



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

October 25, 2017

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

**RE: Notice of Exempt Modification for Sprint 2.5 Rework Site BU: 842875**  
**Sprint Site ID: CT54XC787**  
**99 Day Hill Road, Windsor, CT 06095**  
**Latitude: 42° 52' 16.1" / Longitude: -72° 40' 16.0"**

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 131-foot level of the existing 168-foot monopole at 99 Day Hill Road in Windsor, CT. The tower is owned by Crown Castle. The property is owned by the Town of Windsor. Sprint now intends to add three (3) antennas, four (4) hybrid lines, and three (3) RRHs.

This facility was approved by the Planning and Zoning Commission of the Town of Windsor in Special Use Application #292A on November 30, 2000. This approval included waivers regarding tower height and no conditional statements.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Donald S. Trinks, Mayor for the Town of Windsor, and the tower, and property owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

**The Foundation for a Wireless World.**

CrownCastle.com

Melanie A. Bachman

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5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Jeffrey Barbadora  
Real Estate Specialist  
12 Gill Street, Suite 5800, Woburn, MA 01801  
781-729-0053  
[Jeff.Barbadora@crowncastle.com](mailto:Jeff.Barbadora@crowncastle.com)

Attachments:

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

Tab 2: Exhibit-2: Structural Modification Report

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

cc: The Honorable Donald S. Trinks, Mayor, Town of Windsor  
Town of Windsor  
275 Broad Street  
Windsor, CT 06095

Town of Windsor  
275 Broad St.  
Attn: Accounts Receivable  
Windsor, CT 06095

Planning & Zoning  
Town of Windsor  
275 Broad Street  
Windsor, CT 06095

I, Anita M. Mips, Chairperson of the Windsor Town Planning and Zoning Commission, hereby certify that on October 10, 2000 the Planning and Zoning Commission of the Town of Windsor granted approval of Special Use Application #292A for a Wireless Telecommunications Tower with a monopole height of 170 feet plus 20-foot Town public service whip antennas for a total height of 190 feet, under Zoning Regulations Sections 12.2 & 2.2.19E(1).

This approval also includes the following waivers in accordance with Zoning Regulations Section 12.1:

- 1) a waiver of the height requirement for 15 feet; and
- 2) a waiver of the fall zone distance requirement for 151 feet in relation to the distance of the tower from Day Hill Road, 380 feet being required, 229 feet being proposed.

Said Special Use was granted for the property located at: 99 Day Hill Road

The owner of record of said parcel is: Town of Windsor

Dated at Windsor, Connecticut, this 30<sup>th</sup> day of November, 2000

Anita M. Mips Chairperson

Public Act #75-317

Received for Record this \_\_\_\_\_ day of \_\_\_\_\_, 2000

\_\_\_\_\_  
Attest: Town Clerk

RECEIVED FOR RECORD  
WINDSOR TOWN CLERK

00 NOV 30 PM 12: 58

VOL 1249 PG 156

BY Kathleen H. Quinn  
TOWN CLERK

### Property Cards

Address Search :   [Clear Search](#)

**Your search returned multiple addresses**

Additional addresses:

[99 DAY HILL RD](#)

#### 99 Day Hill Rd

**Property Owner:**

Windsor Town Of

**Property Co-Owner**

Public Works Garage

**Mailing Address:**

275 Broad Street  
Windsor, CT  
06095

**File Code**

9310

**Map:**

42

**Block:**

108

**Lot:**

1

**Census Tract:**

4735.01

**Property Type:**

Municipal MDL-96

**Land Area (Acres):**

11.76

**Zone:**

NZ



[Click to Enlarge](#)

#### Construction Details

**Year Built:**

1982

**Building Style:**

Garage/Office

**Stories:**

1

**Living Area:**

0 Sq/Ft

**Building ID**

3417

**Grade**

Average

**Exterior Wall**

Pre-Finsh Metl

**Total Rooms:**

**Bedrooms:**

**Bathrooms:**

**Half Baths:**

**Heating Type**

Hot Air-No Duc

**Heating Fuel**

Gas

**AC Type**

None

**Valuation**

**Assessed Land Value:**  
\$536,830

**Assessed Building Value:**  
\$1,076,250

**Total Assessed Value:**  
\$1,613,080

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**Appraised Land Value:**  
\$766,900

**Appraised Building Value:**  
\$1,537,500

**Total Appraised Value:**  
\$2,304,400

**Last Sale**

**Last Sale Date:**  
Friday, November 4th, 1977

**Last Sale Price:**  
\$0

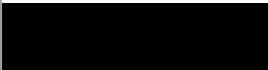
**Qualified Sale:**

**Book/Page:**  
334/0257

**Prior Owners**

Sale Date	Owner Name	Sale Price	Book / Page

**Parcel Sketch**



**Sub Area Detail**

Code	Gross Area (Sq Ft)	Living Area (Sq Ft)
BAS	36300	36300

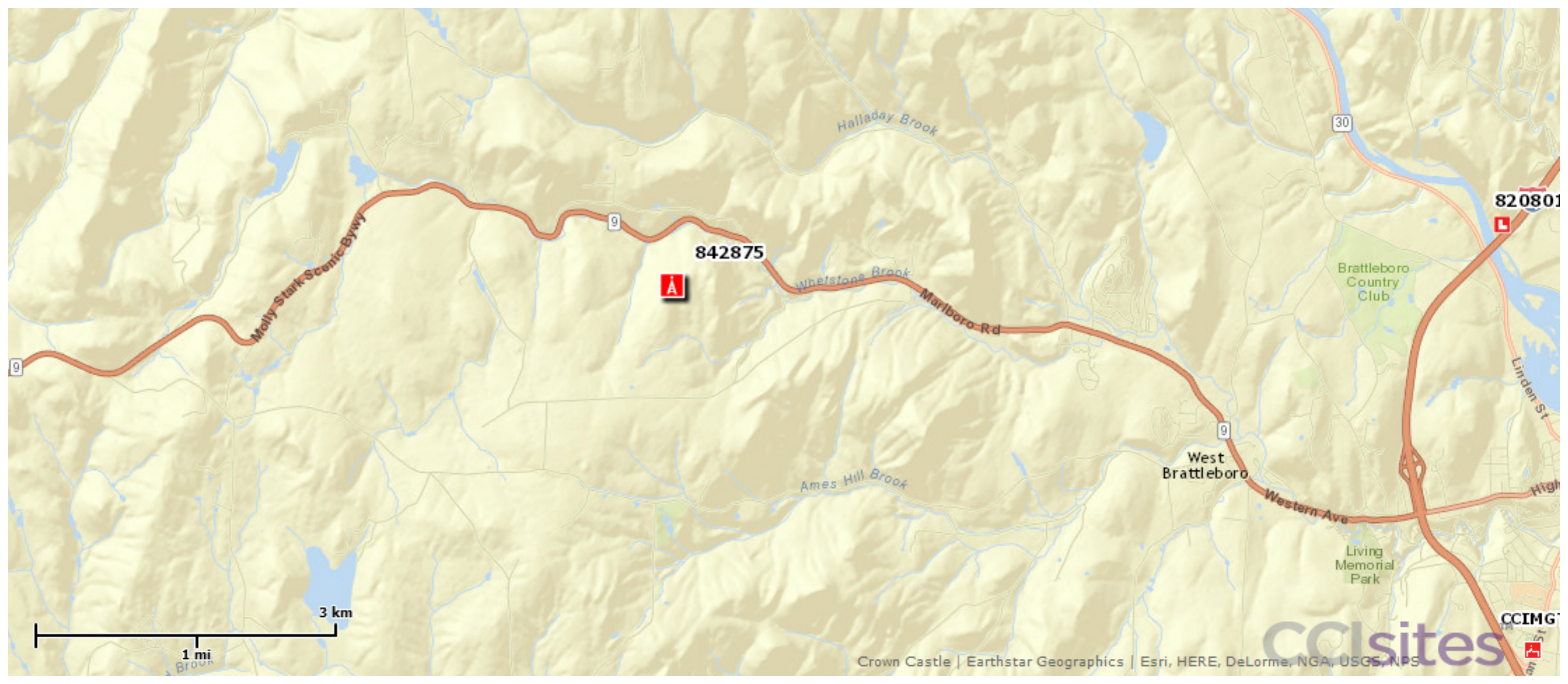
**Outbuildings & Extra Features**

Code	Description	Appraised Value	Assessed Value
PAV1	PAVING-ASPHALT	\$16500.00	\$11550.00
FGR1	GARAGE-AVE	\$51300.00	\$35910.00
CNP2	GOOD QUALITY	\$38900.00	\$27230.00
SHD1	SHED FRAME	\$80000.00	\$56000.00

- |                                    |                                       |                                        |
|------------------------------------|---------------------------------------|----------------------------------------|
| <b>AOF</b> Office Area             | <b>APT</b> Apartment                  | <b>BAS</b> First Floor                 |
| <b>CAN</b> Canopy                  | <b>CDN</b> Canopy (Det)               | <b>CLP</b> Loading Platform (Finished) |
| <b>EAF</b> Attic (Expan)(Finished) | <b>EAU</b> Attic (Expan)(Unfinished)  | <b>FAT</b> Attic (Finished)            |
| <b>FBM</b> Basement (Finished)     | <b>FCB</b> Cabana (Encl)(Finished)    | <b>FCP</b> Carport (Framed)            |
| <b>FDC</b> Carport (Det)(Framed)   | <b>FDS</b> Porch (Scr)(Det)(Finished) | <b>FDU</b> Utility (Det)(Finished)     |

<b>FEP</b> Porch (Encl)(Finished)	<b>FGR</b> Garage (Framed)	<b>FHS</b> Half-Story (Finished)
<b>FLL</b> Lower Level (Finished)	<b>FOP</b> Porch (Open)(Finished)	<b>FSP</b> Porch (Screen)(Finished)
<b>FST</b> Utility (Finished)	<b>FUS</b> Upper-Story (Finished)	<b>PTO</b> Patio
<b>SDA</b> Store Display Area	<b>SFB</b> Base (Semi-Finished)	<b>SPA</b> Service Prod Area
<b>TQS</b> Three-Qtr Story	<b>UAT</b> Attic (Unfinished)	<b>UBM</b> Basement (Unfinished)
<b>UCB</b> Cabana (Encl)(Unfinished)	<b>UDS</b> Porch (Scrn)(Dedt)(Unfinished)	<b>UDU</b> Utility (Det)(Unfinished)
<b>UEP</b> Porch (Encl)(Unfinished)	<b>UHS</b> Half-Story (Unfinished)	<b>ULP</b> Loading Platform (Unfinished)
<b>UOP</b> Porch (Open)(Unfinished)	<b>USP</b> Porch (Scrn)(Unfinished)	<b>UST</b> Utility (Strg)(Unfinished)
<b>UUS</b> Upper-Story (Unfinished)	<b>WDK</b> Wood Deck	





842875

Molly Stark Scenic Byway

Whetstone Brook

Marlboro Rd

Ames Hill Brook

West Brattleboro

Western Ave

Brattleboro Country Club

Living Memorial Park

30

820801

1 mi

3 km



# Sprint



**PROJECT:** 2.5 EQUIPMENT DEPLOYMENT  
**SITE NAME:** WINDOSR LOCKS / AT&T  
**SITE CASCADE:** CT54XC787  
**SITE ADDRESS:** 99 DAY HILL ROAD  
 WINDSOR, CT 06095  
**SITE TYPE:** MONOPOLE  
**MARKET:** NORTHERN CONNECTICUT



6580 SPRINT PARKWAY  
 OVERLAND PARK, KANSAS 66251  
 (517) 436-7466



A SAXON DESIGN GROUP  
 244 RIVERS EDGE LANE  
 TOMS RIVER, NJ 08755  
 (732) 678-0155

ENGINEER'S LICENSE

MICHAEL L. BOHLINGER



PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE  
 COVER SHEET

MICHAEL L. BOHLINGER  
 CT LICENSE No. 20405  
 DATE: 3-3-14  
 PROJECT No: ASDGSP25  
 DRAWING BY: CD  
 CHK. BY:  
 DWG No: T-1

24"x36" SHEETS - SIGN & SEAL AREA

SITE INFORMATION

**PROPERTY OWNER:**  
 AT&T WIRELESS SERVICES, INC.  
 866-593-1383

**LATITUDE:**  
 41.8711093°

**LONGITUDE:**  
 -72.6711093°

**COUNTY:**  
 HARTFORD

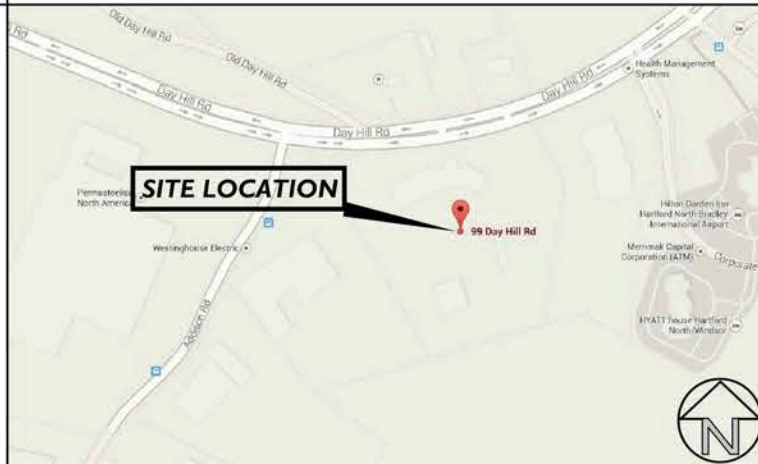
**ZONING DISTRICT:**  
 TOWN OF WINDSOR  
 MUNICIPAL MDL-96

**AAV PROVIDER:**  
 AT&T

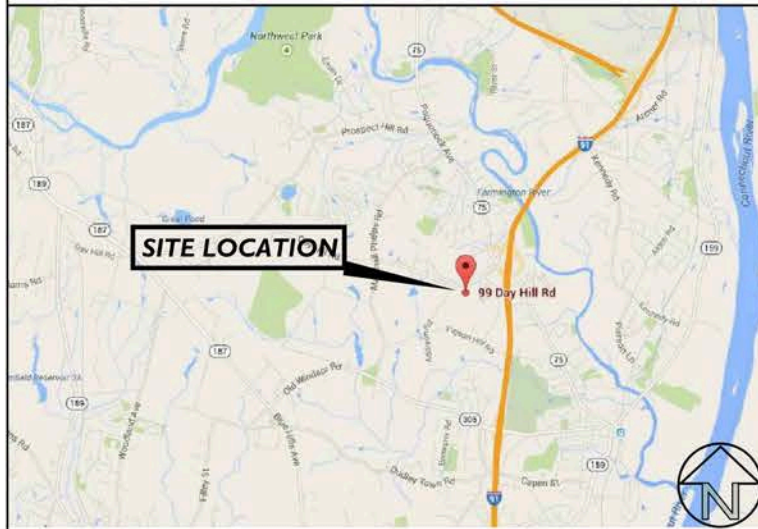
**POWER COMPANY:**  
 CONNECTICUT LIGHT AND POWER  
 PHONE# 800-922-4455

**SPRINT CONSTRUCTION MANAGER:**  
 MICHAEL DELIA  
 781-316-6348  
 MICHAEL.DELIA@SPRINT.COM

AREA MAP



LOCATION MAP



PROJECT DISCIPTION

SPRINT PROPOSED TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- INSTALL (4) NEW BATTERIES IN EXISTING BBU CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRU'S NEAR ANTENNA
- INSTALL (27) JUMPER CABLES
- INSTALL (1) FIBER CABLE

APPLICABLE CODES

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

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

SHEET INDEX

DWG.	DESCRIPTION	REV.
T-1	COVER SHEET	00
SP-1	SPRINT SPECIFICATIONS (SHEET 1 OF 3)	00
SP-2	SPRINT SPECIFICATIONS (SHEET 2 OF 3)	00
SP-3	SPRINT SPECIFICATIONS (SHEET 3 OF 3)	00
A-1	SITE PLAN	00
A-2	BUILDING ELEVATION AND CABLE PLAN	00
A-3	ANTENNA PLAN AND MOUNTING DETAILS	00
A-4	RF DATA SHEET AND EQUIPMENT INFORMATION	00
A-5	WIRING DIAGRAMS	00
A-6	RF DATA SHEET	00
A-7	EQUIPMENT SPECIFICATIONS	00
E-1	ONE-LINE DIAGRAM	00
G-1	GROUNDING DETAILS	00

**APPROVED**

By Jeff Barbadora at 9:47 am, Jun 16, 2014

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

1.5 **DEFINITIONS:**

- A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
- B. COMPANY: SPRINT CORPORATION
- C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
- D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
- E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
- F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.
- G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

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

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

1.8 **ON-SITE SUPERVISION:** THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

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

- A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
- B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.
- C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

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

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

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

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

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

- A. TOP HAT
- B. HOW TO INSTALL A NEW CABINET
- C. BASE BAND UNIT IN EXISTING UNIT
- D. INSTALLATION OF BATTERIES
- E. INSTALLATION OF HYBRID CABLE
- F. INSTALLATION OF RRH'S
- G. CABLING
- H. TS-0200 REV 4 – ANTENNA LINE ACCEPTANCE STANDARDS
- I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.
- J. COMMISSIONING MOPS
- K. SPRINT CELL SITE ENGINEERING NOTICE – EN-2013-002
- L. SPRINT ENGINEERING LETTER – EL-0504
- M. SPRINT ENGINEERING LETTER – EL-0568
- N. SPRINT TECHNICAL SPECIFICATION – TS-0193

1.15 **USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:**

- A. CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT 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. 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**

**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.

**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:
  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 CIVIL CONSTRUCTION:**

- A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
- B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
- C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.

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

- D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION
- E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 **DELIVERABLES:**

- A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER
- B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
  1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
  2. PROJECT PROGRESS REPORTS.
  3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
  13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
  14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS. **CONTINUE SHEET SP-2**

01	3-5-14	REVISED PER CLIENT COMMENTS	CM	KLR
00	3-3-14	INITIAL SUBMISSION	CM	KLR
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY



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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER



ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
WINDSOR LOCKS / AT&T  
99 DAY HILL ROAD  
WINDSOR, CT 06095

DRAWING TITLE  
SPRINT SPECIFICATIONS  
(SHEET 1 OF 3)

MICHAEL L. BOHLINGER CT LICENSE No. 20405	DATE: 3-3-14
	PROJECT No: ASDGSP25
	DRAWING BY: CD
	CHK BY:
	DWG No: SP-1

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CONTINUED FROM SP-1:

SECTION 01 400 - SUBMITTALS, TESTS, AND INSPECTIONS

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.
C. 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.

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: 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.
1. 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.
2. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

- A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS:

- A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.
B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH, DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS - ANTENNALIGN ALIGNMENT TOOL (AAT)
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
E. 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.
F. 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 01 500 - PROJECT REPORTING

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 RADII).
23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
24. FENCE GROUND-RING TRENCH WITH GROUND-WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
25. ALL BTS GROUND CONNECTIONS.
26. ALL GROUND TEST WELLS.
27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
30. GPS ANTENNAS.
31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
32. DOGHOUSE/CABLE EXIT FROM ROOF.
33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
34. MASTER BUS BAR.
35. TELCO BOARD AND NIU.
36. ELECTRICAL DISTRIBUTION WALL.
37. CABLE ENTRY WITH SURGE SUPPRESSION.
38. ENTRANCE TO EQUIPMENT ROOM.
39. COAX WEATHERPROOFING--TOP AND BOTTOM OF TOWER.
40. COAX GROUNDING --TOP AND BOTTOM OF TOWER.
41. ANTENNA AND MAST GROUNDING.
42. LANDSCAPING - WHERE APPLICABLE.

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

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY: THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING ONTO THE ROOF OR BUILDING-MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

- A. PRE-CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.
B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)
C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

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

CONTINUE SHEET SP-3

Table with 4 columns: REV., DATE, REVISION DESCRIPTION, DRAWN BY, CHKD. BY. Row 01: 3-3-14, REVISED PER CLIENT COMMENTS, CM, KLR. Row 00: 3-3-14, INITIAL SUBMISSION, CM, KLR.

Table with 4 columns: REV., DATE, REVISION DESCRIPTION, DRAWN BY, CHKD. BY. Row 01: 3-3-14, REVISED PER CLIENT COMMENTS, CM, KLR. Row 00: 3-3-14, INITIAL SUBMISSION, CM, KLR.

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ENGINEER'S LICENSE for MICHAEL L. BOHLINGER, PROFESSIONAL ENGINEER, CONNECTICUT LICENSE No. 20405. Includes signature and seal.

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION: WINDSOR LOCKS / AT&T 99 DAY HILL ROAD WINDSOR, CT 06095

DRAWING TITLE: SPRINT SPECIFICATIONS (SHEET 2 OF 3)

Table with 2 columns: FIELD, VALUE. Fields include DATE (3-3-14), PROJECT No (ASDGSP25), DRAWING BY (CD), CHK BY, DWG No (SP-2).

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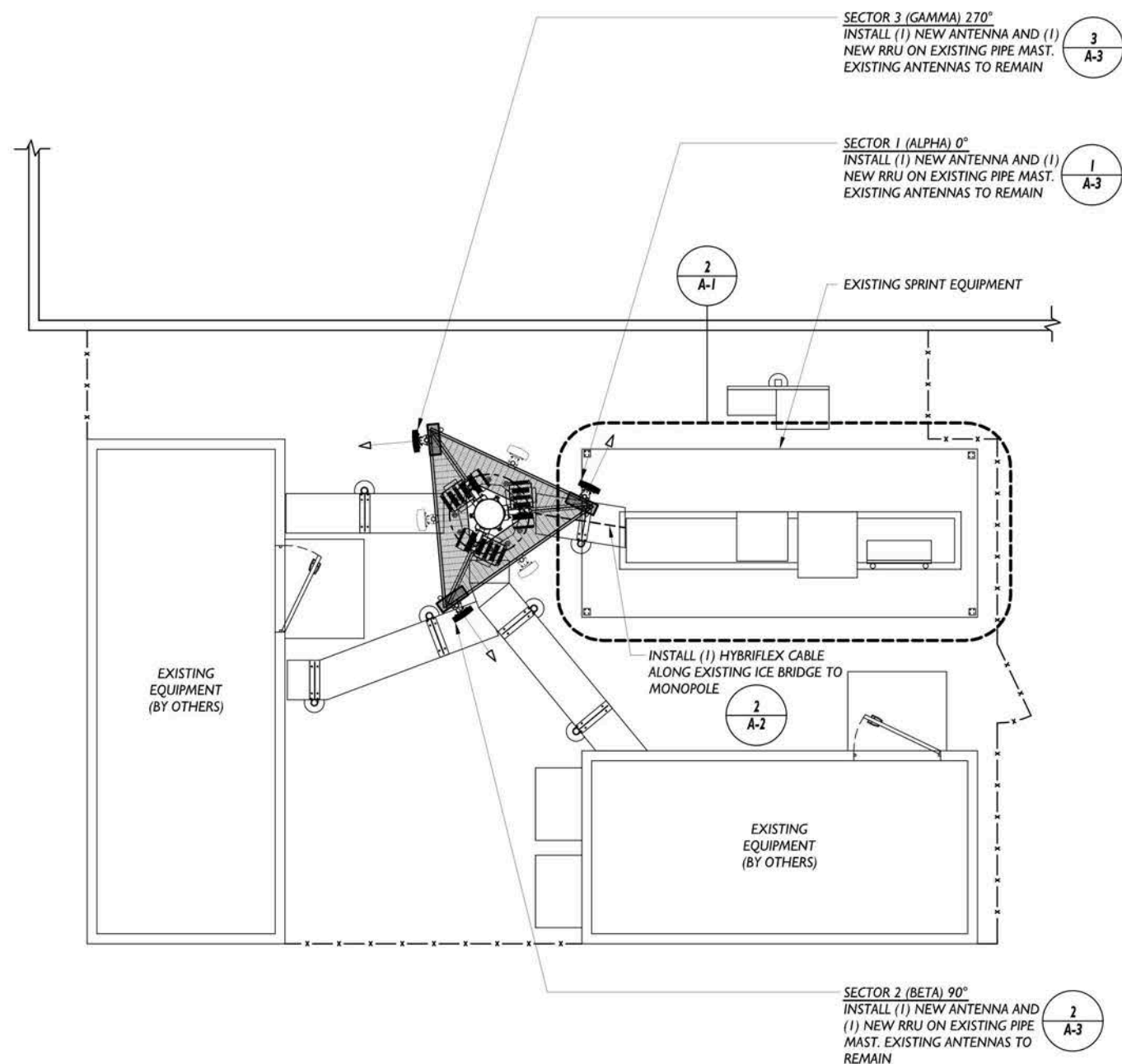






DAY HILL ROAD

NOTES:  
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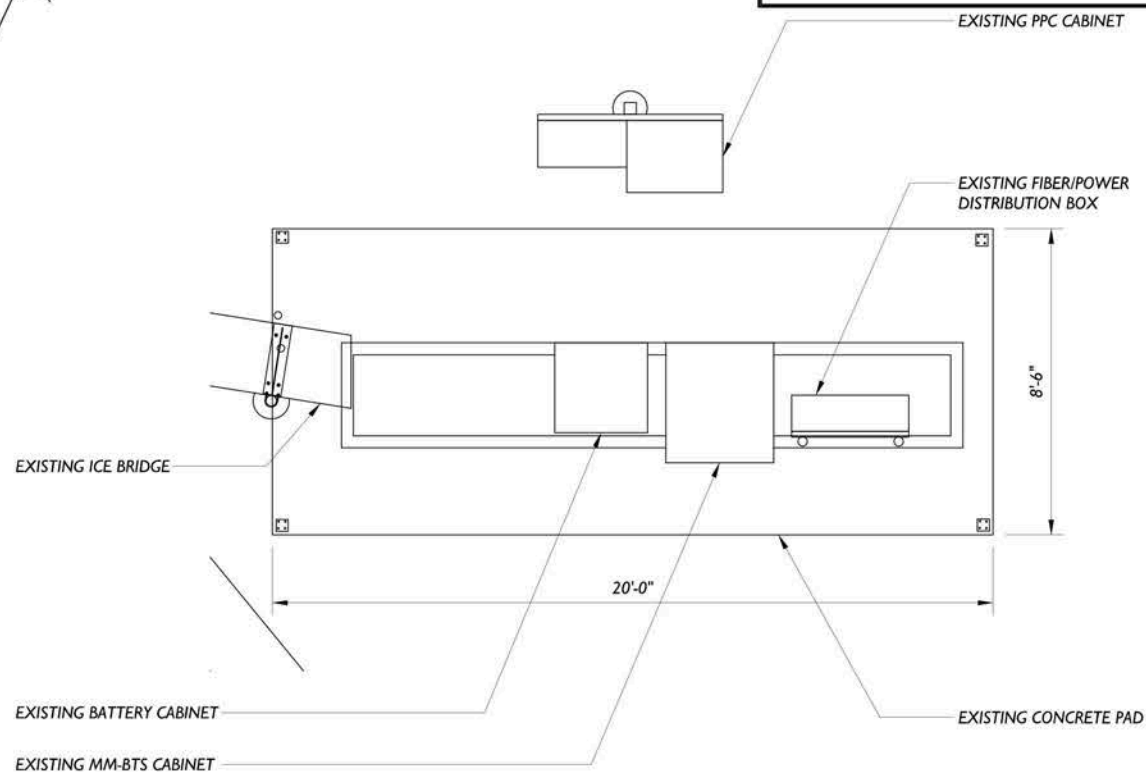
OVERALL SITE PLAN

SCALE 11"x17" : 1/8" = 1'-0"  
 24"x36" : 1/4" = 1'-0"

1



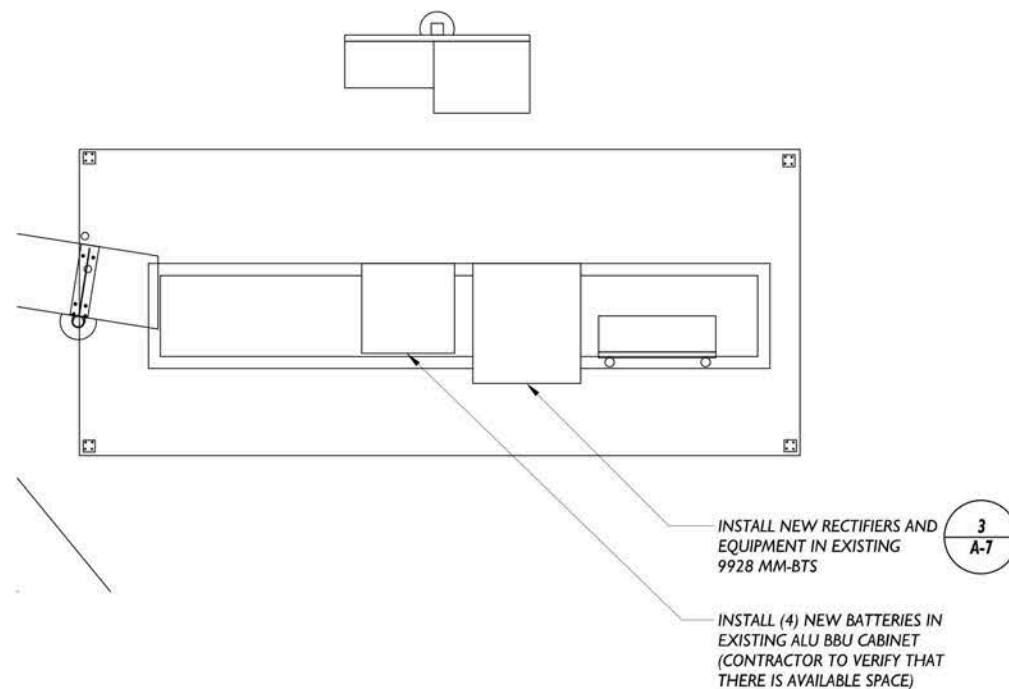
NOTES:  
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EXISTING SPRINT EQUIPMENT PLAN

SCALE 11"x17" : 3/16" = 1'-0"  
 24"x36" : 3/8" = 1'-0"

2



PROPOSED SPRINT EQUIPMENT PLAN

SCALE 11"x17" : 3/16" = 1'-0"  
 24"x36" : 3/8" = 1'-0"

3



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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER



PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

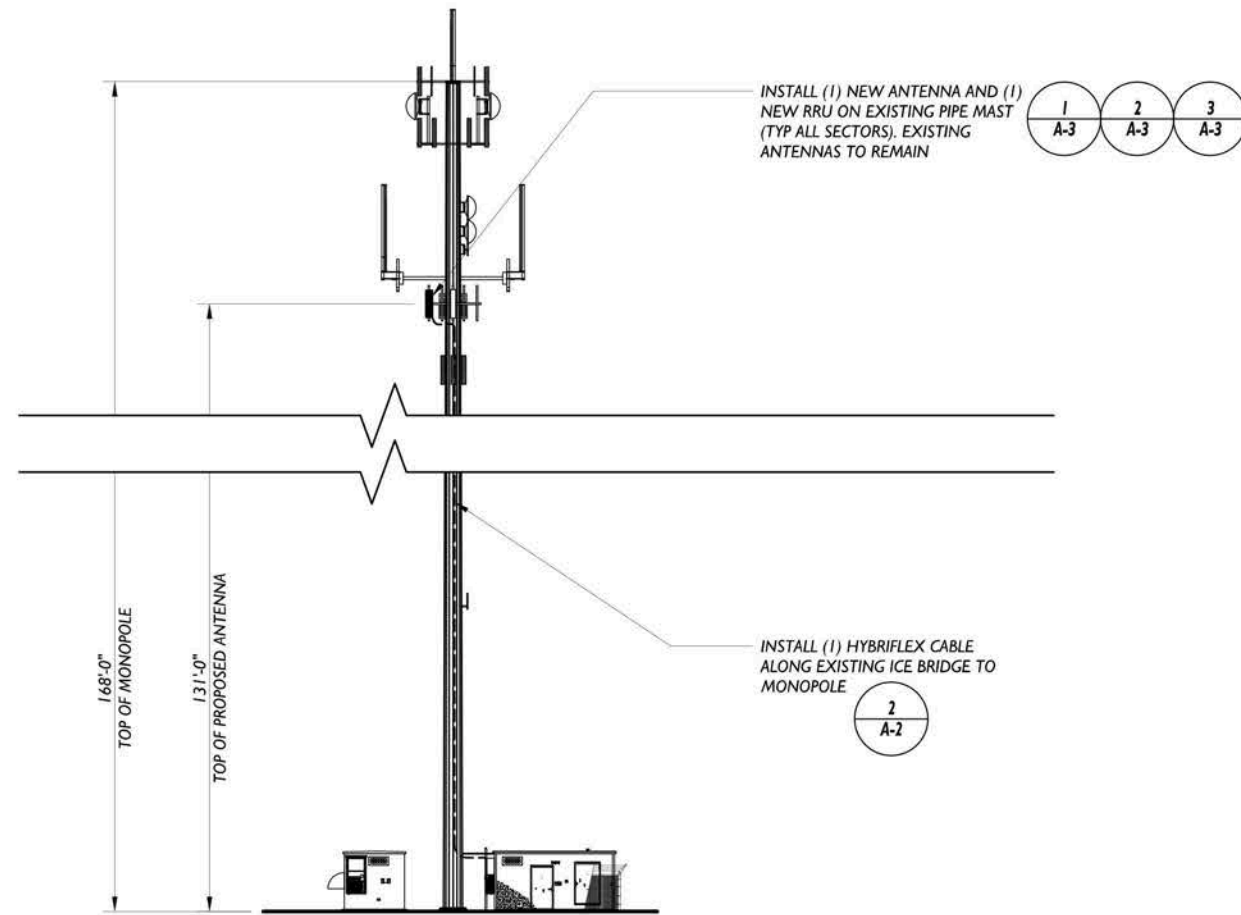
SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE  
 SITE PLAN

MICHAEL L. BOHLINGER  
 CT LICENSE No. 20405

DATE: 3-3-14  
 PROJECT No: ASDGSP25  
 DRAWING BY: CD  
 CHK BY:  
 DWG No: A-1

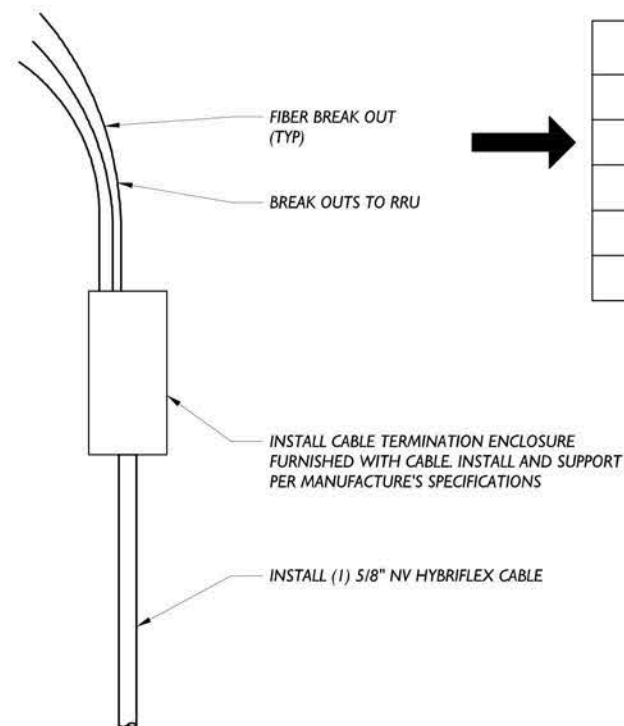




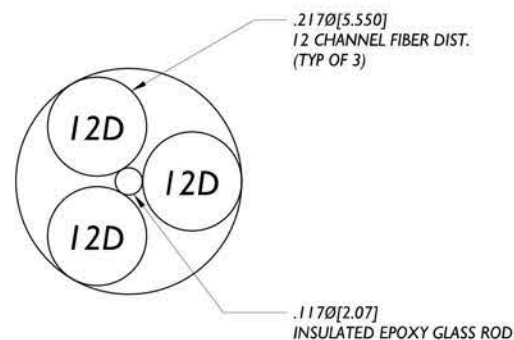
NOTES:  
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**ELEVATION**

SCALE	11"x17" : 1/32" = 1'-0"	1
	24"x36" : 1/16" = 1'-0"	



CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	5/8"
HYBRIFLEX	OVER 200'	8 AWG	1 1/4"
HYBRIFLEX	225'-300'	6 AWG	1 1/4"
HYBRIFLEX	325'-375'	4 AWG	1 1/4"



**HYBRID BREAK OUT DETAIL**

SCALE	11"x17" : NTS	2
	24"x36" : NTS	

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ENGINEER'S LICENSE

**MICHAEL L. BOHLINGER**



PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

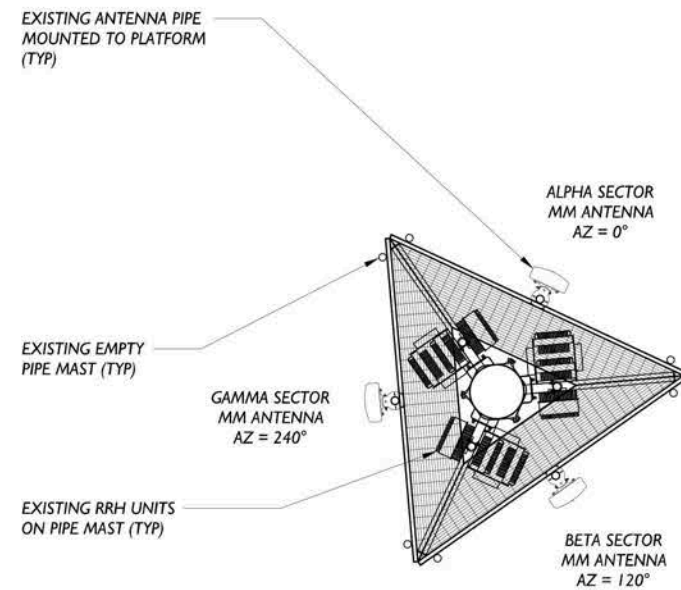
DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
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 99 DAY HILL ROAD  
 WINDSOR, CT 06095

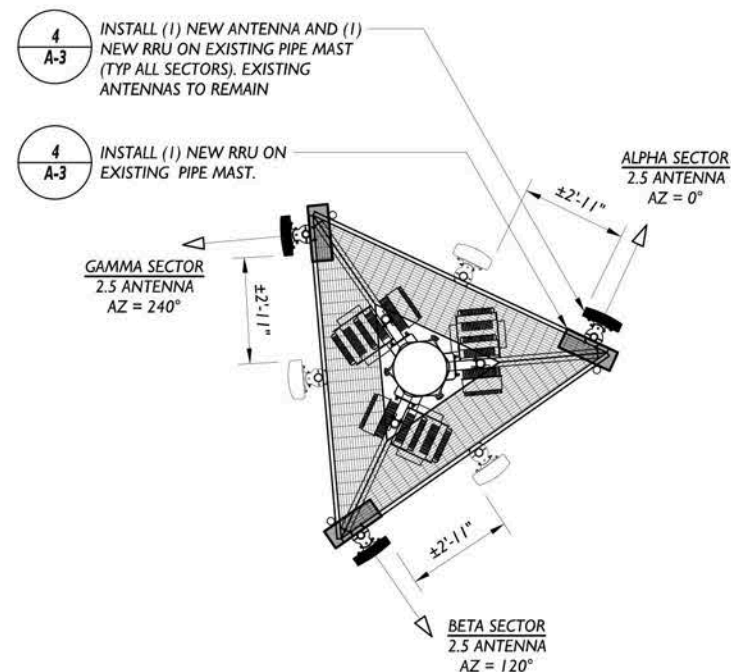
DRAWING TITLE  
 BUILDING ELEVATION  
 AND CABLE PLAN

MICHAEL L. BOHLINGER CT LICENSE No. 20405	DATE: 3-3-14
	PROJECT No: ASDGSP25
	DRAWING BY: CD
	CHK BY:
	DWG No: A-2

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EXISTING LAYOUT



PROPOSED LAYOUT

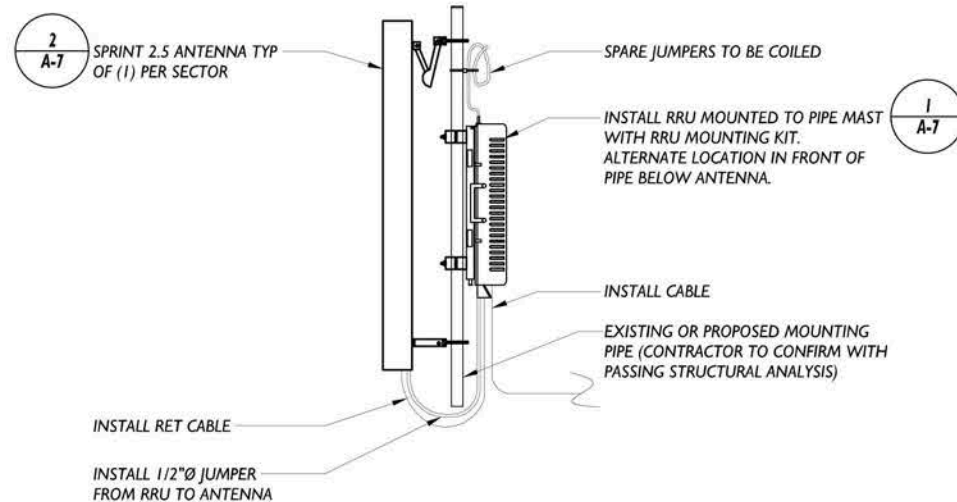
NOTES:  
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EXISTING AND PROPOSED LAYOUTS

SCALE	11"x17" : 3/16" = 1'-0"	1
	24"x36" : 3/8" = 1'-0"	

NOTE:  
 1. CUT DC CONDUCTORS TO LENGTH.  
 2. COIL FIBER CABLE AND SECURE TO SIDE OF RRU.  
 3. DO NOT EXCEED BEND RADIUS.  
 4. JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA CAN NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY.

NOTES:  
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ANTENNA AND RRU MOUNTING DETAIL

SCALE	11"x17" : NTS	4
	24"x36" : NTS	



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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER



PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE  
 ANTENNA PLAN  
 AND MOUNTING DETAILS

MICHAEL L. BOHLINGER CT LICENSE No. 20405	DATE: 3-3-14
	PROJECT No: ASDGSP25
	DRAWING BY: CD
	CHK BY:
	DWG No: A-3

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NOTE:  
GENERAL CONTRACTOR TO VERIFY CURRENT  
RFDS PRIOR TO CONSTRUCTION START.

### RFDS Sheet

#### General Site Information

Site ID	CT54XC787	Equipment Vendor	ALU	Incremental Power Draw needed by added Equipment	0
Market	Northern Connecticut	Latitude	41.8711093		
Region	EAST	Longitude	-72.6711093		
MLA	N/A	LL SITE ID	N/A		
Structure Type	MONOPOLE				
BTS Type	N/A				
Solution ID		Siterra SR Equipment type	N/A		
		Equipment Vendor	ALU		

#### Base Equipment

BBU Kit	ALU BBU KIT	Top Hat	NONE
BBU Kit Qty	1	Top Hat Qty	N/A
Growth Cabinet		Top Hat Dimensions	N/A
	NONE	Top Hat Weight (lbs)	N/A
Growth Cabinet Qty	N/A		
Growth Cabinet Dimensions	N/A		
Growth Cabinet Weight	N/A		

#### RF Path Information

RRH	TD-RRH8x20-25	
RRH Qty	3	
RRH Dimensions	26.1in x 18.6 x 6.7 in	
RRH Weight. lbs.	70	
RRH Mount Weight. Lbs.	TBD	
Power and Fiber Cable	ALU Fiber only	
Cable Qty	1	
Weight per foot. Lbs.	0.12	
Diameter. Inches.	0.7	
Length Ft.	165.6	(calculated as antenna height plus 20%)
Coax Jumper	Coax Jumper. Mfg TBD.	
Coax Jumper Qty	27	
Coax Jumper Length. Feet.	8	
Coax Jumper Weight	TBD	
Coax Jumper Diameter. Inches	0.5	
AISG Cable	Commscope ATCB-B01-006	
AISG Cable Qty	3	
AISG Diameter. Inches.	0.315	
AISG Cable length.	8	
Weight of entire AISG cable. Lbs.	1.3	

#### Antenna Sector Information

	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXVTM14-C-I20	RFS APXVTM14-C-I20	RFS APXVTM14-C-I20
Antenna qty	1	1	1
Antenna Dimensions. Inches	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3
Antenna Weight. Lbs	56	56	56
Antenna Mounting Kit Weight. Lbs.	11 (estimate)	11 (estimate)	11 (estimate)
CL Height	131	131	131
Antenna Azimuth	0	120	240
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	-2	-2	-2

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- NOTES:
- SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.
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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER



PROFESSIONAL ENGINEER  
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
WINDSOR LOCKS / AT&T  
99 DAY HILL ROAD  
WINDSOR, CT 06095

DRAWING TITLE  
RF DATA SHEET AND  
EQUIPMENT INFORMATION

MICHAEL L. BOHLINGER CT LICENSE No. 20405	DATE: 3-3-14
	PROJECT No: ASDGSP25
	DRAWING BY: CD
	CHK BY:
	DWG No: A-4

RF DATA SHEET AND EQUIPMENT INFORMATION

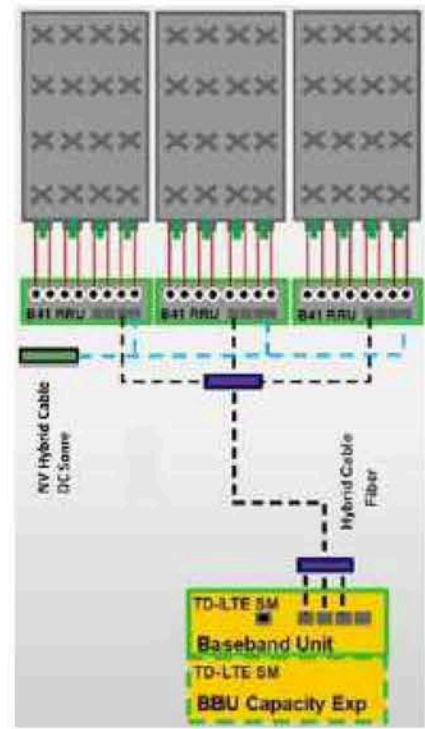
SCALE

11"x17" : NTS  
24"x36" : NTS

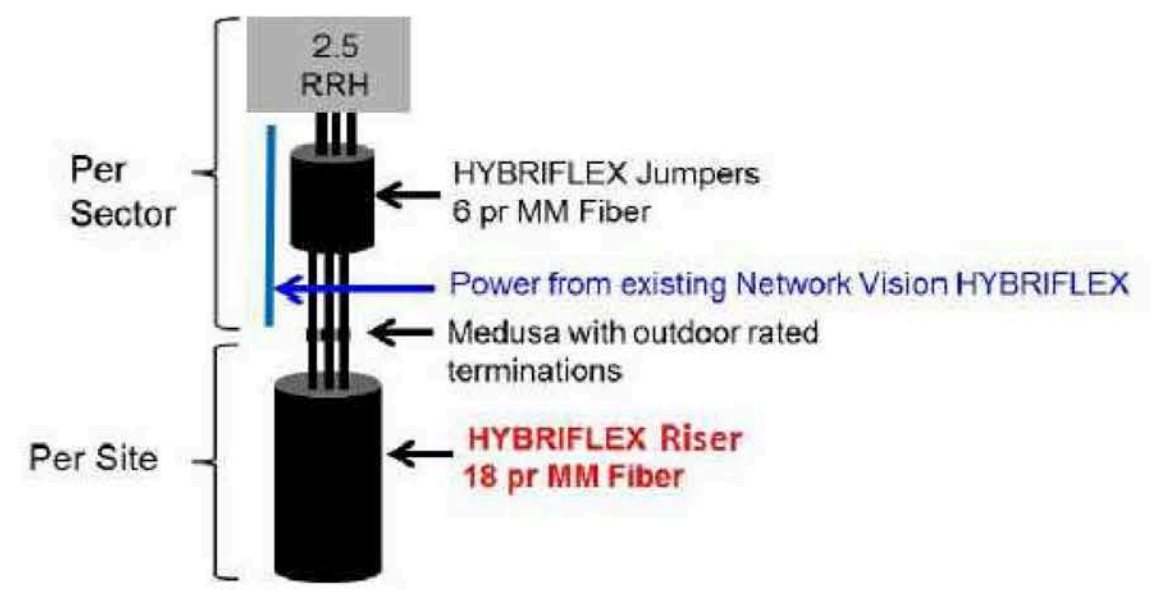
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24"x36" SHEETS - SIGN & SEAL AREA

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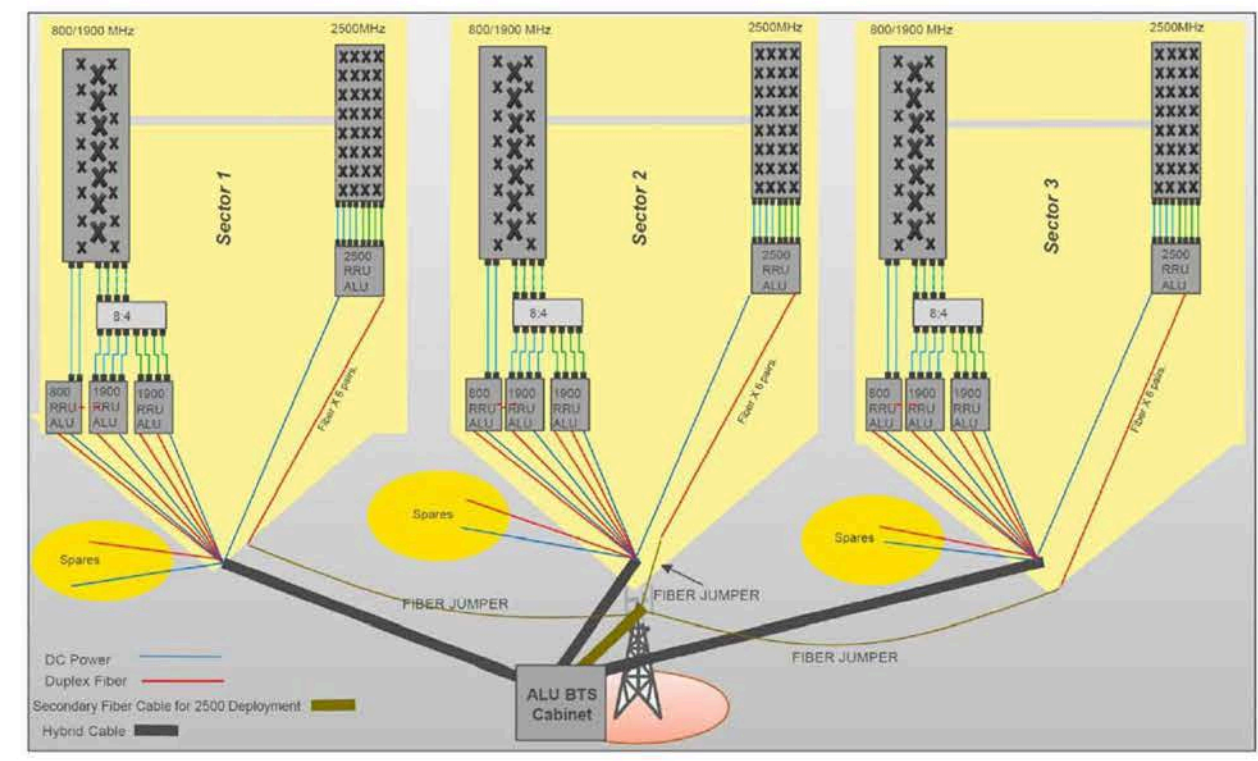


ALU 2500MHz ALU SCENARIO 1

SCALE 11"x17" : NTS  
 24"x36" : NTS

RFS 2500MHz ALU SCENARIO 1

SCALE 11"x17" : NTS  
 24"x36" : NTS



RAN WIRING DIAGRAM: ALU EQUIPMENT

SCALE 11"x17" : NTS  
 24"x36" : NTS



ENGINEER'S LICENSE

MICHAEL L. BOHLINGER  
 PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE  
 WIRING DIAGRAMS

MICHAEL L. BOHLINGER  
 CT LICENSE No. 20405  
 DATE: 3-3-14  
 PROJECT No: ASDGSP25  
 DRAWING BY: CD  
 CHK BY:  
 DWG No: A-5

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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 19.1 CABLE COLOR CODE

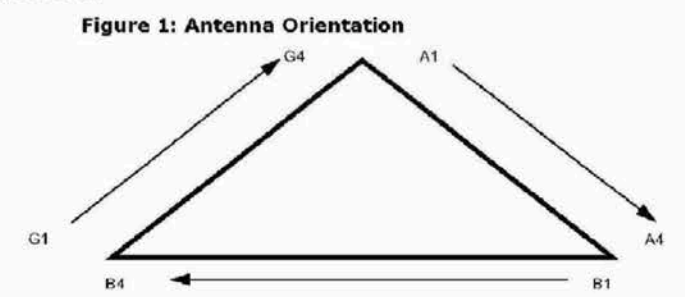
Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
	2	Blue	No Tape	No Tape
	3	Brown	No Tape	No Tape
	4	White	No Tape	No Tape
	5	Red	No Tape	No Tape
	6	Grey	No Tape	No Tape
	7	Purple	No Tape	No Tape
	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
	2	Blue	Blue	No Tape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

- NOTES
- All cables shall be marked at the top and bottom with 2" colored tape, stencil tag colored tape, or colored heat shrink tubing
  - Colored tape may be obtained from Graybar Electronic. UV stabilized tape or heat shrink are preferred.
  - The first ring shall be closest to the end of the cable, and there shall be a 1" space between each ring.
  - The cable color code shall be applied in accordance to Table 19-1.
    - A. Table 19-1 only shows 3 sectors, but additional sectors are easily supported by adding the appropriate number of colored rings to the cable color code.
  - After the cable color code is applied, the frequency color code, Table 19-2, must be applied for the specific frequency band in use on a given line.
    - A. 2" gap shall separate the cable color code from the frequency color code.
    - B. The 2" color rings for the frequency code shall be placed next to each other with no spaces.
  - Wrap 2" colored tape a minimum of 3 times around the coax, and keep the tape in the same area as much as possible. This will allow removal of tape that fades or discolors due to weather.
  - Examples of the cable and frequency color codes are shown in Figure 19-1 and Figure 19-2.

FIGURE 19.2 COLOR CODE

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

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



01	3-5-14	REVISED PER CLIENT COMMENTS	CM	KLR
00	3-3-14	INITIAL SUBMISSION	CM	KLR
REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY

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ENGINEER'S LICENSE

**MICHAEL L. BOHLINGER**

PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE: RF DATA SHEET

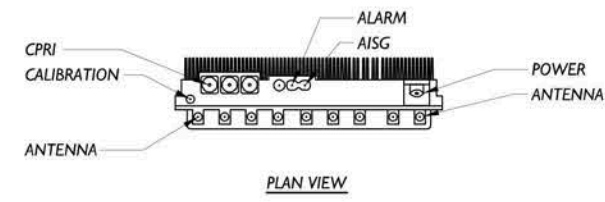
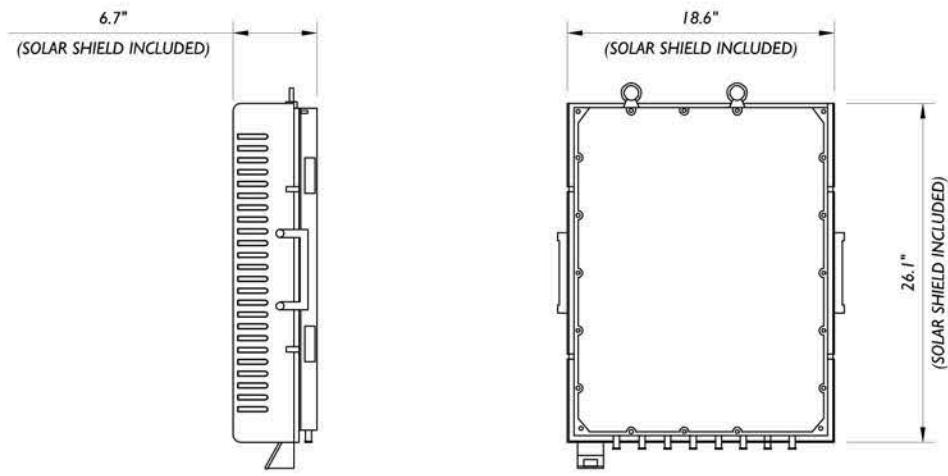
MICHAEL L. BOHLINGER  
 CT LICENSE No. 20405

DATE: 3-3-14  
 PROJECT No: ASDGSP25  
 DRAWING BY: CD  
 CHK. BY:  
 DWG No: A-6

24"x36" SHEETS - SIGN & SEAL AREA

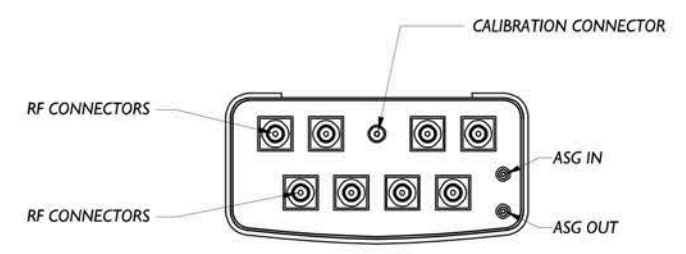
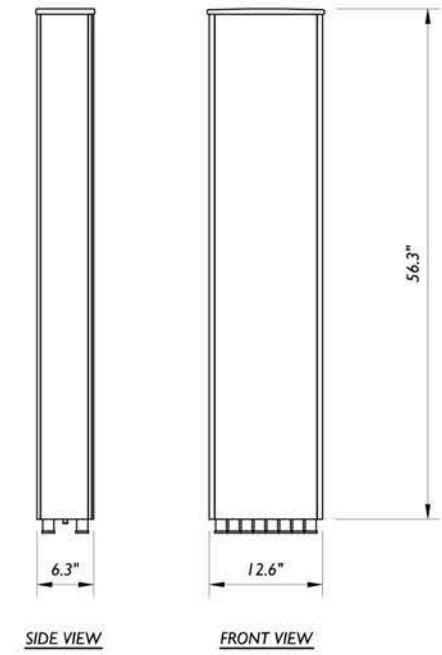
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**TD-RRHx20-25 REMOTE RADIO HEAD**  
 DIMENSIONS: 26.1"x18.6"x6.7"  
 WEIGHT: 60 LBS (WITH HARDWARE)

**NOTES:**  
 1. SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.  
 2. STRUCTURAL ANALYSIS TO BE COMPLETED BY OTHERS.



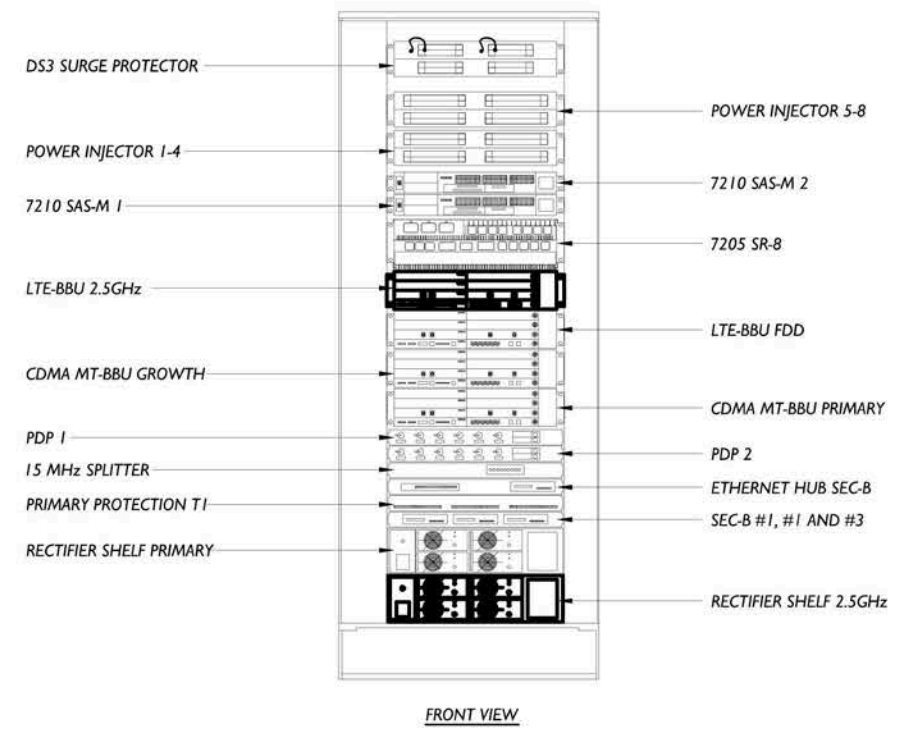
**RFS APXVTM14-C-120 PANEL ANTENNA**  
 DIMENSIONS: 53.3"x12.6"x6.3"  
 WEIGHT: 56 LBS (WITH HARDWARE)  
 FREQUENCY RANGE: 806-869 MHz, 1850-1995 MHz

**2.5 RRUS DETAIL**

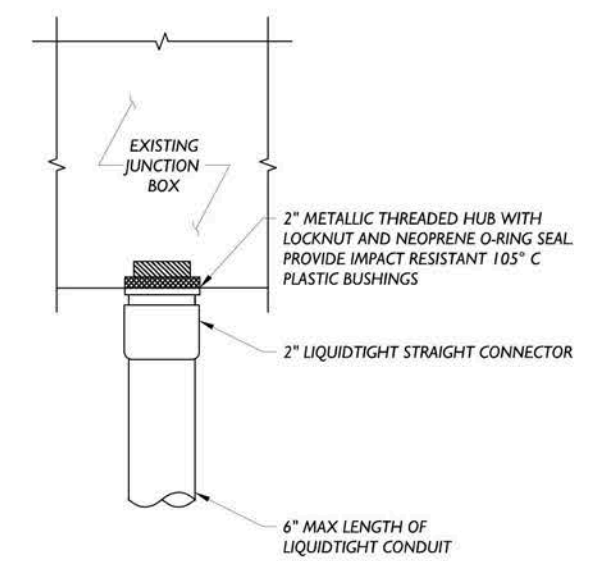
SCALE	11"x17" : NTS	1
	24"x36" : NTS	

**2.5 ANTENNA DETAIL**

SCALE	11"x17" : NTS	2
	24"x36" : NTS	



INSTALL (1) NEW BATTERY STRING IN EXISTING BBU IN EMPTY BAY



**2.5 EQUIP. IN EXISTING CABINET**

SCALE	11"x17" : NTS	3
	24"x36" : NTS	

**EXISTING BBU CABINET**

SCALE	11"x17" : NTS	4
	24"x36" : NTS	

**JUNCTION BOX PENETRATION**

SCALE	11"x17" : NTS	5
	24"x36" : NTS	



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 TOMS RIVER, NJ 08755  
 (732) 678-0155

ENGINEER'S LICENSE

**MICHAEL L. BOHLINGER**



ASDG PROJECT No: ASDGSP25

CLIENT ID No: CT54XC787

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE: EQUIPMENT SPECIFICATIONS

MICHAEL L. BOHLINGER CT LICENSE No. 20405	DATE: 3-3-14
	PROJECT No: ASDGSP25
	DRAWING BY: CD
	CHK. BY:
	DWG No: A-7

24"x36" SHEETS - SIGN & SEAL AREA

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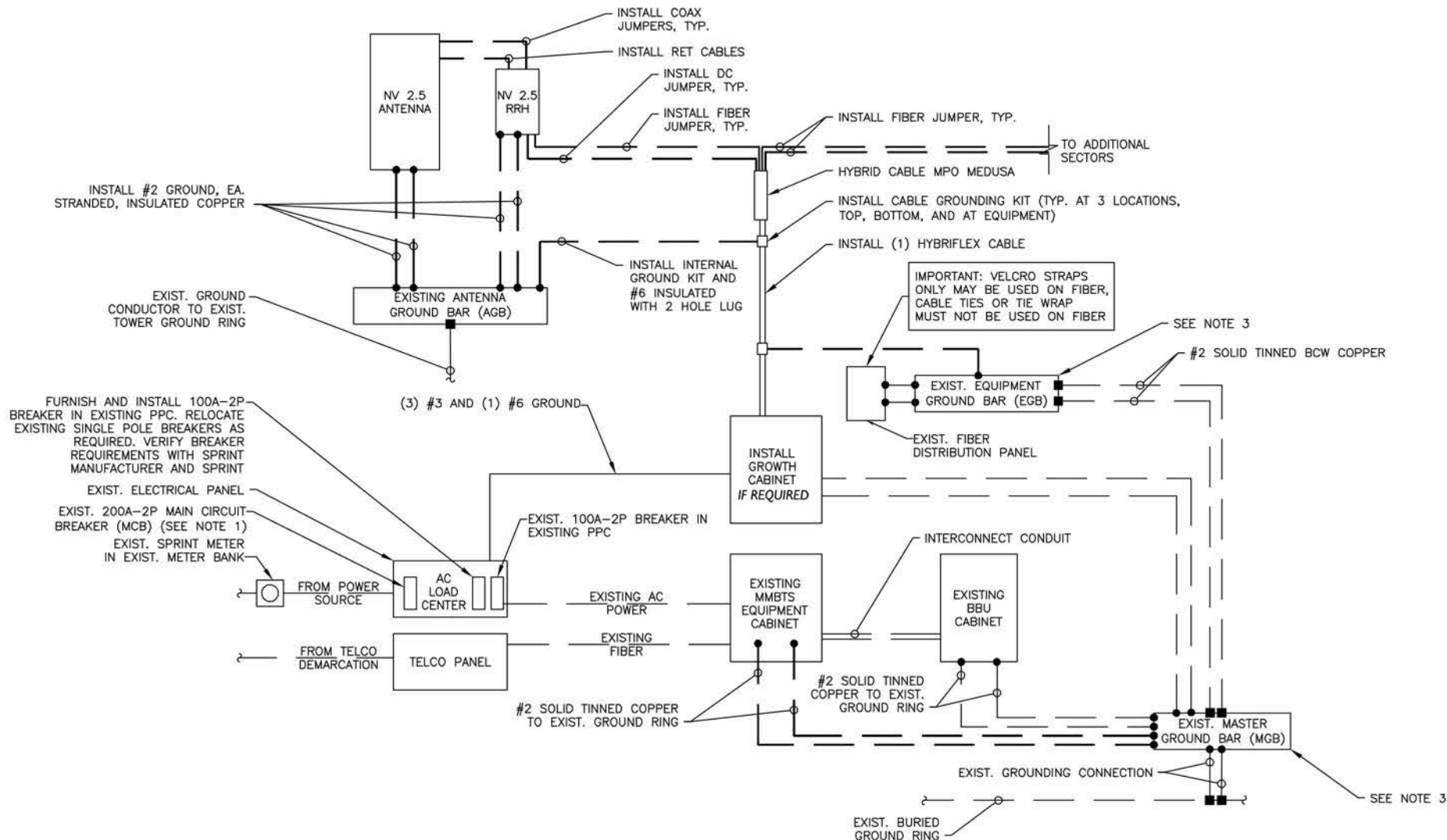


- SPECIAL WORK NOTE:**
- G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0"
  - G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMETS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING FOR A 100-AMP, 240V CIRCUIT.
  - FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):  
-ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12  
-SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12

**NOTE:**  
MAXIMUM LENGTH OF LIQUID TIGHT CONDUIT IS TO BE 6 FEET

**SYMBOL LEGEND**

- (X) SPECIAL WORK NOTE
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- CABLE GROUNDING KIT



**ELECTRICAL NOTES**

- ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
- ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
- ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
- GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.
- ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
- GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
- ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
- BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
- ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
- RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARICATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
- RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARICATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
- FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
- COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.

- NOTES:**
- SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.
  - STRUCTURAL ANALYSIS TO BE COMPLETED BY OTHERS.



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**ENGINEER'S LICENSE**

**MICHAEL L. BOHLINGER**



**PROFESSIONAL ENGINEER**  
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: **ASDGSP25**

CLIENT ID No: **CT54XC787**

DESIGN TYPE: **2.5 GHz**

SITE INFORMATION:  
**WINDSOR LOCKS / AT&T**  
99 DAY HILL ROAD  
WINDSOR, CT 06095

DRAWING TITLE:  
**ONE-LINE DIAGRAM**

MICHAEL L. BOHLINGER  
CT LICENSE No. 20405

DATE: 3-3-14  
PROJECT No: ASDGSP25  
DRAWING BY: CD  
CHK BY:  
DWG No: **E-1**

**ELECTRICAL ONE-LINE DIAGRAM**

SCALE: 11"x17" : NTS  
24"x36" : NTS

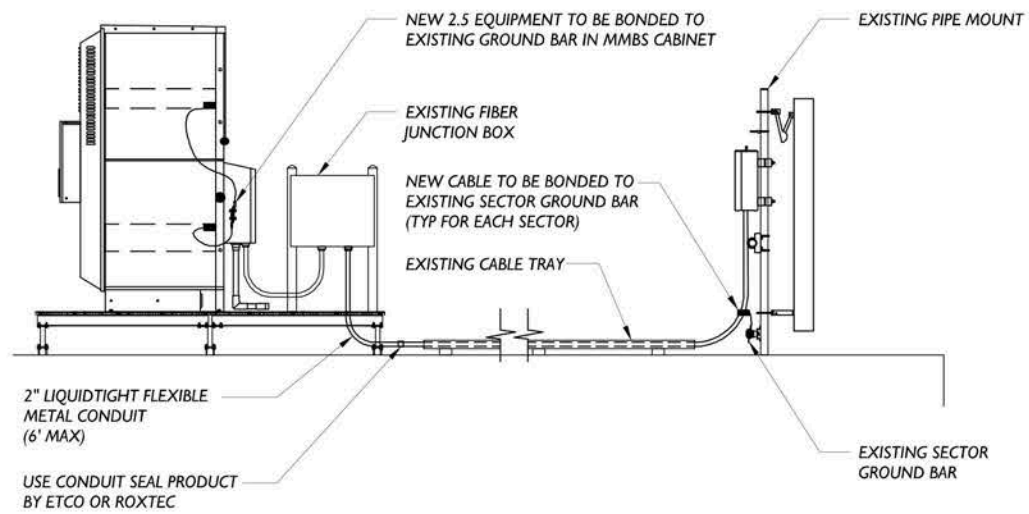
1

**ELECTRICAL NOTES**

SCALE: 11"x17" : NTS  
24"x36" : NTS

2

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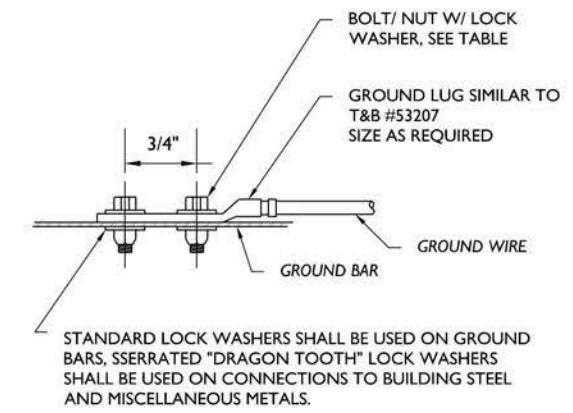


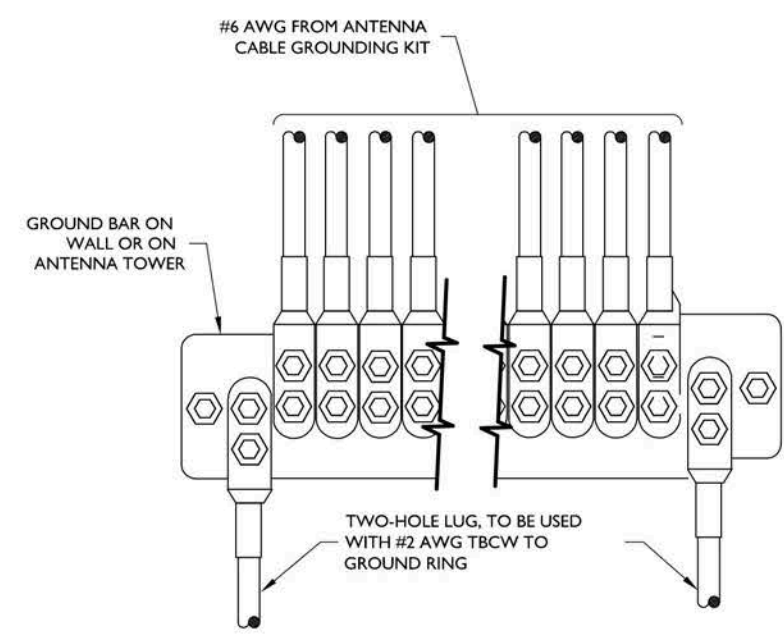
TABLE		
WIRE SIZE	LUG #	BOLT SIZE
#4/0	53212	1/2" - 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#2	53207	1/4" - 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#6	53205	

TYPICAL EQUIPMENT GROUNDING SCHEMATIC

SCALE 11"x17" : NTS  
24"x36" : NTS

GROUND LUG CONNECTION

SCALE 11"x17" : NTS  
24"x36" : NTS



NOTE CONTRACTOR TO UTILIZE KOPR-SHIELD (THOMAS & BETTS) ON ALL LUG CONNECTIONS

GROUND LUG CONNECTION TO GROUND BAR

SCALE 11"x17" : NTS  
24"x36" : NTS

**Sprint**

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 OVERLAND PARK, KANSAS 66251  
 (517) 436-7466

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ENGINEER'S LICENSE  
**MICHAEL L. BOHLINGER**  
 PROFESSIONAL ENGINEER  
 CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP25  
 CLIENT ID No: CT54XC787  
 DESIGN TYPE: 2.5 GHz  
 SITE INFORMATION:  
 WINDSOR LOCKS / AT&T  
 99 DAY HILL ROAD  
 WINDSOR, CT 06095

DRAWING TITLE  
**GROUNDING DETAILS**

MICHAEL L. BOHLINGER  
 CT LICENSE No. 20405

DATE: 3-3-14  
 PROJECT No: ASDGSP25  
 DRAWING BY: CD  
 CHK BY:  
 DWG No: **G-1**

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Date: August 11, 2017

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



Crown Castle  
2000 Corporate Drive  
Canonsburg, PA 15317  
(724) 416-2000

**Subject:** Structural Analysis Report

**Carrier Designation:** Sprint PCS Co-Locate  
**Carrier Site Number:** CT54XC787  
**Carrier Site Name:** CT54XC787

**Crown Castle Designation:** Crown Castle BU Number: 842875  
Crown Castle Site Name: WINDSOR DAY HILL  
Crown Castle JDE Job Number: 450836  
Crown Castle Work Order Number: 1436553  
Crown Castle Application Number: 399495 Rev. 1

**Engineering Firm Designation:** Crown Castle Project Number: 1436553

**Site Data:** 99 DAY HILL ROAD, WINDSOR, Hartford County, CT  
Latitude 41° 52' 16.1", Longitude -72° 40' 16"  
168 Foot - Monopole Tower

Dear Charles McGuirt,

Crown Castle is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1436553, in accordance with application 399495, revision 1.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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

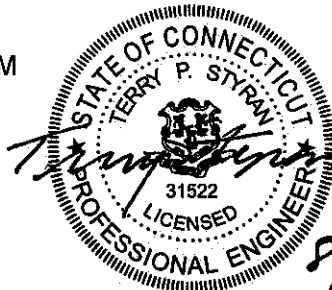
We at Crown Castle appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: Carol Ng / SM

Respectfully submitted by:

Terry P. Styran, P.E.  
Senior Project Engineer

tnxTower Report - version 7.0.5.1



8/11/2017

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### 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

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3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Table 6 – Tower Component Stresses vs. Capacity – LC7

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 168 ft Monopole tower designed by SUMMIT MANUFACTURING in November of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 1 inch ice thickness and 60 mph under service loads, exposure category C.

**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
130.0	131.0	3	alcatel lucent	TD-RRH8x20-25	3 1	5/16 1/2	-
		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	
168.0	169.0	1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe	-	-	2	
		2	quintel technology	QS66512-2 w/ Mount Pipe				
		1	raycap	DC6-48-60-18-8F				
	168.0	168.0	3	cci antennas	DTMABP7819VG12A	2 4 12 2 1	3/8 3/4 1-5/8 Conduit 7/8	1
			2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
			3	kathrein	800 10121 w/ Mount Pipe			
			3	ericsson	RRUS 11			
			1	raycap	DC6-48-60-18-8F			
			1	tower mounts	Platform Mount [LP 1201-1]			
			1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe			
			6	cci antennas	TPX-070821			
			6	kathrein	860 10025			
			3	ericsson	RRUS 32			
			3	ericsson	RRUS 32 B2			
			3	ericsson	RRUS 32 B66			
159.0	164.0	2	andrew	VHLP2.5-11	6	5/16	1	
		1	dragonwave	Horizon Compact				
	160.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe				
		3	samsung telecommunications	RRH-2WB				



Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	159.0	1	tower mounts	Platform Mount [LP 1201-1]			
	156.0	1	andrew	VHLP2.5-11			
		2	dragonwave	Horizon Compact			
		1	rosenberger leoni	FB-15-ABOX			
147.0	147.0	1	andrew	VHLPX2-11	1	3/8	1
143.0	143.0	1	pctel	MPRD2449	1	1/4	1
		1	kathrein	782 10876			
140.0	140.0	1	ericsson	RIU	1	1/4	1
		1	motorola	PTP400 w/ Mount Pipe			
		1	tower mounts	Side Arm Mount [SO 102-3]			
135.0	144.0	2	decibel	ASP 705K	2	7/8	1
	135.0	2	tower mounts	Side Arm Mount [SO 702-1]			
131.0	131.0	3	alcatel lucent	1900MHz RRH	-	-	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
	130.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
130.0	131.0	3	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe	2	1-1/4	1
	130.0	1	tower mounts	Platform Mount [LP 1201-1]			
		-	-	-	-	1	1-1/4
120.0	120.0	3	rfs celwave	APL199016-42T0	6	1-5/8	4
		1	tower mounts	Pipe Mount [PM 602-3]			
79.0	79.0	2	tower mounts	Side Arm Mount [SO 901-1]	-	-	4
52.0	52.0	1	pctel	GPS-TMG-HR-26NCM	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:  
 1) Existing Equipment  
 2) Reserved Equipment  
 3) Equipment To Be Removed; not considered in this analysis  
 4) Abandoned Equipment; considered in this analysis

**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
168.0	168.0	12	allgon	7184.14	-	-
163.0	163.0	12	swedcom	ALP-9212-N	-	-
148.0	148.0	12	swedcom	ALP-9212-N	-	-
133.0	133.0	12	swedcom	ALP-9212-N	-	-
118.0	118.0	12	swedcom	ALP-9212-N	-	-
103.0	103.0	12	swedcom	ALP-9212-N	-	-

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing, LLC	4529456	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing, LLC	4589719	CCISITES

#### 3.1) Analysis Method

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

#### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	168 - 119.25	Pole	TP34.288x24x0.25	1	-15.87	1794.53	54.7	Pass
L2	119.25 - 78.5	Pole	TP42.387x32.8911x0.2813	2	-23.79	2407.42	84.8	Pass
L3	78.5 - 38.75	Pole	TP50.213x40.7166x0.375	3	-35.32	3975.05	73.5	Pass
L4	38.75 - 0	Pole	TP57.64x48.1441x0.375	4	-50.85	4395.43	86.7	Pass
							Summary	
						Pole (L4)	86.7	Pass
						Rating =	86.7	Pass



**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	81.6	Pass
1	Base Plate	0	59.3	Pass
1	Base Foundation Structure	0	67.4	Pass
1	Base Foundation Soil Interaction	0	29.7	Pass

<b>Structure Rating (max from all components) =</b>	<b>86.7%</b>
-----------------------------------------------------	--------------

Notes:

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

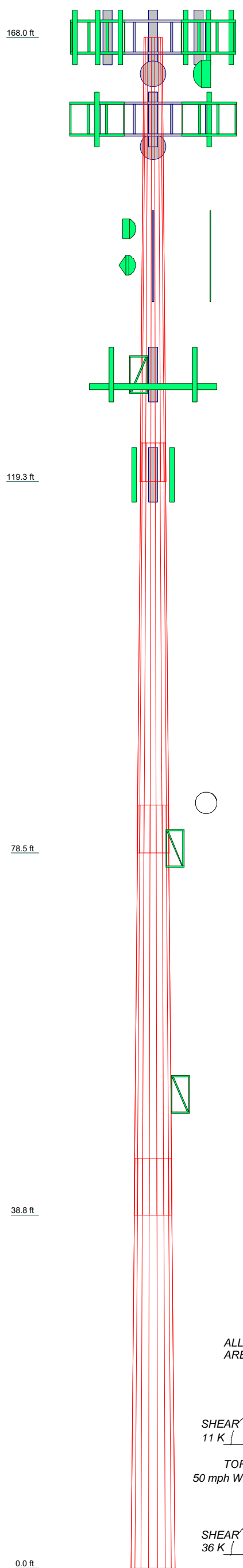
#### 4.1) Recommendations

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

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



Section	1	2	3	4
Length (ft)	48.75	45.00	45.00	45.00
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.2813	0.3750	0.3750
Socket Length (ft)	4.25	5.25	6.25	48.1441
Top Dia (in)	24.0000	32.8911	40.7166	57.6400
Bot Dia (in)	34.2880	42.3870	50.2130	57.6400
Grade		A607-65		
Weight (K)	3.8	5.1	8.2	9.6



**DESIGNED APPURTENANCE LOADING**

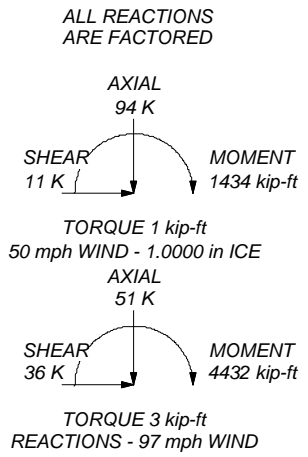
TYPE	ELEVATION	TYPE	ELEVATION
800 10121 w/ Mount Pipe	168	782 10876	147
800 10121 w/ Mount Pipe	168	Pipe Mount [PM 602-1]	147
800 10121 w/ Mount Pipe	168	VHLPX2-11	147
OPA-65R-LCUU-H8 w/ Mount Pipe	168	782 10876	143
OPA-65R-LCUU-H6 w/ Mount Pipe	168	MPRD2449	143
DTMABP7819VG12A	168	PTP400 w/ Mount Pipe	140
DTMABP7819VG12A	168	RIU	140
DTMABP7819VG12A	168	Side Arm Mount [SO 102-3]	140
RRUS 11	168	Side Arm Mount [SO 702-1]	135
RRUS 11	168	Side Arm Mount [SO 702-1]	135
RRUS 11	168	ASP 705K	135
DC6-48-60-18-8F	168	ASP 705K	135
DC6-48-60-18-8F	168	800MHz 2X50W RRH W/FILTER	131
QS66512-2 w/ Mount Pipe	168	6' x 2" mount pipe	131
QS66512-2 w/ Mount Pipe	168	6' x 2" mount pipe	131
OPA-65R-LCUU-H8 w/ Mount Pipe	168	6' x 2" mount pipe	131
TPA-65R-LCUUU-H8 w/ Mount Pipe	168	Side Arm Mount [SO 102-3]	131
(2) 860 10025	168	1900MHz RRH	131
(2) 860 10025	168	1900MHz RRH	131
(2) 860 10025	168	800MHz 2X50W RRH W/FILTER	131
(3) TPX-070821	168	1900MHz RRH	131
TPX-070821	168	800MHz 2X50W RRH W/FILTER	131
(2) TPX-070821	168	APXVTM14-C-120 w/ Mount Pipe	130
RRUS 32 B66	168	TD-RRH8x20-25	130
(2) RRUS 32 B66	168	TD-RRH8x20-25	130
RRUS 32	168	TD-RRH8x20-25	130
(2) RRUS 32	168	(2) 6' x 2" mount pipe	130
RRUS 32 B2	168	(2) 6' x 2" mount pipe	130
(2) RRUS 32 B2	168	(2) 6' x 2" mount pipe	130
5' horizontal 3"x3" sq. tube mount	168	14' Horizontal HSS 3x3x1/4 Tube	130
5' horizontal 3"x3" sq. tube mount	168	14' Horizontal HSS 3x3x1/4 Tube	130
5' horizontal 3"x3" sq. tube mount	168	14' Horizontal HSS 3x3x1/4 Tube	130
4" x 2" Mount Pipe	168	(2) 4' Horizontal L3"x3" Angle Mount	130
4" x 2" Mount Pipe	168	(2) 4' Horizontal L3"x3" Angle Mount	130
4" x 2" Mount Pipe	168	(2) 4' Horizontal L3"x3" Angle Mount	130
Platform Mount [LP 1201-1]	168	Platform Mount [LP 1201-1]	130
LLPX310R-V1 w/ Mount Pipe	159	APXV9ERR18-C-A20 w/ Mount Pipe	130
LLPX310R-V1 w/ Mount Pipe	159	APXV9ERR18-C-A20 w/ Mount Pipe	130
LLPX310R-V1 w/ Mount Pipe	159	APXV9ERR18-C-A20 w/ Mount Pipe	130
(2) Horizon Compact	159	APXVTM14-C-120 w/ Mount Pipe	130
Horizon Compact	159	APXVTM14-C-120 w/ Mount Pipe	130
FB-15-ABOX	159	APL199016-42T0	120
RRH-2WB	159	APL199016-42T0	120
RRH-2WB	159	APL199016-42T0	120
RRH-2WB	159	Pipe Mount [PM 602-3]	120
(3) 6' x 2" mount pipe	159	1' x 2-1/2"	79
(3) 6' x 2" mount pipe	159	Side Arm Mount [SO 901-1]	79
(3) 6' x 2" mount pipe	159	Side Arm Mount [SO 901-1]	79
Platform Mount [LP 1201-1]	159	1' x 2-1/2"	79
VHLP2.5-11	159	2' x 2" Pipe Mount	52
VHLP2.5-11	159	GPS-TMG-HR-26NCM	52
VHLP2.5-11	159	Side Arm Mount [SO 701-1]	52

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 86.7%



<p><b>CROWN CASTLE</b> The foundation for a Wireless World</p>	<p><b>Crown Castle</b> 2000 Corporate Drive Canonburg, PA 15317 Phone: 724-416-2000 FAX:</p>		<p>Job: <b>BU# 842875</b></p>
	<p>Client: Crown Castle</p>	<p>Drawn by: SMandal</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 08/11/17</p>	<p>Scale: NTS</p>
	<p>Path: R:\ISA Models - Letters\Work Area\CN\WIP\842875 WO 1436553\QA-SM\842875.dwg</p>	<p>Dwg No. E-1</p>	

## Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- 1) Tower is located in Hartford County, Connecticut.
- 2) Basic wind speed of 97 mph.
- 3) Structure Class II.
- 4) Exposure Category C.
- 5) Topographic Category 1.
- 6) Crest Height 0.00 ft.
- 7) Nominal ice thickness of 1.0000 in.
- 8) Ice thickness is considered to increase with height.
- 9) Ice density of 56 pcf.
- 10) A wind speed of 50 mph is used in combination with ice.
- 11) Temperature drop of 50 °F.
- 12) Deflections calculated using a wind speed of 60 mph.
- 13) A non-linear (P-delta) analysis was used.
- 14) Pressures are calculated at each section.
- 15) Stress ratio used in pole design is 1.
- 16) 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) SR Members Have Cut Ends SR Members Are Concentric	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  Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line 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 Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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## Tapered Pole Section Geometry

Section	Elevation <i>ft</i>	Section Length <i>ft</i>	Splice Length <i>ft</i>	Number of Sides	Top Diameter <i>in</i>	Bottom Diameter <i>in</i>	Wall Thickness <i>in</i>	Bend Radius <i>in</i>	Pole Grade
L1	168.00-119.25	48.75	4.25	18	24.0000	34.2880	0.2500	1.0000	A607-65 (65 ksi)
L2	119.25-78.50	45.00	5.25	18	32.8911	42.3870	0.2813	1.1250	A607-65 (65 ksi)
L3	78.50-38.75	45.00	6.25	18	40.7166	50.2130	0.3750	1.5000	A607-65 (65 ksi)
L4	38.75-0.00	45.00		18	48.1441	57.6400	0.3750	1.5000	A607-65 (65 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>	I/Q in <sup>2</sup>	w in	w/t
L1	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	34.8169	27.0092	3953.4521	12.0835	17.4183	226.9711	7912.1063	13.5071	5.5947	22.379
L2	34.3092	29.1104	3910.9585	11.5765	16.7087	234.0675	7827.0631	14.5580	5.2938	18.823
	43.0409	37.5873	8419.0120	14.9475	21.5326	390.9892	16849.101	18.7972	6.9651	24.765
L3	42.4698	48.0166	9872.7114	14.3213	20.6841	477.3102	19758.413	24.0129	6.5061	17.35
	50.9876	59.3197	18614.760	17.6925	25.5082	729.7558	37254.015	29.6655	8.1775	21.807
L4	50.2260	56.8571	16391.389	16.9580	24.4572	670.2076	32804.347	28.4340	7.8134	20.836
	58.5292	68.1597	28238.617	20.3291	29.2811	964.3968	56514.392	34.0863	9.4846	25.292

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor Ar	Adjust. Factor Ar	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 168.00-119.25				1	1	1			
L2 119.25-78.50				1	1	1			
L3 78.50-38.75				1	1	1			
L4 38.75-0.00				1	1	1			

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

Description	Sector	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				in	in	plf
*** 52 *** LDF4-50A(1/2)	C	Surface Ar (CaAa)	52.00 - 0.00	1	1	0.180 0.182	0.6300		0.15
***									

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

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	CaAa	Weight
				ft		ft <sup>2</sup> /ft	plf
*** 168 *** LDF7-50A(1-5/8)	C	No	Inside Pole	168.00 - 0.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
FB-L98B-034-XXXXXX(3/8)	C	No	Inside Pole	168.00 - 0.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	168.00 - 0.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
2" Rigid Conduit	C	No	Inside Pole	168.00 - 0.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
LDF5-50A(7/8)	C	No	Inside Pole	168.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>AA</sub>		Weight
						ft <sup>2</sup> /ft	plf	
						1" Ice	0.00	0.33
*** 159 *** ATCB-B01-003(5/16)	B	No	Inside Pole	159.00 - 0.00	6	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
*** 147 *** LDF2-50(3/8)	C	No	Inside Pole	147.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
*** 143 *** LDF1-50A(1/4)	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
*** 140 *** CAT5e(1/4)	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	0.04
						1/2" Ice	0.00	0.04
						1" Ice	0.00	0.04
*** 135 *** LDF5-50A(7/8)	C	No	Inside Pole	135.00 - 0.00	2	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
*** 130 *** HB114-13U3M12-XXXF(1-1/4)	B	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	0.99
						1/2" Ice	0.00	0.99
						1" Ice	0.00	0.99
ATCB-B01-006(5/16)	C	No	Inside Pole	130.00 - 0.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
HYBRIFLEX RRH 1-SECTOR(1/2)	C	No	Inside Pole	130.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
*** 120 *** LDF7-50A(1-5/8)	C	No	Inside Pole	120.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
***								

### Feed Line/Linear Appurtenances Section Areas

Tower Section	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
L1	168.00-119.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.91
L2	119.25-78.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.99
L3	78.50-38.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.835	0.000	0.97
L4	38.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.09
		C	0.000	0.000	2.441	0.000	0.95

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

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>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	168.00-119.25	A	2.315	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.91



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
L2	119.25-78.50	A	2.231	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.99
L3	78.50-38.75	A	2.117	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	6.746	0.000	1.07
L4	38.75-0.00	A	1.898	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.09
		C		0.000	0.000	18.851	0.000	1.22

### 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	168.00-119.25	0.0000	0.0000	0.0000	0.0000
L2	119.25-78.50	0.0000	0.0000	0.0000	0.0000
L3	78.50-38.75	-0.0123	0.0308	-0.0875	0.2197
L4	38.75-0.00	-0.0344	0.0863	-0.2270	0.5699

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L2	26	LDF4-50A(1/2)	78.50 - 52.00	1.0000	1.0000
L3	26	LDF4-50A(1/2)	38.75 - 52.00	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	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	
*** 168 ***									
800 10121 w/ Mount Pipe	A	From Leg	4.00	0.0000	168.00	No Ice	5.39	4.60	0.07
			0.00			1/2" Ice	5.81	5.35	0.11
			0.00			1" Ice	6.23	6.05	0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00	0.0000	168.00	No Ice	5.39	4.60	0.07
			0.00			1/2" Ice	5.81	5.35	0.11
			0.00			1" Ice	6.23	6.05	0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00	0.0000	168.00	No Ice	5.39	4.60	0.07
			0.00			1/2" Ice	5.81	5.35	0.11
			0.00			1" Ice	6.23	6.05	0.17
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	168.00	No Ice	9.90	7.18	0.10
			0.00			1/2" Ice	10.47	8.36	0.18
			0.00			1" Ice	11.01	9.26	0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	168.00	No Ice	9.90	7.18	0.10
			0.00			1/2" Ice	10.47	8.36	0.18
			0.00			1" Ice	11.01	9.26	0.26

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
DTMABP7819VG12A	A	From Leg	4.00	0.0000	168.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
DTMABP7819VG12A	B	From Leg	4.00	0.0000	168.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
DTMABP7819VG12A	C	From Leg	4.00	0.0000	168.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			0.00			Ice	1.23	0.51	0.04
RRUS 11	A	From Leg	4.00	0.0000	168.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			0.00			Ice	3.21	1.49	0.09
RRUS 11	B	From Leg	4.00	0.0000	168.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			0.00			Ice	3.21	1.49	0.09
RRUS 11	C	From Leg	4.00	0.0000	168.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			0.00			Ice	3.21	1.49	0.09
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	168.00	No Ice	0.79	0.79	0.02
			0.00			1/2"	1.27	1.27	0.04
			0.00			Ice	1.45	1.45	0.05
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	168.00	No Ice	0.79	0.79	0.02
			0.00			1/2"	1.27	1.27	0.04
			1.00			Ice	1.45	1.45	0.05
QS66512-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	168.00	No Ice	8.37	8.46	0.14
			0.00			1/2"	8.93	9.66	0.21
			1.00			Ice	9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	168.00	No Ice	8.37	8.46	0.14
			0.00			1/2"	8.93	9.66	0.21
			1.00			Ice	9.46	10.55	0.30
OPA-65R-LCUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.0000	168.00	No Ice	12.98	9.32	0.12
			0.00			1/2"	13.67	10.79	0.21
			0.00			Ice	14.36	12.24	0.32
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.0000	168.00	No Ice	13.54	10.96	0.11
			0.00			1/2"	14.24	12.49	0.22
			1.00			Ice	14.95	14.04	0.33
(2) 860 10025	A	From Leg	4.00	0.0000	168.00	No Ice	0.14	0.12	0.00
			0.00			1/2"	0.20	0.17	0.00
			0.00			Ice	0.26	0.23	0.01
(2) 860 10025	B	From Leg	4.00	0.0000	168.00	No Ice	0.14	0.12	0.00
			0.00			1/2"	0.20	0.17	0.00
			0.00			Ice	0.26	0.23	0.01
(2) 860 10025	C	From Leg	4.00	0.0000	168.00	No Ice	0.14	0.12	0.00
			0.00			1/2"	0.20	0.17	0.00
			0.00			Ice	0.26	0.23	0.01
(3) TPX-070821	A	From Leg	4.00	0.0000	168.00	No Ice	0.47	0.10	0.01
			0.00			1/2"	0.56	0.15	0.01
			0.00			Ice	0.66	0.20	0.02
TPX-070821	B	From Leg	4.00	0.0000	168.00	No Ice	0.47	0.10	0.01



Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
			0.00			1/2"	0.56	0.15	0.01
			0.00			Ice	0.66	0.20	0.02
(2) TPX-070821	C	From Leg	4.00		0.0000	168.00	No Ice	0.47	0.10
			0.00			1/2"	0.56	0.15	0.01
			0.00			Ice	0.66	0.20	0.02
						1" Ice			
RRUS 32 B66	A	From Leg	4.00		0.0000	168.00	No Ice	2.74	1.67
			0.00			1/2"	2.96	1.86	0.07
			0.00			Ice	3.19	2.05	0.10
						1" Ice			
(2) RRUS 32 B66	C	From Leg	4.00		0.0000	168.00	No Ice	2.74	1.67
			0.00			1/2"	2.96	1.86	0.07
			0.00			Ice	3.19	2.05	0.10
						1" Ice			
RRUS 32	A	From Leg	4.00		0.0000	168.00	No Ice	2.86	1.78
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
(2) RRUS 32	C	From Leg	4.00		0.0000	168.00	No Ice	2.86	1.78
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	4.00		0.0000	168.00	No Ice	2.73	1.67
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
(2) RRUS 32 B2	C	From Leg	4.00		0.0000	168.00	No Ice	2.73	1.67
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
5' horizontal 3"x3" sq. tube mount	A	From Leg	4.00		0.0000	168.00	No Ice	1.50	0.07
			0.00			1/2"	1.85	0.11	0.09
			2.00			Ice	2.21	0.16	0.11
						1" Ice			
5' horizontal 3"x3" sq. tube mount	B	From Leg	4.00		0.0000	168.00	No Ice	1.50	0.07
			0.00			1/2"	1.85	0.11	0.09
			2.00			Ice	2.21	0.16	0.11
						1" Ice			
5' horizontal 3"x3" sq. tube mount	C	From Leg	4.00		0.0000	168.00	No Ice	1.50	0.07
			0.00			1/2"	1.85	0.11	0.09
			2.00			Ice	2.21	0.16	0.11
						1" Ice			
4" x 2' Mount Pipe	A	From Leg	4.00		0.0000	168.00	No Ice	0.53	0.53
			0.00			1/2"	0.69	0.69	0.03
			0.00			Ice	0.87	0.87	0.03
						1" Ice			
4" x 2' Mount Pipe	B	From Leg	4.00		0.0000	168.00	No Ice	0.53	0.53
			0.00			1/2"	0.69	0.69	0.03
			0.00			Ice	0.87	0.87	0.03
						1" Ice			
4" x 2' Mount Pipe	C	From Leg	4.00		0.0000	168.00	No Ice	0.53	0.53
			0.00			1/2"	0.69	0.69	0.03
			0.00			Ice	0.87	0.87	0.03
						1" Ice			
Platform Mount [LP 1201-1]	C	None			0.0000	168.00	No Ice	23.10	23.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice			
*** 159 ***									
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00		0.0000	159.00	No Ice	4.54	2.98
			0.00			1/2"	4.89	3.53	0.08
			1.00			Ice	5.25	4.09	0.13
						1" Ice			
LLPX310R-V1 w/ Mount	B	From Leg	4.00		0.0000	159.00	No Ice	4.54	2.98

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
Pipe			0.00 1.00			1/2" Ice 5.25	3.53 4.09	0.08 0.13
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 5.25	2.98 3.53 4.09	0.05 0.08 0.13
(2) Horizon Compact	A	From Leg	4.00 0.00 -3.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 0.94	0.37 0.45 0.54	0.01 0.02 0.03
Horizon Compact	B	From Leg	4.00 0.00 5.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 0.94	0.37 0.45 0.54	0.01 0.02 0.03
FB-15-ABOX	A	From Leg	4.00 0.00 -3.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 3.11	0.51 0.63 0.75	0.01 0.03 0.04
RRH-2WB	A	From Leg	4.00 0.00 1.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 2.69	0.78 0.92 1.06	0.04 0.06 0.08
RRH-2WB	B	From Leg	4.00 0.00 1.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 2.69	0.78 0.92 1.06	0.04 0.06 0.08
RRH-2WB	C	From Leg	4.00 0.00 1.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 2.69	0.78 0.92 1.06	0.04 0.06 0.08
(3) 6' x 2" mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 2.29	1.43 1.43 1.92 2.29	0.02 0.03 0.05
(3) 6' x 2" mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 2.29	1.43 1.43 1.92 2.29	0.02 0.03 0.05
(3) 6' x 2" mount pipe	C	From Leg	4.00 0.00 0.00	0.0000	159.00	1" Ice No Ice 1/2" Ice 2.29	1.43 1.43 1.92 2.29	0.02 0.03 0.05
Platform Mount [LP 1201-1]	C	None		0.0000	159.00	1" Ice No Ice 1/2" Ice 30.50	23.10 23.10 26.80 30.50	2.10 2.50 2.90
*** 147 *** 782 10876	C	From Leg	1.00 0.00 0.00	0.0000	147.00	1" Ice No Ice 1/2" Ice 0.80	0.23 0.31 0.39	0.01 0.01 0.02
Pipe Mount [PM 602-1]	C	From Leg	0.50 0.00 0.00	0.0000	147.00	1" Ice No Ice 1/2" Ice 7.75	1.58 1.95 2.32	0.09 0.12 0.14
*** 143 *** 782 10876	C	From Leg	1.00 0.00 0.00	0.0000	143.00	1" Ice No Ice 1/2" Ice 0.80	0.23 0.31 0.39	0.01 0.01 0.02
*** 140 *** PTP400 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 2.40	0.87 1.11 1.37	0.02 0.04 0.06



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
RIU	B	From Leg	1.00 0.00 0.00	0.0000	140.00	1" Ice No Ice 1/2" Ice	0.16 0.21 0.27	0.12 0.16 0.22	0.00 0.00 0.01
Side Arm Mount [SO 102-3]	B	None		0.0000	140.00	1" Ice No Ice 1/2" Ice	3.00 3.48 3.96	3.00 3.48 3.96	0.08 0.11 0.14
*** 135 *** ASP 705K	A	From Leg	6.00 0.00 9.00	0.0000	135.00	1" Ice No Ice 1/2" Ice	5.50 7.37 9.25	5.50 7.37 9.25	0.02 0.06 0.11
ASP 705K	B	From Leg	6.00 0.00 9.00	0.0000	135.00	1" Ice No Ice 1/2" Ice	5.50 7.37 9.25	5.50 7.37 9.25	0.02 0.06 0.11
Side Arm Mount [SO 702-1]	A	None		0.0000	135.00	1" Ice No Ice 1/2" Ice	1.00 1.25 1.50	1.43 2.05 2.67	0.03 0.04 0.05
Side Arm Mount [SO 702-1]	B	None		0.0000	135.00	1" Ice No Ice 1/2" Ice	1.00 1.25 1.50	1.43 2.05 2.67	0.03 0.04 0.05
***131*** 1900MHz RRH	A	From Leg	1.00 0.00 0.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	B	From Leg	1.00 0.00 0.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	C	From Leg	1.00 0.00 0.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 -1.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 -1.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 -1.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
6' x 2" mount pipe	A	From Leg	0.50 0.00 0.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" mount pipe	B	From Leg	0.50 0.00 0.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" mount pipe	C	From Leg	0.50 0.00 0.00	0.0000	131.00	1" Ice No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Side Arm Mount [SO 102-3]	C	From Leg	0.50 0.00	0.0000	131.00	1" Ice No Ice 1/2"	3.00 3.48	3.00 3.48	0.08 0.11

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
			0.00			Ice 1" Ice	3.96	3.96	0.14
*** 130 ***									
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
APXV9ERR18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.07 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.07 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.07 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
(2) 6' x 2" mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
(2) 6' x 2" mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
(2) 6' x 2" mount pipe	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
14' Horizontal HSS 3x3x1/4 Tube	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	4.20 5.15 6.11	0.07 0.11 0.16	0.12 0.16 0.21
14' Horizontal HSS 3x3x1/4 Tube	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	4.20 5.15 6.11	0.07 0.11 0.16	0.12 0.16 0.21
14' Horizontal HSS 3x3x1/4 Tube	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	4.20 5.15 6.11	0.07 0.11 0.16	0.12 0.16 0.21
(2) 4' Horizontal L3"x3" Angle Mount	A	From Leg	4.00 0.00	0.0000	130.00	No Ice 1/2"	1.70 1.99	0.09 0.16	0.01 0.01

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	ft <sup>2</sup>	ft <sup>2</sup>	K	
				0.00						
(2) 4' Horizontal L3"x3" Angle Mount	B	From Leg		4.00	0.0000	130.00	Ice	2.30	0.22	0.01
				0.00			1" Ice	1.70	0.09	0.01
				0.00			No Ice	1.99	0.16	0.01
				0.00			1/2"	2.30	0.22	0.01
(2) 4' Horizontal L3"x3" Angle Mount	C	From Leg		4.00	0.0000	130.00	Ice	2.30	0.22	0.01
				0.00			1" Ice	1.70	0.09	0.01
				0.00			No Ice	1.99	0.16	0.01
				0.00			1/2"	2.30	0.22	0.01
Platform Mount [LP 1201-1]	C	None			0.0000	130.00	Ice	23.10	23.10	2.10
							No Ice	26.80	26.80	2.50
							1/2"	30.50	30.50	2.90
							Ice			
*** 120 ***										
APL199016-42T0	A	From Leg		1.00	0.0000	120.00	1" Ice	4.12	3.53	0.01
				0.00			No Ice	4.56	3.97	0.03
				0.00			1/2"	5.01	4.41	0.06
				0.00			Ice			
APL199016-42T0	B	From Leg		1.00	0.0000	120.00	1" Ice	4.12	3.53	0.01
				0.00			No Ice	4.56	3.97	0.03
				0.00			1/2"	5.01	4.41	0.06
				0.00			Ice			
APL199016-42T0	C	From Leg		1.00	0.0000	120.00	1" Ice	4.12	3.53	0.01
				0.00			No Ice	4.56	3.97	0.03
				0.00			1/2"	5.01	4.41	0.06
				0.00			Ice			
Pipe Mount [PM 602-3]	C	None			0.0000	120.00	1" Ice	7.68	7.68	0.28
							No Ice	9.50	9.50	0.35
							1/2"	11.32	11.32	0.43
							Ice			
*** 79 ***										
1' x 2-1/2"	A	From Leg		2.00	0.0000	79.00	1" Ice	0.16	0.16	0.03
				0.00			No Ice	0.23	0.23	0.03
				0.00			1/2"	0.31	0.31	0.03
				0.00			Ice			
1' x 2-1/2"	B	From Leg		2.00	0.0000	79.00	1" Ice	0.16	0.16	0.03
				0.00			No Ice	0.23	0.23	0.03
				0.00			1/2"	0.31	0.31	0.03
				0.00			Ice			
Side Arm Mount [SO 901-1]	A	From Leg		1.00	0.0000	79.00	1" Ice	0.50	0.88	0.11
				0.00			No Ice	0.68	1.13	0.11
				0.00			1/2"	0.86	1.38	0.11
				0.00			Ice			
Side Arm Mount [SO 901-1]	B	From Leg		1.00	0.0000	79.00	1" Ice	0.50	0.88	0.11
				0.00			No Ice	0.68	1.13	0.11
				0.00			1/2"	0.86	1.38	0.11
				0.00			Ice			
*** 52 ***										
GPS-TMG-HR-26NCM	B	From Leg		3.00	0.0000	52.00	1" Ice	0.13	0.13	0.00
				0.00			No Ice	0.18	0.18	0.00
				0.00			1/2"	0.24	0.24	0.01
				0.00			Ice			
2' x 2" Pipe Mount	B	From Leg		3.00	0.0000	52.00	1" Ice	0.02	0.02	0.01
				0.00			No Ice	0.05	0.05	0.01
				0.00			1/2"	0.09	0.09	0.01
				0.00			Ice			
Side Arm Mount [SO 701-1]	B	From Leg		1.50	0.0000	52.00	1" Ice	0.85	1.67	0.07
				0.00			No Ice	1.14	2.34	0.08
				0.00			1/2"	1.43	3.01	0.09
				0.00			Ice			
***										



### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K	
*****											
*** 159 ***											
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 -3.00	0.0000		159.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	0.03 0.04 0.05
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 5.00	0.0000		159.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	0.03 0.04 0.05
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 5.00	0.0000		159.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	0.03 0.04 0.05
*** 147 ***											
VHLPX2-11	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	0.0000		147.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07
*** 143 ***											
MPRD2449	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		143.00	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	0.04 0.06 0.08
***											

### Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	168 - 119.25	Pole	Max Tension	26	0.00	0.00	0.00
			Max. Compression	26	-43.53	-1.06	-0.60
			Max. Mx	20	-15.91	652.21	3.18
			Max. My	14	-15.89	0.50	-655.03
			Max. Vy	8	23.21	-649.73	4.08
			Max. Vx	14	23.25	0.50	-655.03
			Max. Torque	15			3.07
L2	119.25 - 78.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.55	-1.06	-0.60
			Max. Mx	20	-23.82	1687.57	4.96
			Max. My	14	-23.81	2.43	-1692.69
			Max. Vy	8	28.12	-1685.59	11.38
			Max. Vx	14	28.16	2.43	-1692.69
			Max. Torque	15			2.82
L3	78.5 - 38.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.07	-2.06	-0.78
			Max. Mx	20	-35.34	2859.65	6.31
			Max. My	14	-35.33	4.07	-2867.41
			Max. Vy	8	32.30	-2859.57	18.85
			Max. Vx	14	32.35	4.07	-2867.41
			Max. Torque	15			3.18
L4	38.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-94.42	-1.81	-1.41
			Max. Mx	8	-50.85	-4402.90	27.79
			Max. My	14	-50.85	7.40	-4413.05
			Max. Vy	8	36.01	-4402.90	27.79
			Max. Vx	14	36.06	7.40	-4413.05
			Max. Torque	15			3.18

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	34	94.42	5.60	-9.72
	Max. H <sub>x</sub>	20	50.88	35.96	0.02
	Max. H <sub>z</sub>	2	50.88	-0.06	35.92
	Max. M <sub>x</sub>	2	4394.72	-0.06	35.92
	Max. M <sub>z</sub>	8	4402.90	-35.97	0.19

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. Torsion	15	3.18	0.07	-36.02
	Min. Vert	11	38.16	-30.95	-18.07
	Min. H <sub>x</sub>	8	50.88	-35.97	0.19
	Min. H <sub>z</sub>	14	50.88	0.07	-36.02
	Min. M <sub>x</sub>	14	-4413.05	0.07	-36.02
	Min. M <sub>z</sub>	20	-4402.39	35.96	0.02
	Min. Torsion	3	-3.01	-0.06	35.92

### 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	42.40	0.00	0.00	0.19	-0.19	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	50.88	0.06	-35.92	-4394.72	-4.07	3.00
0.9 Dead+1.6 Wind 0 deg - No Ice	38.16	0.06	-35.92	-4336.49	-4.03	3.01
1.2 Dead+1.6 Wind 30 deg - No Ice	50.88	18.07	-31.22	-3823.11	-2211.52	2.88
0.9 Dead+1.6 Wind 30 deg - No Ice	38.16	18.07	-31.22	-3772.46	-2182.16	2.88
1.2 Dead+1.6 Wind 60 deg - No Ice	50.88	31.18	-18.17	-2228.53	-3816.01	0.88
0.9 Dead+1.6 Wind 60 deg - No Ice	38.16	31.18	-18.17	-2199.01	-3765.36	0.88
1.2 Dead+1.6 Wind 90 deg - No Ice	50.88	35.97	-0.19	-27.79	-4402.90	-1.42
0.9 Dead+1.6 Wind 90 deg - No Ice	38.16	35.97	-0.19	-27.48	-4344.47	-1.43
1.2 Dead+1.6 Wind 120 deg - No Ice	50.88	30.95	18.07	2221.38	-3781.17	-1.89
0.9 Dead+1.6 Wind 120 deg - No Ice	38.16	30.95	18.07	2191.76	-3731.02	-1.91
1.2 Dead+1.6 Wind 150 deg - No Ice	50.88	17.81	31.19	3822.98	-2175.99	-2.68
0.9 Dead+1.6 Wind 150 deg - No Ice	38.16	17.81	31.19	3772.15	-2147.10	-2.70
1.2 Dead+1.6 Wind 180 deg - No Ice	50.88	-0.07	36.02	4413.05	7.40	-3.16
0.9 Dead+1.6 Wind 180 deg - No Ice	38.16	-0.07	36.02	4354.41	7.36	-3.18
1.2 Dead+1.6 Wind 210 deg - No Ice	50.88	-17.97	31.37	3850.02	2195.74	-2.84
0.9 Dead+1.6 Wind 210 deg - No Ice	38.16	-17.97	31.37	3798.83	2166.70	-2.85
1.2 Dead+1.6 Wind 240 deg - No Ice	50.88	-31.11	18.24	2240.61	3806.32	-1.11
0.9 Dead+1.6 Wind 240 deg - No Ice	38.16	-31.11	18.24	2210.78	3755.90	-1.10
1.2 Dead+1.6 Wind 270 deg - No Ice	50.88	-35.96	-0.02	-7.04	4402.39	1.39
0.9 Dead+1.6 Wind 270 deg - No Ice	38.16	-35.96	-0.02	-6.96	4344.03	1.40
1.2 Dead+1.6 Wind 300 deg - No Ice	50.88	-30.99	-17.98	-2204.58	3789.33	2.28
0.9 Dead+1.6 Wind 300 deg - No Ice	38.16	-30.99	-17.98	-2175.36	3739.12	2.30
1.2 Dead+1.6 Wind 330 deg - No Ice	50.88	-17.83	-31.07	-3802.41	2179.74	2.67
0.9 Dead+1.6 Wind 330 deg - No Ice	38.16	-17.83	-31.07	-3752.03	2150.87	2.69
1.2 Dead+1.0 Ice+1.0 Temp	94.42	0.00	0.00	1.41	-1.81	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	94.42	0.05	-11.13	-1419.36	-8.80	1.14



Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	94.42	5.62	-9.69	-1235.84	-720.31	1.03
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	94.42	9.67	-5.64	-721.01	-1237.05	0.40
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	94.42	11.14	-0.08	-10.58	-1424.08	-0.34
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	94.42	9.59	5.56	712.38	-1223.43	-0.68
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	94.42	5.50	9.64	1233.00	-702.25	-1.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	94.42	-0.05	11.15	1426.43	5.30	-1.18
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	94.42	-5.60	9.72	1244.83	712.44	-1.02
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	94.42	-9.66	5.66	726.66	1230.56	-0.46
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	94.42	-11.14	0.03	5.51	1419.64	0.34
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	94.42	-9.60	-5.54	-705.63	1221.01	0.77
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	94.42	-5.51	-9.62	-1225.30	699.00	1.02
Dead+Wind 0 deg - Service	42.40	0.01	-7.69	-933.78	-1.01	0.65
Dead+Wind 30 deg - Service	42.40	3.87	-6.68	-812.32	-470.13	0.62
Dead+Wind 60 deg - Service	42.40	6.67	-3.89	-473.45	-811.10	0.19
Dead+Wind 90 deg - Service	42.40	7.70	-0.04	-5.76	-935.81	-0.31
Dead+Wind 120 deg - Service	42.40	6.62	3.87	472.21	-803.68	-0.41
Dead+Wind 150 deg - Service	42.40	3.81	6.67	812.58	-462.57	-0.58
Dead+Wind 180 deg - Service	42.40	-0.02	7.71	938.00	1.43	-0.69
Dead+Wind 210 deg - Service	42.40	-3.85	6.71	818.36	466.50	-0.62
Dead+Wind 240 deg - Service	42.40	-6.66	3.90	476.32	808.77	-0.24
Dead+Wind 270 deg - Service	42.40	-7.69	-0.00	-1.34	935.43	0.31
Dead+Wind 300 deg - Service	42.40	-6.63	-3.85	-468.35	805.14	0.50
Dead+Wind 330 deg - Service	42.40	-3.81	-6.65	-807.90	463.08	0.59

## 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	0.00	-42.40	0.00	0.00	42.40	0.00	0.000%
2	0.06	-50.88	-35.92	-0.06	50.88	35.92	0.000%
3	0.06	-38.16	-35.92	-0.06	38.16	35.92	0.000%
4	18.07	-50.88	-31.22	-18.07	50.88	31.22	0.000%
5	18.07	-38.16	-31.22	-18.07	38.16	31.22	0.000%
6	31.18	-50.88	-18.17	-31.18	50.88	18.17	0.000%
7	31.18	-38.16	-18.17	-31.18	38.16	18.17	0.000%
8	35.97	-50.88	-0.19	-35.97	50.88	0.19	0.000%
9	35.97	-38.16	-0.19	-35.97	38.16	0.19	0.000%
10	30.95	-50.88	18.07	-30.95	50.88	-18.07	0.000%
11	30.95	-38.16	18.07	-30.95	38.16	-18.07	0.000%
12	17.81	-50.88	31.19	-17.81	50.88	-31.19	0.000%
13	17.81	-38.16	31.19	-17.81	38.16	-31.19	0.000%
14	-0.07	-50.88	36.02	0.07	50.88	-36.02	0.000%
15	-0.07	-38.16	36.02	0.07	38.16	-36.02	0.000%
16	-17.97	-50.88	31.37	17.97	50.88	-31.37	0.000%
17	-17.97	-38.16	31.37	17.97	38.16	-31.37	0.000%
18	-31.11	-50.88	18.24	31.11	50.88	-18.24	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
19	-31.11	-38.16	18.24	31.11	38.16	-18.24	0.000%
20	-35.96	-50.88	-0.02	35.96	50.88	0.02	0.000%
21	-35.96	-38.16	-0.02	35.96	38.16	0.02	0.000%
22	-30.99	-50.88	-17.98	30.99	50.88	17.98	0.000%
23	-30.99	-38.16	-17.98	30.99	38.16	17.98	0.000%
24	-17.83	-50.88	-31.07	17.83	50.88	31.07	0.000%
25	-17.83	-38.16	-31.07	17.83	38.16	31.07	0.000%
26	0.00	-94.42	0.00	-0.00	94.42	-0.00	0.000%
27	0.05	-94.42	-11.13	-0.05	94.42	11.13	0.000%
28	5.62	-94.42	-9.69	-5.62	94.42	9.69	0.000%
29	9.67	-94.42	-5.64	-9.67	94.42	5.64	0.000%
30	11.14	-94.42	-0.08	-11.14	94.42	0.08	0.000%
31	9.59	-94.42	5.56	-9.59	94.42	-5.56	0.000%
32	5.50	-94.42	9.64	-5.50	94.42	-9.64	0.000%
33	-0.05	-94.42	11.15	0.05	94.42	-11.15	0.000%
34	-5.60	-94.42	9.72	5.60	94.42	-9.72	0.000%
35	-9.66	-94.42	5.66	9.66	94.42	-5.66	0.000%
36	-11.14	-94.42	0.03	11.14	94.42	-0.03	0.000%
37	-9.59	-94.42	-5.54	9.60	94.42	5.54	0.000%
38	-5.51	-94.42	-9.62	5.51	94.42	9.62	0.000%
39	0.01	-42.40	-7.69	-0.01	42.40	7.69	0.000%
40	3.87	-42.40	-6.68	-3.87	42.40	6.68	0.000%
41	6.67	-42.40	-3.89	-6.67	42.40	3.89	0.000%
42	7.70	-42.40	-0.04	-7.70	42.40	0.04	0.000%
43	6.62	-42.40	3.87	-6.62	42.40	-3.87	0.000%
44	3.81	-42.40	6.67	-3.81	42.40	-6.67	0.000%
45	-0.02	-42.40	7.71	0.02	42.40	-7.71	0.000%
46	-3.85	-42.40	6.71	3.85	42.40	-6.71	0.000%
47	-6.66	-42.40	3.90	6.66	42.40	-3.90	0.000%
48	-7.69	-42.40	-0.00	7.69	42.40	0.00	0.000%
49	-6.63	-42.40	-3.85	6.63	42.40	3.85	0.000%
50	-3.81	-42.40	-6.65	3.81	42.40	6.65	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00016489
3	Yes	5	0.00000001	0.00007561
4	Yes	6	0.00000001	0.00018744
5	Yes	6	0.00000001	0.00005691
6	Yes	6	0.00000001	0.00018066
7	Yes	6	0.00000001	0.00005440
8	Yes	5	0.00000001	0.00013948
9	Yes	5	0.00000001	0.00006312
10	Yes	6	0.00000001	0.00017693
11	Yes	6	0.00000001	0.00005330
12	Yes	6	0.00000001	0.00018530
13	Yes	6	0.00000001	0.00005641
14	Yes	5	0.00000001	0.00016091
15	Yes	5	0.00000001	0.00007385
16	Yes	6	0.00000001	0.00017649
17	Yes	6	0.00000001	0.00005293
18	Yes	6	0.00000001	0.00018477
19	Yes	6	0.00000001	0.00005577
20	Yes	5	0.00000001	0.00010419
21	Yes	5	0.00000001	0.00004737
22	Yes	6	0.00000001	0.00018469
23	Yes	6	0.00000001	0.00005617
24	Yes	6	0.00000001	0.00017391
25	Yes	6	0.00000001	0.00005245
26	Yes	4	0.00000001	0.00000738
27	Yes	6	0.00000001	0.00021843
28	Yes	6	0.00000001	0.00035316

29	Yes	6	0.00000001	0.00034620
30	Yes	6	0.00000001	0.00021792
31	Yes	6	0.00000001	0.00033771
32	Yes	6	0.00000001	0.00034588
33	Yes	6	0.00000001	0.00021949
34	Yes	6	0.00000001	0.00034222
35	Yes	6	0.00000001	0.00035009
36	Yes	6	0.00000001	0.00021676
37	Yes	6	0.00000001	0.00034109
38	Yes	6	0.00000001	0.00033102
39	Yes	4	0.00000001	0.00017960
40	Yes	4	0.00000001	0.00080126
41	Yes	4	0.00000001	0.00071081
42	Yes	4	0.00000001	0.00013313
43	Yes	4	0.00000001	0.00067965
44	Yes	4	0.00000001	0.00078517
45	Yes	4	0.00000001	0.00018678
46	Yes	4	0.00000001	0.00067304
47	Yes	4	0.00000001	0.00075904
48	Yes	4	0.00000001	0.00012819
49	Yes	4	0.00000001	0.00077505
50	Yes	4	0.00000001	0.00065531

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	168 - 119.25	29.182	46	1.5339	0.0055
L2	123.5 - 78.5	15.803	46	1.2594	0.0025
L3	83.75 - 38.75	7.085	46	0.7963	0.0011
L4	45 - 0	2.075	46	0.4195	0.0005

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
168.00	800 10121 w/ Mount Pipe	46	29.182	1.5339	0.0055	45099
164.00	VHLP2.5-11	46	27.910	1.5159	0.0052	45099
159.00	LLPX310R-V1 w/ Mount Pipe	46	26.325	1.4929	0.0048	25055
156.00	VHLP2.5-11	46	25.379	1.4786	0.0046	18791
147.00	VHLPX2-11	46	22.582	1.4319	0.0040	10737
143.00	MPRD2449	46	21.365	1.4085	0.0037	9019
140.00	PTP400 w/ Mount Pipe	46	20.466	1.3897	0.0036	8052
135.00	ASP 705K	46	18.999	1.3554	0.0033	6832
131.00	1900MHz RRH	46	17.857	1.3249	0.0031	6093
130.00	APXV9ERR18-C-A20 w/ Mount Pipe	46	17.576	1.3168	0.0030	5933
120.00	APL199016-42T0	46	14.888	1.2247	0.0025	5095
79.00	1' x 2-1/2"	46	6.284	0.7438	0.0010	5312
52.00	GPS-TMG-HR-26NCM	46	2.716	0.4828	0.0006	4954

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	168 - 119.25	137.103	16	7.2202	0.0258
L2	123.5 - 78.5	74.337	16	5.9331	0.0119
L3	83.75 - 38.75	33.353	16	3.7521	0.0050
L4	45 - 0	9.766	16	1.9758	0.0021



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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
168.00	800 10121 w/ Mount Pipe	16	137.103	7.2202	0.0258	9893
164.00	VHLP2.5-11	16	131.136	7.1361	0.0243	9893
159.00	LLPX310R-V1 w/ Mount Pipe	16	123.702	7.0286	0.0225	5495
156.00	VHLP2.5-11	16	119.266	6.9617	0.0214	4120
147.00	VHLPX2-11	16	106.147	6.7428	0.0182	2352
143.00	MPRD2449	16	100.440	6.6334	0.0170	1974
140.00	PTP400 w/ Mount Pipe	16	96.225	6.5450	0.0162	1762
135.00	ASP 705K	16	89.341	6.3840	0.0149	1493
131.00	1900MHz RRH	16	83.980	6.2410	0.0139	1331
130.00	APXV9ERR18-C-A20 w/ Mount Pipe	16	82.662	6.2030	0.0137	1295
120.00	APL199016-42T0	16	70.041	5.7698	0.0113	1109
79.00	1' x 2-1/2"	16	29.582	3.5046	0.0047	1137
52.00	GPS-TMG-HR-26NCM	16	12.787	2.2741	0.0026	1055

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	168 - 119.25 (1)	TP34.288x24x0.25	48.75	0.00	0.0	26.297 5	-15.87	1794.53	0.009
L2	119.25 - 78.5 (2)	TP42.387x32.8911x0.281 3	45.00	0.00	0.0	36.598 3	-23.79	2407.42	0.010
L3	78.5 - 38.75 (3)	TP50.213x40.7166x0.375	45.00	0.00	0.0	57.749 8	-35.32	3975.05	0.009
L4	38.75 - 0 (4)	TP57.64x48.1441x0.375	45.00	0.00	0.0	68.159 7	-50.85	4395.43	0.012

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	168 - 119.25 (1)	TP34.288x24x0.25	657.94	1223.34	0.538	0.00	1223.34	0.000
L2	119.25 - 78.5 (2)	TP42.387x32.8911x0.281 3	1700.61	2031.59	0.837	0.00	2031.59	0.000
L3	78.5 - 38.75 (3)	TP50.213x40.7166x0.375	2880.21	3966.47	0.726	0.00	3966.47	0.000
L4	38.75 - 0 (4)	TP57.64x48.1441x0.375	4432.15	5182.60	0.855	0.00	5182.60	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	168 - 119.25	TP34.288x24x0.25	23.38	897.27	0.026	2.50	2449.67	0.001

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L2	(1) 119.25 - 78.5	TP42.387x32.8911x0.281	28.29	1203.71	0.024	2.48	4068.15	0.001
L3	(2) 78.5 - 38.75	TP50.213x40.7166x0.375	32.50	1987.52	0.016	2.85	7942.63	0.000
L4	(3) 38.75 - 0 (4)	TP57.64x48.1441x0.375	36.20	2197.71	0.016	2.84	10377.92	0.000

### Pole Interaction Design Data

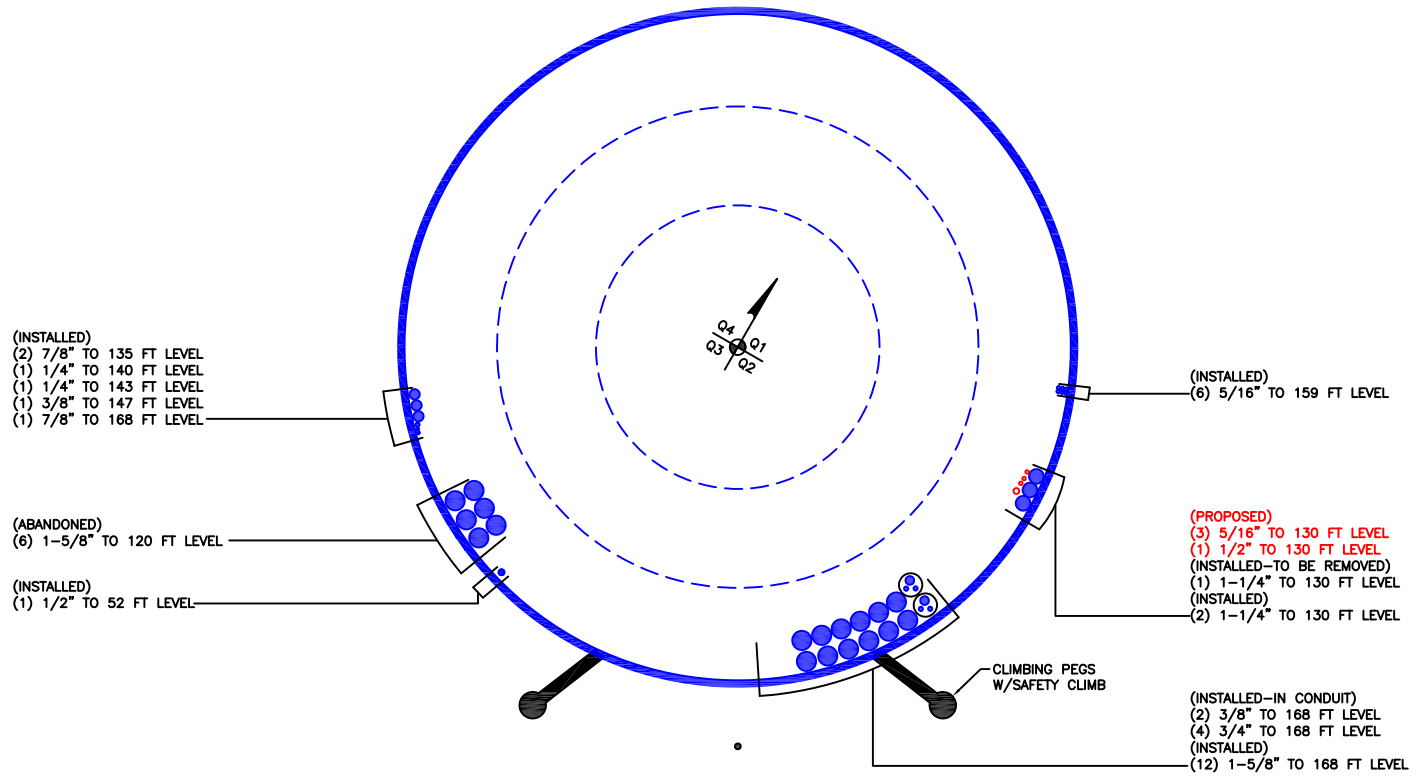
Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	168 - 119.25 (1)	0.009	0.538	0.000	0.026	0.001	0.547	1.000	4.8.2
L2	119.25 - 78.5 (2)	0.010	0.837	0.000	0.024	0.001	0.848	1.000	4.8.2
L3	78.5 - 38.75 (3)	0.009	0.726	0.000	0.016	0.000	0.735	1.000	4.8.2
L4	38.75 - 0 (4)	0.012	0.855	0.000	0.016	0.000	0.867	1.000	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	168 - 119.25	Pole	TP34.288x24x0.25	1	-15.87	1794.53	54.7	Pass
L2	119.25 - 78.5	Pole	TP42.387x32.8911x0.2813	2	-23.79	2407.42	84.8	Pass
L3	78.5 - 38.75	Pole	TP50.213x40.7166x0.375	3	-35.32	3975.05	73.5	Pass
L4	38.75 - 0	Pole	TP57.64x48.1441x0.375	4	-50.85	4395.43	86.7	Pass
Summary								
Pole (L4)							86.7	Pass
<b>RATING =</b>							<b>86.7</b>	<b>Pass</b>

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





BUSINESS UNIT: 842875 TOWER ID: C\_BASELEVEL

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

# 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  $(1) \times (\text{Rod Diameter})$

## Site Data

BU#: 842875  
 Site Name: WINDSORDAY HILL  
 App #: 399495 Rev. 1

## Anchor Rod Data

Eta Factor, $\eta$	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, $F_y$ :	75	ksi
Strength, $F_u$ :	100	ksi
Bolt Circle:	65	in
Anchor Spacing:	6	in

## Plate Data

W=Side:	63	in
Thick:	3.25	in
Grade:	55	ksi
Clip Distance:	6	in

## Stiffener Data (Welding at both sides)

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

## Pole Data

Diam:	57.64	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

## Base Reactions

TIA Revision:	G	
Factored Moment, $M_u$ :	4432	ft-kips
Factored Axial, $P_u$ :	51	kips
Factored Shear, $V_u$ :	36	kips

## Anchor Rod Results

TIA G --> Max Rod ( $C_u + V_u/\eta$ ): 212.3 Kips  
 Axial Design Strength,  $\Phi * F_u * A_{net}$ : 260.0 Kips  
 Anchor Rod Stress Ratio: 81.6% **Pass**

## Base Plate Results

Base Plate Stress: 29.4 ksi  
 PL Design Bending Strength,  $\Phi * F_y$ : 49.5 ksi  
 Base Plate Stress Ratio: 59.3% **Pass**

## Flexural Check

## PL Ref. Data

Yield Line (in):	31.46
Max PL Length:	31.46

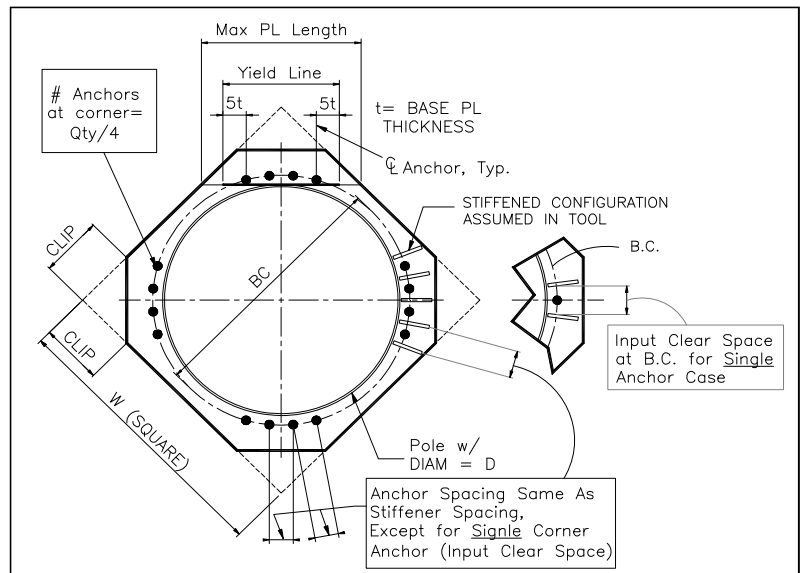
## N/A - Unstiffened

## 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 Foundation



BU # :	842875
Site Name:	WINDSORDAY HILL
App. Number:	399495 Rev. 1

TIA-222 Revison:	G
Tower Type:	Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	4432	
Axial Force (kips)	51	
Shear Force (kips)	36	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	24	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
<i>From 0.5' above grade to 24' below grade</i>		
Pier Diameter	8	ft
Rebar Quantity	24	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	

Analysis Results		
Soil Lateral Capacity		
	Compression	Uplift
D <sub>v=0</sub> (ft from TOC)	8.73	-
Soil Safety Factor	4.48	-
Max Moment (kip-ft)	4708.08	-
Rating	29.7%	-
Soil Vertical Capacity		
	Compression	Uplift
Skin Friction (kips)	1187.52	-
End Bearing (kips)	3015.93	-
Weight of Concrete (kips)	150.16	-
Total Capacity (kips)	4203.45	-
Axial (kips)	201.16	-
Rating	4.8%	-
Reinforced Concrete Capacity		
	Compression	Uplift
Critical Depth (ft from TOC)	8.22	-
Critical Moment (kip-ft)	4706.29	-
Critical Moment Capacity	6979.74	-
Rating	67.4%	-
<b>Soil Interaction Rating</b>		<b>29.7%</b>
<b>Structural Foundation Rating</b>		<b>67.4%</b>

Soil Profile				
Groundwater Depth	5	ft	# of Layers	5

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ <sub>soil</sub> (pcf)	γ <sub>concrete</sub> (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ultimate Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	5	5	100	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	5	10	5	60	87.6	0	35	0.000	0.000	0.00	0.00			Cohesionless
3	10	15	5	55	87.6	0	33	0.000	0.000	0.00	0.00			Cohesionless
4	15	17	2	80	87.6	0	40	0.000	0.000	0.00	0.00			Cohesionless
5	17	24	7	95	87.6	20	0	9.000	9.000			80		Cohesive

# CCISeismic - Design Category

Per 2012/2015 IBC

Site BU: 842875  
 Work Order: 1441006  
 Application: 401419 Rev. 0



	Degrees	Minutes	Seconds	
Site Latitude =	41	52	16.10	41.8711 degrees
Site Longitude =	-72	40	16.00	-72.6711 degrees
Ground Supported Structure =	Yes			
Structure Class =	II			(Table 2-1)
Site Class =	D - Stiff Soil			(Table 2-11)
Spectral response acceleration short periods, $S_s$ =	0.179			<a href="#">USGS Seismic Tool</a>
Spectral response acceleration 1 s period, $S_1$ =	0.064			
Importance Factor, $I$ =	1.0			(Table 2-3)
Acceleration-based site coefficient, $F_a$ =	1.6			(Table 2-12)
Velocity-based site coefficient, $F_v$ =	2.4			(Table 2-13)
Design spectral response acceleration short period, $S_{DS}$ =	0.191			(2.7.6)
Design spectral response acceleration 1 s period, $S_{D1}$ =	0.102			(2.7.6)
Seismic Design Category - Short Period Response =	B			ASCE 7-05 Table 11.6-1
Seismic Design Category - 1s Period Response =	B			ASCE 7-05 Table 11.6-2
Worst Case Seismic Design Category =	B			ASCE 7-05 Tables 11.6-1 and 6-2



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

SPRINT Existing Facility

Site ID: CT54XC787

Windsor Locks / AT&T  
99 Day Hill Road  
Windsor, CT 06095

**October 18, 2017**

**EBI Project Number: 6217004511**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>8.33 %</b>



October 18, 2017

SPRINT

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

## Emissions Analysis for Site: **CT54XC787 – Windsor Locks / AT&T**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **99 Day Hill Road, Windsor, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 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 population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 850 MHz Band is approximately  $567 \mu\text{W}/\text{cm}^2$ . The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) 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 SPRINT Wireless antenna facility located at **99 Day Hill Road, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.



- 6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **RFS APXVSP18-C-A20** and the **RFS APXVTM14-C-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerlines of the proposed antennas are **130 feet** above ground level (AGL) for **Sector A**, **130 feet** above ground level (AGL) for **Sector B** and **130 feet** above ground level (AGL) for Sector C.
- 10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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



## SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	<b>1</b>	Antenna #:	<b>1</b>	Antenna #:	<b>1</b>
Make / Model:	RFS APXVSPPI8-C-A20	Make / Model:	RFS APXVSPPI8-C-A20	Make / Model:	RFS APXVSPPI8-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	<b>130 feet</b>	Height (AGL):	<b>130 feet</b>	Height (AGL):	<b>130 feet</b>
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	<b>2.00 %</b>	Antenna B1 MPE%	<b>2.00 %</b>	Antenna C1 MPE%	<b>2.00 %</b>
Antenna #:	<b>2</b>	Antenna #:	<b>2</b>	Antenna #:	<b>2</b>
Make / Model:	RFS APXVSTM14-C-I20	Make / Model:	RFS APXVSTM14-C-I20	Make / Model:	RFS APXVSTM14-C-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	<b>130 feet</b>	Height (AGL):	<b>130 feet</b>	Height (AGL):	<b>130 feet</b>
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	<b>1.46 %</b>	Antenna B2 MPE%	<b>1.46 %</b>	Antenna C2 MPE%	<b>1.46 %</b>

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	<b>3.45 %</b>
Nextel	0.24 %
Clearwire	0.06 %
MetroPCS	0.94 %
Bloomfield PD	0.01 %
Municipal Ant. 1	0.17 %
Municipal Ant. 2	0.17 %
Municipal MW 1	0.00 %
Municipal MW 2	0.00 %
AT&T	3.29 %
<b>Site Total MPE %:</b>	<b>8.33 %</b>

SPRINT Sector A Total:	3.45 %
SPRINT Sector B Total:	3.45 %
SPRINT Sector C Total:	3.45 %
<b>Site Total:</b>	<b>8.33 %</b>

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	130	1.02	850 MHz	567	0.18%
Sprint 850 MHz LTE	2	437.55	130	2.05	850 MHz	567	0.36%
Sprint 1900 MHz (PCS) CDMA	5	622.47	130	7.28	1900 MHz (PCS)	1000	0.73%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	130	7.28	1900 MHz (PCS)	1000	0.73%
Sprint 2500 MHz (BRS) LTE	8	778.09	130	14.55	2500 MHz (BRS)	1000	1.46%
<b>Total:</b>							<b>3.45%</b>

## Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	3.45 %
Sector B:	3.45 %
Sector C:	3.45 %
SPRINT Maximum Total (per sector):	3.45 %
Site Total:	8.33 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **8.33 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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