip$$

$$\phi_v\cdot V_{c1} = 757\cdot kip$$

$$\frac{V_{u1}}{\phi_v\cdot V_{c1}} = 68.5\cdot\%$$

$$\text{if}\left(1.10\cdot\phi_v\cdot V_{c1} > V_{u1}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$$

5.2 DESIGN FOR PUNCHING (TWO-WAY) SHEAR:

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

ϕ_v= Shear resistance factor (ACI 318-05, Sect. 9.3.2.3 -see flexural (one-way) shear section above for value)
x_{2A}= Distance from the edge of the footing to the critical section for punching shear corresponding to the smaller bearing pressure
x_{2B}= Distance from the edge of the footing to the critical section for punching shear corresponding to the larger bearing pressure
q_{x2A}= Smaller bearing pressure at critical section for punching shear due to factored loads
q_{x2B}= Larger bearing pressure at critical section for punching shear due to factored loads
V_{u2}= Ultimate factored punching (two-way) shear force due to factored loads
b_0 = Perimeter of critical section for punching shear
V_{c2}= Nominal strength of concrete to resist punching (two-way) shear (ACI 318-05, Section 11.12.2)
$\phi_v V_{c2}$= Design strength of concrete to resist punching (two-way) shear

$$x_{2A} := \frac{L_{ftg}}{2} + \frac{L_{pier} + d}{2} = 16.33\ ft$$

$$L_{brg\_ult} = 8.52\ ft$$

$$x_{2B} := \frac{L_{ftg}}{2} - \frac{L_{pier} + d}{2} = 7.67\ ft$$

$$q_{x2A} := \left(\frac{q_{max}}{L_{u\_brg}}\right)\cdot\left(L_{u\_brg} - x_{2A}\right) = -1177\cdot psf$$

$$q_{x2B} := \left(\frac{q_{max}}{L_{u\_brg}}\right)\cdot\left(L_{u\_brg} - x_{2B}\right) = 2194\cdot psf$$

$$V_{u2} := \begin{cases} \text{if } R = 1 \\ \quad \begin{cases} P_{ult} - \left(\frac{q_{x2A} + q_{x2B}}{2}\right)\cdot\left(L_{pier} + d\right)^2 & \text{if } L_{u\_brg} \geq x_{2A} \\ P_{ult} & \text{otherwise} \end{cases} \\ \text{if } R \neq 1 \\ \quad \begin{cases} P_{ult} - \left(\frac{q_{x2A} + q_{x2B}}{2}\right)\cdot\left(L_{pier} + d\right)^2\cdot\left(\frac{\pi}{4}\right) & \text{if } L_{u\_brg} \geq x_{2A} \\ P_{ult} & \text{otherwise} \end{cases} \end{cases} = 38\cdot kip$$

$$b_0 := \begin{cases} 4\cdot\left(L_{pier} + d\right) & \text{if } R = 1 \\ \pi\cdot\left(L_{pier} + d\right) & \text{otherwise} \end{cases} = 27.23\ ft$$

$$V_{c2} := 4\cdot d\cdot b_0\cdot\sqrt{f_c\cdot psi} = 2291\cdot kip$$

$$\phi_v\cdot V_{c2} = 1718\cdot kip$$

$$\text{if}\left(1.10\cdot\phi_v\cdot V_{c2} > V_{u2}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$$

$$\frac{V_{u2}}{\phi_v\cdot V_{c2}} = 2.2\cdot\%$$

5.3 DESIGN FOR FLEXURE:

Load Combinations from TIA-222-F (1.0D + 1.0W) factored to meet ACI 318-05 load combination (1.2D + 1.6W):

x_f= Distance from the edge of the footing to the critical section for flexure corresponding to the smaller bearing pressure

q_f= Smaller bearing pressure at critical section for flexure due to factored loads

M_u= Ultimate factored moment on footing pad due to factored loads

ρ = Ratio of A_s to bd

β_1 = Factor relating depth of equivalent rectangular compressive stress block to neutral axis depth (ACI 318-05, Sect. 10.2.7.3)

ϕ_f= Flexural resistance factor (ACI 318-05, Sect. 9.3.2.3)

M_n= Nominal strength of concrete footing pad to resist flexure

$\phi_f M_n$= Design strength of concrete footing pad to resist flexure

A_s = Total area of longitudinal reinforcement at steel depth "d" in direction of wind

A_{st} = Total area of longitudinal reinforcement in direction of wind (assumes A_s at top and bottom of footing pad)

A_{st_min} = Minimum area of longitudinal reinforcement required in direction of wind (ACI 318-05, Sect. 7.12.2.1)

$$x_f := \frac{L_{ftg}}{2} - \frac{L_{pier}}{2} = 9\,ft$$

$$q_f := \frac{(q_{u\_max} - q_{u\_min})\cdot(L_{u\_brg} - x_f)}{L_{u\_brg}} + q_{min} = 1449\cdot psf$$

$$M_u := \begin{cases} \left(\frac{q_{u\_max}\cdot B_{ftg}\cdot L_{u\_brg}}{2}\right)\cdot\left(x_f - \frac{L_{u\_brg}}{3}\right) & \text{if } L_{u\_brg} < x_f \\ \frac{(q_f\cdot B_{ftg})\cdot x_f^{\,2}}{2} + \frac{(q_{u\_max}\cdot B_{ftg} - q_f\cdot B_{ftg})\cdot(x_f)^2}{3} & \text{otherwise} \end{cases} = 3370\cdot kip\cdot ft$$

$$\rho := \frac{A_s}{B_{ftg}\cdot d} = 0.0026$$

$$\beta_1 = 0.85$$

$$\phi_f = 0.9$$

$$a := \frac{A_s\cdot f_y}{0.85 f_c\cdot B_{ftg}} = 1.92\cdot in$$

$$M_n := A_s\cdot f_y\cdot\left(d - \frac{a}{2}\right) = 3657\cdot kip\cdot ft$$

$$\phi_f\cdot M_n = 3291\cdot kip\cdot ft$$

$\text{if}\left(1.10\cdot\phi_f\cdot M_n > M_u, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$

$$\frac{M_u}{\phi_f\cdot M_n} = 102.4\cdot\%$$

5.3.1 FLEXURAL MINIMUM STEEL CHECK:

$$A_s = 23.56\cdot in^2$$

$$A_{s\_min} := \begin{cases} 0\cdot in^2 & \text{if } \phi_f\cdot M_n \geq \frac{4}{3}\cdot M_u \\ \text{otherwise} & \\ \quad \begin{cases} \frac{200\cdot B_{ftg}\cdot d}{\left(\frac{f_y}{psi}\right)} & \text{if } f_c \leq 4444\cdot psi \\ \frac{3\cdot\sqrt{f_c\cdot psi}\cdot B_{ftg}\cdot d}{(f_y)} & \text{if } f_c > 4444\cdot psi \end{cases} & \end{cases} = 30.72\cdot in^2$$

$\text{if}\left(A_s > A_{s\_min}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"NO GOOD"}$

5.3.2 TEMPERATURE MINIMUM STEEL CHECK:

$$A_{st} := 2\cdot A_s = 47.12\cdot in^2$$

$$A_{st\_min} := 0.0018\cdot B_{ftg}\cdot D_{ftg} = 18.66\cdot in^2$$

$\text{if}\left(A_{st} > A_{st\_min}, \text{"OK"}, \text{"NO GOOD"}\right) = \text{"OK"}$

Version 3.1
Rev. Date: 02.18.2014

Project: BU876364
Site:

MP - SQUARE PIER AND PAD - INDIVIDUAL FOUNDATION ANALYSIS
TIA-222-F

Designed by: NA
Checked by : EP
Date: 03/27/2014

1.0 FOUNDATION GEOMETRY & MATERIALS:

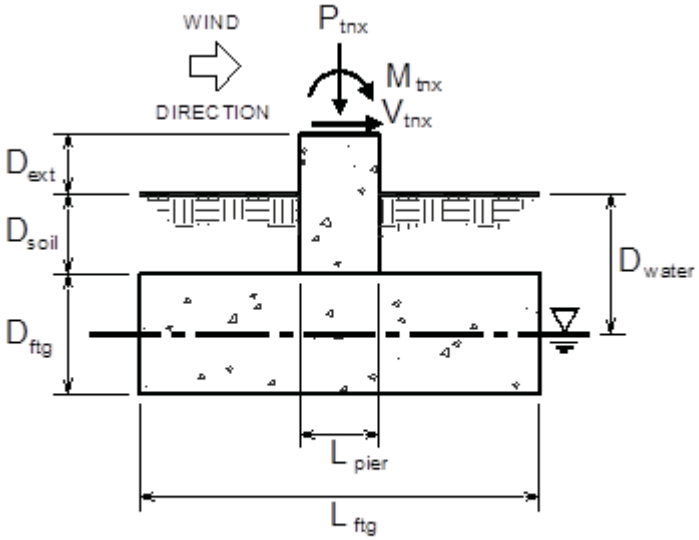
$L_{ftg} = 24\,ft$ $B_{ftg} = 24\,ft$ $L_{pier} = 6\,ft$

$D_{ftg} = 3\,ft$ $D_{soil} = 2\,ft$ $D_{ext} = 1\,ft$

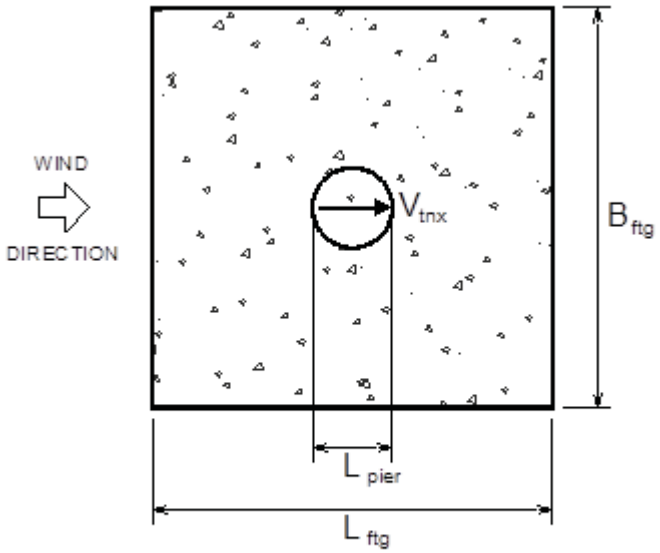
Pier = "Round"

$d = 32 \cdot in$ No_rebar = 30 Size_rebar = 8

$f_y = 60000 \cdot psi$ $f_c = 3000 \cdot psi$



SECTION



PLAN

2.0 SOIL PARAMETERS:

$\phi = 30 \cdot deg$ $K_p = 3.00$

$\gamma_{soil} = 125 \cdot pcf$ $\mu = 0.6$ $c = 0 \cdot psf$

Groundwater = 7 ft

$q_{brg\_allow} = 4000 \cdot psf$

3.0 LOADS:

Load combinations based on TIA-222-F (1.0D + 1.0W):

P = 32·kip

V = 30·kip

M = 2849·kip·ft

4.0 ANALYSIS RESULTS:

		APPLIED	ALLOWABLE	CHECK
4.1	BEARING:	$B_{app} = 2387 \cdot psf$	$B_{cap} = 4000 \cdot psf$	B% = 59.7·%
4.2	OVERTURNING:	$M_{app} = 3029 \cdot kip \cdot ft$	$M_{cap} = 3619 \cdot kip \cdot ft$	M% = 83.7·%
4.3	SLIDING:	$V_{app} = 30 \cdot kip$	$V_{cap} = 101 \cdot kip$	V% = 29.8·%
5.1	FLEXURAL (ONE-WAY) SHEAR:	$V1_{app} = 518 \cdot kip$	$V1_{cap} = 757 \cdot kip$	V1% = 68.5·%
5.2	PUNCHING (TWO-WAY) SHEAR:	$V2_{app} = 38 \cdot kip$	$V2_{cap} = 1718 \cdot kip$	V2% = 2.2·%
5.3	PAD FLEXURE:	$F_{app} = 3370 \cdot kip \cdot ft$	$F_{cap} = 3291 \cdot kip \cdot ft$	F% = 102.4·%

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

Sprint Existing Facility

Site ID: CT23XC558

Cromwell / First Line Emergency

201 Main street
Cromwell, CT 06416

June 15, 2014

EBI Project Number: 62143381

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

EBI Consulting
environmental | engineering | due diligence

June 15, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT23XC558 - Cromwell / First Line Emergency

Site Total: 77.08% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 201 Main street, Cromwell, CT, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 201 Main street, Cromwell, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 3 channels in the 1900 MHz Band were considered for each sector of the proposed installation.
2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation
3) 2 channels in the 2500 MHz Band were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-I20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTM14-C-I20 has a 15.9 dBd gain value at its main lobe at 2500 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
7) The antenna mounting height centerline for the proposed antennas is **127 feet** above ground level (AGL).
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Site ID	CT23XC558 - Cromwell / First Line Emergency
Site Addresss	201 Main street, Cromwell, CT, 06416
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	5.9	127	121	1/2 "	0.5	0	208.04	0.51%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	127	121	1/2 "	0.5	0	39.00	0.17%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	127	121	1/2 "	0.5	0	138.69	0.60%
														Sector total Power Density Value:		1.28%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	5.9	127	121	1/2 "	0.5	0	208.04	0.51%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	127	121	1/2 "	0.5	0	39.00	0.17%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	127	121	1/2 "	0.5	0	138.69	0.60%
														Sector total Power Density Value:		1.28%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	3	60	5.9	127	121	1/2 "	0.5	0	208.04	0.51%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	127	121	1/2 "	0.5	0	39.00	0.17%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	127	121	1/2 "	0.5	0	138.69	0.60%
														Sector total Power Density Value:		1.28%

Site Composite MPE %	
Carrier	MPE %
Sprint	3.84%
Clearwire	1.22%
MetroPCS	16.83%
Verizon Wireless	13.06%
Nextel	8.43%
AT&T	33.70%
Total Site MPE %	**77.08%**

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Summary

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

The anticipated Maximum Composite contributions from the Sprint facility are **3.84% (1.28% from sector 1, 1.28% from sector 2 and 1.28% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **77.08%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

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