



**Crown Castle**  
3530 Torington Way, Suite 300  
Charlotte, NC 28277

October 21, 2014

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

**RE: Sprint PCS-Exempt Modification - Crown Site BU: 876313**  
**Sprint PCS Site ID: CT03XC015**  
**Located at: 1394 Meriden Waterbury Turnpike, Southington, CT 06489**

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 Garry Brumback, Town Manager for the Town of Southington, and Southington Tower Development LLC, Property Owner.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **1394 Meriden Waterbury Turnpike, Southington, CT 06489**. 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.

Melanie A. Bachman

October 21, 2014

Page 2

4. A Structural Modification Report confirming that the tower and foundation can support Sprint's proposed modifications is included as Exhibit-2.
5. The operation of the additional antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for Sprint's modified facility is included as Exhibit-3.

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

Sincerely,



Susan Vale  
Real Estate Specialist

Enclosures

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

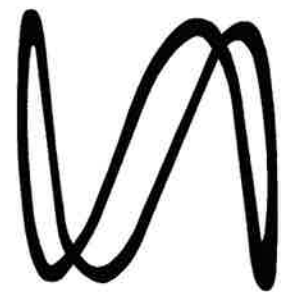
Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Garry Brumback, Town Manager  
75 Main Street  
P.O. Box 610  
Southington, CT 06489

Southington Tower Development LLC  
P.O. Box 331  
Canonsburg, PA 15317

# Sprint



# CROWN CASTLE

PROJECT: 2.5 EQUIPMENT DEPLOYMENT  
 SITE NAME: WEST JOHNSON AVE. BURNT HOUSE  
 SITE CASCADE: CT03XC015  
 SITE NUMBER: 876313  
 SITE ADDRESS: 1394 ROUTE 322  
 (MERIDEN WATERBURY TPK)  
 SOUTHLINGTON, CT 06489  
 SITE TYPE: MONOPOLE TOWER  
 MARKET: NORTHERN CONNECTICUT

PLANS PREPARED FOR:

6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

DRAWING NOTICE:  
 THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, DISSEMINATED OR REDISTRIBUTED WITHOUT THE EXPRESS WRITTEN CONSENT OF SPRINT.

REVISIONS:	DESCRIPTION	DATE	BY	REV
FOR PERMIT		6/25/14	AJD	0

SITE NAME:  
**WEST JOHNSON AVE.  
 BURNT HOUSE**

SITE CASCADE:  
**CT03XC015**

SITE ADDRESS:  
 1394 ROUTE 322  
 (MERIDEN WATERBURY TPK)  
 SOUTHLINGTON, CT 06489

SHEET DESCRIPTION:  
**TITLE SHEET  
 & PROJECT DATA**

SHEET NUMBER:  
**T-1**

**SITE INFORMATION**

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

**LATITUDE (NAD83):**  
 41° 33' 51.39" N  
 41.564275°

**LONGITUDE (NAD83):**  
 72° 53' 30.7" W  
 -72.891861°

**COUNTY:**  
 HARTFORD

**ZONING JURISDICTION:**  
 CONNECTICUT SITING COUNCIL

**ZONING DISTRICT:**  
 MR-1

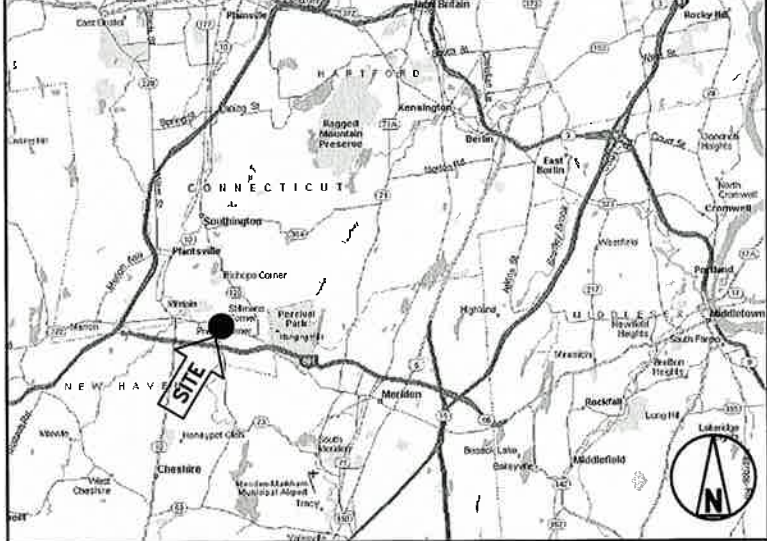
**POWER COMPANY:**  
 CONNECTICUT LIGHT & POWER  
 (860) 947-2000

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

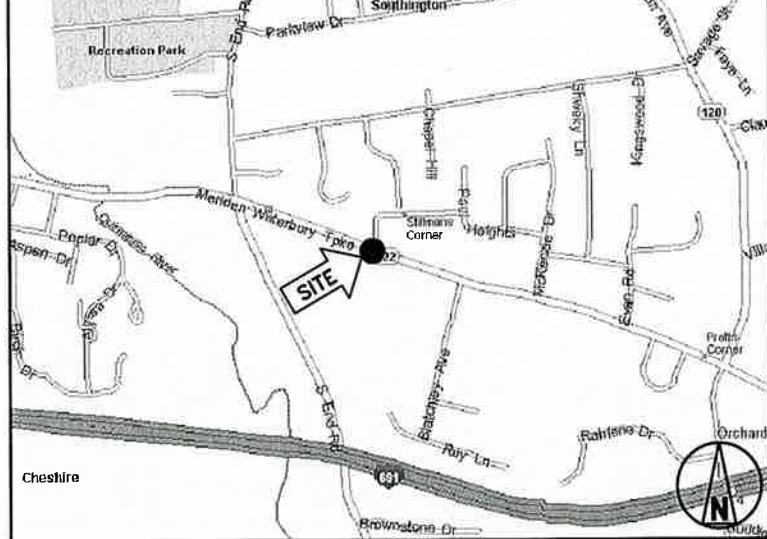
**SPRINT CM:**  
 PETER CULBERT  
 (803) 203-8448  
 (603) 969-0686  
 peter.culbert@sprint.com

**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

**DRAWING INDEX**

SHEET NO:	SHEET TITLE	REV
T-1	TITLE SHEET & PROJECT DATA	0
SP-1	SPRINT SPECIFICATIONS	0
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



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. OFC: 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 NDC 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:



PLANS PREPARED BY:



MLA PARTNER:



ENGINEERING LICENSE:



DRAWING NOTICE:

THESE DOCUMENTS ARE CONFIDENTIAL AND ARE THE SOLE PROPERTY OF SPRINT AND MAY NOT BE REPRODUCED, DISSEMINATED OR REDISTRIBUTED WITHOUT THE EXPRESS WRITTEN CONSENT OF SPRINT.

REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:

**WEST JOHNSON AVE.  
BURNT HOUSE**

SITE CASCADE:

**CT03XC015**

SITE ADDRESS:

**1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489**

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 ANTENNA 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 CIVL 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 465. 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, AASHTO, AND OTHER METHODS IS NEEDED.
  4. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASHTO, 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 - ANTENNA ALIGNMENT TOOL (AAT)

PLANS PREPARED FOR:



6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:



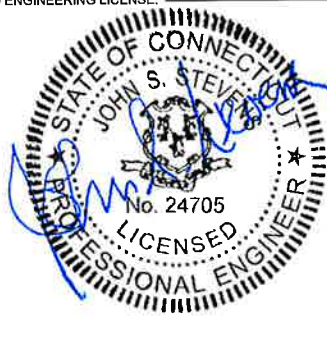
1033 Watervliet Shaker Rd  
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JOB NUMBER 353-000

MLA PARTNER:



ENGINEERING LICENSE:



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REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:

**WEST JOHNSON AVE.  
BURNT HOUSE**

SITE CASCADE:

**CT03XC015**

SITE ADDRESS:

1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489

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. SHELTER 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 RADI).
    23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADI).

24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADI).
  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:



6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:



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

MLA PARTNER:



ENGINEERING LICENSE:



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REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:

**WEST JOHNSON AVE.  
BURNT HOUSE**

SITE CASCADE:

**CT03XC015**

SITE ADDRESS:

1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489

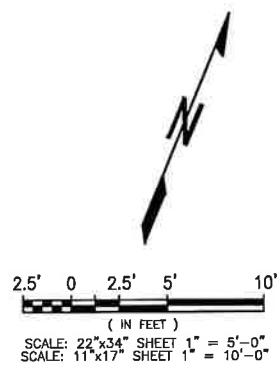
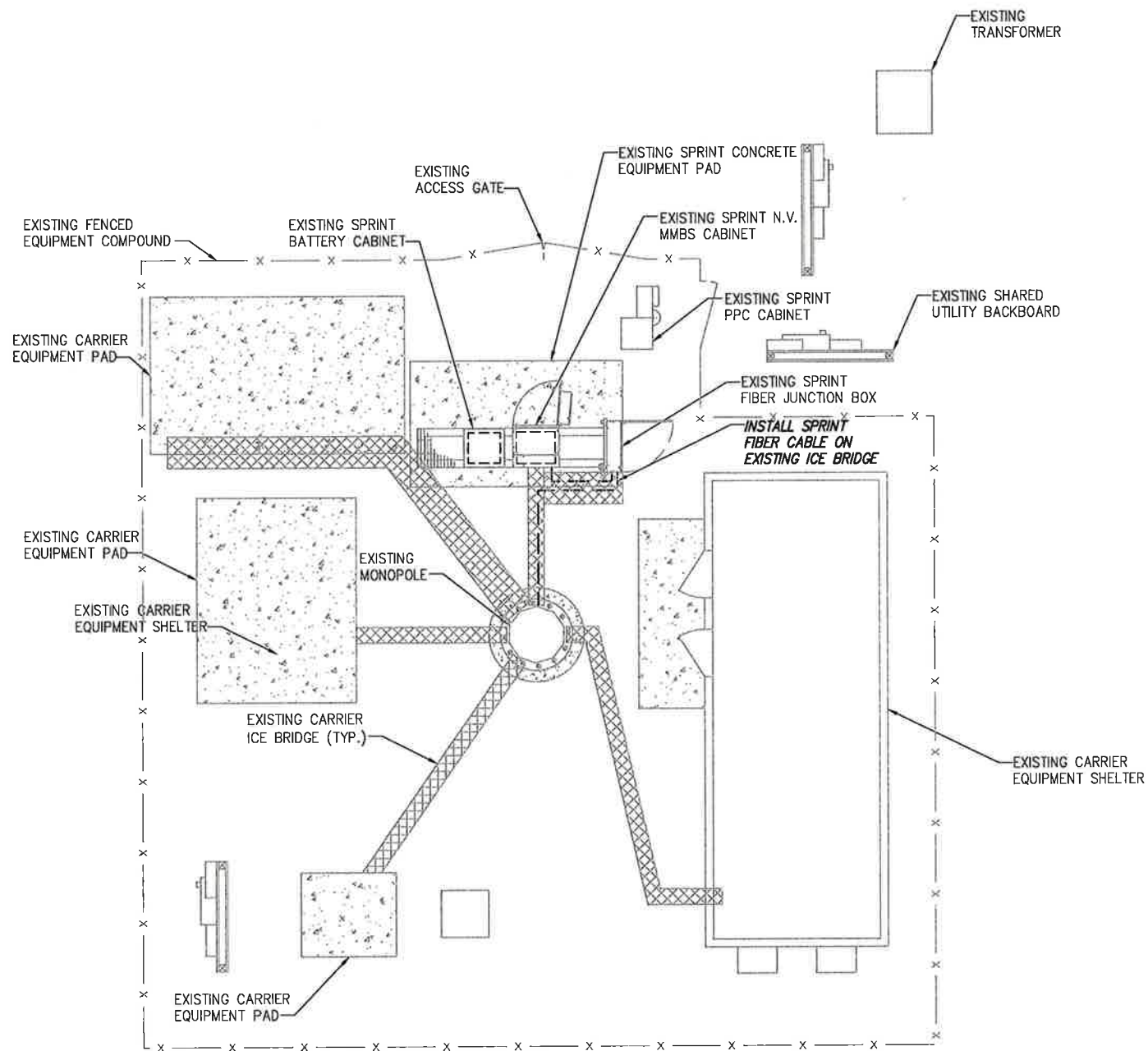
SHEET DESCRIPTION:

**SPRINT SPECIFICATIONS**

SHEET NUMBER:

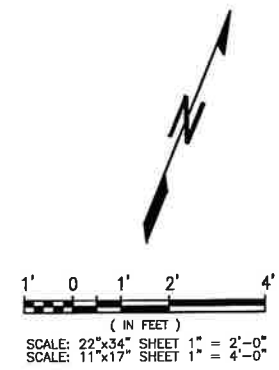
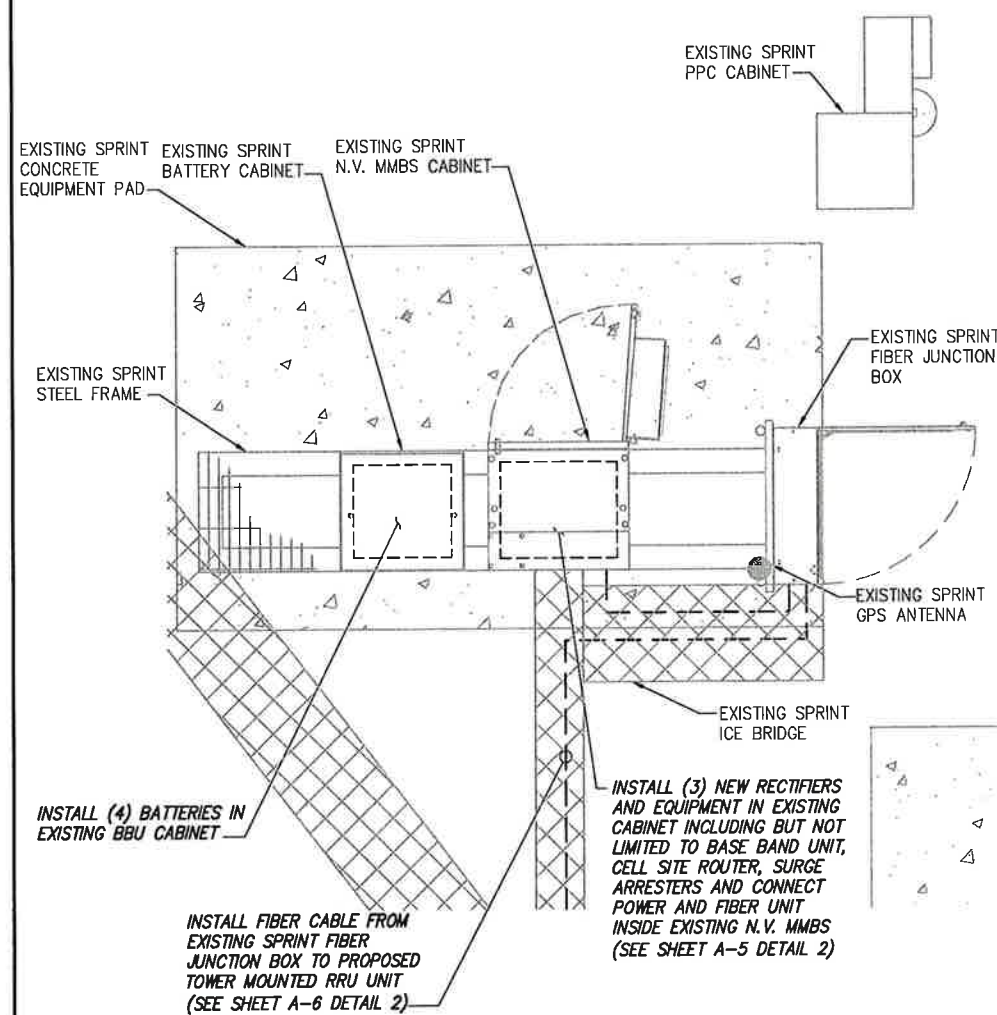
**SP-3**

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



OVERALL SITE PLAN

SCALE: AS NOTED 1



SPRINT EQUIPMENT PLAN

SCALE: AS NOTED 2

PLANS PREPARED FOR:

6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

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SITE NAME:

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BURNT HOUSE

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CT03XC015

SITE ADDRESS:

1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

SITE PLAN

SHEET NUMBER:

A-1

TOP OF EXISTING TOWER  
ELEV. = ±161'-0" A.G.L.

INSTALL (1) SPRINT 2.5  
ANTENNA EACH SECTOR  
(SEE SHEET A-5 DETAIL 3)

EXISTING SPRINT  
PANEL ANTENNAS

EXISTING CARRIER  
PANEL ANTENNAS

EXISTING CARRIER  
PANEL ANTENNAS

INSTALL (1) RRU-2.5 EACH SECTOR  
(SEE SHEET A-5 DETAILS 1)

☉ OF EXISTING/TO BE INSTALLED SPRINT  
ANTENNAS ELEV. = 148'-0" A.G.L.

EXISTING CARRIER  
PANEL ANTENNAS

EXISTING CARRIER  
PANEL ANTENNAS

EXISTING  
MONOPOLE TOWER

INSTALL FIBER CABLE FROM EXISTING  
SPRINT FIBER JUNCTION BOX TO  
PROPOSED TOWER MOUNTED RRU  
UNIT (SEE SHEET A-6 DETAIL 2)

GROUND LEVEL

NOTE:  
SEE DETAIL 2 ON A-3  
FOR ANTENNA LAYOUT

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

DETAIL NOT USED

NO SCALE

2

TOWER ELEVATION

NO SCALE

1

DETAIL NOT USED

NO SCALE

3

DETAIL NOT USED

NO SCALE

4

PLANS PREPARED FOR:



6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:




Design.  
Build.  
Deliver.


1033 Watervliet Shaker Rd  
Albany, NY 12205  
Office # (518) 690-0790  
Fax # (518) 690-0783

JOB NUMBER 353-000

MLA PARTNER:



ENGINEERING LICENSE:



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REVISIONS:

DESCRIPTION	DATE	BY	REV
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SITE NAME:

WEST JOHNSON AVE.  
BURNT HOUSE

SITE CASCADE:

CT03XC015

SITE ADDRESS:

1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489

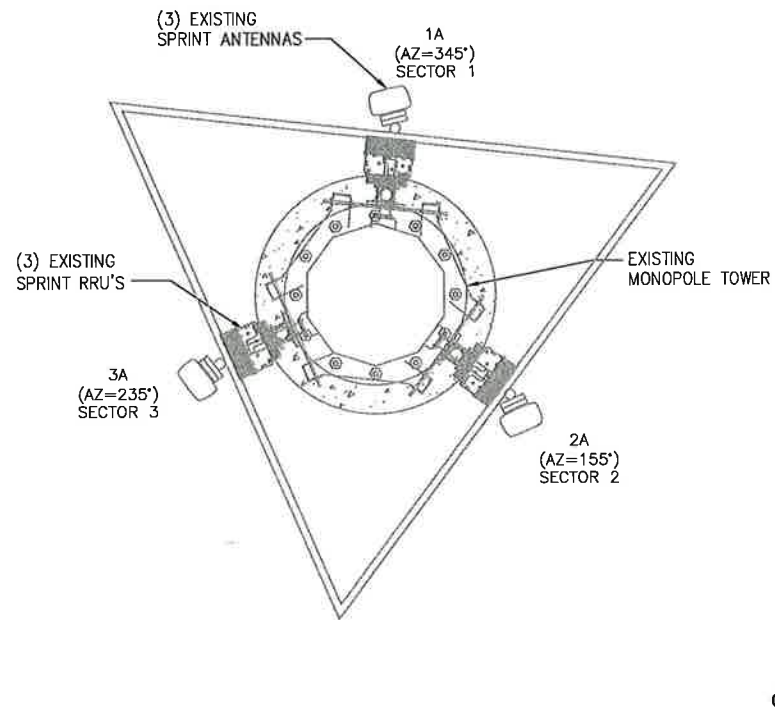
SHEET DESCRIPTION:

TOWER ELEVATION  
& CABLE PLAN

SHEET NUMBER:

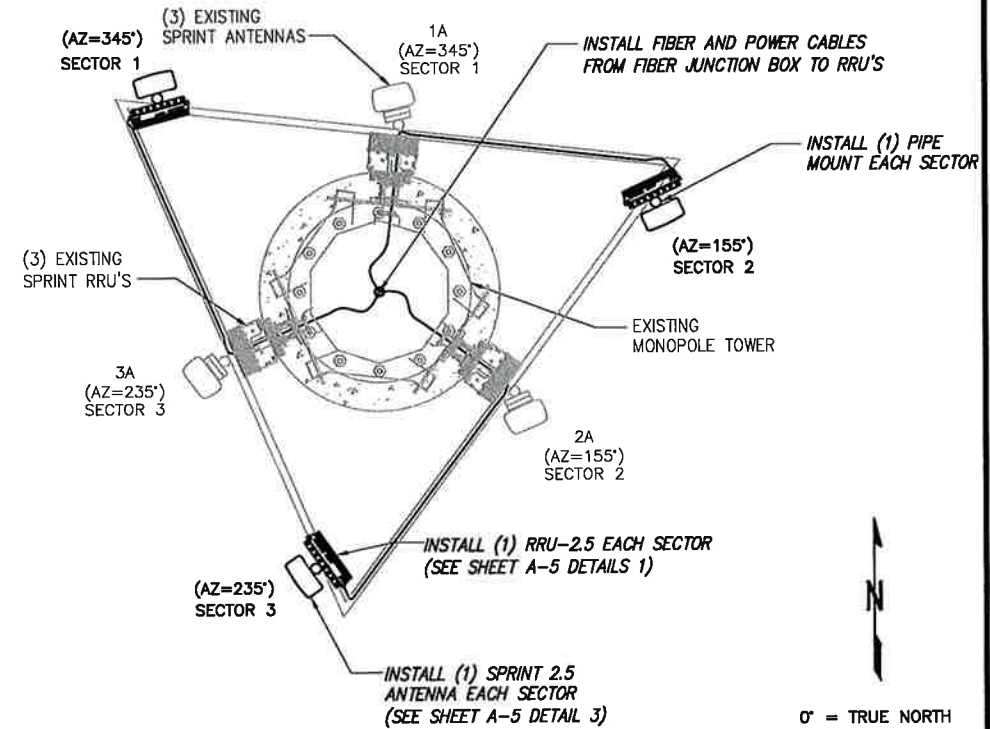
A-2





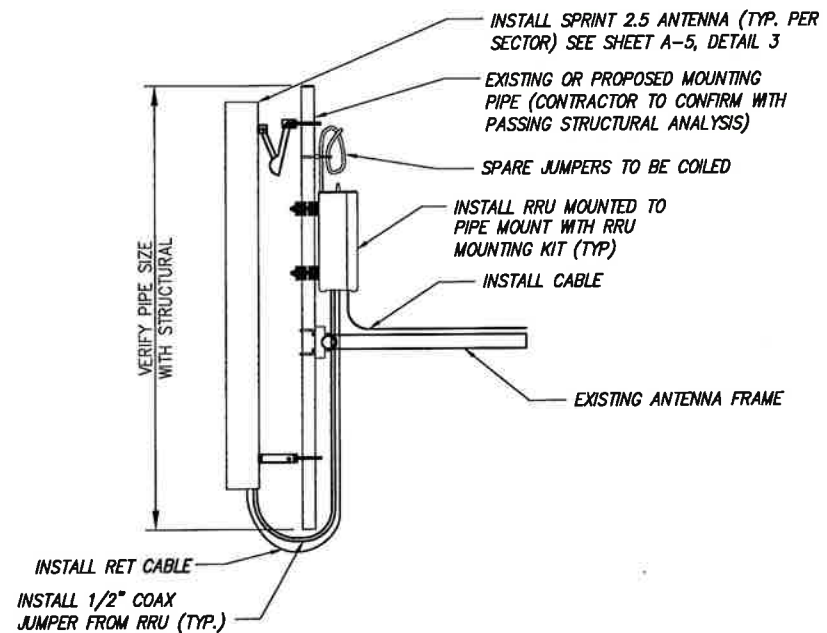
EXISTING ANTENNA & RRU LAYOUT

NO SCALE 1



FINAL ANTENNA LAYOUT

NO SCALE 2



NOTES:

1. CUT DC CONDUCTORS TO LENGTH.
2. COIL FIBER CABLE AND SECURE AT SIDE OF RRU.
3. DO NOT 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.

DETAIL NOT USED

NO SCALE 3

TYPICAL ANTENNA & RRU MOUNTING DETAILS

NO SCALE 4

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 RRU TO THE 2.5 ANTENNA CANNOT EXCEED 15 FEET

PLANS PREPARED FOR:



PLANS PREPARED BY:



MLA PARTNER:



ENGINEERING LICENSE:



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SITE CASCADE:

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SITE ADDRESS:

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(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

ANTENNA LAYOUT  
& MOUNTING DETAILS

SHEET NUMBER:

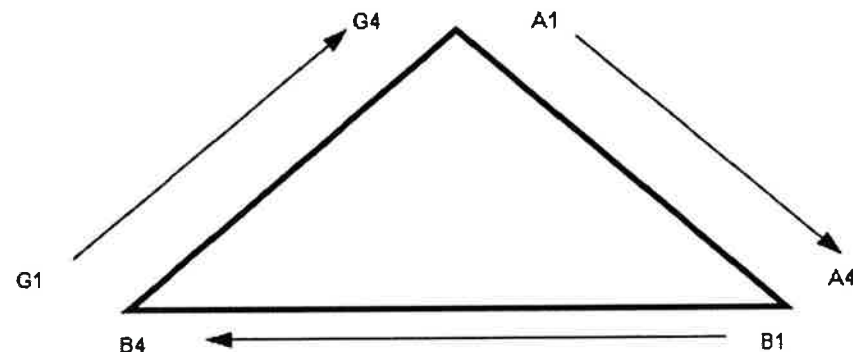
A-3

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



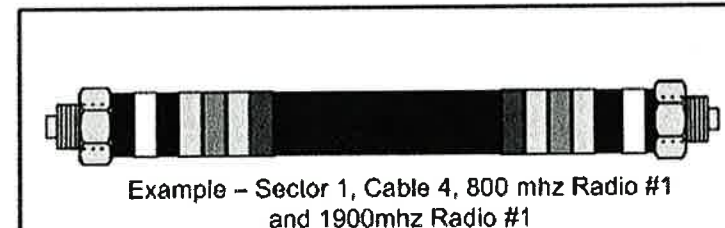
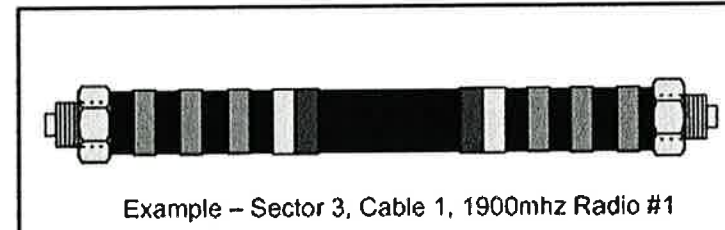
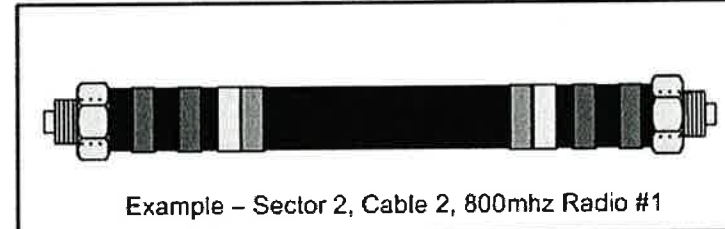
NOTES:

- ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
- 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.
- 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.
- 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.
- 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.
- 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.
- HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
- 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
	2	Blue	No Tape	No Tape
	3	No Tape	No Tape	No Tape
	4	White	No Tape	No Tape
	5	Red	No Tape	No Tape
	6	Grey	No Tape	No Tape
	7	Purple	No Tape	No Tape
	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
	2	Blue	Blue	No Tape
	3	No Tape	No Tape	No Tape
	4	White	White	No Tape
	5	Red	Red	No Tape
	6	Grey	Grey	No Tape
	7	Purple	Purple	No Tape
	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
	2	Blue	Blue	Blue
	3	No Tape	No Tape	No Tape
	4	White	White	White
	5	Red	Red	Red
	6	Grey	Grey	Grey
	7	Purple	Purple	Purple
	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



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PLANS PREPARED BY:

Design. Build. Deliver.

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

JOB NUMBER 353-000

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BURNT HOUSE**

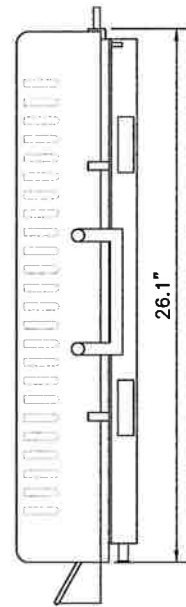
SITE CASCADE:  
**CT03XC015**

SITE ADDRESS:  
**1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489**

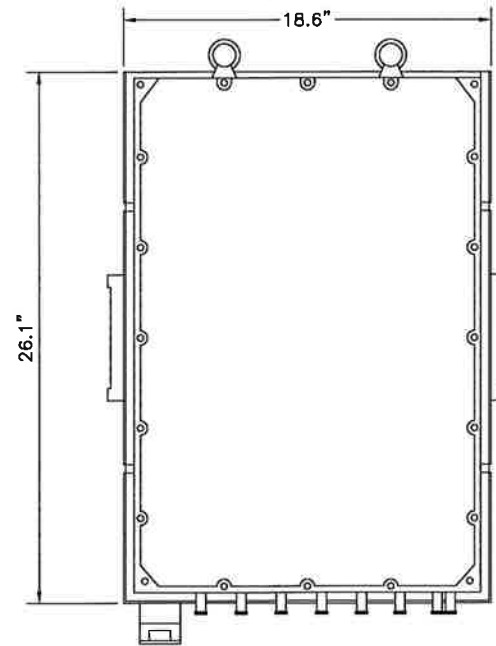
SHEET DESCRIPTION:  
**COLOR CODING  
AND NOTES**

SHEET NUMBER:  
**A-4**

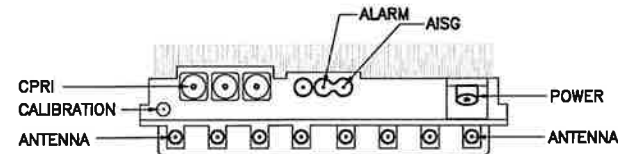
**RRU: ALCATEL LUCENT TD-RRH8X20**  
**COLOR: LIGHT GREY**  
**WEIGHT: 70 LBS.**



**SIDE VIEW**



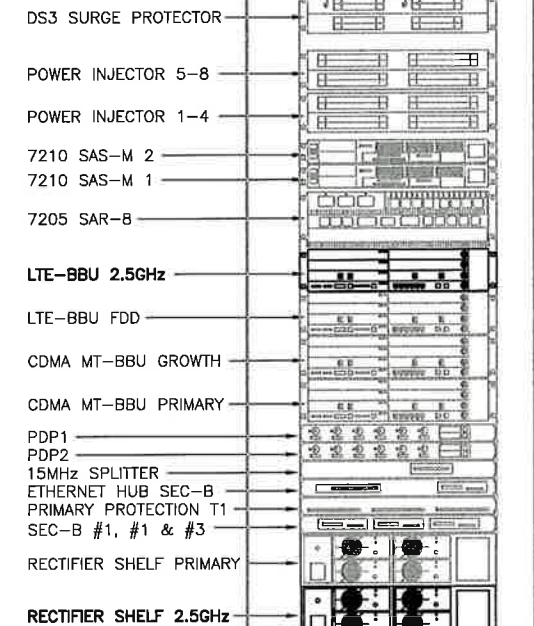
**FRONT VIEW**



**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



**FRONT VIEW**

- DS3 SURGE PROTECTOR
- POWER INJECTOR 5-8
- POWER INJECTOR 1-4
- 7210 SAS-M 2
- 7210 SAS-M 1
- 7205 SAR-B
- LTE-BBU 2.5GHz
- LTE-BBU FDD
- CDMA MT-BBU GROWTH
- CDMA MT-BBU PRIMARY
- PDP1
- PDP2
- 15MHz SPLITTER
- ETHERNET HUB SEC-B
- PRIMARY PROTECTION T1
- SEC-B #1, #1 & #3
- RECTIFIER SHELF PRIMARY
- RECTIFIER SHELF 2.5GHz

PLANS PREPARED FOR:

6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

MLA PARTNER:

ENGINEERING LICENSE:

**2.5 RRU**

NO SCALE

1

**NEW EQUIPMENT IN EXISTING CABINET**

NO SCALE

2

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SITE CASCADE:  
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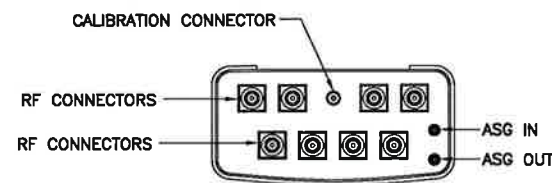
SITE ADDRESS:  
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 (MERIDEN WATERBURY TPK)  
 SOUTHLINGTON, CT 06489

SHEET DESCRIPTION:  
**EQUIPMENT &  
 MOUNTING DETAILS**

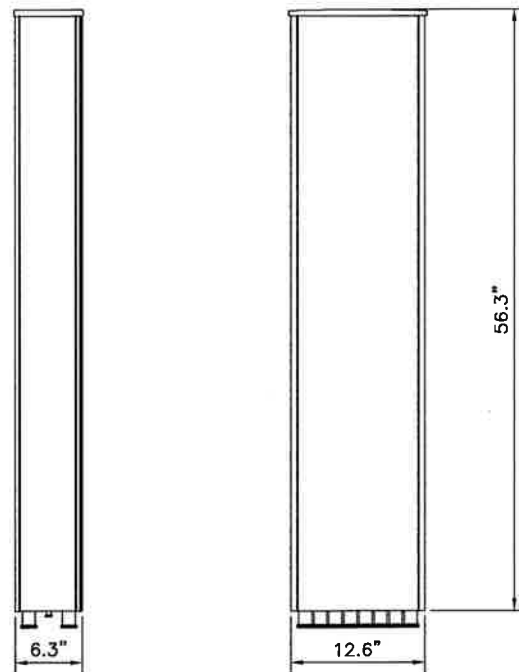
SHEET NUMBER:  
**A-5**

**ANTENNA: RFS APXVM14-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

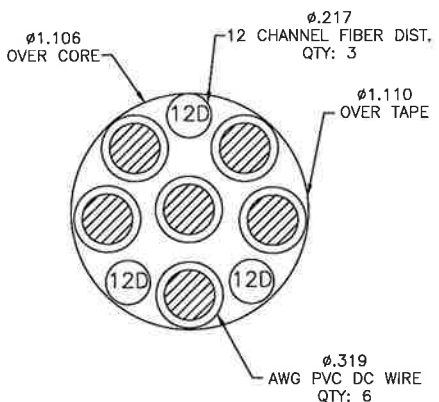
**RFS HYBRIFLEX RISER CABLE SCHEDULE**

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

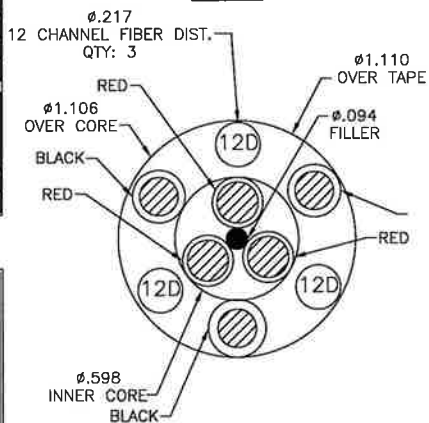
**RFS HYBRIFLEX JUMPER CABLE SCHEDULE**

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
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	MN: HBF078-21U1M3-30F1	30 ft

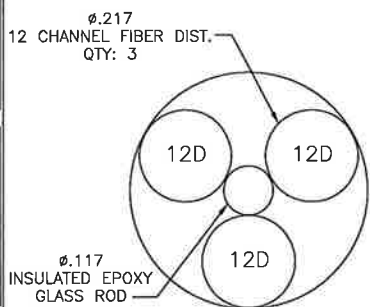
NOTE:  
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.



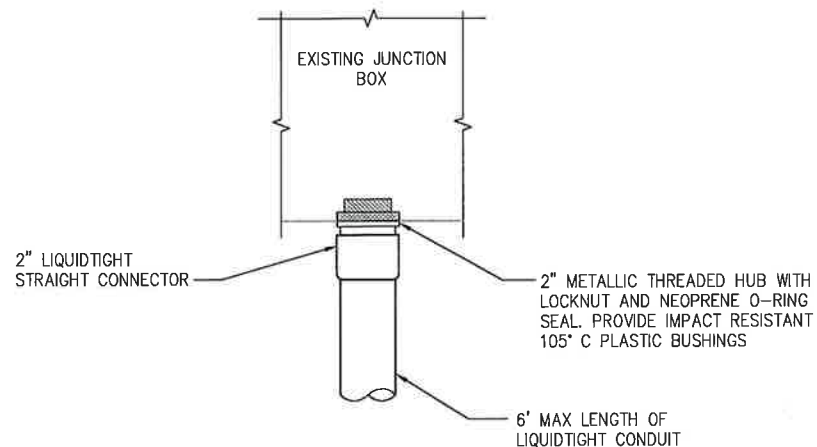
**4 AWG**



**8 & 6 AWG**



**FIBER ONLY**



**FIBER JUNCTION BOX PENETRATION**

NO SCALE

2

**2.5 CABLE CROSS SECTION DATA**

NO SCALE

1

**DETAIL NOT USED**

NO SCALE

3

PLANS PREPARED FOR:

6580 Sprint Parkway  
Overland Park, Kansas 66251

PLANS PREPARED BY:

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

JOB NUMBER 353-000

MLA PARTNER:

ENGINEERING LICENSE:

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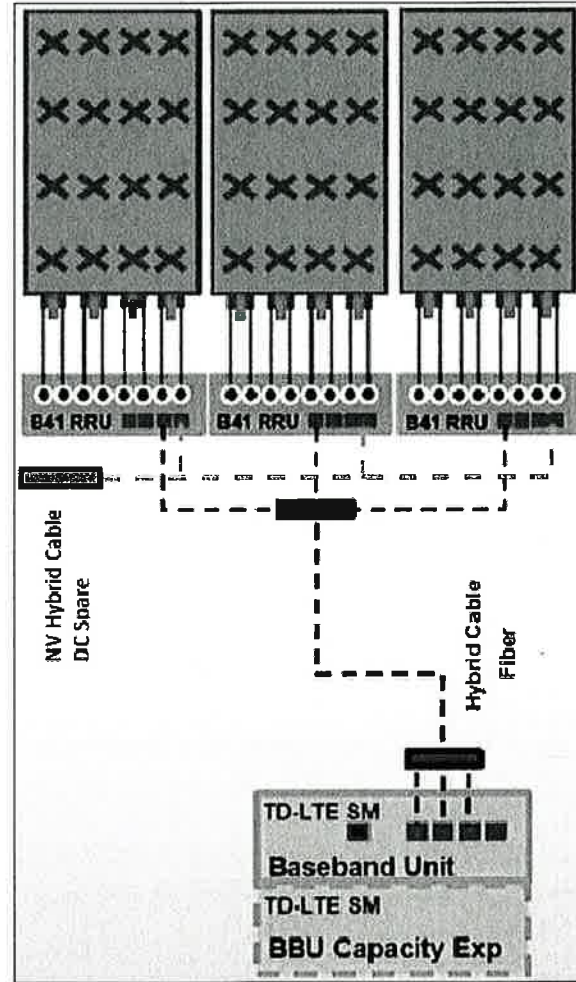
SITE NAME:  
**WEST JOHNSON AVE.  
BURNT HOUSE**

SITE CASCADE:  
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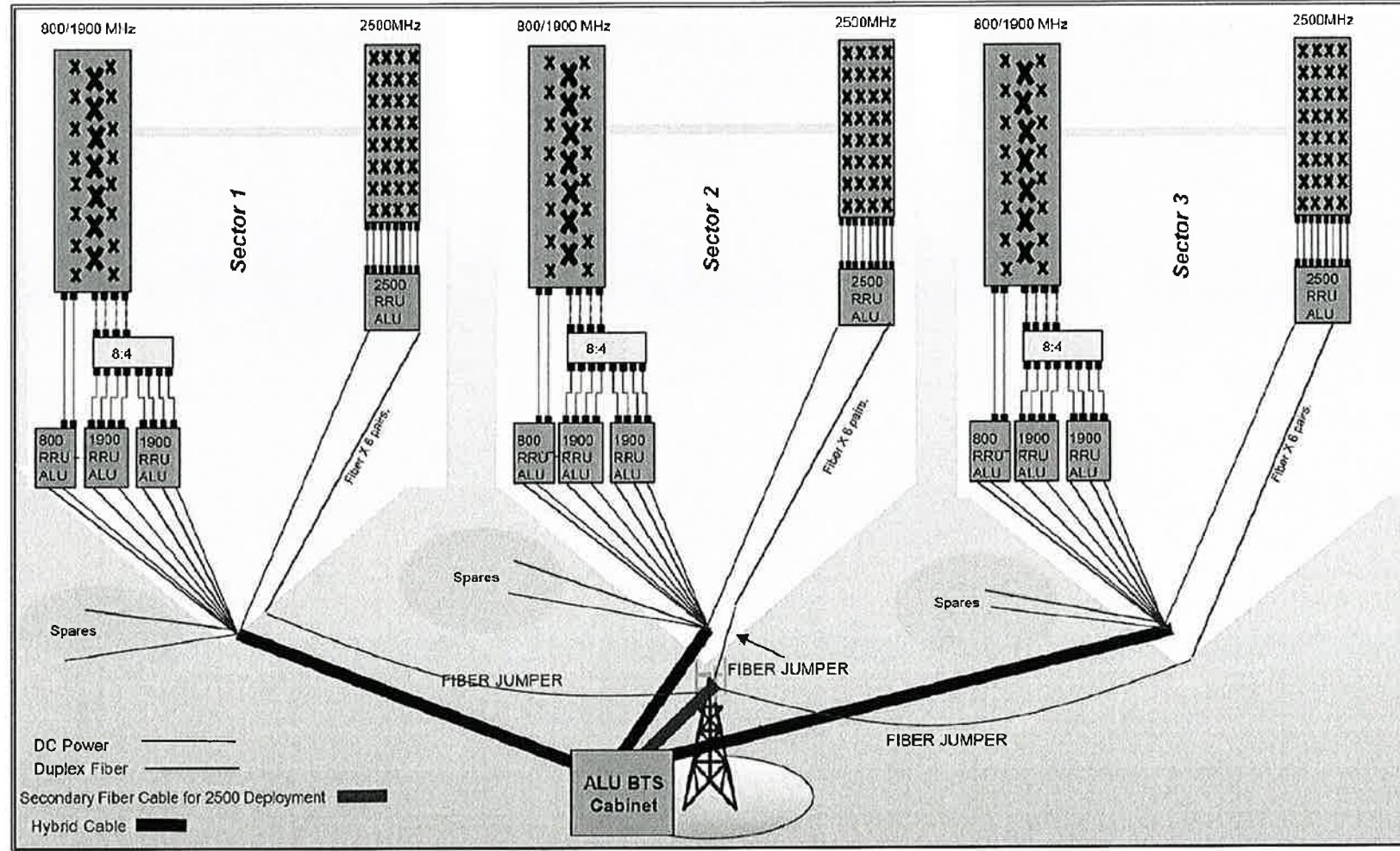
SITE ADDRESS:  
1394 ROUTE 322  
(MERIDEN WATERBURY TPK)  
SOUTHINGTON, CT 06489

SHEET DESCRIPTION:  
**CIVIL DETAILS**

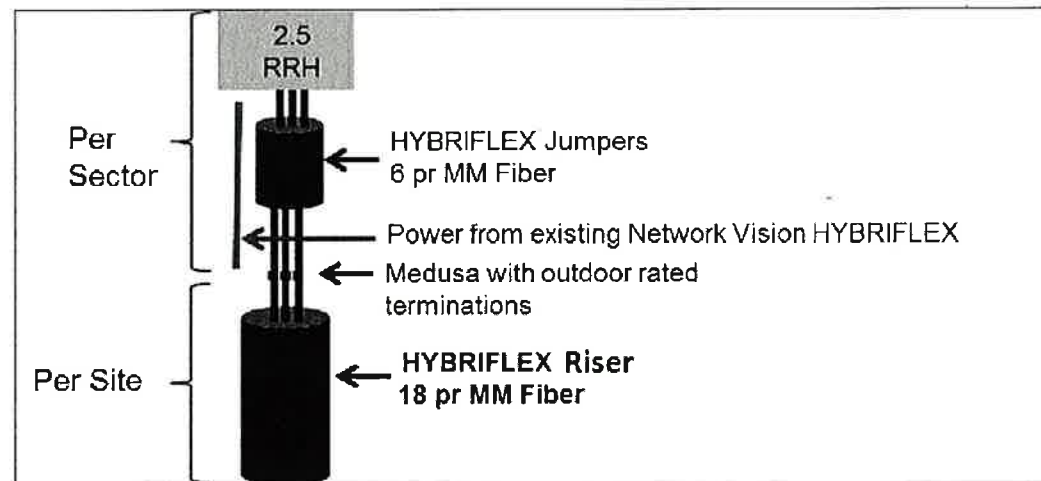
SHEET NUMBER:  
**A-6**



ALU 2.5 ALU SCENARIO 1



RAN WIRING DIAGRAM



RF 2.5 ALU SCENARIO 1

PLUMBING DIAGRAM

NO SCALE

1

PLANS PREPARED FOR:

**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  
PROFESSIONAL ENGINEER

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SOUTHINGTON, CT 06489

SHEET DESCRIPTION:

**CIVIL DETAILS**

SHEET NUMBER:

**A-7**

PLAN NOT USED

NO SCALE 1

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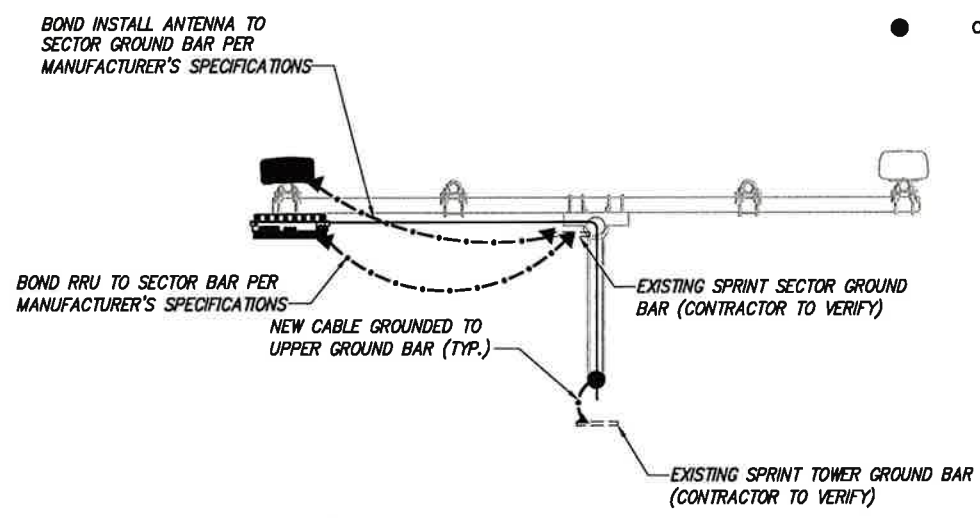
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**CT03XC015**

SITE ADDRESS:  
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 (MERIDEN WATERBURY TPK)  
 SOUTHTON, CT 06489

SHEET DESCRIPTION:  
**ELECTRICAL &  
 GROUNDING PLAN**

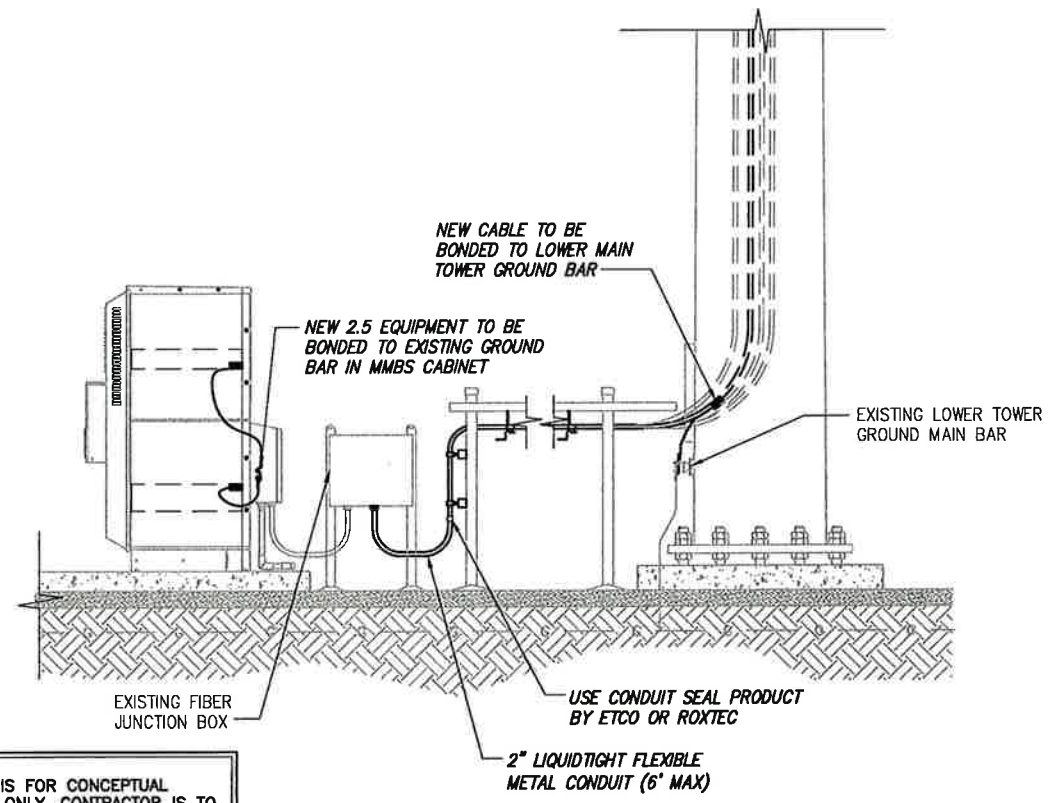
SHEET NUMBER:  
**E-1**

- LEGEND:**
- G — EXISTING GROUND RING
  - CADWELD CONNECTION (EXOTHERMIC WELD)
  - ▲ MECHANICAL CONNECTION
  - ⊗ GROUND ROD
  - CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE 2

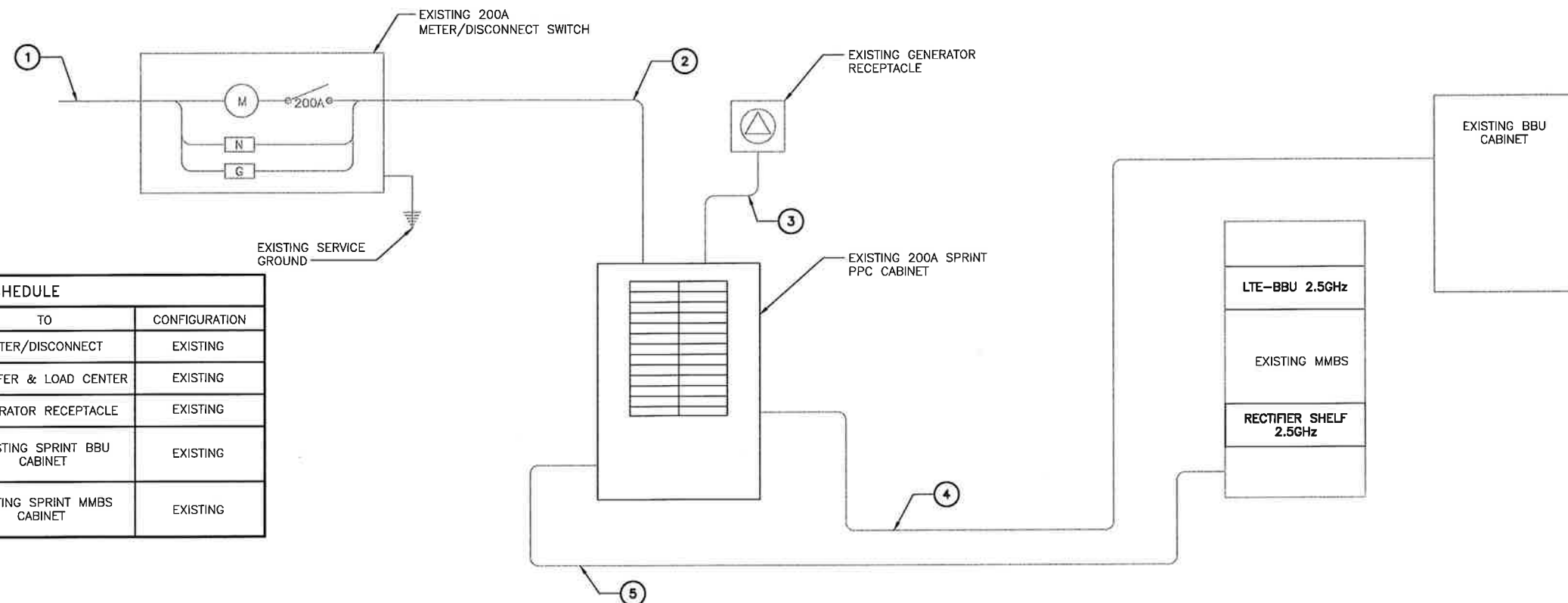


NOTE:  
 DEPICTION IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO FIELD VERIFY PRIOR TO CONSTRUCTION

TYPICAL EQUIPMENT GROUNDING PLAN (ELEVATION)

NO SCALE 3

**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

PLANS PREPARED FOR:

6580 Sprint Parkway  
 Overland Park, Kansas 66251

PLANS PREPARED BY:

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

MLA PARTNER:

ENGINEERING LICENSE:

DRAWING NOTICE:  
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REVISIONS:

DESCRIPTION	DATE	BY	REV
FOR PERMIT	6/25/14	AJD	0

SITE NAME:  
**WEST JOHNSON AVE. BURNT HOUSE**

SITE CASCADE:  
**CT03XC015**

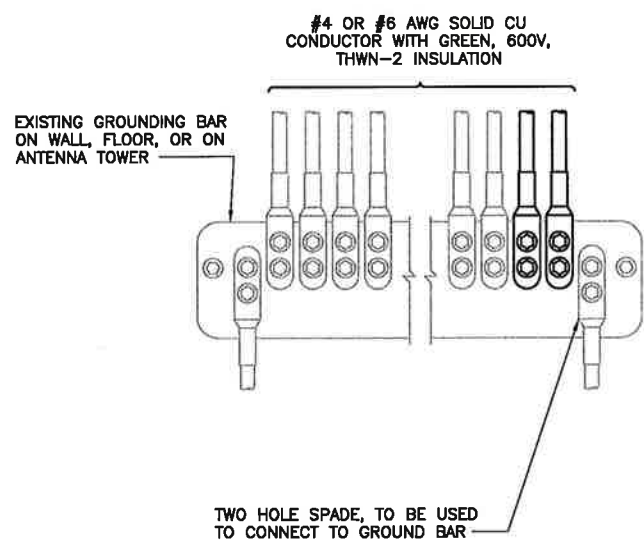
SITE ADDRESS:  
 1394 ROUTE 322  
 (MERIDEN WATERBURY TPK)  
 SOUTHTONING, CT 06489

SHEET DESCRIPTION:  
**ELECTRICAL & GROUNDING DETAILS**

SHEET NUMBER:  
**E-2**

**ELECTRICAL ONE-LINE DIAGRAM**

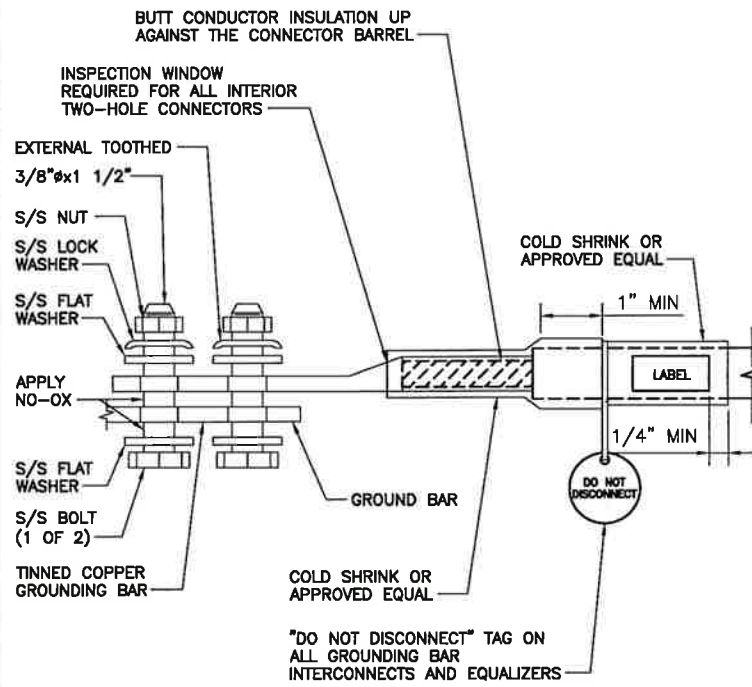
NO SCALE 1



**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**

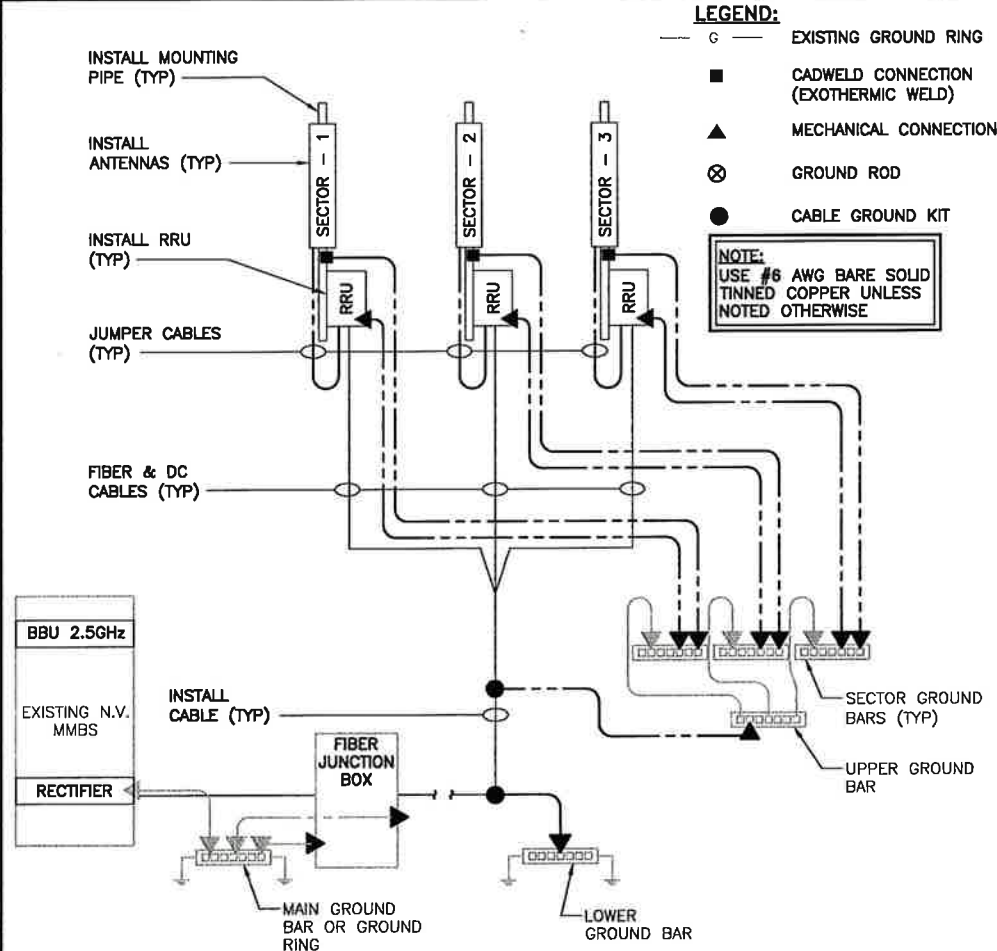
NO SCALE 2



"DO NOT DISCONNECT" TAG ON ALL GROUNDING BAR INTERCONNECTS AND EQUALIZERS

**TWO HOLE LUG**

NO SCALE 3



**GROUNDING RISER DIAGRAM**

NO SCALE 4



**PAUL J. FORD AND COMPANY**  
**STRUCTURAL ENGINEERS**  
 250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

**Date: August 20, 2014**

Steve Tuttle  
 Crown Castle  
 8 Parkmeadow Drive  
 Pittsford, NY 14534  
 585.899.3445

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

**Subject: Structural Modification Report**

**Carrier Designation:**

**Sprint PCS Co-Locate**  
**Carrier Site Number:** CT03XC015  
**Carrier Site Name:** N/A

**Crown Castle Designation:**

**Crown Castle BU Number:** 876313  
**Crown Castle Site Name:** West Johnson Ave. Burnt House  
**Crown Castle JDE Job Number:** 286424  
**Crown Castle Work Order Number:** 910749  
**Crown Castle Application Number:** 245304 Rev. 3

**Engineering Firm Designation:**

**Paul J Ford and Company Project Number:** 37513-0756.003.7700

**Site Data:**

**1394 Meriden Waterbury Tpk, SOUTHTON, Hartford County, CT**  
**Latitude 41° 33' 51.39", Longitude -72° 53' 30.7"**  
**160 Foot - Monopole Tower**

Dear Steve Tuttle,

Paul J Ford and Company is pleased to submit this "Structural Modification 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 682066, in accordance with application 245304, revision 3.

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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment  
 Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

**Sufficient Capacity**

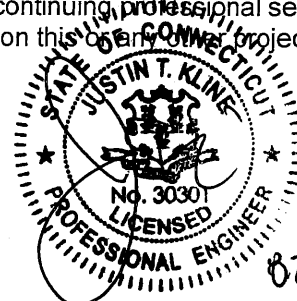
The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Bob Koors, E.I. *JK*  
 Structural Designer







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STRUCTURAL ENGINEERS  
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **August 20, 2014**

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**Carrier Site Number:**

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N/A

**Crown Castle Designation:**

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**Crown Castle Site Name:**

West Johnson Ave. Burnt House

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910749

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245304 Rev. 3

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Bob Koors, E.I.  
Structural Designer

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

### 3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 – Tower Components vs. Capacity

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 161 ft Monopole tower designed by SUMMIT in August of 1998.  
 The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

**Table 1 - Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	148.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	-
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

**Table 2 - Existing and Reserved Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
157.0	158.0	3	ericsson	RRUS-11	-	-	2
		1	andrew	SBNH-1D6565C w/ Mount Pipe	6 1 2	1-5/8 3/8 3/4	1
		3	ericsson	RRUS-11			
		3	kathrein	800 10121 w/ Mount Pipe			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
	1	raycap	DC6-48-60-18-8F				
	157.0	1	tower mounts	Side Arm Mount [SO 101-3]			
150.0	154.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
	1	tower mounts	Side Arm Mount [SO 103-3]				
148.0	148.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		1	tower mounts	Platform Mount [LP 712-1]			
139.0	140.0	3	alcatel lucent	RRH2X40-AWS	-	-	2
	139.0	1	tower mounts	Side Arm Mount [SO 102-3]			
138.0	142.0	1	lucent	KS24019-L112A	12 1	1-5/8 1/2	1
	138.0	3	antel	BXA-171063-12BF-EDIN-X w/ Mount Pipe			
		3	antel	BXA-70063-6CF-EDIN-2 w/ Mount Pipe			
		6	antel	LPA-80063-6CF-EDIN-2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 712-1]			
	3	kathrein	742 213 w/ Mount Pipe	1			
1	rfs celwave	DB-T1-6Z-8AB-0Z					
127.0	128.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	127.0	1	tower mounts	Platform Mount [LP 712-1]	12	1-5/8	1
119.0	119.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	6 1	1-5/8 3/8	1
		1	tower mounts	T-Arm Mount [TA 602-3]			
48.0	50.0	1	lucent	KS24019-L112A	1	1/2	1
	48.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:  
 1) Existing Equipment  
 2) Reserved Equipment  
 3) Equipment To Be Removed

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Goodkind & O'Dea, 08/27/1998	1529743	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29298-582, 08/27/1998	1633746	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29298-582, 08/27/1998	2134246	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD, 2012775.876313.01	3348783	CCISITES
4-POST MODIFICATION INSPECTION	TEP, 25560.9690, 03/13/2014	4600286	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) Monopole was fabricated and installed in accordance with the manufacturer's specifications.
- 2) Monopole has been properly maintained in accordance with manufacturer's specifications.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Monopole was modified in conformance with the referenced modification drawings.
- 5) Monopole will be modified in conformance with the attached proposed modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

## 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 148.5	Pole	TP10x10x0.349	1	-1.633	296.209	59.5	Pass
L2	148.5 - 148	Pole	TP23x10x0.349	2	-1.637	296.209	59.5	Pass
L3	148 - 111	Pole	TP28.994x23x0.25	3	-10.792	1071.395	91.2	Pass
L4	111 - 105.25	Pole	TP29.4254x27.8865x0.3125	4	-12.440	1385.720	93.6	Pass
L5	105.25 - 76.75	Pole	TP34.042x29.4254x0.4446	5	-17.373	2087.545	95.8	Pass
L6	76.75 - 71	Pole	TP34.3484x32.4643x0.5631	6	-20.566	2504.880	92.6	Pass
L7	71 - 70	Pole	TP34.5104x34.3484x0.7487	7	-20.894	3328.874	71.2	Pass
L8	70 - 43	Pole	TP38.884x34.5104x0.5356	8	-26.760	2940.038	97.9	Pass
L9	43 - 28	Pole	TP40.5641x37.0028x0.6536	9	-34.463	3470.465	98.3	Pass
L10	28 - 27.25	Pole	TP40.6856x40.5641x0.6528	10	-34.723	3526.811	97.2	Pass
L11	27.25 - 16	Pole	TP42.508x40.6856x0.6551	11	-38.670	4002.292	91.5	Pass
L12	16 - 14.5	Pole	TP42.751x42.508x0.8063	12	-39.300	4464.323	83.3	Pass
L13	14.5 - 12.25	Pole	TP43.1155x42.751x0.6431	13	-40.102	3932.363	95.1	Pass
L14	12.25 - 10	Pole	TP43.48x43.1155x0.8213	14	-41.082	4447.901	85.8	Pass
L15	10 - 0	Pole	TP45.1x43.48x0.661	15	-44.819	4578.148	87.0	Pass
							Summary	
						Pole (L9)	98.3	Pass
						Rating =	98.3	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC4.7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	91.0	Pass
1	Base Plate	0	82.2	Pass
1	Base Foundation Steel	0	86.1	Pass
1	Base Foundation Soil Interaction	0	95.4	Pass

<b>Structure Rating (max from all components) =</b>	<b>98.3%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the geotechnical report's recommendation, or the greater of the frost depth of the site or half of the caisson diameter.

**4.1) Recommendations**

Reinforce monopole in conformance with the attached proposed modification drawings.

**APPENDIX A**  
**TNXTOWER OUTPUT**

## 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 Hartford County, Connecticut.
- 2) Basic wind speed of 80 mph.
- 3) Nominal ice thickness of 1.0000 in.
- 4) Ice thickness is considered to increase with height.
- 5) Ice density of 56.000 pcf.
- 6) A wind speed of 38 mph is used in combination with ice.
- 7) Temperature drop of 50.000 °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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption	Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	--	--

## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.000-148.500	11.500	0.000	Round	10.0000	10.0000	0.3490		A53-B-35 (35 ksi)
L2	148.500-148.000	0.500	0.000	Round	10.0000	23.0000	0.3490		A53-B-35 (35 ksi)
L3	148.000-111.000	37.000	3.750	18	23.0000	28.9940	0.2500	1.0000	A607-60 (60 ksi)
L4	111.000-105.250	9.500	0.000	18	27.8865	29.4254	0.3125	1.2500	A607-60 (60 ksi)
L5	105.250-76.750	28.500	4.250	18	29.4254	34.0420	0.4446	1.7785	Reinf 56.20 ksi (56 ksi)
L6	76.750-71.000	10.000	0.000	18	32.4643	34.3484	0.5631	2.2522	Reinf 51.87 ksi (52 ksi)
L7	71.000-70.000	1.000	0.000	18	34.3484	34.5104	0.7487	2.9946	Reinf 51.88 ksi (52 ksi)
L8	70.000-43.000	27.000	5.000	18	34.5104	38.8840	0.5356	2.1425	Reinf 57.60 ksi (58 ksi)
L9	43.000-28.000	20.000	0.000	18	37.0028	40.5641	0.6536	2.6143	Reinf 52.41 ksi (52 ksi)



Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L10	28.000-27.250	0.750	0.000	18	40.5641	40.6856	0.6528	2.6113	Reinf 53.16 ksi (53 ksi)
L11	27.250-16.000	11.250	0.000	18	40.6856	42.5080	0.6551	2.6205	Reinf 57.50 ksi (58 ksi)
L12	16.000-14.500	1.500	0.000	18	42.5080	42.7510	0.8063	3.2251	Reinf 52.00 ksi (52 ksi)
L13	14.500-12.250	2.250	0.000	18	42.7510	43.1155	0.6431	2.5725	Reinf 56.71 ksi (57 ksi)
L14	12.250-10.000	2.250	0.000	18	43.1155	43.4800	0.8213	3.2852	Reinf 50.01 ksi (50 ksi)
L15	10.000-0.000	10.000		18	43.4800	45.1000	0.6610	2.6438	Reinf 61.40 ksi (61 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	10.0000	10.5815	123.3587	3.4144	5.0000	24.6717	246.7174	5.2876	0.0000	0
	10.0000	10.5815	123.3587	3.4144	5.0000	24.6717	246.7174	5.2876	0.0000	0
L2	10.0000	10.5815	123.3587	3.4144	5.0000	24.6717	246.7174	5.2876	0.0000	0
	23.0000	24.8349	1593.1275	8.0093	11.5000	138.5328	3186.2550	12.4100	0.0000	0
L3	23.3548	18.0521	1180.3983	8.0762	11.6840	101.0269	2362.3498	9.0278	3.6080	14.432
	29.4413	22.8084	2380.8169	10.2041	14.7290	161.6420	4764.7665	11.4063	4.6629	18.652
L4	28.9335	27.3500	2627.2035	9.7888	14.1663	185.4539	5257.8639	13.6776	4.3580	13.946
	29.8793	28.8763	3092.0742	10.3351	14.9481	206.8541	6188.2170	14.4409	4.6289	14.812
L5	29.8793	40.8992	4339.8228	10.2882	14.9481	290.3262	8685.3560	20.4535	4.3963	9.888
	34.5672	47.4145	6761.7480	11.9271	17.2933	391.0031	13532.393	23.7117	5.2088	11.715
L6	33.7782	57.0124	7330.2930	11.3249	16.4919	444.4795	14670.231	28.5116	4.7227	8.388
	34.8783	60.3796	8707.3394	11.9938	17.4490	499.0163	17426.136	30.1955	5.0543	8.977
L7	34.8783	79.8414	11387.760	11.9279	17.4490	652.6308	22790.504	39.9283	4.7277	6.315
	35.0428	80.2263	11553.262	11.9854	17.5313	659.0078	23121.726	40.1208	4.7562	6.353
L8	35.0428	57.7602	8423.2559	12.0611	17.5313	480.4696	16857.595	28.8856	5.1311	9.58
	39.4838	65.1957	12112.951	13.6137	19.7531	613.2186	24241.842	32.6040	5.9009	11.017
L9	38.4777	75.4052	12587.200	12.9040	18.7974	669.6234	25190.962	37.7097	5.3622	8.204
	41.1898	82.7928	16661.111	14.1682	20.6065	808.5350	33344.146	41.4043	5.9890	9.163
L10	41.1898	82.6981	16642.688	14.1685	20.6065	807.6410	33307.276	41.3569	5.9903	9.176
	41.3132	82.9499	16795.145	14.2116	20.6683	812.6055	33612.390	41.4828	6.0117	9.209
L11	41.3132	83.2386	16851.657	14.2108	20.6683	815.3397	33725.489	41.6272	6.0076	9.17
	43.1638	87.0282	19259.656	14.8578	21.5941	891.8952	38544.654	43.5224	6.3284	9.66
L12	43.1638	106.7203	23447.314	14.8041	21.5941	1085.8214	46925.480	53.3703	6.0624	7.519
	43.4105	107.3422	23859.596	14.8904	21.7175	1098.6334	47750.587	53.6813	6.1051	7.572
L13	43.4105	85.9546	19254.572	14.9483	21.7175	886.5916	38534.481	42.9855	6.3923	9.939
	43.7807	86.6987	19758.935	15.0777	21.9027	902.1237	39543.870	43.3576	6.4564	10.039
L14	43.7807	110.2529	24916.644	15.0145	21.9027	1137.6067	49866.075	55.1369	6.1428	7.479
	44.1508	111.2030	25566.404	15.1438	22.0879	1157.4872	51166.449	55.6121	6.2070	7.558
L15	44.1508	89.8282	20807.728	15.2008	22.0879	942.0441	41642.836	44.9226	6.4892	9.818

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
	45.7957	93.2267	23259.869 4 7	15.7759	22.9108	1015.2360	46550.345 2 4	46.6222	6.7743	10.249

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 160.000-148.500				1	1	1		
L2 148.500-148.000				1	1	1		
L3 148.000-111.000				1	1	1		
L4 111.000-105.250				1	1	1		
L5 105.250-76.750				1	1	1		
L6 76.750-71.000				1	1	1		
L7 71.000-70.000				1	1	1		
L8 70.000-43.000				1	1	1		
L9 43.000-28.000				1	1	1		
L10 28.000-27.250				1	1	1		
L11 27.250-16.000				1	1	1		
L12 16.000-14.500				1	1	1		
L13 14.500-12.250				1	1	1		
L14 12.250-10.000				1	1	1		
L15 10.000-0.000				1	1	1		

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter r in	Perimete r in	Weight klf
**										

**Feed Line/Linear Appurtenances - Entered As Area**

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight klf
LDF7-50A(1-5/8")	C	No	Inside Pole	157.000 - 0.000	6	No Ice 0.000 1/2" Ice 0.000 1" Ice 0.000 2" Ice 0.000 4" Ice 0.000	0.001 0.001 0.001 0.001 0.001
FB-L98B-002-75000(3/8")	C	No	Inside Pole	157.000 - 0.000	1	No Ice 0.000 1/2" Ice 0.000 1" Ice 0.000 2" Ice 0.000 4" Ice 0.000	0.000 0.000 0.000 0.000 0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight
							ft <sup>2</sup> /ft	k/ft
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	157.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
2" Conduit (1 1/2" EMT)	C	No	Inside Pole	157.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
**								
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	148.000 - 0.000	3	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB114-21U3M12-XXXF(1-1/4")	C	No	Inside Pole	148.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
**								
AL7-50(1 5/8)	C	No	Inside Pole	138.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF4-50A(1/2")	C	No	Inside Pole	138.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	138.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.031
**								
LDF7-50A(1-5/8")	C	No	Inside Pole	127.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	127.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	127.000 - 0.000	4	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
LDF7-50A(1-5/8")	C	No	Inside Pole	127.000 - 0.000	7	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	127.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.029
**								
FXL-1873(1 5/8")	C	No	CaAa (Out Of Face)	119.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.030

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight
						No Ice	ft <sup>2</sup> /ft	k/ft
860 10033(3/8)	C	No	CaAa (Out Of Face)	119.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
**								
LDF4-50A(1/2")	C	No	Inside Pole	48.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
**								
Aero MP3-06	C	No	CaAa (Out Of Face)	30.500 - 0.000	1	No Ice	0.434	0.000
						1/2" Ice	0.545	0.000
						1" Ice	0.657	0.000
						2" Ice	0.879	0.000
						4" Ice	1.323	0.000
Aero MP3-05	C	No	CaAa (Out Of Face)	73.250 - 43.250	1	No Ice	0.348	0.000
						1/2" Ice	0.400	0.000
						1" Ice	0.657	0.000
						2" Ice	0.879	0.000
						4" Ice	1.323	0.000
Aero MP3-04	C	No	CaAa (Out Of Face)	106.750 - 76.750	1	No Ice	0.269	0.000
						1/2" Ice	0.380	0.000
						1" Ice	0.491	0.000
						2" Ice	0.713	0.000
						4" Ice	1.158	0.000
**								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	49.500 - 24.500	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
						2" Ice	0.653	0.000
						4" Ice	1.097	0.000
**								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	18.000 - 8.000	1	No Ice	0.167	0.000
						1/2" Ice	0.278	0.000
						1" Ice	0.389	0.000
						2" Ice	0.611	0.000
						4" Ice	1.056	0.000
**								

**Feed Line/Linear Appurtenances Section Areas**

Tower Sectio n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	160.000-148.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.062
L2	148.500-148.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.004
L3	148.000-111.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.514	0.929
L4	111.000-105.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.681	0.226
L5	105.250-76.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	18.953	1.121
L6	76.750-71.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.060	0.226
L7	71.000-70.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000

Tower Section n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L8	70.000-43.000	C	0.000	0.000	0.000	0.744	0.039
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L9	43.000-28.000	C	0.000	0.000	0.000	21.350	1.063
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L10	28.000-27.250	C	0.000	0.000	0.000	10.151	0.592
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L11	27.250-16.000	C	0.000	0.000	0.000	0.779	0.030
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L12	16.000-14.500	C	0.000	0.000	0.000	10.247	0.444
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L13	14.500-12.250	C	0.000	0.000	0.000	1.495	0.059
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L14	12.250-10.000	C	0.000	0.000	0.000	2.243	0.089
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L15	10.000-0.000	C	0.000	0.000	0.000	2.243	0.089
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.637	0.395

**Feed Line/Linear Appurtenances Section Areas - With Ice**

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	160.000-148.500	A	1.203	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.062
L2	148.500-148.000	A	1.198	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.004
L3	148.000-111.000	A	1.178	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	18.642	1.747
L4	111.000-105.250	A	1.153	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	5.782	0.590
L5	105.250-76.750	A	1.129	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	38.973	2.807
L6	76.750-71.000	A	1.102	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	6.415	0.566
L7	71.000-70.000	A	1.095	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.512	0.096
L8	70.000-43.000	A	1.066	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	43.055	2.520
L9	43.000-28.000	A	1.009	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	20.693	1.402
L10	28.000-27.250	A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.412	0.066
L11	27.250-16.000	A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	18.303	0.990
L12	16.000-14.500	A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L13	14.500-12.250	C		0.000	0.000	0.000	2.762	0.132
		A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
L14	12.250-10.000	C		0.000	0.000	0.000	4.143	0.198
		A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
L15	10.000-0.000	C		0.000	0.000	0.000	4.143	0.198
		A	1.000	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	15.303	0.880

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>X</sub> in	CP <sub>Z</sub> in	CP <sub>X</sub> Ice in	CP <sub>Z</sub> Ice in
L1	160.000-148.500	0.0000	0.0000	0.0000	0.0000
L2	148.500-148.000	0.0000	0.0000	0.0000	0.0000
L3	148.000-111.000	-0.2821	0.1629	-0.5164	0.2981
L4	111.000-105.250	-0.5085	0.2936	-0.8734	0.5043
L5	105.250-76.750	-0.6903	0.3985	-1.1185	0.6457
L6	76.750-71.000	-0.5829	0.3365	-0.9931	0.5734
L7	71.000-70.000	-0.7673	0.4430	-1.2348	0.7129
L8	70.000-43.000	-0.8183	0.4724	-1.3151	0.7593
L9	43.000-28.000	-0.7305	0.4218	-1.2166	0.7024
L10	28.000-27.250	-1.0325	0.5961	-1.5237	0.8797
L11	27.250-16.000	-0.9367	0.5408	-1.3924	0.8039
L12	16.000-14.500	-1.0113	0.5839	-1.5282	0.8823
L13	14.500-12.250	-1.0129	0.5848	-1.5322	0.8846
L14	12.250-10.000	-1.0147	0.5859	-1.5368	0.8873
L15	10.000-0.000	-0.9087	0.5246	-1.3608	0.7857

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft, Vert ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
Side Arm Mount [SO 101-3]	C	None		0.0000	157.000	No Ice	7.500	7.500	0.252
						1/2" Ice	8.900	8.900	0.333
						1" Ice	10.300	10.300	0.414
						2" Ice	13.100	13.100	0.576
						4" Ice	18.700	18.700	0.900
800 10121 w/ Mount Pipe	A	From Face	4.000, 0.000, 1.000	0.0000	157.000	No Ice	6.033	4.948	0.072
						1/2" Ice	6.714	6.022	0.123
						1" Ice	7.299	6.810	0.181
						2" Ice	8.500	8.459	0.321
						4" Ice	11.044	12.102	0.728
800 10121 w/ Mount Pipe	B	From Face	4.000, 0.000, 1.000	0.0000	157.000	No Ice	6.033	4.948	0.072
						1/2" Ice	6.714	6.022	0.123
						1" Ice	7.299	6.810	0.181
						2" Ice	8.500	8.459	0.321
						4" Ice	11.044	12.102	0.728
800 10121 w/ Mount Pipe	C	From Face	4.000, 0.000	0.0000	157.000	No Ice	6.033	4.948	0.072
						1/2" Ice	6.714	6.022	0.123

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			1.000			Ice	7.299	6.810	0.181
						1" Ice	8.500	8.459	0.321
						2" Ice	11.044	12.102	0.728
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	8.498	6.304	0.074
						1/2"	9.149	7.479	0.139
						Ice	9.767	8.368	0.212
						1" Ice	11.031	10.179	0.385
						2" Ice	13.679	14.024	0.874
						4" Ice			
DC6-48-60-18-8F	B	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	2.567	2.567	0.019
						1/2"	2.798	2.798	0.041
						Ice	3.038	3.038	0.067
						1" Ice	3.543	3.543	0.129
						2" Ice	4.658	4.658	0.299
						4" Ice			
P65-17-XLH-RR w/ Mount Pipe	B	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	11.823	9.056	0.094
						1/2"	12.594	10.619	0.181
						Ice	13.375	12.205	0.278
						1" Ice	14.940	14.697	0.506
						2" Ice	18.334	19.643	1.144
						4" Ice			
SBNH-1D6565C w/ Mount Pipe	C	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	11.556	9.715	0.097
						1/2"	12.223	11.186	0.185
						Ice	12.893	12.594	0.284
						1" Ice	14.291	14.869	0.514
						2" Ice	17.428	19.618	1.148
						4" Ice			
(2) LGP21401	A	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	1.288	0.364	0.014
						1/2"	1.445	0.479	0.021
						Ice	1.611	0.602	0.030
						1" Ice	1.969	0.874	0.055
						2" Ice	2.788	1.522	0.135
						4" Ice			
(2) LGP21401	B	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	1.288	0.364	0.014
						1/2"	1.445	0.479	0.021
						Ice	1.611	0.602	0.030
						1" Ice	1.969	0.874	0.055
						2" Ice	2.788	1.522	0.135
						4" Ice			
(2) LGP21401	C	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	1.288	0.364	0.014
						1/2"	1.445	0.479	0.021
						Ice	1.611	0.602	0.030
						1" Ice	1.969	0.874	0.055
						2" Ice	2.788	1.522	0.135
						4" Ice			
RRUS-11	A	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	3.249	1.373	0.048
						1/2"	3.491	1.551	0.068
						Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS-11	B	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	3.249	1.373	0.048
						1/2"	3.491	1.551	0.068
						Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS-11	C	From Face	4.000 0.000 1.000	0.0000	157.000	No Ice	3.249	1.373	0.048
						1/2"	3.491	1.551	0.068
						Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS-11	A	From Face	4.000	0.0000	157.000	No Ice	3.249	1.373	0.048

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			0.000			1/2"	3.491	1.551	0.068
			1.000			Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS-11	B	From Face	4.000	0.0000	157.000	No Ice	3.249	1.373	0.048
			0.000			1/2"	3.491	1.551	0.068
			1.000			Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
RRUS-11	C	From Face	4.000	0.0000	157.000	No Ice	3.249	1.373	0.048
			0.000			1/2"	3.491	1.551	0.068
			1.000			Ice	3.741	1.738	0.092
						1" Ice	4.268	2.138	0.150
						2" Ice	5.426	3.042	0.310
						4" Ice			
**									
PCS 1900MHz 4x45W-65MHz	A	From Face	4.000	0.0000	150.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			4.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Face	4.000	0.0000	150.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			4.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Face	4.000	0.0000	150.000	No Ice	2.709	2.611	0.060
			0.000			1/2"	2.948	2.847	0.083
			4.000			Ice	3.195	3.092	0.110
						1" Ice	3.716	3.608	0.173
						2" Ice	4.862	4.744	0.347
						4" Ice			
800MHz 2X50W RRH W/FILTER	A	From Face	4.000	0.0000	150.000	No Ice	2.401	2.254	0.064
			0.000			1/2"	2.613	2.460	0.086
			4.000			Ice	2.833	2.675	0.111
						1" Ice	3.300	3.132	0.172
						2" Ice	4.337	4.148	0.338
						4" Ice			
800MHz 2X50W RRH W/FILTER	B	From Face	4.000	0.0000	150.000	No Ice	2.401	2.254	0.064
			0.000			1/2"	2.613	2.460	0.086
			4.000			Ice	2.833	2.675	0.111
						1" Ice	3.300	3.132	0.172
						2" Ice	4.337	4.148	0.338
						4" Ice			
800MHz 2X50W RRH W/FILTER	C	From Face	4.000	0.0000	150.000	No Ice	2.401	2.254	0.064
			0.000			1/2"	2.613	2.460	0.086
			4.000			Ice	2.833	2.675	0.111
						1" Ice	3.300	3.132	0.172
						2" Ice	4.337	4.148	0.338
						4" Ice			
Side Arm Mount [SO 103-3]	C	None		0.0000	150.000	No Ice	9.500	9.500	0.224
						1/2"	11.800	11.800	0.317
						Ice	14.100	14.100	0.410
						1" Ice	18.700	18.700	0.596
						2" Ice	27.900	27.900	0.968
						4" Ice			
**									
APXVSP18-C-A20 w/ Mount Pipe	A	From Face	4.000	0.0000	148.000	No Ice	8.498	6.946	0.083
			0.000			1/2"	9.149	8.127	0.151
			0.000			Ice	9.767	9.021	0.227
						1" Ice	11.031	10.844	0.406



Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.000 0.000 0.000	0.0000	148.000	2" Ice	13.679	14.851	0.909	
						4" Ice				
						No Ice	8.498	6.946	0.083	
						1/2" Ice	9.149	8.127	0.151	
						1" Ice	9.767	9.021	0.227	
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.000 0.000 0.000	0.0000	148.000	1" Ice	11.031	10.844	0.406	
						2" Ice	13.679	14.851	0.909	
						4" Ice				
						No Ice	8.498	6.946	0.083	
						1/2" Ice	9.149	8.127	0.151	
IBC1900HG-2A	A	From Face	4.000 0.000 0.000	0.0000	148.000	Ice	9.767	9.021	0.227	
						1" Ice	11.031	10.844	0.406	
						2" Ice	13.679	14.851	0.909	
						4" Ice				
						No Ice	1.127	0.533	0.022	
IBC1900HG-2A	B	From Face	4.000 0.000 0.000	0.0000	148.000	1/2" Ice	1.273	0.647	0.030	
						Ice	1.427	0.770	0.039	
						1" Ice	1.761	1.041	0.065	
						2" Ice	2.534	1.688	0.147	
						4" Ice				
IBC1900HG-2A	C	From Face	4.000 0.000 0.000	0.0000	148.000	No Ice	1.127	0.533	0.022	
						1/2" Ice	1.273	0.647	0.030	
						Ice	1.427	0.770	0.039	
						1" Ice	1.761	1.041	0.065	
						2" Ice	2.534	1.688	0.147	
IBC1900BB-1	A	From Face	4.000 0.000 0.000	0.0000	148.000	4" Ice				
						No Ice	1.127	0.533	0.022	
						1/2" Ice	1.273	0.647	0.030	
						Ice	1.427	0.770	0.039	
						1" Ice	1.761	1.041	0.065	
IBC1900BB-1	B	From Face	4.000 0.000 0.000	0.0000	148.000	2" Ice	2.534	1.688	0.147	
						4" Ice				
						No Ice	1.127	0.533	0.022	
						1/2" Ice	1.273	0.647	0.030	
						Ice	1.427	0.770	0.039	
IBC1900BB-1	C	From Face	4.000 0.000 0.000	0.0000	148.000	1" Ice	1.761	1.041	0.065	
						2" Ice	2.534	1.688	0.147	
						4" Ice				
						No Ice	1.127	0.533	0.022	
						1/2" Ice	1.273	0.647	0.030	
APXVTM14-C-120 w/ Mount Pipe	A	From Face	4.000 0.000 0.000	0.0000	148.000	Ice	1.427	0.770	0.039	
						1" Ice	1.761	1.041	0.065	
						2" Ice	2.534	1.688	0.147	
						4" Ice				
						No Ice	7.134	4.959	0.077	
APXVTM14-C-120 w/ Mount Pipe	B	From Face	4.000 0.000 0.000	0.0000	148.000	1/2" Ice	7.662	5.754	0.131	
						Ice	8.183	6.472	0.193	
						1" Ice	9.256	8.010	0.338	
						2" Ice	11.526	11.412	0.752	
						4" Ice				
APXVTM14-C-120 w/ Mount Pipe	C	From Face	4.000 0.000 0.000	0.0000	148.000	No Ice	7.134	4.959	0.077	
						1/2" Ice	7.662	5.754	0.131	
						Ice	8.183	6.472	0.193	
						1" Ice	9.256	8.010	0.338	
						2" Ice	11.526	11.412	0.752	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			Horz ft	Lateral ft						
TD-RRH8x20-25	A	From Face	4.000	0.000	0.0000	148.000	1" Ice	9.256	8.010	0.338
							2" Ice	11.526	11.412	0.752
							4" Ice			
							No Ice	4.720	1.703	0.070
							1/2" Ice	5.014	1.920	0.097
							1" Ice	5.316	2.145	0.128
							2" Ice	5.948	2.622	0.201
TD-RRH8x20-25	B	From Face	4.000	0.000	0.0000	148.000	2" Ice	7.314	3.680	0.397
							4" Ice			
							No Ice	4.720	1.703	0.070
							1/2" Ice	5.014	1.920	0.097
							1" Ice	5.316	2.145	0.128
							1" Ice	5.948	2.622	0.201
							2" Ice	7.314	3.680	0.397
TD-RRH8x20-25	C	From Face	4.000	0.000	0.0000	148.000	4" Ice			
							No Ice	4.720	1.703	0.070
							1/2" Ice	5.014	1.920	0.097
							1" Ice	5.316	2.145	0.128
							1" Ice	5.948	2.622	0.201
							2" Ice	7.314	3.680	0.397
							4" Ice			
Platform Mount [LP 712-1]	C	None	0.000	0.0000	148.000	No Ice	24.530	24.530	1.335	
						1/2" Ice	29.940	29.940	1.646	
						1" Ice	35.350	35.350	1.956	
						1" Ice	46.170	46.170	2.577	
						2" Ice	67.810	67.810	3.820	
						4" Ice				
						No Ice				
** Side Arm Mount [SO 102-3]	C	None	0.000	0.0000	139.000	No Ice	3.000	3.000	0.081	
						1/2" Ice	3.480	3.480	0.111	
						1" Ice	3.960	3.960	0.141	
						1" Ice	4.920	4.920	0.201	
						2" Ice	6.840	6.840	0.321	
						4" Ice				
						No Ice				
RRH2X40-AWS	A	From Face	4.000	0.000	0.0000	139.000	4" Ice			
							No Ice	2.522	1.589	0.044
							1/2" Ice	2.753	1.795	0.061
							1" Ice	2.993	2.010	0.082
							1" Ice	3.499	2.465	0.132
							2" Ice	4.615	3.479	0.275
							4" Ice			
RRH2X40-AWS	B	From Face	4.000	0.000	0.0000	139.000	4" Ice			
							No Ice	2.522	1.589	0.044
							1/2" Ice	2.753	1.795	0.061
							1" Ice	2.993	2.010	0.082
							1" Ice	3.499	2.465	0.132
							2" Ice	4.615	3.479	0.275
							4" Ice			
RRH2X40-AWS	C	From Face	4.000	0.000	0.0000	139.000	4" Ice			
							No Ice	2.522	1.589	0.044
							1/2" Ice	2.753	1.795	0.061
							1" Ice	2.993	2.010	0.082
							1" Ice	3.499	2.465	0.132
							2" Ice	4.615	3.479	0.275
							4" Ice			
** Platform Mount [LP 712-1]	C	None	0.000	0.0000	138.000	No Ice	24.530	24.530	1.335	
						1/2" Ice	29.940	29.940	1.646	
						1" Ice	35.350	35.350	1.956	
						1" Ice	46.170	46.170	2.577	
						2" Ice	67.810	67.810	3.820	
						4" Ice				
						No Ice				
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	A	From Face	4.000	0.000	0.0000	138.000	4" Ice			
							No Ice	10.745	10.700	0.052
							1/2" Ice	11.412	11.967	0.145
							1" Ice	12.045	12.948	0.247
							1" Ice	13.341	14.963	0.480
							2" Ice	16.054	19.208	1.095
							4" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	B	From Face	4.000	0.0000	138.000	No Ice	10.745	10.700	0.052
			0.000			1/2"	11.412	11.967	0.145
			0.000			Ice	12.045	12.948	0.247
						1" Ice	13.341	14.963	0.480
						2" Ice	16.054	19.208	1.095
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	C	From Face	4.000	0.0000	138.000	No Ice	10.745	10.700	0.052
			0.000			1/2"	11.412	11.967	0.145
			0.000			Ice	12.045	12.948	0.247
						1" Ice	13.341	14.963	0.480
						2" Ice	16.054	19.208	1.095
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Face	4.000	0.0000	138.000	No Ice	7.969	5.801	0.042
			0.000			1/2"	8.609	6.953	0.103
			0.000			Ice	9.216	7.819	0.171
						1" Ice	10.459	9.601	0.335
						2" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Face	4.000	0.0000	138.000	No Ice	7.969	5.801	0.042
			0.000			1/2"	8.609	6.953	0.103
			0.000			Ice	9.216	7.819	0.171
						1" Ice	10.459	9.601	0.335
						2" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Face	4.000	0.0000	138.000	No Ice	7.969	5.801	0.042
			0.000			1/2"	8.609	6.953	0.103
			0.000			Ice	9.216	7.819	0.171
						1" Ice	10.459	9.601	0.335
						2" Ice	13.066	13.366	0.804
BXA-171063-12BF-EDIN-X w/ Mount Pipe	A	From Face	4.000	0.0000	138.000	No Ice	5.037	5.297	0.039
			0.000			1/2"	5.592	6.470	0.085
			0.000			Ice	6.113	7.360	0.138
						1" Ice	7.177	9.162	0.271
						2" Ice	9.449	12.966	0.675
BXA-171063-12BF-EDIN-X w/ Mount Pipe	B	From Face	4.000	0.0000	138.000	No Ice	5.037	5.297	0.039
			0.000			1/2"	5.592	6.470	0.085
			0.000			Ice	6.113	7.360	0.138
						1" Ice	7.177	9.162	0.271
						2" Ice	9.449	12.966	0.675
BXA-171063-12BF-EDIN-X w/ Mount Pipe	C	From Face	4.000	0.0000	138.000	No Ice	5.037	5.297	0.039
			0.000			1/2"	5.592	6.470	0.085
			0.000			Ice	6.113	7.360	0.138
						1" Ice	7.177	9.162	0.271
						2" Ice	9.449	12.966	0.675
KS24019-L112A	C	From Face	4.000	0.0000	138.000	No Ice	0.156	0.156	0.005
			0.000			1/2"	0.225	0.225	0.007
			4.000			Ice	0.302	0.302	0.009
						1" Ice	0.484	0.484	0.018
						2" Ice	0.951	0.951	0.056
(2) FD9R6004/2C-3L	A	From Face	4.000	0.0000	138.000	No Ice	0.367	0.085	0.003
			0.000			1/2"	0.451	0.136	0.005
			0.000			Ice	0.543	0.196	0.009
						1" Ice	0.755	0.343	0.020
						2" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L	B	From Face	4.000	0.0000	138.000	No Ice	0.367	0.085	0.003
			0.000			1/2"	0.451	0.136	0.005
			0.000			Ice	0.543	0.196	0.009
						1" Ice	0.755	0.343	0.020
						2" Ice	1.281	0.740	0.063

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
(2) FD9R6004/2C-3L	C	From Face	4.000 0.000 0.000	0.0000	138.000	4" Ice			
						No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
742 213 w/ Mount Pipe	A	From Face	4.000 0.000 0.000	0.0000	138.000	4" Ice			
						No Ice	5.373	4.620	0.049
						1/2" Ice	5.950	6.000	0.094
						1" Ice	6.501	6.982	0.146
						2" Ice	7.611	8.852	0.277
742 213 w/ Mount Pipe	B	From Face	4.000 0.000 0.000	0.0000	138.000	4" Ice			
						No Ice	5.373	4.620	0.049
						1/2" Ice	5.950	6.000	0.094
						1" Ice	6.501	6.982	0.146
						2" Ice	7.611	8.852	0.277
742 213 w/ Mount Pipe	C	From Face	4.000 0.000 0.000	0.0000	138.000	4" Ice			
						No Ice	5.373	4.620	0.049
						1/2" Ice	5.950	6.000	0.094
						1" Ice	6.501	6.982	0.146
						2" Ice	7.611	8.852	0.277
DB-T1-6Z-8AB-0Z	C	From Face	4.000 0.000 0.000	0.0000	138.000	4" Ice			
						No Ice	5.600	2.333	0.044
						1/2" Ice	5.915	2.558	0.080
						1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
** ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.000 0.000 1.000	0.0000	127.000	4" Ice			
						No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.000 0.000 1.000	0.0000	127.000	4" Ice			
						No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.000 0.000 1.000	0.0000	127.000	4" Ice			
						No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.000 0.000 1.000	0.0000	127.000	4" Ice			
						No Ice	6.815	5.633	0.112
						1/2" Ice	7.337	6.472	0.169
						1" Ice	7.853	7.248	0.232
						2" Ice	8.916	8.854	0.383
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.000 0.000 1.000	0.0000	127.000	4" Ice			
						No Ice	6.815	5.633	0.112
						1/2" Ice	7.337	6.472	0.169
						1" Ice	7.853	7.248	0.232
						2" Ice	8.916	8.854	0.383
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.000 0.000 1.000	0.0000	127.000	4" Ice			
						No Ice	6.815	5.633	0.112
						1/2" Ice	7.337	6.472	0.169
						1" Ice	7.853	7.248	0.232
						2" Ice	8.916	8.854	0.383

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			Horz ft	Lateral ft						Vert ft
KRY 112 144/1	A	From Face	4.000	0.000	0.0000	127.000	1" Ice	8.916	8.854	0.383
							2" Ice	11.165	12.280	0.806
							4" Ice			
							No Ice	0.408	0.204	0.011
							1/2" Ice	0.497	0.273	0.014
							1" Ice	0.594	0.351	0.019
							2" Ice	0.815	0.533	0.032
KRY 112 144/1	B	From Face	4.000	0.000	0.0000	127.000	2" Ice	1.359	0.999	0.082
							4" Ice			
							No Ice	0.408	0.204	0.011
							1/2" Ice	0.497	0.273	0.014
							1" Ice	0.594	0.351	0.019
							1" Ice	0.815	0.533	0.032
							2" Ice	1.359	0.999	0.082
KRY 112 144/1	C	From Face	4.000	0.000	0.0000	127.000	4" Ice			
							No Ice	0.408	0.204	0.011
							1/2" Ice	0.497	0.273	0.014
							1" Ice	0.594	0.351	0.019
							1" Ice	0.815	0.533	0.032
							2" Ice	1.359	0.999	0.082
							4" Ice			
Platform Mount [LP 712-1]	C	None	0.000	0.000	0.0000	127.000	No Ice	24.530	24.530	1.335
							1/2" Ice	29.940	29.940	1.646
							1" Ice	35.350	35.350	1.956
							1" Ice	46.170	46.170	2.577
							2" Ice	67.810	67.810	3.820
							4" Ice			
							No Ice			
2.375" OD x 6' Mount Pipe	A	From Face	4.000	0.000	0.0000	127.000	4" Ice			
							No Ice	1.425	1.425	0.025
							1/2" Ice	1.925	1.925	0.036
							1" Ice	2.294	2.294	0.051
							1" Ice	3.060	3.060	0.093
							2" Ice	4.702	4.702	0.234
							4" Ice			
2.375" OD x 6' Mount Pipe	B	From Face	4.000	0.000	0.0000	127.000	4" Ice			
							No Ice	1.425	1.425	0.025
							1/2" Ice	1.925	1.925	0.036
							1" Ice	2.294	2.294	0.051
							1" Ice	3.060	3.060	0.093
							2" Ice	4.702	4.702	0.234
							4" Ice			
2.375" OD x 6' Mount Pipe	C	From Face	4.000	0.000	0.0000	127.000	4" Ice			
							No Ice	1.425	1.425	0.025
							1/2" Ice	1.925	1.925	0.036
							1" Ice	2.294	2.294	0.051
							1" Ice	3.060	3.060	0.093
							2" Ice	4.702	4.702	0.234
							4" Ice			
** T-Arm Mount [TA 602-3]	C	None	0.000	0.000	0.0000	119.000	No Ice	11.590	11.590	0.774
							1/2" Ice	15.440	15.440	0.990
							1" Ice	19.290	19.290	1.206
							1" Ice	26.990	26.990	1.639
							2" Ice	42.390	42.390	2.503
							4" Ice			
							No Ice			
HBX-6516DS-VTM w/ Mount Pipe	A	From Face	4.000	0.000	0.0000	119.000	4" Ice			
							No Ice	3.598	3.241	0.029
							1/2" Ice	3.998	3.914	0.062
							1" Ice	4.435	4.564	0.101
							1" Ice	5.368	5.914	0.199
							2" Ice	7.361	8.877	0.504
							4" Ice			
HBX-6516DS-VTM w/ Mount Pipe	B	From Face	4.000	0.000	0.0000	119.000	4" Ice			
							No Ice	3.598	3.241	0.029
							1/2" Ice	3.998	3.914	0.062
							1" Ice	4.435	4.564	0.101
							1" Ice	5.368	5.914	0.199
							2" Ice	7.361	8.877	0.504
							4" Ice			
HBX-6516DS-VTM w/ Mount Pipe	C	From Face	4.000	0.000	0.0000	119.000	No Ice	3.598	3.241	0.029

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
Mount Pipe			0.000 0.000		1/2" Ice	3.998 4.435	3.914 4.564	0.062 0.101	
					1" Ice	5.368	5.914	0.199	
					2" Ice	7.361	8.877	0.504	
					4" Ice				
2.375" OD x 6' Mount Pipe	A	From Face	4.000 0.000 0.000	0.0000	119.000	No Ice 1/2" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
						1" Ice	3.060	3.060	0.093
						2" Ice	4.702	4.702	0.234
						4" Ice			
2.375" OD x 6' Mount Pipe	B	From Face	4.000 0.000 0.000	0.0000	119.000	No Ice 1/2" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
						1" Ice	3.060	3.060	0.093
						2" Ice	4.702	4.702	0.234
						4" Ice			
2.375" OD x 6' Mount Pipe	C	From Face	4.000 0.000 0.000	0.0000	119.000	No Ice 1/2" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.025 0.036 0.051
						1" Ice	3.060	3.060	0.093
						2" Ice	4.702	4.702	0.234
						4" Ice			
** KS24019-L112A	A	From Face	4.000 0.000 2.000	0.0000	48.000	No Ice 1/2" Ice	0.156 0.225 0.302	0.156 0.225 0.302	0.005 0.007 0.009
						1" Ice	0.484	0.484	0.018
						2" Ice	0.951	0.951	0.056
						4" Ice			
Side Arm Mount [SO 701-1]	C	None		0.0000	48.000	No Ice 1/2" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
						1" Ice	2.010	4.350	0.121
						2" Ice	3.170	7.030	0.177
						4" Ice			

**Tower Pressures - No Ice**

$G_H = 1.690$

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> ksf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>
L1 160.000-148.500	154.250	1.554	0.025	9.583	A	0.000	9.583	9.583	100.00	0.000	0.000
					B	0.000	9.583		100.00	0.000	0.000
					C	0.000	9.583		100.00	0.000	0.000
L2 148.500-148.000	148.217	1.536	0.025	0.688	A	0.000	0.688	0.688	100.00	0.000	0.000
					B	0.000	0.688		100.00	0.000	0.000
					C	0.000	0.688		100.00	0.000	0.000
L3 148.000-111.000	128.978	1.476	0.024	80.157	A	0.000	80.157	80.157	100.00	0.000	0.000
					B	0.000	80.157		100.00	0.000	0.000
					C	0.000	80.157		100.00	0.000	8.514
L4 111.000-105.250	108.110	1.404	0.023	13.877	A	0.000	13.877	13.877	100.00	0.000	0.000
					B	0.000	13.877		100.00	0.000	0.000
					C	0.000	13.877		100.00	0.000	2.681
L5 105.250-	90.654	1.335	0.022	75.368	A	0.000	75.368	75.368	100.00	0.000	0.000

Section Elevation ft	z ft	K <sub>z</sub>	q <sub>z</sub> ksf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
76.750					B	0.000	75.368		100.00	0.000	0.000
					C	0.000	75.368		100.00	0.000	18.953
L6 76.750-71.000	73.860	1.259	0.021	16.199	A	0.000	16.199	16.199	100.00	0.000	0.000
					B	0.000	16.199		100.00	0.000	0.000
					C	0.000	16.199		100.00	0.000	3.060
L7 71.000-70.000	70.500	1.242	0.020	2.869	A	0.000	2.869	2.869	100.00	0.000	0.000
					B	0.000	2.869		100.00	0.000	0.000
					C	0.000	2.869		100.00	0.000	0.744
L8 70.000-43.000	56.232	1.164	0.019	82.569	A	0.000	82.569	82.569	100.00	0.000	0.000
					B	0.000	82.569		100.00	0.000	0.000
					C	0.000	82.569		100.00	0.000	21.350
L9 43.000-28.000	35.415	1.02	0.017	49.036	A	0.000	49.036	49.036	100.00	0.000	0.000
					B	0.000	49.036		100.00	0.000	0.000
					C	0.000	49.036		100.00	0.000	10.151
L10 28.000-27.250	27.625	1	0.016	2.539	A	0.000	2.539	2.539	100.00	0.000	0.000
					B	0.000	2.539		100.00	0.000	0.000
					C	0.000	2.539		100.00	0.000	0.779
L11 27.250-16.000	21.584	1	0.016	38.997	A	0.000	38.997	38.997	100.00	0.000	0.000
					B	0.000	38.997		100.00	0.000	0.000
					C	0.000	38.997		100.00	0.000	10.247
L12 16.000-14.500	15.249	1	0.016	5.329	A	0.000	5.329	5.329	100.00	0.000	0.000
					B	0.000	5.329		100.00	0.000	0.000
					C	0.000	5.329		100.00	0.000	1.495
L13 14.500-12.250	13.373	1	0.016	8.050	A	0.000	8.050	8.050	100.00	0.000	0.000
					B	0.000	8.050		100.00	0.000	0.000
					C	0.000	8.050		100.00	0.000	2.243
L14 12.250-10.000	11.123	1	0.016	8.118	A	0.000	8.118	8.118	100.00	0.000	0.000
					B	0.000	8.118		100.00	0.000	0.000
					C	0.000	8.118		100.00	0.000	2.243
L15 10.000-0.000	4.970	1	0.016	36.908	A	0.000	36.908	36.908	100.00	0.000	0.000
					B	0.000	36.908		100.00	0.000	0.000
					C	0.000	36.908		100.00	0.000	8.637

**Tower Pressure - With Ice**

$G_H = 1.690$

Section Elevation ft	z ft	K <sub>z</sub>	q <sub>z</sub> ksf	t <sub>z</sub> in	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L1 160.000-148.500	154.250	1.554	0.006	1.2033	11.890	A	0.000	11.890	11.890	100.00	0.000	0.000
						B	0.000	11.890		100.00	0.000	0.000
						C	0.000	11.890		100.00	0.000	0.000
L2 148.500-148.000	148.217	1.536	0.006	1.1975	0.787	A	0.000	0.787	0.787	100.00	0.000	0.000
						B	0.000	0.787		100.00	0.000	0.000
						C	0.000	0.787		100.00	0.000	0.000
L3 148.000-111.000	128.978	1.476	0.005	1.1777	87.420	A	0.000	87.420	87.420	100.00	0.000	0.000
						B	0.000	87.420		100.00	0.000	0.000
						C	0.000	87.420		100.00	0.000	18.642
L4 111.000-105.250	108.110	1.404	0.005	1.1530	15.005	A	0.000	15.005	15.005	100.00	0.000	0.000
						B	0.000	15.005		100.00	0.000	0.000
						C	0.000	15.005		100.00	0.000	5.782
L5 105.250-76.750	90.654	1.335	0.005	1.1289	80.730	A	0.000	80.730	80.730	100.00	0.000	0.000
						B	0.000	80.730		100.00	0.000	0.000
						C	0.000	80.730		100.00	0.000	38.973
L6 76.750-71.000	73.860	1.259	0.005	1.1015	17.281	A	0.000	17.281	17.281	100.00	0.000	0.000
						B	0.000	17.281		100.00	0.000	0.000
						C	0.000	17.281		100.00	0.000	6.415
L7 71.000-70.000	70.500	1.242	0.004	1.0954	3.052	A	0.000	3.052	3.052	100.00	0.000	0.000
						B	0.000	3.052		100.00	0.000	0.000
						C	0.000	3.052		100.00	0.000	1.512
L8 70.000-43.000	56.232	1.164	0.004	1.0660	87.366	A	0.000	87.366	87.366	100.00	0.000	0.000
						B	0.000	87.366		100.00	0.000	0.000
						C	0.000	87.366		100.00	0.000	43.055

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> ksf	t <sub>z</sub> in	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L9 43.000-28.000	35.415	1.02	0.004	1.0085	51.701	A	0.000	51.701	51.701	100.00	0.000	0.000
						B	0.000	51.701		100.00	0.000	0.000
						C	0.000	51.701		100.00	0.000	20.693
L10 28.000-27.250	27.625	1	0.004	1.0000	2.664	A	0.000	2.664	2.664	100.00	0.000	0.000
						B	0.000	2.664		100.00	0.000	0.000
						C	0.000	2.664		100.00	0.000	1.412
L11 27.250-16.000	21.584	1	0.004	1.0000	40.872	A	0.000	40.872	40.872	100.00	0.000	0.000
						B	0.000	40.872		100.00	0.000	0.000
						C	0.000	40.872		100.00	0.000	18.303
L12 16.000-14.500	15.249	1	0.004	1.0000	5.579	A	0.000	5.579	5.579	100.00	0.000	0.000
						B	0.000	5.579		100.00	0.000	0.000
						C	0.000	5.579		100.00	0.000	2.762
L13 14.500-12.250	13.373	1	0.004	1.0000	8.425	A	0.000	8.425	8.425	100.00	0.000	0.000
						B	0.000	8.425		100.00	0.000	0.000
						C	0.000	8.425		100.00	0.000	4.143
L14 12.250-10.000	11.123	1	0.004	1.0000	8.493	A	0.000	8.493	8.493	100.00	0.000	0.000
						B	0.000	8.493		100.00	0.000	0.000
						C	0.000	8.493		100.00	0.000	4.143
L15 10.000-0.000	4.970	1	0.004	1.0000	38.575	A	0.000	38.575	38.575	100.00	0.000	0.000
						B	0.000	38.575		100.00	0.000	0.000
						C	0.000	38.575		100.00	0.000	15.303

### Tower Pressure - Service

**G<sub>H</sub> = 1.690**

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> ksf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L1 160.000-148.500	154.250	1.554	0.010	9.583	A	0.000	9.583	9.583	100.00	0.000	0.000
					B	0.000	9.583		100.00	0.000	0.000
					C	0.000	9.583		100.00	0.000	0.000
L2 148.500-148.000	148.217	1.536	0.010	0.688	A	0.000	0.688	0.688	100.00	0.000	0.000
					B	0.000	0.688		100.00	0.000	0.000
					C	0.000	0.688		100.00	0.000	0.000
L3 148.000-111.000	128.978	1.476	0.009	80.157	A	0.000	80.157	80.157	100.00	0.000	0.000
					B	0.000	80.157		100.00	0.000	0.000
					C	0.000	80.157		100.00	0.000	8.514
L4 111.000-105.250	108.110	1.404	0.009	13.877	A	0.000	13.877	13.877	100.00	0.000	0.000
					B	0.000	13.877		100.00	0.000	0.000
					C	0.000	13.877		100.00	0.000	2.681
L5 105.250-76.750	90.654	1.335	0.009	75.368	A	0.000	75.368	75.368	100.00	0.000	0.000
					B	0.000	75.368		100.00	0.000	0.000
					C	0.000	75.368		100.00	0.000	18.953
L6 76.750-71.000	73.860	1.259	0.008	16.199	A	0.000	16.199	16.199	100.00	0.000	0.000
					B	0.000	16.199		100.00	0.000	0.000
					C	0.000	16.199		100.00	0.000	3.060
L7 71.000-70.000	70.500	1.242	0.008	2.869	A	0.000	2.869	2.869	100.00	0.000	0.000
					B	0.000	2.869		100.00	0.000	0.000
					C	0.000	2.869		100.00	0.000	0.744
L8 70.000-43.000	56.232	1.164	0.007	82.569	A	0.000	82.569	82.569	100.00	0.000	0.000
					B	0.000	82.569		100.00	0.000	0.000
					C	0.000	82.569		100.00	0.000	21.350
L9 43.000-28.000	35.415	1.02	0.007	49.036	A	0.000	49.036	49.036	100.00	0.000	0.000
					B	0.000	49.036		100.00	0.000	0.000
					C	0.000	49.036		100.00	0.000	10.151
L10 28.000-27.250	27.625	1	0.006	2.539	A	0.000	2.539	2.539	100.00	0.000	0.000
					B	0.000	2.539		100.00	0.000	0.000
					C	0.000	2.539		100.00	0.000	0.779
L11 27.250-16.000	21.584	1	0.006	38.997	A	0.000	38.997	38.997	100.00	0.000	0.000
					B	0.000	38.997		100.00	0.000	0.000
					C	0.000	38.997		100.00	0.000	10.247



Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> ksf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L12 16.000-14.500	15.249	1	0.006	5.329	A	0.000	5.329	5.329	100.00	0.000	0.000
					B	0.000	5.329	100.00	0.000	0.000	
					C	0.000	5.329	100.00	0.000	1.495	
L13 14.500-12.250	13.373	1	0.006	8.050	A	0.000	8.050	8.050	100.00	0.000	0.000
					B	0.000	8.050	100.00	0.000	0.000	
					C	0.000	8.050	100.00	0.000	2.243	
L14 12.250-10.000	11.123	1	0.006	8.118	A	0.000	8.118	8.118	100.00	0.000	0.000
					B	0.000	8.118	100.00	0.000	0.000	
					C	0.000	8.118	100.00	0.000	2.243	
L15 10.000-0.000	4.970	1	0.006	36.908	A	0.000	36.908	36.908	100.00	0.000	0.000
					B	0.000	36.908	100.00	0.000	0.000	
					C	0.000	36.908	100.00	0.000	8.637	

### 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	160 - 148.5	Pole	Max Tension	8	0.000	0.001	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	148.5 - 148	Pole	Max. Compression	14	-4.746	-0.599	-0.029
			Max. Mx	5	-1.634	-37.234	0.100
			Max. My	8	-1.635	0.055	-36.844
			Max. Vy	11	-4.736	36.937	-0.107
			Max. Vx	8	4.709	0.055	-36.844
			Max. Torque	2			-0.881
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-4.793	-0.596	-0.032
			Max. Mx	5	-1.669	-39.606	0.099
			Max. My	8	-1.670	0.053	-39.203
L3	148 - 111	Pole	Max. Vy	11	-4.756	39.309	-0.119
			Max. Vx	8	4.729	0.053	-39.203
			Max. Torque	2			-0.880
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.907	0.399	-1.418
			Max. Mx	5	-10.813	-555.444	0.165
			Max. My	8	-10.792	0.532	-557.847
			Max. Vy	11	-21.470	555.427	-0.804
			Max. Vx	8	21.582	0.532	-557.847
			Max. Torque	9			1.080
L4	111 - 105.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-28.426	0.996	-1.780
			Max. Mx	11	-12.459	763.028	-0.972
			Max. My	8	-12.440	0.713	-766.486
			Max. Vy	11	-22.225	763.028	-0.972
			Max. Vx	8	22.338	0.713	-766.486
			Max. Torque	3			-1.053
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-35.528	3.076	-3.015
			Max. Mx	11	-17.387	1327.528	-1.442
L5	105.25 - 76.75	Pole	Max. My	8	-17.373	1.274	-1333.607
			Max. Vy	11	-24.333	1327.528	-1.442
			Max. Vx	8	24.447	1.274	-1333.607
			Max. Torque	3			-1.041
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.859	3.964	-3.538
			Max. Mx	11	-20.579	1575.845	-1.637
			Max. My	8	-20.566	1.513	-1583.005
			Max. Vy	11	-25.254	1575.845	-1.637
			Max. Vx	8	25.367	1.513	-1583.005
L6	76.75 - 71	Pole	Max. Torque	10			0.999
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-40.275	4.055	-3.592
			Max. Mx	11	-20.907	1601.146	-1.658
			Max. My	8	-20.894	1.537	-1608.415
			Max. Vy	11	-25.344	1601.146	-1.658
			Max. Vx	8	25.457	1.537	-1608.415
			Max. Torque	10			0.999
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-47.972	6.045	-4.757
L7	71 - 70	Pole	Max. Mx	11	-26.768	2177.585	-2.095
			Max. My	8	-26.760	2.096	-2187.211
			Max. Vy	11	-27.052	2177.585	-2.095
			Max. Vx	8	27.165	2.096	-2187.211
			Max. Torque	10			0.999
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-57.675	7.933	-5.798
			Max. Mx	11	-34.468	2735.416	-2.482
			Max. My	8	-34.463	2.641	-2747.126
			Max. Vy	11	-28.525	2735.416	-2.482
L8	70 - 43	Pole	Max. Vx	8	28.637	2.641	-2747.126
			Max. Torque	10			0.972
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-57.991	7.998	-5.836
			Max. Mx	11	-34.728	2756.829	-2.497
			Max. My	8	-34.723	2.661	-2768.618
			Max. Vy	11	-28.574	2756.829	-2.497
			Max. Vx	8	28.685	2.661	-2768.618
			Max. Torque	10			0.972
			Max Tension	1	0.000	0.000	0.000
L9	43 - 28	Pole	Max. Compression	14	-57.991	7.998	-5.836
			Max. Mx	11	-34.728	2756.829	-2.497
			Max. My	8	-34.723	2.661	-2768.618
			Max. Vy	11	-28.574	2756.829	-2.497
			Max. Vx	8	28.685	2.661	-2768.618
			Max. Torque	10			0.972
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-57.991	7.998	-5.836
			Max. Mx	11	-34.728	2756.829	-2.497
			Max. My	8	-34.723	2.661	-2768.618
L10	28 - 27.25	Pole	Max. Vy	11	-28.574	2756.829	-2.497
			Max. Vx	8	28.685	2.661	-2768.618
			Max. Torque	10			0.972
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-57.991	7.998	-5.836
			Max. Mx	11	-34.728	2756.829	-2.497
			Max. My	8	-34.723	2.661	-2768.618
			Max. Vy	11	-28.574	2756.829	-2.497
			Max. Vx	8	28.685	2.661	-2768.618
			Max. Torque	10			0.972

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L11	27.25 - 16	Pole	Max. Torque	10			0.972
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-62.831	8.985	-6.403
			Max. Mx	11	-38.673	3082.350	-2.725
			Max. My	8	-38.670	2.965	-3095.311
			Max. Vy	11	-29.292	3082.350	-2.725
			Max. Vx	8	29.402	2.965	-3095.311
L12	16 - 14.5	Pole	Max. Torque	10			0.972
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-63.590	9.120	-6.480
			Max. Mx	11	-39.303	3126.367	-2.756
			Max. My	8	-39.300	3.006	-3139.483
			Max. Vy	11	-29.401	3126.367	-2.756
			Max. Vx	8	29.511	3.006	-3139.483
L13	14.5 - 12.25	Pole	Max. Torque	10			0.971
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-64.571	9.324	-6.597
			Max. Mx	11	-40.104	3192.673	-2.801
			Max. My	8	-40.102	3.067	-3206.022
			Max. Vy	11	-29.543	3192.673	-2.801
			Max. Vx	8	29.653	3.067	-3206.022
L14	12.25 - 10	Pole	Max. Torque	11			0.977
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-65.740	9.530	-6.716
			Max. Mx	11	-41.084	3259.318	-2.847
			Max. My	8	-41.082	3.129	-3272.898
			Max. Vy	11	-29.698	3259.318	-2.847
			Max. Vx	8	29.807	3.129	-3272.898
L15	10 - 0	Pole	Max. Torque	11			0.987
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-70.293	10.466	-7.253
			Max. Mx	11	-44.820	3559.254	-3.051
			Max. My	8	-44.819	3.406	-3573.855
			Max. Vy	11	-30.286	3559.254	-3.051
			Max. Vx	8	30.395	3.406	-3573.855
			Max. Torque	11			1.027

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	70.293	-0.001	0.000
	Max. H <sub>x</sub>	11	44.831	30.269	-0.011
	Max. H <sub>z</sub>	2	44.831	-0.011	30.377
	Max. M <sub>x</sub>	2	3571.307	-0.011	30.377
	Max. M <sub>z</sub>	5	3556.025	-30.269	0.011
	Max. Torsion	11	1.027	30.269	-0.011
	Min. Vert	8	44.831	0.011	-30.377
	Min. H <sub>x</sub>	5	44.831	-30.269	0.011
	Min. H <sub>z</sub>	8	44.831	0.011	-30.377
	Min. M <sub>x</sub>	8	-3573.855	0.011	-30.377
	Min. M <sub>z</sub>	11	-3559.254	30.269	-0.011
	Min. Torsion	5	-1.026	-30.269	0.011

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	44.831	-0.000	0.000	1.226	1.569	0.000

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead+Wind 0 deg - No Ice	44.831	0.011	-30.377	-3571.307	-0.152	0.165
Dead+Wind 30 deg - No Ice	44.831	15.145	-26.315	-3093.880	-1778.882	0.656
Dead+Wind 60 deg - No Ice	44.831	26.221	-15.199	-1786.762	-3080.560	0.971
Dead+Wind 90 deg - No Ice	44.831	30.269	-0.011	-0.507	-3556.025	1.026
Dead+Wind 120 deg - No Ice	44.831	26.211	15.181	1786.233	-3078.797	0.807
Dead+Wind 150 deg - No Ice	44.831	15.127	26.305	3094.662	-1775.812	0.371
Dead+Wind 180 deg - No Ice	44.831	-0.011	30.377	3573.855	3.406	-0.164
Dead+Wind 210 deg - No Ice	44.831	-15.145	26.315	3096.416	1782.134	-0.655
Dead+Wind 240 deg - No Ice	44.831	-26.221	15.199	1789.295	3083.798	-0.971
Dead+Wind 270 deg - No Ice	44.831	-30.269	0.011	3.051	3559.254	-1.027
Dead+Wind 300 deg - No Ice	44.831	-26.211	-15.181	-1783.678	3082.031	-0.807
Dead+Wind 330 deg - No Ice	44.831	-15.127	-26.305	-3092.104	1779.058	-0.371
Dead+Ice+Temp	70.293	0.001	-0.000	7.253	10.466	0.000
Dead+Wind 0 deg+Ice+Temp	70.293	-0.001	-8.943	-1093.661	10.864	-0.060
Dead+Wind 30 deg+Ice+Temp	70.293	4.459	-7.744	-946.079	-538.153	0.124
Dead+Wind 60 deg+Ice+Temp	70.293	7.725	-4.471	-542.967	-940.122	0.274
Dead+Wind 90 deg+Ice+Temp	70.293	8.921	0.001	7.615	-1087.287	0.352
Dead+Wind 120 deg+Ice+Temp	70.293	7.726	4.473	558.137	-940.342	0.334
Dead+Wind 150 deg+Ice+Temp	70.293	4.462	7.746	961.085	-538.535	0.228
Dead+Wind 180 deg+Ice+Temp	70.293	0.001	8.943	1108.444	10.421	0.060
Dead+Wind 210 deg+Ice+Temp	70.293	-4.459	7.744	960.859	559.434	-0.124
Dead+Wind 240 deg+Ice+Temp	70.293	-7.725	4.471	557.749	961.398	-0.274
Dead+Wind 270 deg+Ice+Temp	70.293	-8.921	-0.001	7.172	1108.562	-0.352
Dead+Wind 300 deg+Ice+Temp	70.293	-7.726	-4.473	-543.347	961.621	-0.334
Dead+Wind 330 deg+Ice+Temp	70.293	-4.462	-7.746	-946.296	559.819	-0.228
Dead+Wind 0 deg - Service	44.831	0.004	-11.893	-1401.256	0.926	0.069
Dead+Wind 30 deg - Service	44.831	5.930	-10.304	-1213.928	-697.446	0.262
Dead+Wind 60 deg - Service	44.831	10.267	-5.951	-700.723	-1208.505	0.386
Dead+Wind 90 deg - Service	44.831	11.851	-0.004	0.586	-1395.050	0.406
Dead+Wind 120 deg - Service	44.831	10.263	5.944	702.083	-1207.809	0.317
Dead+Wind 150 deg - Service	44.831	5.923	10.299	1215.799	-696.240	0.144
Dead+Wind 180 deg - Service	44.831	-0.004	11.893	1403.822	2.319	-0.068
Dead+Wind 210 deg - Service	44.831	-5.930	10.304	1216.493	700.691	-0.262
Dead+Wind 240 deg - Service	44.831	-10.267	5.951	703.288	1211.748	-0.386
Dead+Wind 270 deg - Service	44.831	-11.851	0.004	1.979	1398.292	-0.406
Dead+Wind 300 deg - Service	44.831	-10.263	-5.944	-699.515	1211.051	-0.317
Dead+Wind 330 deg - Service	44.831	-5.923	-10.299	-1213.231	699.484	-0.144

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-44.831	0.000	0.000	44.831	-0.000	0.000%
2	0.011	-44.831	-30.380	-0.011	44.831	30.377	0.005%
3	15.145	-44.831	-26.315	-15.145	44.831	26.315	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
4	26.221	-44.831	-15.199	-26.221	44.831	15.199	0.000%
5	30.272	-44.831	-0.011	-30.269	44.831	0.011	0.005%
6	26.211	-44.831	15.181	-26.211	44.831	-15.181	0.000%
7	15.127	-44.831	26.305	-15.127	44.831	-26.305	0.000%
8	-0.011	-44.831	30.380	0.011	44.831	-30.377	0.005%
9	-15.145	-44.831	26.315	15.145	44.831	-26.315	0.000%
10	-26.221	-44.831	15.199	26.221	44.831	-15.199	0.000%
11	-30.272	-44.831	0.011	30.269	44.831	-0.011	0.005%
12	-26.211	-44.831	-15.181	26.211	44.831	15.181	0.000%
13	-15.127	-44.831	-26.305	15.127	44.831	26.305	0.000%
14	0.000	-70.293	0.000	-0.001	70.293	0.000	0.001%
15	-0.001	-70.293	-8.944	0.001	70.293	8.943	0.001%
16	4.459	-70.293	-7.745	-4.459	70.293	7.744	0.000%
17	7.725	-70.293	-4.471	-7.725	70.293	4.471	0.000%
18	8.921	-70.293	0.001	-8.921	70.293	-0.001	0.001%
19	7.727	-70.293	4.473	-7.726	70.293	-4.473	0.000%
20	4.462	-70.293	7.746	-4.462	70.293	-7.746	0.000%
21	0.001	-70.293	8.944	-0.001	70.293	-8.943	0.001%
22	-4.459	-70.293	7.745	4.459	70.293	-7.744	0.000%
23	-7.725	-70.293	4.471	7.725	70.293	-4.471	0.000%
24	-8.921	-70.293	-0.001	8.921	70.293	0.001	0.001%
25	-7.727	-70.293	-4.473	7.726	70.293	4.473	0.000%
26	-4.462	-70.293	-7.746	4.462	70.293	7.746	0.000%
27	0.004	-44.831	-11.895	-0.004	44.831	11.893	0.005%
28	5.930	-44.831	-10.304	-5.930	44.831	10.304	0.001%
29	10.267	-44.831	-5.951	-10.267	44.831	5.951	0.001%
30	11.853	-44.831	-0.004	-11.851	44.831	0.004	0.005%
31	10.263	-44.831	5.944	-10.263	44.831	-5.944	0.001%
32	5.923	-44.831	10.300	-5.923	44.831	-10.299	0.001%
33	-0.004	-44.831	11.895	0.004	44.831	-11.893	0.005%
34	-5.930	-44.831	10.304	5.930	44.831	-10.304	0.001%
35	-10.267	-44.831	5.951	10.267	44.831	-5.951	0.001%
36	-11.853	-44.831	0.004	11.851	44.831	-0.004	0.005%
37	-10.263	-44.831	-5.944	10.263	44.831	5.944	0.001%
38	-5.923	-44.831	-10.300	5.923	44.831	10.299	0.001%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.0000001	0.0000001
2	Yes	17	0.0000573	0.00009510
3	Yes	22	0.0000001	0.00012902
4	Yes	22	0.0000001	0.00012518
5	Yes	17	0.0000576	0.00008510
6	Yes	22	0.0000001	0.00012730
7	Yes	22	0.0000001	0.00012742
8	Yes	17	0.0000572	0.00008713
9	Yes	22	0.0000001	0.00012559
10	Yes	22	0.0000001	0.00012928
11	Yes	17	0.0000575	0.00009352
12	Yes	22	0.0000001	0.00012624
13	Yes	22	0.0000001	0.00012629
14	Yes	11	0.0000001	0.00004546
15	Yes	19	0.0000001	0.00010440
16	Yes	20	0.0000001	0.00008366
17	Yes	20	0.0000001	0.00008233
18	Yes	19	0.0000001	0.00010413
19	Yes	20	0.0000001	0.00008493
20	Yes	20	0.0000001	0.00008464
21	Yes	19	0.0000001	0.00010589
22	Yes	20	0.0000001	0.00008568
23	Yes	20	0.0000001	0.00008691
24	Yes	19	0.0000001	0.00010577
25	Yes	20	0.0000001	0.00008431

26	Yes	20	0.0000001	0.00008476
27	Yes	16	0.00010580	0.00005722
28	Yes	19	0.0000001	0.00008503
29	Yes	19	0.0000001	0.00007888
30	Yes	16	0.00010581	0.00005588
31	Yes	19	0.0000001	0.00008258
32	Yes	19	0.0000001	0.00008280
33	Yes	16	0.00010580	0.00005660
34	Yes	19	0.0000001	0.00007966
35	Yes	19	0.0000001	0.00008551
36	Yes	16	0.00010580	0.00005673
37	Yes	19	0.0000001	0.00008087
38	Yes	19	0.0000001	0.00008096

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 148.5	50.272	33	2.8834	0.0128
L2	148.5 - 148	43.419	33	2.7410	0.0047
L3	148 - 111	43.133	33	2.7397	0.0046
L4	114.75 - 105.25	25.407	33	2.2120	0.0019
L5	105.25 - 76.75	21.178	33	2.0078	0.0015
L6	81 - 71	12.300	33	1.4742	0.0009
L7	71 - 70	9.360	33	1.3103	0.0007
L8	70 - 43	9.087	33	1.2948	0.0007
L9	48 - 28	4.212	33	0.8207	0.0004
L10	28 - 27.25	1.408	33	0.4872	0.0002
L11	27.25 - 16	1.332	33	0.4734	0.0002
L12	16 - 14.5	0.459	33	0.2689	0.0001
L13	14.5 - 12.25	0.378	33	0.2470	0.0001
L14	12.25 - 10	0.271	33	0.2061	0.0001
L15	10 - 0	0.181	33	0.1738	0.0001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.000	Side Arm Mount [SO 101-3]	33	48.455	2.8332	0.0100	4899
150.000	PCS 1900MHz 4x45W-65MHz	33	44.287	2.7481	0.0051	3158
148.000	APXVSP18-C-A20 w/ Mount Pipe	33	43.133	2.7397	0.0047	4141
139.000	Side Arm Mount [SO 102-3]	33	38.030	2.6697	0.0040	5624
138.000	Platform Mount [LP 712-1]	33	37.472	2.6570	0.0039	5309
127.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	33	31.513	2.4711	0.0028	3271
119.000	T-Arm Mount [TA 602-3]	33	27.448	2.3037	0.0022	2556
48.000	KS24019-L112A	33	4.212	0.8207	0.0004	3278

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 148.5	127.518	8	7.3113	0.0324
L2	148.5 - 148	110.179	8	6.9533	0.0117
L3	148 - 111	109.452	8	6.9499	0.0116
L4	114.75 - 105.25	64.547	8	5.6179	0.0048

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	105.25 - 76.75	53.819	8	5.1009	0.0038
L6	81 - 71	31.275	8	3.7478	0.0022
L7	71 - 70	23.804	8	3.3317	0.0018
L8	70 - 43	23.111	8	3.2924	0.0018
L9	48 - 28	10.717	8	2.0878	0.0009
L10	28 - 27.25	3.583	8	1.2398	0.0005
L11	27.25 - 16	3.391	8	1.2047	0.0005
L12	16 - 14.5	1.167	8	0.6844	0.0003
L13	14.5 - 12.25	0.961	8	0.6287	0.0002
L14	12.25 - 10	0.689	8	0.5245	0.0002
L15	10 - 0	0.462	8	0.4424	0.0002

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.000	Side Arm Mount [SO 101-3]	8	122.921	7.1849	0.0256	2018
150.000	PCS 1900MHz 4x45W-65MHz	8	112.376	6.9712	0.0130	1300
148.000	APXVSP18-C-A20 w/ Mount Pipe	8	109.452	6.9499	0.0121	1702
139.000	Side Arm Mount [SO 102-3]	8	96.533	6.7737	0.0102	2284
138.000	Platform Mount [LP 712-1]	8	95.120	6.7417	0.0100	2154
127.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	80.023	6.2727	0.0072	1321
119.000	T-Arm Mount [TA 602-3]	8	69.722	5.8497	0.0055	1030
48.000	KS24019-L112A	8	10.717	2.0878	0.0009	1293

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P P <sub>a</sub>
L1	160 - 148.5 (1)	TP10x10x0.349	11.500	0.000	0.0	21.000	10.5815	-1.633	222.212	0.007
L2	148.5 - 148 (2)	TP23x10x0.349	0.500	0.000	0.0	21.000	10.5815	-1.637	222.212	0.007
L3	148 - 111 (3)	TP28.994x23x0.25	37.000	0.000	0.0	36.000	22.3263	-10.792	803.747	0.013
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.312 5	9.500	0.000	0.0	36.000	28.8763	-12.440	1039.550	0.012
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	28.500	0.000	0.0	33.720	46.4429	-17.373	1566.050	0.011
L6	76.75 - 71 (6)	TP34.3484x32.4643x0.563 1	10.000	0.000	0.0	31.122	60.3796	-20.566	1879.130	0.011
L7	71 - 70 (7)	TP34.5104x34.3484x0.748 7	1.000	0.000	0.0	31.128	80.2263	-20.894	2497.280	0.008
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	27.000	0.000	0.0	34.560	63.8187	-26.760	2205.580	0.012
L9	43 - 28 (9)	TP40.5641x37.0028x0.653 6	20.000	0.000	0.0	31.446	82.7928	-34.463	2603.500	0.013
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.652 8	0.750	0.000	0.0	31.896	82.9499	-34.723	2645.770	0.013
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	11.250	0.000	0.0	34.500	87.0282	-38.670	3002.470	0.013
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	1.500	0.000	0.0	31.200	107.342	-39.300	3349.080	0.012
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	2.250	0.000	0.0	34.026	86.6987	-40.102	2950.010	0.014
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	2.250	0.000	0.0	30.006	111.203 0	-41.082	3336.760	0.012

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio P/P <sub>a</sub>
L15	10 - 0 (15)	TP45.1x43.48x0.661	10.000	0.000	0.0	36.840	93.2267	-44.819	3434.470	0.013

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> kip-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio f <sub>bx</sub> /F <sub>bx</sub>	Actual M <sub>y</sub> kip-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio f <sub>by</sub> /F <sub>by</sub>
L1	160 - 148.5 (1)	TP10x10x0.349	37.236	18.111	23.100	0.784	0.000	0.000	23.100	0.000
L2	148.5 - 148 (2)	TP23x10x0.349	37.228	18.107	23.100	0.784	0.000	0.000	23.100	0.000
L3	148 - 111 (3)	TP28.994x23x0.25	557.84 7	43.229	36.000	1.201	0.000	0.000	36.000	0.000
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.31 25	766.48 7	44.465	36.000	1.235	0.000	0.000	36.000	0.000
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.444 6	1333.6 08	42.671	33.720	1.265	0.000	0.000	33.720	0.000
L6	76.75 - 71 (6)	TP34.3484x32.4643x0.56 31	1583.0 08	38.067	31.122	1.223	0.000	0.000	31.122	0.000
L7	71 - 70 (7)	TP34.5104x34.3484x0.74 87	1608.4 17	29.288	31.128	0.941	0.000	0.000	31.128	0.000
L8	70 - 43 (8)	TP38.884x34.5104x0.535 6	2187.2 08	44.681	34.560	1.293	0.000	0.000	34.560	0.000
L9	43 - 28 (9)	TP40.5641x37.0028x0.65 36	2747.1 25	40.772	31.446	1.297	0.000	0.000	31.446	0.000
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.65 28	2768.6 17	40.885	31.896	1.282	0.000	0.000	31.896	0.000
L11	27.25 - 16 (11)	TP42.508x40.6856x0.655 1	3095.3 17	41.646	34.500	1.207	0.000	0.000	34.500	0.000
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063 83	3139.4 83	34.291	31.200	1.099	0.000	0.000	31.200	0.000
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.643 1	3206.0 25	42.646	34.026	1.253	0.000	0.000	34.026	0.000
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213 00	3272.9 00	33.931	30.006	1.131	0.000	0.000	30.006	0.000
L15	10 - 0 (15)	TP45.1x43.48x0.661	3573.8 58	42.243	36.840	1.147	0.000	0.000	36.840	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio f <sub>v</sub> /F <sub>v</sub>	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio f <sub>vt</sub> /F <sub>vt</sub>
L1	160 - 148.5 (1)	TP10x10x0.349	4.740	0.448	14.000	0.064	0.564	0.132	14.000	0.009
L2	148.5 - 148 (2)	TP23x10x0.349	4.790	0.453	14.000	0.028	0.564	0.132	14.000	0.009
L3	148 - 111 (3)	TP28.994x23x0.25	21.582	0.967	24.000	0.081	0.829	0.031	24.000	0.001
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.31 25	22.338	0.774	24.000	0.064	0.803	0.023	24.000	0.001
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.444 6	24.447	0.526	22.480	0.047	0.683	0.011	22.480	0.000
L6	76.75 - 71 (6)	TP34.3484x32.4643x0.56 31	25.367	0.420	20.748	0.040	0.635	0.007	20.748	0.000
L7	71 - 70 (7)	TP34.5104x34.3484x0.74 87	25.457	0.317	20.752	0.031	0.630	0.006	20.752	0.000
L8	70 - 43 (8)	TP38.884x34.5104x0.535 6	27.165	0.426	23.040	0.037	0.498	0.005	23.040	0.000
L9	43 - 28 (9)	TP40.5641x37.0028x0.65 36	28.637	0.346	20.964	0.033	0.367	0.003	20.964	0.000
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.65	28.685	0.346	21.264	0.033	0.362	0.003	21.264	0.000



Section No.	Elevation ft	Size	Actual V K	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L11	(10) 27.25 - 16	28 TP42.508x40.6856x0.655	29.402	0.338	23.000	0.029	0.286	0.002	23.000	0.000
L12	(11) 16 - 14.5 (12)	1 TP42.751x42.508x0.8063	29.511	0.275	20.800	0.026	0.279	0.001	20.800	0.000
L13	(12) 14.5 - 12.25	1 TP43.1155x42.751x0.643	29.653	0.342	22.684	0.030	0.258	0.002	22.684	0.000
L14	(13) 12.25 - 10	1 TP43.48x43.1155x0.8213	29.807	0.268	20.004	0.027	0.241	0.001	20.004	0.000
L15	(14) 10 - 0 (15)	1 TP45.1x43.48x0.661	30.395	0.326	24.560	0.027	0.171	0.001	24.560	0.000

### Pole Interaction Design Data

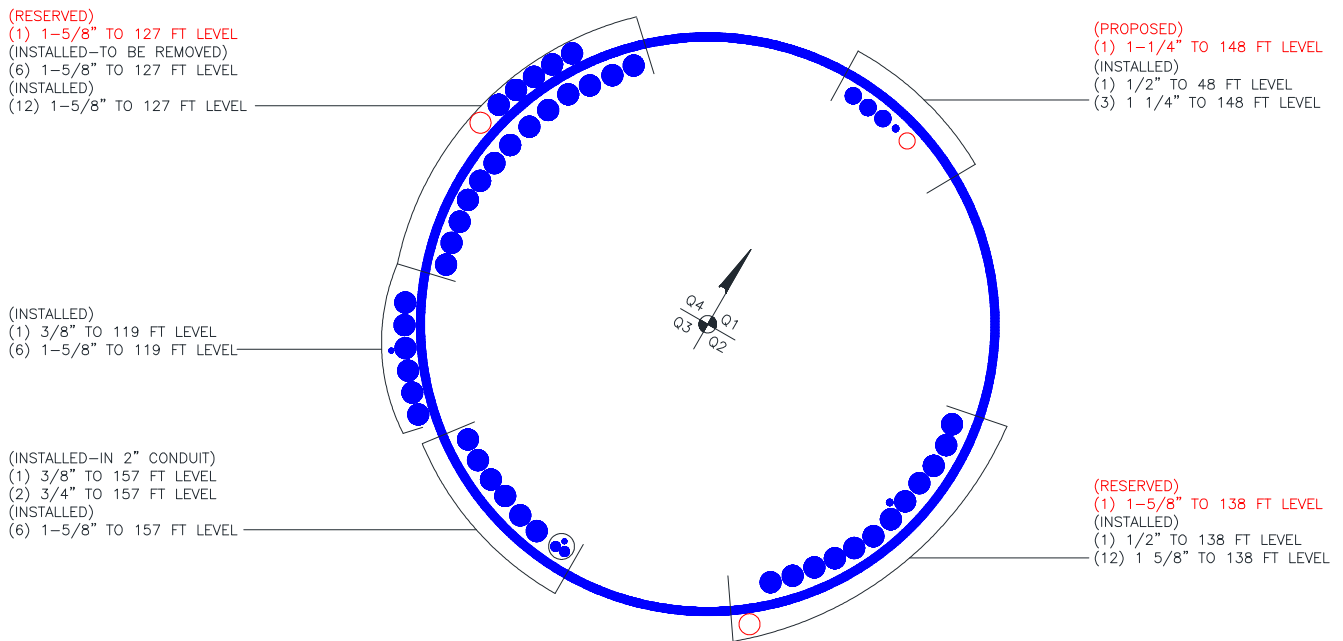
Section No.	Elevation ft	Ratio P	Ratio $f_{bx}$	Ratio $f_{by}$	Ratio $f_v$	Ratio $f_{vt}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P_a$	$F_{bx}$	$F_{by}$	$F_v$	$F_{vt}$			
L1	160 - 148.5 (1)	0.007	0.784	0.000	0.064	0.009	0.793	1.333	H1-3+VT ✓
L2	148.5 - 148 (2)	0.007	0.784	0.000	0.028	0.009	0.793	1.333	H1-3+VT ✓
L3	148 - 111 (3)	0.013	1.201	0.000	0.081	0.001	1.216	1.333	H1-3+VT ✓
L4	111 - 105.25 (4)	0.012	1.235	0.000	0.064	0.001	1.248	1.333	H1-3+VT ✓
L5	105.25 - 76.75 (5)	0.011	1.265	0.000	0.047	0.000	1.277	1.333	H1-3+VT ✓
L6	76.75 - 71 (6)	0.011	1.223	0.000	0.040	0.000	1.235	1.333	H1-3+VT ✓
L7	71 - 70 (7)	0.008	0.941	0.000	0.031	0.000	0.949	1.333	H1-3+VT ✓
L8	70 - 43 (8)	0.012	1.293	0.000	0.037	0.000	1.305	1.333	H1-3+VT ✓
L9	43 - 28 (9)	0.013	1.297	0.000	0.033	0.000	1.310	1.333	H1-3+VT ✓
L10	28 - 27.25 (10)	0.013	1.282	0.000	0.033	0.000	1.295	1.333	H1-3+VT ✓
L11	27.25 - 16 (11)	0.013	1.207	0.000	0.029	0.000	1.220	1.333	H1-3+VT ✓
L12	16 - 14.5 (12)	0.012	1.099	0.000	0.026	0.000	1.111	1.333	H1-3+VT ✓
L13	14.5 - 12.25 (13)	0.014	1.253	0.000	0.030	0.000	1.267	1.333	H1-3+VT ✓
L14	12.25 - 10 (14)	0.012	1.131	0.000	0.027	0.000	1.143	1.333	H1-3+VT ✓
L15	10 - 0 (15)	0.013	1.147	0.000	0.027	0.000	1.160	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF \cdot P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 148.5	Pole	TP10x10x0.349	1	-1.633	296.209	59.5	Pass
L2	148.5 - 148	Pole	TP23x10x0.349	2	-1.637	296.209	59.5	Pass
L3	148 - 111	Pole	TP28.994x23x0.25	3	-10.792	1071.395	91.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P <sub>allow</sub> K	% Capacity	Pass Fail	
L4	111 - 105.25	Pole	TP29.4254x27.8865x0.3125	4	-12.440	1385.720	93.6	Pass	
L5	105.25 - 76.75	Pole	TP34.042x29.4254x0.4446	5	-17.373	2087.545	95.8	Pass	
L6	76.75 - 71	Pole	TP34.3484x32.4643x0.5631	6	-20.566	2504.880	92.6	Pass	
L7	71 - 70	Pole	TP34.5104x34.3484x0.7487	7	-20.894	3328.874	71.2	Pass	
L8	70 - 43	Pole	TP38.884x34.5104x0.5356	8	-26.760	2940.038	97.9	Pass	
L9	43 - 28	Pole	TP40.5641x37.0028x0.6536	9	-34.463	3470.465	98.3	Pass	
L10	28 - 27.25	Pole	TP40.6856x40.5641x0.6528	10	-34.723	3526.811	97.2	Pass	
L11	27.25 - 16	Pole	TP42.508x40.6856x0.6551	11	-38.670	4002.292	91.5	Pass	
L12	16 - 14.5	Pole	TP42.751x42.508x0.8063	12	-39.300	4464.323	83.3	Pass	
L13	14.5 - 12.25	Pole	TP43.1155x42.751x0.6431	13	-40.102	3932.363	95.1	Pass	
L14	12.25 - 10	Pole	TP43.48x43.1155x0.8213	14	-41.082	4447.901	85.8	Pass	
L15	10 - 0	Pole	TP45.1x43.48x0.661	15	-44.819	4578.148	87.0	Pass	
							Summary		
							Pole (L9)	98.3	Pass
							<b>RATING =</b>	<b>98.3</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



**APPENDIX C**  
**ADDITIONAL CALCULATIONS**





v4.4 - Effective 7-12-13

**Asymmetric Anchor Rod Analysis**

Moment = 3574 k-ft  
Axial = 45.0 kips  
Shear = 30.0 kips  
Anchor Qty = 19

TIA Ref. = F  
ASIF = 1.3333  
Max Ratio = 100.0%

Location = Base Plate  
η = N/A for BP, Rev. G Sect. 4.9.9  
Threads = N/A for FP, Rev. G

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in <sup>2</sup>	Area, in <sup>2</sup>	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	25.2	52.00	0.00	3.98	168.55	163.55	163.55	0.00	195.00	83.9%
2	2.250	#18J A615 Gr 75	75	100	38.4	52.00	0.00	3.98	171.60	166.60	166.60	0.00	195.00	85.4%
3	2.250	#18J A615 Gr 75	75	100	51.6	52.00	0.00	3.98	175.55	170.56	170.56	0.00	195.00	87.5%
4	2.250	#18J A615 Gr 75	75	100	64.8	52.00	0.00	3.98	179.51	174.51	174.51	0.00	195.00	89.5%
5	2.250	#18J A615 Gr 75	75	100	115.2	52.00	0.00	3.98	182.11	177.11	177.11	0.00	195.00	90.8%
6	2.250	#18J A615 Gr 75	75	100	128.4	52.00	0.00	3.98	178.45	173.46	173.46	0.00	195.00	89.0%
7	2.250	#18J A615 Gr 75	75	100	141.6	52.00	0.00	3.98	173.64	168.65	168.65	0.00	195.00	86.5%
8	2.250	#18J A615 Gr 75	75	100	154.8	52.00	0.00	3.98	168.53	163.54	163.54	0.00	195.00	83.9%
9	2.250	#18J A615 Gr 75	75	100	205.2	52.00	0.00	3.98	162.07	157.08	157.08	0.00	195.00	80.6%
10	2.250	#18J A615 Gr 75	75	100	218.4	52.00	0.00	3.98	165.48	160.48	160.48	0.00	195.00	82.3%
11	2.250	#18J A615 Gr 75	75	100	231.6	52.00	0.00	3.98	170.13	165.13	165.13	0.00	195.00	84.7%
12	2.250	#18J A615 Gr 75	75	100	244.8	52.00	0.00	3.98	175.03	170.03	170.03	0.00	195.00	87.2%
13	2.250	#18J A615 Gr 75	75	100	295.2	52.00	0.00	3.98	182.36	177.36	177.36	0.00	195.00	91.0%
14	2.250	#18J A615 Gr 75	75	100	308.4	52.00	0.00	3.98	180.06	175.07	175.07	0.00	195.00	89.8%
15	2.250	#18J A615 Gr 75	75	100	321.6	52.00	0.00	3.98	176.60	171.60	171.60	0.00	195.00	88.0%
16	2.250	#18J A615 Gr 75	75	100	334.8	52.00	0.00	3.98	172.74	167.74	167.74	0.00	195.00	86.0%
17	1.750	Williams R71	127.7	150	10.0	67.10	0.00	2.66	143.15	139.80	139.80	0.00	175.76	79.5%
18	1.750	Williams R71	127.7	150	148.0	67.10	0.00	2.66	147.63	144.28	144.28	0.00	175.76	82.1%
19	1.750	Williams R71	127.7	150	238.0	67.10	0.00	2.66	148.95	145.61	145.61	0.00	175.76	82.8%

71.67

## Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F / G

- Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).  
 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)  
 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)\*(Rod Diameter)

Site Data		
BU#:	876313	
Site Name:		
App #:		
Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	0	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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

Pole Data		
Diam:	45.1	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3117.6	ft-kips
Unfactored Axial, P:	40	kips
Unfactored Shear, V:	26.7	kips

Reactions adjusted to account for additional anchor rods.

### Anchor Rod Results

TIA F --> Maximum Rod Tension: 177.4 Kips  
 Allowable Tension: 195.0 Kips  
 Anchor Rod Stress Ratio: 91.0% **Pass**

### Base Plate Results

Base Plate Stress: 41.1 ksi  
 Allowable PL Bending Stress: 50.0 ksi  
 Base Plate Stress Ratio: 82.2% **Pass**

### Flexural Check

PL Ref. Data	
Yield Line (in):	29.85
Max PL Length:	29.85

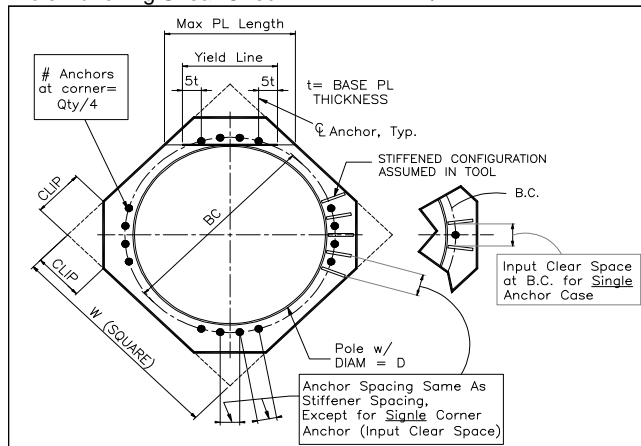
### N/A - Unstiffened

### Stiffener Results

Horizontal Weld: N/A  
 Vertical Weld: N/A  
 Plate Flex+Shear,  $f_b/F_b + (f_v/F_v)^2$ : N/A  
 Plate Tension+Shear,  $f_t/F_t + (f_v/F_v)^2$ : N/A  
 Plate Comp. (AISC Bracket): N/A

### Pole Results

Pole Punching Shear Check: N/A



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





## DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

### Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	3180.0		k-ft
Shear, V =	30.0		kips
Axial Load, P =	45.0		kips
OTM =	3195.0	0.0	k-ft @ Ground

### Safety Factors / Load Factors / $\Phi$ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

### Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	25.5	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =	11	ft
Mat Ftdn. Cap Length =	11	ft
Depth Below Grade =	6.5	ft

	Safety Factor	$\Phi$ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

### Load Combinations Checked per TIA/EIA-222-F

- Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt.  $\geq$  Comp.
- Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25  $\geq$  Uplift
- Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50  $\geq$  Uplift

### Steel Parameters

Number of Bars =	20	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

### Soil Parameters

Water Table Depth =	7.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?	Ground	
Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)		
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)		

### Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

### Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

### Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	2	110		26	Sand				2
2	3	120		33	Sand				5
3	32	115		25	Sand	6000			37
4									
5									
6									
7									
8									
9									
10									
11									
12									

### Soil Results: Overturning

Depth to COR =	17.07	ft, from Grade
Bending Moment, M =	3707.14	k-ft, from COR
Resisting Moment, Ma =	3885.77	k-ft, from COR

**MOMENT RATIO = 95.4% OK**

Shear, V =	30.00	kips
Resisting Shear, Va =	31.45	kips

**SHEAR RATIO = 95.4% OK**

### Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	153.84	kips

**UPLIFT RATIO = 0.0% OK**

### Soil Results: Compression

Compression, C =	45.00	kips
Allowable Comp. Cap., Ca =	301.41	kips

**COMPRESSION RATIO = 14.9% OK**

### Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	31.20	sq in

Allowable Min Axial, Pa =	-1296.00	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	6369.58	kips, Where Ma = 0 k-ft

Axial Load, P =	37.27	kips @ 6.50 ft Below Grade
Moment, M =	3275.68	k-ft @ 6.50 ft Below Grade
Allowable Moment, Ma =	3803.77	k-ft

**MOMENT RATIO = 86.1% OK**

foundation loads

Tower or Pole Weight = 0 kips  
 Total Horizontal Force = 0 kips  
 Overturning Moment = 394 ft-kips

soil properties

Safety factor against overturning = 1.5  
 Soil density = 115 pcf  
 Allowable soil bearing = 3 ksf  
 Depth to water table = 7 ft

mat dimensions

depth to bottom of footing = 6.5 ft  
 Footing thickness = 7 ft  
 Footing Width = 11 ft  
 Footing Length = 11 ft  
 Tower/Pole Center Offset = 0 ft

Summary of analysis results

Overturning Moment:

(Stress Ratio = 0.846)  
 Calculated Overturning Moment = 394 ft-kips  
 Resisting Moment = 698.8 ft-kips  
 Factor of Safety against overturning = 1.774 > **1.5 okay**

Soil Bearing

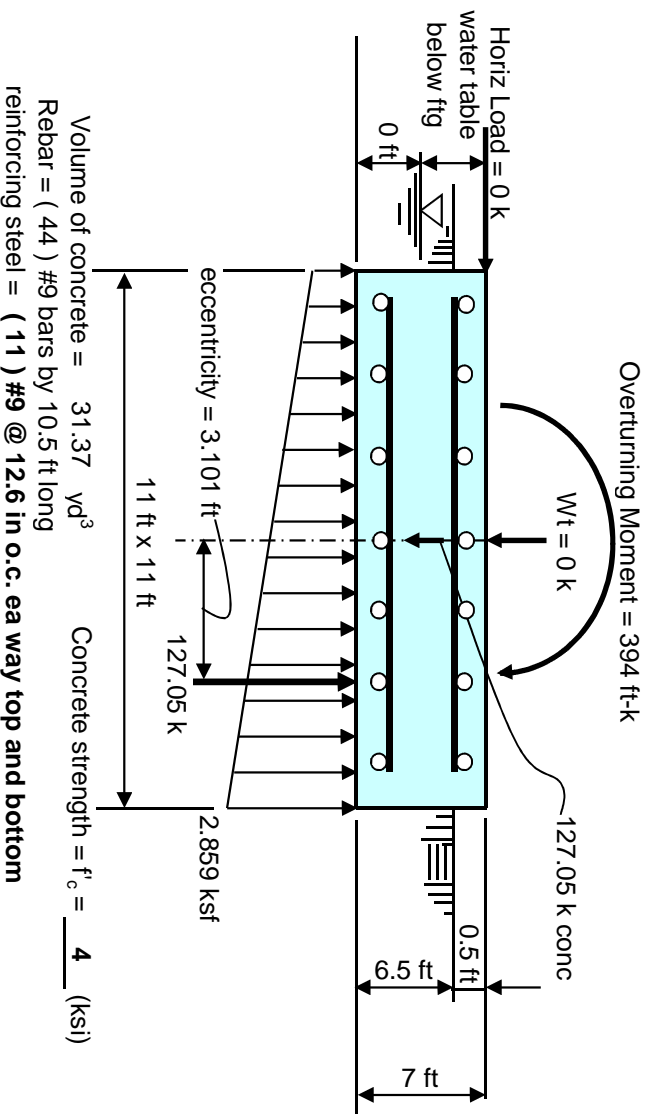
(Stress Ratio = 0.953) < **CONTROLLING CRITERIA**  
 Net Soil Bearing Resistance = 3 ksf  
 Calculated Soil Bearing Pressure = 2.859 ksf < 3 ksf okay

Bending Moment

(Stress Ratio = 0.062)  
 Ultimate Bending Moment Resistance = 3890 ft-kips  
 Calculated Ultimate Bending Moment = 241 ft-kips < 3890 ft-kips okay

Bending Shear

(Stress Ratio = 0.066)  
 Ultimate Bending Shear Resistance = 1126 kips  
 Calculated Ultimate Bending Shear = 75 kips < 1126 kips okay



Rebar strength =  $F_v = 60$  (ksi)  
 minimum cover over rebar = 3 inches

# MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

**BU #876313; WEST JOHNSON AVE. BURNT HOUSE**

APP: 245304 REV. 3; WO: 910749

SITE ADDRESS

**1394 MERIDEN WATERBURY TPK  
SOUTHINGTON, CONNECTICUT 06489  
HARTFORD COUNTY**

## PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.  
  
(B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.  
  
(C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED [NON-TC] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

## PROJECT CONTACTS:

### MONOPOLE OWNER:

CROWN CASTLE  
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534  
TSA CONTACT: STEVE TUTTLE AT STEVE.TUTTLE@CROWNCastle.COM  
PH: (585) 899-3445

### STRUCTURAL ENGINEER OF RECORD (EOR):

PAUL J. FORD AND COMPANY  
250 EAST BROAD STREET, SUITE 600  
COLUMBUS, OHIO 43215-3708  
CONTACT: ROBERT KOORS AT RKOORS@PJFWEB.COM  
PHONE: 614-221-6679

## DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 80 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 1 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-0756.003.7700), DATED 8-20-2014.

## THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING  
FIELD WELDED ANCHOR BRACKETS  
POST INSTALLED ANCHOR RODS

## SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MISC DETAILS
S-7	MI CHECKLIST

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**CROWN CASTLE**

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PH: (585) 899-3445

**BU #876313; WEST JOHNSON AVE.  
BURNT HOUSE  
SOUTHINGTON, CONNECTICUT  
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY:  
B.M.S.

CHECKED BY:  
R.M.K.

APPROVED BY:

DATE:  
8-20-2014

TITLE SHEET

**T-1**

**A. GENERAL NOTES**

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. **IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES:** THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: **"ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT"**.
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

**B. (SECTION NOT USED)**

**C. SPECIAL INSPECTION AND TESTING**

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
  2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
  3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
  4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
    - (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
    - (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
  5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
    - A. GENERAL:
      - (1.) PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
    - B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
    - C. CONCRETE TESTING PER ACI - (NOT REQUIRED)
    - D. STRUCTURAL STEEL
      - (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      - (2.) CHECK MILL CERTIFICATIONS.
      - (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      - (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      - (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      - (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      - (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      - (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
    - E. WELDING:
      - (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      - (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      - (3.) APPROVE FIELD WELDING SEQUENCE.
        - (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      - (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
        - (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
        - (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
        - (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
        - (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
        - (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
        - (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
        - (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
        - (H.) REVIEW THE REPORTS BY TESTING LABS.
        - (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
        - (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
        - (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
    - F. REPORTS:
      - (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

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**BU #876313; WEST JOHNSON AVE.**  
**BURNT HOUSE**  
**SOUTHINGTON, CONNECTICUT**  
**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY:  
B.M.S.

CHECKED BY:  
R.M.K.

APPROVED BY:

DATE:  
8-20-2014

GENERAL NOTES

S-1

**D. STRUCTURAL STEEL**

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:  
BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
- A. (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."  
(B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.  
(C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
- B. BY THE AMERICAN WELDING SOCIETY (AWS):  
(A.) "STRUCTURAL WELDING CODE - STEEL D1.1."  
(B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:  
(A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.  
(B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.  
(C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

**E. BASE PLATE GROUT - (NOT REQUIRED)**

**F. FOUNDATION WORK - (NOT REQUIRED)**

**G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**

**H. EPOXY GROUTED REINFORCING ANCHOR RODS**

1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BAR CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BAR ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A153. ALTERNATIVELY, ALL REINFORCING ANCHOR RODS MAY BE EPOXY COATED PER ASTM A775.
2. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS, PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY.
3. CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
4. ULTRABOND 1, HILTI HIT RE-500 OR ANCHORTITE EPOXY SHALL BE USED TO ANCHOR THE 150 KSI ALL-THREAD BAR IN THE DRILL HOLES. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO PAUL J FORD AND COMPANY FOR REVIEW PRIOR TO CONSTRUCTION. AS NOTED ABOVE, FOLLOW ALL EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHOR RODS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING DRAWING SHEETS FOR SPECIFIED ANCHOR ROD PROOF LOAD.
6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED AND BASE PLATE / BEARING PLATE GROUT HAS CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED AFTER TESTING), CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

**I. TOUCH UP OF GALVANIZING**

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

**J. HOT DIP GALVANIZING**

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

**K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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**SOUTHINGTON, CONNECTICUT**  
**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY:  
B.M.S.

CHECKED BY:  
R.M.K.

APPROVED BY:

DATE:  
8-20-2014

GENERAL NOTES

S-2

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
  2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
  3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
  4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

**NOTES FOR AJAX M20 'ONE-SIDE BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):**

**DTI'S REQUIRED:** DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH RED DURABLE SQUIRT MEDIA EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

**PART NUMBER:** 2DTIM208MGAFSIF

**DESCRIPTION:** P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

**DISTRIBUTOR CONTACT DETAILS:**

ALLFASTENERS  
 15401 COMMERCE PARK DR.  
 BROOKPARK, OHIO 44142  
 PHONE: 440-232-6060  
 E-MAIL: SALES@ALLFASTENERS.COM

**DTI:** USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

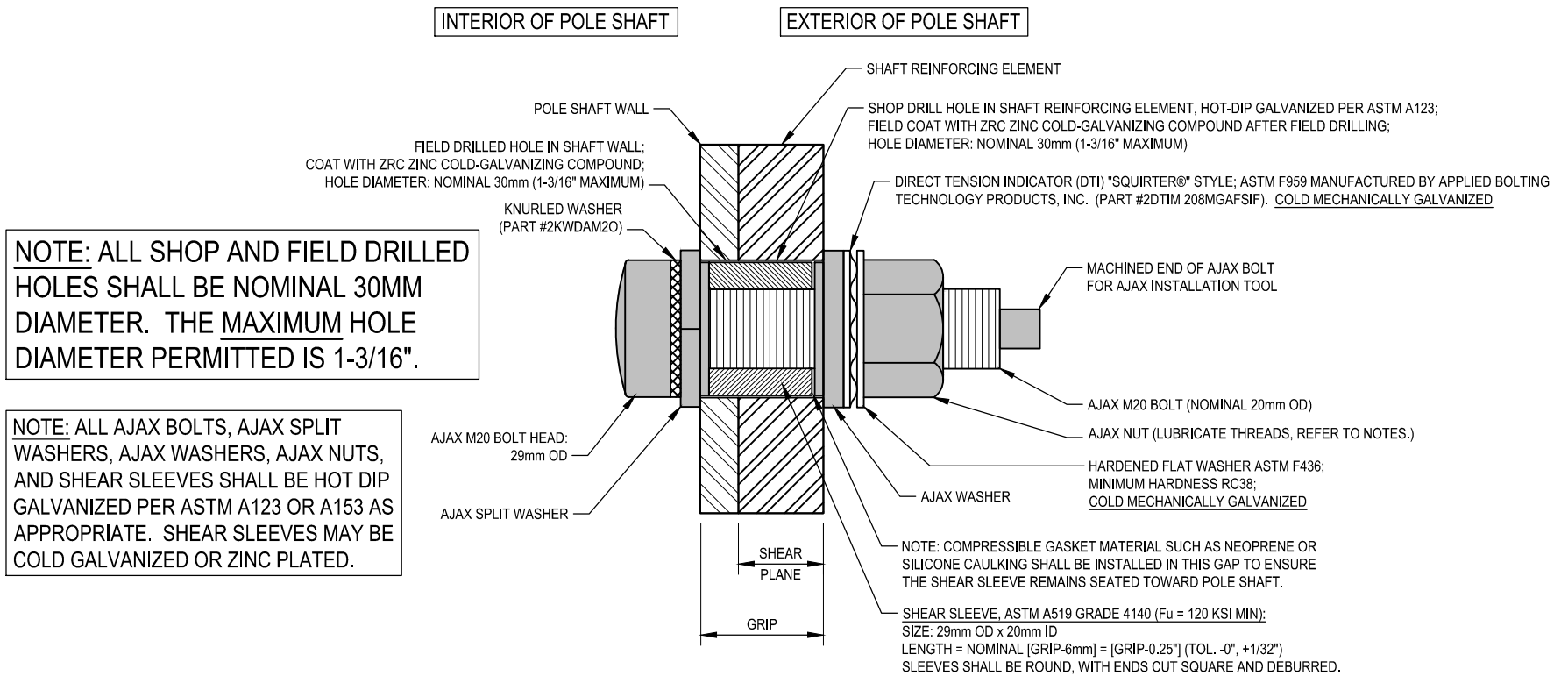
**HARDENED WASHERS REQUIRED:** USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

**NUT LUBRICATION REQUIRED:** PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

**NOTE:** COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

**INSPECTION REQUIRED:** ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.




**NOTE:** ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

**NOTE:** ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.

**TYPICAL AJAX BOLT DETAIL** 1  
S-3

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**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700	
DRAWN BY: B.M.S.	AJAX BOLT DETAIL
CHECKED BY: R.M.K.	
APPROVED BY:	<b>S-3</b>
DATE: 8-20-2014	

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON & ROUND
TAPER:	0.161998 IN/FT
SHAFT STEEL:	ASTM A607 GRADE 65 & 60; ASTM A53-B-35
BASE PL STEEL:	ASTM A572 GRADE 50
ANCHOR RODS:	2 1/4"Ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	12.00	0.3490		10.000	10.000
2	37.00	0.2500	45.00	23.000	28.994
3	38.00	0.3125	51.00	27.887	34.042
4	38.00	0.3750	60.00	32.729	38.884
5	48.00	0.4375		37.324	45.100

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:	
(A)	INSTALL NEW ANCHOR RODS AND BRACKETS AT BASE PLATE. SEE SHEET S-5.
(B)	INSTALL NEW SHAFT REINFORCING. SEE CHART.

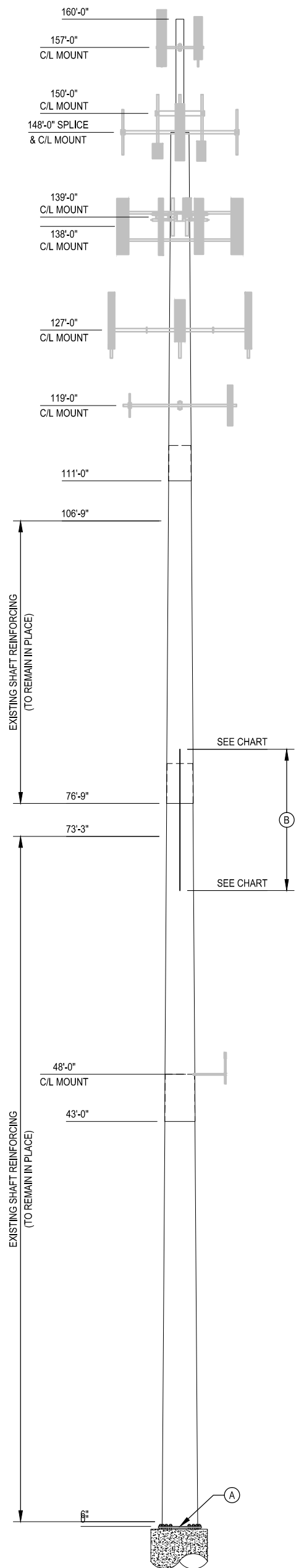
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
BOTTOM ELEVATION	TOP ELEVATION	FLAT #/ DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
67'-6"	82'-6"	F2, F8 & F14	CCI-AFP-06010015	15'-0"	3	27	81	10	10	16"	919 LBS.
							81				919 LBS.

**NOTES:**

- 1) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
- 2) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
- 3) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
- 4) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
- 5) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
- 6) ALL SHIMS SHALL BE ASTM A-36.

NEW SHIM CHART				
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
21	3	6"	4"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL DETERMINE FINAL SHIM QUANTITIES DURING FABRICATION.



POLE ELEVATION 1 S-4

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

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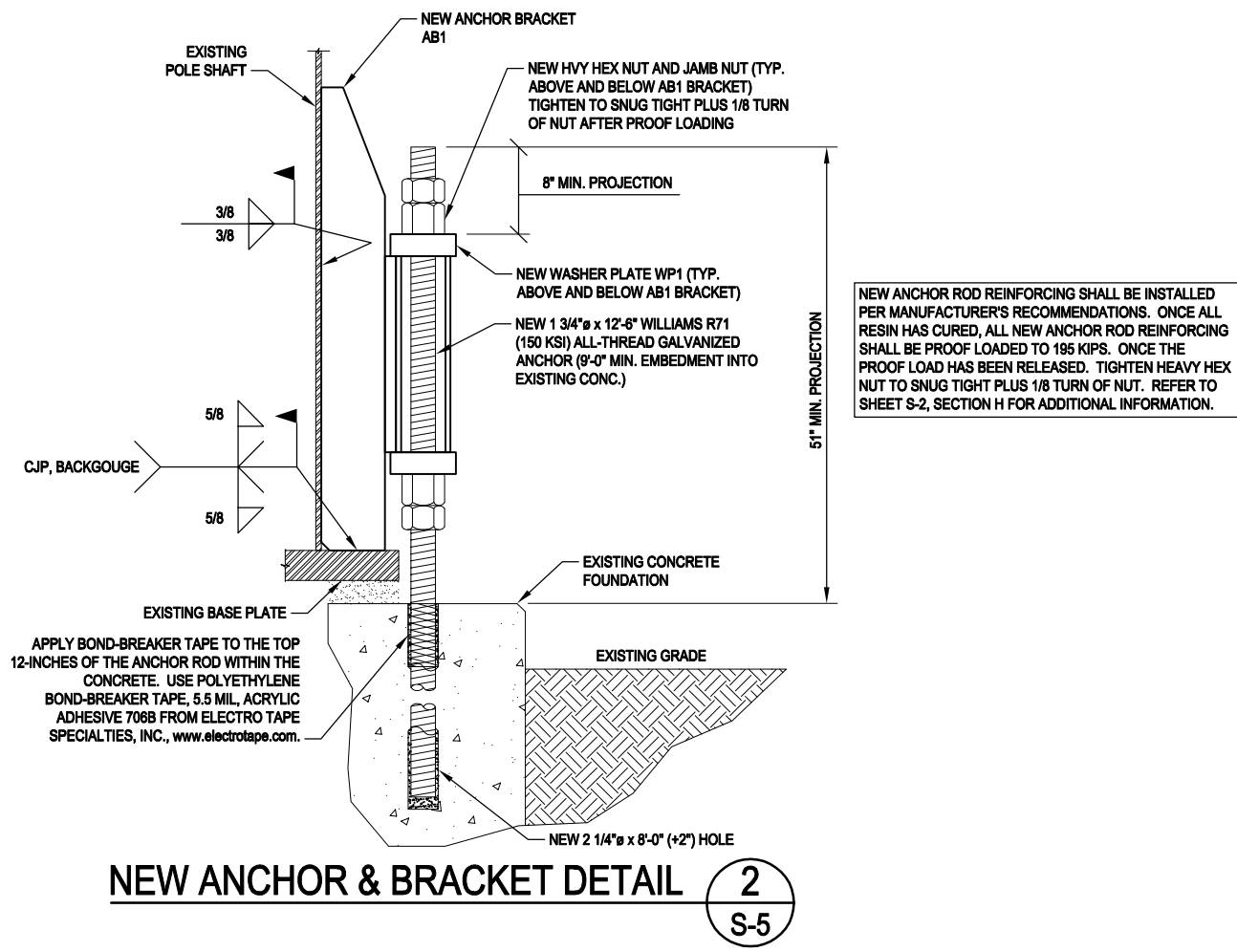
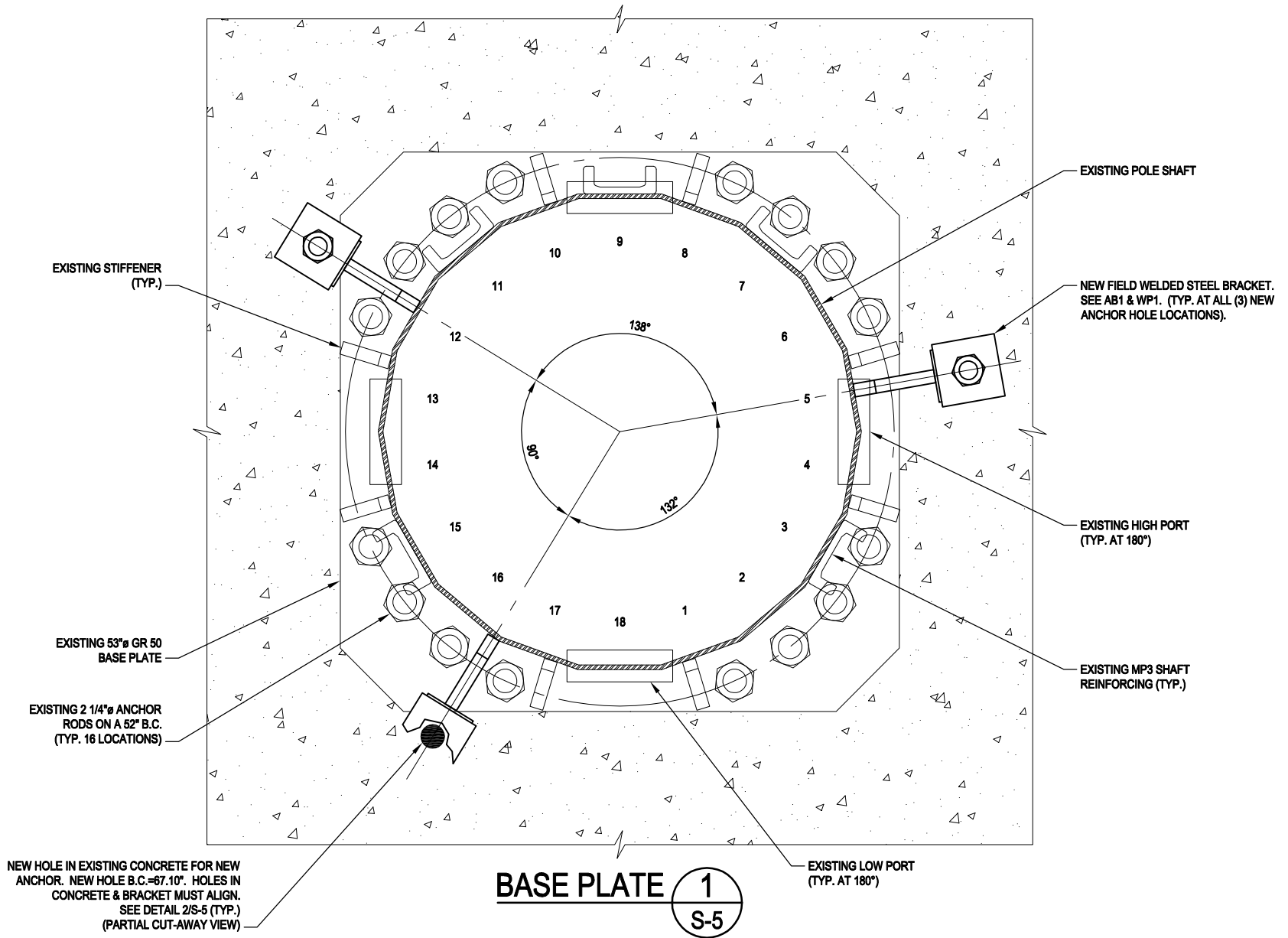
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PH: (585) 899-3445

**BU #876313; WEST JOHNSON AVE.**  
**BURNT HOUSE**  
**SOUTHINGTON, CONNECTICUT**  
**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY: B.M.S.	MONOPOLE PROFILE
CHECKED BY: R.M.K.	
APPROVED BY:	<b>S-4</b>
DATE: 8-20-2014	



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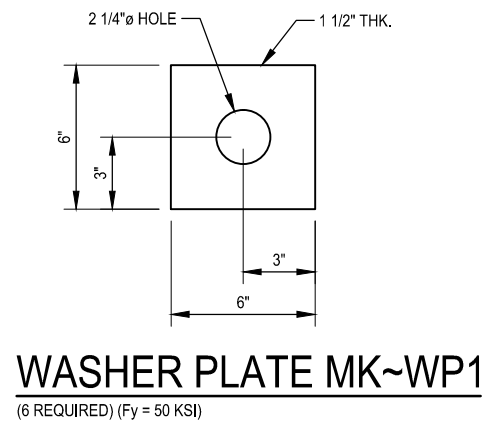
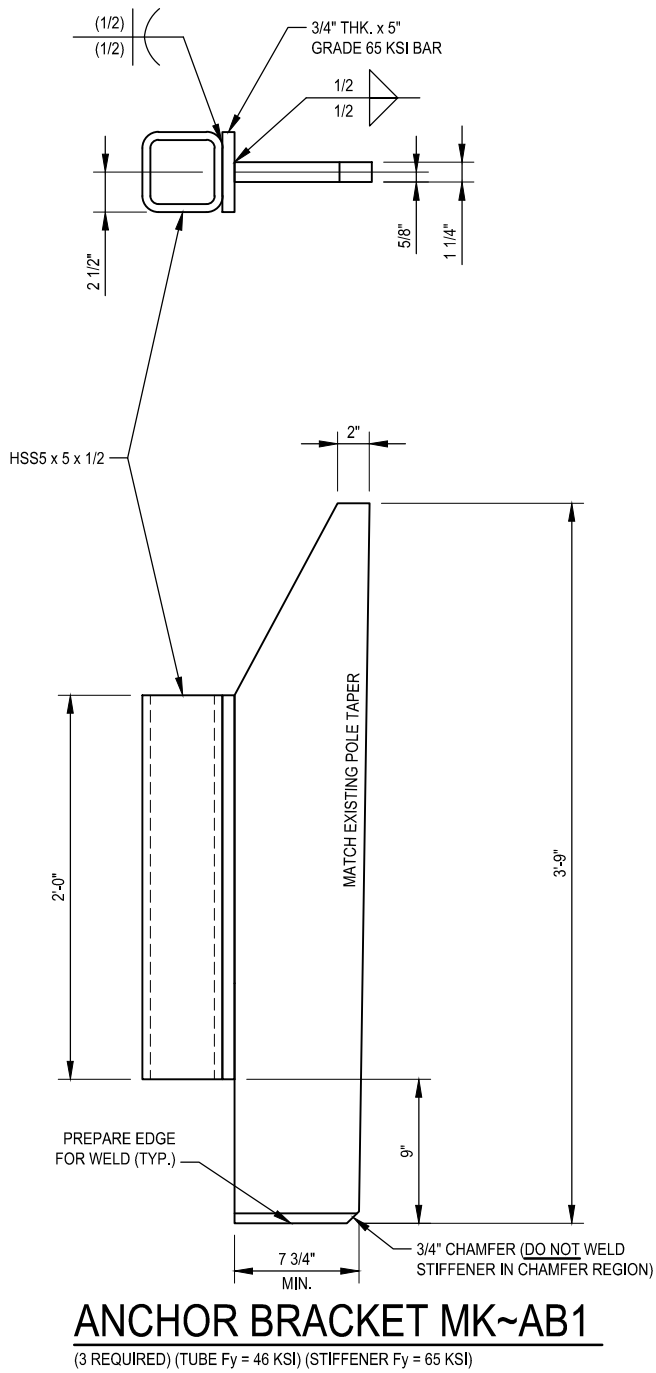
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PROJECT: 37513-0756.003.7700

DRAWN BY: B.M.S.	BASE PLATE DETAILS
CHECKED BY: R.M.K.	
APPROVED BY:	<b>S-5</b>
DATE: 8-20-2014	





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B.M.S.

CHECKED BY:  
R.M.K.

APPROVED BY:

DATE:  
8-20-2014

MISC DETAILS

**S-6**

**MODIFICATION INSPECTION NOTES:**

**GENERAL**

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS..

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

**MI INSPECTOR**

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

**GENERAL CONTRACTOR**

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN DENG-SOW-10007.

**RECOMMENDATIONS**

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

**CANCELLATION OR DELAYS IN SCHEDULED MI**

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

**CORRECTION OF FAILING MI'S**

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

**MI VERIFICATION INSPECTIONS**

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

**PHOTOGRAPHS**

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

**MI CHECKLIST**

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
<b>PRE-CONSTRUCTION</b>	
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS: -----	
<b>CONSTRUCTION</b>	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF AJAX BOLTS AND DTIS PER REQUIREMENTS ON SHEET S-3
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
ADDITIONAL TESTING AND INSPECTIONS: -----	
<b>POST-CONSTRUCTION</b>	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS: -----	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT  
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

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**SOUTHINGTON, CONNECTICUT**  
**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY:  
B.M.S.

CHECKED BY:  
R.M.K.

APPROVED BY:

DATE:  
8-20-2014

MI CHECKLIST

**S-7**

# MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME  
**BU #876313; WEST JOHNSON AVE. BURNT HOUSE**  
 APP: 245304 REV. 3; WO: 910749

SITE ADDRESS  
**1394 MERIDEN WATERBURY TPK**  
**SOUTHINGTON, CONNECTICUT 06489**  
**HARTFORD COUNTY**

## PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.  
  
(B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.  
  
(C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED [NON-TC] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

## PROJECT CONTACTS:

### MONOPOLE OWNER:

CROWN CASTLE  
 8 PARKMEADOW DRIVE, PITTSFORD, NY 14534  
 TSA CONTACT: STEVE TUTTLE AT STEVE.TUTTLE@CROWNCastle.COM  
 PH: (585) 899-3445

### STRUCTURAL ENGINEER OF RECORD (EOR):

PAUL J. FORD AND COMPANY  
 250 EAST BROAD STREET, SUITE 600  
 COLUMBUS, OHIO 43215-3708  
 CONTACT: ROBERT KOORS AT RKOORS@PJFWEB.COM  
 PHONE: 614-221-6679

## DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 80 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 1 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-0756.003.7700), DATED 8-20-2014.

## THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING  
 FIELD WELDED ANCHOR BRACKETS  
 POST INSTALLED ANCHOR RODS

## SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MISC DETAILS
S-7	MI CHECKLIST



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PROJECT: 37513-0756.003.7700

DRAWN BY:  
 B.M.S.  
 CHECKED BY:  
 R.M.K.  
 APPROVED BY:

DATE:  
 8-20-2014

TITLE SHEET

T-1

CROWN CASTLE PROJECT: BU #876313; WEST JOHNSON AVE. BURNT HOUSE; SOUTHTON, CONNECTICUT  
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

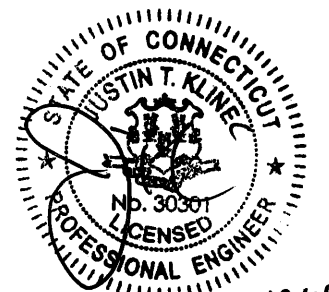
#### A. GENERAL NOTES

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
- THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
- IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
- THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. **IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES:** THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
- THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
- ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
- ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
- ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

#### B. (SECTION NOT USED)

#### C. SPECIAL INSPECTION AND TESTING

- ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
- OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
  - ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
- THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
  - GENERAL:
    - PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
  - FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
  - CONCRETE TESTING PER ACI - (NOT REQUIRED)
  - STRUCTURAL STEEL
    - CHECK THE STEEL ON THE JOB WITH THE PLANS.
    - CHECK MILL CERTIFICATIONS.
    - CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
    - INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
    - CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
    - CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
    - CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
    - CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
  - WELDING:
    - VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
    - INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
    - APPROVE FIELD WELDING SEQUENCE.
      - A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
    - INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
      - INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
      - VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
      - INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
      - VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
      - SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
      - INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
      - VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
      - REVIEW THE REPORTS BY TESTING LABS.
      - CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
      - INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
      - CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
  - REPORTS:
    - COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
- THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
- AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
- RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



822-14



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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-0756.003.7700

DRAWN BY:

B.M.S.

CHECKED BY:

R.M.K.

APPROVED BY:

DATE:

8-20-2014

GENERAL NOTES

S-1

**D. STRUCTURAL STEEL**

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
- A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
  - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
  - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
  - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
- B. BY THE AMERICAN WELDING SOCIETY (AWS):
  - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
  - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
  - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
  - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
  - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

**E. BASE PLATE GROUT - (NOT REQUIRED)****F. FOUNDATION WORK - (NOT REQUIRED)****G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)****H. EPOXY GROUTED REINFORCING ANCHOR RODS**

1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BAR CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BAR ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL.
2. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A153. ALTERNATIVELY, ALL REINFORCING ANCHOR RODS MAY BE EPOXY COATED PER ASTM A775.
3. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS, PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY. CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
4. ULTRABOND 1, HILTI HIT RE-500 OR ANCHORTITE EPOXY SHALL BE USED TO ANCHOR THE 150 KSI ALL-THREAD BAR IN THE DRILL HOLES. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO PAUL J FORD AND COMPANY FOR REVIEW PRIOR TO CONSTRUCTION. AS NOTED ABOVE, FOLLOW ALL EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHOR RODS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING DRAWING SHEETS FOR SPECIFIED ANCHOR ROD PROOF LOAD.
6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED AND BASE PLATE / BEARING PLATE GROUT HAS CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED AFTER TESTING), CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

**I. TOUCH UP OF GALVANIZING**

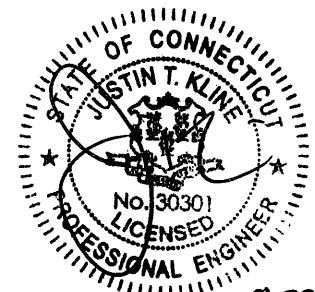
1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

**J. HOT DIP GALVANIZING**

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

**K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".



82214



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R.M.K.

APPROVED BY:

DATE:

8-20-2014

GENERAL NOTES

S-2

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
  2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
  3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
  4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

**NOTES FOR AJAX M20 'ONE-SIDE BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):**

**DTI'S REQUIRED:** DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH RED DURABLE SQUIRT MEDIA EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

**PART NUMBER:** 2DTIM208MGAFSIF

**DESCRIPTION:** P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

**DISTRIBUTOR CONTACT DETAILS:**

ALLFASTENERS  
15401 COMMERCE PARK DR.  
BROOKPARK, OHIO 44142  
PHONE: 440-232-6060  
E-MAIL: SALES@ALLFASTENERS.COM

**DTI:** USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

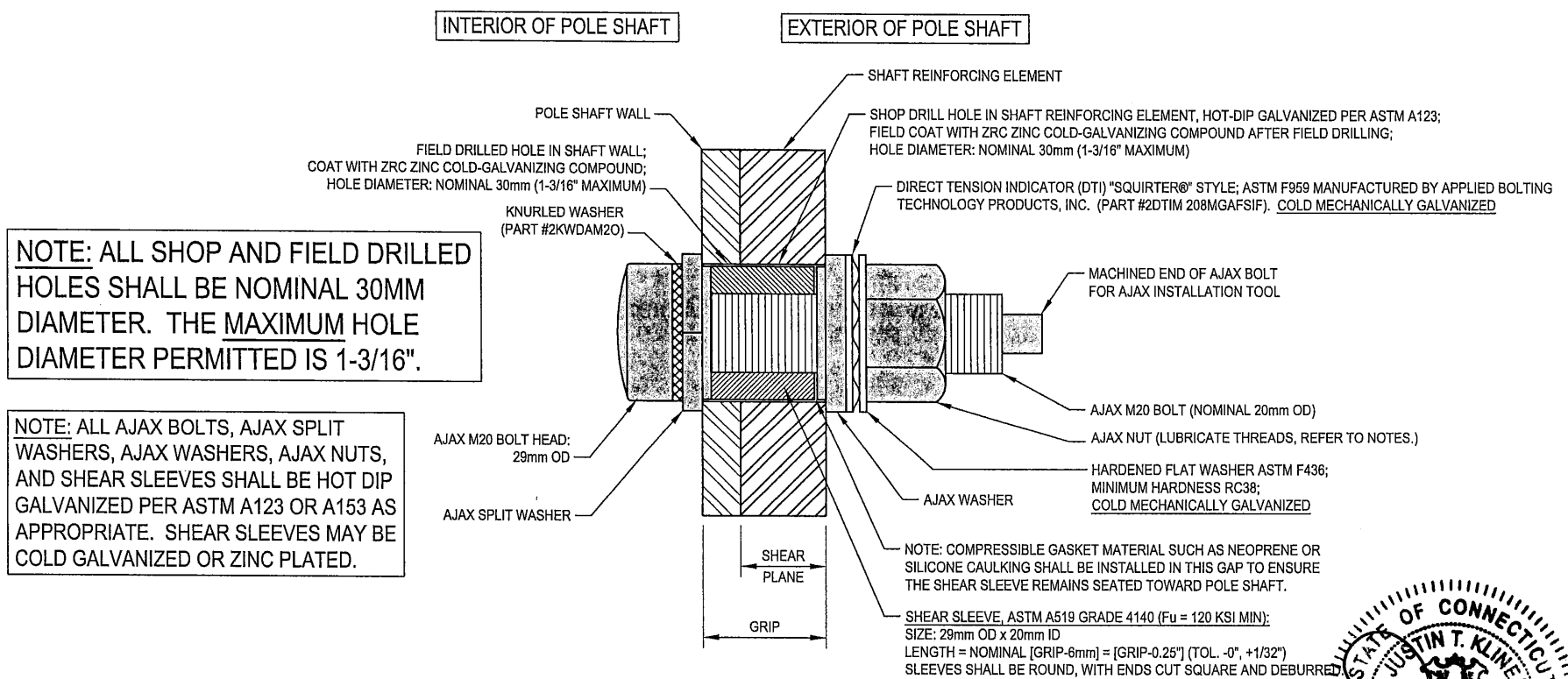
**HARDENED WASHERS REQUIRED:** USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

**NUT LUBRICATION REQUIRED:** PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

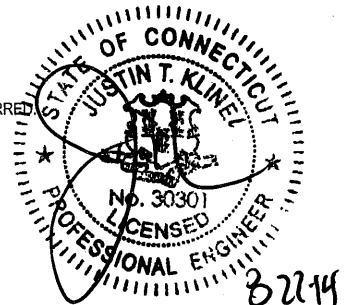
**NOTE:** COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

**INSPECTION REQUIRED:** ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



TYPICAL AJAX BOLT DETAIL 1  
S-3



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DRAWN BY:  
B.M.S.  
CHECKED BY:  
R.M.K.  
APPROVED BY:

AJAX BOLT DETAIL

DATE:  
8-20-2014

S-3

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON & ROUND
TAPER:	0.161998 IN/FT
SHAFT STEEL:	ASTM A607 GRADE 65 & 60; ASTM A53-B-35
BASE PL. STEEL:	ASTM A572 GRADE 50
ANCHOR RODS:	2 1/4"Ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	12.00	0.3490		10.000	10.000
2	37.00	0.2500		23.000	28.994
3	38.00	0.3125	45.00	27.887	34.042
4	38.00	0.3750	51.00	32.729	38.884
5	48.00	0.4375	60.00	37.324	45.100

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND AN EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

- MODIFICATIONS:
- (A) INSTALL NEW ANCHOR RODS AND BRACKETS AT BASE PLATE. SEE SHEET S-5.
  - (B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

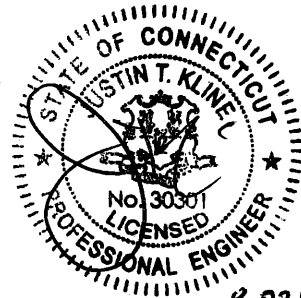
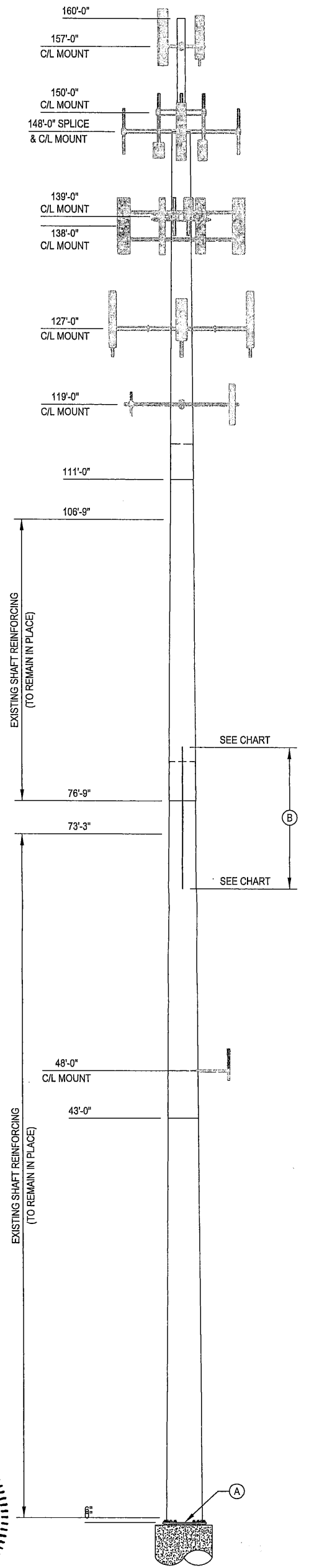
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
67'-6"	82'-6"	F2, F8 & F14	CCI-AFP-06010015	15'-0"	3	27	81	10	10	16"	919 LBS.
							81				919 LBS.

NOTES:

- AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
- ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
- ALL REINFORCING SHALL BE ASTM A572 GR. 65.
- WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
- HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
- ALL SHIMS SHALL BE ASTM A-36.

NEW SHIM CHART				
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
21	3	6"	4"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL DETERMINE FINAL SHIM QUANTITIES DURING FABRICATION.



POLE ELEVATION 1 S-4

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

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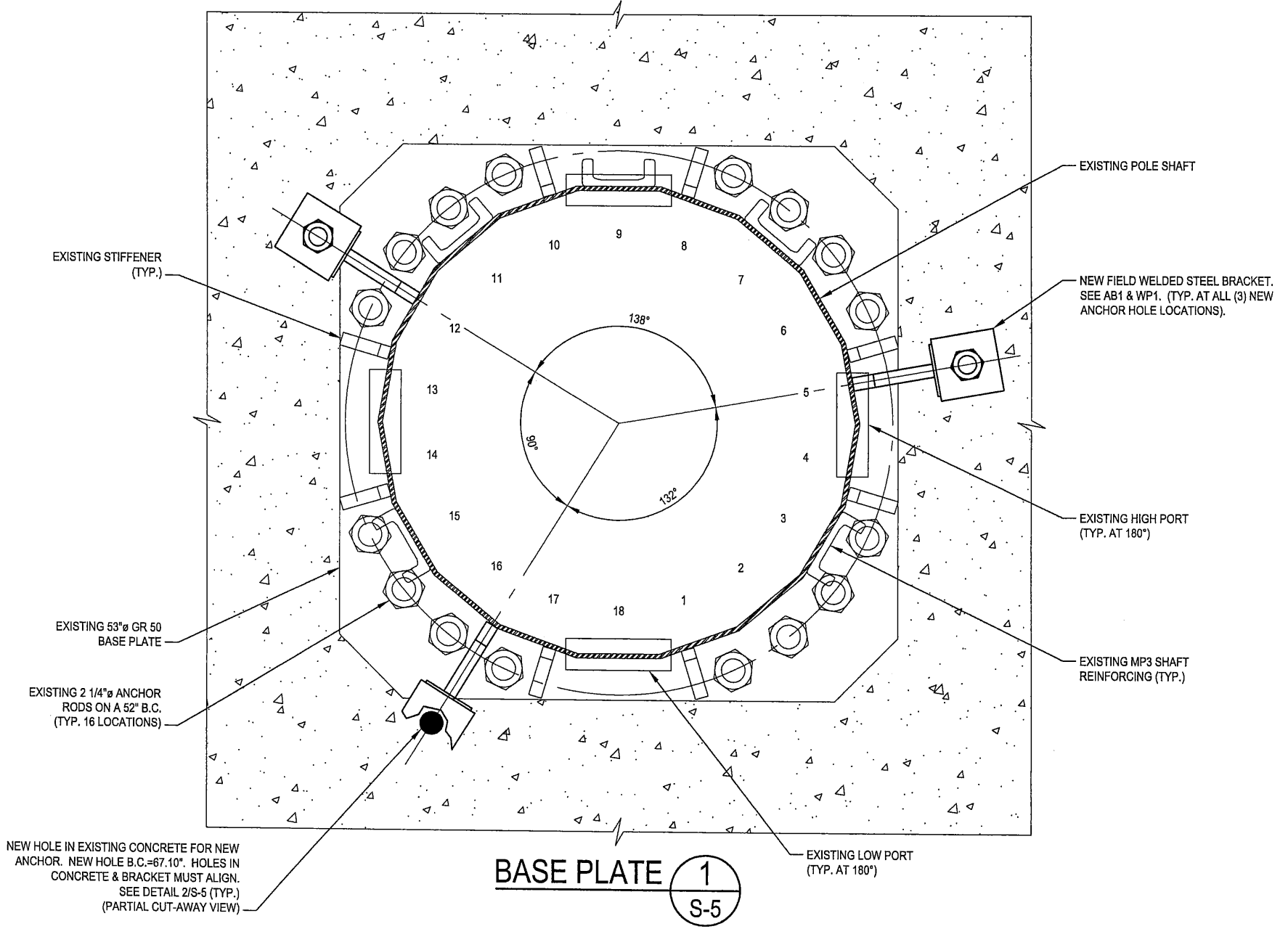
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PH: (585) 899-3445

BU #876313; WEST JOHNSON AVE.  
BURNT HOUSE  
SOUTHINGTON, CONNECTICUT  
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

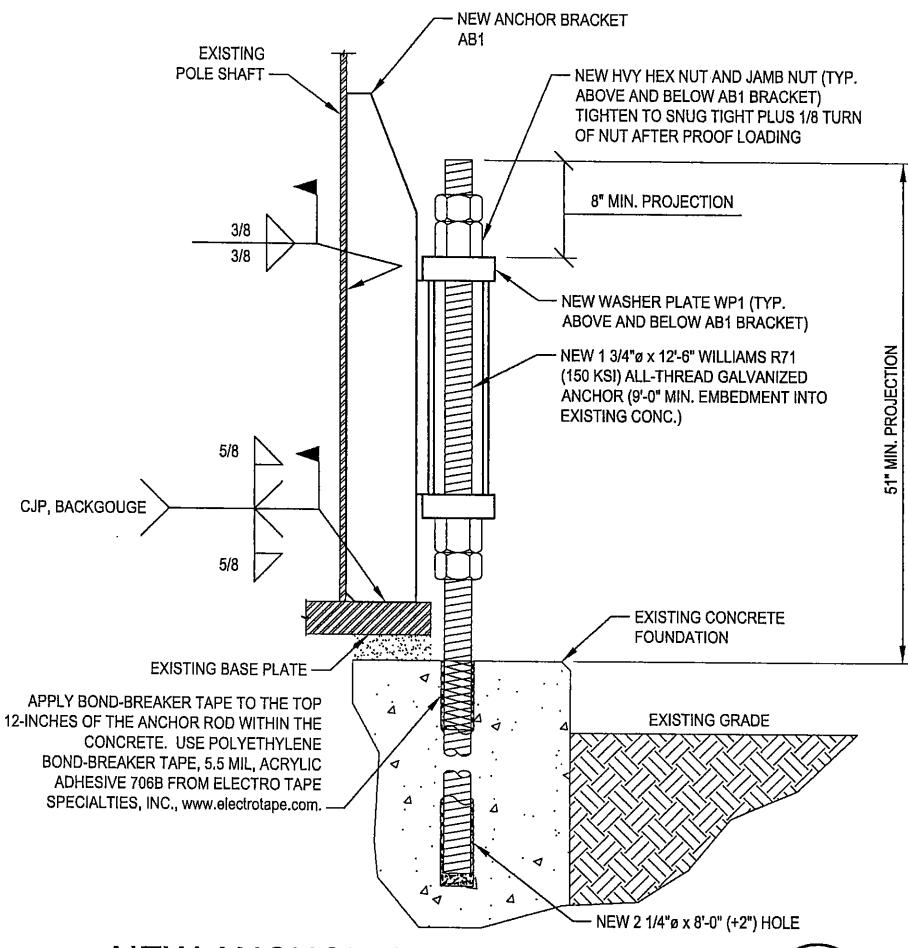
PROJECT: 37513-0756.003.7700

DRAWN BY: B.M.S.	MONOPOLE PROFILE
CHECKED BY: R.M.K.	
APPROVED BY:	
DATE: 8-20-2014	S-4

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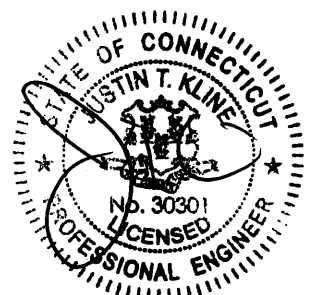


**BASE PLATE 1**  
S-5



NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE PROOF LOADED TO 195 KIPS. ONCE THE PROOF LOAD HAS BEEN RELEASED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-2, SECTION H FOR ADDITIONAL INFORMATION.

**NEW ANCHOR & BRACKET DETAIL 2**  
S-5



32214

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**BURNT HOUSE**  
**SOUTHINGTON, CONNECTICUT**  
**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY:  
B.M.S.

CHECKED BY:  
R.M.K.

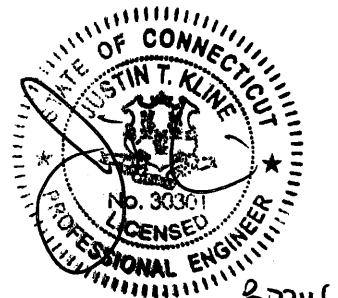
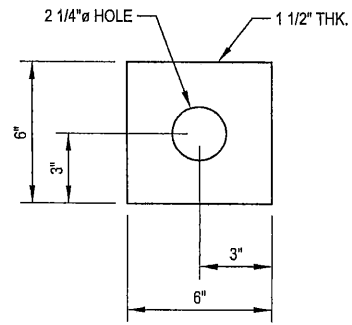
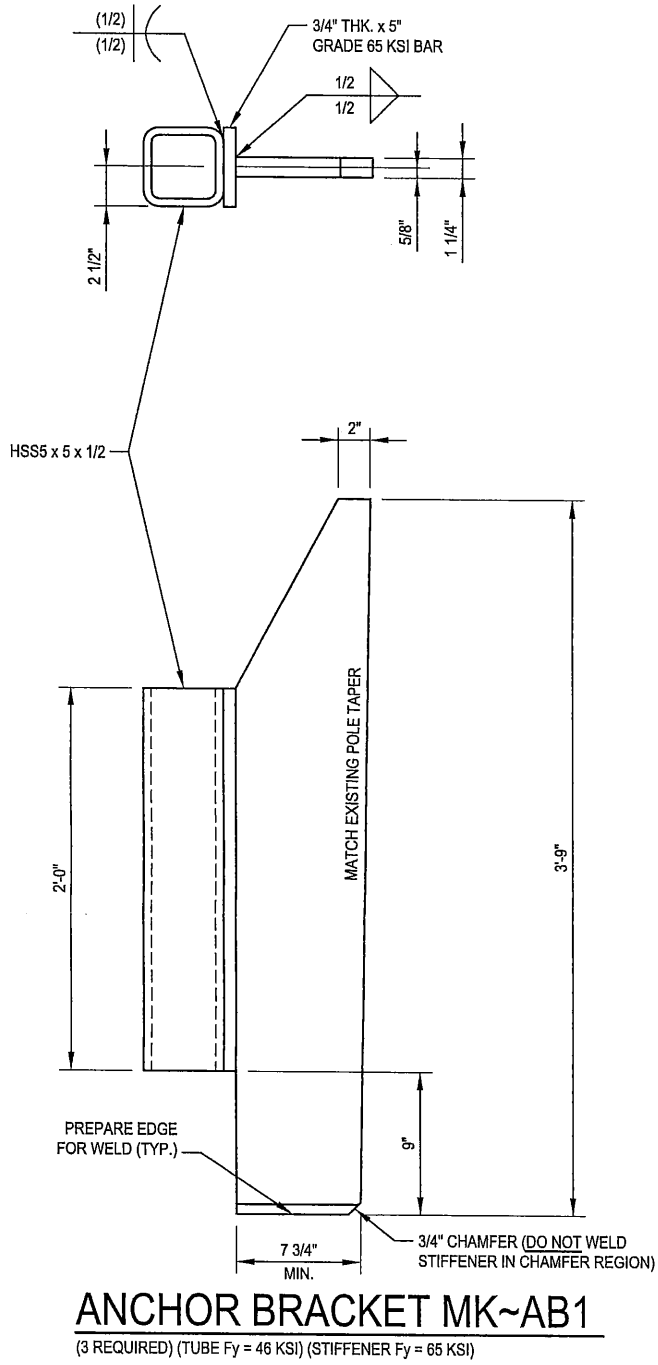
APPROVED BY:

DATE:  
8-20-2014

BASE PLATE DETAILS

**S-5**





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**SOUTHINGTON, CONNECTICUT**  
**MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700

DRAWN BY:  
 B.M.S.  
 CHECKED BY:  
 R.M.K.  
 APPROVED BY:

MISC DETAILS

DATE:  
 8-20-2014

**S-6**

**MODIFICATION INSPECTION NOTES:**

**GENERAL**

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS..

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

**MI INSPECTOR**

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

**GENERAL CONTRACTOR**

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN DENG-SOW-10007.

**RECOMMENDATIONS**

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

**CANCELLATION OR DELAYS IN SCHEDULED MI**

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

**CORRECTION OF FAILING MI'S**

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

**MI VERIFICATION INSPECTIONS**

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

**PHOTOGRAPHS**

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

**MI CHECKLIST**

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
<b>PRE-CONSTRUCTION</b>	
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
<b>CONSTRUCTION</b>	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF AJAX BOLTS AND DT'S PER REQUIREMENTS ON SHEET S-3
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
ADDITIONAL TESTING AND INSPECTIONS:	
<b>POST-CONSTRUCTION</b>	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT  
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT



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**BU #876313; WEST JOHNSON AVE.  
BURNT HOUSE  
SOUTHINGTON, CONNECTICUT  
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT**

PROJECT: 37513-0756.003.7700	
DRAWN BY: B.M.S.	MI CHECKLIST
CHECKED BY: R.M.K.	
APPROVED BY:	
DATE: 8-20-2014	<b>S-7</b>

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

Sprint Existing Facility

Site ID: CT03XC015

West Johnson Avenue, Burnt House

1394 Route 322  
Southington, CT 06489

**October 17, 2014**

**EBI Project Number: 62145319**

October 17, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:  
**CT03XC015 - West Johnson Avenue, Burnt House**

**Site Total: 43.52% - MPE% in full compliance**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at **1394 Route 322, Southington, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limit for the cellular band (850 MHz Band) is approximately  $567 \mu\text{W}/\text{cm}^2$ , and the general population exposure limit for the 1900 MHz and 2500 MHz bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 **1394 Route 322, Southington, 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) 5 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 **148 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	CT03XC015 - West Johnson Avenue, Burnt House
Site Address	1394 Route 322, Southington, CT, 06489
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	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	5	100	5.9	148	142	1/2 "	0.5	0	346.74	0.62%
1a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
Sector total Power Density Value:																1.18%

**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	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	5	100	5.9	148	142	1/2 "	0.5	0	346.74	0.62%
2a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
Sector total Power Density Value:																1.18%

**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	APXVSP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	5	100	5.9	148	142	1/2 "	0.5	0	346.74	0.62%
3a	RFS	APXVSP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	148	142	1/2 "	0.5	0	39.00	0.12%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	148	142	1/2 "	0.5	0	138.69	0.44%
Sector total Power Density Value:																1.18%

Site Composite MPE %	
Carrier	MPE %
Sprint	3.53%
AT&T	14.16%
MetroPCS	8.58%
Verizon Wireless	17.04%
T-Mobile	0.21%
<b>Total Site MPE %</b>	<b>43.52%</b>

## 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 **3.53% (1.18% from sector 1, 1.18% from sector 2 and 1.18% 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 **43.52%** 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.



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