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June 16, 2017

**VIA OVERNIGHT COURIER &  
E-MAIL (SITING.COUNCIL@CT.GOV)**

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

**RE: Sprint Corporation's Tower Sharing Application  
220 Evergreen Street, Bridgeport, CT  
41.1977, -73.1907**

Dear Executive Director Bachman:

Sprint Corporation ("Sprint") proposes to share the existing 135-foot monopole tower (the "Tower") and associated equipment compound located at 220 Evergreen Street in Bridgeport, Connecticut (the "Facility"). Sprint therefore requests a finding from the Connecticut Siting Council pursuant to Conn. Gen. Stat. § 6-50aa (the "Statute") that the shared use of this Facility is technically, legally, environmentally and economically feasible, will meet public safety concerns, will avoid the unnecessary proliferation of towers and is in the public interest. The purpose of this request is to allow Sprint to relocate its existing antennas from the HI HO storage silo facility at 370 North Avenue in Bridgeport (the "Silo") to the existing Tower because the Silo has been deemed structurally unfit (see Docket No. 464, Findings of Fact, #8).

The Tower is owned and operated by Blue Sky Towers, LLC and is located on land owned by the Chapin & Bangs Company. Sprint has entered into a lease with Blue Sky Towers, LLC for the purpose of locating Sprint's antennas and associated equipment at the Facility. The Council has the authority, pursuant to the Statute, to issue orders approving the shared use of the Facility. Therefore, consistent with the Statute, the proposal is legally and economically feasible. A Letter of Authorization signed by Blue Sky Towers, LLC is attached as **Exhibit 1**.



AT&T is currently the only carrier on the Tower with 9 panel antennas and 27 remote radio heads on a low profile platform at 130 feet and associated ground equipment at the base of the Tower (see Docket No. 464). Sprint is proposing to install the following equipment (and associated cables) on the Tower at a centerline of 120 feet:

- 6 panel antennas [(3) RFS Model APXVSPP18-C-A20; (3) RFS Model APXVTM14-ALU-I20];
- 3 MW dish antennas with ODUs [Andrew 26.1" diameter];
- 1 MW flat panel antenna with ODU [Motorola 14.6" Integrated Panel];
- 12 remote radio heads [(6) 1900 MHz RRH, (3) 800 MHz, (3) ALU Nokia TD-RRH8x20-25 RRHs]; and
- 6 combiners [(3) RFS IBC1900HG-2A, (3) RFS IBC1900BB-1].

Sprint is also proposing to install a new 10' x 20' steel equipment platform within its 15' x 20' lease area within the existing fenced compound. The equipment platform will be raised 2'-10" to keep it above the flood zone. Sprint will install two electronics cabinets on the equipment platform and an ice bridge will connect the Tower and equipment cabinets. Sprint will also mount a GPS antenna on the ice bridge. Utilities will be routed underground to an existing vacant meter socket and to an existing fiber demarcation box. The site plan is attached as **Exhibit 2**.

Consistent with the requirements of the Statute, it is technically feasible for Sprint to co-locate on this Tower. The existing monopole was designed and constructed to support additional carriers and Sprint will be the second carrier on the Tower. The structural analysis indicates that the existing tower and foundation are both structurally capable of supporting Sprint's proposed equipment loads without modification and therefore, this proposal is technically feasible. The structural analysis was performed by Bennet & Pless, Inc. and is attached as **Exhibit 3**<sup>1</sup>.

Pursuant to the Statute, the proposal will be environmentally feasible for the following reasons:

- The overall impact on the City of Bridgeport will be decreased with the sharing of a single tower versus the proliferation of many towers;
- The proposal will not increase the height of the Tower or the size of the compound;
- The proposal will have an insignificant visual impact with the addition of Sprint's antennas below AT&T's existing antennas and an equipment platform within the existing fenced compound;
- There will be no increased impact on any wetlands or water resources;
- There will be no increased impact on air quality because no air pollutants will be generated during the normal operation of the Facility;

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<sup>1</sup> Please note that the structural report includes (3) DAP heads, (6) lines of 5/16" coax, (3) 1" conduits and (3) lines of power cables (AWG-9-10/C AC) for potential future use. Sprint does not initially propose to install the DAP heads or this cabling therefore they are not included on the site plan.



- There will only be a brief, slight increase in noise pollution during the attachment of the antennas and construction of the equipment platform and cabinets; and
- During construction, the proposed project will generate a small amount of traffic as workers arrive and depart and materials are delivered. Upon completion, traffic will be limited to an average of one (1) monthly maintenance and inspection visit.

Finally, in accordance with the Statute, Sprint's proposed project will not cause an adverse impact on public health or safety. Sprint analyzed the total frequency electromagnetic radiation of the power density at the site and found it will not be at or above the standard adopted by the Federal Communications Commission (the "FCC"). Attached as **Exhibit 4** is a power density analysis for the operation of Sprint's antennas at the Facility as measured at the base of the Tower and a cumulative analysis with AT&T's antennas. The cumulative power density is 8.48% of the maximum permissible exposure based on the NCRP standard. These calculations show that the Facility will be well below the FCC mandated limits in all locations around the Tower, even with extremely conservative assumptions.

Moreover, by allowing Sprint to relocate its antennas from the HI HO silo to the existing Tower, Sprint will be able to continue to provide wireless communication service to the residents, businesses and emergency services in the City of Bridgeport. Specifically, Sprint will provide service to Route 1, Route 8, Route 25 and East Main Street.

For the reasons stated above, the attachment of Sprint's antennas to this Tower would meet all the requirements set forth in the Statute. This proposal is technically, legally, environmentally and economically feasible and meets all public safety concerns. Therefore, Sprint respectfully requests that the Council approve this request for the shared use of the existing telecommunications facility located at 220 Evergreen Street in Bridgeport, Connecticut.

Sincerely,

**BROWN RUDNICK LLP**

A handwritten signature in blue ink, appearing to read 'T. Regan', is written over the typed name.

Thomas J. Regan

Enclosures

cc: Mayor Joseph P. Ganim, City of Bridgeport  
Dennis Buckley, Zoning Administrator, City of Bridgeport  
Melville T. Riley, Jr., Acting Chairperson, Planning & Zoning Commission, City of Bridgeport  
Chapin & Bangs Co., Property Owner



## List of Exhibits

Exhibit 1 – Letter of Authorization

Exhibit 2 – Site Plan

Exhibit 3 – Structural Analysis

Exhibit 4 – Calculated Radio Frequency Emissions Report

62794572

# **EXHIBIT 1**



**LETTER OF AUTHORIZATION – PERMIT APPLICATION**

TO THE CONNECTICUT SITING COUNCIL

APPLICATIONS FOR PERMITS / APPROVALS

The undersigned representative of Blue Sky Towers, LLC (“Owner”), owner of the communication tower on the below described property, does hereby authorize applicant Sprint Corp., including its affiliates/subsidiaries, their employees and agents (“Sprint”), to file and complete the necessary applications for any and all required Connecticut Siting Council reviews, permits and approvals, as may be required for the construction/installation of Sprint’s proposed collocation of communication equipment (consisting of antennas, remote radio units, cabling, electronics cabinets and associated supporting equipment) on the existing communication tower on the Property. Sprint will be responsible for all costs, fees and expenses incurred in securing its required permits and approvals from the Connecticut Siting Council.


Property Located at: 220 Evergreen Street, City of Bridgeport, CT (“Property”)

Assessor's Parcel Number ID: 53-1527-2

Tower Owner's Name: Blue Sky Towers, LLC

Signature (and title, if applicable) of Tower Owner Representative:

**Blue Sky Towers, LLC,**  
a Delaware limited liability company

By:   
Name: Sean Gormley  
Title: Project Manager  
Date: 5-17-17

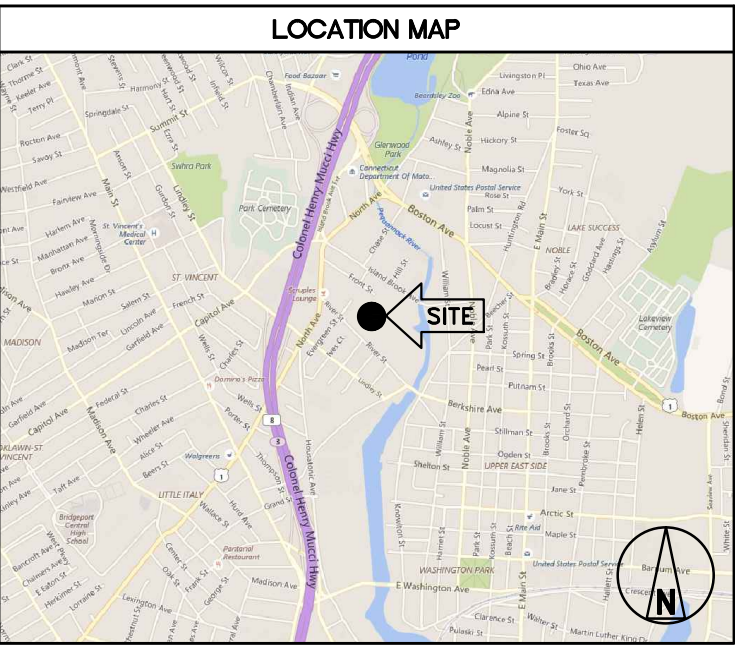
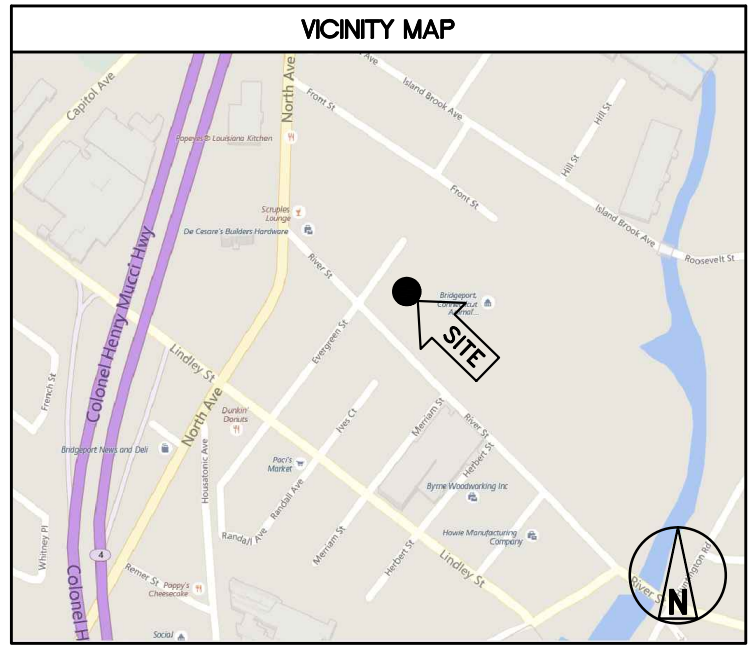
# **EXHIBIT 2**

**SPECIAL CONSTRUCTION NOTE:**  
 SPRINT TOWER TOP WORK IS CONTINGENT ON THE FOLLOWING:  
 \* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS (PROVIDED BY TOWER OWNER).  
 \* COMPLETION OF A EQUIPMENT PLATFORM ANALYSIS COMPLETED BY HUDSON DESIGN GROUP LLC DATED 05/05/17

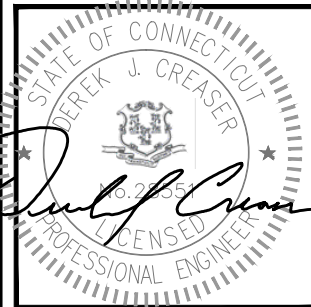
**SITE NAME:** BRIDGEPORT  
**SITE NUMBER:** CT25XC553  
**AUGMENT ID:** CT25XC553  
**SITE ADDRESS:** 220 EVERGREEN STREET  
 BRIDGEPORT, CT 06606  
**JURISDICTION:** FAIRFIELD COUNTY  
**SITE TYPE:** MONOPOLE  
**PROGRAM:** NSD



PROJECT INFORMATION	
COUNTY:	FAIRFIELD
SITE NAME:	BRIDGEPORT
SITE NUMBER:	CT25XC553
AUGMENT ID:	CT25XC553
SITE ADDRESS:	220 EVERGREEN STREET BRIDGEPORT, CT 06606
TAX MAP PARCEL#	53-1527-2
LATITUDE:	41° 11' 52.00" N.
LONGITUDE:	73° 11' 26.49" W.
GROUND ELEVATION:	12'± AMSL
TOWER OWNER:	BLUE SKY TOWER 158 MAIN STREET, SUITE 2 NORFOLK, MA 02056 PHONE: 508.530.3580
APPLICANT:	SPRINT 3 ENTERPRISE DRIVE ALBANY, NY 12203 PHONE: 617-247-4305
SPRINT PROJECT MANAGER:	MICHAEL DELIA michael.delia@sprint.com 781-316-6348



DRAWING INDEX		
SHEET	DESCRIPTION	REV.
T-1	TITLE SHEET	3
SP-1	OUTLINE SPECIFICATIONS	3
SP-2	OUTLINE SPECIFICATIONS	3
SP-3	OUTLINE SPECIFICATIONS	3
A-1	COMPOUND & EQUIPMENT PLANS	3
A-2	ANTENNA LAYOUT & ELEVATION	3
A-3	RF DATA SHEET	3
A-4	RAN WIRING DIAGRAM	3
A-5	EQUIPMENT DETAILS	3
A-6	EQUIPMENT DETAILS	3
A-7	TOWER EQUIPMENT DETAILS	3
S-1	ANTENNA AND RRH MOUNTING DETAILS	3
S-2	INSPECTION CHECKLIST	3
S-3	PLATFORM STRUCTURAL DETAILS	3
S-4	PLATFORM STRUCTURAL DETAILS	3
S-5	PLATFORM STRUCTURAL DETAILS	3
S-6	PLATFORM STRUCTURAL DETAILS	3
E-1	ELECTRICAL DETAILS AND NOTES	3
G-1	GROUNDING DETAILS AND NOTES	3



CHECKED BY: BB  
 APPROVED BY: DJC

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
2	05/25/17	CONSTRUCTION FINAL	DJM
1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

PROJECT CONSULTANTS	
PROJECT MANAGEMENT:	SPRINT ATTN: HEATHER CASTAGNARO 3 ENTERPRISE DRIVE ALBANY, NY 12203 PHONE: 617-247-4305 heather.2.castagnaro@sprint.com
PROFESSIONAL ENGINEER:	HUDSON DESIGN GROUP LLC 1600 OSGOOD STREET BUILDING 20 NORTH SUITE 3090 PHONE: 978.557.5553 FAX: 978.336.5586
SITE ACQUISITION & ZONING:	J.P. WIRELESS CONSULTING, LLC. ATTN: JOSEPH A. PAPA, JR. 11 PAR CIRCLE ALBANY, NY 12208 PHONE: 518-365-9711 joseph.a.papa@gmail.com
CONSTRUCTION MANAGER:	MICHAEL DELIA michael.delia@sprint.com 781-316-6348

SCOPE OF WORK
<ul style="list-style-type: none"> <li>INSTALL (4) NEW SPRINT MW ANTENNA WITH ODUS</li> <li>INSTALL (6) NEW SPRINT PANEL ANTENNAS</li> <li>INSTALL (3) NEW SPRINT 800MHz RADIOS</li> <li>INSTALL (6) NEW SPRINT 1900MHz RADIOS</li> <li>INSTALL (3) NEW SPRINT 2500MHz RADIOS</li> <li>INSTALL (6) NEW SPRINT RFS COMBINERS</li> <li>INSTALL (3) NEW SPRINT 1-1/4" HYBRIFLEX CABLES</li> <li>INSTALL (1) NEW SPRINT 5/8" FIBER ONLY HYBRIFLEX CABLE</li> <li>INSTALL (1) NEW SPRINT 1/2" COAX</li> <li>INSTALL (4) 1/2" ETHERNET CABLES</li> <li>INSTALL (2) NEW SPRINT CABINETS ON NEW STEEL FRAME</li> <li>INSTALL (1) NEW SPRINT GPS ANTENNA</li> </ul>

**DIRECTIONS**

DIRECTIONS FROM 3 ENTERPRISE DRIVE ALBANY, NY:  
 HEAD NORTHWEST ON ENTERPRISE DR TOWARD ERIE BLVD 0.1 MI. TURN RIGHT ONTO ERIE BLVD 0.4 MI. CONTINUE ONTO CANAL RD S 0.3 MI. TURN LEFT ONTO SIMMONS LN 0.1 MI. TURN RIGHT ONTO BROADWAY 0.3 MI. TURN RIGHT TO MERGE ONTO I-787 S 0.6 MI. MERGE ONTO I-787 S 0.6 MI. USE THE RIGHT 2 LANES TO TAKE EXIT 5 TO MERGE ONTO I-90 E TOWARD BOSTON 14.3 MI. TAKE THE EXIT 2 FOR US-20 E STAY ON I-90 E TOWARD TACONIC PKWY/BOSTON 28.7 MI. TAKE EXIT 2 FOR US-20 E 0.4 MI. USE ANY LANE TO TURN LEFT ONTO US-20 E 6.9 MI. TURN RIGHT ONTO MA-8 S 13.5 MI. KEEP LEFT TO STAY ON MA-8 S 315 FT. SLIGHT LEFT ONTO MA-57 E/MA-8 S CONTINUE TO FOLLOW MA-8 S 4.2 MI. CONTINUE ONTO CT-8 S 8.5 MI. TURN LEFT ONTO S MAIN ST 0.4 MI. TURN RIGHT ONTO CT-8 S (SIGNS FOR TORRINGTON/WATERBURY) 18.9 MI. CONTINUE ONTO CT-8 S/US-6 W 0.8 MI. CONTINUE ONTO CT-8 S 35.8 MI. TAKE EXIT 5 TOWARD US-1/BOSTON AVE/NORTH AVE 0.3 MI. MERGE ONTO CHOPSEY HILL RD 0.3 MI. TURN RIGHT ONTO NORTH AVE 0.4 MI. TURN LEFT ONTO RIVER ST 0.2 MI.  
 220 EVERGREEN ST. BRIDGEPORT, CT 06606

**CODE COMPLIANCE**

DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES:

- BUILDING CODE: IBC 2012 WITH 2016 CONNECTICUT STATE BUILDING CODE AMENDMENTS
- ELECTRICAL CODE: 2014 NATIONAL ELECTRICAL CODE
- STRUCTURAL CODE: TIA/EIA-222-G OR LATEST EDITION

GENERAL NOTES	
1.	THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION: - HANDICAPPED ACCESS NOT REQUIRED - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED
2.	CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.



APPROVALS		
DISCIPLINE	SIGNATURE	DATE
LANDLORD:		

SITE NUMBER:  
CT25XC553  
 SITE NAME:  
BRIDGEPORT  
 AUGMENT ID:  
CT25XC553  
 SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
TITLE SHEET

SHEET NUMBER  
T-1



THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE SECTION 01 300 – CELL SITE CONSTRUCTION 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. 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. SPRINT TS-0200 (CURRENT VERSION) – 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.

**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:**

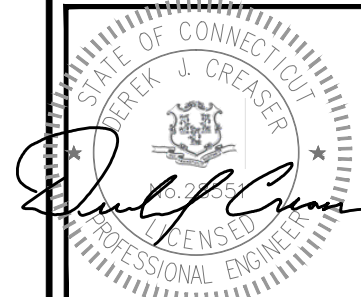
- A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING 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 HERINAFTER.
  14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HERINAFTER
  15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
  16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
  17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
  18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
  19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
  20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND-OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 **GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:**

- A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
- B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
- C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
  1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
  2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
- D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION
- E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 **DELIVERABLES:**

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



CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
2	05/25/17	CONSTRUCTION FINAL	DJM
1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

SITE NUMBER:  
CT25XC553  
SITE NAME:  
BRIDGEPORT  
AUGMENT ID:  
CT25XC553  
SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
OUTLINE  
SPECIFICATIONS

SHEET NUMBER  
SP-1

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 SPRINT TS-0200 (CURRENT VERSION) 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.
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.
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

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 – ANTENNA 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:

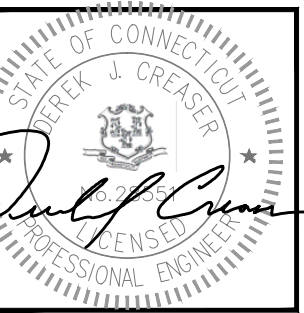
- A. PRE-CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.
B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER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



CHECKED BY: BB

APPROVED BY: DJC

Table with 4 columns: REV., DATE, DESCRIPTION, BY. Contains revision history for construction revised, construction final, issued for construction, and issued for review.

SITE NUMBER: CT25XC553
SITE NAME: BRIDGEPORT
AUGMENT ID: CT25XC553
SITE ADDRESS: 220 EVERGREEN STREET, BRIDGEPORT, CT 06606, FAIRFIELD COUNTY

SHEET TITLE: OUTLINE SPECIFICATIONS

SHEET NUMBER: SP-2

CONTINUED FROM SP-2:

**MATERIALS:**

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

**PAINT SCHEDULE:**

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

- B. ROOF TOP CONSTRUCTION: TOUCH UP - PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

**PAINTING APPLICATION:**

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

**TOUCHUP PAINTING:**

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

**SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO HEADS AND CABLE INSTALLATION**

**SUMMARY:**

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

**ANTENNAS AND RRH'S:**

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

**HYBRID CABLE:**

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

**JUMPERS AND CONNECTORS:**

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRH'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRH'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPERFLEX OUTDOORS. JUMPERS SHALL BE FACTORY FABRICATED IN APPROPRIATE LENGTHS WITH A MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS

**REMOTE ELECTRICAL TILT (RET) CABLES:**

**MISCELLANEOUS:**

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

**ANTENNA INSTALLATION:**

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

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

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

**HYBRID CABLES INSTALLATION:**

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

- B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADI.

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

- FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4"-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.
- FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
  - FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH @ 18" OC. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
  - DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
- FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
- CABLE INSTALLATION:
  - INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
  - CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
  - HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.

- GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
- HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 4.
- HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

**WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:**

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

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

- COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
- SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
- 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
- OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

**SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBTS) AND RELATED EQUIPMENT**

**SUMMARY:**

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

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

- C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

**DC CIRCUIT BREAKER LABELING**

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

**SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE TRANSCIEVER STATIONS (MMBTS) AND RELATED EQUIPMENT**

**SUMMARY:**

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

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

- C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

**SUPPORTING DEVICES:**

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

- ALLIED TUBE AND CONDUIT
- B-LINE SYSTEM
- UNISTRUT DIVERSIFIED PRODUCTS
- THOMAS & BETTS

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

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

**SUPPORTING DEVICES:**

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

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

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

- D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

- E. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

**ELECTRICAL IDENTIFICATION:**

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

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

**SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT**

**CONDUIT:**

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

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

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

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

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

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

**HUBS AND BOXES:**

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

- B. CABLE TERMINATION FITTINGS FOR CONDUIT
  - CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL.
  - CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

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

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

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

**SUPPLEMENTAL GROUNDING SYSTEM**

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

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

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

**EXISTING STRUCTURE:**

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

**CONDUIT AND CONDUCTOR INSTALLATION:**

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

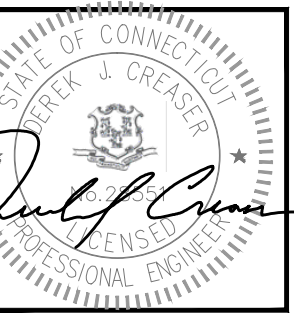
- B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.



3 ENTERPRISE DRIVE  
ALBANY, NY 12204



1600 OSGOOD STREET  
BUILDING 20 NORTH, SUITE 3090 TEL: (978) 557-5553  
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CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
2	05/25/17	CONSTRUCTION FINAL	DJM
1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

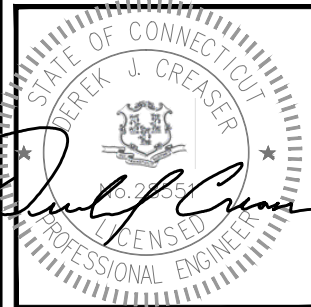
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SITE NAME:  
BRIDGEPORT  
AUGMENT ID:  
CT25XC553  
SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
OUTLINE  
SPECIFICATIONS

SHEET NUMBER  
SP-3

**STRUCTURAL NOTES:**  
 PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO EQUIPMENT PLATFORM STRUCTURAL ANALYSIS PROVIDED BY HUDSON DESIGN GROUP LLC DATED 05/05/17 AND TOWER STRUCTURAL ANALYSIS PROVIDED BY TOWER OWNER DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

**NOTE:**  
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



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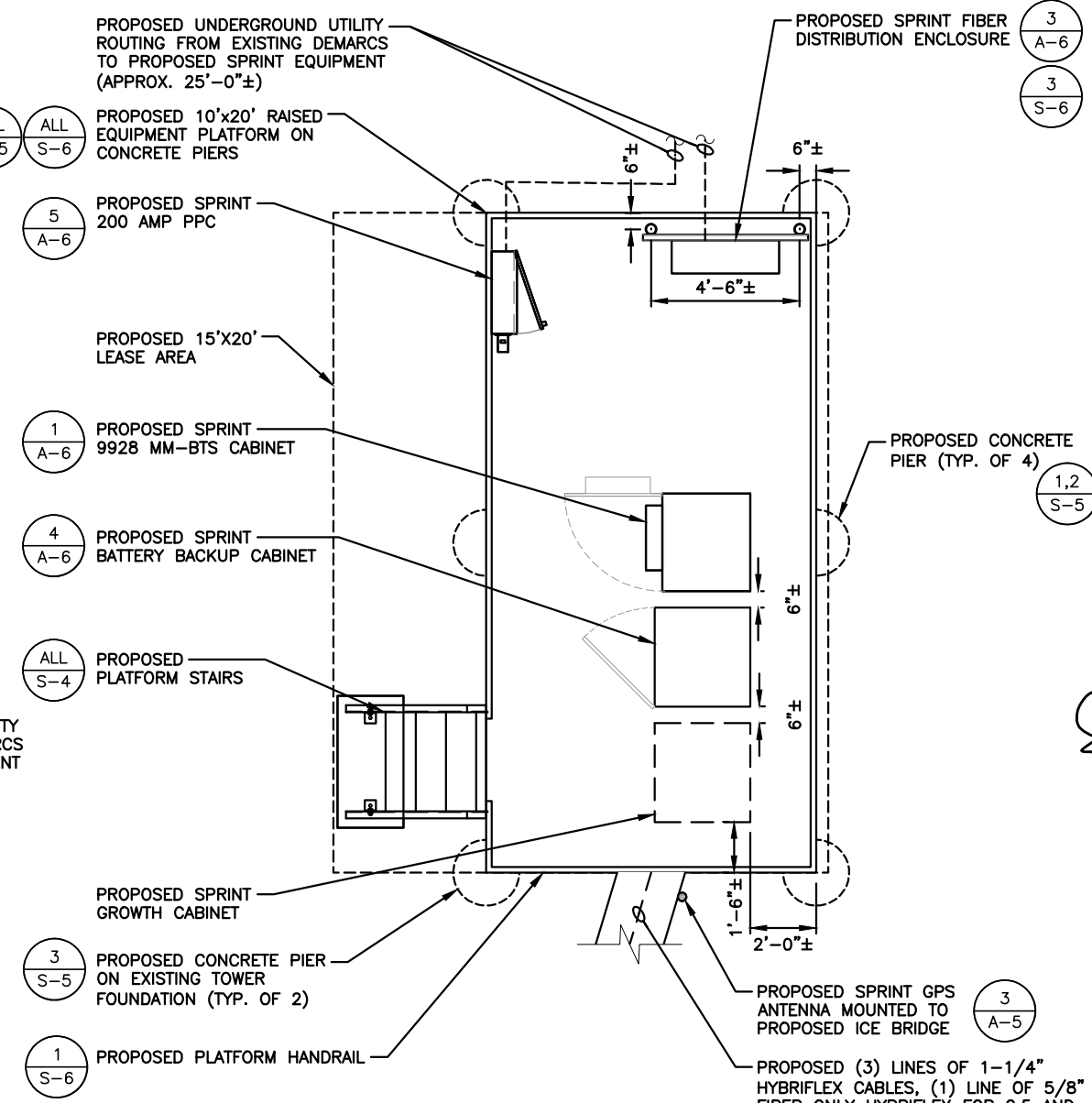
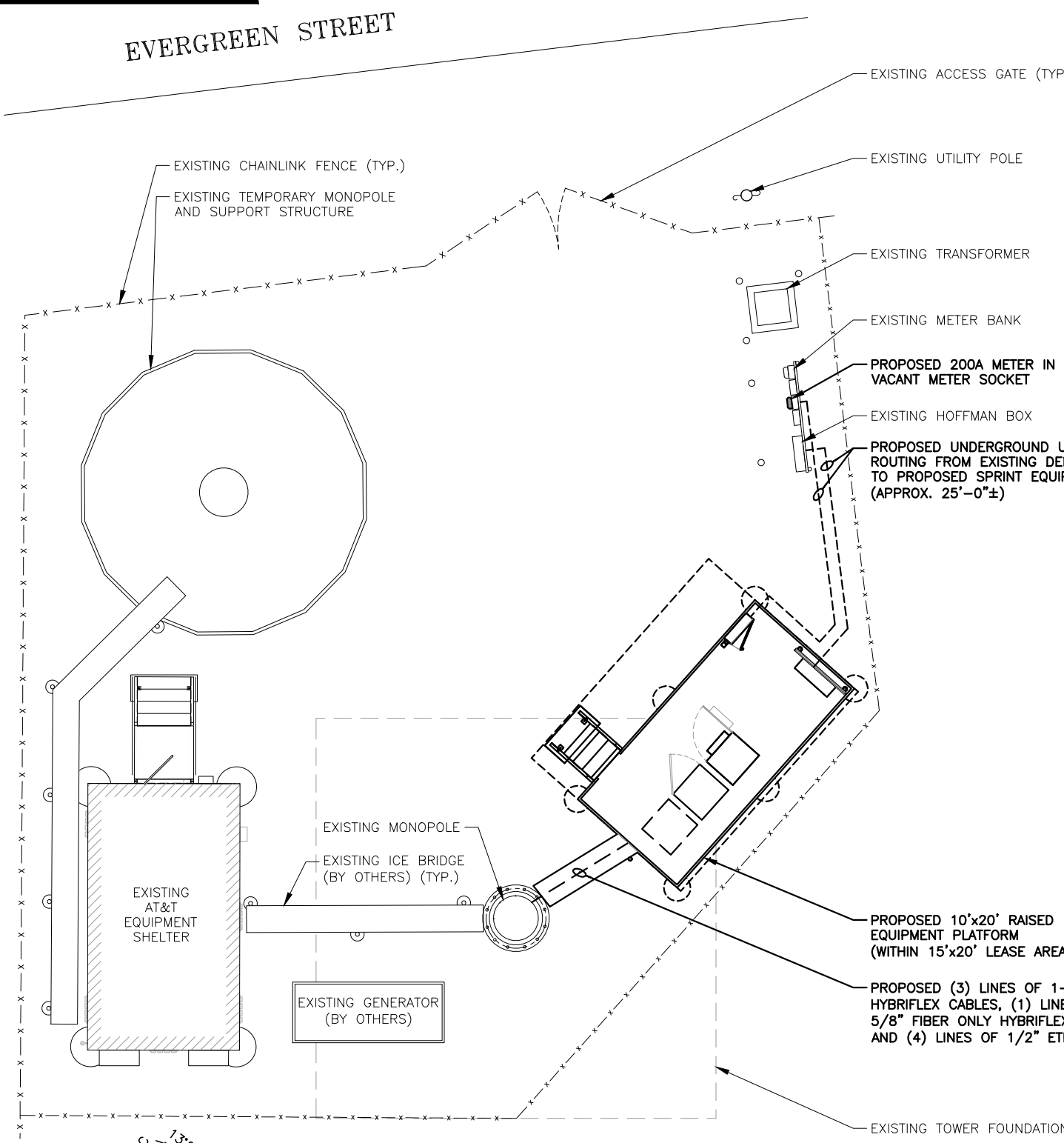
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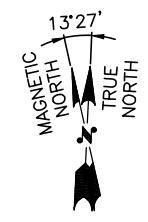
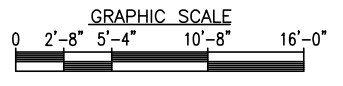
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 BRIDGEPORT, CT 06606  
 FAIRFIELD COUNTY

SHEET TITLE  
 COMPOUND AND  
 EQUIPMENT PLANS

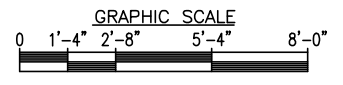
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**A-1**



**COMPOUND PLAN** (1) A-1  
 22x34 SCALE: 3/16"=1'-0"  
 11x17 SCALE: 3/32"=1'-0"

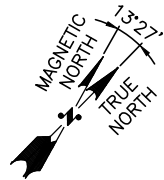
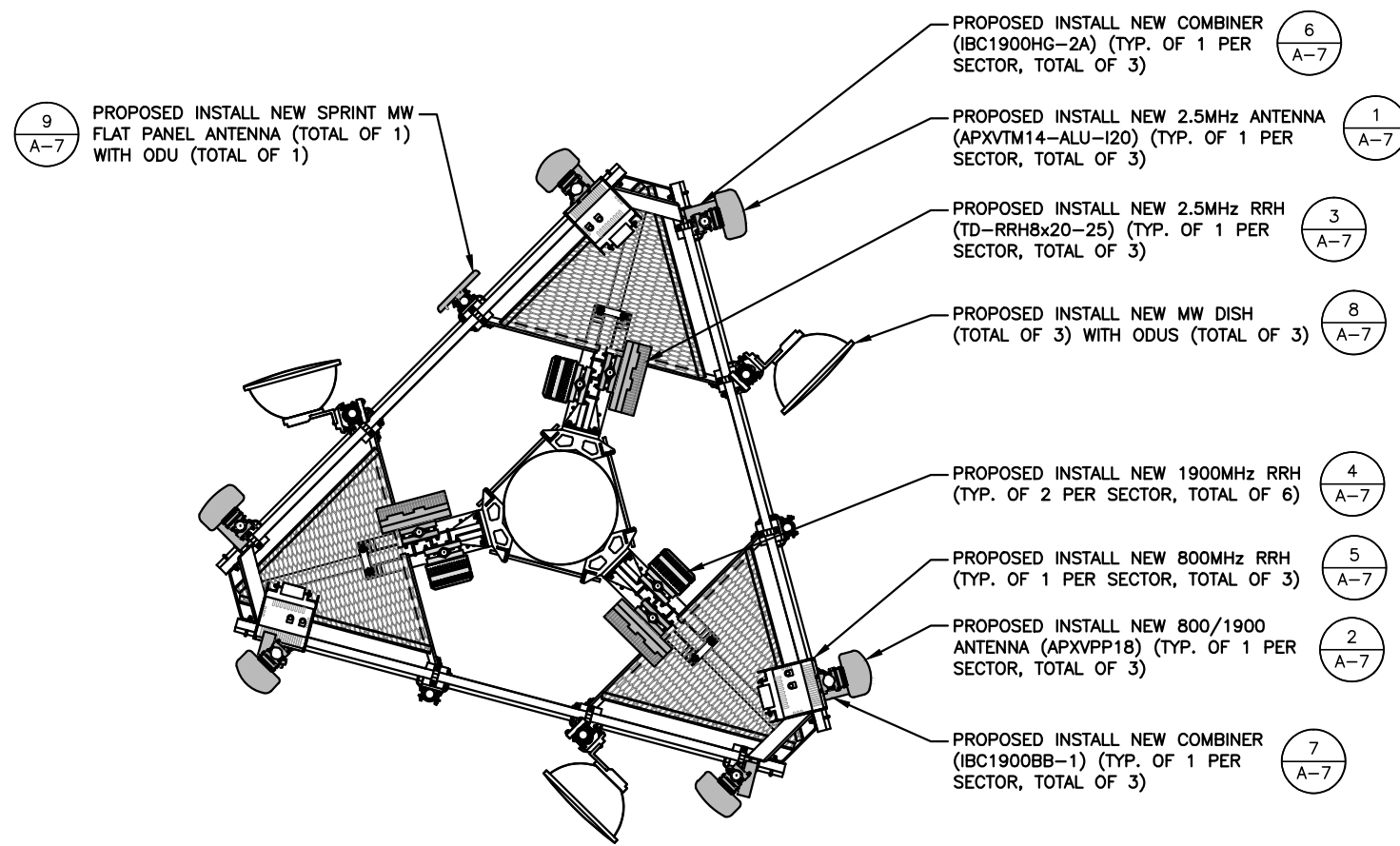
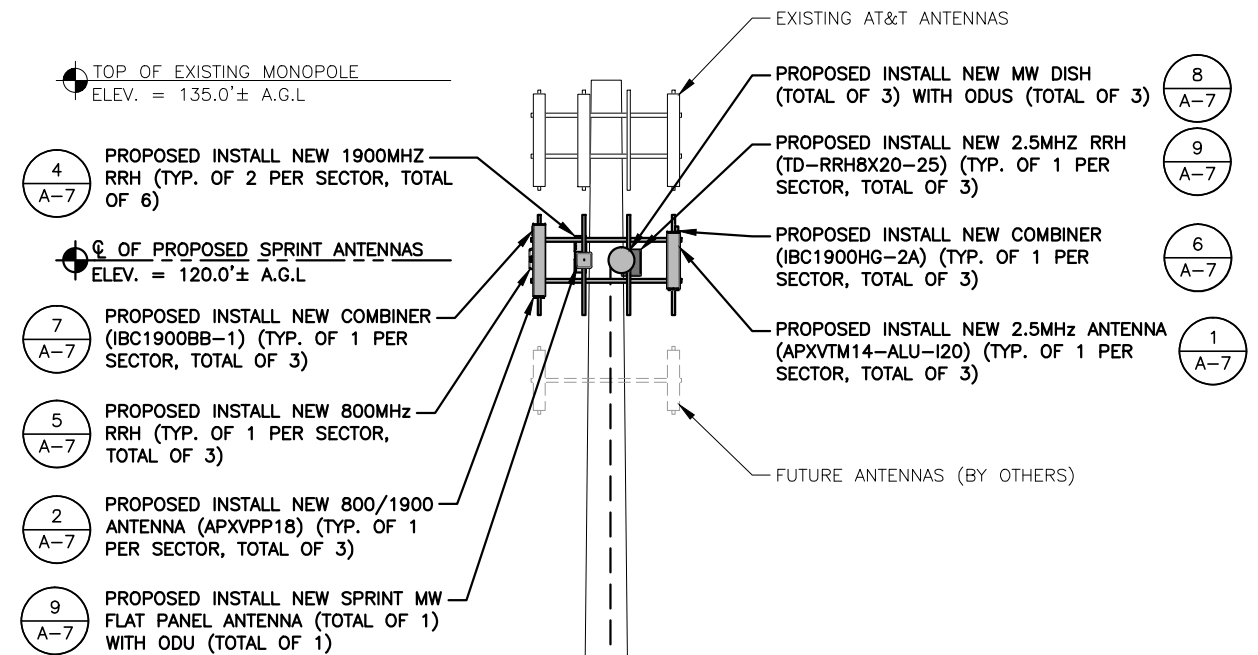


**EQUIPMENT PLAN** (2) A-1  
 22x34 SCALE: 3/8"=1'-0"  
 11x17 SCALE: 3/16"=1'-0"

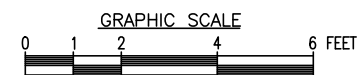


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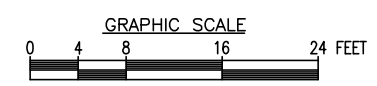
**NOTE:**  
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



**PROPOSED ANTENNA LAYOUT** 1  
 A-2  
 22x34 SCALE: 1/2"=1'-0"  
 11x17 SCALE: 1/4"=1'-0"



**ELEVATION** 2  
 A-2  
 22x34 SCALE: 1/8"=1'-0"  
 11x17 SCALE: 1/16"=1'-0"



**Sprint**

3 ENTERPRISE DRIVE  
 ALBANY, NY 12204

**Hudson Design Group**

1600 OSGOOD STREET  
 BUILDING 20 NORTH, SUITE 3090  
 N. ANDOVER, MA 01845

TEL: (978) 557-5553  
 FAX: (978) 336-5586

STATE OF CONNECTICUT  
 DEREK J. CREASER  
 No. 2555  
 LICENSED PROFESSIONAL ENGINEER

*Derek J. Creaser*

CHECKED BY: BB

APPROVED BY: DJC

**SUBMITTALS**

REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
2	05/25/17	CONSTRUCTION FINAL	DJM
1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

SITE NUMBER:  
 CT25XC553

SITE NAME:  
 BRIDGEPORT

AUGMENT ID:  
 CT25XC553

SITE ADDRESS:  
 220 EVERGREEN STREET  
 BRIDGEPORT, CT 06606  
 FAIRFIELD COUNTY

SHEET TITLE  
 ANTENNA LAYOUT  
 AND ELEVATION

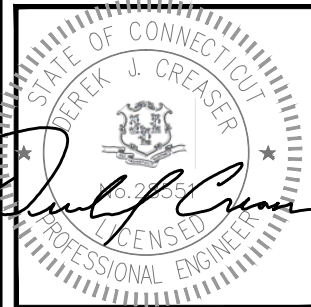
SHEET NUMBER  
**A-2**

**SPRINT CONSTRUCTION STANDARDS:**

GENERAL CONTRACTOR SHALL ADHERE TO THE FOLLOWING SPRINT CONSTRUCTION STANDARDS.

- CONSTRUCTION STANDARDS: INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES - (CURRENT VERSION), INCLUDING EXHIBITS A-M.
- CONSTRUCTION SPECIFICATIONS: CONSTRUCTION STANDARDS EXHIBIT A - STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES (CURRENT VERSION).
- GROUNDING STANDARDS: EXTERIOR GROUNDING SYSTEM DESIGN. GROUNDING STANDARDS (SUPPLEMENT): ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412 AND SPRINT ENGINEERING LETTER EL-0504 DATED 04.20.12.
- WEATHER PROOFING STANDARDS: EXCERPT FROM CONSTRUCTION STANDARDS EXHIBIT A, SECTION 3.6 WEATHERPROOFING CONNECTORS AND GROUND KITS.
- COLOR CODING: SPRINT NEXTEL ANT AND LINE COLOR CODING PER SPRINT TS-0200 CURRENT VERSION.
- GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT IN RFDS, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING SPRINT-PROVIDED CONTACT INFORMATION FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5G ANTENNA AT SAME CL HEIGHT AS 1.9G ANTENNA AND EMAIL CORRECT CL HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILD DRAWING WITH CORRECT CL HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
- AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5G. TEST INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
- GENERAL CONTRACTOR MUST INSURE THAT NO OBJECT IS LOCATED IN FRONT OF ANTENNA. THIS MEANS NO OBJECT IS TO BE LOCATED 45 DEGREES LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5G ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
- GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREES. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL. [HTTP://WWW.3ZTELECOM.COM/ANTENNA-ALIGNMENT-TOOL/](http://www.3ztelecom.com/antenna-alignment-tool/).

**NOTE:**  
REFER TO LATEST SPRINT RFDS  
PRIOR TO CONSTRUCTION



CHECKED BY: BB

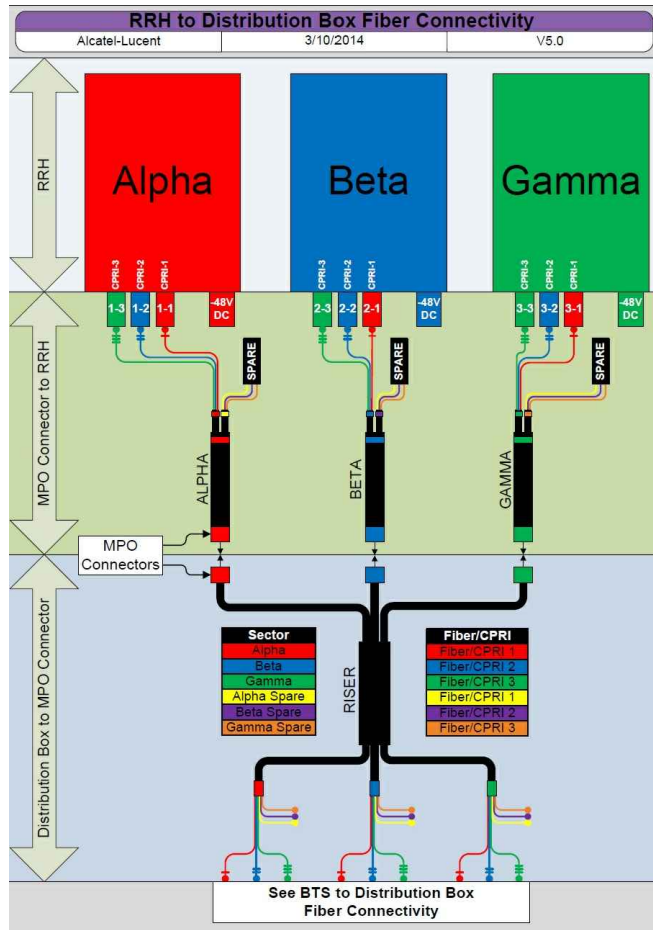
APPROVED BY: DJC

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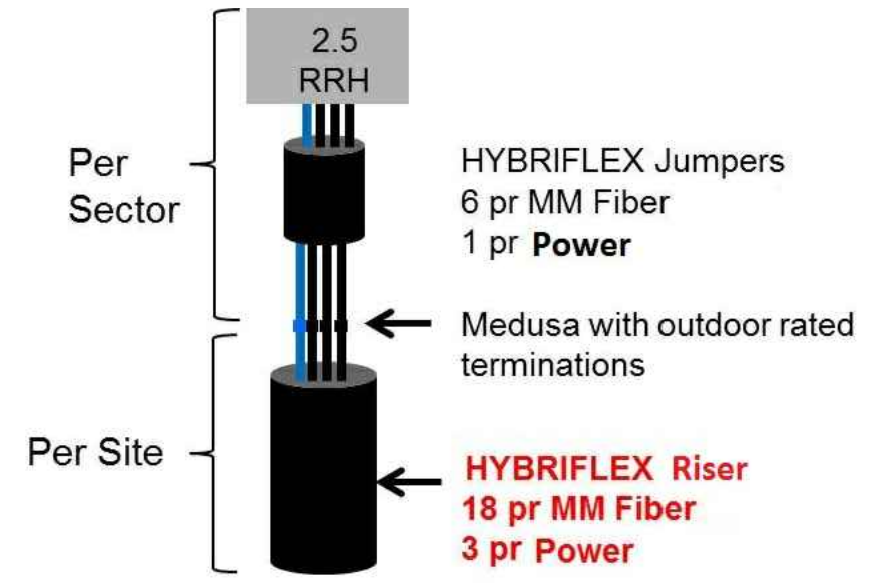
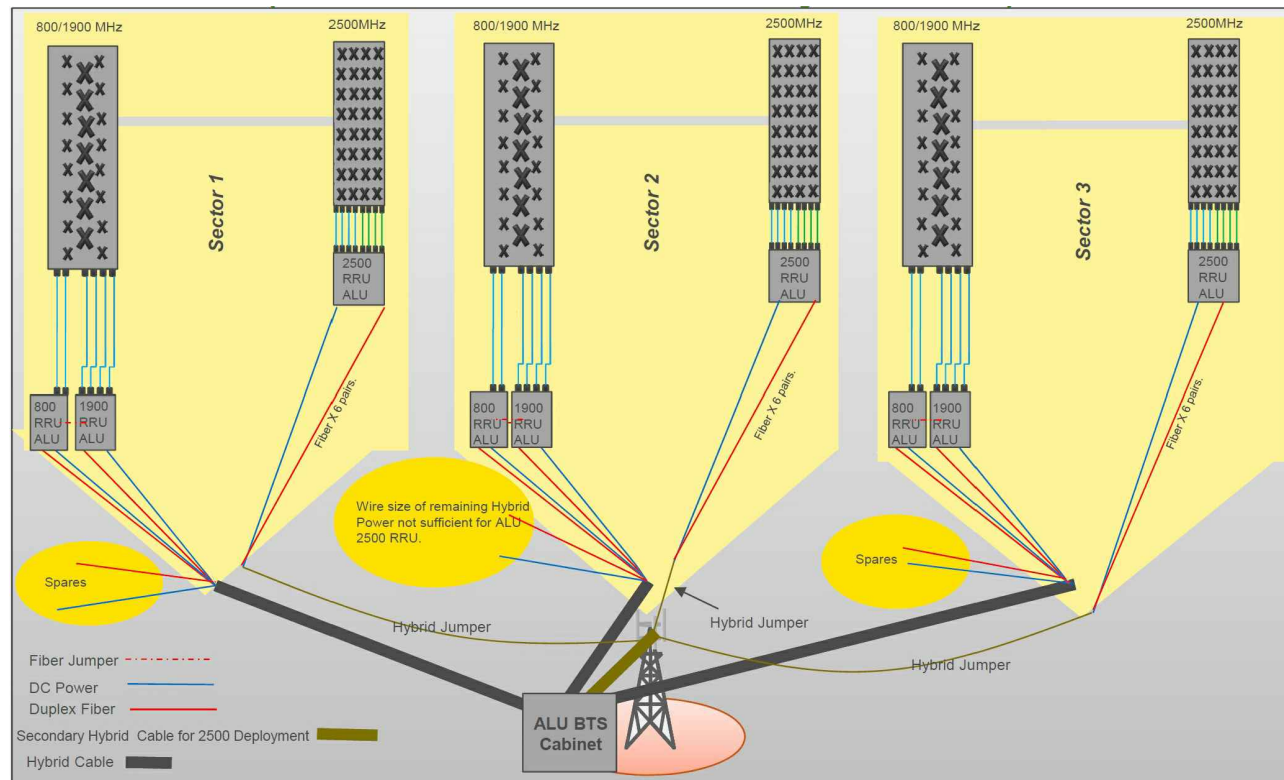
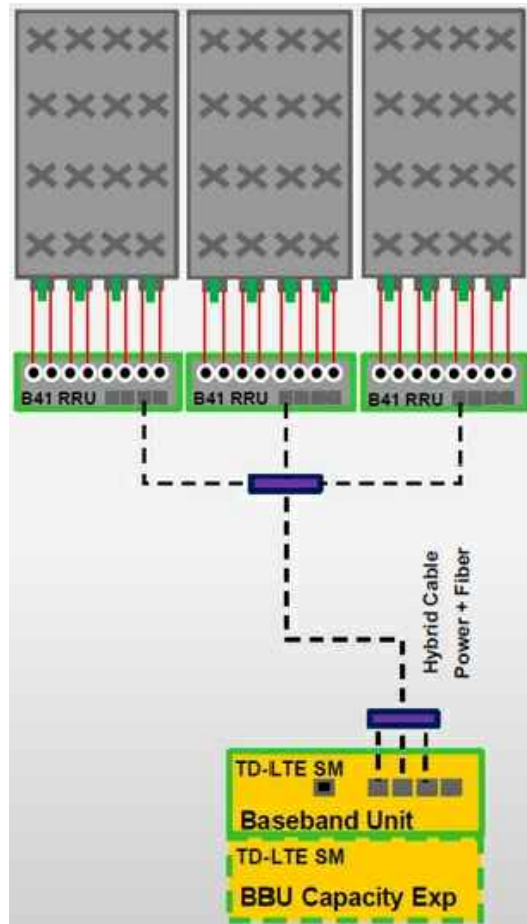
SITE NUMBER:  
CT25XC553  
SITE NAME:  
BRIDGEPORT  
AUGMENT ID:  
CT25XC553  
SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
RF DATA SHEET

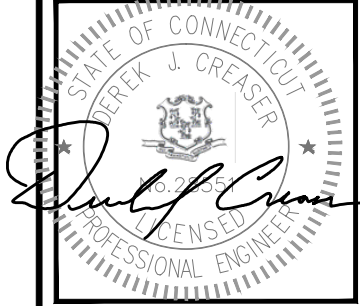
SHEET NUMBER  
A-3



**CABLE COLOR CODING DIAGRAM** 1  
 SCALE: N.T.S. A-4



**NOTE:**  
 GENERAL CONTRACTOR SHALL VERIFY THAT THE LATEST RF DATA SHEET IS USED FOR EQUIPMENT INSTALLATION.



CHECKED BY: BB

APPROVED BY: DJC

**SUBMITTALS**

REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
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 220 EVERGREEN STREET  
 BRIDGEPORT, CT 06606  
 FAIRFIELD COUNTY

SHEET TITLE  
 RAN WIRING DIAGRAM

SHEET NUMBER  
**A-4**

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
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 CT25XC553  
 SITE ADDRESS:  
 220 EVERGREEN STREET  
 BRIDGEPORT, CT 06606  
 FAIRFIELD COUNTY

SHEET TITLE  
 EQUIPMENT DETAILS

SHEET NUMBER  
**A-5**

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE				
MANUF:	RFS			
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER	
FIBER ONLY	VARIES	USE NV HYBRIFLEX	5/8"	
HYBRIFLEX	<200'	8 AWG	1-1/4"	
HYBRIFLEX	225-300'	6 AWG	1-1/4"	
HYBRIFLEX	325-375'	4 AWG	1-1/4"	

**RFS HYBRIFLEX RISER CABLE SCHEDULE**

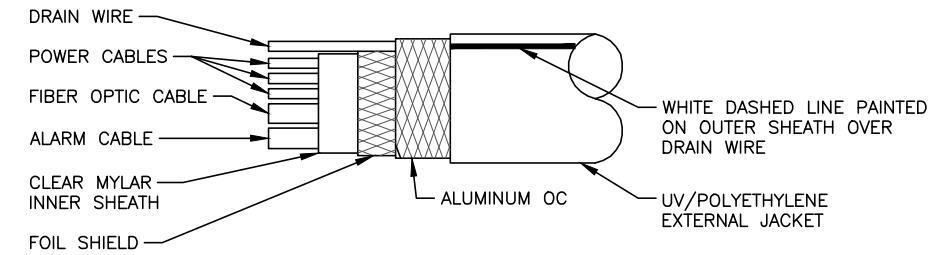
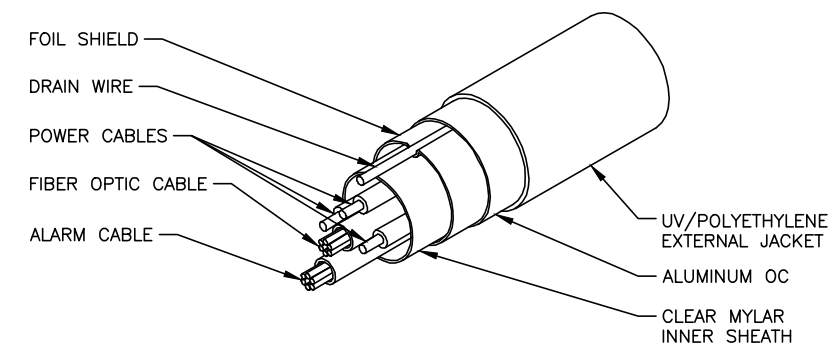
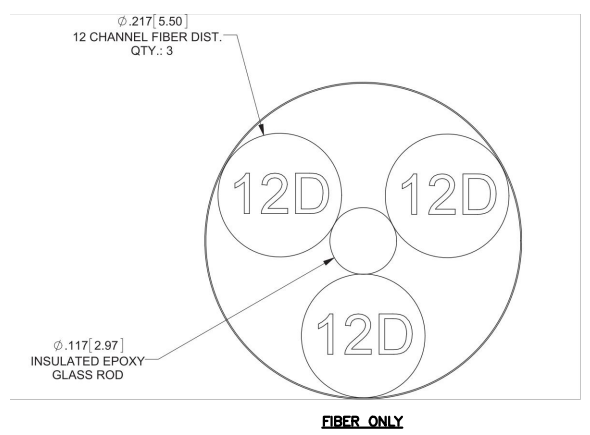
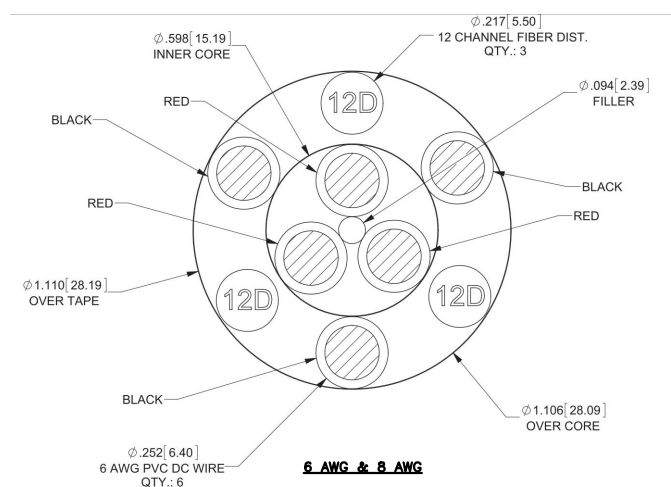
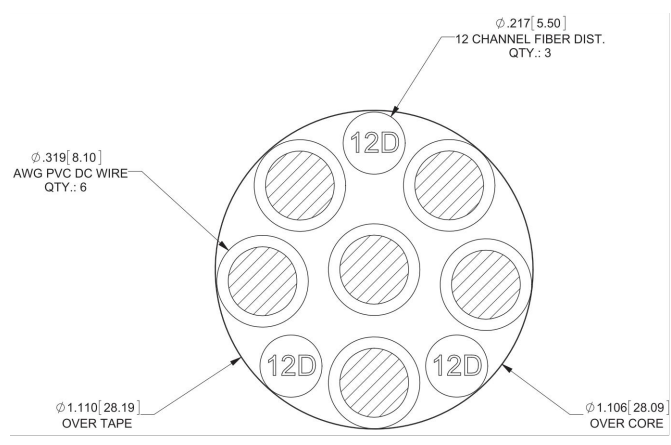
Power	Description	Length
Fiber Only (Existing DC Power)	Hybrid cable MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom: LC Connectors, 5/8 cable, 50 ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN: HB058-M12-125F	125 ft
	MN: HB058-M12-150F	150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

**RFS HYBRIFLEX JUMPER CABLE SCHEDULE**

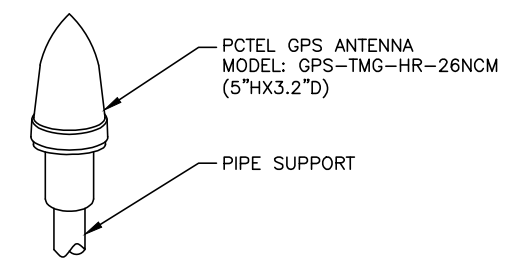
Power	Description	Length
Fiber Only	Hybrid Jumper cable MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power (*)	Hybrid Jumper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

\* NOTE: SPRINT CM TO CONFIRM HYBRID RISER CABLE AND HYBRID JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

**2.5 HYBRID CABLE X-SECTION AND DATA**



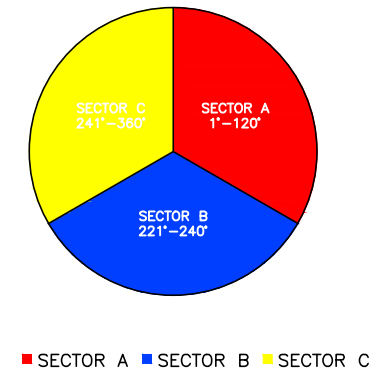
**HYBRIFLEX CABLE DETAIL**  
 SCALE: N.T.S.



**GPS ANTENNA DETAIL**  
 SCALE: N.T.S.

MICROWAVE SWEEPBACK COLOR-CODING		
AZIMUTH	MARKING METHOD COLORED BANDS	MARKING METHOD NUMBER OF BANDS
1°-120°	RED	SMALLEST # THIS RANGE = R1 NEXT LARGER # =R2
121°-240°	BLUE	SMALLEST # THIS RANGE = B1 NEXT LARGER # =B2
241°-360°	YELLOW	SMALLEST # THIS RANGE = Y1 NEXT LARGER # =Y2

**SPRINT SECTOR DIAGRAM AND AZIMUTHS**



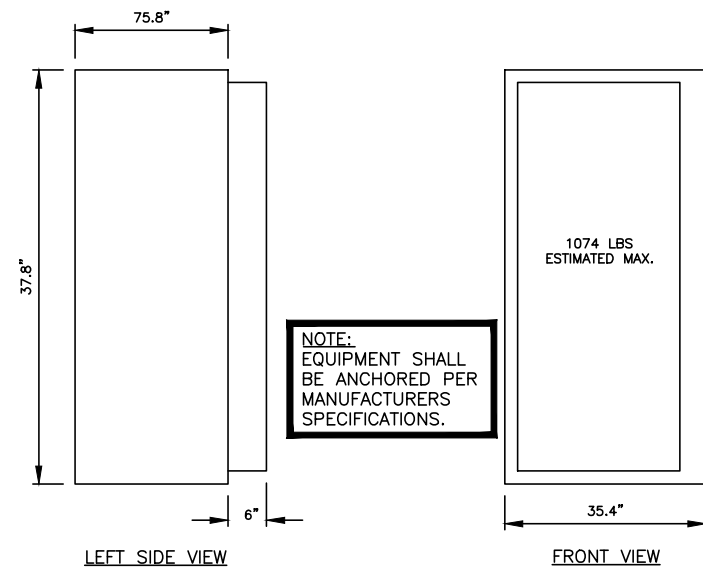
NOTES:  
 LABEL EACH ANTENNA ABOVE THE DOWN-TILT KNOB AND ON THE DOWN-TILT OUTER CAP WITH COLORED TAPE, LABEL AS FOLLOWS:  
 RED: RFU\_1 BLUE: RFU\_2 YELLOW: RFU\_3

ETHERNET CABLES SHALL BE PLACED INSIDE INNER DUCT AND ATTACHED TO TOWER.

**SECTOR DIAGRAM & AZIMUTH**  
 SCALE: N.T.S.

SCALE: N.T.S.



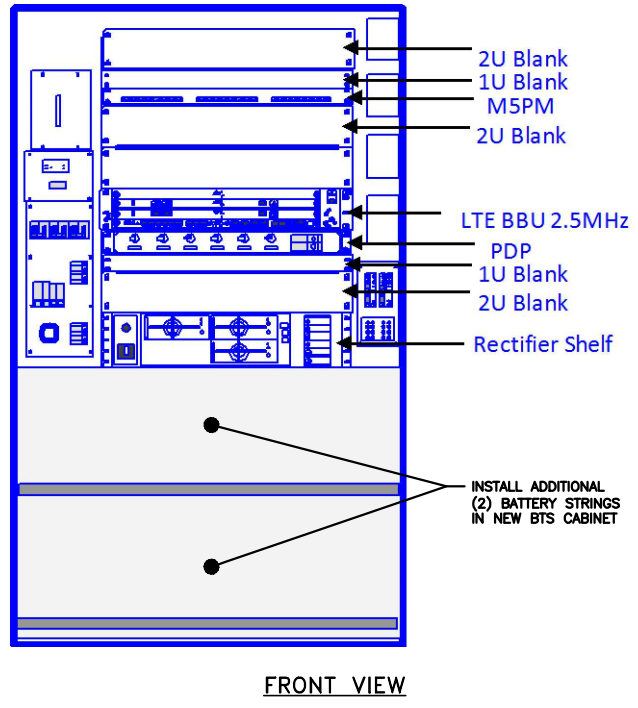


NOTE:  
EQUIPMENT SHALL  
BE ANCHORED PER  
MANUFACTURERS  
SPECIFICATIONS.

9928 DISTRIBUTION BASE STATION CABINET DIMENSIONS	
MODEL #	9928
MANUF.	ALCATEL-LUCENT
HEIGHT	75.8"
WIDTH	35.4"
DEPTH	37.8"
WEIGHT	1074 LBS
NOTE: INSTALL CABINET ANCHORS PER MANUFACTURER'S INSTALLATION GUIDELINES	

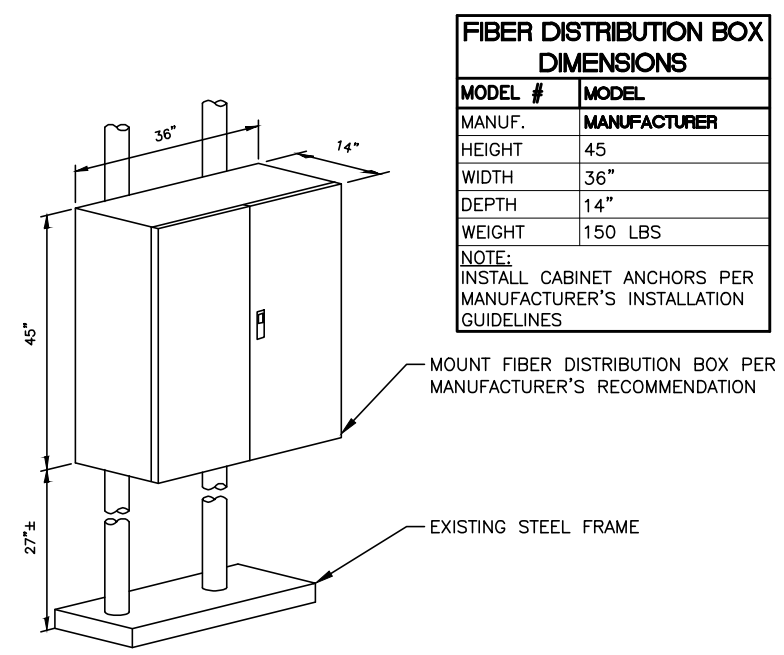
**ALCATEL-LUCENT 9928 OUTDOOR CABINET**  
SCALE: N.T.S.

1  
A-6



**PROPOSED MMBTS OUTDOOR CABINET  
WITH LTE 2.5 BBU EQUIPMENT**  
SCALE: N.T.S.

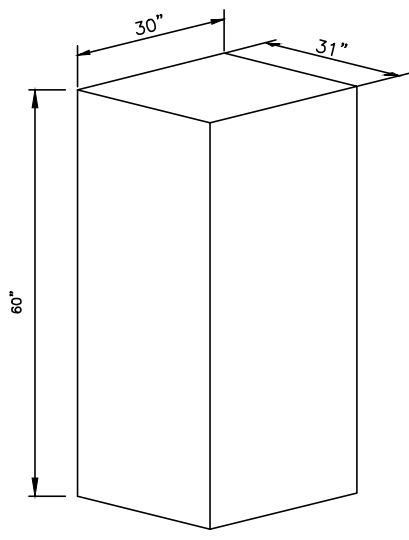
2  
A-6



FIBER DISTRIBUTION BOX DIMENSIONS	
MODEL #	MODEL
MANUF.	MANUFACTURER
HEIGHT	45
WIDTH	36"
DEPTH	14"
WEIGHT	150 LBS
NOTE: INSTALL CABINET ANCHORS PER MANUFACTURER'S INSTALLATION GUIDELINES	

**FIBER DISTRIBUTION BOX**  
SCALE: N.T.S.

3  
A-6

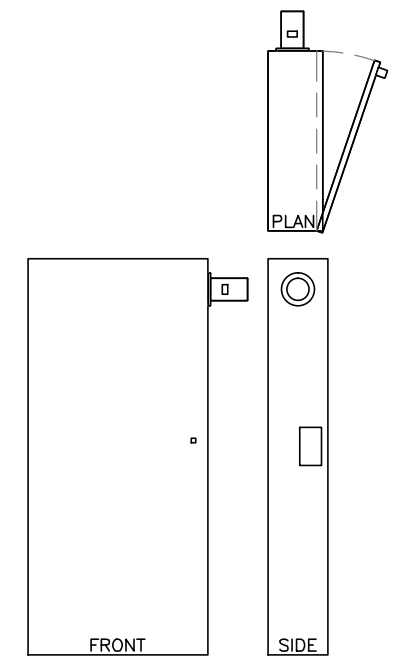


60ECV2 BATTERY CABINET DIMENSIONS	
MODEL #	60ECV2
MANUF.	ALCATEL-LUCENT
HEIGHT	60
WIDTH	30"
DEPTH	31"
WEIGHT	2830 LBS
NOTE: INSTALL CABINET ANCHORS PER MANUFACTURER'S INSTALLATION GUIDELINES	

**60ECV2 BATTERY BACK-UP CABINET**  
SCALE: N.T.S.

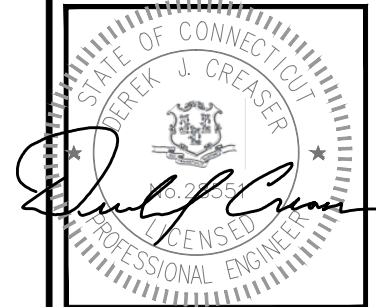
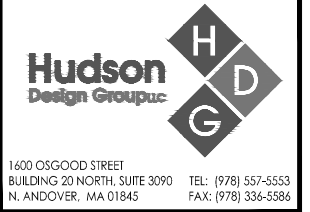
4  
A-6

PPC DIMENSIONS	
MODEL #	CS2S2-W736
MANUF.	EMERSON
WIDTH	30"
DEPTH	10"
HEIGHT	66"
WEIGHT	150 LBS
NOTE: INSTALL CABINET ANCHORS PER MANUFACTURER'S INSTALLATION GUIDELINES	



**POWER PROTECTION CABINET (PPC)**  
SCALE: N.T.S.

5  
A-6



CHECKED BY: BB

APPROVED BY: DJC

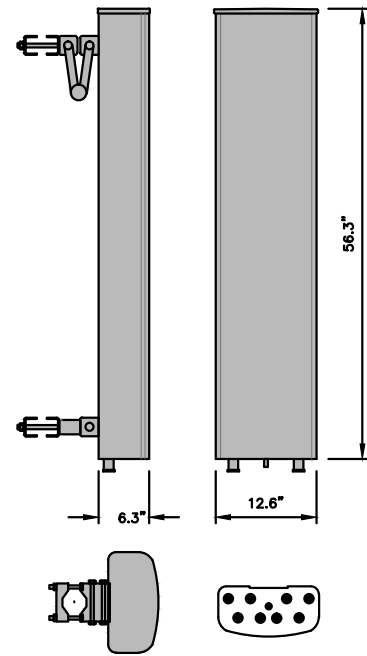
SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
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BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
EQUIPMENT DETAILS

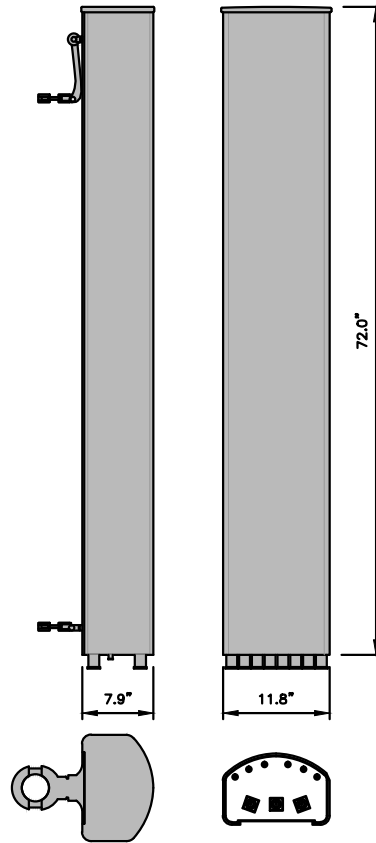
SHEET NUMBER  
**A-6**

2.5MHZ ANTENNA DIMENSIONS	
MODEL #	APXVTM14-ALU-I20
MANUF.	RFS
HEIGHT	56.3"
WIDTH	12.6"
DEPTH	6.3"
WEIGHT	56.2 LBS



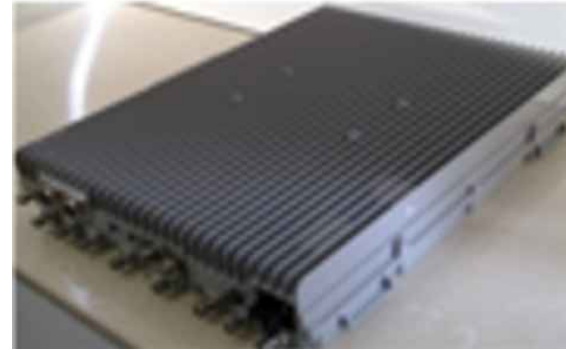
**2.5MHz ANTENNA DETAIL** 1  
SCALE: N.T.S. A-7

800/1900MHZ ANTENNA DIMENSIONS	
MODEL #	APXCSP18-C-A20
MANUF.	RFS
HEIGHT	72.0"
WIDTH	11.8"
DEPTH	7.9"
WEIGHT	62.0 LBS



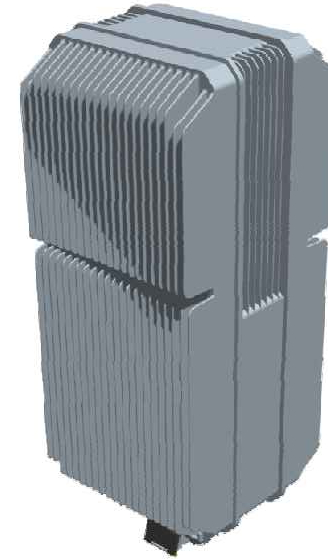
**800/1900 MHZ ANTENNA DETAIL** 2  
SCALE: N.T.S. A-7

2.5MHZ RRH DIMENSIONS	
MODEL #	TD-RRH8X20-25
MANUF.	NOKIA/ ALU
LENGTH	26.1"
WIDTH	18.6"
DEPTH	6.7"
WEIGHT	70 LBS



**2.5MHz RRH DETAIL** 3  
SCALE: N.T.S. A-7

1900MHZ RRH DIMENSIONS	
MODEL #	1900MHZ RRH 65MHZ
MANUF.	ALCATEL-LUCENT
LENGTH	25"
WIDTH	11.1"
DEPTH	11.4"
WEIGHT	60 LBS



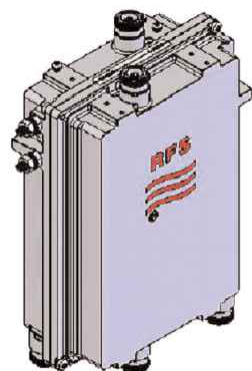
**1900 MHZ RRH DETAIL** 4  
SCALE: N.T.S. A-7

800MHZ RRH DIMENSIONS	
MODEL #	800MHZ RRH
MANUF.	ALCATEL-LUCENT
LENGTH	15.75"
WIDTH	13"
DEPTH	9.8"
WEIGHT	53 LBS



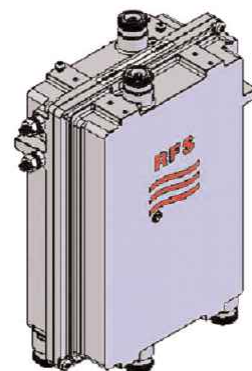
**800 MHZ RRH DETAIL** 5  
SCALE: N.T.S. A-7

COMBINER DIMENSIONS	
MODEL #	IBC1900HG-2A
MANUF.	RFS
LENGTH	12.6"
WIDTH	9.2"
DEPTH	4.35"
WEIGHT	22 LBS



**COMBINER DETAIL** 6  
SCALE: N.T.S. A-7

COMBINER DIMENSIONS	
MODEL #	IBC1900-BB-1
MANUF.	RFS
LENGTH	-
WIDTH	-
DEPTH	-
WEIGHT	-



**COMBINER DETAIL** 7  
SCALE: N.T.S. A-7

COMBINER DIMENSIONS	
MODEL #	VHLP2-18
MANUF.	ANDREW
DIAMETER	26"
DEPTH	11.4
WEIGHT	17 LBS



**MICROWAVE DISH ANTENNA** 8  
SCALE: N.T.S. A-7

COMBINER DIMENSIONS	
MODEL #	MT-485025/NVH
MANUF.	MTI
LENGTH	14.6"
WIDTH	14.6"
DEPTH	1.5"
WEIGHT	5.5 LBS



**MICROWAVE PANEL ANTENNA** 9  
SCALE: N.T.S. A-7

**Sprint**  
3 ENTERPRISE DRIVE  
ALBANY, NY 12204

**Hudson Design Group**  
1600 OSGOOD STREET  
BUILDING 20 NORTH, SUITE 3090  
N. ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

STATE OF CONNECTICUT  
DEREK J. CREASER  
No. 2555  
LICENSED PROFESSIONAL ENGINEER

*Derek J. Creaser*

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS			
REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
2	05/25/17	CONSTRUCTION FINAL	DJM
1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

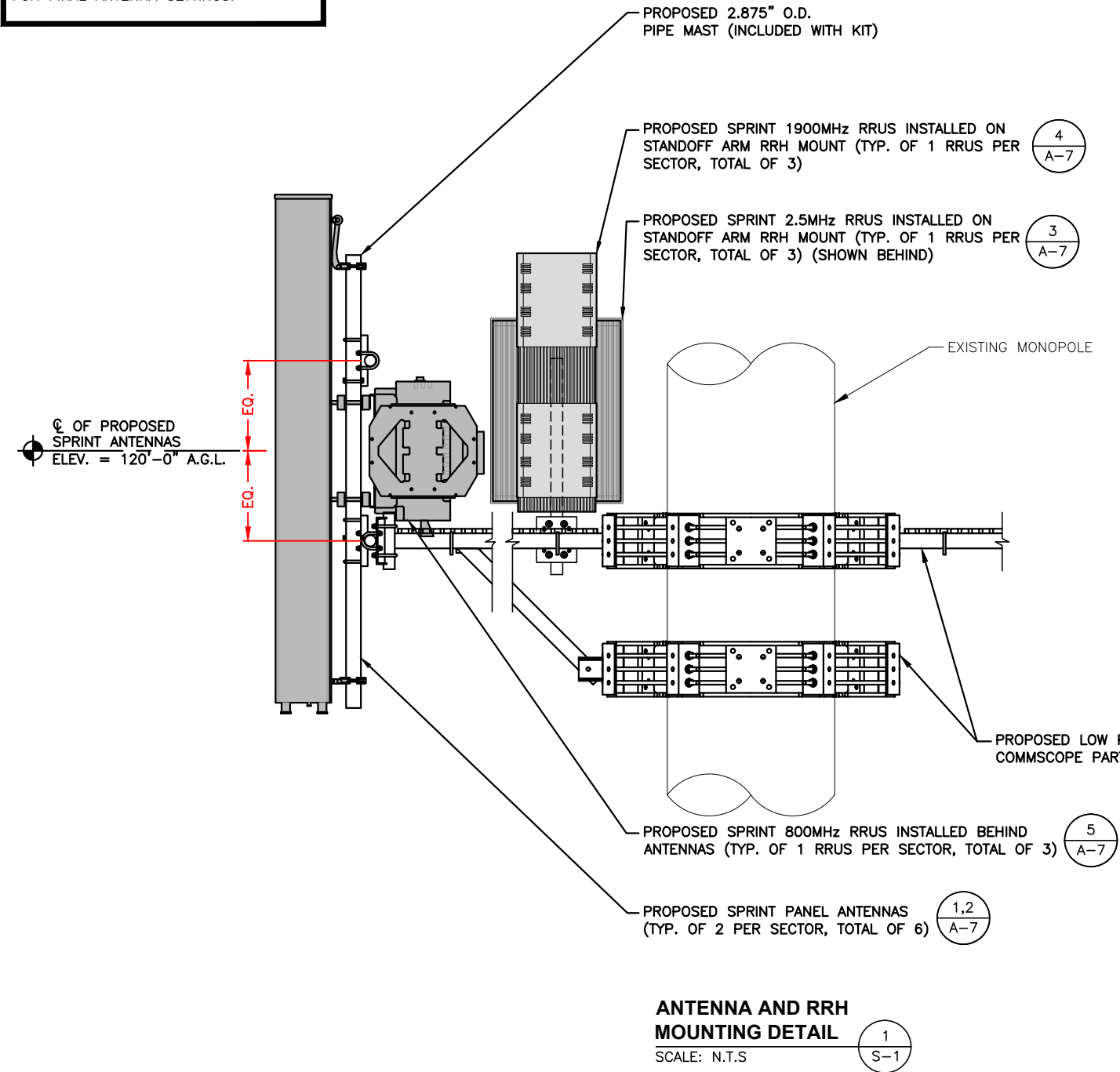
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CT25XC553  
SITE NAME:  
BRIDGEPORT  
AUGMENT ID:  
CT25XC553  
SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
TOWER EQUIPMENT  
DETAILS

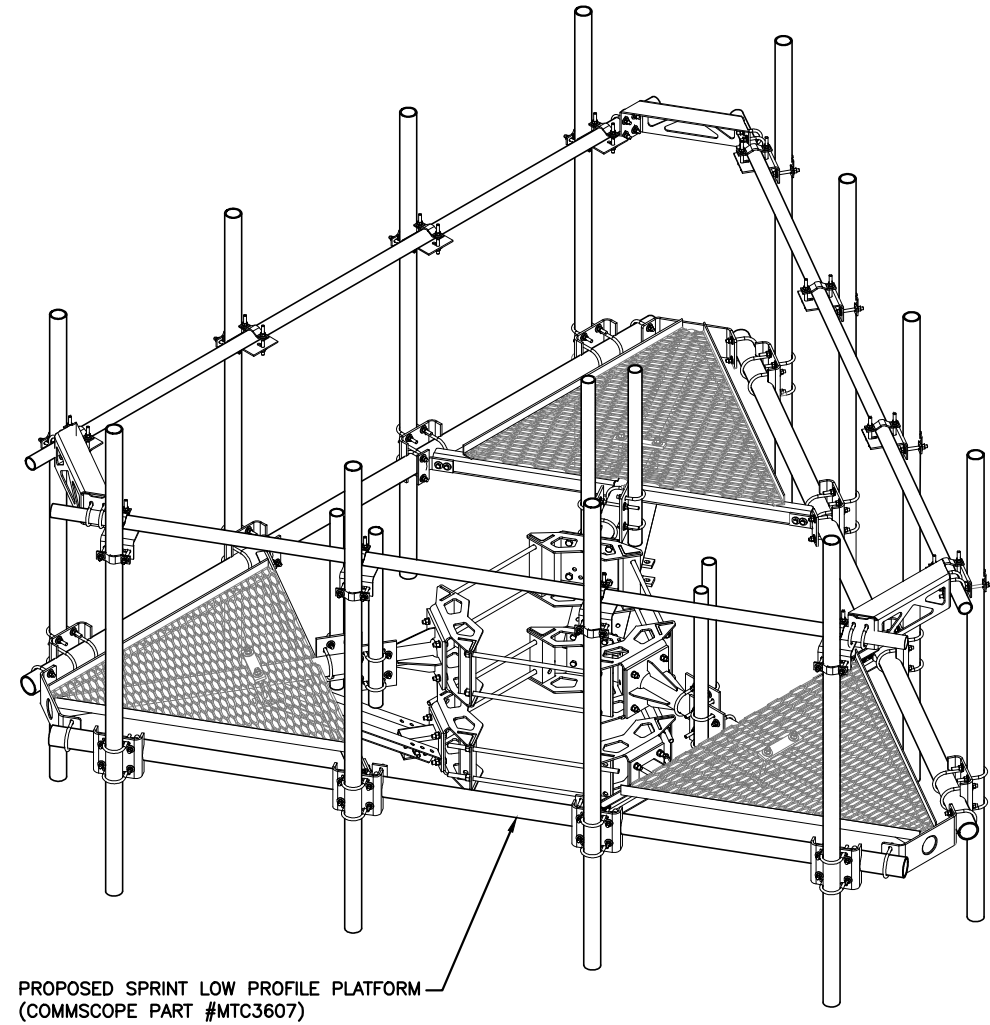
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**A-7**

**STRUCTURAL NOTES:**  
 PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO EQUIPMENT PLATFORM STRUCTURAL ANALYSIS PROVIDED BY HUDSON DESIGN GROUP LLC DATED 05/05/17 AND TOWER STRUCTURAL ANALYSIS PROVIDED BY TOWER OWNER DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

**NOTE:**  
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



**ANTENNA AND RRH MOUNTING DETAIL**  
 SCALE: N.T.S. 1  
S-1



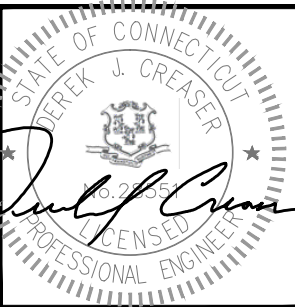
**PROPOSED SPRINT LOW PROFILE PLATFORM**  
 (COMMSCOPE PART #MTC3607)  
**PLATFORM DETAIL**  
 SCALE: N.T.S. 2  
S-1



3 ENTERPRISE DRIVE  
 ALBANY, NY 12204



1600 OSGOOD STREET  
 BUILDING 20 NORTH, SUITE 3090 TEL: (978) 557-5553  
 N. ANDOVER, MA 01845 FAX: (978) 336-5586



CHECKED BY: BB

APPROVED BY: DJC

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 220 EVERGREEN STREET  
 BRIDGEPORT, CT 06606  
 FAIRFIELD COUNTY

SHEET TITLE  
 ANTENNA AND RRH MOUNTING DETAILS

SHEET NUMBER  
**S-1**

**STRUCTURAL NOTES:**

- DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE (IBC 2009), ASCE 7-05, EIA/TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
- DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
- STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
- STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
- STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
- ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
- ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
- FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
- CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D.I.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". 14TH EDITION.
- INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
- UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
- EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-20 AND OR HY-150 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
- EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
- WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
- ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
- NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
- SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS CHECKLIST	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
<b>REQUIRED</b>	ENGINEER OF RECORD APPROVED SHOP DRAWINGS <sup>1</sup>
<b>REQUIRED</b>	MATERIAL SPECIFICATIONS REPORT <sup>2</sup>
N/A	FABRICATOR NDE INSPECTION
N/A	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
<b>REQUIRED</b>	PACKING SLIPS <sup>3</sup>
ADDITIONAL TESTING AND INSPECTIONS:	
DURING CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
<b>REQUIRED</b>	STEEL INSPECTIONS
<b>REQUIRED</b>	HIGH STRENGTH BOLT INSPECTIONS
N/A	HIGH WIND ZONE INSPECTIONS
<b>REQUIRED</b>	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT
N/A	POST INSTALLED ANCHOR ROD VERIFICATION
N/A	BASE PLATE GROUT VERIFICATION
N/A	CERTIFIED WELD INSPECTION
N/A	EARTHWORK: LIFT AND DENSITY
N/A	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
ADDITIONAL TESTING AND INSPECTIONS:	
AFTER CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
<b>REQUIRED</b>	MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS <sup>5</sup>
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
<b>REQUIRED</b>	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

**NOTES:**

- REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
- PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
- PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
- HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
- AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

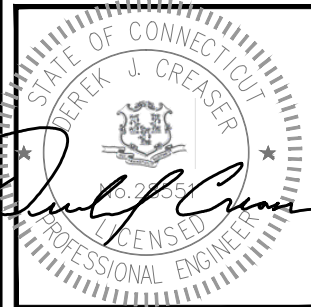
**SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):**

GENERAL: WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.



CHECKED BY: BB

APPROVED BY: DJC

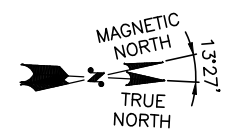
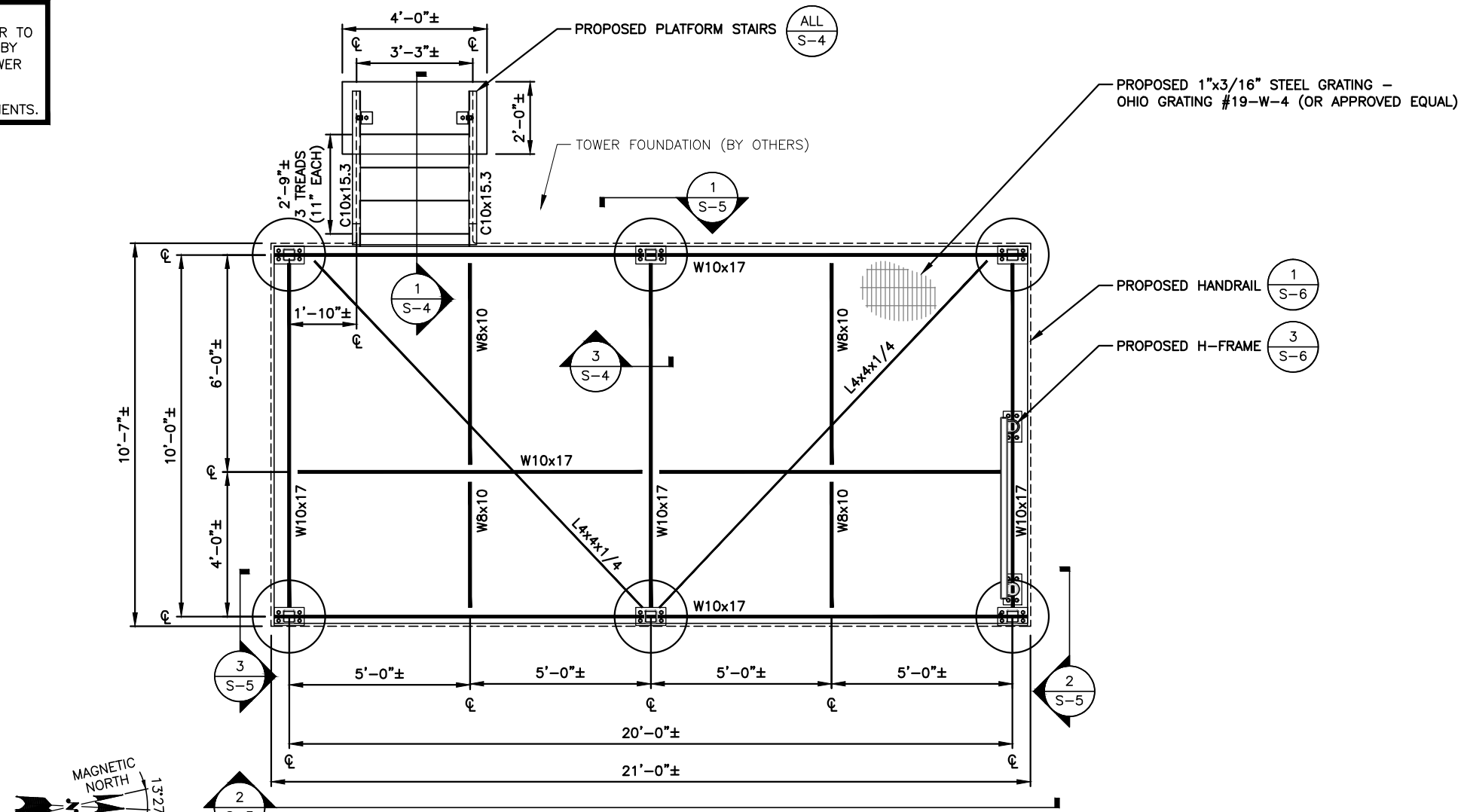
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REV.	DATE	DESCRIPTION	BY
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FAIRFIELD COUNTY

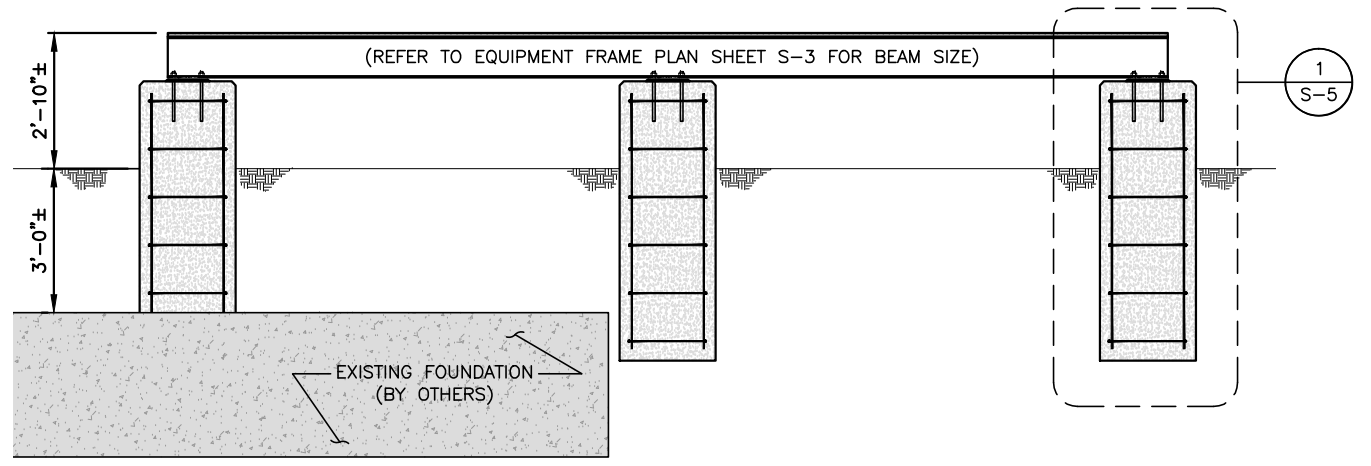
SHEET TITLE  
INSPECTION  
CHECKLIST

SHEET NUMBER  
**S-2**

**STRUCTURAL NOTES:**  
 PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO EQUIPMENT PLATFORM STRUCTURAL ANALYSIS PROVIDED BY HUDSON DESIGN GROUP LLC DATED 05/05/17 AND TOWER STRUCTURAL ANALYSIS PROVIDED BY TOWER OWNER DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.



**STEEL PLATFORM FRAME PLAN** (1 S-3)  
 22x34 SCALE: 1/2"=1'-0"  
 11x17 SCALE: 1/4"=1'-0"  
 GRAPHIC SCALE  
 0 1 2 4 6 FEET



**EQUIPMENT FRAME ELEVATION** (2 S-3)  
 22x34 SCALE: 1/2"=1'-0"  
 11x17 SCALE: 1/4"=1'-0"  
 GRAPHIC SCALE  
 0 1 2 4 6 FEET

**NOTES:**  
 1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4"Ø A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.  
 2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.

**Sprint**  
 3 ENTERPRISE DRIVE  
 ALBANY, NY 12204

**Hudson Design Group LLC**

1600 OSGOOD STREET  
 BUILDING 20 NORTH, SUITE 3090  
 N. ANDOVER, MA 01845  
 TEL: (978) 557-5553  
 FAX: (978) 336-5586

STATE OF CONNECTICUT  
 DEREK J. CREASER  
 No. 22555  
 LICENSED PROFESSIONAL ENGINEER

CHECKED BY: BB  
 APPROVED BY: DJC

**SUBMITTALS**

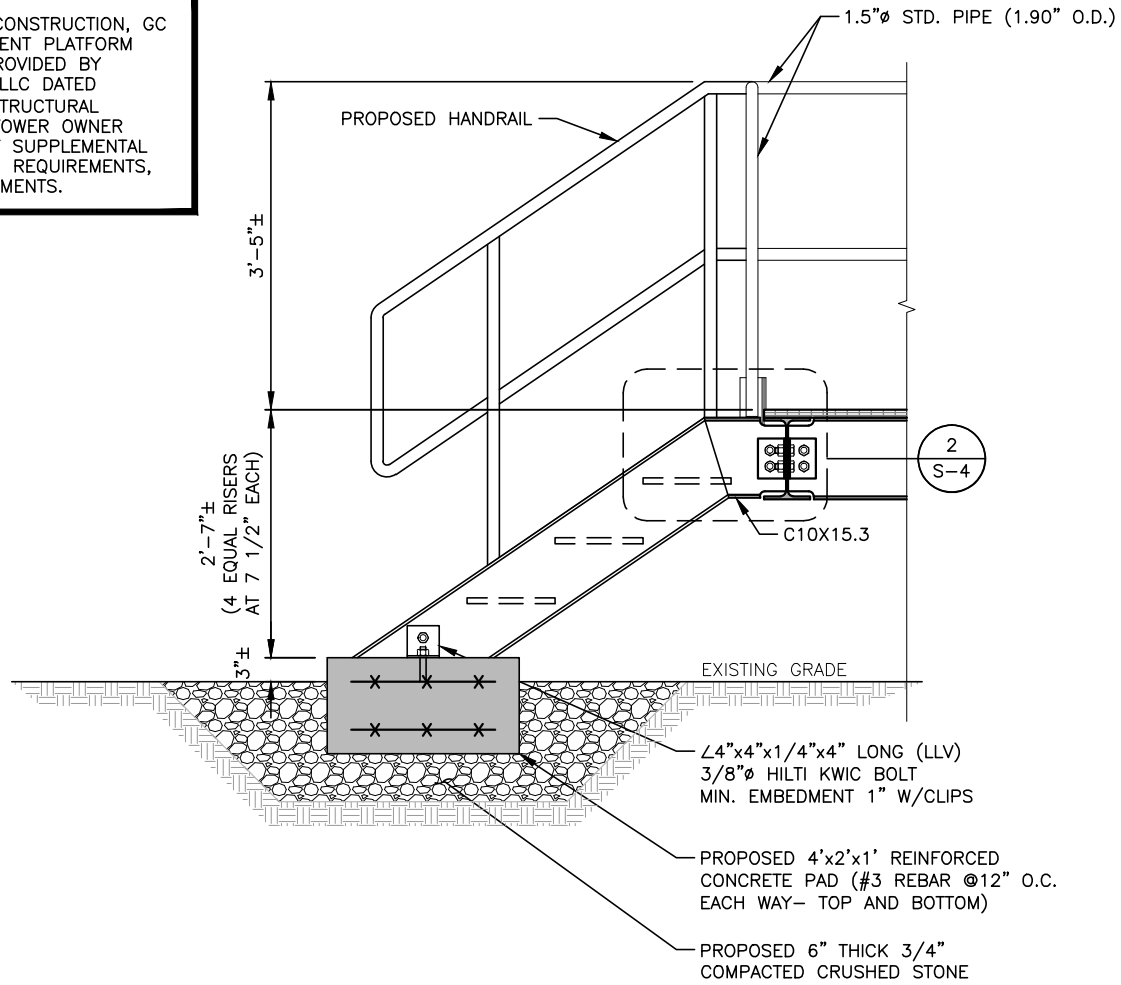
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 220 EVERGREEN STREET  
 BRIDGEPORT, CT 06606  
 FAIRFIELD COUNTY

SHEET TITLE  
 PLATFORM  
 STRUCTURAL  
 DETAILS

SHEET NUMBER  
**S-3**

**STRUCTURAL NOTES:**  
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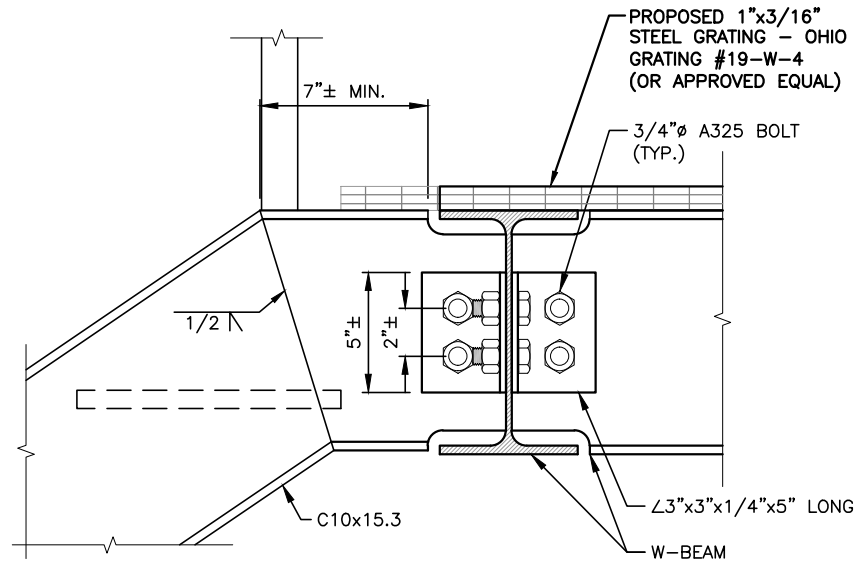


**STAIR DETAIL**

22x34 SCALE: 1"=1'-0"  
 11x17 SCALE: 1/2"=1'-0"

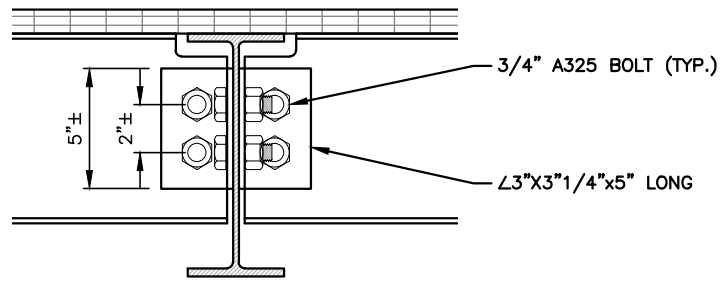
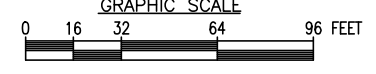


**NOTES:**  
 1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4" A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.  
 2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.



**STAIR CONNECTION DETAIL**

22x34 SCALE: 3"=1'-0"  
 11x17 SCALE: 1-1/2"=1'-0"



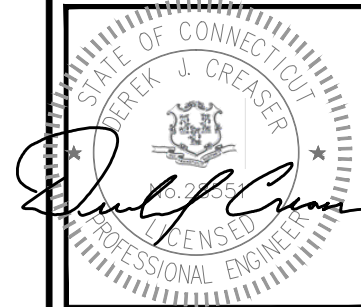
**W8x10 TO W10x17 BEAM CONNECTION**

22x34 SCALE: 3"=1'-0"  
 11x17 SCALE: 1-1/2"=1'-0"



**FOUNDATION NOTES & CONCRETE SPECIFICATIONS:**

- FOUNDATION AREA SHALL BE EXCAVATED TO THE DEPTH AND DIMENSIONS SHOWN ON THE PLANS. EXISTING LEDGE AND ALL OTHER EXISTING UNSUITABLE MATERIAL SHALL BE REMOVED AND LEGALLY DISPOSED OF OFF-SITE. THE SUBGRADE SHALL BE ROLLED WITH A 1-TON, VIBRATORY, WALK-BEHIND ROLLER AT A SPEED OF LESS THAN 2 FPS, 6 PASSES MINIMUM, TO PROVIDE UNYIELDING SURFACE.
- UNDERCUT SOFT OR "WEAVING" AREAS A MINIMUM OF 12 INCHES DEEP. BACKFILL UNDERCUT AREA WITH FILL MEETING THE SPECIFICATIONS OF STRUCTURAL FILL.
- CONCRETE TO HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c)=4000 psi. CONCRETE TO BE AIR ENTRAINED, DESIRED AIR CONTENT TO BE 6% (PLUS OR MINUS 2%)
- REINFORCING BAR TO BE ASTM A615 GRADE 60.
- WELDED WIRE FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A185. WIRES FOR FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A82.
- ALL REINFORCING TO HAVE MINIMUM CONCRETE COVER PER ACI SPECIFICATIONS.
- ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL CONFORM TO LATEST EDITION OF ACI 318 AND APPLICABLE STATE BUILDING CODE.



CHECKED BY: BB

APPROVED BY: DJC

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SHEET TITLE  
 PLATFORM  
 STRUCTURAL  
 DETAILS

SHEET NUMBER  
**S-4**

CHECKED BY: BB

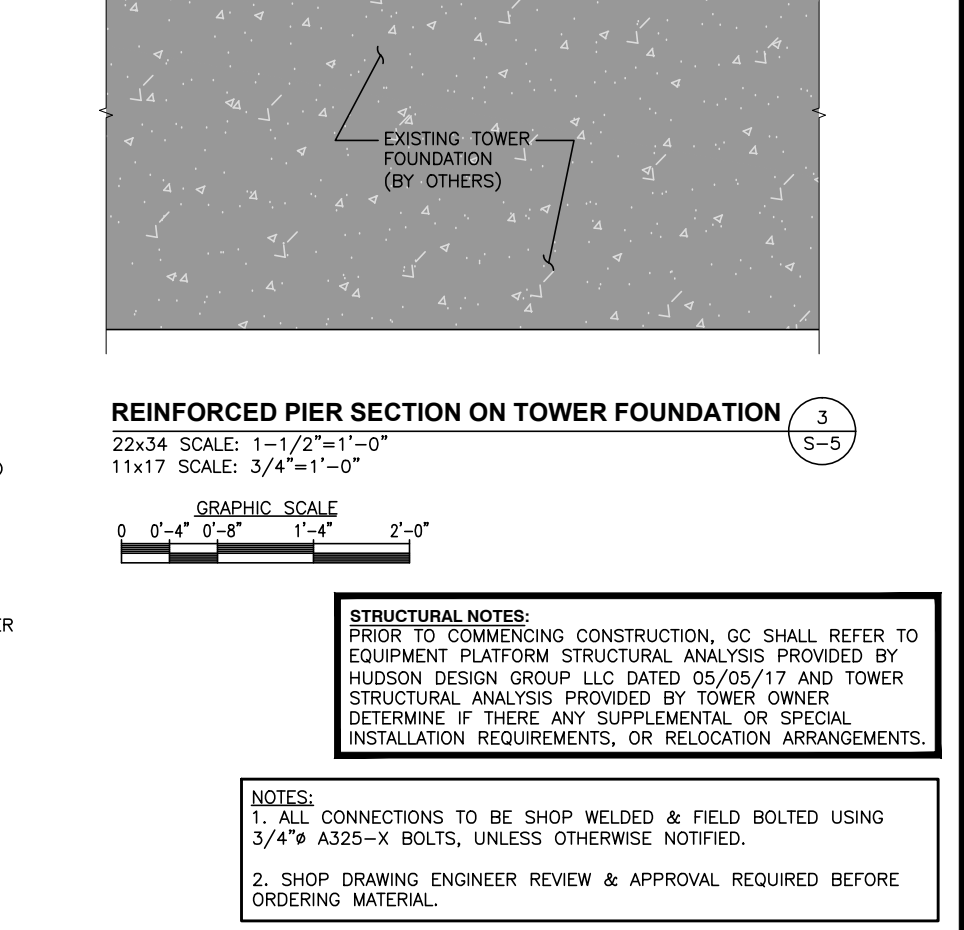
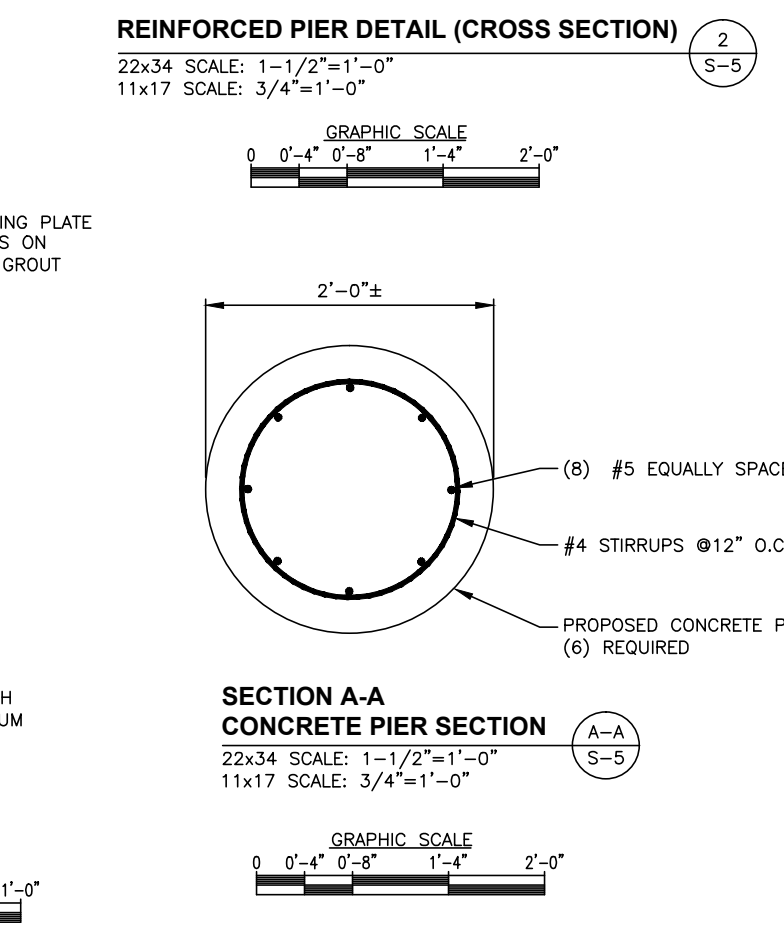
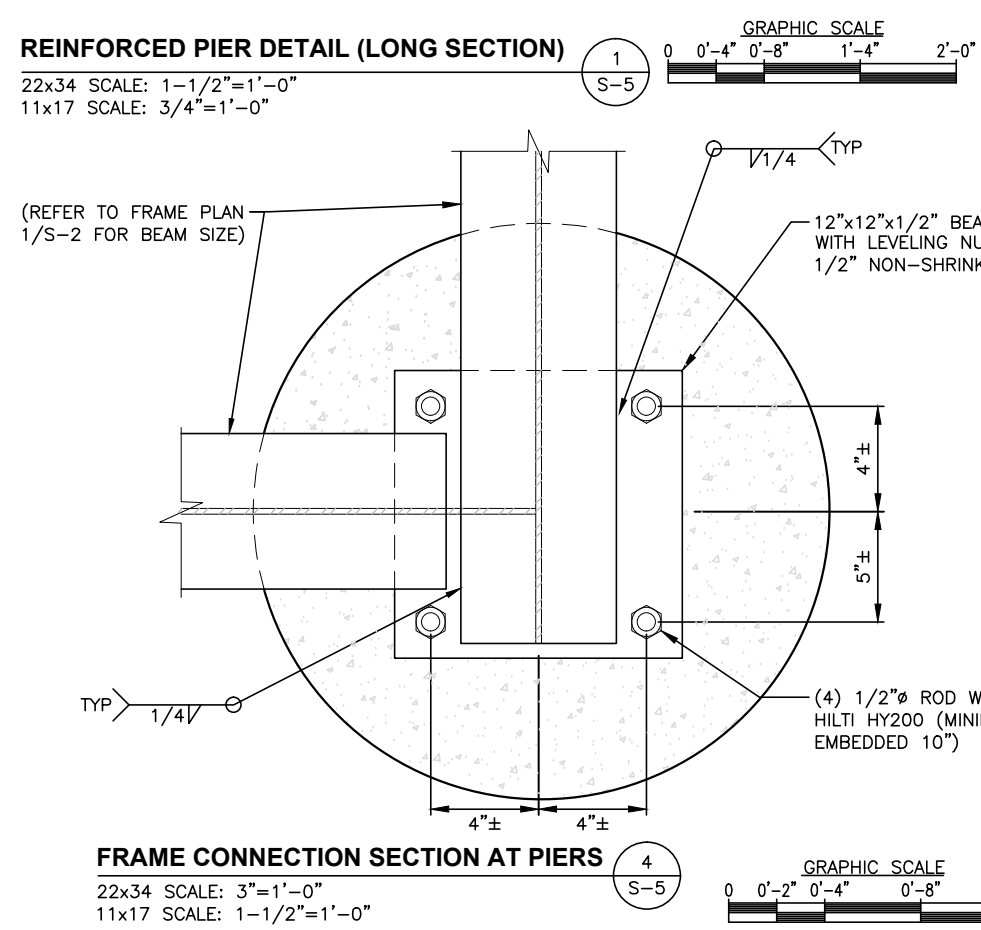
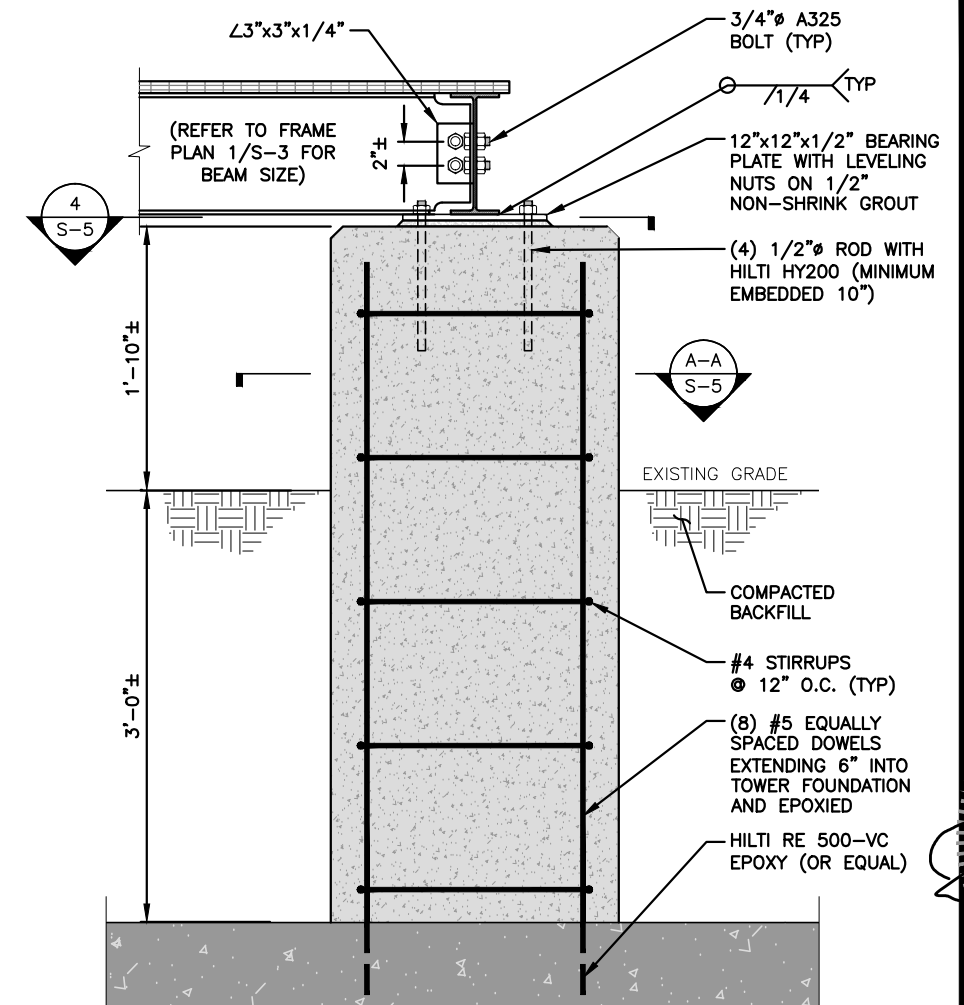
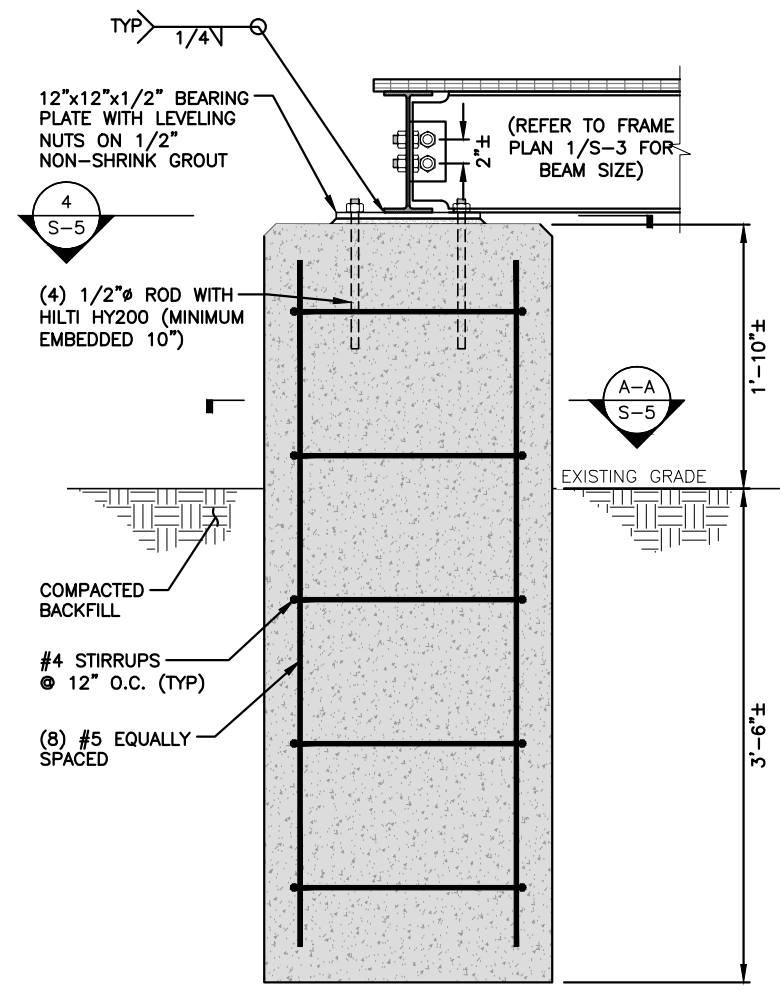
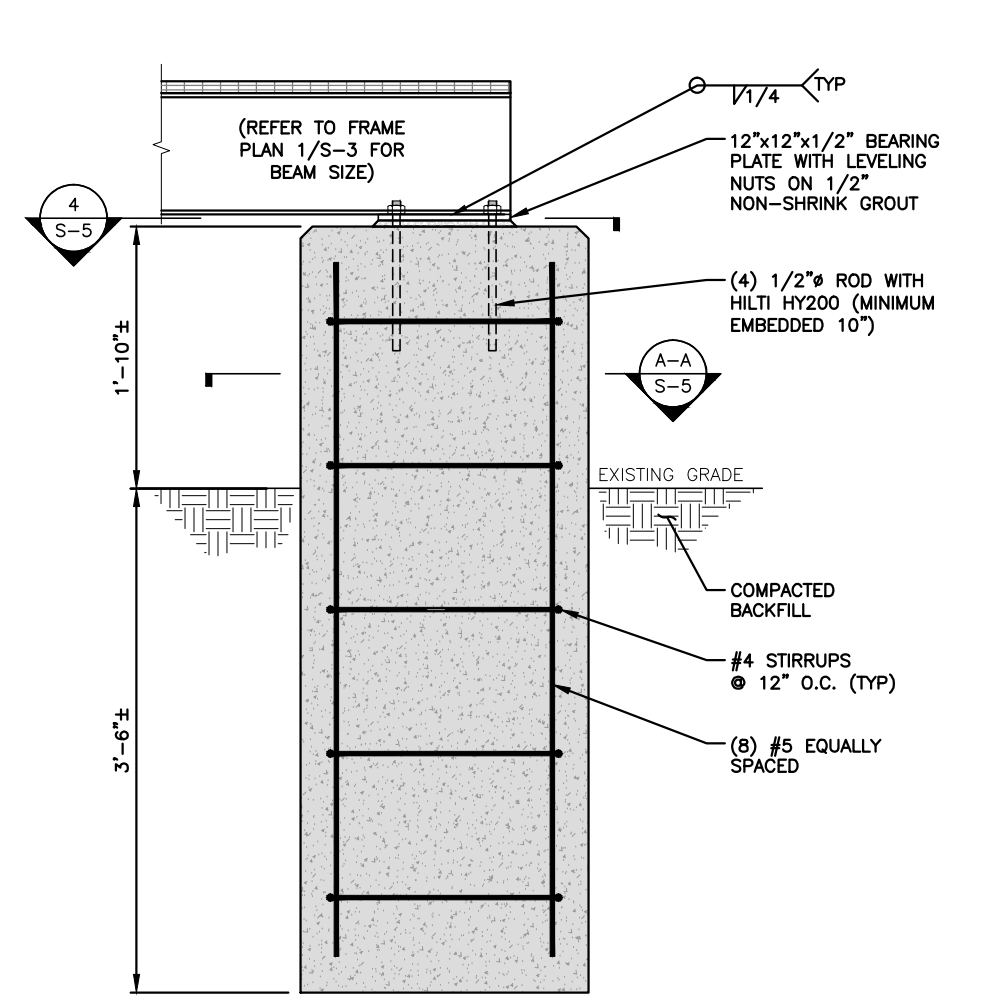
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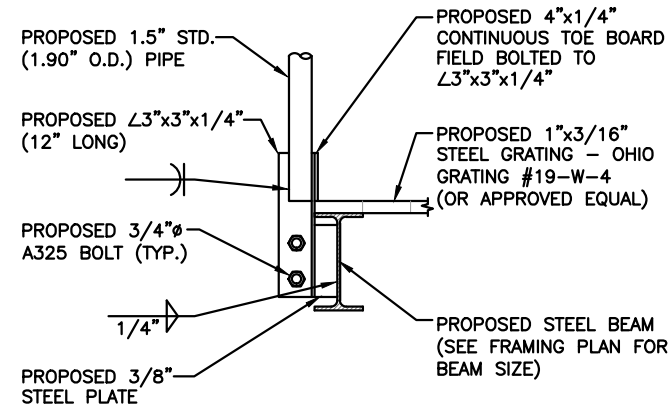
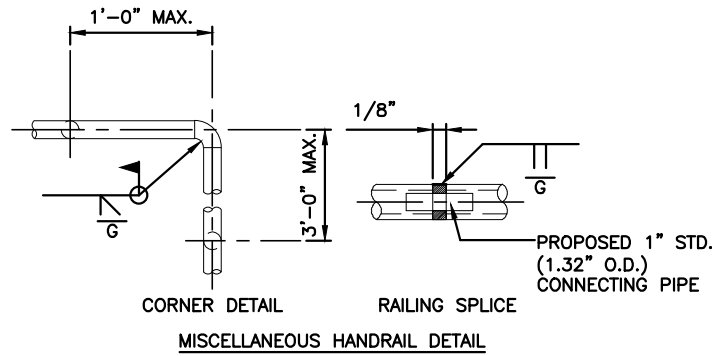
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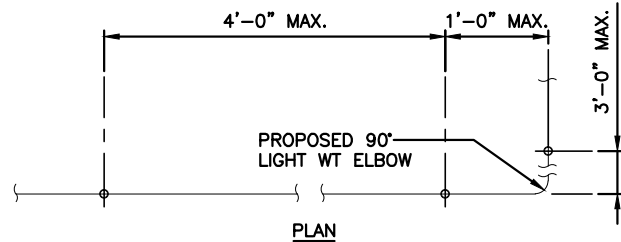
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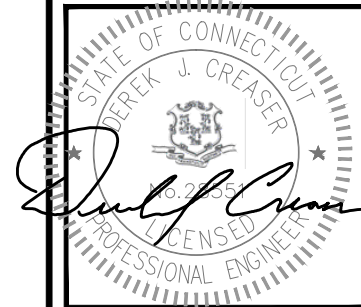
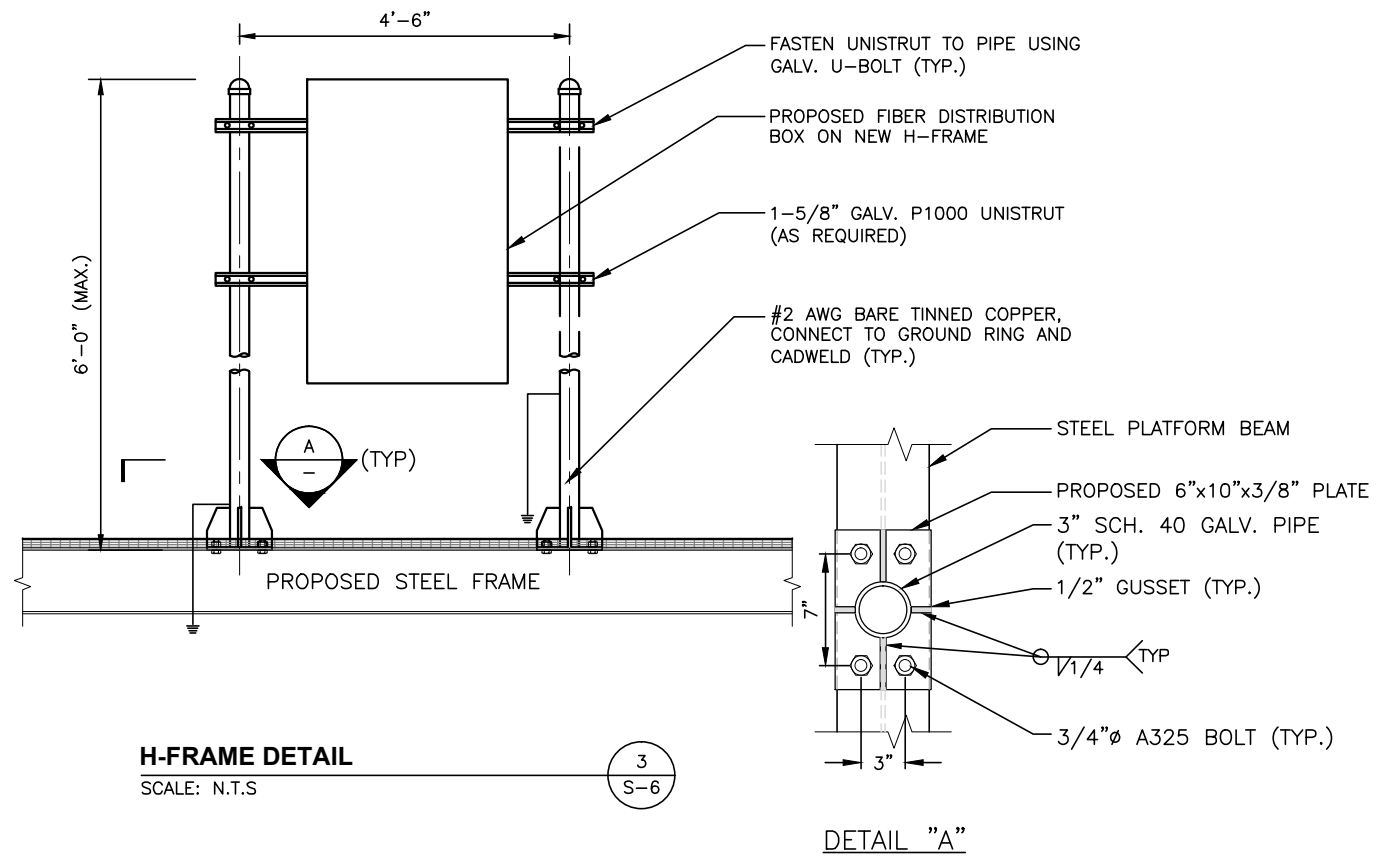
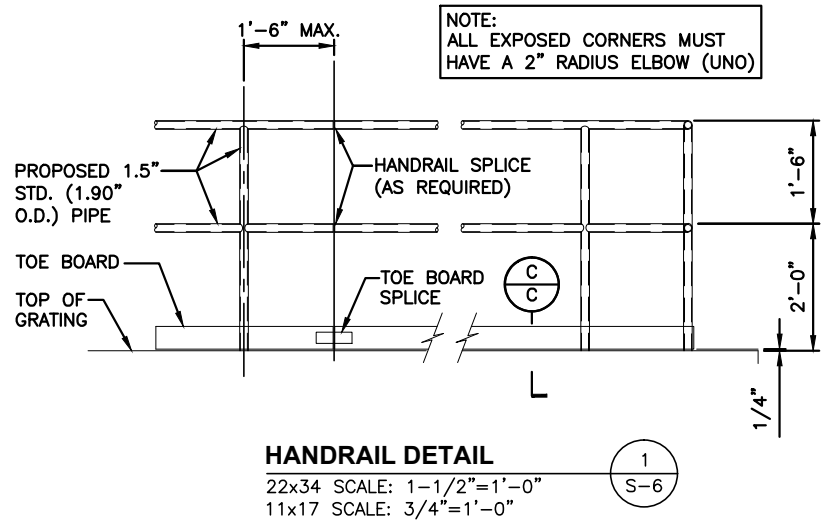
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**SECTION C-C**  
 22x34 SCALE: 1-1/2"=1'-0"  
 11x17 SCALE: 3/4"=1'-0"



**NOTES:**  
 1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4" A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.  
 2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.



CHECKED BY: BB

APPROVED BY: DJC

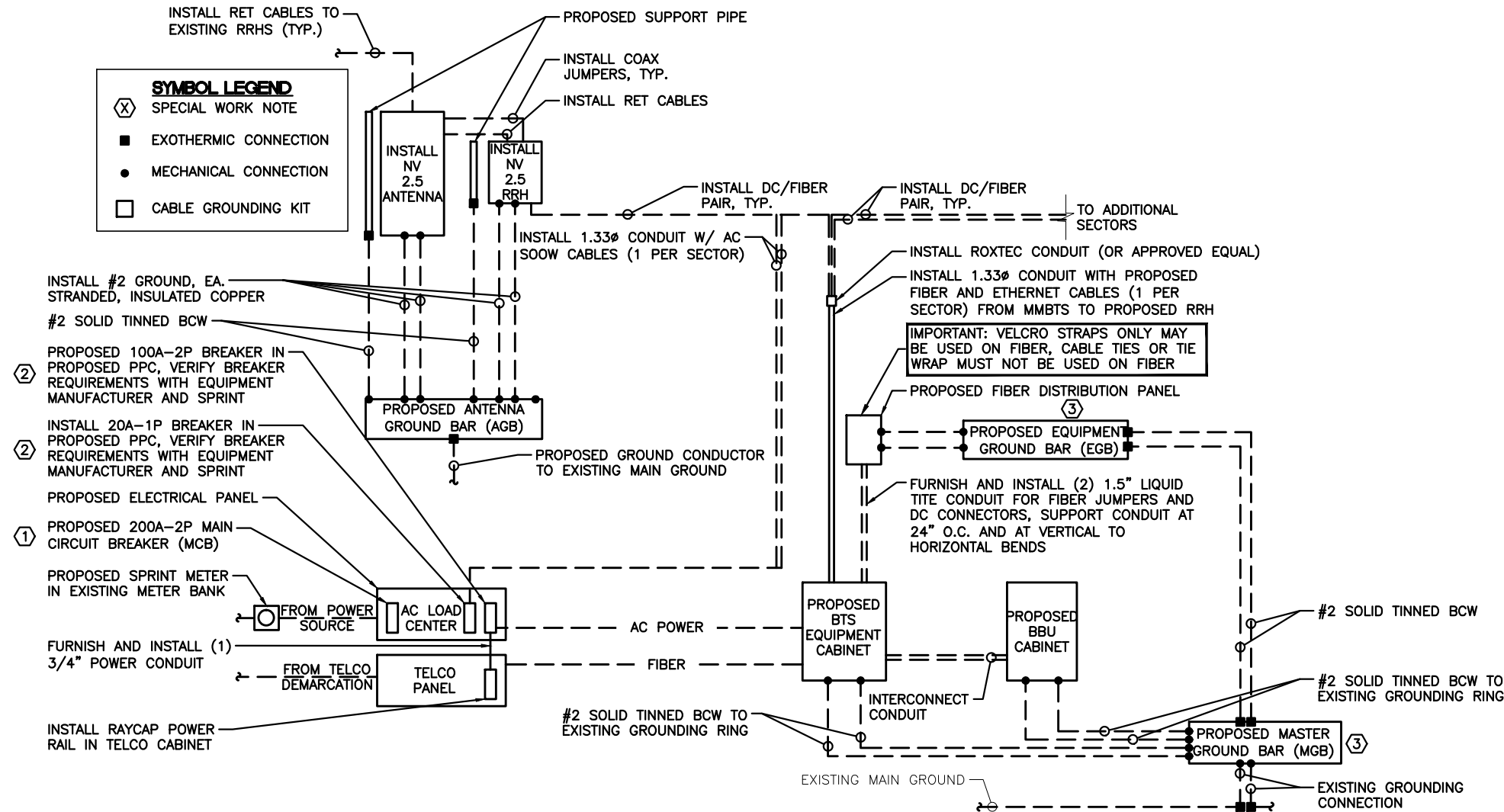
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1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

SITE NUMBER: CT25XC553  
 SITE NAME: BRIDGEPORT  
 AUGMENT ID: CT25XC553  
 SITE ADDRESS: 220 EVERGREEN STREET, BRIDGEPORT, CT 06606, FAIRFIELD COUNTY

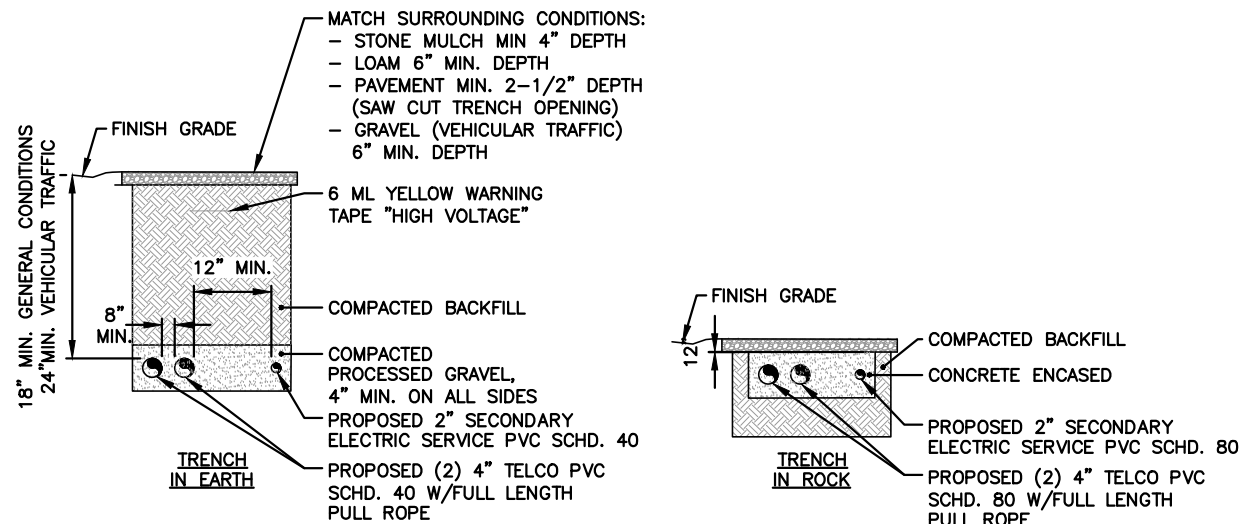
SHEET TITLE: PLATFORM STRUCTURAL DETAILS

SHEET NUMBER: S-6





**TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS** 1  
SCALE: N.T.S. E-1



**SPECIAL WORK NOTE:**  
EXISTING UNDERGROUND UTILITY LOCATIONS ARE UNKNOWN. WHERE DIRECTED OR REQUIRED, HAND-EXCAVATE PROPOSED UTILITY TRENCHING

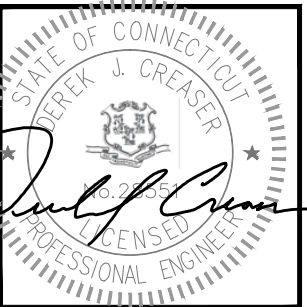
**BURIED CONDUIT DETAIL** 2  
SCALE: N.T.S. E-1

**ELECTRICAL NOTES**

- 1) ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- 2) THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
- 3) ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
- 4) ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
- 5) 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.
- 6) ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- 7) THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
- 8) GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
- 9) 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.
- 10) BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
- 11) ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
- 12) RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
- 13) RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
- 14) FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
- 15) COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.

**SPECIAL WORK NOTE:**

- 1) 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"
- 2) G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBTS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING FOR A 100-AMP, 240V CIRCUIT.
- 3) 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



CHECKED BY: BB

APPROVED BY: DJC

**SUBMITTALS**

REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
2	05/25/17	CONSTRUCTION FINAL	DJM
1	05/18/17	ISSUED FOR CONSTRUCTION	DJM
0	04/03/17	ISSUED FOR REVIEW	DJM

SITE NUMBER:  
CT25XC553

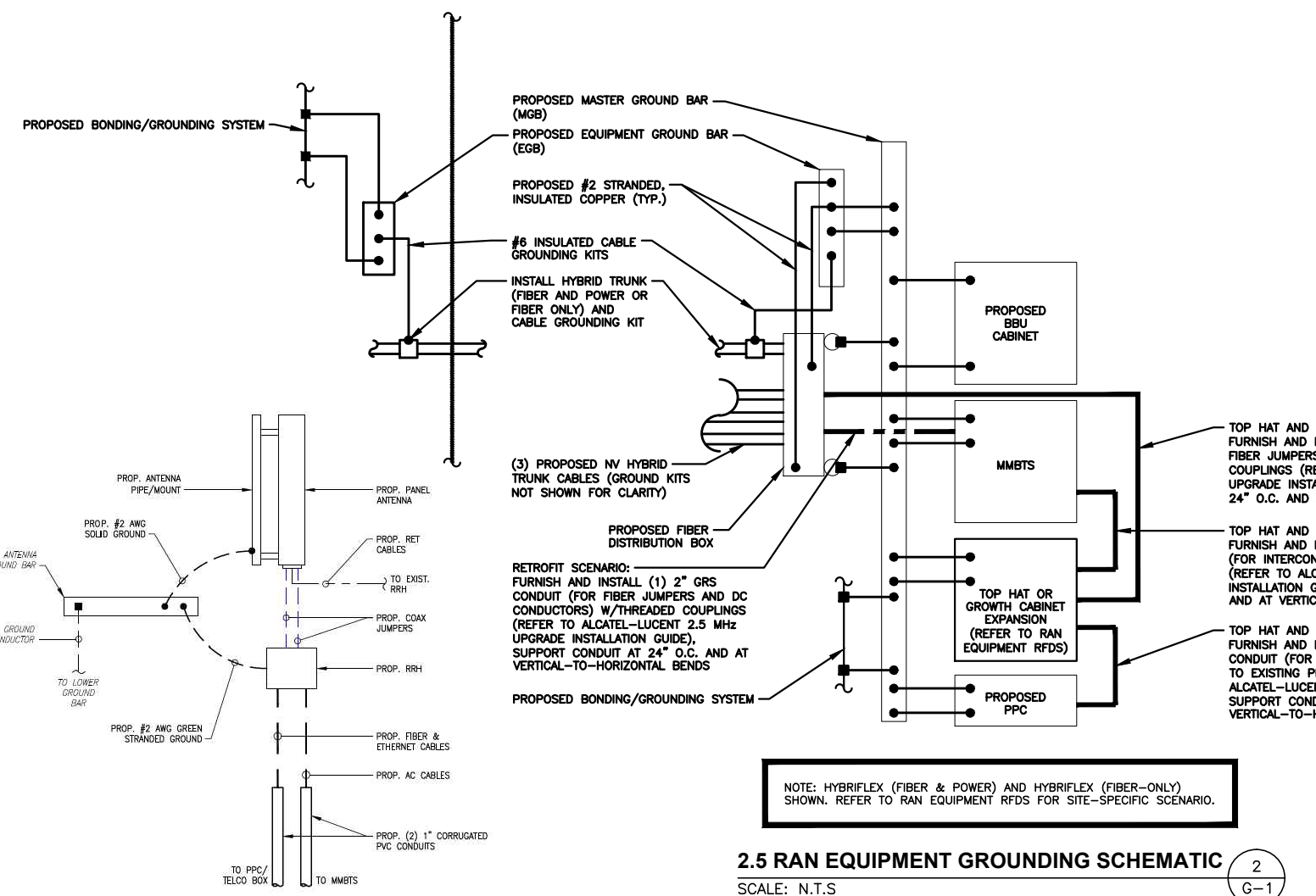
SITE NAME:  
BRIDGEPORT

AUGMENT ID:  
CT25XC553

SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
ELECTRICAL DETAILS  
AND NOTES

SHEET NUMBER  
E-1



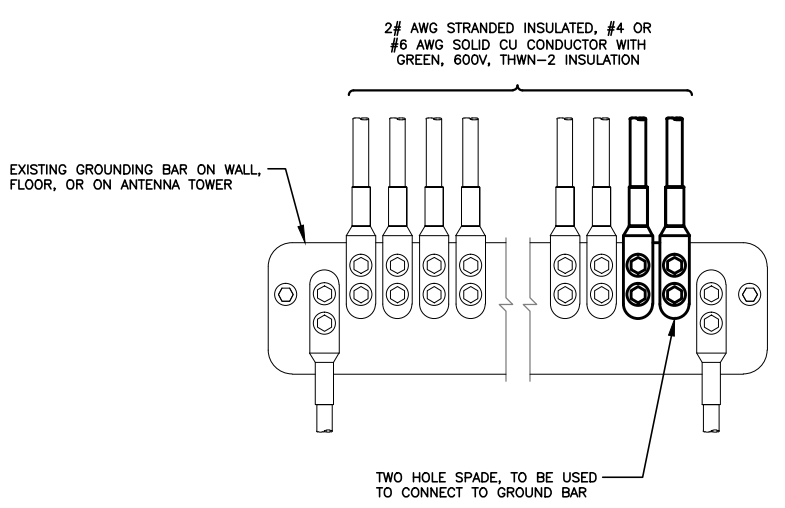
**2.5 RAN EQUIPMENT GROUNDING SCHEMATIC**  
SCALE: N.T.S.

**SYMBOL LEGEND**

- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- CABLE GROUNDING KIT
- GROUNDING/BONDING
- CONDUIT

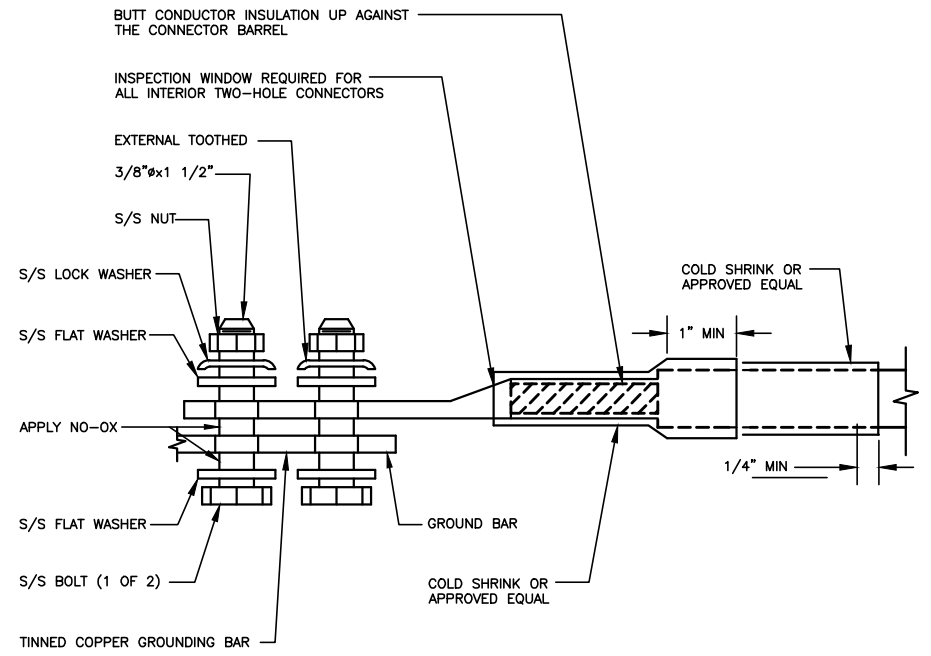
UNLESS NOTED OTHERWISE, ALL BONDING CONDUCTORS ARE #2 SOLID TINNED BCW.

**EQUIPMENT GROUNDING SCHEMATIC**  
SCALE: N.T.S.



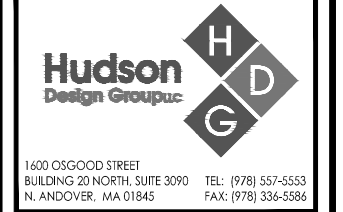
- NOTES**
1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
  2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

**INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR**  
SCALE: N.T.S.



**TWO HOLE LUG**  
SCALE: N.T.S.

- PROTECTIVE GROUNDING SYSTEMS GENERAL NOTES:**
1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.
  2. GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT SSEO DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES" AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING".
  3. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
  4. GROUND CONNECTIONS: CLEAN SURFACES THOROUGHLY BEFORE APPLYING GROUND LUGS OR CLAMPS. IF SURFACE IS COATED, REMOVE THE COATING, APPLY A NON-CORROSIVE APPROVED COMPOUND TO CLEAN SURFACE AND INSTALL LUGS OR CLAMPS. WHERE GALVANIZING IS REMOVED FROM METAL, IT SHALL BE PAINTED OR TOUCHED UP WITH "GALVAMOX" OR EQUAL.
  5. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
  6. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
  7. ALL GROUND WIRES SHALL BE #2 SOLID TINNED BCW UNLESS NOTED OTHERWISE.
  8. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
  9. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
  10. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 SOLID TINNED BCW EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
  11. GROUND HYBRIFLEX SHIELD AT TOP, BOTTOM AND AT TRANSITION TO HYBRIFLEX JUMPER CABLES AT EQUIPMENT CABINET ENTRANCE USING MANUFACTURER'S GUIDELINES. WHEN HYBRIFLEX CABLE EXCEEDS 200', GROUND AT INTERVALS NOT EXCEEDING 100'.
  12. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
  13. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL OTHERWISE. THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES, LONG BARREL LUGS OR DOUBLE CRIMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH AN ANTI-OXIDANT (THOMAS BETTS KOPR-SHILD) BEFORE MAKING THE CRIMP CONNECTIONS THE CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDED TORQUES ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS.
  14. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.
  15. THE MASTER GROUND BAR (MGB) SHALL BE MADE OF BARE 1/4"x2" COPPER (FOR OUTDOOR APPLICATIONS IT SHALL BE TINNED COPPER) AND LARGE ENOUGH TO ACCOMMODATE THE REQUIRED NUMBER OF GROUND CONNECTIONS. THE HARDWARE SECURING THE MGB SHALL ELECTRICAL INSULATE THE MGB FROM ANY STRUCTURE TO WHICH IT IS FASTENED.
  16. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
  17. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH SPRINT CONSTRUCTION MANAGER.
  18. FOR NEW OR REPAIRED GROUNDING EQUIPMENT. REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):  
-ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED: 08-24-12 (OR CURRENT VERSION)  
-SPRINT ENGINEERING LETTER EL-0504 DATED: 04-20-12 (OR CURRENT VERSION)



CHECKED BY: BB  
APPROVED BY: DJC

**SUBMITTALS**

REV.	DATE	DESCRIPTION	BY
3	06/15/17	CONSTRUCTION REVISED	DJM
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SITE NUMBER:  
CT25XC553  
SITE NAME:  
BRIDGEPORT  
AUGMENT ID:  
CT25XC553  
SITE ADDRESS:  
220 EVERGREEN STREET  
BRIDGEPORT, CT 06606  
FAIRFIELD COUNTY

SHEET TITLE  
GROUNDING DETAILS AND NOTES

SHEET NUMBER  
**G-1**

# **EXHIBIT 3**



## **Structural Analysis Report**

**Structure** : 135 foot Monopole Tower  
**BST Site Name** : Evergreen Street  
**BST Site Number** : CT-5020  
**Proposed Carrier** : Sprint  
**Carrier Site Name** : Bridgeport  
**Carrier Site Number** : CT25XC553  
**Site Location** : 220 Evergreen Street  
Bridgeport, CT (Fairfield County)  
41.1977, -73.1907  
**Date** : June 12, 2017  
**Max Member Stress Level** : 36%  
**Result** : **ACCEPTABLE**

**Prepared by:**  
**Bennett & Pless, Inc.**  
**B&P Job No.: 17003.005**



**Table of Contents**

**Introduction .....1**

**Existing Structural Information .....1**

**Final Proposed Equipment Loading for Sprint. ....1**

**Design Criteria .....2**

**Analysis Results .....2**

**Assumptions .....2**

**Conclusions .....3**

**Standard Conditions .....4**

**Disclaimer of Warranties .....4**

**Calculations..... Attached**

**Collocation Application ..... Attached**

## Introduction

We have completed our structural analysis of the proposed equipment installation on the foregoing tower to determine its ability to support the new loads proposed by Sprint. The objective of the analysis was to determine if the tower meets the current structural codes and standards with the proposed equipment installation.

## Existing Structural Information

The following documents for the existing structure were made available for our structural analysis.

<b>Tower Information</b>	Rohn Drawing No.: 217435-01-DIR2 dated March 17, 2016.
<b>Foundation Information</b>	Rohn Drawing No.: 217435-01-F1 dated March 17, 2016.
<b>Geotechnical Information</b>	Geotechnical Information was not available at this time .
<b>Existing Equipment Information</b>	BlueSky Collocation Application dated April 8, 2017 BlueSky AT&T Collocation Application dated July 1, 2015.
<b>Tower Reinforcement Information</b>	Tower has not been previously reinforced.

## Final Proposed Equipment Loading for Sprint

The following proposed loading was obtained from the BlueSky Collocation Application:

		Antenna/Equipment			Coax	
Mount	RAD	Qty.	Antenna	Type	Qty.	Size/Type
120.0	-	3	Sector Frames	Mount	4 6 3 4 3	1 ¼” Hybriflex 5/16” Coax 1” Conduit ½” Ethernet AWG-9-10/C AC
	120.0	3	RFS APXVSP18-C-A20	Panel		
		3	RFS APXVTM14-ALU-I20	Panel		
		6	Nokia 1900 MHz	RRH		
		3	Nokia 800 MHz-2/50w	RRH		
		3	Nokia TD-RRH8x20-25	RRH		
		3	Samsung DAP Head	DAP		
		3	RFS IBC1900HG-2A	Combiner		
		3	RFS IBC1900-BB-1	Combiner		
		3	NEMA 4x Enclosure Box	Box		
		3	Andrew VHLP2-18	Dish		
		1	Motorola MT-485025	Panel		
		3	Dragonwave ODU	ODU		
		1	Motorola ODU	ODU		

Note: All equipment shown is proposed.

Note: AT&T existing loading can be found on the tower profile attached.

## Design Criteria

The tower was analyzed using tnxTower (Version 7.0.7.0) tower analysis software using the following design criteria.

<b>State/County</b>	Connecticut / Fairfield County
<b>State Building Code</b>	2016 Connecticut State Bldg Code (IBC 2012)
<b>TIA/EIA Standard Code</b>	TIA-222-G
<b>Basic Wind Speed</b>	115 MPH (3 Second Gust)
<b>Basic Wind Speed w/ Ice</b>	50 MPH/ 0.75" Ice
<b>Steel Grade</b>	65 ksi pole, 50 ksi base plate, anchor bolts A615 Grade 75
<b>Exposure Category</b>	C
<b>Topographic Category (height)</b>	1 (0.0 ft)
<b>Structure Class</b>	II

## Analysis Results

Based on the foregoing information, our structural analysis determined that **the existing tower is structurally capable of supporting the proposed equipment loads without modification.**

The existing foundation has also been evaluated. Based on the foregoing information, our structural analysis determined that **the existing foundation is structurally capable of supporting the proposed equipment loads without modification.**

<b>Component</b>	<b>Analysis Reactions</b>	<b>Original Reactions</b>	<b>% Capacity</b>	<b>Results</b>
Vertical (Kips)	74	156.5	<b>47</b>	<b>Pass</b>
Horizontal (Kips)	40	79.6	<b>50</b>	<b>Pass</b>
OTM (Kip-ft)	3755	8066.7	<b>47</b>	<b>Pass</b>

## Assumptions

The below assumptions are true, complete and accurate.

1. The existing tower has been maintained to manufacturer's specifications and is in good condition.
2. Foundations are considered to have been properly designed for the original design loads.
3. All member connections are considered to have been designed to meet the load carrying capacity of the connected member.
4. Antenna mount loads have been estimated based on generally accepted industry standards.
5. The mounts for the proposed antennas have been analyzed and designed by others.
6. See additional assumptions contained in the report attached.
7. Tower is within acceptable engineering tolerance at 105%.
8. Foundations are within acceptable engineering tolerance at 110%.

## Conclusions

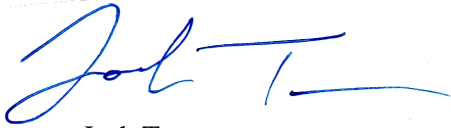
The existing tower described above **does have sufficient capacity** to support the proposed loading based on the governing Building Code. The existing tower base and anchor foundations also have sufficient capacity.

We appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance, please call us anytime at 678-990-8700.

Sincerely,

Analysis by:

Reviewed by:



Josh Turner  
Project Manager

Paul Grupe, P.E.  
Vice President, Atlanta Office





## **Standard Conditions**

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but not necessarily limited, to:

- Information supplied by the client regarding the structure itself, the antenna and transmission line loading on the structure and its components, or relevant information.
- Information from drawings in possession of Bennett & Pless Inc., or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Bennett & Pless Inc. and used in the performance of our engineering services is correct and complete. In the absence of information contrary, we consider that all structures were constructed in accordance with the drawings and specifications and are in an uncorroded condition and have not deteriorated; and we, therefore consider that their capacity has not significantly changed from the original design condition.

All services will be performed to the codes and standards specified by the client, and we do not imply to meet any other code and standard requirements unless explicitly agreed to in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes and standards, the client shall specify the exact requirements. In the absence of information to the contrary, all work will be performed in accordance with the revision of ANSI/TIA/EIA-222 requested.

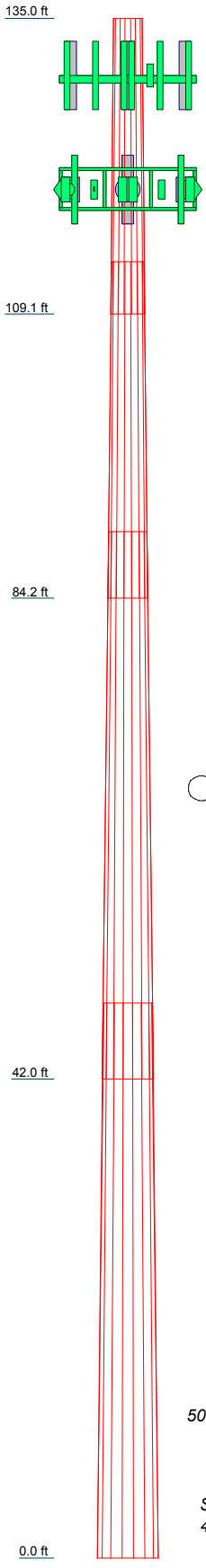
All services are performed, results obtained and recommendations made in accordance with the generally accepted engineering principles and practices. Bennett & Pless Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

## **Disclaimer of Warranties**

Bennett & Pless Inc. makes no warranties, expressed or implied, in connection with this report, and disclaims any liability arising from the ability of the existing structure to support the design loads for which it was originally designed. Bennett & Pless Inc. will not be responsible whatsoever for or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of Bennett & Pless Inc. pursuant to this report will be limited to the total fee received for preparation of this report.

## Attachment 1: Calculations

Section	1	2	3	4
Length (ft)	25.920	29.500	48.000	48.660
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3125	0.5000	0.6250
Socket Length (ft)	4.580	5.833	6.667	50.9844
Top Dia (in)	29.5200	34.9231	40.6656	64.0000
Bot Dia (in)	36.6800	42.8600	53.8100	64.0000
Grade	A572-65			
Weight (K)	2.3	3.8	12.1	18.7



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATT)	130	TD-RRH8x20-25 (Sprint)	120
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATT)	130	FWHR 2500 MHz (Sprint)	120
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATT)	130	IBC1900HG-2A (Sprint)	120
Ericsson RBS 6601 (ATT)	130	IBC1900-BB-1 (Sprint)	120
Ericsson RBS 6601 (ATT)	130	NEMA 4X Enclosure (Sprint)	120
LP 301-1 (ATT)	130	APXVSP18-C-A20 w/ Mount Pipe (Sprint)	120
APXVSP18-C-A20 w/ Mount Pipe (Sprint)	120	APXVTM14-C-120 w/ Mount Pipe (Sprint)	120
APXVTM14-C-120 w/ Mount Pipe (Sprint)	120	(2) 1900MHZ 2*40W (Sprint)	120
(2) 1900MHZ 2*40W (Sprint)	120	800 MHz RRH (Sprint)	120
800 MHz RRH (Sprint)	120	TD-RRH8x20-25 (Sprint)	120
TD-RRH8x20-25 (Sprint)	120	FWHR 2500 MHz (Sprint)	120
FWHR 2500 MHz (Sprint)	120	IBC1900HG-2A (Sprint)	120
IBC1900HG-2A (Sprint)	120	IBC1900-BB-1 (Sprint)	120
IBC1900-BB-1 (Sprint)	120	NEMA 4X Enclosure (Sprint)	120
NEMA 4X Enclosure (Sprint)	120	ODU (15 lbs, 1.5 CaAa) (Sprint)	120
APXVSP18-C-A20 w/ Mount Pipe (Sprint)	120	ODU (15 lbs, 1.5 CaAa) (Sprint)	120
APXVTM14-C-120 w/ Mount Pipe (Sprint)	120	ODU (15 lbs, 1.5 CaAa) (Sprint)	120
(2) 1900MHZ 2*40W (Sprint)	120	ODU (15 lbs, 1.5 CaAa) (Sprint)	120
800 MHz RRH (Sprint)	120	GPS-TMG-HR-26NCM (Sprint)	120
		Sector Frame Mount (Sprint)	120
		VHLP2-18 (Sprint)	120
		VHLP2-18 (Sprint)	120
		VHLP2-18 (Sprint)	120
		MT-485025 (Sprint)	120

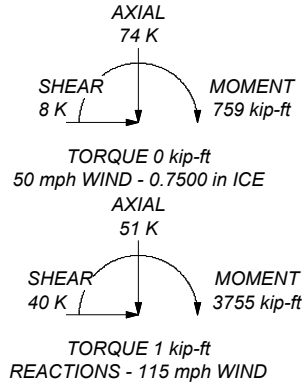
### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

### TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 115 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. Weld together tower sections have flange connections.
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.
11. TOWER RATING: 36%

ALL REACTIONS ARE FACTORED



<b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701		Job: <b>CT-5020 Bridgeport - Evergreen St.</b> Project: <b>Monopole Structural Analysis</b> Client: Blue Sky Towers Code: TIA-222-G Path:	Drawn by: Josh Turner Date: 04/18/17 Scale: NTS Dwg No. E-1
---	--	---	--

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b> CT-5020 Bridgeport - Evergreen St.	<b>Page</b> 1 of 21
	<b>Project</b> Monopole Structural Analysis	<b>Date</b> 18:37:11 04/18/17
	<b>Client</b> Blue Sky Towers	<b>Designed by</b> Josh Turner

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

Basic wind speed of 115 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.000 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

Weld together tower sections have flange connections..

Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Welds are fabricated with ER-70S-6 electrodes..

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>√ Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>√ Retension Guys To Initial Tension</li> <li>Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>√ Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>Sort Capacity Reports By Component</li> <li>√ Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> <li style="text-align: center;">Poles</li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|

## Tapered Pole Section Geometry

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b> CT-5020 Bridgeport - Evergreen St.	<b>Page</b> 2 of 21
	<b>Project</b> Monopole Structural Analysis	<b>Date</b> 18:37:11 04/18/17
	<b>Client</b> Blue Sky Towers	<b>Designed by</b> Josh Turner

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	135.000-109.080	25.920	4.580	18	29.5200	36.6900	0.2500	1.0000	A572-65 (65 ksi)
L2	109.080-84.160	29.500	5.833	18	34.9231	42.8600	0.3125	1.2500	A572-65 (65 ksi)
L3	84.160-41.993	48.000	6.667	18	40.6656	53.8100	0.5000	2.0000	A572-65 (65 ksi)
L4	41.993-0.000	48.660		18	50.9844	64.0000	0.6250	2.5000	A572-65 (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>	It/Q in <sup>2</sup>	w in	w/t
L1	29.9754	23.2257	2513.9263	10.3909	14.9962	167.6380	5031.1606	11.6151	4.7555	19.022
	37.2560	28.9151	4850.8683	12.9362	18.6385	260.2604	9708.1196	14.4603	6.0174	24.07
L2	36.7131	34.3294	5195.4239	12.2868	17.7409	292.8497	10397.6841	17.1679	5.5965	17.909
	43.5212	42.2018	9651.9827	15.1044	21.7729	443.3030	19316.6657	21.1049	6.9934	22.379
L3	42.9149	63.7427	12991.9963	14.2588	20.6581	628.9055	26001.0878	31.8774	6.2771	12.554
	54.6401	84.6030	30376.6883	18.9250	27.3355	1111.2550	60793.3470	42.3095	8.5906	17.181
L4	53.5816	99.9004	32008.5027	17.8776	25.9001	1235.8466	64059.1229	49.9597	7.8732	12.597
	64.9873	125.7202	63793.7757	22.4981	32.5120	1962.1609	127671.492	62.8720	10.1640	16.262

9

Tower Elevation ft	Gusset Area ft <sup>2</sup> (per face)	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 135.000-109.080				1	1	1			
L2 109.080-84.160				1	1	1			
L3 84.160-41.993				1	1	1			
L4 41.993-0.000				1	1	1			

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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
						ft <sup>2</sup> /ft	klf
2" Flex Conduit (AT&T)	C	No	Inside Pole	130.000 - 4.000	4	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000
***							
1 1/4" Hybriflex (Sprint)	C	No	Inside Pole	120.000 - 4.000	4	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.001
5/16" Coax	C	No	Inside Pole	120.000 - 4.000	6	No Ice	0.000

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	3 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight klf
(Sprint)						1/2" Ice 0.000	0.000
1" Conduit (Sprint)	C	No	Inside Pole	120.000 - 4.000	2	1" Ice No Ice 1/2" Ice 0.000 0.000 0.000	0.000 0.001 0.001 0.001
Gray Telephone Line (Sprint)	C	No	Inside Pole	120.000 - 4.000	1	1" Ice No Ice 1/2" Ice 0.000 0.000 0.000	0.000 0.000 0.000 0.000
Fiber OTPO (0.44in 0.08lb/ft) (Sprint)	C	No	Inside Pole	120.000 - 4.000	1	No Ice 1/2" Ice 1" Ice 0.000 0.000 0.000	0.000 0.000 0.000 0.000
12 AWG (Sprint)	C	No	Inside Pole	120.000 - 4.000	1	No Ice 1/2" Ice 1" Ice 0.000 0.000 0.000	0.000 0.000 0.000 0.000
1/2" Coax (Sprint)	C	No	Inside Pole	120.000 - 4.000	1	No Ice 1/2" Ice 1" Ice 0.000 0.000 0.000	0.000 0.000 0.000 0.000
Gray Telephone Line (Sprint)	C	No	Inside Pole	120.000 - 4.000	4	No Ice 1/2" Ice 1" Ice 0.000 0.000 0.000	0.000 0.000 0.000 0.000

### 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>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	135.000-109.080	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.063
L2	109.080-84.160	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.134
L3	84.160-41.993	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.226
L4	41.993-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.204

### 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>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	135.000-109.080	A	1.709	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.063
L2	109.080-84.160	A	1.670	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.134
L3	84.160-41.993	A	1.599	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.226
L4	41.993-0.000	A	1.435	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000

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	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
		C		0.000	0.000	0.000	0.000	0.204

### Feed Line Center of Pressure

Section	Elevation ft	$CP_X$ in	$CP_Z$ in	$CP_X$ Ice in	$CP_Z$ Ice in
L1	135.000-109.080	0.0000	0.0000	0.0000	0.0000
L2	109.080-84.160	0.0000	0.0000	0.0000	0.0000
L3	84.160-41.993	0.0000	0.0000	0.0000	0.0000
L4	41.993-0.000	0.0000	0.0000	0.0000	0.0000

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
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### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	$C_{AA}$ Front ft <sup>2</sup>	$C_{AA}$ Side ft <sup>2</sup>	Weight K	
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATT)	A	From Leg	2.000	0.0000	130.000	No Ice	13.213	9.582	0.100
			0.000			1/2" Ice	13.899	11.052	0.196
			0.000			1" Ice	14.587	12.496	0.303
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATT)	B	From Leg	2.000	0.0000	130.000	No Ice	13.213	9.582	0.100
			0.000			1/2" Ice	13.899	11.052	0.196
			0.000			1" Ice	14.587	12.496	0.303
(3) HPA-65R-BUU-H8 w/ Mount Pipe (ATT)	C	From Leg	2.000	0.0000	130.000	No Ice	13.213	9.582	0.100
			0.000			1/2" Ice	13.899	11.052	0.196
			0.000			1" Ice	14.587	12.496	0.303
Ericsson RBS 6601 (ATT)	A	From Leg	1.000	0.0000	130.000	No Ice	2.714	0.957	0.044
			0.000			1/2" Ice	2.925	1.111	0.061
			0.000			1" Ice	3.144	1.273	0.081
Ericsson RBS 6601 (ATT)	B	From Leg	1.000	0.0000	130.000	No Ice	2.714	0.957	0.044
			0.000			1/2" Ice	2.925	1.111	0.061
			0.000			1" Ice	3.144	1.273	0.081
LP 301-1 (ATT)	C	None		0.0000	130.000	No Ice	30.100	30.100	1.589
						1/2" Ice	40.800	40.800	2.029
						1" Ice	51.500	51.500	2.470
***									
APXVSP18-C-A20 w/ Mount Pipe (Sprint)	A	From Leg	4.000	0.0000	120.000	No Ice	8.262	6.946	0.083
			0.000			1/2" Ice	8.822	8.127	0.151
			0.000			1" Ice	9.346	9.021	0.227
APXVTM14-C-120 w/	A	From Leg	4.000	0.0000	120.000	No Ice	6.580	4.959	0.077

<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	5 of 21
<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
Mount Pipe (Sprint)			0.000			1/2" Ice	7.031	5.754	0.132
(2) 1900MHZ 2*40W (Sprint)	A	From Leg	0.000			1" Ice	7.473	6.472	0.193
			2.000	0.0000	120.000	No Ice	4.045	1.533	0.070
			0.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
800 MHz RRH (Sprint)	A	From Leg	2.000	0.0000	120.000	No Ice	2.134	1.773	0.053
			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
TD-RRH8x20-25 (Sprint)	A	From Leg	2.000	0.0000	120.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			0.000			1" Ice	4.557	1.901	0.128
FWHR 2500 MHz (Sprint)	A	From Leg	2.000	0.0000	120.000	No Ice	1.043	0.509	0.025
			0.000			1/2" Ice	1.172	0.602	0.034
			0.000			1" Ice	1.309	0.702	0.046
IBC1900HG-2A (Sprint)	A	From Leg	2.000	0.0000	120.000	No Ice	1.090	0.531	0.022
			0.000			1/2" Ice	1.224	0.635	0.030
			0.000			1" Ice	1.365	0.745	0.041
IBC1900-BB-1 (Sprint)	A	From Leg	2.000	0.0000	120.000	No Ice	1.230	0.512	0.040
			0.000			1/2" Ice	1.379	0.603	0.052
			0.000			1" Ice	1.536	0.702	0.067
NEMA 4X Enclosure (Sprint)	A	From Leg	2.000	0.0000	120.000	No Ice	0.583	0.417	0.001
			0.000			1/2" Ice	0.681	0.504	0.007
			0.000			1" Ice	0.787	0.598	0.014
APXVSP18-C-A20 w/ Mount Pipe (Sprint)	B	From Leg	4.000	0.0000	120.000	No Ice	8.262	6.946	0.083
			0.000			1/2" Ice	8.822	8.127	0.151
			0.000			1" Ice	9.346	9.021	0.227
APXVTM14-C-120 w/ Mount Pipe (Sprint)	B	From Leg	4.000	0.0000	120.000	No Ice	6.580	4.959	0.077
			0.000			1/2" Ice	7.031	5.754	0.132
			0.000			1" Ice	7.473	6.472	0.193
(2) 1900MHZ 2*40W (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	4.045	1.533	0.070
			0.000			1/2" Ice	4.298	1.712	0.097
			0.000			1" Ice	4.557	1.899	0.128
800 MHz RRH (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	2.134	1.773	0.053
			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
TD-RRH8x20-25 (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			0.000			1" Ice	4.557	1.901	0.128
FWHR 2500 MHz (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	1.043	0.509	0.025
			0.000			1/2" Ice	1.172	0.602	0.034
			0.000			1" Ice	1.309	0.702	0.046
IBC1900HG-2A (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	1.090	0.531	0.022
			0.000			1/2" Ice	1.224	0.635	0.030
			0.000			1" Ice	1.365	0.745	0.041
IBC1900-BB-1 (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	1.230	0.512	0.040
			0.000			1/2" Ice	1.379	0.603	0.052
			0.000			1" Ice	1.536	0.702	0.067
NEMA 4X Enclosure (Sprint)	B	From Leg	2.000	0.0000	120.000	No Ice	0.583	0.417	0.001
			0.000			1/2" Ice	0.681	0.504	0.007
			0.000			1" Ice	0.787	0.598	0.014
APXVSP18-C-A20 w/ Mount Pipe (Sprint)	C	From Leg	4.000	0.0000	120.000	No Ice	8.262	6.946	0.083
			0.000			1/2" Ice	8.822	8.127	0.151
			0.000			1" Ice	9.346	9.021	0.227
APXVTM14-C-120 w/ Mount Pipe (Sprint)	C	From Leg	4.000	0.0000	120.000	No Ice	6.580	4.959	0.077
			0.000			1/2" Ice	7.031	5.754	0.132
			0.000			1" Ice	7.473	6.472	0.193
(2) 1900MHZ 2*40W	C	From Leg	2.000	0.0000	120.000	No Ice	4.045	1.533	0.070



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	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz Lateral	Vert						°
(Sprint)			0.000			1/2" Ice	4.298	1.712	0.097	
			0.000			1" Ice	4.557	1.899	0.128	
800 MHz RRH (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	2.134	1.773	0.053
			0.000				1/2" Ice	2.320	1.946	0.074
			0.000				1" Ice	2.512	2.127	0.098
TD-RRH8x20-25 (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	4.045	1.535	0.070
			0.000				1/2" Ice	4.298	1.714	0.097
			0.000				1" Ice	4.557	1.901	0.128
FWHR 2500 MHz (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	1.043	0.509	0.025
			0.000				1/2" Ice	1.172	0.602	0.034
			0.000				1" Ice	1.309	0.702	0.046
IBC1900HG-2A (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	1.090	0.531	0.022
			0.000				1/2" Ice	1.224	0.635	0.030
			0.000				1" Ice	1.365	0.745	0.041
IBC1900-BB-1 (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	1.230	0.512	0.040
			0.000				1/2" Ice	1.379	0.603	0.052
			0.000				1" Ice	1.536	0.702	0.067
NEMA 4X Enclosure (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	0.583	0.417	0.001
			0.000				1/2" Ice	0.681	0.504	0.007
			0.000				1" Ice	0.787	0.598	0.014
ODU (15 lbs, 1.5 CaAa) (Sprint)	A	From Leg	2.000		0.0000	120.000	No Ice	1.500	1.500	0.015
			0.000				1/2" Ice	2.000	2.000	0.020
			0.000				1" Ice	2.500	2.500	0.024
ODU (15 lbs, 1.5 CaAa) (Sprint)	B	From Leg	2.000		0.0000	120.000	No Ice	1.500	1.500	0.015
			0.000				1/2" Ice	2.000	2.000	0.020
			0.000				1" Ice	2.500	2.500	0.024
ODU (15 lbs, 1.5 CaAa) (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	1.500	1.500	0.015
			0.000				1/2" Ice	2.000	2.000	0.020
			0.000				1" Ice	2.500	2.500	0.024
ODU (15 lbs, 1.5 CaAa) (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	1.500	1.500	0.015
			0.000				1/2" Ice	2.000	2.000	0.020
			0.000				1" Ice	2.500	2.500	0.024
GPS-TMG-HR-26NCM (Sprint)	C	From Leg	2.000		0.0000	120.000	No Ice	0.072	0.072	0.001
			0.000				1/2" Ice	0.117	0.117	0.002
			0.000				1" Ice	0.170	0.170	0.004
Sector Frame Mount (Sprint)	C	None			0.0000	120.000	No Ice	15.000	15.000	0.500
							1/2" Ice	20.600	20.600	0.650
							1" Ice	26.200	26.200	0.800

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz Lateral	Vert							°
VHLP2-18 (Sprint)	A	Paraboloid w/Radome	From Leg	4.000		0.0000		120.000	2.175	No Ice	3.720	0.030
				0.000						1/2" Ice	4.010	0.050
				0.000						1" Ice	4.300	0.070
VHLP2-18 (Sprint)	B	Paraboloid w/Radome	From Leg	4.000		0.0000		120.000	2.175	No Ice	3.720	0.030
				0.000						1/2" Ice	4.010	0.050

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	7 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				ft	°	°	ft	ft	ft <sup>2</sup>	K	
VHLP2-18 (Sprint)	C	Paraboloid w/Radome	From Leg	0.000	0.0000		120.000	2.175	1" Ice	4.300	0.070
				4.000					No Ice	3.720	0.030
				0.000					1/2" Ice	4.010	0.050
MT-485025 (Sprint)	C	Grid	From Leg	0.000	0.0000		120.000	1.167	1" Ice	4.300	0.070
				4.000					No Ice	1.069	0.006
				0.000					1/2" Ice	1.227	0.012
				0.000					1" Ice	1.385	0.019

**Tower Pressures - No Ice**

$G_H = 1.100$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		ksf	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L1 135.000-109.080	121.572	1.319	0.042	72.610	A	0.000	72.610	72.610	100.00	0.000	0.000
					B	0.000	72.610	100.00	0.000	0.000	
					C	0.000	72.610	100.00	0.000	0.000	
L2 109.080-84.160	96.268	1.256	0.040	83.310	A	0.000	83.310	83.310	100.00	0.000	0.000
					B	0.000	83.310	100.00	0.000	0.000	
					C	0.000	83.310	100.00	0.000	0.000	
L3 84.160-41.993	62.606	1.147	0.037	171.399	A	0.000	171.399	171.399	100.00	0.000	0.000
					B	0.000	171.399	100.00	0.000	0.000	
					C	0.000	171.399	100.00	0.000	0.000	
L4 41.993-0.000	21.129	0.912	0.029	207.463	A	0.000	207.463	207.463	100.00	0.000	0.000
					B	0.000	207.463	100.00	0.000	0.000	
					C	0.000	207.463	100.00	0.000	0.000	

**Tower Pressure - With Ice**

$G_H = 1.100$

Section Elevation	z	K <sub>Z</sub>	q <sub>z</sub>	t <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		ksf	in	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L1 135.000-109.080	121.572	1.319	0.008	1.7089	79.992	A	0.000	79.992	79.992	100.00	0.000	0.000
						B	0.000	79.992	100.00	0.000	0.000	
						C	0.000	79.992	100.00	0.000	0.000	
L2 109.080-84.160	96.268	1.256	0.008	1.6695	90.408	A	0.000	90.408	90.408	100.00	0.000	0.000
						B	0.000	90.408	100.00	0.000	0.000	
						C	0.000	90.408	100.00	0.000	0.000	
L3 84.160-41.993	62.606	1.147	0.007	1.5992	183.132	A	0.000	183.132	183.132	100.00	0.000	0.000
						B	0.000	183.132	100.00	0.000	0.000	
						C	0.000	183.132	100.00	0.000	0.000	
L4 41.993-0.000	21.129	0.912	0.006	1.4346	218.655	A	0.000	218.655	218.655	100.00	0.000	0.000
						B	0.000	218.655	100.00	0.000	0.000	
						C	0.000	218.655	100.00	0.000	0.000	

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	8 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

### Tower Pressure - Service

$$G_H = 1.100$$

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> ksf	A <sub>G</sub> ft <sup>2</sup>	F <sub>a</sub> c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L1 135.000-109.0	121.572	1.319	0.010	72.610	A	0.000	72.610	72.610	100.00	0.000	0.000
80					B	0.000	72.610		100.00	0.000	0.000
L2 109.080-84.16	96.268	1.256	0.010	83.310	C	0.000	72.610		100.00	0.000	0.000
0					A	0.000	83.310	83.310	100.00	0.000	0.000
L3 84.160-41.993	62.606	1.147	0.009	171.399	B	0.000	83.310		100.00	0.000	0.000
					C	0.000	83.310		100.00	0.000	0.000
L4 41.993-0.000	21.129	0.912	0.007	207.463	A	0.000	171.399	171.399	100.00	0.000	0.000
					B	0.000	171.399		100.00	0.000	0.000
					C	0.000	171.399		100.00	0.000	0.000
					A	0.000	207.463	207.463	100.00	0.000	0.000
					B	0.000	207.463		100.00	0.000	0.000
					C	0.000	207.463		100.00	0.000	0.000

### Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F <sub>a</sub> c e	e	C <sub>F</sub>	q <sub>z</sub> ksf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F K	w klf	Ctrl. Face
L1 135.000-109.0	0.063	2.299	A	1	0.65	0.042	1	1	72.610	2.202	0.085	C
80			B	1	0.65		1	1	72.610			
L2 109.080-84.16	0.134	3.841	C	1	0.65		1	1	72.610			
0			A	1	0.65	0.040	1	1	83.310	2.405	0.097	C
L3 84.160-41.993	0.226	12.115	B	1	0.65		1	1	83.310			
			C	1	0.65		1	1	83.310			
L4 41.993-0.000	0.204	18.679	A	1	0.65	0.029	1	1	171.399	4.504	0.107	C
			B	1	0.65		1	1	171.399			
			C	1	0.65		1	1	171.399			
Sum Weight:	0.627	36.935	A	1	0.65		1	1	207.463	4.376	0.104	C
			B	1	0.65		1	1	207.463			
			C	1	0.65		1	1	207.463			
								OTM	873.692 kip-ft	13.487		

### Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	F <sub>a</sub> c e	e	C <sub>F</sub>	q <sub>z</sub> ksf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F K	w klf	Ctrl. Face
L1 135.000-109.0	0.063	2.299	A	1	0.65	0.042	1	1	72.610	2.202	0.085	C
80			B	1	0.65		1	1	72.610			
L2 109.080-84.16	0.134	3.841	C	1	0.65		1	1	72.610			
0			A	1	0.65	0.040	1	1	83.310	2.405	0.097	C
			B	1	0.65		1	1	83.310			

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	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C <sub>F</sub>	q <sub>z</sub> ksf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F K	w klf	Ctrl. Face
0			C	1	0.65		1	1	83.310			
L3 84.160-41.993	0.226	12.115	A	1	0.65	0.037	1	1	171.399	4.504	0.107	C
			B	1	0.65		1	1	171.399			
			C	1	0.65		1	1	171.399			
L4 41.993-0.000	0.204	18.679	A	1	0.65	0.029	1	1	207.463	4.376	0.104	C
			B	1	0.65		1	1	207.463			
			C	1	0.65		1	1	207.463			
Sum Weight:	0.627	36.935						OTM	873.692 kip-ft	13.487		

### Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C <sub>F</sub>	q <sub>z</sub> ksf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F K	w klf	Ctrl. Face
L1 135.000-109.0	0.063	2.299	A	1	0.65	0.042	1	1	72.610	2.202	0.085	C
			B	1	0.65		1	1	72.610			
			C	1	0.65		1	1	72.610			
L2 109.080-84.160	0.134	3.841	A	1	0.65	0.040	1	1	83.310	2.405	0.097	C
			B	1	0.65		1	1	83.310			
			C	1	0.65		1	1	83.310			
L3 84.160-41.993	0.226	12.115	A	1	0.65	0.037	1	1	171.399	4.504	0.107	C
			B	1	0.65		1	1	171.399			
			C	1	0.65		1	1	171.399			
L4 41.993-0.000	0.204	18.679	A	1	0.65	0.029	1	1	207.463	4.376	0.104	C
			B	1	0.65		1	1	207.463			
			C	1	0.65		1	1	207.463			
Sum Weight:	0.627	36.935						OTM	873.692 kip-ft	13.487		

### Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C <sub>F</sub>	q <sub>z</sub> ksf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F K	w klf	Ctrl. Face
L1 135.000-109.0	0.063	4.203	A	1	1.2	0.008	1	1	79.992	0.847	0.033	C
			B	1	1.2		1	1	79.992			
			C	1	1.2		1	1	79.992			
L2 109.080-84.160	0.134	5.956	A	1	1.2	0.008	1	1	90.408	0.911	0.037	C
			B	1	1.2		1	1	90.408			
			C	1	1.2		1	1	90.408			
L3 84.160-41.993	0.226	16.246	A	1	1.2	0.007	1	1	183.132	1.679	0.040	C
			B	1	1.2		1	1	183.132			
			C	1	1.2		1	1	183.132			
L4 41.993-0.000	0.204	23.127	A	1	1.2	0.006	1	1	218.655	1.610	0.038	C
			B	1	1.2		1	1	218.655			
			C	1	1.2		1	1	218.655			

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	10 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Section Elevation	Add Weight	Self Weight	Face	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K				ksf			ft <sup>2</sup>	K	klf	
Sum Weight:	0.627	49.532						OTM	329.770 kip-ft	5.047		

### Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	Face	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K				ksf			ft <sup>2</sup>	K	klf	
L1 135.000-109.0	0.063	4.203	A	1	1.2	0.008	1	1	79.992	0.847	0.033	C
80			B	1	1.2		1	1	79.992			
L2 109.080-84.160	0.134	5.956	C	1	1.2		1	1	79.992			
0			A	1	1.2	0.008	1	1	90.408	0.911	0.037	C
L3 84.160-41.993	0.226	16.246	B	1	1.2		1	1	90.408			
0			C	1	1.2		1	1	90.408			
L4 41.993-0.000	0.204	23.127	A	1	1.2	0.007	1	1	183.132	1.679	0.040	C
0			B	1	1.2		1	1	183.132			
0			C	1	1.2		1	1	183.132			
Sum Weight:	0.627	49.532	A	1	1.2	0.006	1	1	218.655	1.610	0.038	C
			B	1	1.2		1	1	218.655			
			C	1	1.2		1	1	218.655			
								OTM	329.770 kip-ft	5.047		

### Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	Face	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K				ksf			ft <sup>2</sup>	K	klf	
L1 135.000-109.0	0.063	4.203	A	1	1.2	0.008	1	1	79.992	0.847	0.033	C
80			B	1	1.2		1	1	79.992			
L2 109.080-84.160	0.134	5.956	C	1	1.2		1	1	79.992			
0			A	1	1.2	0.008	1	1	90.408	0.911	0.037	C
L3 84.160-41.993	0.226	16.246	B	1	1.2		1	1	90.408			
0			C	1	1.2		1	1	90.408			
L4 41.993-0.000	0.204	23.127	A	1	1.2	0.007	1	1	183.132	1.679	0.040	C
0			B	1	1.2		1	1	183.132			
0			C	1	1.2		1	1	183.132			
Sum Weight:	0.627	49.532	A	1	1.2	0.006	1	1	218.655	1.610	0.038	C
			B	1	1.2		1	1	218.655			
			C	1	1.2		1	1	218.655			
								OTM	329.770 kip-ft	5.047		

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	11 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

### Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e			ksf			ft <sup>2</sup>	K	klf	
L1	0.063	2.299	A	1	0.65	0.010	1	1	72.610	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.610			
80			C	1	0.65		1	1	72.610			
L2	0.134	3.841	A	1	0.65	0.010	1	1	83.310	0.586	0.024	C
109.080-84.16			B	1	0.65		1	1	83.310			
0			C	1	0.65		1	1	83.310			
L3	0.226	12.115	A	1	0.65	0.009	1	1	171.399	1.097	0.026	C
84.160-41.993			B	1	0.65		1	1	171.399			
			C	1	0.65		1	1	171.399			
L4	0.204	18.679	A	1	0.65	0.007	1	1	207.463	1.066	0.025	C
41.993-0.000			B	1	0.65		1	1	207.463			
			C	1	0.65		1	1	207.463			
Sum Weight:	0.627	36.935						OTM	212.795 kip-ft	3.285		

### Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e			ksf			ft <sup>2</sup>	K	klf	
L1	0.063	2.299	A	1	0.65	0.010	1	1	72.610	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.610			
80			C	1	0.65		1	1	72.610			
L2	0.134	3.841	A	1	0.65	0.010	1	1	83.310	0.586	0.024	C
109.080-84.16			B	1	0.65		1	1	83.310			
0			C	1	0.65		1	1	83.310			
L3	0.226	12.115	A	1	0.65	0.009	1	1	171.399	1.097	0.026	C
84.160-41.993			B	1	0.65		1	1	171.399			
			C	1	0.65		1	1	171.399			
L4	0.204	18.679	A	1	0.65	0.007	1	1	207.463	1.066	0.025	C
41.993-0.000			B	1	0.65		1	1	207.463			
			C	1	0.65		1	1	207.463			
Sum Weight:	0.627	36.935						OTM	212.795 kip-ft	3.285		

### Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	K	K	e			ksf			ft <sup>2</sup>	K	klf	
L1	0.063	2.299	A	1	0.65	0.010	1	1	72.610	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.610			
80			C	1	0.65		1	1	72.610			
L2	0.134	3.841	A	1	0.65	0.010	1	1	83.310	0.586	0.024	C

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	12 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Section Elevation ft	Add Weight K	Self Weight K	F a c e	e	C <sub>F</sub>	q <sub>z</sub> ksf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F K	w klf	Ctrl. Face
109.080-84.160	0.226	12.115	B	1	0.65	0.009	1	1	83.310	1.097	0.026	C
0			C	1	0.65		1	1	83.310			
L3			A	1	0.65		1	1	171.399			
84.160-41.993	0.204	18.679	B	1	0.65	0.007	1	1	171.399	1.066	0.025	C
L4			C	1	0.65		1	1	171.399			
41.993-0.000			A	1	0.65		1	1	207.463			
			B	1	0.65		1	1	207.463			
			C	1	0.65		1	1	207.463			
Sum Weight:	0.627	36.935						OTM	212.795 kip-ft	3.285		

### Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Leg Weight	36.935					
Bracing Weight	0.000					
Total Member Self-Weight	36.935			-0.008	-0.013	
Total Weight	42.328			-0.008	-0.013	
Wind 0 deg - No Ice		-0.033	-25.021	-2322.471	4.295	-0.204
Wind 30 deg - No Ice		12.434	-21.650	-2008.915	-1151.545	-0.317
Wind 60 deg - No Ice		21.570	-12.454	-1154.114	-1998.985	0.000
Wind 90 deg - No Ice		24.967	0.057	7.191	-2315.544	0.317
Wind 120 deg - No Ice		21.652	12.539	1164.955	-2009.171	0.204
Wind 150 deg - No Ice		12.525	21.654	2009.714	-1163.097	0.032
Wind 180 deg - No Ice		0.031	24.962	2315.344	-4.148	0.203
Wind 210 deg - No Ice		-12.474	21.627	2006.102	1156.362	0.310
Wind 240 deg - No Ice		-21.625	12.485	1157.866	2005.484	0.000
Wind 270 deg - No Ice		-24.967	-0.010	-1.612	2315.517	-0.310
Wind 300 deg - No Ice		-21.602	-12.508	-1161.264	2003.073	-0.203
Wind 330 deg - No Ice		-12.490	-21.674	-2012.128	1158.914	-0.032
Member Ice	12.598					
Total Weight Ice	64.019			0.006	0.011	
Wind 0 deg - Ice		0.011	-8.347	-744.239	-1.223	-0.080
Wind 30 deg - Ice		4.167	-7.221	-643.607	-371.273	-0.077
Wind 60 deg - Ice		7.211	-4.163	-370.843	-642.319	0.000
Wind 90 deg - Ice		8.338	0.002	0.272	-743.016	0.077
Wind 120 deg - Ice		7.234	4.164	371.060	-645.142	0.080
Wind 150 deg - Ice		4.173	7.217	643.199	-372.060	0.058
Wind 180 deg - Ice		0.005	8.327	741.837	-0.689	0.100
Wind 210 deg - Ice		-4.164	7.216	642.930	370.908	0.111
Wind 240 deg - Ice		-7.218	4.167	371.294	643.101	0.000
Wind 270 deg - Ice		-8.331	-0.001	-0.249	742.248	-0.111
Wind 300 deg - Ice		-7.209	-4.168	-371.515	642.105	-0.100
Wind 330 deg - Ice		-4.164	-7.222	-643.813	370.997	-0.058
Total Weight	42.328			-0.008	-0.013	
Wind 0 deg - Service		-0.008	-6.094	-565.662	1.036	-0.050
Wind 30 deg - Service		3.028	-5.273	-489.293	-280.478	-0.077
Wind 60 deg - Service		5.254	-3.033	-281.099	-486.878	0.000
Wind 90 deg - Service		6.081	0.014	1.746	-563.979	0.077
Wind 120 deg - Service		5.274	3.054	283.728	-489.359	0.050
Wind 150 deg - Service		3.051	5.274	489.476	-283.291	0.008

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	13 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, $M_x$ kip-ft	Sum of Overturning Moments, $M_z$ kip-ft	Sum of Torques kip-ft
Wind 180 deg - Service		0.008	6.080	563.915	-1.020	0.050
Wind 210 deg - Service		-3.038	5.267	488.596	281.631	0.076
Wind 240 deg - Service		-5.267	3.041	282.002	488.441	0.000
Wind 270 deg - Service		-6.081	-0.003	-0.398	563.952	-0.076
Wind 300 deg - Service		-5.261	-3.046	-282.841	487.854	-0.050
Wind 330 deg - Service		-3.042	-5.279	-490.075	282.253	-0.008

## 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
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



<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	14 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Comb. No.	Description
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	135 - 109.08	Pole	Max Tension	3	0.000	-0.000	-0.000
			Max. Compression	26	-18.670	0.009	-0.005
			Max. Mx	8	-7.249	-251.971	-1.144
			Max. My	2	-7.243	0.893	253.191
			Max. Vy	8	21.484	-251.971	-1.144
			Max. Vx	2	-21.571	0.893	253.191
			Max. Torque	8			-0.508
L2	109.08 - 84.16	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.305	0.009	-0.005
			Max. Mx	8	-11.614	-802.895	-3.336
			Max. My	2	-11.609	2.161	806.196
			Max. Vy	8	25.108	-802.895	-3.336
			Max. Vx	2	-25.196	2.161	806.196
			Max. Torque	8			-0.508
L3	84.16 - 41.9933	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-43.377	0.009	-0.005
			Max. Mx	8	-25.376	-1984.256	-7.165
			Max. My	2	-25.374	4.373	1991.200
			Max. Vy	8	32.102	-1984.256	-7.165
			Max. Vx	2	-32.190	4.373	1991.200
			Max. Torque	8			-0.508
L4	41.9933 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-74.151	0.009	-0.005
			Max. Mx	8	-50.780	-3743.463	-11.642
			Max. My	2	-50.780	6.958	3754.673
			Max. Vy	8	39.962	-3743.463	-11.642
			Max. Vx	2	-40.049	6.958	3754.673
			Max. Torque	8			-0.508

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	74.151	0.000	0.000
	Max. H <sub>x</sub>	20	50.793	39.946	0.017
	Max. H <sub>z</sub>	2	50.793	0.053	40.033
	Max. M <sub>x</sub>	2	3754.673	0.053	40.033
	Max. M <sub>z</sub>	8	3743.463	-39.946	-0.091
	Max. Torsion	4	0.507	-19.894	34.640
	Min. Vert	3	38.095	0.053	40.031
	Min. H <sub>x</sub>	8	50.793	-39.946	-0.091
	Min. H <sub>z</sub>	14	50.793	-0.050	-39.938

<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	15 of 21
<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M <sub>x</sub>	14	-3743.154	-0.050	-39.938
	Min. M <sub>z</sub>	20	-3743.429	39.946	0.017
	Min. Torsion	8	-0.507	-39.946	-0.091

**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	42.328	0.000	0.000	-0.008	-0.013	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	50.793	-0.053	-40.033	-3754.673	6.958	-0.327
0.9 Dead+1.6 Wind 0 deg - No Ice	38.095	-0.053	-40.031	-3744.530	6.941	-0.327
1.2 Dead+1.6 Wind 30 deg - No Ice	50.793	19.894	-34.640	-3247.817	-1861.685	-0.507
0.9 Dead+1.6 Wind 30 deg - No Ice	38.095	19.894	-34.640	-3239.174	-1856.733	-0.507
1.2 Dead+1.6 Wind 60 deg - No Ice	50.793	34.513	-19.926	-1865.851	-3231.748	-0.000
0.9 Dead+1.6 Wind 60 deg - No Ice	38.095	34.512	-19.926	-1860.887	-3223.151	-0.000
1.2 Dead+1.6 Wind 90 deg - No Ice	50.793	39.946	0.091	11.642	-3743.463	0.507
0.9 Dead+1.6 Wind 90 deg - No Ice	38.095	39.944	0.091	11.609	-3733.352	0.507
1.2 Dead+1.6 Wind 120 deg - No Ice	50.793	34.644	20.062	1883.398	-3248.225	0.327
0.9 Dead+1.6 Wind 120 deg - No Ice	38.095	34.643	20.062	1878.387	-3239.580	0.327
1.2 Dead+1.6 Wind 150 deg - No Ice	50.793	20.040	34.646	3249.115	-1880.382	0.052
0.9 Dead+1.6 Wind 150 deg - No Ice	38.095	20.040	34.646	3240.472	-1875.374	0.052
1.2 Dead+1.6 Wind 180 deg - No Ice	50.793	0.050	39.938	3743.154	-6.711	0.325
0.9 Dead+1.6 Wind 180 deg - No Ice	38.095	0.050	39.936	3733.049	-6.686	0.325
1.2 Dead+1.6 Wind 210 deg - No Ice	50.793	-19.959	34.603	3243.273	1869.489	0.496
0.9 Dead+1.6 Wind 210 deg - No Ice	38.095	-19.959	34.603	3234.648	1864.522	0.495
1.2 Dead+1.6 Wind 240 deg - No Ice	50.793	-34.600	19.976	1871.924	3242.268	-0.000
0.9 Dead+1.6 Wind 240 deg - No Ice	38.095	-34.599	19.976	1866.948	3233.649	-0.000
1.2 Dead+1.6 Wind 270 deg - No Ice	50.793	-39.946	-0.017	-2.611	3743.429	-0.496
0.9 Dead+1.6 Wind 270 deg - No Ice	38.095	-39.944	-0.017	-2.600	3733.327	-0.495
1.2 Dead+1.6 Wind 300 deg - No Ice	50.793	-34.563	-20.013	-1877.424	3238.373	-0.325
0.9 Dead+1.6 Wind 300 deg - No Ice	38.095	-34.563	-20.013	-1872.425	3229.764	-0.325
1.2 Dead+1.6 Wind 330 deg - No Ice	50.793	-19.985	-34.678	-3253.016	1873.625	-0.052
0.9 Dead+1.6 Wind 330 deg - No Ice	38.095	-19.985	-34.678	-3244.358	1868.645	-0.052

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	16 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

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
No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	74.151	0.000	0.000	0.005	0.009	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	74.151	0.011	-8.347	-758.835	-1.251	-0.080
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	74.151	4.167	-7.221	-656.227	-378.552	-0.077
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	74.151	7.211	-4.163	-378.113	-654.910	-0.000
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	74.151	8.338	0.002	0.277	-757.585	0.077
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	74.151	7.234	4.164	378.334	-657.796	0.080
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	74.151	4.173	7.217	655.808	-379.359	0.058
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	74.151	0.005	8.327	756.378	-0.708	0.101
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	74.151	-4.164	7.216	655.532	378.174	0.111
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	74.151	-7.218	4.167	378.571	655.704	-0.000
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	74.151	-8.331	-0.001	-0.257	756.795	-0.111
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	74.151	-7.209	-4.168	-378.802	654.688	-0.101
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	74.151	-4.164	-7.222	-656.439	378.267	-0.058
Dead+Wind 0 deg - Service	42.328	-0.008	-6.093	-570.511	1.046	-0.050
Dead+Wind 30 deg - Service	42.328	3.028	-5.272	-493.486	-282.880	-0.077
Dead+Wind 60 deg - Service	42.328	5.252	-3.032	-283.507	-491.049	-0.000
Dead+Wind 90 deg - Service	42.328	6.079	0.014	1.762	-568.811	0.077
Dead+Wind 120 deg - Service	42.328	5.272	3.053	286.161	-493.554	0.050
Dead+Wind 150 deg - Service	42.328	3.050	5.273	493.672	-285.720	0.008
Dead+Wind 180 deg - Service	42.328	0.008	6.078	568.747	-1.030	0.050
Dead+Wind 210 deg - Service	42.328	-3.038	5.266	492.783	284.043	0.076
Dead+Wind 240 deg - Service	42.328	-5.266	3.040	284.418	492.626	-0.000
Dead+Wind 270 deg - Service	42.328	-6.079	-0.003	-0.403	568.785	-0.076
Dead+Wind 300 deg - Service	42.328	-5.260	-3.046	-285.266	492.034	-0.050
Dead+Wind 330 deg - Service	42.328	-3.041	-5.278	-494.277	284.672	-0.008

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-42.328	0.000	0.000	42.328	0.000	0.000%
2	-0.053	-50.793	-40.033	0.053	50.793	40.033	0.001%
3	-0.053	-38.095	-40.033	0.053	38.095	40.031	0.004%
4	19.894	-50.793	-34.640	-19.894	50.793	34.640	0.000%
5	19.894	-38.095	-34.640	-19.894	38.095	34.640	0.000%
6	34.513	-50.793	-19.926	-34.513	50.793	19.926	0.000%
7	34.513	-38.095	-19.926	-34.512	38.095	19.926	0.000%
8	39.946	-50.793	0.091	-39.946	50.793	-0.091	0.001%
9	39.946	-38.095	0.091	-39.944	38.095	-0.091	0.004%
10	34.644	-50.793	20.062	-34.644	50.793	-20.062	0.000%
11	34.644	-38.095	20.062	-34.643	38.095	-20.062	0.000%
12	20.040	-50.793	34.646	-20.040	50.793	-34.646	0.000%
13	20.040	-38.095	34.646	-20.040	38.095	-34.646	0.000%
14	0.050	-50.793	39.939	-0.050	50.793	-39.938	0.001%

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	17 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
15	0.050	-38.095	39.939	-0.050	38.095	-39.936	0.004%
16	-19.959	-50.793	34.603	19.959	50.793	-34.603	0.000%
17	-19.959	-38.095	34.603	19.959	38.095	-34.603	0.000%
18	-34.600	-50.793	19.976	34.600	50.793	-19.976	0.000%
19	-34.600	-38.095	19.976	34.599	38.095	-19.976	0.000%
20	-39.946	-50.793	-0.017	39.946	50.793	0.017	0.001%
21	-39.946	-38.095	-0.017	39.944	38.095	0.017	0.004%
22	-34.563	-50.793	-20.013	34.563	50.793	20.013	0.000%
23	-34.563	-38.095	-20.013	34.563	38.095	20.013	0.000%
24	-19.985	-50.793	-34.678	19.985	50.793	34.678	0.000%
25	-19.985	-38.095	-34.678	19.985	38.095	34.678	0.000%
26	0.000	-74.151	0.000	0.000	74.151	0.000	0.000%
27	0.011	-74.151	-8.347	-0.011	74.151	8.347	0.000%
28	4.167	-74.151	-7.221	-4.167	74.151	7.221	0.000%
29	7.211	-74.151	-4.163	-7.211	74.151	4.163	0.000%
30	8.338	-74.151	0.002	-8.338	74.151	-0.002	0.000%
31	7.234	-74.151	4.164	-7.234	74.151	-4.164	0.000%
32	4.173	-74.151	7.217	-4.173	74.151	-7.217	0.000%
33	0.005	-74.151	8.327	-0.005	74.151	-8.327	0.000%
34	-4.164	-74.151	7.216	4.164	74.151	-7.216	0.000%
35	-7.218	-74.151	4.167	7.218	74.151	-4.167	0.000%
36	-8.331	-74.151	-0.001	8.331	74.151	0.001	0.000%
37	-7.209	-74.151	-4.168	7.209	74.151	4.168	0.000%
38	-4.164	-74.151	-7.222	4.164	74.151	7.222	0.000%
39	-0.008	-42.328	-6.094	0.008	42.328	6.093	0.003%
40	3.028	-42.328	-5.273	-3.028	42.328	5.272	0.003%
41	5.254	-42.328	-3.033	-5.252	42.328	3.032	0.003%
42	6.081	-42.328	0.014	-6.079	42.328	-0.014	0.003%
43	5.274	-42.328	3.054	-5.272	42.328	-3.053	0.003%
44	3.051	-42.328	5.274	-3.050	42.328	-5.273	0.003%
45	0.008	-42.328	6.080	-0.008	42.328	-6.078	0.003%
46	-3.038	-42.328	5.267	3.038	42.328	-5.266	0.003%
47	-5.267	-42.328	3.041	5.266	42.328	-3.040	0.003%
48	-6.081	-42.328	-0.003	6.079	42.328	0.003	0.003%
49	-5.261	-42.328	-3.046	5.260	42.328	3.046	0.003%
50	-3.042	-42.328	-5.279	3.041	42.328	5.278	0.003%

## Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	10	0.00000001	0.00004275
3	Yes	9	0.00000001	0.00013477
4	Yes	12	0.00000001	0.00004090
5	Yes	11	0.00000001	0.00013182
6	Yes	12	0.00000001	0.00004145
7	Yes	11	0.00000001	0.00013371
8	Yes	10	0.00000001	0.00004719
9	Yes	9	0.00000001	0.00014221
10	Yes	12	0.00000001	0.00004279
11	Yes	11	0.00000001	0.00013798
12	Yes	12	0.00000001	0.00004218
13	Yes	11	0.00000001	0.00013596
14	Yes	10	0.00000001	0.00004078
15	Yes	9	0.00000001	0.00013154

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	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

16	Yes	12	0.00000001	0.00004255
17	Yes	11	0.00000001	0.00013729
18	Yes	12	0.00000001	0.00004181
19	Yes	11	0.00000001	0.00013482
20	Yes	10	0.00000001	0.00004394
21	Yes	9	0.00000001	0.00013674
22	Yes	12	0.00000001	0.00004147
23	Yes	11	0.00000001	0.00013370
24	Yes	12	0.00000001	0.00004220
25	Yes	11	0.00000001	0.00013606
26	Yes	6	0.00000001	0.00000001
27	Yes	11	0.00000001	0.00005372
28	Yes	11	0.00000001	0.00005580
29	Yes	11	0.00000001	0.00005569
30	Yes	11	0.00000001	0.00005361
31	Yes	11	0.00000001	0.00005593
32	Yes	11	0.00000001	0.00005583
33	Yes	11	0.00000001	0.00005353
34	Yes	11	0.00000001	0.00005575
35	Yes	11	0.00000001	0.00005577
36	Yes	11	0.00000001	0.00005355
37	Yes	11	0.00000001	0.00005571
38	Yes	11	0.00000001	0.00005583
39	Yes	8	0.00000001	0.00011177
40	Yes	8	0.00000001	0.00010446
41	Yes	8	0.00000001	0.00010436
42	Yes	8	0.00000001	0.00011145
43	Yes	8	0.00000001	0.00010521
44	Yes	8	0.00000001	0.00010492
45	Yes	8	0.00000001	0.00011140
46	Yes	8	0.00000001	0.00010510
47	Yes	8	0.00000001	0.00010466
48	Yes	8	0.00000001	0.00011143
49	Yes	8	0.00000001	0.00010446
50	Yes	8	0.00000001	0.00010502

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	135 - 109.08	5.067	39	0.3297	0.0002
L2	113.66 - 84.16	3.616	39	0.3097	0.0002
L3	89.9933 - 41.9933	2.230	39	0.2380	0.0001
L4	48.66 - 0	0.643	39	0.1201	0.0000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	(3) HPA-65R-BUU-H8 w/ Mount Pipe	39	4.719	0.3275	0.0002	110533
120.000	VHLP2-18	39	4.034	0.3196	0.0002	36844

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b>	CT-5020 Bridgeport - Evergreen St.	<b>Page</b>	19 of 21
	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	135 - 109.08	33.341	2	2.1701	0.0014
L2	113.66 - 84.16	23.797	2	2.0382	0.0011
L3	89.9933 - 41.9933	14.676	2	1.5668	0.0006
L4	48.66 - 0	4.229	2	0.7908	0.0002

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	(3) HPA-65R-BUU-H8 w/ Mount Pipe	2	31.053	2.1555	0.0013	16852
120.000	VHLP2-18	2	26.550	2.1036	0.0012	5617

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	135 - 109.08 (1)	TP36.69x29.52x0.25	25.920	135.000	129.7	27.9098	-7.243	374.580	0.019
L2	109.08 - 84.16 (2)	TP42.86x34.9231x0.3125	29.500	135.000	111.4	40.6451	-11.609	740.419	0.016
L3	84.16 - 41.9933 (3)	TP53.81x40.6656x0.5	48.000	135.000	88.6	81.7057	-25.374	2350.470	0.011
L4	41.9933 - 0 (4)	TP64x50.9844x0.625	48.660	135.000	72.0	125.720 0	-50.780	4988.760	0.010

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>ux</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub> kip-ft	φM <sub>uy</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	135 - 109.08 (1)	TP36.69x29.52x0.25	253.463	1347.958	0.188	0.000	1347.958	0.000
L2	109.08 - 84.16 (2)	TP42.86x34.9231x0.3125	806.271	2346.867	0.344	0.000	2346.867	0.000
L3	84.16 -	TP53.81x40.6656x0.5	1991.242	6368.033	0.313	0.000	6368.033	0.000

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	<b>Project</b>	Monopole Structural Analysis	<b>Date</b>	18:37:11 04/18/17
	<b>Client</b>	Blue Sky Towers	<b>Designed by</b>	Josh Turner

Section No.	Elevation ft	Size	$M_{ux}$ kip-ft	$\phi M_{rx}$ kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	$M_{uy}$ kip-ft	$\phi M_{ry}$ kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L4	41.9933 (3) 41.9933 - 0 (4)	TP64x50.9844x0.625	3754.750	12107.500	0.310	0.000	12107.500	0.000

### Pole Shear Design Data

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 $\frac{T_u}{\phi T_n}$
L1	135 - 109.08 (1)	TP36.69x29.52x0.25	21.563	931.149	0.023	0.052	2699.208	0.000
L2	109.08 - 84.16 (2)	TP42.86x34.9231x0.3125	25.188	1392.240	0.018	0.052	4699.467	0.000
L3	84.16 - 41.9933 (3)	TP53.81x40.6656x0.5	32.191	3013.040	0.011	0.327	12751.667	0.000
L4	41.9933 - 0 (4)	TP64x50.9844x0.625	40.050	4654.520	0.009	0.327	24244.584	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	Ratio $\frac{M_{uy}}{\phi M_{ry}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	135 - 109.08 (1)	0.019	0.188	0.000	0.023	0.000	0.208	1.000	4.8.2 ✓
L2	109.08 - 84.16 (2)	0.016	0.344	0.000	0.018	0.000	0.360	1.000	4.8.2 ✓
L3	84.16 - 41.9933 (3)	0.011	0.313	0.000	0.011	0.000	0.324	1.000	4.8.2 ✓
L4	41.9933 - 0 (4)	0.010	0.310	0.000	0.009	0.000	0.320	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	135 - 109.08	Pole	TP36.69x29.52x0.25	1	-7.243	374.580	20.8	Pass	
L2	109.08 - 84.16	Pole	TP42.86x34.9231x0.3125	2	-11.609	740.419	36.0	Pass	
L3	84.16 - 41.9933	Pole	TP53.81x40.6656x0.5	3	-25.374	2350.470	32.4	Pass	
L4	41.9933 - 0	Pole	TP64x50.9844x0.625	4	-50.780	4988.760	32.0	Pass	
							Summary		
							Pole (L2)	36.0	Pass
							<b>RATING =</b>	<b>36.0</b>	<b>Pass</b>

<b>tnxTower</b>  <b>Bennett &amp; Pless</b> 47 Perimeter Center East Suite 500 Atlanta, GA 30346 Phone: (678) 990-8700 FAX: (678) 990-8701	<b>Job</b> CT-5020 Bridgeport - Evergreen St.	<b>Page</b> 21 of 21
	<b>Project</b> Monopole Structural Analysis	<b>Date</b> 18:37:11 04/18/17
	<b>Client</b> Blue Sky Towers	<b>Designed by</b> Josh Turner

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Program Version 7.0.7.0 - 7/18/2016 File:Z:/Shared/Projects/2017/17000 - 17299 - GA/17003.xxx - Blue Sky/17003.005 - CT-5020 Evergreen St - Bridgeport/Sprint Re-Run (4-19-17)/CT-5020\_SA\_SPRINT REV\_041817.eri



Attachment 2:  
Collocation Application



**Collocation Application**

<b>Installation Type:</b>	<b>Anchor</b> <input type="checkbox"/>	<b>Collocation</b> <input checked="" type="checkbox"/>	<b>Add to Existing</b> <input type="checkbox"/>
<b>BlueSky Towers, LLC Info</b>			
Contact:	Sean Gormley	Site Number:	CT-5020
Email:	collos@blueskytower.com	Site Name:	Evergreen Street
Office:	508-530-3580	Submittal Date:	9/14/2016
Fax:	508-530-3564	Revision Date(s):	rev. 04/08/17

PLEASE SUBMIT THIS APPLICATION VIA E-MAIL

**Applicant Information**

Applicant Name:	Sprint	Primary Contact/Agent Name:	Heather Castagnaro	
Applicant Site Name:	Bridgeport	Contact/Agent Company Name:	Sprint	
Applicant Site Number:	CT25XC553	Contact/Agent Number:	774-214-6154	
Proposed ON AIR Date:	1/31/2017	Contact/Agent Fax:	N/A	
Applicant Legal Entity:	Sprint Spectrum Realty Company, LLC, a Delaware limited liability company		Contact Email:	heather.2.castagnaro@sprint.com
Notice Address for Site License:	erty Services Sprint Site ID: CT25XC553, Mailstop KSOPHT0101-Z2650, 6391 Sprint Parkway, Overland Park KS			

**Applicant Contact Information**

Leasing Contact Name:	Heather Castagnaro	Email:	heather.2.castagnaro@sprint.com	Number:	774-214-6154
RF Contact Name:	Rich Kane	Email:	richard.kane@sprint.com	Number:	
Construction Contact Name:	Mike Delia	Email:	michael.delia@sprint.com	Number:	
Emergency Contact Name:	TBD	Email:	N/A	Number:	1-866-400-6040
Account Payable Contact Name:	N/A	Email:	N/A	Number:	N/A

**Tower Information**

Latitude:	41-11-52.00	N	Structure Type:	Monopole
Longitude:	73-11-26.49	W	Structure Height:	135'
AMSL:		FT		
Site Address:	220 Evergreen Street, Bridgeport, CT 06606			

**EQUIPMENT SPECIFICATIONS**

Summary of Work to be Completed: Install antennas on tower and ground equipment within compound.

Sector	SECTOR 1	SECTOR 2	SECTOR 3	SECTOR 4	
Equipment Type	Panel	Panel	Panel	GPS / MW Dish	
Installation Status	Proposed	Proposed	Proposed	Proposed	
Desired RAD Center (Ft AGL)	120	120	120	120	
Tower Mount Mounting Height	120	120	120	120	
Mount Type(Attach Specs)	Sector Frame	Sector Frame	Sector Frame	Sector Frame	
Equipment Manufacturer	(1) RFS panel; (1) RFS panel; (2) Nokia [ALU] RRHs; (1) Nokia [ALU] RRH; (1) Nokia RRH; (1) Samsung DAP head; (1) RFS Combiner; (1) RFS Combiner	(1) RFS panel; (1) RFS panel; (2) Nokia [ALU] RRHs; (1) Nokia [ALU] RRH; (1) Nokia RRH; (1) Samsung DAP head; (1) RFS Combiner; (1) RFS Combiner	(1) RFS panel; (1) RFS panel; (2) Nokia [ALU] RRHs; (1) Nokia [ALU] RRH; (1) Nokia RRH; (1) Samsung DAP head; (1) RFS Combiner; (1) RFS Combiner	(1) PCTEL / (3) Andrew MWS / (1) Motorola MW / (3) Dragonwave ODU / (1) Motorola ODU	
Equipment Model# (Attached Specs)	(1) RFS APXVSP18-C-A20; (1) RFS Model APXVTM14-ALU-120; (2) 1900MHz RRH (65MHz); (1) 800 MHz-2/50w RRH; (1) TD-RRHx20-25 RRH; (1) DAP head; (1) RFS IBC1900HG-2A Combiner; (1) RFS IBC1900-BB-1 Combiner	(1) RFS APXVSP18-C-A20; (1) RFS Model APXVTM14-ALU-120; (2) 1900MHz RRH (65MHz); (1) 800 MHz-2/50w RRH; (1) TD-RRHx20-25 RRH; (1) DAP head; (1) RFS IBC1900HG-2A Combiner; (1) RFS IBC1900-BB-1 Combiner	(1) RFS APXVSP18-C-A20; (1) RFS Model APXVTM14-ALU-120; (2) 1900MHz RRH (65MHz); (1) 800 MHz-2/50w RRH; (1) TD-RRHx20-25 RRH; (1) DAP head; (1) RFS IBC1900HG-2A Combiner; (1) RFS IBC1900-BB-1 Combiner	(1) GPS-TMG-HR-26NCM / (3) Andrew VHLP2-18 MWS / (1) Motorola MT-485025 14" Integrated Panel / (3) Dragonwave ODU / (1) Motorola ODU	
Equipment Dimensions (WxHxD)(Feet Or Inches)	(1) 72"x11.8"x7"; (1) 56.3"x12.6"x6.3"; (2) 25" x 12.4" x 12.2"; (1) 19.7"x13"x10.8"; (1) 26.1"x18.6"x6.7"; (1) 16.14"x11.63"x5.29"; (1) 14.25"x9.18"x4.35"; (1) 8.2"x18"x7.5"	(1) 72"x11.8"x7"; (1) 56.3"x12.6"x6.3"; (2) 25" x 12.4" x 12.2"; (1) 19.7"x13"x10.8"; (1) 26.1"x18.6"x6.7"; (1) 16.14"x11.63"x5.29"; (1) 14.25"x9.18"x4.35"; (1) 8.2"x18"x7.5";	(1) 72"x11.8"x7"; (1) 56.3"x12.6"x6.3"; (2) 25" x 12.4" x 12.2"; (1) 19.7"x13"x10.8"; (1) 26.1"x18.6"x6.7"; (1) 16.14"x11.63"x5.29"; (1) 14.25"x9.18"x4.35"; (1) 8.2"x18"x7.5";	(1) 72"x11.8"x7"; (1) 56.3"x12.6"x6.3"; (2) 25" x 12.4" x 12.2"; (1) 19.7"x13"x10.8"; (1) 26.1"x18.6"x6.7"; (1) 16.14"x11.63"x5.29"; (1) 14.25"x9.18"x4.35"; (1) 8.2"x18"x7.5";	(1) 5" / (3) 26.1" / (1) 14" / (3) 4.7" x 7.5" (diam) / (1) 14.5" x 14.5" x 3.75"
Equipment Weight (Per Item, In Lbs.)	(1) 64.5 lbs; (1) 56 lbs; (2) 60 lbs; (1) 53 lbs; (1) 70 lbs; (1) 33 lbs; (1) 22 lbs; (1) 40 lbs	(1) 64.5 lbs; (1) 56 lbs; (2) 60 lbs; (1) 53 lbs; (1) 70 lbs; (1) 33 lbs; (1) 22 lbs; (1) 40 lbs;	(1) 64.5 lbs; (1) 56 lbs; (2) 60 lbs; (1) 53 lbs; (1) 70 lbs; (1) 33 lbs; (1) 22 lbs; (1) 40 lbs;	(1) 0.6 lbs / (3) 18 lbs / (1) 6 lbs / (3) 7 lbs / (1) 12.1 lbs	
Equipment Quantity	(2) panel antennas; (4) RRHs; (2) combiners	(2) panel antennas; (4) RRHs; (2) combiners	(2) panel antennas; (4) RRH's; (2) combiners	(1) GPS / (3) MW dishes / (1) MW panel / (3) ODU's / (1) ODU	
Orientation/Azimuth (Degrees)	30	180	270	(1) N/A / (3) TBD / (1) TBD / (3) TBD / (1) TBD	
Transmit Frequency (Mhz)	2496-2690 MHz; 1950-1965 MHz; 1990-1995 MHz; 862-869 MHz; 1930-1995 MHz	2496-2690 MHz; 1950-1965 MHz; 1990-1995 MHz; 862-869 MHz; 1930-1995 MHz	2496-2690 MHz; 1950-1965 MHz; 1990-1995 MHz; 862-869 MHz; 1930-1995 MHz	TBD	
Receive Frequency (Mhz)	2496-2690 MHz; 1870-1885 MHz; 1910-1915 MHz; 817-824 MHz; 1850-1915 MHz; CW - 21.2-23.6 MHz	2496-2690 MHz; 1870-1885 MHz; 1910-1915 MHz; 817-824 MHz; 1850-1915 MHz; CW - 21.2-23.6 MHz	2496-2690 MHz; 1870-1885 MHz; 1910-1915 MHz; 817-824 MHz; 1850-1915 MHz; CW - 21.2-23.6 MHz	TBD	
Antenna Gain (Db)	TBD	TBD	TBD	TBD	
Total# Of Lines For Equipment In Column	6 total cables and 2 total innerduct conduits [(1) hybridflex; (2) coax; (1) 1" flexible corrugated conduit (w/ (1) ethernet and (1) fiber cables); (1) 1" flexible corrugated conduit with (1) 12 AWG-9-10/C SOWW AC power cable)	3 total (1 hybridflex fiber-DC; and 2 coax)	3 total (1 hybridflex fiber-DC; and 2 coax)	5 total (1 coax; and 4 ethernet)	
Line Type	Fiber Hybrid / Coax / Ethernet / Fiber / Power <u>(2) 1-1/4" hybridflex;</u> (2) 5/16" coax;	Fiber hybrid / Coax	Fiber Hybrid / Coax	Coax / Ethernet	
Diameter Of Coax Cables (In)		(1) 1-1/4" hybridflex; and (2) 5/16" coax	(1) 1-1/4" hybridflex; and(2) 5/16" coax	(1) 1/2" coax / (4) 1/2" ethernet	
Removing Equipment (If Applicable)	N/A	N/A	N/A	N/A	
Transmitter/Receiver Type	N/A	N/A	N/A	N/A	
Qty Of Transmitters/Receivers	N/A	N/A	N/A	N/A	
Manufacturer	N/A	N/A	N/A	N/A	
Type & Model	N/A	N/A	N/A	N/A	
Type of Technology	LTE	CDMA	WiMax	N/A	
TX Power Output	N/A	N/A	N/A	N/A	
ERP (Watts)	524 & 300	524 & 300	524 & 300	N/A	
Electric Service Required (Amps/Volts)	200/240	200/240	200/240	N/A	
Will RRUs be located behind antennas:	Yes				

**GROUND SPACE REQUIREMENTS**

Existing Lease Area:	DIMS: L(ft)	15'	W(ft)	20'	OR	300	Square footage
New/Add'l Lease Area being requested:	DIMS: L(ft)	15'	W(ft)	20'	OR	300	Square footage

New/Add'l Rooftop Lease Area being requested (if space is needed on both ground and rooftop):			
	DIMS: L(ft)	W(ft)	OR Square footage
Shelter:	DIMS: L(ft)	W(ft)	H(ft)
Concrete Pad for Shelter:	DIMS: L(ft)	W(ft)	
Cabinets:	DIMS: L(ft)	W(ft)	H(ft)
Concrete Pad for Cabinets:	DIMS: L(ft)	W(ft)	
Cabinet/Shelter Manufacturer/Model:		TBD	

**POWER REQUIREMENTS**

Power Provided by:	Electrical Service Provider:	Electrical Service Telephone Number:
Average Monthly Power Consumption:	KWH units	
Is a multi-tenant meter rack present:	How many, if any, empty meter banks are present:	
Telco/Interconnect Requirements:	POTS <input type="checkbox"/>	T1 <input type="checkbox"/>
Fiber Provider:	MICROWAVE <input type="checkbox"/>	FIBER OPTICS <input checked="" type="checkbox"/>

**BACK-UP POWER INFORMATION**

Generator Required:	No	Generator Location:		Fuel Type:	
Generator Ground Space Requirement:	DIMS: L(ft)	W(ft)	H(ft)		
BST Generator:		Generator Owner:		Shared Generator Peak Usage:	KW
Generator Capacity:	KW	Generator Make:		Generator Model:	
Fuel Tank Location:		Fuel Tank Size:	DIMS: L(ft)	W(ft)	Fuel Tank Size: Gallons
Pad for Fuel Tank (if required)	DIMS: L(ft)	W(ft)			
Comments:					

Attach manufacturer's equipment specifications for antennas, mounts, cabinets, shelters if available

Sprint proposes a final configuration of: (6) panel antennas [3-RFS Model APXVSP18-C-A20; 3-RFS Model APXVTM14-ALU-I20]; (12) RRHs [6-1900MHz RRH (65MHz) RRHs; 3-800 MHz-2/50w RRH; 3-ALU Nokia TD-RRH8x20-25 RRHs]; (3) DAP heads; (3) MW Dish Antennas [Andrew 26.1" diam.]; (1) MW Panel Antenna [Motorola 14" Integrated Panel]; (4) ODU's; (6) combiners; (4) lines of 1/4" Hybriflex cable; (6) lines of 5/16" coax; (4) lines of 1/2" ethernet; (1) GPS antenna w/ 1/2" coax; and a 15' x 20' (300 sq. ft.) equipment area.

www.blueskytower.com

# **EXHIBIT 4**



C Squared Systems, LLC  
65 Dartmouth Drive  
Auburn, NH 03032  
(603) 644-2800  
support@csquaredsystems.com

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## Calculated Radio Frequency Emissions Report

**Sprint**<sup>®</sup>



CT25XC553 – Bridgeport

220 Evergreen Street, Bridgeport, CT 06606

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June 9, 2017

## Table of Contents

1. Introduction .....	1
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits.....	1
3. RF Exposure Prediction Methods.....	2
4. Calculation Results .....	3
5. Conclusion .....	4
6. Statement of Certification.....	4
Attachment A: References.....	5
Attachment B: FCC Limits for Maximum Permissible Exposure (MPE).....	6
Attachment C: Sprint’s Antenna Model Data Sheets and Electrical Patterns.....	8

## List of Tables

Table 1: Carrier Information .....	3
Table 2: FCC Limits for Maximum Permissible Exposure (MPE) .....	6

## List of Figures

Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE).....	7
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## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of Sprint antenna arrays on the monopole tower located at 220 Evergreen Street in Bridgeport, CT. The coordinates of the tower are 41° 11' 52.00" N, 73° 11' 26.49" W. AT&T is currently the only collocater with antennas on the tower.

Sprint is proposing to install the following:

- 1) Install three 865/1900 MHz CDMA/LTE panel antennas (one per sector);
- 2) Install three 2500 MHz LTE panel antennas (one per sector);
- 3) Install twelve remote radio units (RRUs) for their 865/1900/2500 MHz networks (four per sector);
- 4) Install one 5.8 GHz panel antenna and associated ODU for site backhaul;
- 5) Install three 18 GHz microwave dishes and associated ODUs for site backhaul.

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ( $\text{mW}/\text{cm}^2$ ). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

### 3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left( \frac{1.6^2 \times \text{EIRP}}{4\pi \times R^2} \right) \times \text{OffBeamLoss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance =  $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna patterns

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the final site configuration.



#### 4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed Sprint antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical patterns of the proposed Sprint antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm <sup>2</sup> )	Limit	%MPE
AT&T - UMTS	130	880	1	1028	0.0241	0.5867	0.41%
AT&T - UMTS	130	1900	1	1265	0.0296	1.0000	0.30%
AT&T - LTE	130	710	2	1254	0.0587	0.4733	1.24%
AT&T - LTE	130	850	1	1542	0.0361	0.5667	0.64%
AT&T - LTE	130	1900	2	1897	0.0888	1.0000	0.89%
AT&T - LTE	130	2300	1	2179	0.0510	1.0000	0.51%
<i>Sprint - CDMA</i>	<i>120</i>	<i>865</i>	<i>1</i>	<i>350</i>	<i>0.0097</i>	<i>0.5767</i>	<i>0.17%</i>
<i>Sprint - CDMA</i>	<i>120</i>	<i>1900</i>	<i>5</i>	<i>622</i>	<i>0.0861</i>	<i>1.0000</i>	<i>0.86%</i>
<i>Sprint - LTE</i>	<i>120</i>	<i>865</i>	<i>1</i>	<i>1750</i>	<i>0.0484</i>	<i>0.5767</i>	<i>0.84%</i>
<i>Sprint - LTE</i>	<i>120</i>	<i>1900</i>	<i>1</i>	<i>3112</i>	<i>0.0862</i>	<i>1.0000</i>	<i>0.86%</i>
<i>Sprint - LTE</i>	<i>120</i>	<i>2500</i>	<i>1</i>	<i>6225</i>	<i>0.1723</i>	<i>1.0000</i>	<i>1.72%</i>
<i>Sprint - MW</i>	<i>120</i>	<i>5800</i>	<i>1</i>	<i>2.5</i>	<i>0.0001</i>	<i>1.0000</i>	<i>0.00%</i>
<i>Sprint - MW</i>	<i>120</i>	<i>18000</i>	<i>4</i>	<i>16.2</i>	<i>0.0018</i>	<i>1.0000</i>	<i>0.02%</i>
<i>Sprint - MW</i>	<i>120</i>	<i>18000</i>	<i>2</i>	<i>40.7</i>	<i>0.0023</i>	<i>1.0000</i>	<i>0.02%</i>
						<b>Total:</b>	<b>8.48%</b>

Table 1: Carrier Information<sup>1 2</sup>

<sup>1</sup> The power density information for AT&T was taken directly from the CSC database dated 10/11/2016. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

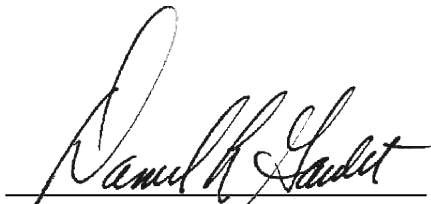
<sup>2</sup> Antenna heights listed for Sprint are in reference to the Hudson Design Group, LLC, Construction Drawings, dated 5/25/2017.

## 5. Conclusion

The above analysis verifies that emissions from the final site configuration will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. The highest, cumulative expected percent of Maximum Permissible Exposure at ground level is **8.48% of the FCC Uncontrolled/General Population limit.**

## 6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Daniel L. Goulet  
C Squared Systems, LLC

June 9, 2017

Date

## **Attachment A: References**

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

**Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)**

**(A) Limits for Occupational/Controlled Exposure<sup>3</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

**(B) Limits for General Population/Uncontrolled Exposure<sup>4</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz \* Plane-wave equivalent power density

**Table 2: FCC Limits for Maximum Permissible Exposure (MPE)**

<sup>3</sup> Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

<sup>4</sup> General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

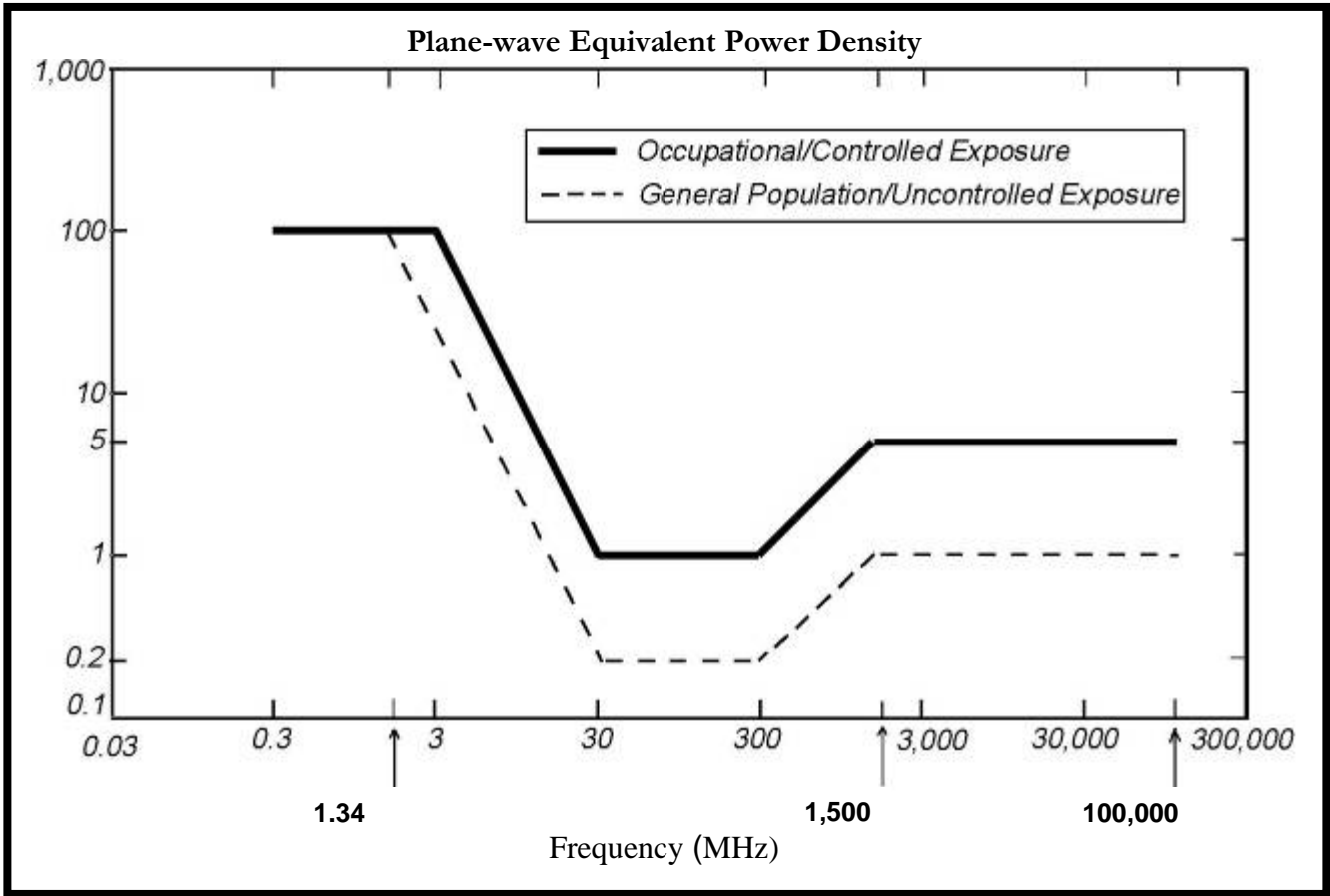
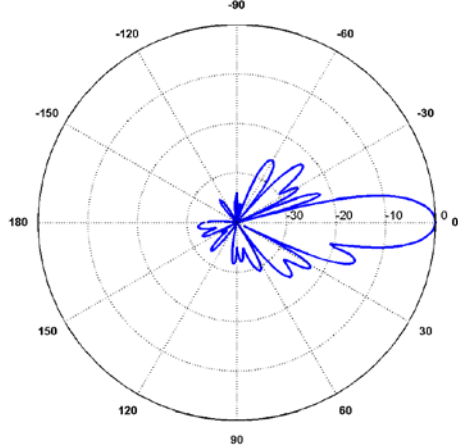
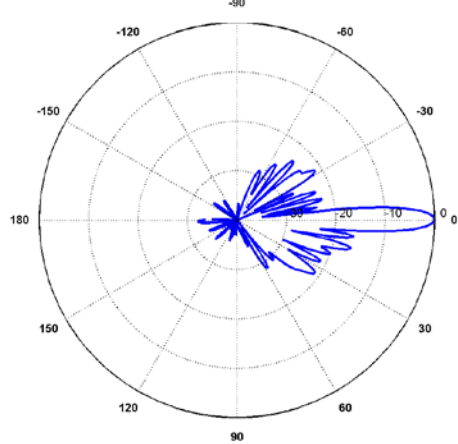
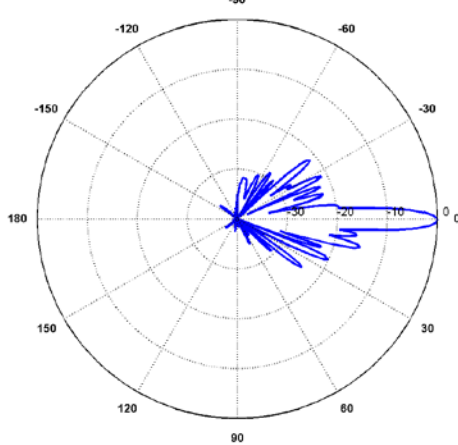


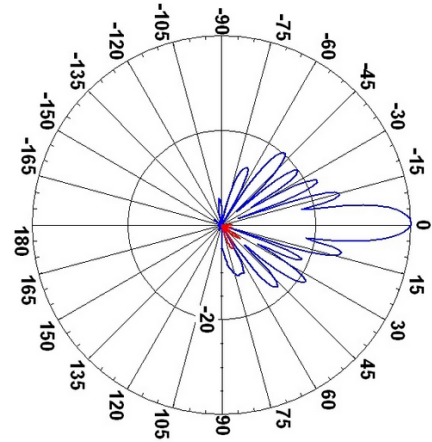
Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

### Attachment C: Sprint's Antenna Model Data Sheets and Electrical Patterns

<p><b>865 MHz CDMA/LTE</b></p> <p>Manufacturer: RFS            Model #: APXVSPP18-C-A20            Frequency Band: 806-869 MHz            Gain: 13.4 dBd            Vertical Beamwidth: 11.5°            Horizontal Beamwidth: 65°            Polarization: Dual Pol ± 45°            Size L x W x D: 72.0" x 11.8" x 7.0"</p>	
<p><b>1900 MHz CDMA/LTE</b></p> <p>Manufacturer: RFS            Model #: APXVSPP18-C-A20            Frequency Band: 1850-1995 MHz            Gain: 15.9 dBd            Vertical Beamwidth: 5.5°            Horizontal Beamwidth: 65°            Polarization: Dual Pol ± 45°            Size L x W x D: 72.0" x 11.8" x 7.0"</p>	
<p><b>2500 MHz LTE</b></p> <p>Manufacturer: RFS            Model #: APXVTM14-ALU-I20            Frequency Band: 2490-2690 MHz            Gain: 15.9 dBd            Vertical Beamwidth: 5.0°            Horizontal Beamwidth: 65°            Polarization: Dual Pol ± 45°            Size L x W x D: 56.3" x 12.6" x 6.3"</p>	

### 5.8 GHz Microwave

Manufacturer: MTI Wireless Edge  
 Model #: MT-485025  
 Frequency Band: 5150-6000 MHz  
 Gain: 20.9 dBd  
 Vertical Beamwidth: 9°  
 Horizontal Beamwidth: 9°  
 Polarization: Dual Linear  
 Size L x W x D: 14.6" x 14.6" x 1.6"



### 18 GHz Microwave

Manufacturer: Commscope  
 Model #: VHLP2-18  
 Frequency Band: 17700-19700 MHz  
 Gain: 36.6 dBd  
 Vertical Beamwidth: 2.1°  
 Horizontal Beamwidth: 2.1°  
 Polarization: Single  
 Diameter: 24.0"

