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

December 19, 2018

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

RE: **Notice of Exempt Modification for Sprint Crown Site BU: 827050**
Sprint Site ID: CT23XC556
699 Old Main Street, Rocky Hill, Hartford County, CT 06067
Latitude: 41° 40′ 5.77″/ **Longitude:** -72° 38′ 16.93″

Dear Ms. Bachman:

Sprint currently maintains (3) antennas at the 130-foot level of the existing 147.5-foot monopole at 699 Old Main Street, Rocky Hill, Connecticut 06460. The tower is owned by Crown Castle. The property is owned by the Town of Rocky Hill. Sprint intends to replace (3) antennas and install (3) additional antennas. Sprint also intends to remove (3) RRHs and swap (1) hybrid cable.

The facility was approved by the Town of Rocky Hill Planning and Zoning Commission on December 16, 1998. This approval is attached hereto for reference.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to the Town Manager, John Mehr, for the Town of Rocky Hill and Kim Ricci, Town Planner, for the Town of Rocky Hill, the property owner, and Crown Castle is the tower owner.

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

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

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

cc: John Mehr, Town Manager
Town Hall
761 Old Main Street
Rocky Hill, CT 06067

Kim Ricci, Town Planner
Town Hall
761 Old Main Street
Rocky Hill, CT 06067

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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CT11-058

Town of Rocky Hill

699 OLD MAIN STREET • PO BOX 657 • ROCKY HILL, CT 06067 • FAX (860) 258-7638

CERTIFIED

December 18, 1998

Mr. Thomas Gilligan
Omnipoint Communications, Inc.
100 Filley St.
Bloomfield, CT 06002

Ms. Barbara Gilbert Interium Town Manager
Town of Rocky Hill
699 Old Main St.
Rocky Hill, CT 06067

RE: Site Plan Application, 150' monopole Antenna, 699 Old Main Street

Dear Mr. Gilligan and Ms. Gilbert,

The Rocky Hill Planning and Zoning Commission at their regular meeting of December 16, 1998 voted to approve the aforementioned application. The applicants at the meeting indicated that the fenced-in area could be screened with shrubs and that the antenna could be painted, etc. to better blend with the environment. Please contact the undersigned with your intentions for screening.

Please prepare and submit two (2) sets of the final plans for the Commission's signature. One set of plans is to conform with the enclosed Map Requirements, and the other can be mylar for filing with the Planning and Engineering Departments. The plans are to have signature blocks for the Commission. In addition, there is a $10.00 per sheet recording fee (one set only) due and payable to the Town of Rocky Hill. Upon receipt of the signed plans and the recording fee, Staff will gladly record the plans with the Town Clerk.

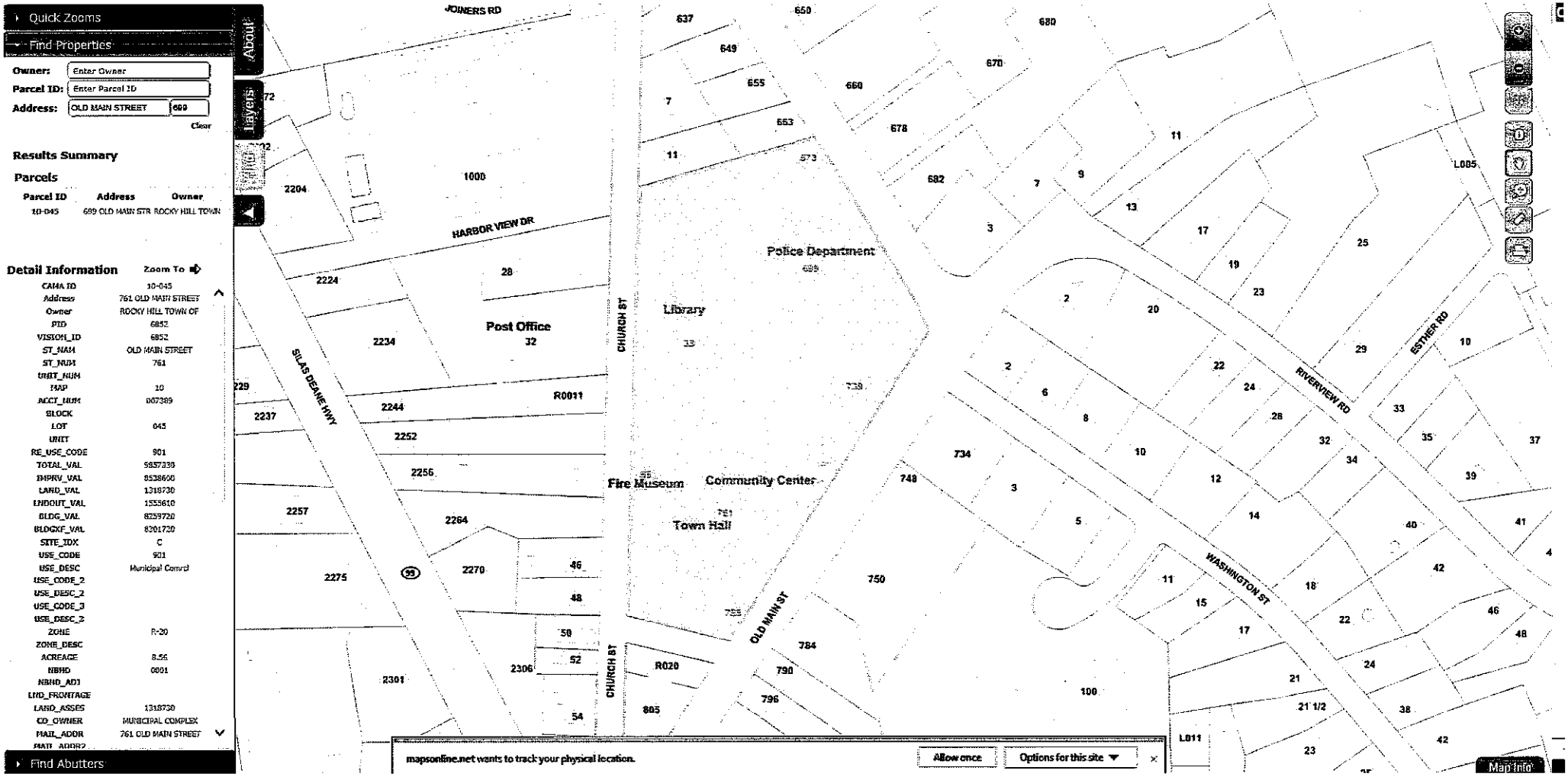
Should you have any questions, please do not hesitate to contact this office at 860-258-2761 or 860-258-2766.

Sincerely,

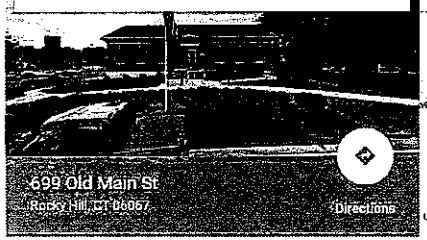
Kimberley A. Ricci, Town Planner/Assistant ZEO

KAR/mn

cc: Police Chief
Fire Chief


Quick Zooms
Find Properties
Owner: Enter Owner
Parcel ID: Enter Parcel ID
Address: OLD MAIN STREET 699
Clear
Results Summary
Parcels
Parcel ID Address Owner
10-045 699 OLD MAIN STR ROCKY HILL TOWN
Detail Information
Zoom To
CAMA ID 10-045
Address 761 OLD MAIN STREET
Owner ROCKY HILL TOWN OF
PID 6852
VISION_ID 6852
ST_NAM OLD MAIN STREET
ST_NUM 761
UNIT_NUM
MAP 10
ACCT_NUM 007389
BLOCK
LOT 045
UNIT
RE_USE_CODE 901
TOTAL_VAL 9857330
IMPRV_VAL 8538600
LAND_VAL 1318730
LNDOUT_VAL 1555610
BLDG_VAL 8259720
BLDGXF_VAL 8201720
SITE_IDX C
USE_CODE 901
USE_DESC Municipal Concrd
USE_CODE_2
USE_DESC_2
USE_CODE_3
USE_DESC_3
ZONE R-20
ZONE_DESC
ACREAGE 8.56
NBHD 0001
NBHD_ADJ
LND_FRONTAGE
LAND_ASSES 1318730
CO_OWNER MUNICIPAL COMPLEX
MAIL_ADDR 761 OLD MAIN STREET
MAIL_ADDR2
Find Abutters
About
Layers
JOINERS RD
HARBOR VIEW DR
SILAS DEANE HWY
CHURCH ST
OLD MAIN ST
WASHINGTON ST
RIVERVIEW RD
ESTHER RD
Police Department
Library
Post Office
Fire Museum
Community Center
Town Hall
R0011
R020
mapsonline.net wants to track your physical location.
Allow once
Options for this site
Map Info

699 Old Main St, Rocky Hill, CT 0



SAVE NEARBY SEND TO YOUR PHONE SHARE

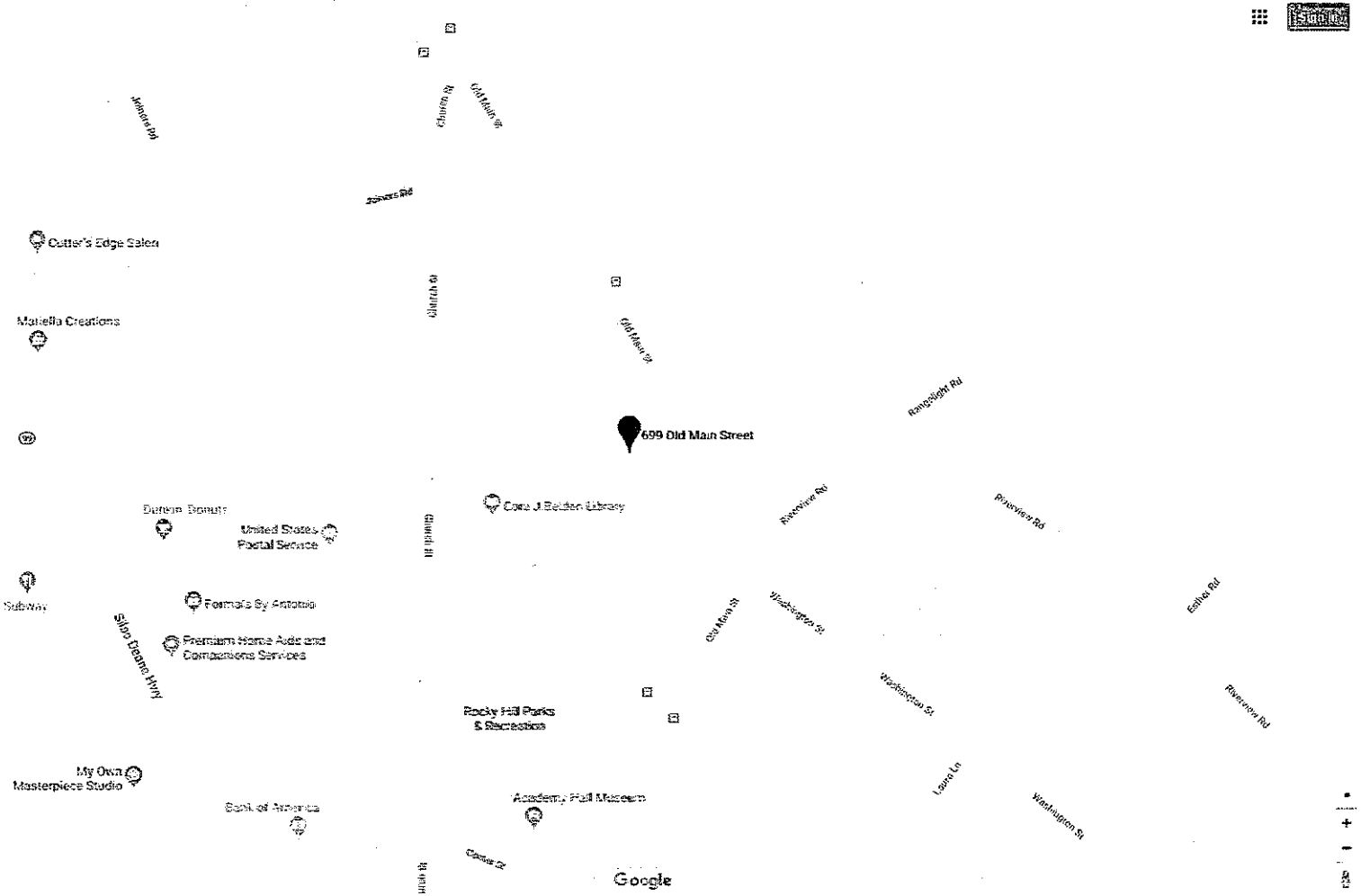
Add a missing place

At this location

Rocky Hill Human Services Department
5.0 ★★★★★
Social Services Organization · 699 Old Main St

Rocky Hill Mini Bus Transportation
City Government Office · 699 Old Main St

Rocky Hill Police Department
5.0 ★★★★★
Police Department · 699 Old Main St



SPECIAL CONSTRUCTION NOTE:
SPRINT WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
* COMPLETION OF AN ANTENNA/RRH MOUNT STRUCTURAL ASSESSMENT.
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED ANALYSIS AND ASSESSMENT.

Sprint

PROJECT: DO MACRO UPGRADE (800 3G/4G & 2.5)

SITE NAME: ROCKY HILL/ RTE 160_1

SITE CASCADE: CT23XC556

MARKET: NE

SITE ADDRESS: 699 OLD MAIN STREET
ROCKY HILL, CT 06067

SITE TYPE: MONOPOLE

NOTE:

OWNER AND TENANT MAY, FROM TIME TO TIME AT TENANT'S OPTION, REPLACE THIS EXHIBIT WITH AN EXHIBIT SETTING FORTH THE LEGAL DESCRIPTION OF THE SITE, OR WITH ENGINEERED OR AS-BUILT DRAWING DEPICTING THE SITE OR ILLUSTRATING STRUCTURAL MODIFICATIONS OR CONSTRUCTION PLANS OF THE SITE. ANY VISUAL OR TEXTUAL REPRESENTATION OF THE EQUIPMENT LOCATED WITHIN THE SITE CONTAINED IN THESE OTHER DOCUMENTS IS ILLUSTRATIVE ONLY, AND DOES NOT LIMIT THE RIGHTS OF SPRINT AS PROVIDED FOR IN THE AGREEMENT. THE LOCATIONS OF ANY ACCESS AND UTILITY EASEMENTS ARE ILLUSTRATIVE ONLY. ACTUAL LOCATIONS MAY BE DETERMINED BY TENANT AND/OR THE SERVICING UTILITY COMPANY IN COMPLIANCE WITH LOCAL LAWS AND REGULATIONS.

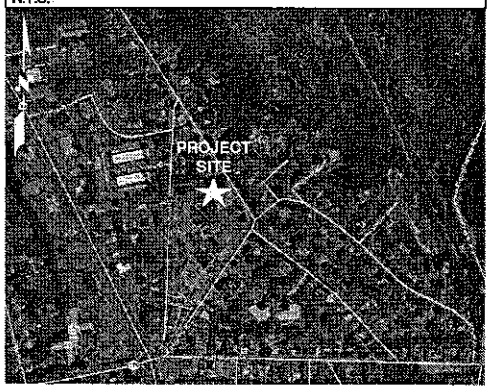
NOTE:
THESE PLANS ARE BASED ON INFORMATION OBTAINED FROM PHOTOS DATED 12/13/17. THE SPRINT CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL ITEMS AND NOTIFYING THE ENGINEER OF RECORD OF ANY DISCREPANCIES.

STRUCTURAL NOTES:
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS COMPLETED BY PAUL J. FORD & COMPANY, DATED 10/01/18 AND MOUNT STRUCTURAL ANALYSIS COMPLETED BY HDG, DATED 10/12/18 TO DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

CROWN CASTLE SITE #: 827050
CROWN CASTLE SITE NAME: ROCKY HILL/ RTE 160_1

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

VICINITY MAP
N.T.S.



PROJECT INFORMATION

SITE INFORMATION:

SPRINT EQUIPMENT MODIFICATIONS REQUIRED TO SUPPORT MODERNIZATION OF AN EXISTING WIRELESS COMMUNICATIONS FACILITY AND UTILIZATION OF FCC BROADBAND SPECTRUM LICENSE FOR DO_MACRO UPGRADE, INCLUDING INSTALLATION OF:
GROUND-LEVEL RAN EQUIPMENT, CONSISTING OF:
* REMOVE (3) REMOTE RADIO HEADS (RRH) FROM H-FRAME
TOWER EQUIPMENT, INCLUDING INSTALLATION OF:
* (6) PANEL ANTENNAS TO REPLACE (6) EXISTING ANTENNAS
* (9) REMOTE RADIO HEADS (RRH) [RELOCATE (3) 1900 RRHS FROM GROUND TO TOWER TOP]
* (4) HYBRID CABLES

LATITUDE:	N 41° 40' 5.77"
LONGITUDE:	W 72° 38' 16.93"
GROUND ELEVATION	100'± AMSL (PER GOOGLE EARTH)
STRUCTURE HEIGHT	147.5'± AGL (TYPE: MONOPOLE)
ZONING JURISDICTION	ROCKY HILL

APPLICANT:

SPRINT
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495

PROPERTY OWNER:

TOWN OF ROCKY HILL MUNICIPAL COMPLEX
761 OLD MAIN STREET
ROCKY HILL, CT. 06067

TOWER OWNER:

CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01801

SPRINT CONSTRUCTION MANAGER:

MIKE DURKIN
PHONE: 401-363-9923
michael.durkin@sprint.com

CROWN CASTLE PROJECT MANAGER:

WILL STONE
PHONE: 518-373-3543
william.stone@crowncastle.com

SPRINT MARKET MANAGER:

RONALD HIBBARD
PHONE: 774-269-8812
ronald.hibbard@sprint.com

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
SP-1	OUTLINE SPECIFICATIONS	1
SP-2	OUTLINE SPECIFICATIONS	1
SP-3	OUTLINE SPECIFICATIONS	1
A-1	COMPOUND PLAN & EQUIPMENT PLAN	1
A-2	ANTENNA PLANS & ELEVATION	1
A-3	EQUIPMENT DETAILS	1
A-4	MOUNTING DETAILS	1
RF-1	RF DATA SHEET	1
RF-2	WIRING DIAGRAMS	1
G-1	ONE LINE DIAGRAM, GROUNDING DETAILS & NOTES	1

SPECIAL ZONING NOTE

BASED ON INFORMATION PROVIDED BY SPRINT REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW, ADMINISTRATIVE REVIEW).

GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
- ADA COMPLIANCE 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 PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.

3. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

4. NEW CONSTRUCTION WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
BUILDING CODE: INTERNATIONAL BUILDING CODE 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS
ELECTRICAL CODE: NFPA 70 2017 - NATIONAL ELECTRIC CODE
STRUCTURAL CODE: TIA/EIA-222-H STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

CROWN CASTLE
CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

HDG HUDSON Design Group LLC
45 RESEARCH DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER
CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	11/15/18	CONSTRUCTION FINAL	DJM
0	10/26/18	ISSUED FOR CONSTRUCTION	DJM

SITE NUMBER:
CT23XC556
SITE NAME:
ROCKY HILL/ RTE 160_1
CROWN BU NUMBER:
827050
SITE ADDRESS:
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

SHEET TITLE
TITLE SHEET
(DO MACRO)

SHEET NUMBER
T-1

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

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

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

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
1. GR–78–CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
2. GR–1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
3. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
4. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
5. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
6. AMERICAN CONCRETE INSTITUTE (ACI)
7. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
8. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
9. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
10. PORTLAND CEMENT ASSOCIATION (PCA)
11. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
12. BRICK INDUSTRY ASSOCIATION (BIA)
13. AMERICAN WELDING SOCIETY (AWS)
14. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
15. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
16. DOOR AND HARDWARE INSTITUTE (DHI)
17. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
18. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

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

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

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

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

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

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

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

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

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

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

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.
A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF HYBRID CABLE
F. INSTALLATION OF RRH'S
G. CABLING
H. 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.

SECTION 01 300 – CELL SITE CONSTRUCTION

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

1.3 NOTICE TO PROCEED:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

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

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

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE–GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H–FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND–OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

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

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

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

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

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

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

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

CONTINUE SHEET SP–2

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

CROWN CASTLE
CROWN CASTLE
12 GILL STREET, SUITE 5800
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HDG
HUDSON Design Group LLC
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TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER
CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	11/15/18	CONSTRUCTION FINAL	DJM
0	10/29/18	ISSUED FOR CONSTRUCTION	DJM

SITE NUMBER:
CT23XC556
SITE NAME:
ROCKY HILL/ RTE 160_1
CROWN BU NUMBER:
827050
SITE ADDRESS:
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

SHEET TITLE
OUTLINE SPECIFICATIONS
(DO MACRO)

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. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 TESTS AND INSPECTIONS:

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

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

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

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

3.2 REQUIRED TESTS:

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

3.3 REQUIRED INSPECTIONS:

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE- AND POST-CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)
7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN-ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

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

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

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

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

SECTION 01 500 – PROJECT REPORTING

PART 1 – GENERAL

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

1.2 RELATED DOCUMENTS:

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

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

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

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

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

3.2 PROJECT CONFERENCE CALLS:

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

3.3 PROJECT TRACKING IN SMS:

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

3.4 ADDITIONAL REPORTING:

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

3.5 PROJECT PHOTOGRAPHS:

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

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

SECTION 07 500 – ROOF CUTTING, PATCHING AND REPAIR

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

1.4 SUBMITTALS:

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

B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)

C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

SECTION 09 900 – PAINTING

QUALITY ASSURANCE:

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

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

CONTINUE SHEET SP-3

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

CROWN CASTLE
CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
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TEL: (978) 557-5553
FAX: (978) 336-5586

CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREON

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	11/15/18	CONSTRUCTION FINAL	DAM
0	10/25/18	ISSUED FOR CONSTRUCTION	DAM

SITE NUMBER:
CT23XC556
SITE NAME:
ROCKY HILL/ RTE 160_1
CROWN BU NUMBER:
827050
SITE ADDRESS:
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

SHEET TITLE
OUTLINE SPECIFICATIONS
(DO MACRO)

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:

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

TOUCHUP PAINTING:

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

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO 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 RADII.

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

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
   a. FIBER: SUPPORT FIBER BUNDLES USING ½" 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.
   b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
   a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
   b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
   c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 4.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & 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.

1. 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.
2. 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.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. 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:
1. ALLIED TUBE AND CONDUIT
2. B-LINE SYSTEM
3. UNISTRUT DIVERSIFIED PRODUCTS
4. THOMAS & BETTS

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

SUPPORTING DEVICES:

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

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

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

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

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

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR 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.

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STATE OF CONNECTICUT
BEREK + CREASER
LICENSED PROFESSIONAL ENGINEER
CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED ASSERTION DATE LISTED HEREIN

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	11/15/18	CONSTRUCTION FINAL	DJM
0	10/25/18	ISSUED FOR CONSTRUCTION	DJM

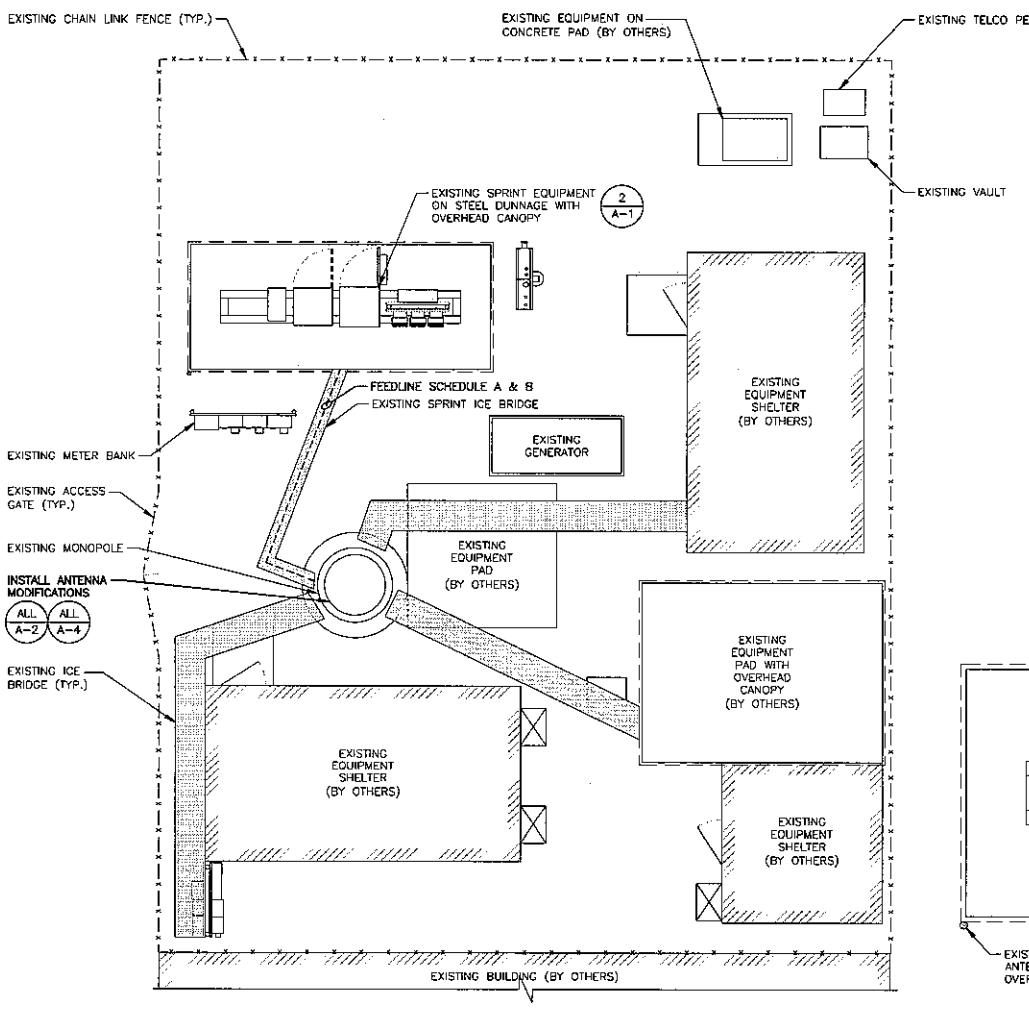
SITE NUMBER:
CT23XC556
SITE NAME:
ROCKY HILL/ RTE 160_1
CROWN BU NUMBER:
827050
SITE ADDRESS:
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

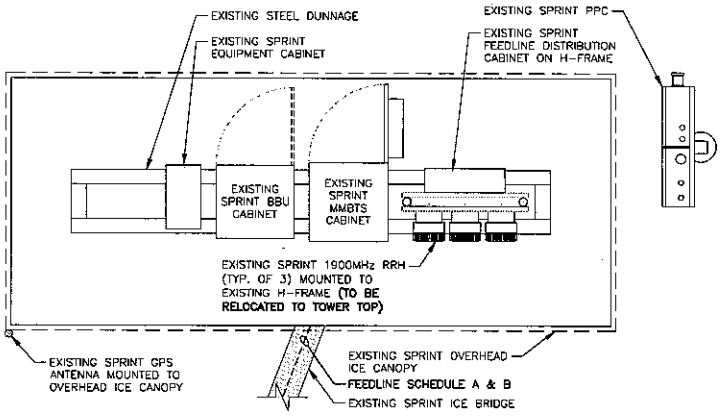
SHEET TITLE
OUTLINE SPECIFICATIONS
(DO MACRO)

SHEET NUMBER
SP-3

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

STRUCTURAL NOTES:
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS COMPLETED BY PAUL J. FORD & COMPANY, DATED 10/01/18 AND MOUNT STRUCTURAL ANALYSIS COMPLETED BY HDG, DATED 10/12/18 TO DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.





MAGNETIC NORTH 13°48' TRUE NORTH

COMPOUND PLAN 1 A-1
22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"
0 2'-0" 4'-0" 8'-0" 12'-0"

MAGNETIC NORTH 13°48' TRUE NORTH

EQUIPMENT PLAN 2 A-1
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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12 GILL STREET, SUITE 5000
WOBURN, MA 01801

HDG
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45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
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STATE OF CONNECTICUT
DEREK A. CREASER
LICENSED PROFESSIONAL ENGINEER
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CHECKED BY: BB

APPROVED BY: DJC

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CT23XC556
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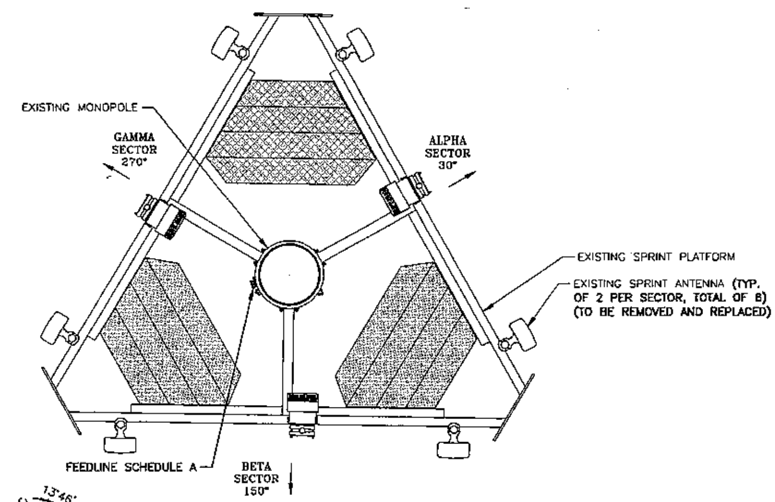
ROCKY HILL/ RTE 160_1
CROWN BU NUMBER:
827050
SITE ADDRESS:
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

SHEET TITLE
COMPOUND PLAN & EQUIPMENT PLAN
(DO MACRO)

SHEET NUMBER
A-1



EXISTING ANTENNA PLAN (1 / A-2)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"

STRUCTURAL NOTE:
DESIGN LIMITATIONS AND ASSUMPTIONS:
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NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

SCOPE NOTE:
PROPOSED DESIGN IS BASED OFF OF CROWN APPLICATION REV #0

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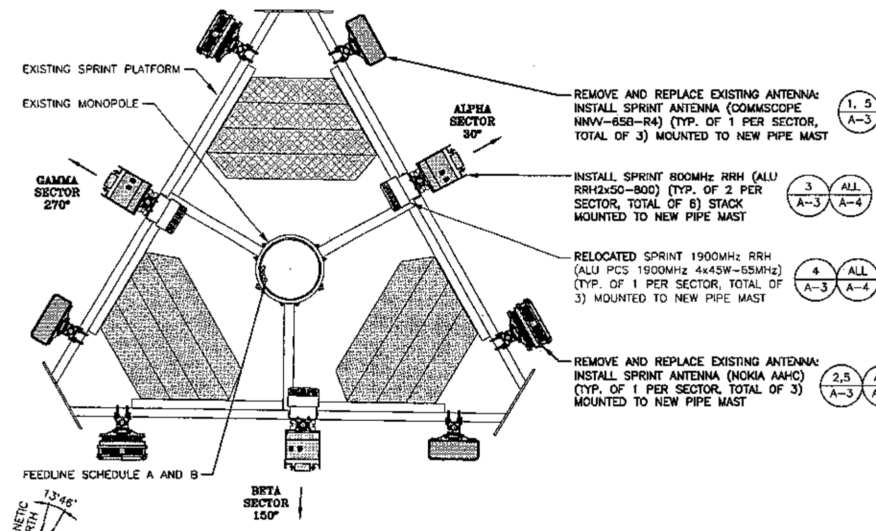
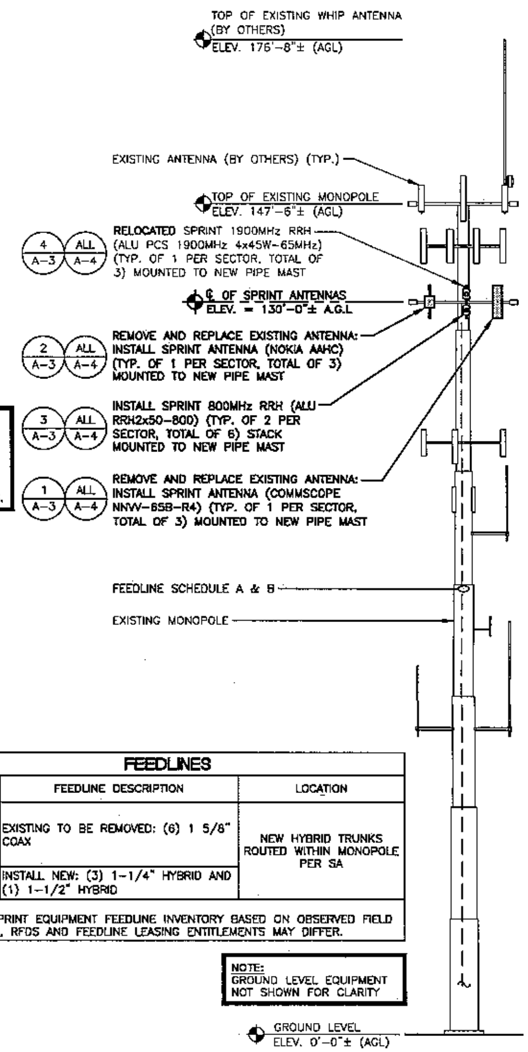


PROPOSED ANTENNA PLAN (2 / A-2)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"
0 1'-0" 2'-0" 4'-0" 6'-0"



FEEDLINES

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMOVED: (6) 1 5/8" COAX	NEW HYBRID TRUNKS ROUTED WITHIN MONOPOLE PER SA
B	INSTALL NEW: (3) 1-1/4" HYBRID AND (1) 1-1/2" HYBRID	

NOTE:
EXISTING SPRINT EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS, RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER.

NOTE:
GROUND LEVEL EQUIPMENT NOT SHOWN FOR CLARITY

ELEVATION (3 / A-2)
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"
0 5'-4" 10'-8" 21'-4" 32'-0"

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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CROWN CASTLE
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12 GILL STREET, SUITE 5800
WOBURN, MA 01801

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FAX: (978) 336-5586

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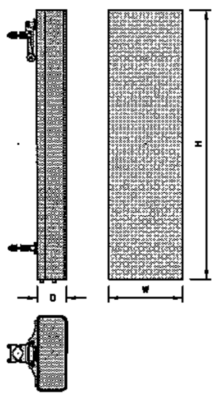
ROCKY HILL, CT 06067
HARTFORD COUNTY

SHEET TITLE
ANTENNA PLANS & ELEVATION
(DO MACRO)

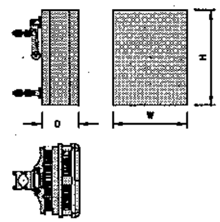
SHEET NUMBER
A-2

DUAL BAND ANTENNA DIMENSIONS	
MODEL #	NNVV-65B-R4
MANUF.	COMMSCOPE
HEIGHT	72.0"
WIDTH	19.6"
DEPTH	7.8"
WEIGHT	77.4 LBS



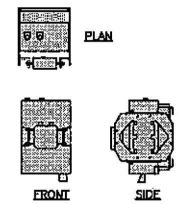
DUAL BAND ANTENNA DETAIL (1 / A-3)
SCALE: N.T.S

2500 MHZ ANTENNA DIMENSIONS	
MODEL #	2.5G MAA-AAHC(64T64R)
MANUF.	NOKIA
HEIGHT	25.63"
WIDTH	19.72"
DEPTH	9.65"
WEIGHT	103.62 LBS



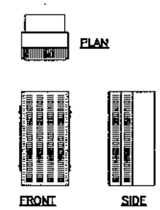
2500MHz ANTENNA DETAIL (2 / A-3)
SCALE: N.T.S

800 MHZ RRH DIMENSIONS	
MODEL #	RRH2X50-800
MANUF.	ALCATEL LUCENT
HEIGHT	19.7"
WIDTH	13"
DEPTH	10.8"
WEIGHT	53 LBS

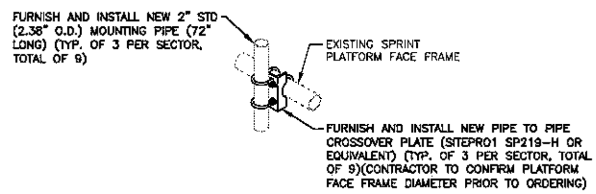


800MHz RRHS DETAIL (3 / A-3)
SCALE: N.T.S

1900 MHZ RRH DIMENSIONS	
MODEL #	PCS 1900MHZ 4X45W-65MHZ
MANUF.	ALCATEL LUCENT
HEIGHT	25"
WIDTH	11.1"
DEPTH	11.4"
WEIGHT	53 LBS



1900MHz RRHS DETAIL (4 / A-3)
SCALE: N.T.S



PIPE TO PIPE CROSS-OVER PLATE (5 / A-3)
SCALE: N.T.S

Sprint
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MAHWAH, NJ 07495
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HARTFORD COUNTY

SHEET TITLE
EQUIPMENT DETAILS
(DO MACRO)

SHEET NUMBER
A-3

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NOTE:
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SCOPE NOTE:
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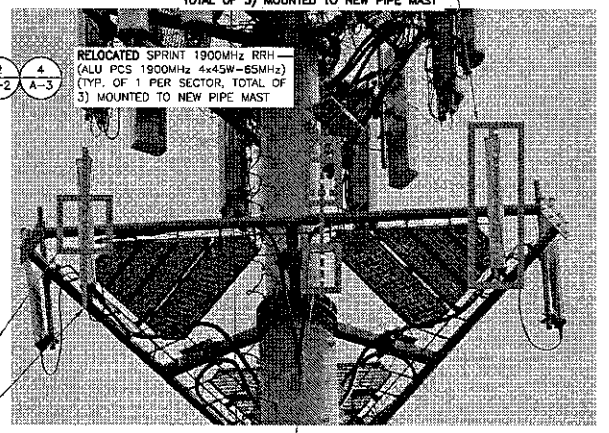
MAJOR RF EQUIPMENT LIST
(GC SHALL FURNISH AND INSTALL ALL OTHER MATERIALS AND EQUIPMENT NOT SUPPLIED BY SPRINT)

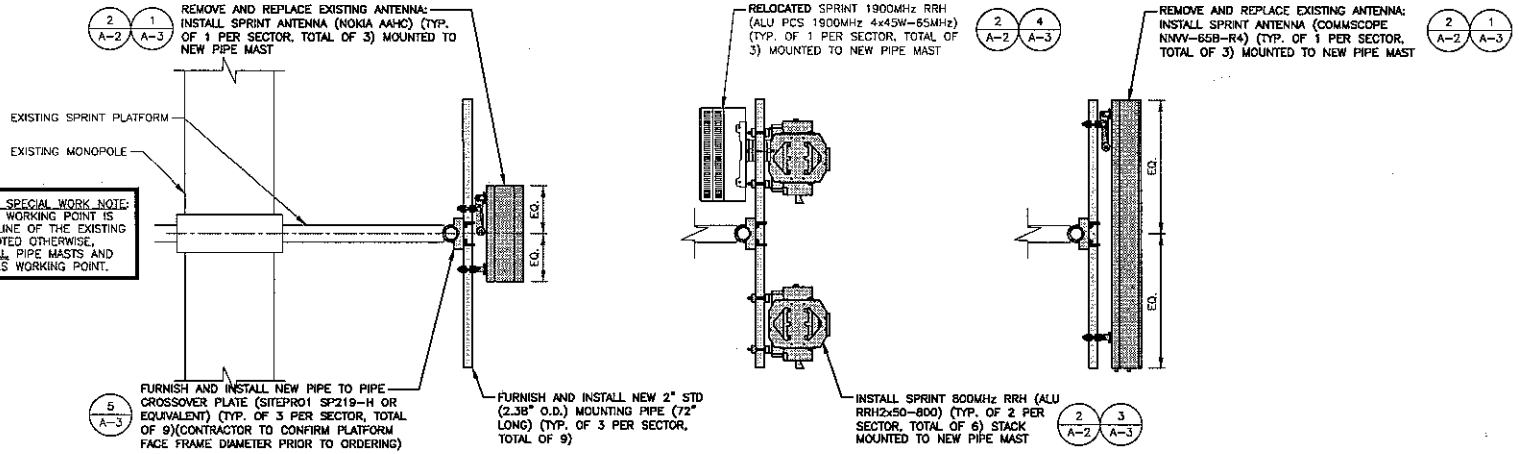
DESCRIPTION	QUANTITY	UNITS	MAKE/MODEL/MATERIAL	PROVIDED BY
ANTENNA	3	EA	COMMSCOPE NNVV-65B-R4	SPRINT
ANTENNA	3	EA	NOKIA AAHC	SPRINT
1900 RRU	3	EA	ALCATEL LUCENT PCS 1900MHz 4x45W-65MHz	EXISTING
800 RRU	6	EA	ALCATEL LUCENT RRH2x50-800	SPRINT
FEEDLINE	3 @ 170'±	LINEAR FEET LISTED	RFS 1-1/4" HYBRID HB114-1-08U4-M5F	SPRINT
FEEDLINE	1 @ 170'±	LINEAR FEET LISTED	HUBER AND SUHNER 1-1/2" HYBRID MLC6C-06C-008R-008R	SPRINT

SPRINT-PROVIDED EQUIPMENT SCHEDULE (2 / A-4)
SCALE: N.T.S



ANTENNA & RRH MOUNT PHOTO DETAIL (3 / A-4)
SCALE: N.T.S

ANTENNA INSTALLATION SPECIAL WORK NOTE:
ANTENNA INSTALLATION WORKING POINT IS THE VERTICAL CENTERLINE OF THE EXISTING PLATFORM. UNLESS NOTED OTHERWISE, VERTICALLY CENTER ALL PIPE MASTS AND ALL ANTENNAS ON THIS WORKING POINT.



ANTENNA & RRH MOUNTING ELEVATION (1 / A-4)
22x34 SCALE: 3/4"=1'-0"
11x17 SCALE: 3/8"=1'-0"
0 8" 1'-4" 2'-8" 4'-0"

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

CROWN CASTLE
CROWN CASTLE
12 GILL STREET, SUITE 3800
WOBURN, MA 01801

HDG
HUDSON
Design Group LLC
45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
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DEREK J. CREASER — STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER
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APPROVED BY: DJC

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HARTFORD COUNTY

SHEET TITLE
MOUNTING DETAILS
(DO MACRO)

SHEET NUMBER
A-4

SCOPE NOTE:
RFDS HAS NOT BEEN PROVIDED BY CROWN CASTLE, REFER TO CROWN APP REV #0

NOTE:

SPRINT CM SHALL CONFIRM HYBRID CABLE LENGTH, COAX JUMPER LENGTH AND AISG CABLE LENGTH BEFORE PREPARING BOM. A&E RECOMMENDED HYBRID CABLE LENGTH BASED ON NV 2.5 EQUIPMENT AUDIT PLUS 20 FEET FOR (2) 10--FOOT COILS AT EACH END OF THE FIBER TRUNK.

NOTE:

GENERAL CONTRACTOR/TOWER CREW SHALL VERIFY THAT THE LATEST RF DATA SHEET IS USED FOR EQUIPMENT INSTALLATION.

SPECIAL WORK NOTE:

JUMPERS (COAX/AISG) FROM THE 2.5 RRH TO THE 2.5 ANTENNA CANNOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY.

RF DATA SHEET (1 / RF-1)
SCALE: N.T.S

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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HARTFORD COUNTY

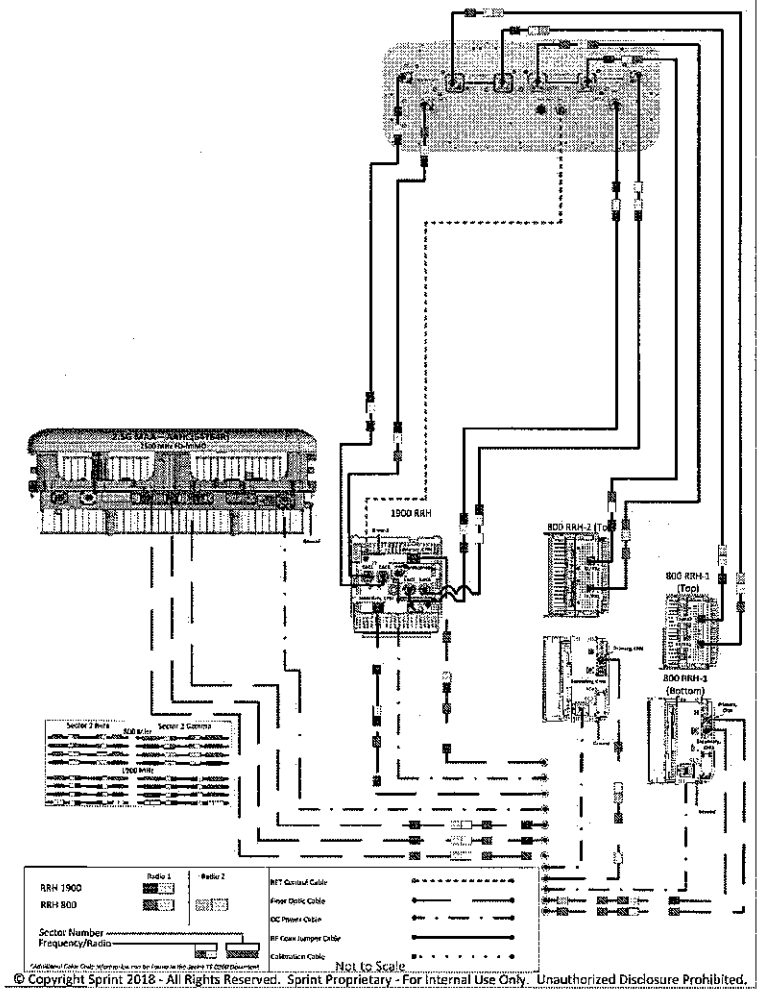
SHEET TITLE
RF DATA SHEET
(DO MACRO)

SHEET NUMBER
RF-1

Prepared By	Revision Date	Revision Number
Mark Elliott	March 24, 2018	R1
Approved By	Approval Date	
RAN Hardware & Antenna Teams	Final-Macro Generated	

Sprint

ALU 21-MIMO NNVV-65B-R4 wo Filters



PLUMBING DIAGRAM (1 / RF-2)
SCALE: N.T.S

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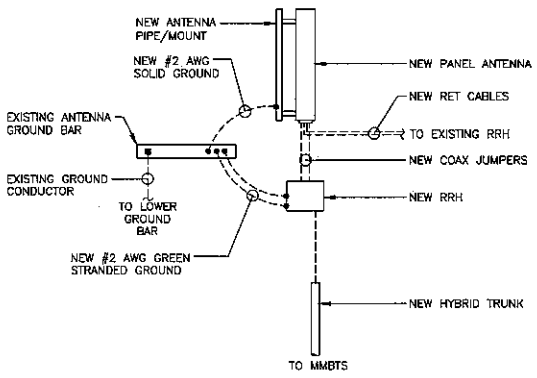
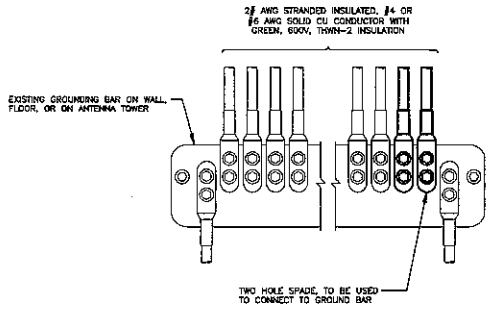
SHEET TITLE
WIRING DIAGRAM
(DO MACRO)

SHEET NUMBER
RF-2



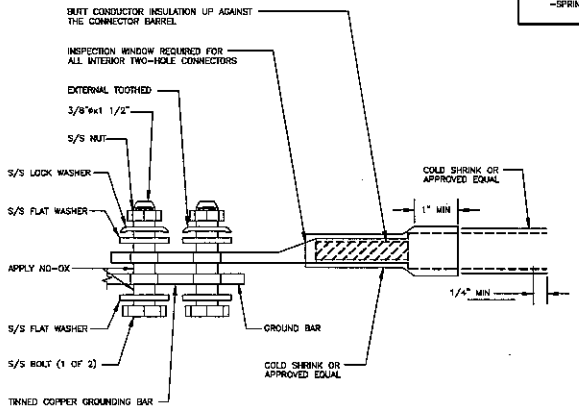
EQUIPMENT GROUNDING SCHEMATIC (1 / G-1)
SCALE: N.T.S



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 (2 / G-1)
SCALE: N.T.S



TWO HOLE LUG (3 / G-1)
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 SSED 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 GIGBE.
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-SHIELD) 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)

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

CROWN CASTLE
CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
LICENSED PROFESSIONAL ENGINEER

CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN

CHECKED BY: BB

APPROVED BY: DJC

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
I	11/15/18	CONSTRUCTION FINAL	DJM
D	10/26/18	ISSUED FOR CONSTRUCTION	DJM

SITE NUMBER:
CT23XC556
SITE NAME:
ROCKY HILL/ RTE 160_1
CROWN BU NUMBER:
827050
SITE ADDRESS:
699 OLD MAIN STREET
ROCKY HILL, CT 06067
HARTFORD COUNTY

SHEET TITLE
ONE LINE DIAGRAM, GROUNDING DETAILS & NOTES
(DO MACRO)

SHEET NUMBER
G-1

PAUL J. FORD & COMPANY

Date: **October 01, 2018**

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

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
(614) 221-6679

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT23XC556
	Carrier Site Name:	CT23XC556Q17.1
Crown Castle Designation:	**Crown Castle BU Number:**	827050
	Crown Castle Site Name:	Rocky Hill/ Rte 160_1
	Crown Castle JDE Job Number:	532745
	Crown Castle Work Order Number:	1640028
	Crown Castle Order Number:	460046 Rev. 0
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-0273.003.7805
Site Data:	**699 Old Main St., Rocky Hill, Hartford County, CT** **Latitude *41° 40' 5.77"*, Longitude *-72° 38' 16.93"*** **147.5 Foot - Monopole Tower**	

Dear Kevin Morrow,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

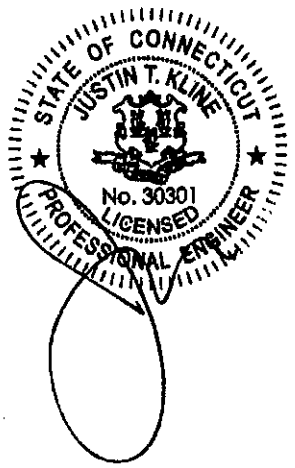
LC7: Proposed Equipment Configuration , **Sufficient Capacity**

This analysis has been performed in accordance with the ANSI/TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph from the 2016 Connecticut State Building Code per section 1609.3 and Appendix N. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

Respectfully submitted by:

Gowtham

Gowtham Penumatsa
Structural Designer



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Respectfully submitted by:

Gowtham Penumatsa
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 147.5 ft Monopole tower designed by PIROD MANUFACTURES INC in July of 1999. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

Building Code:	2016 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130.0	130.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	1 3	1-1/2 1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	AAHC w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 405-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
148.0	167.0	2	dbspectra	DS4C06F36D-D	13 7	1-5/8 7/8
	154.0	1	rfs celwave	201-1N		
	152.0	1	radiowaves	HPD2-4.7		
	149.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe		
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe		
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RRUS 11 B12		
	148.0	1	tower mounts	Platform Mount [LP 405-1]		
140.0	140.0	1	andrew	LNX-6514DS-A1M w/ Mount Pipe	7 1	1-5/8 1-1/4
		5	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		6	commscope	NNHH-65B-R4 w/ Mount Pipe		
		1	raycap	RVZDC-6627-PF-48		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
		1	tower mounts	Platform Mount [LP 303-1]		
105.0	105.0	1	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	5 4 12 1	3/8 5/8 1-5/8 2" Cond
		2	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe		
		2	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 32 B66		
		3	powerwave technologies	1001940		
		3	powerwave technologies	7750.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		6	powerwave technologies	LGP21903		
		1	quintel technology	QS66512-2 w/ Mount Pipe		
		2	raycap	DC6-48-60-18-8F		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	tower mounts	Pipe Mount [PM 601-3]		
		1	tower mounts	Platform Mount [LP 303-1]		
		1	tower mounts	Side Arm Mount [SO 101-3]		
95.0	95.0	3	rfs celwave	APXV18-206516S-C	6	1-5/8
		1	tower mounts	Pipe Mount [PM 601-3]		
89.0	95.0	1	rfs celwave	1142-2C	1	1/2
	89.0	1	tower mounts	Side Arm Mount [SO 701-1]		
72.0	74.0	1	gps	GPS_A	-	-
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]		
54.0	64.0	1	rfs celwave	220-8N	2	7/8
	61.0	1	rfs celwave	201-1N		
	54.0	2	tower mounts	Side Arm Mount [SO 701-1]		
49.0	49.0	1	decibel	DB436-C	1	7/8
		1	tower mounts	Pipe Mount [PM 601-1]		
45.0	45.0	1	decibel	DB436-C	1	7/8
		1	tower mounts	Pipe Mount [PM 601-1]		
40.0	40.0	1	decibel	DB436-C	1	7/8
		1	tower mounts	Pipe Mount [PM 601-1]		
37.0	37.0	1	decibel	DB436-C	1	7/8
		1	tower mounts	Pipe Mount [PM 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	French And Parrello, 98A190ER1, 10/12/1998	3464587	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 129342, 3/13/2013	3774967	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 102048, 12/3/2010	3774968	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 150012, 08/19/2015	5849862	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PiRod, A-115401, 7/20/1999	3674483	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, A-115401, 7/20/1999	3464619	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 102048, 12/3/2010	4047808	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 129342, 03/13/2013	4047725	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-1388, 05/20/2013	4424839	CCISITES
4-MONOPOLE MAPPING REPORT	HighTower Solutions Inc., 827050, 7/21/2016	6388740	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.
5) Monopole has been reinforced in conformance with the referenced modification documents.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147.5 - 142.5	Pole	TP24x24x0.375	Pole	8.8%	Pass
142.5 - 137.5	Pole	TP24x24x0.375	Pole	17.0%	Pass
137.5 - 132.5	Pole	TP24x24x0.375	Pole	27.6%	Pass
132.5 - 127.5	Pole	TP24x24x0.375	Pole	40.3%	Pass
127.5 - 125	Pole	TP24x24x0.375	Pole	47.3%	Pass
125 - 120	Pole	TP30x30x0.375	Pole	40.7%	Pass
120 - 115	Pole	TP30x30x0.375	Pole	50.3%	Pass
115 - 110	Pole	TP30x30x0.375	Pole	60.2%	Pass
110 - 105	Pole	TP30x30x0.375	Pole	70.2%	Pass
105 - 100	Pole	TP30x30x0.375	Pole	84.0%	Pass
100 - 95	Pole	TP36x36x0.375	Pole	69.5%	Pass
95 - 94.25	Pole	TP36x36x0.375	Pole	71.1%	Pass
94.25 - 94	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	58.7%	Pass
94 - 89	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	67.2%	Pass
89 - 84	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	75.9%	Pass
84 - 80	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	83.0%	Pass
80 - 79.75	Pole + Reinf.	TP42x42x0.575	Pole	49.7%	Pass
79.75 - 74.75	Pole + Reinf.	TP42x42x0.575	Pole	55.1%	Pass
74.75 - 69.75	Pole + Reinf.	TP42x42x0.575	Pole	60.6%	Pass
69.75 - 64.75	Pole + Reinf.	TP42x42x0.575	Pole	66.3%	Pass
64.75 - 60	Pole + Reinf.	TP42x42x0.575	Pole	71.8%	Pass
60 - 59.75	Pole + Reinf.	TP48x48x0.6125	Pole	52.5%	Pass
59.75 - 54.75	Pole + Reinf.	TP48x48x0.6125	Pole	56.8%	Pass
54.75 - 49.75	Pole + Reinf.	TP48x48x0.6125	Pole	61.4%	Pass
49.75 - 44.75	Pole + Reinf.	TP48x48x0.6125	Pole	66.0%	Pass
44.75 - 40	Pole + Reinf.	TP48x48x0.6125	Pole	70.4%	Pass
40 - 39.75	Pole + Reinf.	TP54x54x0.65	Pole	53.2%	Pass
39.75 - 34.75	Pole + Reinf.	TP54x54x0.65	Pole	56.8%	Pass
34.75 - 29.75	Pole + Reinf.	TP54x54x0.65	Pole	60.5%	Pass
29.75 - 24.75	Pole + Reinf.	TP54x54x0.65	Pole	64.2%	Pass
24.75 - 20	Pole + Reinf.	TP54x54x0.65	Pole	67.8%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.625	Reinf. 7 Compression	81.0%	Pass
19.75 - 19	Pole + Reinf.	TP60x60x0.625	Reinf. 7 Compression	81.7%	Pass
19 - 18.75	Pole + Reinf.	TP60x60x0.625	Pole	58.9%	Pass
18.75 - 13.75	Pole + Reinf.	TP60x60x0.625	Pole	62.2%	Pass
13.75 - 8.75	Pole + Reinf.	TP60x60x0.625	Pole	65.6%	Pass
8.75 - 3.75	Pole + Reinf.	TP60x60x0.625	Pole	69.0%	Pass
3.75 - 0	Pole + Reinf.	TP60x60x0.625	Pole	71.6%	Pass
				Summary	
			Pole	84.0%	Pass
			Reinforcement	83.0%	Pass
			Overall	84.0%	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	85.6	Pass
1	Base Plate	0	97.1	Pass
1	Base Foundation Structural Steel	0	66.8	Pass
1	Base Foundation Soil Interaction	0	30.5	Pass
1	Flange Connection	20	94.5	Pass
1	Flange Connection	40	97.9	Pass
1	Flange Connection	60	87.3	Pass
1	Flange Connection	80	89.1	Pass
1,2	Flange Connection	100	85.3	Pass
1,2	Flange Connection	125	47.3	Pass

Structure Rating (max from all components) =	97.9%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed. All ratings per TIA-222-H Section 15.5.
2) See assumption #4

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower base elevation above sea level: 97.0000 ft.
- Basic wind speed of 125 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height 0.0000 ft.
- Nominal ice thickness of 1.7000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.00 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- TIA-222-H Annex S.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
				Pole With Shroud Or No Appurtenances
				Outside and Inside Corner Radii Are Known

Pole Section Geometry

Section	*Elevation*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	147.5000-142.5000	5.0000	P24x0.375	A53-B-42 (42 ksi)	
L2	142.5000-	5.0000	P24x0.375	A53-B-42	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
	137.5000			(42 ksi)	
L3	137.5000-132.5000	5.0000	P24x0.375	A53-B-42 (42 ksi)	
L4	132.5000-127.5000	5.0000	P24x0.375	A53-B-42 (42 ksi)	
L5	127.5000-125.0000	2.5000	P24x0.375	A53-B-42 (42 ksi)	
L6	125.0000-120.0000	5.0000	P30x0.375	A53-B-42 (42 ksi)	
L7	120.0000-115.0000	5.0000	P30x0.375	A53-B-42 (42 ksi)	
L8	115.0000-110.0000	5.0000	P30x0.375	A53-B-42 (42 ksi)	
L9	110.0000-105.0000	5.0000	P30x0.375	A53-B-42 (42 ksi)	
L10	105.0000-100.0000	5.0000	P30x0.375	A53-B-42 (42 ksi)	
L11	100.0000-95.0000	5.0000	P36x0.375	A53-B-42 (42 ksi)	
L12	95.0000-94.2500	0.7500	P36x0.375	A53-B-42 (42 ksi)	
L13	94.2500-94.0000	0.2500	P36x0.49375	A53-B-42 (42 ksi)	
L14	94.0000-89.0000	5.0000	P36x0.49375	A53-B-42 (42 ksi)	
L15	89.0000-84.0000	5.0000	P36x0.49375	A53-B-42 (42 ksi)	
L16	84.0000-80.0000	4.0000	P36x0.49375	A53-B-42 (42 ksi)	
L17	80.0000-79.7500	0.2500	P42x0.575	A53-B-42 (42 ksi)	
L18	79.7500-74.7500	5.0000	P42x0.575	A53-B-42 (42 ksi)	
L19	74.7500-69.7500	5.0000	P42x0.575	A53-B-42 (42 ksi)	
L20	69.7500-64.7500	5.0000	P42x0.575	A53-B-42 (42 ksi)	
L21	64.7500-60.0000	4.7500	P42x0.575	A53-B-42 (42 ksi)	
L22	60.0000-59.7500	0.2500	P48x0.6125	A53-B-42 (42 ksi)	
L23	59.7500-54.7500	5.0000	P48x0.6125	A53-B-42 (42 ksi)	
L24	54.7500-49.7500	5.0000	P48x0.6125	A53-B-42 (42 ksi)	
L25	49.7500-44.7500	5.0000	P48x0.6125	A53-B-42 (42 ksi)	
L26	44.7500-40.0000	4.7500	P48x0.6125	A53-B-42 (42 ksi)	
L27	40.0000-39.7500	0.2500	P54x0.65	A53-B-42 (42 ksi)	
L28	39.7500-34.7500	5.0000	P54x0.65	A53-B-42 (42 ksi)	
L29	34.7500-29.7500	5.0000	P54x0.65	A53-B-42 (42 ksi)	
L30	29.7500-24.7500	5.0000	P54x0.65	A53-B-42 (42 ksi)	
L31	24.7500-20.0000	4.7500	P54x0.65	A53-B-42 (42 ksi)	
L32	20.0000-19.7500	0.2500	P60x0.625	A53-B-42 (42 ksi)	
L33	19.7500-19.0000	0.7500	P60x0.625	A53-B-42 (42 ksi)	
L34	19.0000-18.7500	0.2500	P60x0.625	A53-B-42 (42 ksi)	
L35	18.7500-13.7500	5.0000	P60x0.625	A53-B-42 (42 ksi)	
L36	13.7500-8.7500	5.0000	P60x0.625	A53-B-42 (42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L37	8.7500-3.7500	5.0000	P60x0.625	A53-B-42 (42 ksi)	
L38	3.7500-0.0000	3.7500	P60x0.625	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 147.5000-142.5000				1	1	1			
L2 142.5000-137.5000				1	1	1			
L3 137.5000-132.5000				1	1	1			
L4 132.5000-127.5000				1	1	1			
L5 127.5000-125.0000				1	1	1			
L6 125.0000-120.0000				1	1	1			
L7 120.0000-115.0000				1	1	1			
L8 115.0000-110.0000				1	1	1			
L9 110.0000-105.0000				1	1	1			
L10 105.0000-100.0000				1	1	1			
L11 100.0000-95.0000				1	1	1			
L12 95.0000-94.2500				1	1	1			
L13 94.2500-94.0000				1	1	0.979915			
L14 94.0000-89.0000				1	1	0.979915			
L15 89.0000-84.0000				1	1	0.979915			
L16 84.0000-80.0000				1	1	0.979915			
L17 80.0000-79.7500				1	1	0.976046			
L18 79.7500-74.7500				1	1	0.976046			
L19 74.7500-69.7500				1	1	0.976046			
L20 69.7500-64.7500				1	1	0.976046			
L21 64.7500-60.0000				1	1	0.976046			
L22 60.0000-59.7500				1	1	0.971735			
L23 59.7500-54.7500				1	1	0.971735			
L24 54.7500-49.7500				1	1	0.971735			
L25 49.7500-44.7500				1	1	0.971735			
L26 44.7500-40.0000				1	1	0.971735			
L27 40.0000-39.7500				1	1	0.970011			
L28 39.7500-				1	1	0.970011			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
34.7500									
L29 34.7500-29.7500				1	1	0.970011			
L30 29.7500-24.7500				1	1	0.970011			
L31 24.7500-20.0000				1	1	0.970011			
L32 20.0000-19.7500				1	1	1.05821			
L33 19.7500-19.0000				1	1	1.05821			
L34 19.0000-18.7500				1	1	0.967075			
L35 18.7500-13.7500				1	1	0.967075			
L36 13.7500-8.7500				1	1	0.967075			
L37 8.7500-3.7500				1	1	0.967075			
L38 3.7500-0.0000				1	1	0.967075			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight klf
2" Solid Rod Reinforcing	C	No	No	CaAa (Out Of Face)	42.5000 - 37.5000	1	No Ice	0.2000	0.00
							1/2" Ice	0.3000	0.00
							1" Ice	0.4000	0.00
							2" Ice	0.6000	0.00
2" Solid Rod Reinforcing	C	No	No	CaAa (Out Of Face)	22.5000 - 17.5000	1	No Ice	0.2000	0.00
							1/2" Ice	0.3000	0.00
							1" Ice	0.4000	0.00
							2" Ice	0.6000	0.00
**********									
1 1/4" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	60.0000 - 0.0000	2	No Ice	0.2083	0.00
							1/2" Ice	0.3194	0.00
							1" Ice	0.4306	0.00
							2" Ice	0.6528	0.00
1" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	80.0000 - 60.0000	2	No Ice	0.1667	0.00
							1/2" Ice	0.2778	0.00
							1" Ice	0.3889	0.00
							2" Ice	0.6111	0.00
3/4" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	95.0000 - 80.0000	2	No Ice	0.1250	0.00
							1/2" Ice	0.2361	0.00
							1" Ice	0.3472	0.00
							2" Ice	0.5694	0.00
**********									
MLE HYBRID 9POWER/18FIBER RL 2(1-5/8)	C	No	No	Inside Pole	0.0000 - 147.5000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
FLC 158-50J(1-5/8)	C	No	No	Inside Pole	0.0000 - 147.5000	12	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
AVA5-50(7/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 147.5000	2	No Ice	0.1102	0.00
							1/2" Ice	0.2102	0.00
							1" Ice	0.3102	0.00

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
							2" Ice	0.5102	0.01
AVA5-50FX(7/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 147.5000	4	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
LCF78-50A(7/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 147.5000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	140.0000 - 0.0000	6	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
HB158-1-08U8-S8J18(1-5/8)	C	No	No	CaAa (Out Of Face)	105.0000 - 0.0000	1	No Ice	0.1980	0.00
							1/2" Ice	0.2980	0.00
							1" Ice	0.3980	0.00
							2" Ice	0.5980	0.01
HB114-U6S12-XXX-LI(1-1/4)	C	No	No	CaAa (Out Of Face)	105.0000 - 0.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
HB114-U6S12-XXX-LI(1-1/4)	C	No	No	CaAa (Out Of Face)	140.0000 - 105.0000	2	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
***									
HB114-1-08U4-M5F(1-1/4)	C	No	No	Inside Pole	0.0000 - 130.0000	3	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
HB114-13U3M12-XXXF(1-1/4)	C	No	No	Inside Pole	0.0000 - 130.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
***									
LDF2-50(3/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	2	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
LDF7-50A(1-5/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	10	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
100266(3/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
FB-L98-002-XXX(3/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
WR-VG82ST-BRDA(5/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	2	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
2" (Nominal) Conduit	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
LDF7-50A(1-5/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	2	No Ice	0.1980	0.00
							1/2" Ice	0.2980	0.00
							1" Ice	0.3980	0.00
							2" Ice	0.5980	0.01
FB-L98-002-XXX(3/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
WR-VG82ST-BRDA(5/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 105.0000	2	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
***									
LDF7-50A(1-5/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 95.0000	6	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.01
***									
LDF4-50A(1/2)	C	No	No	Inside Pole	0.0000 - 89.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
***									
LCF78-50A(7/8)	C	No	No	Inside Pole	0.0000 - 54.0000	2	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
***									
LCF78-50A(7/8)	C	No	No	Inside Pole	0.0000 - 49.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
***									
LCF78-50A(7/8)	C	No	No	Inside Pole	0.0000 - 45.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
***									
LCF78-50A(7/8)	C	No	No	Inside Pole	0.0000 - 40.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00
***									
LCF78-50A(7/8)	C	No	No	Inside Pole	0.0000 - 37.0000	1	No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
							2" Ice	0.0000	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	147.5000-142.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.07
L2	142.5000-137.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.09
L3	137.5000-132.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.11
L4	132.5000-127.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.12
L5	127.5000-125.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.551	0.07
L6	125.0000-120.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	1.102	0.13
L7	120.0000-115.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.13
L8	115.0000-110.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.13
L9	110.0000-105.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.102	0.13
L10	105.0000-100.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.072	0.19
L11	100.0000-95.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.072	0.19
L12	95.0000-94.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.798	0.03
L13	94.2500-94.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.266	0.01
L14	94.0000-89.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.322	0.22
L15	89.0000-84.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.322	0.22
L16	84.0000-80.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.258	0.17
L17	80.0000-79.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.287	0.01
L18	79.7500-74.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.739	0.22
L19	74.7500-69.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.739	0.22
L20	69.7500-64.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.739	0.22
L21	64.7500-60.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.452	0.21
L22	60.0000-59.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.308	0.01
L23	59.7500-54.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.155	0.22
L24	54.7500-49.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.155	0.22
L25	49.7500-44.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.155	0.22
L26	44.7500-40.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.348	0.21
L27	40.0000-39.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.358	0.01
L28	39.7500-34.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.605	0.23
L29	34.7500-29.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	6.155	0.23
L30	29.7500-24.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.155	0.23
L31	24.7500-20.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.348	0.22
L32	20.0000-19.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.358	0.01
L33	19.7500-19.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.073	0.03
L34	19.0000-18.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.358	0.01
L35	18.7500-13.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.405	0.23
L36	13.7500-8.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.155	0.23
L37	8.7500-3.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.155	0.23
L38	3.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.616	0.17

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	147.5000-142.5000	A	1.971	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.044	0.33
L2	142.5000-137.5000	A	1.964	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.031	0.39
L3	137.5000-132.5000	A	1.957	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.016	0.45
L4	132.5000-127.5000	A	1.950	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.002	0.46
L5	127.5000-125.0000	A	1.944	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.495	0.24
L6	125.0000-120.0000	A	1.938	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.979	0.47
L7	120.0000-115.0000	A	1.930	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.962	0.47
L8	115.0000-110.0000	A	1.922	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.946	0.47
L9	110.0000-105.0000	A	1.913	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.928	0.47
L10	105.0000-100.0000	A	1.904	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.592	1.38
L11	100.0000-95.0000	A	1.895	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	13.545	1.38
L12	95.0000-94.2500	A	1.889	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.845	0.25
L13	94.2500-94.0000	A	1.888	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.948	0.08
L14	94.0000-89.0000	A	1.883	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.918	1.66
L15	89.0000-84.0000	A	1.872	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.842	1.65
L16	84.0000-80.0000	A	1.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	15.016	1.31
L17	80.0000-79.7500	A	1.857	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.958	0.08
L18	79.7500-74.7500	A	1.851	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.106	1.63
L19	74.7500-69.7500	A	1.839	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.017	1.62
L20	69.7500-64.7500	A	1.825	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.922	1.61
L21	64.7500-60.0000	A	1.812	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	17.882	1.51
L22	60.0000-59.7500	A	1.804	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.959	0.08
L23	59.7500-54.7500	A	1.796	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.128	1.58
L24	54.7500-49.7500	A	1.780	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.010	1.56
L25	49.7500-44.7500	A	1.762	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.882	1.55
L26	44.7500-40.0000	A	1.743	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.178	1.45
L27	40.0000-39.7500	A	1.732	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.070	0.08
L28	39.7500-34.7500	A	1.721	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	19.807	1.51
L29	34.7500-29.7500	A	1.696	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.405	1.49
L30	29.7500-24.7500	A	1.668	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.200	1.46
L31	24.7500-20.0000	A	1.635	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.385	1.35
L32	20.0000-19.7500	A	1.616	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.022	0.07
L33	19.7500-19.0000	A	1.612	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.061	0.21
L34	19.0000-18.7500	A	1.608	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	1.019	0.07
L35	18.7500-13.7500	A	1.584	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.239	1.37
L36	13.7500-8.7500	A	1.527	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	17.180	1.31
L37	8.7500-3.7500	A	1.439	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	16.551	1.23
L38	3.7500-0.0000	A	1.276	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.529	0.80

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	147.5000-142.5000	-1.6125	0.9310	-2.7568	1.5917
L2	142.5000-137.5000	-1.6125	0.9310	-2.7523	1.5890
L3	137.5000-132.5000	-1.6125	0.9310	-2.7476	1.5863
L4	132.5000-127.5000	-1.6125	0.9310	-2.7427	1.5835
L5	127.5000-125.0000	-1.6125	0.9310	-2.7389	1.5813
L6	125.0000-120.0000	-1.6642	0.9608	-2.9508	1.7037
L7	120.0000-115.0000	-1.6642	0.9608	-2.9445	1.7000
L8	115.0000-110.0000	-1.6642	0.9608	-2.9380	1.6962
L9	110.0000-105.0000	-1.6642	0.9608	-2.9311	1.6923
L10	105.0000-100.0000	-4.5711	2.6391	-5.7898	3.3427
L11	100.0000-95.0000	-4.8559	2.8035	-6.3141	3.6455
L12	95.0000-94.2500	-5.7926	3.3444	-7.6086	4.3929
L13	94.2500-94.0000	-5.7926	3.3444	-7.6074	4.3921
L14	94.0000-89.0000	-5.7926	3.3444	-7.6005	4.3881
L15	89.0000-84.0000	-5.7926	3.3444	-7.5868	4.3803
L16	84.0000-80.0000	-5.7926	3.3444	-7.5739	4.3728
L17	80.0000-79.7500	-6.4270	3.7107	-8.2911	4.7868
L18	79.7500-74.7500	-6.4270	3.7107	-8.2817	4.7815
L19	74.7500-69.7500	-6.4270	3.7107	-8.2631	4.7707
L20	69.7500-64.7500	-6.4270	3.7107	-8.2431	4.7592
L21	64.7500-60.0000	-6.4270	3.7107	-8.2222	4.7471
L22	60.0000-59.7500	-7.0467	4.0684	-8.8637	5.1175
L23	59.7500-54.7500	-7.0467	4.0684	-8.8499	5.1095
L24	54.7500-49.7500	-7.0467	4.0684	-8.8216	5.0932
L25	49.7500-44.7500	-7.0467	4.0684	-8.7907	5.0753
L26	44.7500-40.0000	-7.4338	4.2919	-9.1353	5.2743
L27	40.0000-39.7500	-8.1001	4.6766	-9.9814	5.7628
L28	39.7500-34.7500	-7.6821	4.4352	-9.5439	5.5102
L29	34.7500-29.7500	-7.3226	4.2277	-9.1369	5.2752
L30	29.7500-24.7500	-7.3226	4.2277	-9.0802	5.2425
L31	24.7500-20.0000	-7.7414	4.4695	-9.4297	5.4442
L32	20.0000-19.7500	-8.3908	4.8444	-10.2021	5.8902
L33	19.7500-19.0000	-8.3908	4.8444	-10.1926	5.8847
L34	19.0000-18.7500	-8.3908	4.8444	-10.1829	5.8791
L35	18.7500-13.7500	-7.7745	4.4886	-9.5111	5.4912
L36	13.7500-8.7500	-7.5593	4.3644	-9.1642	5.2910

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L37	8.7500-3.7500	-7.5593	4.3644	-8.9603	5.1732
L38	3.7500-0.0000	-7.5593	4.3644	-8.5614	4.9429

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DS4C06F36D-D	A	From Leg	4.0000 0.00 19.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.2062 8.1830 10.1747 14.2080	6.2062 8.1830 10.1747 14.2080	0.05 0.09 0.15 0.30
DS4C06F36D-D	C	From Leg	4.0000 0.00 19.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.2062 8.1830 10.1747 14.2080	6.2062 8.1830 10.1747 14.2080	0.05 0.09 0.15 0.30
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.3292 6.7751 7.2137 8.1168	5.6424 6.4259 7.1313 8.5907	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.3292 6.7751 7.2137 8.1168	5.6424 6.4259 7.1313 8.5907	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.3292 6.7751 7.2137 8.1168	5.6424 6.4259 7.1313 8.5907	0.11 0.17 0.23 0.38
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	11.6828 12.4043 13.1351 14.5120	9.8418 11.3657 12.9138 15.2672	0.08 0.17 0.27 0.51
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	11.6828 12.4043 13.1351 14.5120	9.8418 11.3657 12.9138 15.2672	0.08 0.17 0.27 0.51
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	11.6828 12.4043 13.1351 14.5120	9.8418 11.3657 12.9138 15.2672	0.08 0.17 0.27 0.51

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.3186 6.7646 7.2032 8.1062	5.6334 6.4160 7.1208 8.5791	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.3186 6.7646 7.2032 8.1062	5.6334 6.4160 7.1208 8.5791	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.3186 6.7646 7.2032 8.1062	5.6334 6.4160 7.1208 8.5791	0.11 0.17 0.23 0.38
201-1N	B	From Leg	4.0000 0.00 6.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4890 2.4082 3.3440 4.7512	1.4890 2.4082 3.3440 4.7512	0.01 0.02 0.04 0.09
KRY 112 144/1	A	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3500 0.4259 0.5093 0.6981	0.1750 0.2343 0.3009 0.4565	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3500 0.4259 0.5093 0.6981	0.1750 0.2343 0.3009 0.4565	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3500 0.4259 0.5093 0.6981	0.1750 0.2343 0.3009 0.4565	0.01 0.01 0.02 0.03
RRUS 11 B12	A	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8333 3.0426 3.2593 3.7148	1.1821 1.3299 1.4848 1.8259	0.05 0.07 0.10 0.15
RRUS 11 B12	B	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8333 3.0426 3.2593 3.7148	1.1821 1.3299 1.4848 1.8259	0.05 0.07 0.10 0.15
RRUS 11 B12	C	From Leg	4.0000 0.00 1.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8333 3.0426 3.2593 3.7148	1.1821 1.3299 1.4848 1.8259	0.05 0.07 0.10 0.15
Platform Mount [LP 405-1]	C	None		0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice	20.8000 28.1000 35.4000 50.0000	20.8000 28.1000 35.4000 50.0000	1.80 2.07 2.33 2.86
**********									
(2) LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.8000 5.0704 5.3481 5.9259	2.0000 2.1926 2.3926 2.8148	0.04 0.08 0.12 0.21
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	12.5086 13.1075 13.6715 14.8221	7.4125 8.5976 9.4965 11.3279	0.10 0.19 0.29 0.52
(2) NNHH-65B-R4 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	12.5086 13.1075 13.6715 14.8221	7.4125 8.5976 9.4965 11.3279	0.10 0.19 0.29 0.52
(2) NNHH-65B-R4 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	12.5086 13.1075 13.6715 14.8221	7.4125 8.5976 9.4965 11.3279	0.10 0.19 0.29 0.52
(2) RFV01U-D2A	A	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.8750 2.0454 2.2231 2.6009	1.0125 1.1445 1.2840 1.5851	0.07 0.09 0.11 0.15
RFV01U-D2A	B	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.8750 2.0454 2.2231 2.6009	1.0125 1.1445 1.2840 1.5851	0.07 0.09 0.11 0.15
RFV01U-D1A	B	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.8750 2.0454 2.2231 2.6009	1.2500 1.3926 1.5426 1.8648	0.08 0.10 0.12 0.18
(2) RFV01U-D1A	C	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.8750 2.0454 2.2231 2.6009	1.2500 1.3926 1.5426 1.8648	0.08 0.10 0.12 0.18
RVZDC-6627-PF-48	A	From Leg	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.7922 4.0441 4.3033 4.8439	2.5137 2.7270 2.9472 3.4168	0.03 0.06 0.10 0.18
Platform Mount [LP 303-1]	C	None		0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice	14.6600 18.8700 23.0800 31.5000	14.6600 18.8700 23.0800 31.5000	1.25 1.48 1.71 2.18
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AAHC w/ Mount Pipe	A	From Leg	4.0000 0.00	0.0000	130.0000	No Ice 1/2"	4.4091 4.7270	2.6915 3.0786	0.12 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	5.0553	3.4862	0.20
						1" Ice	5.7429	4.3595	0.31
						2" Ice			
AAHC w/ Mount Pipe	B	From Leg	4.0000	0.0000	130.0000	No Ice	4.4091	2.6915	0.12
			0.00			1/2"	4.7270	3.0786	0.16
			0.00			Ice	5.0553	3.4862	0.20
						1" Ice	5.7429	4.3595	0.31
						2" Ice			
AAHC w/ Mount Pipe	C	From Leg	4.0000	0.0000	130.0000	No Ice	4.4091	2.6915	0.12
			0.00			1/2"	4.7270	3.0786	0.16
			0.00			Ice	5.0553	3.4862	0.20
						1" Ice	5.7429	4.3595	0.31
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.0000	0.0000	130.0000	No Ice	12.5086	7.4125	0.10
			0.00			1/2"	13.1075	8.5976	0.19
			0.00			Ice	13.6715	9.4965	0.29
						1" Ice	14.8221	11.3279	0.52
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.0000	0.0000	130.0000	No Ice	12.5086	7.4125	0.10
			0.00			1/2"	13.1075	8.5976	0.19
			0.00			Ice	13.6715	9.4965	0.29
						1" Ice	14.8221	11.3279	0.52
						2" Ice			
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.0000	0.0000	130.0000	No Ice	12.5086	7.4125	0.10
			0.00			1/2"	13.1075	8.5976	0.19
			0.00			Ice	13.6715	9.4965	0.29
						1" Ice	14.8221	11.3279	0.52
						2" Ice			
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.0000	0.0000	130.0000	No Ice	2.3218	2.2381	0.06
			0.00			1/2"	2.5266	2.4407	0.08
			0.00			Ice	2.7388	2.6507	0.11
						1" Ice	3.1855	3.0929	0.17
						2" Ice			
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	4.0000	0.0000	130.0000	No Ice	2.3218	2.2381	0.06
			0.00			1/2"	2.5266	2.4407	0.08
			0.00			Ice	2.7388	2.6507	0.11
						1" Ice	3.1855	3.0929	0.17
						2" Ice			
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	4.0000	0.0000	130.0000	No Ice	2.3218	2.2381	0.06
			0.00			1/2"	2.5266	2.4407	0.08
			0.00			Ice	2.7388	2.6507	0.11
						1" Ice	3.1855	3.0929	0.17
						2" Ice			
(2) RRH2X50-800	A	From Leg	4.0000	0.0000	130.0000	No Ice	1.7008	1.2822	0.05
			0.00			1/2"	1.8640	1.4275	0.07
			0.00			Ice	2.0345	1.5803	0.09
						1" Ice	2.3979	1.9081	0.14
						2" Ice			
(2) RRH2X50-800	B	From Leg	4.0000	0.0000	130.0000	No Ice	1.7008	1.2822	0.05
			0.00			1/2"	1.8640	1.4275	0.07
			0.00			Ice	2.0345	1.5803	0.09
						1" Ice	2.3979	1.9081	0.14
						2" Ice			
(2) RRH2X50-800	C	From Leg	4.0000	0.0000	130.0000	No Ice	1.7008	1.2822	0.05
			0.00			1/2"	1.8640	1.4275	0.07
			0.00			Ice	2.0345	1.5803	0.09
						1" Ice	2.3979	1.9081	0.14
						2" Ice			
Platform Mount [LP 405-1]	C	None		0.0000	130.0000	No Ice	20.8000	20.8000	1.80
						1/2"	28.1000	28.1000	2.07
						Ice	35.4000	35.4000	2.33
						1" Ice	50.0000	50.0000	2.86
						2" Ice			
7750.00 w/ Mount Pipe	A	From Leg	4.0000	0.0000	105.0000	No Ice	5.7460	4.2543	0.06
			0.00			1/2"	6.1791	5.0137	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	6.6067	5.7109	0.16
						1" Ice	7.4880	7.1553	0.29
						2" Ice			
7750.00 w/ Mount Pipe	B	From Leg	4.0000	0.0000	105.0000	No Ice	5.7460	4.2543	0.06
			0.00			1/2"	6.1791	5.0137	0.10
			0.00			Ice	6.6067	5.7109	0.16
						1" Ice	7.4880	7.1553	0.29
						2" Ice			
7750.00 w/ Mount Pipe	C	From Leg	4.0000	0.0000	105.0000	No Ice	5.7460	4.2543	0.06
			0.00			1/2"	6.1791	5.0137	0.10
			0.00			Ice	6.6067	5.7109	0.16
						1" Ice	7.4880	7.1553	0.29
						2" Ice			
(2) LGP21903	A	From Leg	4.0000	0.0000	105.0000	No Ice	0.2310	0.1575	0.01
			0.00			1/2"	0.2941	0.2129	0.01
			0.00			Ice	0.3647	0.2756	0.02
						1" Ice	0.5280	0.4234	0.03
						2" Ice			
(2) LGP21903	B	From Leg	4.0000	0.0000	105.0000	No Ice	0.2310	0.1575	0.01
			0.00			1/2"	0.2941	0.2129	0.01
			0.00			Ice	0.3647	0.2756	0.02
						1" Ice	0.5280	0.4234	0.03
						2" Ice			
(2) LGP21903	C	From Leg	4.0000	0.0000	105.0000	No Ice	0.2310	0.1575	0.01
			0.00			1/2"	0.2941	0.2129	0.01
			0.00			Ice	0.3647	0.2756	0.02
						1" Ice	0.5280	0.4234	0.03
						2" Ice			
DC6-48-60-18-8F	A	From Leg	4.0000	0.0000	105.0000	No Ice	0.9167	0.9167	0.02
			0.00			1/2"	1.4583	1.4583	0.04
			0.00			Ice	1.6431	1.6431	0.06
						1" Ice	2.0417	2.0417	0.11
						2" Ice			
(2) LGP21401	A	From Leg	4.0000	0.0000	105.0000	No Ice	1.1040	0.3471	0.01
			0.00			1/2"	1.2388	0.4422	0.02
			0.00			Ice	1.3810	0.5444	0.03
						1" Ice	1.6877	0.7696	0.05
						2" Ice			
(2) LGP21401	B	From Leg	4.0000	0.0000	105.0000	No Ice	1.1040	0.3471	0.01
			0.00			1/2"	1.2388	0.4422	0.02
			0.00			Ice	1.3810	0.5444	0.03
						1" Ice	1.6877	0.7696	0.05
						2" Ice			
(2) LGP21401	C	From Leg	4.0000	0.0000	105.0000	No Ice	1.1040	0.3471	0.01
			0.00			1/2"	1.2388	0.4422	0.02
			0.00			Ice	1.3810	0.5444	0.03
						1" Ice	1.6877	0.7696	0.05
						2" Ice			
RRUS 11	A	From Leg	4.0000	0.0000	105.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice	3.6656	1.8390	0.15
						2" Ice			
RRUS 11	B	From Leg	4.0000	0.0000	105.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice	3.6656	1.8390	0.15
						2" Ice			
RRUS 11	C	From Leg	4.0000	0.0000	105.0000	No Ice	2.7908	1.1923	0.05
			0.00			1/2"	2.9984	1.3395	0.07
			0.00			Ice	3.2134	1.4957	0.10
						1" Ice	3.6656	1.8390	0.15
						2" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.0000	0.0000	105.0000	No Ice	9.8953	8.1125	0.08
			0.00			1/2"	10.4700	9.3041	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	11.0098	10.2095	0.25
						1" Ice	12.1119	12.0135	0.46
						2" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	13.2134 13.8986 14.5871 15.9095	9.5823 11.0517 12.4963 14.7516	0.10 0.20 0.30 0.55
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	13.2134 13.8986 14.5871 15.9095	9.5823 11.0517 12.4963 14.7516	0.10 0.20 0.30 0.55
QS66512-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	8.3708 8.9314 9.4571 10.5310	8.4625 9.6573 10.5478 12.3523	0.14 0.21 0.30 0.49
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	13.5353 14.2380 14.9495 16.3081	10.9597 12.4861 14.0367 16.3910	0.11 0.22 0.33 0.59
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	13.5353 14.2380 14.9495 16.3081	10.9597 12.4861 14.0367 16.3910	0.11 0.22 0.33 0.59
RRUS 32 B2	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.7313 2.9531 3.1823 3.6628	1.6681 1.8552 2.0493 2.4585	0.05 0.07 0.10 0.16
RRUS 32 B2	B	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.7313 2.9531 3.1823 3.6628	1.6681 1.8552 2.0493 2.4585	0.05 0.07 0.10 0.16
RRUS 32 B2	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.7313 2.9531 3.1823 3.6628	1.6681 1.8552 2.0493 2.4585	0.05 0.07 0.10 0.16
RRUS 32 B66	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.7427 2.9647 3.1941 3.6753	1.6681 1.8552 2.0493 2.4585	0.05 0.07 0.10 0.16
RRUS 32 B66	B	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.7427 2.9647 3.1941 3.6753	1.6681 1.8552 2.0493 2.4585	0.05 0.07 0.10 0.16
RRUS 32 B66	C	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.7427 2.9647 3.1941 3.6753	1.6681 1.8552 2.0493 2.4585	0.05 0.07 0.10 0.16
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.0000	105.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice	0.9167 1.4583 1.6431 2.0417	0.9167 1.4583 1.6431 2.0417	0.02 0.04 0.06 0.11
1001940	A	From Leg	4.0000 0.00	0.0000	105.0000	No Ice 1/2"	0.1758 0.2317	0.0833 0.1264	0.00 0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	0.2950	0.1778	0.01
						1" Ice	0.4439	0.3045	0.01
						2" Ice			
1001940	B	From Leg	4.0000	0.0000	105.0000	No Ice	0.1758	0.0833	0.00
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
						1" Ice	0.4439	0.3045	0.01
						2" Ice			
1001940	C	From Leg	4.0000	0.0000	105.0000	No Ice	0.1758	0.0833	0.00
			0.00			1/2"	0.2317	0.1264	0.00
			0.00			Ice	0.2950	0.1778	0.01
						1" Ice	0.4439	0.3045	0.01
						2" Ice			
RRUS 32	A	From Leg	4.0000	0.0000	105.0000	No Ice	2.8571	1.7766	0.06
			0.00			1/2"	3.0830	1.9677	0.08
			0.00			Ice	3.3163	2.1658	0.10
						1" Ice	3.8052	2.5829	0.16
						2" Ice			
RRUS 32	B	From Leg	4.0000	0.0000	105.0000	No Ice	2.8571	1.7766	0.06
			0.00			1/2"	3.0830	1.9677	0.08
			0.00			Ice	3.3163	2.1658	0.10
						1" Ice	3.8052	2.5829	0.16
						2" Ice			
RRUS 32	C	From Leg	4.0000	0.0000	105.0000	No Ice	2.8571	1.7766	0.06
			0.00			1/2"	3.0830	1.9677	0.08
			0.00			Ice	3.3163	2.1658	0.10
						1" Ice	3.8052	2.5829	0.16
						2" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	105.0000	No Ice	14.6600	14.6600	1.25
						1/2"	18.8700	18.8700	1.48
						Ice	23.0800	23.0800	1.71
						1" Ice	31.5000	31.5000	2.18
						2" Ice			
Side Arm Mount [SO 101-3]	C	None		0.0000	105.0000	No Ice	7.5000	7.5000	0.25
						1/2"	8.9000	8.9000	0.33
						Ice	10.3000	10.3000	0.41
						1" Ice	13.1000	13.1000	0.58
						2" Ice			
Pipe Mount [PM 601-3]	C	None		0.0000	105.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice			
5' x 2' Pipe Mount	C	None		0.0000	105.0000	No Ice	1.0000	1.0000	0.03
						1/2"	1.3932	1.3932	0.04
						Ice	1.7031	1.7031	0.05
						1" Ice	2.3506	2.3506	0.08
						2" Ice			
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APXV18-206516S-C	A	From Leg	1.0000	0.0000	95.0000	No Ice	3.6211	2.0078	0.02
			0.00			1/2"	3.9653	2.3318	0.04
			0.00			Ice	4.3034	2.6631	0.06
						1" Ice	4.9940	3.3479	0.13
						2" Ice			
APXV18-206516S-C	B	From Leg	1.0000	0.0000	95.0000	No Ice	3.6211	2.0078	0.02
			0.00			1/2"	3.9653	2.3318	0.04
			0.00			Ice	4.3034	2.6631	0.06
						1" Ice	4.9940	3.3479	0.13
						2" Ice			
APXV18-206516S-C	C	From Leg	1.0000	0.0000	95.0000	No Ice	3.6211	2.0078	0.02
			0.00			1/2"	3.9653	2.3318	0.04
			0.00			Ice	4.3034	2.6631	0.06
						1" Ice	4.9940	3.3479	0.13
						2" Ice			
Pipe Mount [PM 601-3]	C	None		0.0000	95.0000	No Ice	4.3900	4.3900	0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	5.4800	5.4800	0.24
						1" Ice	6.5700	6.5700	0.28
						2" Ice	8.7500	8.7500	0.36
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1142-2C	C	From Leg	6.0000 0.00 6.00	0.0000	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.0916 3.3738 4.6726 7.3203	2.0916 3.3738 4.6726 7.3203	0.02 0.04 0.07 0.14
Side Arm Mount [SO 701-1]	C	From Leg	1.5000 0.00 0.00	0.0000	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8500 1.1400 1.4300 2.0100	1.6700 2.3400 3.0100 4.3500	0.07 0.08 0.09 0.12
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GPS_A	A	From Leg	3.0000 0.00 2.00	0.0000	72.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.2550 0.3205 0.3934 0.5614	0.2550 0.3205 0.3934 0.5614	0.00 0.00 0.01 0.02
Side Arm Mount [SO 701-1]	A	From Leg	1.5000 0.00 0.00	0.0000	72.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8500 1.1400 1.4300 2.0100	1.6700 2.3400 3.0100 4.3500	0.07 0.08 0.09 0.12
**********									
201-1N	A	From Leg	3.0000 0.00 7.00	30.0000	54.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4890 2.4082 3.3440 4.7512	1.4890 2.4082 3.3440 4.7512	0.01 0.02 0.04 0.09
220-8N	C	From Leg	3.0000 0.00 10.00	30.0000	54.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.1792 7.0938 9.0250 12.9375	5.1792 7.0938 9.0250 12.9375	0.02 0.06 0.11 0.24
Side Arm Mount [SO 701-1]	A	From Leg	1.5000 0.00 0.00	0.0000	54.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8500 1.1400 1.4300 2.0100	1.6700 2.3400 3.0100 4.3500	0.07 0.08 0.09 0.12
Side Arm Mount [SO 701-1]	C	From Leg	1.5000 0.00 0.00	0.0000	54.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8500 1.1400 1.4300 2.0100	1.6700 2.3400 3.0100 4.3500	0.07 0.08 0.09 0.12
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DB436-C	A	From Leg	1.0000 0.00 0.00	-60.0000	49.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.4500 0.8100 1.1700 1.8900	0.4500 0.8100 1.1700 1.8900	0.01 0.01 0.01 0.02
Pipe Mount [PM 601-1]	A	From Leg	0.5000 0.00 0.00	0.0000	49.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.0000 3.7400 4.4800 5.9600	0.9000 1.1200 1.3400 1.7800	0.07 0.08 0.09 0.12
**********									
DB436-C	A	From Leg	1.0000 0.00 0.00	-60.0000	45.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.4500 0.8100 1.1700 1.8900	0.4500 0.8100 1.1700 1.8900	0.01 0.01 0.01 0.02
Pipe Mount [PM 601-1]	A	From Leg	0.5000	0.0000	45.0000	No Ice	3.0000	0.9000	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice 2" Ice	3.7400 4.4800 5.9600	1.1200 1.3400 1.7800	0.08 0.09 0.12
**********									
DB436-C	A	From Leg	1.0000 0.00 0.00	-60.0000	40.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.4500 0.8100 1.1700 1.8900	0.4500 0.8100 1.1700 1.8900	0.01 0.01 0.01 0.02
Pipe Mount [PM 601-1]	A	From Leg	0.5000 0.00 0.00	0.0000	40.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.0000 3.7400 4.4800 5.9600	0.9000 1.1200 1.3400 1.7800	0.07 0.08 0.09 0.12
**********									
DB436-C	A	From Leg	1.0000 0.00 0.00	-60.0000	37.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.4500 0.8100 1.1700 1.8900	0.4500 0.8100 1.1700 1.8900	0.01 0.01 0.01 0.02
Pipe Mount [PM 601-1]	A	From Leg	0.5000 0.00 0.00	0.0000	37.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.0000 3.7400 4.4800 5.9600	0.9000 1.1200 1.3400 1.7800	0.07 0.08 0.09 0.12
**********									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HPD2-4.7	C	Paraboloid w/o Radome	From Leg	4.0000 0.00 4.00	16.0000		148.0000	2.0417	No Ice 1/2" Ice 1" Ice 2" Ice	3.2700 3.5500 3.8200 4.3600	0.03 0.05 0.06 0.10

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 147.5000-142.5000	145.0000	1.369	49.23	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L2 142.5000-137.5000	140.0000	1.359	48.87	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L3 137.5000-132.5000	135.0000	1.348	48.50	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	10.000		100.00	0.000	1.102
L4 132.5000-127.5000	130.0000	1.337	48.11	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L5 127.5000-125.0000	126.2500	1.329	47.82	5.000	A	0.000	5.000	5.000	100.00	0.000	0.000
					B	0.000	5.000		100.00	0.000	0.000
					C	0.000	5.000		100.00	0.000	0.551
L6 125.0000-120.0000	122.5000	1.321	47.52	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L7 120.0000-115.0000	117.5000	1.309	47.10	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L8 115.0000-110.0000	112.5000	1.297	46.67	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L9 110.0000-105.0000	107.5000	1.285	46.23	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L10 105.0000-100.0000	102.5000	1.272	45.77	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	4.072
L11 100.0000-95.0000	97.5000	1.259	45.29	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	4.072
L12 95.0000-94.2500	94.6250	1.251	45.00	2.250	A	0.000	2.250	2.250	100.00	0.000	0.000
					B	0.000	2.250		100.00	0.000	0.000
					C	0.000	2.250		100.00	0.000	0.798
L13 94.2500-94.0000	94.1250	1.25	44.95	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.266
L14 94.0000-89.0000	91.5000	1.242	44.69	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	5.322
L15 89.0000-84.0000	86.5000	1.228	44.16	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	5.322
L16 84.0000-80.0000	82.0000	1.214	43.67	12.000	A	0.000	12.000	12.000	100.00	0.000	0.000
					B	0.000	12.000		100.00	0.000	0.000
					C	0.000	12.000		100.00	0.000	4.258
L17 80.0000-79.7500	79.8750	1.207	43.43	0.875	A	0.000	0.875	0.875	100.00	0.000	0.000
					B	0.000	0.875		100.00	0.000	0.000
					C	0.000	0.875		100.00	0.000	0.287
L18 79.7500-74.7500	77.2500	1.199	43.12	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	5.739
L19 74.7500-69.7500	72.2500	1.182	42.52	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	5.739
L20 69.7500-64.7500	67.2500	1.164	41.88	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	5.739
L21 64.7500-60.0000	62.3750	1.146	41.22	16.625	A	0.000	16.625	16.625	100.00	0.000	0.000
					B	0.000	16.625		100.00	0.000	0.000
					C	0.000	16.625		100.00	0.000	5.452
L22 60.0000-59.7500	59.8750	1.136	40.87	1.000	A	0.000	1.000	1.000	100.00	0.000	0.000
					B	0.000	1.000		100.00	0.000	0.000
					C	0.000	1.000		100.00	0.000	0.308
L23 59.7500-54.7500	57.2500	1.125	40.48	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	6.155
L24 54.7500-49.7500	52.2500	1.104	39.71	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	6.155
L25 49.7500-44.7500	47.2500	1.081	38.88	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	6.155
L26 44.7500-	42.3750	1.056	38.00	19.000	A	0.000	19.000	19.000	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
40.0000					B	0.000	19.000		100.00	0.000	0.000
					C	0.000	19.000		100.00	0.000	6.348
L27 40.0000-39.7500	39.8750	1.043	37.52	1.125	A	0.000	1.125	1.125	100.00	0.000	0.000
					B	0.000	1.125		100.00	0.000	0.000
					C	0.000	1.125		100.00	0.000	0.358
L28 39.7500-34.7500	37.2500	1.028	36.98	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	6.605
L29 34.7500-29.7500	32.2500	0.997	35.88	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	6.155
L30 29.7500-24.7500	27.2500	0.963	34.63	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	6.155
L31 24.7500-20.0000	22.3750	0.923	33.22	21.375	A	0.000	21.375	21.375	100.00	0.000	0.000
					B	0.000	21.375		100.00	0.000	0.000
					C	0.000	21.375		100.00	0.000	6.348
L32 20.0000-19.7500	19.8750	0.901	32.40	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.358
L33 19.7500-19.0000	19.3750	0.896	32.23	3.750	A	0.000	3.750	3.750	100.00	0.000	0.000
					B	0.000	3.750		100.00	0.000	0.000
					C	0.000	3.750		100.00	0.000	1.073
L34 19.0000-18.7500	18.8750	0.891	32.05	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.358
L35 18.7500-13.7500	16.2500	0.863	31.06	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	6.405
L36 13.7500-8.7500	11.2500	0.85	30.58	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	6.155
L37 8.7500-3.7500	6.2500	0.85	30.58	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	6.155
L38 3.7500-0.0000	1.8750	0.85	30.58	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	4.616

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.5000-142.5000	145.0000	1.369	7.88	1.9712	11.643	A	0.000	11.643	11.643	100.00	0.000	0.000
						B	0.000	11.643		100.00	0.000	0.000
						C	0.000	11.643		100.00	0.000	5.044
L2 142.5000-137.5000	140.0000	1.359	7.82	1.9643	11.637	A	0.000	11.637	11.637	100.00	0.000	0.000
						B	0.000	11.637		100.00	0.000	0.000
						C	0.000	11.637		100.00	0.000	5.031
L3 137.5000-132.5000	135.0000	1.348	7.76	1.9572	11.631	A	0.000	11.631	11.631	100.00	0.000	0.000
						B	0.000	11.631		100.00	0.000	0.000
						C	0.000	11.631		100.00	0.000	5.016
L4 132.5000-127.5000	130.0000	1.337	7.70	1.9498	11.625	A	0.000	11.625	11.625	100.00	0.000	0.000
						B	0.000	11.625		100.00	0.000	0.000
						C	0.000	11.625		100.00	0.000	5.002
L5 127.5000-125.0000	126.2500	1.329	7.65	1.9441	5.810	A	0.000	5.810	5.810	100.00	0.000	0.000
						B	0.000	5.810		100.00	0.000	0.000
						C	0.000	5.810		100.00	0.000	2.495
L6 125.0000-120.0000	122.5000	1.321	7.60	1.9383	14.115	A	0.000	14.115	14.115	100.00	0.000	0.000
						B	0.000	14.115		100.00	0.000	0.000
						C	0.000	14.115		100.00	0.000	4.979

Section Elevation	z	K_z	q_z	t_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L7 120.0000-115.0000	117.5000	1.309	7.54	1.9302	14.108	A	0.000	14.108	14.108	100.00	0.000	0.000
						B	0.000	14.108		100.00	0.000	0.000
						C	0.000	14.108		100.00	0.000	4.962
L8 115.0000-110.0000	112.5000	1.297	7.47	1.9218	14.102	A	0.000	14.102	14.102	100.00	0.000	0.000
						B	0.000	14.102		100.00	0.000	0.000
						C	0.000	14.102		100.00	0.000	4.946
L9 110.0000-105.0000	107.5000	1.285	7.40	1.9131	14.094	A	0.000	14.094	14.094	100.00	0.000	0.000
						B	0.000	14.094		100.00	0.000	0.000
						C	0.000	14.094		100.00	0.000	4.928
L10 105.0000-100.0000	102.5000	1.272	7.32	1.9040	14.087	A	0.000	14.087	14.087	100.00	0.000	0.000
						B	0.000	14.087		100.00	0.000	0.000
						C	0.000	14.087		100.00	0.000	13.592
L11 100.0000-95.0000	97.5000	1.259	7.25	1.8945	16.579	A	0.000	16.579	16.579	100.00	0.000	0.000
						B	0.000	16.579		100.00	0.000	0.000
						C	0.000	16.579		100.00	0.000	13.545
L12 95.0000-94.2500	94.6250	1.251	7.20	1.8889	2.486	A	0.000	2.486	2.486	100.00	0.000	0.000
						B	0.000	2.486		100.00	0.000	0.000
						C	0.000	2.486		100.00	0.000	2.845
L13 94.2500-94.0000	94.1250	1.25	7.19	1.8879	0.829	A	0.000	0.829	0.829	100.00	0.000	0.000
						B	0.000	0.829		100.00	0.000	0.000
						C	0.000	0.829		100.00	0.000	0.948
L14 94.0000-89.0000	91.5000	1.242	7.15	1.8825	16.569	A	0.000	16.569	16.569	100.00	0.000	0.000
						B	0.000	16.569		100.00	0.000	0.000
						C	0.000	16.569		100.00	0.000	18.918
L15 89.0000-84.0000	86.5000	1.228	7.07	1.8720	16.560	A	0.000	16.560	16.560	100.00	0.000	0.000
						B	0.000	16.560		100.00	0.000	0.000
						C	0.000	16.560		100.00	0.000	18.842
L16 84.0000-80.0000	82.0000	1.214	6.99	1.8620	13.241	A	0.000	13.241	13.241	100.00	0.000	0.000
						B	0.000	13.241		100.00	0.000	0.000
						C	0.000	13.241		100.00	0.000	15.016
L17 80.0000-79.7500	79.8750	1.207	6.95	1.8571	0.952	A	0.000	0.952	0.952	100.00	0.000	0.000
						B	0.000	0.952		100.00	0.000	0.000
						C	0.000	0.952		100.00	0.000	0.958
L18 79.7500-74.7500	77.2500	1.199	6.90	1.8509	19.042	A	0.000	19.042	19.042	100.00	0.000	0.000
						B	0.000	19.042		100.00	0.000	0.000
						C	0.000	19.042		100.00	0.000	19.106
L19 74.7500-69.7500	72.2500	1.182	6.80	1.8386	19.032	A	0.000	19.032	19.032	100.00	0.000	0.000
						B	0.000	19.032		100.00	0.000	0.000
						C	0.000	19.032		100.00	0.000	19.017
L20 69.7500-64.7500	67.2500	1.164	6.70	1.8254	19.021	A	0.000	19.021	19.021	100.00	0.000	0.000
						B	0.000	19.021		100.00	0.000	0.000
						C	0.000	19.021		100.00	0.000	18.922
L21 64.7500-60.0000	62.3750	1.146	6.60	1.8118	18.059	A	0.000	18.059	18.059	100.00	0.000	0.000
						B	0.000	18.059		100.00	0.000	0.000
						C	0.000	18.059		100.00	0.000	17.882
L22 60.0000-59.7500	59.8750	1.136	6.54	1.8044	1.075	A	0.000	1.075	1.075	100.00	0.000	0.000
						B	0.000	1.075		100.00	0.000	0.000
						C	0.000	1.075		100.00	0.000	0.959
L23 59.7500-54.7500	57.2500	1.125	6.48	1.7963	21.497	A	0.000	21.497	21.497	100.00	0.000	0.000
						B	0.000	21.497		100.00	0.000	0.000
						C	0.000	21.497		100.00	0.000	19.128
L24 54.7500-49.7500	52.2500	1.104	6.35	1.7799	21.483	A	0.000	21.483	21.483	100.00	0.000	0.000
						B	0.000	21.483		100.00	0.000	0.000
						C	0.000	21.483		100.00	0.000	19.010
L25 49.7500-44.7500	47.2500	1.081	6.22	1.7621	21.468	A	0.000	21.468	21.468	100.00	0.000	0.000
						B	0.000	21.468		100.00	0.000	0.000
						C	0.000	21.468		100.00	0.000	18.882
L26 44.7500-40.0000	42.3750	1.056	6.08	1.7430	20.380	A	0.000	20.380	20.380	100.00	0.000	0.000
						B	0.000	20.380		100.00	0.000	0.000
						C	0.000	20.380		100.00	0.000	19.178
L27 40.0000-39.7500	39.8750	1.043	6.00	1.7325	1.197	A	0.000	1.197	1.197	100.00	0.000	0.000
						B	0.000	1.197		100.00	0.000	0.000
						C	0.000	1.197		100.00	0.000	1.070
L28 39.7500-34.7500	37.2500	1.028	5.92	1.7207	23.934	A	0.000	23.934	23.934	100.00	0.000	0.000
						B	0.000	23.934		100.00	0.000	0.000
						C	0.000	23.934		100.00	0.000	19.807
L29 34.7500-29.7500	32.2500	0.997	5.74	1.6961	23.913	A	0.000	23.913	23.913	100.00	0.000	0.000
						B	0.000	23.913		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	23.913		100.00	0.000	18.405
L30 29.7500-24.7500	27.2500	0.963	5.54	1.6678	23.890	A	0.000	23.890	23.890	100.00	0.000	0.000
						B	0.000	23.890		100.00	0.000	0.000
						C	0.000	23.890		100.00	0.000	18.200
L31 24.7500-20.0000	22.3750	0.923	5.32	1.6352	22.670	A	0.000	22.670	22.670	100.00	0.000	0.000
						B	0.000	22.670		100.00	0.000	0.000
						C	0.000	22.670		100.00	0.000	18.385
L32 20.0000-19.7500	19.8750	0.901	5.18	1.6160	1.317	A	0.000	1.317	1.317	100.00	0.000	0.000
						B	0.000	1.317		100.00	0.000	0.000
						C	0.000	1.317		100.00	0.000	1.022
L33 19.7500-19.0000	19.3750	0.896	5.16	1.6118	3.951	A	0.000	3.951	3.951	100.00	0.000	0.000
						B	0.000	3.951		100.00	0.000	0.000
						C	0.000	3.951		100.00	0.000	3.061
L34 19.0000-18.7500	18.8750	0.891	5.13	1.6076	1.317	A	0.000	1.317	1.317	100.00	0.000	0.000
						B	0.000	1.317		100.00	0.000	0.000
						C	0.000	1.317		100.00	0.000	1.019
L35 18.7500-13.7500	16.2500	0.863	4.97	1.5837	26.320	A	0.000	26.320	26.320	100.00	0.000	0.000
						B	0.000	26.320		100.00	0.000	0.000
						C	0.000	26.320		100.00	0.000	18.239
L36 13.7500-8.7500	11.2500	0.85	4.89	1.5266	26.272	A	0.000	26.272	26.272	100.00	0.000	0.000
						B	0.000	26.272		100.00	0.000	0.000
						C	0.000	26.272		100.00	0.000	17.180
L37 8.7500-3.7500	6.2500	0.85	4.89	1.4394	26.200	A	0.000	26.200	26.200	100.00	0.000	0.000
						B	0.000	26.200		100.00	0.000	0.000
						C	0.000	26.200		100.00	0.000	16.551
L38 3.7500-0.0000	1.8750	0.85	4.89	1.2761	19.548	A	0.000	19.548	19.548	100.00	0.000	0.000
						B	0.000	19.548		100.00	0.000	0.000
						C	0.000	19.548		100.00	0.000	11.529

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.5000-142.5000	145.0000	1.369	10.15	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L2 142.5000-137.5000	140.0000	1.359	10.07	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L3 137.5000-132.5000	135.0000	1.348	10.00	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L4 132.5000-127.5000	130.0000	1.337	9.92	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	1.102
L5 127.5000-125.0000	126.2500	1.329	9.86	5.000	A	0.000	5.000	5.000	100.00	0.000	0.000
					B	0.000	5.000		100.00	0.000	0.000
					C	0.000	5.000		100.00	0.000	0.551
L6 125.0000-120.0000	122.5000	1.321	9.80	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L7 120.0000-115.0000	117.5000	1.309	9.71	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L8 115.0000-110.0000	112.5000	1.297	9.62	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	1.102
L9 110.0000-105.0000	107.5000	1.285	9.53	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	12.500		100.00	0.000	1.102
L10 105.0000-100.0000	102.5000	1.272	9.43	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	4.072
L11 100.0000-95.0000	97.5000	1.259	9.34	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	4.072
L12 95.0000-94.2500	94.6250	1.251	9.28	2.250	A	0.000	2.250	2.250	100.00	0.000	0.000
					B	0.000	2.250		100.00	0.000	0.000
					C	0.000	2.250		100.00	0.000	0.798
L13 94.2500-94.0000	94.1250	1.25	9.27	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.266
L14 94.0000-89.0000	91.5000	1.242	9.21	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	5.322
L15 89.0000-84.0000	86.5000	1.228	9.10	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	5.322
L16 84.0000-80.0000	82.0000	1.214	9.00	12.000	A	0.000	12.000	12.000	100.00	0.000	0.000
					B	0.000	12.000		100.00	0.000	0.000
					C	0.000	12.000		100.00	0.000	4.258
L17 80.0000-79.7500	79.8750	1.207	8.95	0.875	A	0.000	0.875	0.875	100.00	0.000	0.000
					B	0.000	0.875		100.00	0.000	0.000
					C	0.000	0.875		100.00	0.000	0.287
L18 79.7500-74.7500	77.2500	1.199	8.89	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	5.739
L19 74.7500-69.7500	72.2500	1.182	8.76	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	5.739
L20 69.7500-64.7500	67.2500	1.164	8.63	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	5.739
L21 64.7500-60.0000	62.3750	1.146	8.50	16.625	A	0.000	16.625	16.625	100.00	0.000	0.000
					B	0.000	16.625		100.00	0.000	0.000
					C	0.000	16.625		100.00	0.000	5.452
L22 60.0000-59.7500	59.8750	1.136	8.42	1.000	A	0.000	1.000	1.000	100.00	0.000	0.000
					B	0.000	1.000		100.00	0.000	0.000
					C	0.000	1.000		100.00	0.000	0.308
L23 59.7500-54.7500	57.2500	1.125	8.35	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	6.155
L24 54.7500-49.7500	52.2500	1.104	8.19	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	6.155
L25 49.7500-44.7500	47.2500	1.081	8.02	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	6.155
L26 44.7500-40.0000	42.3750	1.056	7.83	19.000	A	0.000	19.000	19.000	100.00	0.000	0.000
					B	0.000	19.000		100.00	0.000	0.000
					C	0.000	19.000		100.00	0.000	6.348
L27 40.0000-39.7500	39.8750	1.043	7.73	1.125	A	0.000	1.125	1.125	100.00	0.000	0.000
					B	0.000	1.125		100.00	0.000	0.000
					C	0.000	1.125		100.00	0.000	0.358
L28 39.7500-34.7500	37.2500	1.028	7.62	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	6.605
L29 34.7500-29.7500	32.2500	0.997	7.40	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	6.155
L30 29.7500-24.7500	27.2500	0.963	7.14	22.500	A	0.000	22.500	22.500	100.00	0.000	0.000
					B	0.000	22.500		100.00	0.000	0.000
					C	0.000	22.500		100.00	0.000	6.155
L31 24.7500-20.0000	22.3750	0.923	6.85	21.375	A	0.000	21.375	21.375	100.00	0.000	0.000
					B	0.000	21.375		100.00	0.000	0.000
					C	0.000	21.375		100.00	0.000	6.348
L32 20.0000-	19.8750	0.901	6.68	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	$A_{G'}$ ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
19.7500					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.358
L33 19.7500-19.0000	19.3750	0.896	6.64	3.750	A	0.000	3.750	3.750	100.00	0.000	0.000
					B	0.000	3.750		100.00	0.000	0.000
					C	0.000	3.750		100.00	0.000	1.073
L34 19.0000-18.7500	18.8750	0.891	6.61	1.250	A	0.000	1.250	1.250	100.00	0.000	0.000
					B	0.000	1.250		100.00	0.000	0.000
					C	0.000	1.250		100.00	0.000	0.358
L35 18.7500-13.7500	16.2500	0.863	6.40	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	6.405
L36 13.7500-8.7500	11.2500	0.85	6.30	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	6.155
L37 8.7500-3.7500	6.2500	0.85	6.30	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	6.155
L38 3.7500-0.0000	1.8750	0.85	6.30	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	4.616

Load Combinations

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

Comb. No.	Description
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	147.5 - 142.5	Pole	Max Tension	26	0.00	-0.00	0.00
			Max. Compression	26	-9.80	1.69	0.14
			Max. Mx	8	-3.77	-55.13	0.73
			Max. My	2	-3.79	-1.18	54.12
			Max. Vy	8	6.94	-55.13	0.73
			Max. Vx	2	-6.78	-1.18	54.12
			Max. Torque	16			-1.70
L2	142.5 - 137.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.56	1.19	0.15
			Max. Mx	8	-7.26	-106.63	0.91
			Max. My	2	-7.28	-1.93	104.69
			Max. Vy	8	13.61	-106.63	0.91
			Max. Vx	2	-13.46	-1.93	104.69
			Max. Torque	16			-1.71
L3	137.5 - 132.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.91	1.60	-0.08
			Max. Mx	8	-7.95	-175.68	0.99
			Max. My	2	-7.97	-2.41	173.02
			Max. Vy	8	14.02	-175.68	0.99
			Max. Vx	2	-13.88	-2.41	173.02
			Max. Torque	16			-1.60
L4	132.5 - 127.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.46	2.01	-0.31
			Max. Mx	8	-11.96	-256.07	1.07
			Max. My	2	-11.98	-2.88	252.69
			Max. Vy	8	18.15	-256.07	1.07
			Max. Vx	2	-18.00	-2.88	252.69
			Max. Torque	16			-1.63
L5	127.5 - 125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.15	2.23	-0.42
			Max. Mx	8	-12.34	-301.65	1.10
			Max. My	2	-12.36	-3.12	297.91
			Max. Vy	8	18.34	-301.65	1.10
			Max. Vx	2	-18.19	-3.12	297.91
			Max. Torque	16			-1.64
L6	125 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.74	2.74	-0.71
			Max. Mx	8	-13.23	-394.46	1.18
			Max. My	2	-13.25	-3.59	389.99
			Max. Vy	8	18.81	-394.46	1.18
			Max. Vx	2	-18.66	-3.59	389.99
			Max. Torque	16			-1.68
L7	120 - 115	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.33	3.26	-0.99
			Max. Mx	8	-14.13	-489.62	1.25
			Max. My	2	-14.15	-4.06	484.43
			Max. Vy	8	19.27	-489.62	1.25

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-19.12	-4.06	484.43
			Max. Torque	16			-1.71
L8	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.91	3.77	-1.28
			Max. Mx	8	-15.04	-587.03	1.33
			Max. My	2	-15.06	-4.53	581.12
			Max. Vy	8	19.72	-587.03	1.33
			Max. Vx	2	-19.57	-4.53	581.12
			Max. Torque	16			-1.75
L9	110 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.49	4.28	-1.56
			Max. Mx	8	-15.97	-686.61	1.40
			Max. My	2	-15.99	-5.00	679.96
			Max. Vy	8	20.14	-686.61	1.40
			Max. Vx	2	-19.99	-5.00	679.96
			Max. Torque	16			-1.78
L10	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.27	5.83	-2.31
			Max. Mx	8	-20.69	-819.94	1.77
			Max. My	2	-20.71	-5.39	812.00
			Max. Vy	8	26.96	-819.94	1.77
			Max. Vx	2	-26.63	-5.39	812.00
			Max. Torque	12			-1.91
L11	100 - 95	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.98	7.65	-3.35
			Max. Mx	8	-21.84	-956.16	1.79
			Max. My	2	-21.86	-5.77	946.61
			Max. Vy	8	27.59	-956.16	1.79
			Max. Vx	2	-27.26	-5.77	946.61
			Max. Torque	12			-2.21
L12	95 - 94.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.19	7.99	-3.54
			Max. Mx	8	-22.30	-977.28	1.79
			Max. My	2	-22.32	-5.82	967.50
			Max. Vy	8	28.26	-977.28	1.79
			Max. Vx	2	-27.93	-5.82	967.50
			Max. Torque	12			-2.27
L13	94.25 - 94	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.36	8.10	-3.60
			Max. Mx	8	-22.37	-984.34	1.78
			Max. My	2	-22.40	-5.84	974.48
			Max. Vy	8	28.29	-984.34	1.78
			Max. Vx	2	-27.96	-5.84	974.48
			Max. Torque	12			-2.29
L14	94 - 89	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.60	10.30	-4.86
			Max. Mx	8	-23.79	-1127.34	1.78
			Max. My	2	-23.81	-6.17	1115.89
			Max. Vy	8	28.99	-1127.34	1.78
			Max. Vx	2	-28.66	-6.17	1115.89
			Max. Torque	12			-2.68
L15	89 - 84	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.10	13.71	-6.82
			Max. Mx	8	-25.32	-1274.80	1.51
			Max. My	2	-25.34	-6.10	1262.01
			Max. Vy	8	29.81	-1274.80	1.51
			Max. Vx	2	-29.50	-6.10	1262.01
			Max. Torque	12			-4.11
L16	84 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.67	15.45	-7.81
			Max. Mx	8	-26.48	-1394.90	1.43
			Max. My	2	-26.50	-6.30	1380.93
			Max. Vy	8	30.33	-1394.90	1.43
			Max. Vx	2	-30.01	-6.30	1380.93
			Max. Torque	12			-4.41
L17	80 - 79.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.85	15.57	-7.88
			Max. Mx	8	-26.58	-1402.48	1.43
			Max. My	2	-26.60	-6.31	1388.43

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	30.36	-1402.48	1.43
			Max. Vx	2	-30.05	-6.31	1388.43
			Max. Torque	12			-4.44
L18	79.75 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.52	18.06	-9.31
			Max. Mx	8	-28.37	-1555.97	1.32
			Max. My	2	-28.39	-6.54	1540.45
			Max. Vy	8	31.13	-1555.97	1.32
			Max. Vx	2	-30.82	-6.54	1540.45
			Max. Torque	12			-4.91
L19	74.75 - 69.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.31	20.53	-10.19
			Max. Mx	8	-30.25	-1713.46	1.46
			Max. My	2	-30.27	-6.76	1696.65
			Max. Vy	8	31.96	-1713.46	1.46
			Max. Vx	2	-31.61	-6.76	1696.65
			Max. Torque	12			-5.23
L20	69.75 - 64.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.94	22.98	-11.59
			Max. Mx	8	-32.07	-1874.82	1.36
			Max. My	2	-32.09	-6.98	1856.34
			Max. Vy	8	32.68	-1874.82	1.36
			Max. Vx	2	-32.33	-6.98	1856.34
			Max. Torque	12			-5.69
L21	64.75 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.37	25.27	-12.91
			Max. Mx	8	-33.81	-2031.34	1.26
			Max. My	2	-33.82	-7.19	2011.29
			Max. Vy	8	33.33	-2031.34	1.26
			Max. Vx	2	-32.98	-7.19	2011.29
			Max. Torque	12			-6.12
L22	60 - 59.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.57	25.41	-12.99
			Max. Mx	8	-33.92	-2039.66	1.25
			Max. My	2	-33.94	-7.20	2019.53
			Max. Vy	8	33.36	-2039.66	1.25
			Max. Vx	2	-33.01	-7.20	2019.53
			Max. Torque	12			-6.15
L23	59.75 - 54.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.55	28.12	-14.54
			Max. Mx	8	-36.04	-2208.17	1.13
			Max. My	2	-36.05	-7.39	2186.40
			Max. Vy	8	34.15	-2208.17	1.13
			Max. Vx	2	-33.80	-7.39	2186.40
			Max. Torque	12			-6.69
L24	54.75 - 49.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.06	32.16	-16.01
			Max. Mx	8	-38.35	-2384.84	1.05
			Max. My	2	-38.36	-7.20	2361.80
			Max. Vy	8	35.33	-2384.84	1.05
			Max. Vx	2	-34.96	-7.20	2361.80
			Max. Torque	12			-8.37
L25	49.75 - 44.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91.29	34.80	-16.79
			Max. Mx	8	-40.67	-2563.29	1.28
			Max. My	2	-40.68	-7.32	2539.37
			Max. Vy	8	36.17	-2563.29	1.28
			Max. Vx	2	-35.99	-7.32	2539.37
			Max. Torque	12			-8.74
L26	44.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.01	37.26	-18.21
			Max. Mx	8	-42.72	-2736.45	1.09
			Max. My	2	-42.72	-7.43	2711.74

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	36.85	-2736.45	1.09
			Max. Vx	2	-36.66	-7.43	2711.74
			Max. Torque	12			-9.27
L27	40 - 39.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.36	37.41	-17.93
			Max. Mx	8	-42.94	-2745.66	1.30
			Max. My	2	-42.94	-7.43	2721.15
			Max. Vy	8	36.94	-2745.66	1.30
			Max. Vx	2	-36.84	-7.43	2721.15
			Max. Torque	12			-9.27
L28	39.75 - 34.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-99.80	40.26	-19.17
			Max. Mx	8	-45.50	-2932.13	1.32
			Max. My	2	-45.51	-7.51	2907.67
			Max. Vy	8	37.77	-2932.13	1.32
			Max. Vx	2	-37.76	-7.51	2907.67
			Max. Torque	12			-9.75
L29	34.75 - 29.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-104.07	43.06	-20.77
			Max. Mx	8	-48.00	-3122.47	1.10
			Max. My	2	-48.00	-7.60	3098.06
			Max. Vy	8	38.49	-3122.47	1.10
			Max. Vx	2	-38.47	-7.60	3098.06
			Max. Torque	12			-10.30
L30	29.75 - 24.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.30	45.79	-22.34
			Max. Mx	8	-50.50	-3316.28	0.88
			Max. My	2	-50.50	-7.68	3291.93
			Max. Vy	8	39.16	-3316.28	0.88
			Max. Vx	2	-39.15	-7.68	3291.93
			Max. Torque	12			-10.83
L31	24.75 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.27	48.31	-23.80
			Max. Mx	8	-52.89	-3503.46	0.67
			Max. My	2	-52.89	-7.76	3479.15
			Max. Vy	8	39.78	-3503.46	0.67
			Max. Vx	2	-39.77	-7.76	3479.15
			Max. Torque	12			-11.35
L32	20 - 19.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.50	48.46	-23.88
			Max. Mx	8	-53.04	-3513.39	0.66
			Max. My	2	-53.04	-7.76	3489.09
			Max. Vy	8	39.80	-3513.39	0.66
			Max. Vx	2	-39.79	-7.76	3489.09
			Max. Torque	12			-11.38
L33	19.75 - 19	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-113.18	48.89	-24.13
			Max. Mx	8	-53.46	-3543.24	0.62
			Max. My	2	-53.46	-7.77	3518.95
			Max. Vy	8	39.91	-3543.24	0.62
			Max. Vx	2	-39.90	-7.77	3518.95
			Max. Torque	12			-11.48
L34	19 - 18.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-113.40	49.03	-24.21
			Max. Mx	8	-53.60	-3553.20	0.61
			Max. My	2	-53.60	-7.77	3528.92
			Max. Vy	8	39.95	-3553.20	0.61
			Max. Vx	2	-39.93	-7.77	3528.92
			Max. Torque	12			-11.51
L35	18.75 - 13.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-117.72	51.82	-25.82
			Max. Mx	8	-56.23	-3754.25	0.37
			Max. My	2	-56.24	-7.82	3730.04
			Max. Vy	8	40.60	-3754.25	0.37
			Max. Vx	2	-40.59	-7.82	3730.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	12			-12.05
L36	13.75 - 8.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-121.95	54.46	-27.34
			Max. Mx	8	-58.88	-3958.47	0.14
			Max. My	2	-58.88	-7.88	3934.33
			Max. Vy	8	41.22	-3958.47	0.14
			Max. Vx	2	-41.21	-7.88	3934.33
			Max. Torque	12			-12.57
L37	8.75 - 3.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-126.07	56.91	-28.76
			Max. Mx	8	-61.54	-4165.73	-0.10
			Max. My	2	-61.54	-7.93	4141.66
			Max. Vy	8	41.82	-4165.73	-0.10
			Max. Vx	2	-41.81	-7.93	4141.66
			Max. Torque	12			-13.09
L38	3.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-128.98	58.48	-29.66
			Max. Mx	8	-63.53	-4323.12	-0.28
			Max. My	2	-63.53	-7.97	4299.11
			Max. Vy	8	42.26	-4323.12	-0.28
			Max. Vx	2	-42.25	-7.97	4299.11
			Max. Torque	12			-13.48

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	128.98	-0.00	0.00
	Max. H_x	21	47.66	42.15	0.09
	Max. H_z	3	47.66	-0.07	42.24
	Max. M_x	2	4299.11	-0.07	42.24
	Max. M_z	8	4323.12	-42.25	-0.01
	Max. Torsion	24	13.37	21.16	36.58
	Min. Vert	9	47.66	-42.25	-0.01
	Min. H_x	9	47.66	-42.25	-0.01
	Min. H_z	15	47.66	-0.03	-42.21
	Min. M_x	14	-4297.77	-0.03	-42.21
	Min. M_z	20	-4319.78	42.15	0.09
	Min. Torsion	12	-13.48	-21.28	-36.55

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	52.95	-0.00	0.00	1.22	4.90	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	63.54	0.07	-42.24	-4299.11	-7.97	-12.30
0.9 Dead+1.0 Wind 0 deg - No Ice	47.66	0.07	-42.24	-4272.07	-9.37	-12.29
1.2 Dead+1.0 Wind 30 deg - No Ice	63.54	21.19	-36.52	-3714.72	-2172.75	-7.87
0.9 Dead+1.0 Wind 30 deg - No Ice	47.66	21.19	-36.52	-3691.42	-2160.31	-7.86
1.2 Dead+1.0 Wind 60 deg - No Ice	63.54	36.58	-21.04	-2139.78	-3744.16	-1.70
0.9 Dead+1.0 Wind 60 deg - No Ice	47.66	36.58	-21.04	-2126.51	-3721.70	-1.69
1.2 Dead+1.0 Wind 90 deg - No Ice	63.54	42.25	0.01	0.28	-4323.12	4.88

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
0.9 Dead+1.0 Wind 90 deg - No Ice	47.66	42.25	0.01	-0.07	-4296.98	4.88
1.2 Dead+1.0 Wind 120 deg - No Ice	63.54	36.68	21.08	2142.03	-3756.80	10.43
0.9 Dead+1.0 Wind 120 deg - No Ice	47.66	36.68	21.08	2128.04	-3734.26	10.43
1.2 Dead+1.0 Wind 150 deg - No Ice	63.54	21.28	36.55	3719.57	-2180.45	13.48
0.9 Dead+1.0 Wind 150 deg - No Ice	47.66	21.28	36.55	3695.51	-2167.97	13.47
1.2 Dead+1.0 Wind 180 deg - No Ice	63.54	0.03	42.21	4297.77	4.32	12.51
0.9 Dead+1.0 Wind 180 deg - No Ice	47.66	0.03	42.21	4270.01	2.80	12.50
1.2 Dead+1.0 Wind 210 deg - No Ice	63.54	-20.98	36.54	3721.05	2151.41	8.61
0.9 Dead+1.0 Wind 210 deg - No Ice	47.66	-20.98	36.54	3696.96	2136.19	8.60
1.2 Dead+1.0 Wind 240 deg - No Ice	63.54	-36.46	21.06	2146.10	3736.71	2.15
0.9 Dead+1.0 Wind 240 deg - No Ice	47.66	-36.46	21.06	2132.04	3711.36	2.14
1.2 Dead+1.0 Wind 270 deg - No Ice	63.54	-42.15	-0.09	-8.44	4319.78	-5.00
0.9 Dead+1.0 Wind 270 deg - No Ice	47.66	-42.15	-0.09	-8.75	4290.71	-5.00
1.2 Dead+1.0 Wind 300 deg - No Ice	63.54	-36.51	-21.20	-2157.75	3741.97	-10.64
0.9 Dead+1.0 Wind 300 deg - No Ice	47.66	-36.51	-21.20	-2144.36	3716.59	-10.63
1.2 Dead+1.0 Wind 330 deg - No Ice	63.54	-21.16	-36.58	-3720.63	2173.56	-13.37
0.9 Dead+1.0 Wind 330 deg - No Ice	47.66	-21.16	-36.58	-3697.29	2158.19	-13.36
1.2 Dead+1.0 Ice+1.0 Temp	128.98	0.00	-0.00	29.66	58.48	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	128.98	0.01	-13.65	-1316.62	55.70	-5.96
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	128.98	6.81	-11.80	-1134.31	-619.17	-3.85
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	128.98	11.78	-6.80	-641.25	-1110.31	-0.78
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	128.98	13.61	0.01	29.68	-1291.02	2.49
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	128.98	11.81	6.82	700.91	-1113.36	5.15
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	128.98	6.84	11.82	1194.38	-621.29	6.49
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	128.98	0.01	13.64	1375.08	57.96	6.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	128.98	-6.77	11.81	1194.47	728.89	4.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	128.98	-11.75	6.81	701.41	1223.12	0.88
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	128.98	-13.59	-0.02	27.27	1404.74	-2.51
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	128.98	-11.77	-6.84	-645.65	1224.53	-5.18
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	128.98	-6.82	-11.82	-1135.85	734.23	-6.46
Dead+Wind 0 deg - Service	52.95	0.01	-8.71	-882.00	2.13	-2.55
Dead+Wind 30 deg - Service	52.95	4.37	-7.53	-761.98	-442.46	-1.63
Dead+Wind 60 deg - Service	52.95	7.54	-4.34	-438.53	-765.19	-0.35
Dead+Wind 90 deg - Service	52.95	8.71	0.00	0.99	-884.04	1.01
Dead+Wind 120 deg - Service	52.95	7.56	4.34	440.86	-767.79	2.16
Dead+Wind 150 deg - Service	52.95	4.39	7.53	764.85	-444.04	2.79
Dead+Wind 180 deg - Service	52.95	0.01	8.70	883.59	4.65	2.58

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	52.95	-4.33	7.53	765.14	445.61	1.78
Dead+Wind 240 deg - Service	52.95	-7.52	4.34	441.69	771.19	0.44
Dead+Wind 270 deg - Service	52.95	-8.69	-0.02	-0.80	890.87	-1.03
Dead+Wind 300 deg - Service	52.95	-7.53	-4.37	-442.22	772.27	-2.20
Dead+Wind 330 deg - Service	52.95	-4.36	-7.54	-763.19	450.16	-2.76

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-52.95	0.00	0.00	52.95	-0.00	0.000%
2	0.07	-63.54	-42.24	-0.07	63.54	42.24	0.000%
3	0.07	-47.66	-42.24	-0.07	47.66	42.24	0.000%
4	21.19	-63.54	-36.52	-21.19	63.54	36.52	0.000%
5	21.19	-47.66	-36.52	-21.19	47.66	36.52	0.000%
6	36.58	-63.54	-21.04	-36.58	63.54	21.04	0.000%
7	36.58	-47.66	-21.04	-36.58	47.66	21.04	0.000%
8	42.25	-63.54	0.01	-42.25	63.54	-0.01	0.000%
9	42.25	-47.66	0.01	-42.25	47.66	-0.01	0.000%
10	36.68	-63.54	21.08	-36.68	63.54	-21.08	0.000%
11	36.68	-47.66	21.08	-36.68	47.66	-21.08	0.000%
12	21.28	-63.54	36.55	-21.28	63.54	-36.55	0.000%
13	21.28	-47.66	36.55	-21.28	47.66	-36.55	0.000%
14	0.03	-63.54	42.21	-0.03	63.54	-42.21	0.000%
15	0.03	-47.66	42.21	-0.03	47.66	-42.21	0.000%
16	-20.98	-63.54	36.54	20.98	63.54	-36.54	0.000%
17	-20.98	-47.66	36.54	20.98	47.66	-36.54	0.000%
18	-36.46	-63.54	21.06	36.46	63.54	-21.06	0.000%
19	-36.46	-47.66	21.06	36.46	47.66	-21.06	0.000%
20	-42.15	-63.54	-0.09	42.15	63.54	0.09	0.000%
21	-42.15	-47.66	-0.09	42.15	47.66	0.09	0.000%
22	-36.51	-63.54	-21.20	36.51	63.54	21.20	0.000%
23	-36.51	-47.66	-21.20	36.51	47.66	21.20	0.000%
24	-21.16	-63.54	-36.58	21.16	63.54	36.58	0.000%
25	-21.16	-47.66	-36.58	21.16	47.66	36.58	0.000%
26	0.00	-128.98	0.00	-0.00	128.98	0.00	0.000%
27	0.01	-128.98	-13.65	-0.01	128.98	13.65	0.000%
28	6.81	-128.98	-11.80	-6.81	128.98	11.80	0.000%
29	11.78	-128.98	-6.80	-11.78	128.98	6.80	0.000%
30	13.61	-128.98	0.01	-13.61	128.98	-0.01	0.000%
31	11.81	-128.98	6.82	-11.81	128.98	-6.82	0.000%
32	6.84	-128.98	11.82	-6.84	128.98	-11.82	0.000%
33	0.01	-128.98	13.64	-0.01	128.98	-13.64	0.000%
34	-6.77	-128.98	11.81	6.77	128.98	-11.81	0.000%
35	-11.75	-128.98	6.81	11.75	128.98	-6.81	0.000%
36	-13.59	-128.98	-0.02	13.59	128.98	0.02	0.000%
37	-11.77	-128.98	-6.84	11.77	128.98	6.84	0.000%
38	-6.82	-128.98	-11.82	6.82	128.98	11.82	0.000%
39	0.01	-52.95	-8.71	-0.01	52.95	8.71	0.001%
40	4.37	-52.95	-7.53	-4.37	52.95	7.53	0.001%
41	7.54	-52.95	-4.34	-7.54	52.95	4.34	0.001%
42	8.71	-52.95	0.00	-8.71	52.95	-0.00	0.002%
43	7.56	-52.95	4.34	-7.56	52.95	-4.34	0.001%
44	4.39	-52.95	7.53	-4.39	52.95	-7.53	0.001%
45	0.01	-52.95	8.70	-0.01	52.95	-8.70	0.001%
46	-4.33	-52.95	7.53	4.33	52.95	-7.53	0.001%
47	-7.52	-52.95	4.34	7.52	52.95	-4.34	0.001%
48	-8.69	-52.95	-0.02	8.69	52.95	0.02	0.002%
49	-7.53	-52.95	-4.37	7.53	52.95	4.37	0.001%
50	-4.36	-52.95	-7.54	4.36	52.95	7.54	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	16	0.00000001	0.00007128
3	Yes	16	0.00000001	0.00005560
4	Yes	17	0.00000001	0.00009626
5	Yes	17	0.00000001	0.00007232
6	Yes	17	0.00000001	0.00010374
7	Yes	17	0.00000001	0.00007808
8	Yes	15	0.00000001	0.00007799
9	Yes	15	0.00000001	0.00006081
10	Yes	17	0.00000001	0.00011379
11	Yes	17	0.00000001	0.00008588
12	Yes	17	0.00000001	0.00009361
13	Yes	17	0.00000001	0.00007028
14	Yes	16	0.00000001	0.00007588
15	Yes	16	0.00000001	0.00005918
16	Yes	17	0.00000001	0.00011122
17	Yes	17	0.00000001	0.00008387
18	Yes	17	0.00000001	0.00009912
19	Yes	17	0.00000001	0.00007444
20	Yes	15	0.00000001	0.00007826
21	Yes	15	0.00000001	0.00006106
22	Yes	17	0.00000001	0.00009428
23	Yes	17	0.00000001	0.00007068
24	Yes	17	0.00000001	0.00011752
25	Yes	17	0.00000001	0.00008875
26	Yes	13	0.00000001	0.00010951
27	Yes	17	0.00000001	0.00006249
28	Yes	17	0.00000001	0.00006464
29	Yes	17	0.00000001	0.00006446
30	Yes	17	0.00000001	0.00006090
31	Yes	17	0.00000001	0.00006704
32	Yes	17	0.00000001	0.00006724
33	Yes	17	0.00000001	0.00006486
34	Yes	17	0.00000001	0.00007109
35	Yes	17	0.00000001	0.00007080
36	Yes	17	0.00000001	0.00006563
37	Yes	17	0.00000001	0.00006921
38	Yes	17	0.00000001	0.00006944
39	Yes	13	0.00000001	0.00008427
40	Yes	13	0.00000001	0.00008629
41	Yes	13	0.00000001	0.00009297
42	Yes	12	0.00000001	0.00011032
43	Yes	13	0.00000001	0.00012476
44	Yes	13	0.00000001	0.00010040
45	Yes	13	0.00000001	0.00008641
46	Yes	13	0.00000001	0.00011976
47	Yes	13	0.00000001	0.00008535
48	Yes	12	0.00000001	0.00011208
49	Yes	13	0.00000001	0.00009137
50	Yes	13	0.00000001	0.00013959

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 142.5	12.967	48	0.8724	0.0041
L2	142.5 - 137.5	12.056	48	0.8665	0.0038
L3	137.5 - 132.5	11.154	48	0.8549	0.0036

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L4	132.5 - 127.5	10.269	48	0.8337	0.0034
L5	127.5 - 125	9.411	48	0.8017	0.0032
L6	125 - 120	8.997	48	0.7809	0.0031
L7	120 - 115	8.192	48	0.7545	0.0029
L8	115 - 110	7.419	48	0.7209	0.0028
L9	110 - 105	6.685	48	0.6801	0.0027
L10	105 - 100	5.998	48	0.6318	0.0025
L11	100 - 95	5.365	48	0.5746	0.0023
L12	95 - 94.25	4.783	48	0.5358	0.0022
L13	94.25 - 94	4.699	48	0.5295	0.0022
L14	94 - 89	4.672	48	0.5279	0.0022
L15	89 - 84	4.137	48	0.4925	0.0021
L16	84 - 80	3.642	48	0.4521	0.0019
L17	80 - 79.75	3.278	48	0.4162	0.0018
L18	79.75 - 74.75	3.256	48	0.4150	0.0017
L19	74.75 - 69.75	2.836	48	0.3881	0.0016
L20	69.75 - 64.75	2.445	48	0.3584	0.0015
L21	64.75 - 60	2.086	48	0.3257	0.0014
L22	60 - 59.75	1.779	48	0.2920	0.0012
L23	59.75 - 54.75	1.764	48	0.2908	0.0012
L24	54.75 - 49.75	1.472	48	0.2666	0.0011
L25	49.75 - 44.75	1.206	48	0.2403	0.0010
L26	44.75 - 40	0.969	48	0.2121	0.0009
L27	40 - 39.75	0.772	48	0.1833	0.0008
L28	39.75 - 34.75	0.763	48	0.1823	0.0008
L29	34.75 - 29.75	0.583	48	0.1608	0.0007
L30	29.75 - 24.75	0.426	48	0.1380	0.0006
L31	24.75 - 20	0.294	48	0.1136	0.0005
L32	20 - 19.75	0.193	48	0.0892	0.0004
L33	19.75 - 19	0.189	48	0.0882	0.0004
L34	19 - 18.75	0.175	48	0.0852	0.0004
L35	18.75 - 13.75	0.171	48	0.0841	0.0003
L36	13.75 - 8.75	0.093	48	0.0633	0.0003
L37	8.75 - 3.75	0.038	48	0.0413	0.0002
L38	3.75 - 0	0.007	48	0.0182	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.0000	HPD2-4.7	48	12.967	0.8724	0.0041	33421
148.0000	DS4C06F36D-D	48	12.967	0.8724	0.0041	33421
140.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	48	11.603	0.8617	0.0037	23295
130.0000	AAHC w/ Mount Pipe	48	9.836	0.8197	0.0033	8822
105.0000	7750.00 w/ Mount Pipe	48	5.998	0.6318	0.0025	5452
95.0000	APXV18-206516S-C	48	4.783	0.5358	0.0022	7526
89.0000	1142-2C	48	4.137	0.4925	0.0021	7568
72.0000	GPS_A	48	2.617	0.3719	0.0016	9585
54.0000	201-1N	48	1.430	0.2627	0.0011	11215
49.0000	DB436-C	48	1.169	0.2364	0.0010	10392
45.0000	DB436-C	48	0.980	0.2136	0.0009	9811
40.0000	DB436-C	48	0.772	0.1833	0.0008	11082
37.0000	DB436-C	48	0.661	0.1707	0.0007	12820

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 142.5	63.107	8	4.2529	0.0201
L2	142.5 - 137.5	58.670	8	4.2250	0.0188
L3	137.5 - 132.5	54.275	8	4.1687	0.0176
L4	132.5 - 127.5	49.963	8	4.0655	0.0166
L5	127.5 - 125	45.786	8	3.9092	0.0154
L6	125 - 120	43.767	8	3.8071	0.0149
L7	120 - 115	39.848	8	3.6779	0.0143
L8	115 - 110	36.082	8	3.5137	0.0136
L9	110 - 105	32.506	8	3.3138	0.0129
L10	105 - 100	29.158	8	3.0773	0.0122
L11	100 - 95	26.079	8	2.7976	0.0113
L12	95 - 94.25	23.247	8	2.6079	0.0107
L13	94.25 - 94	22.840	8	2.5770	0.0106
L14	94 - 89	22.705	8	2.5689	0.0106
L15	89 - 84	20.105	8	2.3959	0.0101
L16	84 - 80	17.697	8	2.1992	0.0092
L17	80 - 79.75	15.927	8	2.0242	0.0085
L18	79.75 - 74.75	15.822	8	2.0180	0.0085
L19	74.75 - 69.75	13.776	8	1.8869	0.0079
L20	69.75 - 64.75	11.875	8	1.7421	0.0073
L21	64.75 - 60	10.133	8	1.5832	0.0067
L22	60 - 59.75	8.639	8	1.4188	0.0060
L23	59.75 - 54.75	8.565	8	1.4132	0.0060
L24	54.75 - 49.75	7.146	8	1.2952	0.0056
L25	49.75 - 44.75	5.856	8	1.1675	0.0050
L26	44.75 - 40	4.705	8	1.0301	0.0044
L27	40 - 39.75	3.749	10	0.8902	0.0037
L28	39.75 - 34.75	3.702	10	0.8851	0.0037
L29	34.75 - 29.75	2.829	10	0.7810	0.0033
L30	29.75 - 24.75	2.069	10	0.6699	0.0028
L31	24.75 - 20	1.429	10	0.5518	0.0023
L32	20 - 19.75	0.939	10	0.4330	0.0018
L33	19.75 - 19	0.916	10	0.4281	0.0018
L34	19 - 18.75	0.850	10	0.4135	0.0017
L35	18.75 - 13.75	0.828	10	0.4086	0.0017
L36	13.75 - 8.75	0.453	10	0.3074	0.0013
L37	8.75 - 3.75	0.187	10	0.2006	0.0008
L38	3.75 - 0	0.035	10	0.0882	0.0004

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.0000	HPD2-4.7	8	63.107	4.2529	0.0201	7061
148.0000	DS4C06F36D-D	8	63.107	4.2529	0.0201	7061
140.0000	(2) LNX-6514DS-A1M w/ Mount Pipe	8	56.465	4.2020	0.0182	4869
130.0000	AAHC w/ Mount Pipe	8	47.854	3.9969	0.0160	1822
105.0000	7750.00 w/ Mount Pipe	8	29.158	3.0773	0.0122	1121
95.0000	APXV18-206516S-C	8	23.247	2.6079	0.0107	1545
89.0000	1142-2C	8	20.105	2.3959	0.0101	1555
72.0000	GPS_A	8	12.712	1.8081	0.0076	1971
54.0000	201-1N	8	6.944	1.2764	0.0055	2307
49.0000	DB436-C	8	5.674	1.1482	0.0049	2139
45.0000	DB436-C	8	4.759	1.0378	0.0044	2019
40.0000	DB436-C	10	3.749	0.8902	0.0037	2281
37.0000	DB436-C	10	3.209	0.8290	0.0035	2639

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u
	ft		ft	ft		in^2	K
L1	147.5 - 142.5 (1)	P24x0.375	5.0000	0.0000	0.0	27.8325	-3.77
L2	142.5 - 137.5 (2)	P24x0.375	5.0000	0.0000	0.0	27.8325	-7.26
L3	137.5 - 132.5 (3)	P24x0.375	5.0000	0.0000	0.0	27.8325	-7.95
L4	132.5 - 127.5 (4)	P24x0.375	5.0000	0.0000	0.0	27.8325	-11.96
L5	127.5 - 125 (5)	P24x0.375	2.5000	0.0000	0.0	27.8325	-12.34
L6	125 - 120 (6)	P30x0.375	5.0000	0.0000	0.0	34.9011	-13.23
L7	120 - 115 (7)	P30x0.375	5.0000	0.0000	0.0	34.9011	-14.13
L8	115 - 110 (8)	P30x0.375	5.0000	0.0000	0.0	34.9011	-15.04
L9	110 - 105 (9)	P30x0.375	5.0000	0.0000	0.0	34.9011	-15.97
L10	105 - 100 (10)	P30x0.375	5.0000	0.0000	0.0	34.9011	-20.69
L11	100 - 95 (11)	P36x0.375	5.0000	0.0000	0.0	41.9697	-21.84
L12	95 - 94.25 (12)	P36x0.375	0.7500	0.0000	0.0	41.9697	-22.30
L13	94.25 - 94 (13)	P36x0.49375	0.2500	0.0000	0.0	55.0759	-22.37
L14	94 - 89 (14)	P36x0.49375	5.0000	0.0000	0.0	55.0759	-23.79
L15	89 - 84 (15)	P36x0.49375	5.0000	0.0000	0.0	55.0759	-25.32
L16	84 - 80 (16)	P36x0.49375	4.0000	0.0000	0.0	55.0759	-26.48
L17	80 - 79.75 (17)	P42x0.575	0.2500	0.0000	0.0	74.8308	-26.58
L18	79.75 - 74.75 (18)	P42x0.575	5.0000	0.0000	0.0	74.8308	-28.37
L19	74.75 - 69.75 (19)	P42x0.575	5.0000	0.0000	0.0	74.8308	-30.25
L20	69.75 - 64.75 (20)	P42x0.575	5.0000	0.0000	0.0	74.8308	-32.07
L21	64.75 - 60 (21)	P42x0.575	4.7500	0.0000	0.0	74.8308	-33.81
L22	60 - 59.75 (22)	P48x0.6125	0.2500	0.0000	0.0	91.1842	-33.92
L23	59.75 - 54.75 (23)	P48x0.6125	5.0000	0.0000	0.0	91.1842	-36.04
L24	54.75 - 49.75 (24)	P48x0.6125	5.0000	0.0000	0.0	91.1842	-38.35
L25	49.75 - 44.75 (25)	P48x0.6125	5.0000	0.0000	0.0	91.1842	-40.67
L26	44.75 - 40 (26)	P48x0.6125	4.7500	0.0000	0.0	91.1842	-42.72
L27	40 - 39.75 (27)	P54x0.65	0.2500	0.0000	0.0	108.9430	-42.94
L28	39.75 - 34.75 (28)	P54x0.65	5.0000	0.0000	0.0	108.9430	-45.50
L29	34.75 - 29.75 (29)	P54x0.65	5.0000	0.0000	0.0	108.9430	-48.00
L30	29.75 - 24.75 (30)	P54x0.65	5.0000	0.0000	0.0	108.9430	-50.50
L31	24.75 - 20 (31)	P54x0.65	4.7500	0.0000	0.0	108.9430	-52.89
L32	20 - 19.75 (32)	P60x0.625	0.2500	0.0000	0.0	116.5830	-53.04
L33	19.75 - 19	P60x0.625	0.7500	0.0000	0.0	116.58	-53.46

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K
	(33)					30	
L34	19 - 18.75	P60x0.625	0.2500	0.0000	0.0	116.58	-53.60
	(34)					30	
L35	18.75 - 13.75	P60x0.625	5.0000	0.0000	0.0	116.58	-56.23
	(35)					30	
L36	13.75 - 8.75	P60x0.625	5.0000	0.0000	0.0	116.58	-58.88
	(36)					30	
L37	8.75 - 3.75	P60x0.625	5.0000	0.0000	0.0	116.58	-61.54
	(37)					30	
L38	3.75 - 0 (38)	P60x0.625	3.7500	0.0000	0.0	116.58	-63.53
						30	

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft
L1	147.5 - 142.5	P24x0.375	55.18
	(1)		
L2	142.5 - 137.5	P24x0.375	106.64
	(2)		
L3	137.5 - 132.5	P24x0.375	175.68
	(3)		
L4	132.5 - 127.5	P24x0.375	256.07
	(4)		
L5	127.5 - 125	P24x0.375	301.65
	(5)		
L6	125 - 120 (6)	P30x0.375	394.46
L7	120 - 115 (7)	P30x0.375	489.62
L8	115 - 110 (8)	P30x0.375	587.03
L9	110 - 105 (9)	P30x0.375	686.61
L10	105 - 100 (10)	P30x0.375	819.95
L11	100 - 95 (11)	P36x0.375	956.16
L12	95 - 94.25	P36x0.375	977.28
	(12)		
L13	94.25 - 94	P36x0.49375	984.34
	(13)		
L14	94 - 89 (14)	P36x0.49375	1127.34
L15	89 - 84 (15)	P36x0.49375	1274.80
L16	84 - 80 (16)	P36x0.49375	1394.91
L17	80 - 79.75	P42x0.575	1402.48
	(17)		
L18	79.75 - 74.75	P42x0.575	1555.97
	(18)		
L19	74.75 - 69.75	P42x0.575	1713.47
	(19)		
L20	69.75 - 64.75	P42x0.575	1874.82
	(20)		
L21	64.75 - 60	P42x0.575	2031.34
	(21)		
L22	60 - 59.75	P48x0.6125	2039.66
	(22)		
L23	59.75 - 54.75	P48x0.6125	2208.18
	(23)		
L24	54.75 - 49.75	P48x0.6125	2384.84
	(24)		
L25	49.75 - 44.75	P48x0.6125	2563.29
	(25)		
L26	44.75 - 40	P48x0.6125	2736.45
	(26)		
L27	40 - 39.75	P54x0.65	2745.66
	(27)		
L28	39.75 - 34.75	P54x0.65	2932.13
	(28)		
L29	34.75 - 29.75	P54x0.65	3122.47

Section No.	Elevation ft	Size	M_{ux} kip-ft
L30	29.75 - 24.75 (29)	P54x0.65	3316.28
L31	24.75 - 20 (30)	P54x0.65	3503.19
L32	20 - 19.75 (31)	P60x0.625	3513.14
L33	19.75 - 19 (32)	P60x0.625	3543.05
L34	19 - 18.75 (33)	P60x0.625	3553.04
L35	18.75 - 13.75 (34)	P60x0.625	3754.52
L36	13.75 - 8.75 (35)	P60x0.625	3959.17
L37	8.75 - 3.75 (36)	P60x0.625	4166.85
L38	3.75 - 0 (37)	P60x0.625	4324.56

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K
L1	147.5 - 142.5 (1)	P24x0.375	6.93
L2	142.5 - 137.5 (2)	P24x0.375	13.61
L3	137.5 - 132.5 (3)	P24x0.375	14.02
L4	132.5 - 127.5 (4)	P24x0.375	18.15
L5	127.5 - 125 (5)	P24x0.375	18.34
L6	125 - 120 (6)	P30x0.375	18.81
L7	120 - 115 (7)	P30x0.375	19.27
L8	115 - 110 (8)	P30x0.375	19.72
L9	110 - 105 (9)	P30x0.375	20.14
L10	105 - 100 (10)	P30x0.375	26.96
L11	100 - 95 (11)	P36x0.375	27.59
L12	95 - 94.25 (12)	P36x0.375	28.26
L13	94.25 - 94 (13)	P36x0.49375	28.29
L14	94 - 89 (14)	P36x0.49375	28.99
L15	89 - 84 (15)	P36x0.49375	29.81
L16	84 - 80 (16)	P36x0.49375	30.33
L17	80 - 79.75 (17)	P42x0.575	30.36
L18	79.75 - 74.75 (18)	P42x0.575	31.13
L19	74.75 - 69.75 (19)	P42x0.575	31.96
L20	69.75 - 64.75 (20)	P42x0.575	32.68
L21	64.75 - 60 (21)	P42x0.575	33.33
L22	60 - 59.75 (22)	P48x0.6125	33.36
L23	59.75 - 54.75 (23)	P48x0.6125	34.15
L24	54.75 - 49.75 (24)	P48x0.6125	35.33
L25	49.75 - 44.75 (25)	P48x0.6125	36.17

Section No.	Elevation ft	Size	Actual V_u K
L26	44.75 - 40 (26)	P48x0.6125	36.85
L27	40 - 39.75 (27)	P54x0.65	36.94
L28	39.75 - 34.75 (28)	P54x0.65	37.77
L29	34.75 - 29.75 (29)	P54x0.65	38.49
L30	29.75 - 24.75 (30)	P54x0.65	39.16
L31	24.75 - 20 (31)	P54x0.65	39.84
L32	20 - 19.75 (32)	P60x0.625	39.86
L33	19.75 - 19 (33)	P60x0.625	39.98
L34	19 - 18.75 (34)	P60x0.625	40.01
L35	18.75 - 13.75 (35)	P60x0.625	40.66
L36	13.75 - 8.75 (36)	P60x0.625	41.28
L37	8.75 - 3.75 (37)	P60x0.625	41.88
L38	3.75 - 0 (38)	P60x0.625	42.32

CCIpole

per TIA-222- H

Site BU: 827050

Work Order: _____

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	147.5	22.5		0	24	24	0.375		A53-B-42
2	125	25		0	30.00	30	0.375		A53-B-42
3	100	20		0	36.00	36	0.375		A53-B-42
4	80	20		0	42.00	42	0.375		A53-B-42
5	60	20		0	48.00	48	0.375		A53-B-42
6	40	20		0	54.00	54	0.375		A53-B-42
7	20	20		0	60.00	60	0.375		A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	19	plate	I-085125; (1) (1.1875)	3	50	140	230															
2	0	20	plate	I-085125; (1) (1.1875)	1	320																	
3	20	40	plate	I-085125; (1) (1.1875)	4	52	142	232	322														
4	40	60	plate	I-065125; (1) (1.1875)	4	48	138	228	318														
5	60	80	plate	I-060100; (1) (1.1875)	4	48	138	228	318														
6	80	94.25	plate	I-040075; (1) (1.1875)	4	48	138	228	318														
7	19	20	plate	I-085125; (1) (1.1875)	4	50	140	230	320														
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	8.5	1.25	10.625	0.625	51.000	51.000	17.000	9.063	1.1875	A572-65
2	8.5	1.25	10.625	0.625	51.000	51.000	17.000	9.063	1.1875	A572-65
3	8.5	1.25	10.625	0.625	51.000	51.000	17.000	9.063	1.1875	A572-65
4	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
5	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65
6	4	0.75	3	0.375	12.000	12.000	16.000	2.063	1.1875	A572-65
7	8.5	1.25	10.625	0.625	n/a	n/a	17.000	9.063	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	147.5 - 142.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
2	142.5 - 137.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
3	137.5 - 132.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
4	132.5 - 127.5	5		0	24.000	24.000	0.375	A53-B-42	1.000
5	127.5 - 125	2.5	0	0	24.000	24.000	0.375	A53-B-42	1.000
6	125 - 120	5		0	30.000	30.000	0.375	A53-B-42	1.000
7	120 - 115	5		0	30.000	30.000	0.375	A53-B-42	1.000
8	115 - 110	5		0	30.000	30.000	0.375	A53-B-42	1.000
9	110 - 105	5		0	30.000	30.000	0.375	A53-B-42	1.000
10	105 - 100	5	0	0	30.000	30.000	0.375	A53-B-42	1.000
11	100 - 95	5		0	36.000	36.000	0.375	A53-B-42	1.000
12	95 - 94.25	0.75		0	36.000	36.000	0.375	A53-B-42	1.000
13	94.25 - 94	0.25		0	36.000	36.000	0.49375	A53-B-42	0.980
14	94 - 89	5		0	36.000	36.000	0.49375	A53-B-42	0.980
15	89 - 84	5		0	36.000	36.000	0.49375	A53-B-42	0.980
16	84 - 80	4	0	0	36.000	36.000	0.49375	A53-B-42	0.980
17	80 - 79.75	0.25		0	42.000	42.000	0.575	A53-B-42	0.976
18	79.75 - 74.75	5		0	42.000	42.000	0.575	A53-B-42	0.976
19	74.75 - 69.75	5		0	42.000	42.000	0.575	A53-B-42	0.976
20	69.75 - 64.75	5		0	42.000	42.000	0.575	A53-B-42	0.976
21	64.75 - 60	4.75	0	0	42.000	42.000	0.575	A53-B-42	0.976
22	60 - 59.75	0.25		0	48.000	48.000	0.6125	A53-B-42	0.972
23	59.75 - 54.75	5		0	48.000	48.000	0.6125	A53-B-42	0.972
24	54.75 - 49.75	5		0	48.000	48.000	0.6125	A53-B-42	0.972
25	49.75 - 44.75	5		0	48.000	48.000	0.6125	A53-B-42	0.972
26	44.75 - 40	4.75	0	0	48.000	48.000	0.6125	A53-B-42	0.972
27	40 - 39.75	0.25		0	54.000	54.000	0.65	A53-B-42	0.970
28	39.75 - 34.75	5		0	54.000	54.000	0.65	A53-B-42	0.970
29	34.75 - 29.75	5		0	54.000	54.000	0.65	A53-B-42	0.970
30	29.75 - 24.75	5		0	54.000	54.000	0.65	A53-B-42	0.970
31	24.75 - 20	4.75	0	0	54.000	54.000	0.65	A53-B-42	0.970
32	20 - 19.75	0.25		0	60.000	60.000	0.625	A53-B-42	1.058
33	19.75 - 19	0.75		0	60.000	60.000	0.625	A53-B-42	1.058
34	19 - 18.75	0.25		0	60.000	60.000	0.625	A53-B-42	0.967
35	18.75 - 13.75	5		0	60.000	60.000	0.625	A53-B-42	0.967
36	13.75 - 8.75	5		0	60.000	60.000	0.625	A53-B-42	0.967
37	8.75 - 3.75	5		0	60.000	60.000	0.625	A53-B-42	0.967
38	3.75 - 0	3.75		0	60.000	60.000	0.625	A53-B-42	0.967

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	147.5 - 142.5	3.77	55.18	6.93
2	142.5 - 137.5	7.26	106.64	13.61
3	137.5 - 132.5	7.95	175.68	14.02
4	132.5 - 127.5	11.96	256.07	18.15
5	127.5 - 125	12.34	301.65	18.34
6	125 - 120	13.23	394.46	18.81
7	120 - 115	14.13	489.62	19.27
8	115 - 110	15.04	587.04	19.72
9	110 - 105	15.97	686.61	20.14
10	105 - 100	20.69	819.94	26.96
11	100 - 95	21.84	956.16	27.59
12	95 - 94.25	22.30	977.29	28.26
13	94.25 - 94	22.37	984.34	28.29
14	94 - 89	23.79	1127.34	28.99
15	89 - 84	25.32	1274.80	29.81
16	84 - 80	26.48	1394.91	30.33
17	80 - 79.75	26.58	1402.48	30.36
18	79.75 - 74.75	28.37	1555.97	31.13
19	74.75 - 69.75	30.25	1713.46	31.96
20	69.75 - 64.75	32.07	1874.82	32.68
21	64.75 - 60	33.81	2031.34	33.33
22	60 - 59.75	33.92	2039.66	33.36
23	59.75 - 54.75	36.04	2208.17	34.15
24	54.75 - 49.75	38.35	2384.84	35.33
25	49.75 - 44.75	40.67	2563.29	36.17
26	44.75 - 40	42.72	2736.45	36.85
27	40 - 39.75	42.94	2745.66	36.94
28	39.75 - 34.75	45.50	2932.13	37.77
29	34.75 - 29.75	48.00	3122.47	38.49
30	29.75 - 24.75	50.50	3316.28	39.16
31	24.75 - 20	52.89	3503.46	39.78
32	20 - 19.75	53.04	3513.39	39.80
33	19.75 - 19	53.46	3543.24	39.91
34	19 - 18.75	53.60	3553.20	39.95
35	18.75 - 13.75	56.23	3754.52	40.66
36	13.75 - 8.75	58.88	3959.17	41.28
37	8.75 - 3.75	61.54	4166.85	41.88
38	3.75 - 0	63.53	4324.56	42.32

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
147.5 - 142.5	Pole	TP24x24x0.375	Pole	8.8%	Pass
142.5 - 137.5	Pole	TP24x24x0.375	Pole	17.0%	Pass
137.5 - 132.5	Pole	TP24x24x0.375	Pole	27.6%	Pass
132.5 - 127.5	Pole	TP24x24x0.375	Pole	40.3%	Pass
127.5 - 125	Pole	TP24x24x0.375	Pole	47.3%	Pass
125 - 120	Pole	TP30x30x0.375	Pole	40.7%	Pass
120 - 115	Pole	TP30x30x0.375	Pole	50.3%	Pass
115 - 110	Pole	TP30x30x0.375	Pole	60.2%	Pass
110 - 105	Pole	TP30x30x0.375	Pole	70.2%	Pass
105 - 100	Pole	TP30x30x0.375	Pole	84.0%	Pass
100 - 95	Pole	TP36x36x0.375	Pole	69.5%	Pass
95 - 94.25	Pole	TP36x36x0.375	Pole	71.1%	Pass
94.25 - 94	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	58.7%	Pass
94 - 89	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	67.2%	Pass
89 - 84	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	75.9%	Pass
84 - 80	Pole + Reinf.	TP36x36x0.4938	Reinf. 6 Tension Rupture	83.0%	Pass
80 - 79.75	Pole + Reinf.	TP42x42x0.575	Pole	49.7%	Pass
79.75 - 74.75	Pole + Reinf.	TP42x42x0.575	Pole	55.1%	Pass
74.75 - 69.75	Pole + Reinf.	TP42x42x0.575	Pole	60.6%	Pass
69.75 - 64.75	Pole + Reinf.	TP42x42x0.575	Pole	66.3%	Pass
64.75 - 60	Pole + Reinf.	TP42x42x0.575	Pole	71.8%	Pass
60 - 59.75	Pole + Reinf.	TP48x48x0.6125	Pole	52.5%	Pass
59.75 - 54.75	Pole + Reinf.	TP48x48x0.6125	Pole	56.8%	Pass
54.75 - 49.75	Pole + Reinf.	TP48x48x0.6125	Pole	61.4%	Pass
49.75 - 44.75	Pole + Reinf.	TP48x48x0.6125	Pole	66.0%	Pass
44.75 - 40	Pole + Reinf.	TP48x48x0.6125	Pole	70.4%	Pass
40 - 39.75	Pole + Reinf.	TP54x54x0.65	Pole	53.2%	Pass
39.75 - 34.75	Pole + Reinf.	TP54x54x0.65	Pole	56.8%	Pass
34.75 - 29.75	Pole + Reinf.	TP54x54x0.65	Pole	60.5%	Pass
29.75 - 24.75	Pole + Reinf.	TP54x54x0.65	Pole	64.2%	Pass
24.75 - 20	Pole + Reinf.	TP54x54x0.65	Pole	67.8%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.625	Reinf. 7 Compression	81.0%	Pass
19.75 - 19	Pole + Reinf.	TP60x60x0.625	Reinf. 7 Compression	81.7%	Pass
19 - 18.75	Pole + Reinf.	TP60x60x0.625	Pole	58.9%	Pass
18.75 - 13.75	Pole + Reinf.	TP60x60x0.625	Pole	62.2%	Pass
13.75 - 8.75	Pole + Reinf.	TP60x60x0.625	Pole	65.6%	Pass
8.75 - 3.75	Pole + Reinf.	TP60x60x0.625	Pole	69.0%	Pass
3.75 - 0	Pole + Reinf.	TP60x60x0.625	Pole	71.6%	Pass
				Summary	
			Pole	84.0%	Pass
			Reinforcement	83.0%	Pass
			Overall	84.0%	Pass

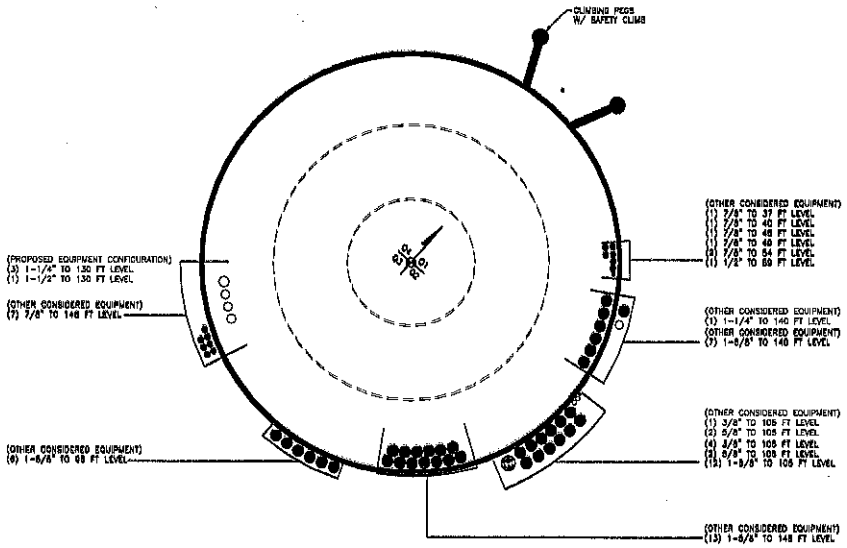
Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*							
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7
147.5 - 142.5	1942	n/a	1942	27.83	n/a	27.83	8.8%							
142.5 - 137.5	1942	n/a	1942	27.83	n/a	27.83	17.0%							
137.5 - 132.5	1942	n/a	1942	27.83	n/a	27.83	27.6%							
132.5 - 127.5	1942	n/a	1942	27.83	n/a	27.83	40.3%							
127.5 - 125	1942	n/a	1942	27.83	n/a	27.83	47.3%							
125 - 120	3829	n/a	3829	34.90	n/a	34.90	40.7%							
120 - 115	3829	n/a	3829	34.90	n/a	34.90	50.3%							
115 - 110	3829	n/a	3829	34.90	n/a	34.90	60.2%							
110 - 105	3829	n/a	3829	34.90	n/a	34.90	70.2%							
105 - 100	3829	n/a	3829	34.90	n/a	34.90	84.0%							
100 - 95	6659	n/a	6659	41.97	n/a	41.97	69.5%							
95 - 94.25	6659	n/a	6659	41.97	n/a	41.97	71.1%							
94.25 - 94	6659	2034	8693	41.97	12.00	53.97	54.8%						58.7%	
94 - 89	6659	2034	8693	41.97	12.00	53.97	62.6%						67.2%	
89 - 84	6659	2034	8693	41.97	12.00	53.97	70.7%						75.9%	
84 - 80	6659	2034	8693	41.97	12.00	53.97	77.3%						83.0%	
80 - 79.75	10622	5584	16206	49.04	24.00	73.04	49.7%					45.7%		
79.75 - 74.75	10622	5584	16206	49.04	24.00	73.04	55.1%					50.6%		
74.75 - 69.75	10622	5584	16206	49.04	24.00	73.04	60.6%					55.7%		
69.75 - 64.75	10622	5584	16206	49.04	24.00	73.04	66.3%					60.9%		
64.75 - 60	10622	5584	16206	49.04	24.00	73.04	71.8%					66.0%		
60 - 59.75	15908	9913	25821	56.11	32.50	88.61	52.5%				46.8%			
59.75 - 54.75	15908	9913	25821	56.11	32.50	88.61	56.8%				50.7%			
54.75 - 49.75	15908	9913	25821	56.11	32.50	88.61	61.4%				54.7%			
49.75 - 44.75	15908	9913	25821	56.11	32.50	88.61	66.0%				58.8%			
44.75 - 40	15908	9913	25821	56.11	32.50	88.61	70.4%				62.7%			
40 - 39.75	22710	16347	39057	63.18	42.50	105.68	53.2%			44.4%				
39.75 - 34.75	22710	16347	39057	63.18	42.50	105.68	56.8%			47.4%				
34.75 - 29.75	22710	16347	39057	63.18	42.50	105.68	60.5%			50.6%				
29.75 - 24.75	22710	16347	39057	63.18	42.50	105.68	64.2%			53.6%				
24.75 - 20	22710	16347	39057	63.18	42.50	105.68	67.8%			56.6%				
20 - 19.75	31221	20190	51411	70.24	53.13	123.37	58.6%		37.7%					81.0%
19.75 - 19	31221	20190	51411	70.24	53.13	123.37	59.1%		38.0%					81.7%
19 - 18.75	31217	20061	51278	70.24	42.50	112.74	58.9%	48.6%	48.6%					
18.75 - 13.75	31217	20061	51278	70.24	42.50	112.74	62.2%	51.4%	51.4%					
13.75 - 8.75	31217	20061	51278	70.24	42.50	112.74	65.6%	54.2%	54.2%					
8.75 - 3.75	31217	20061	51278	70.24	42.50	112.74	69.0%	57.0%	57.0%					
3.75 - 0	31217	20061	51278	70.24	42.50	112.74	71.6%	59.2%	59.2%					

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

APPENDIX B

BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(OTHER CONSIDERED EQUIPMENT)
(1) 7/8" TO 37 FT LEVEL
(1) 7/8" TO 40 FT LEVEL
(1) 7/8" TO 46 FT LEVEL
(1) 7/8" TO 49 FT LEVEL
(2) 7/8" TO 54 FT LEVEL
(1) 1/2" TO 89 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(3) 1-1/4" TO 130 FT LEVEL
(1) 1-1/2" TO 130 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(7) 7/8" TO 148 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-1/4" TO 140 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(7) 1-5/8" TO 140 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 105 FT LEVEL
(2) 5/8" TO 105 FT LEVEL
(4) 3/8" TO 105 FT LEVEL
(3) 5/8" TO 105 FT LEVEL
(13) 1-5/8" TO 105 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 98 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(13) 1-5/8" TO 148 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

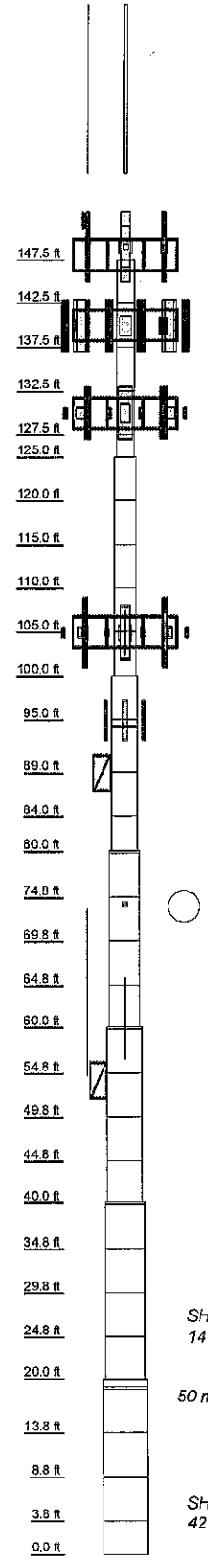
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.70 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.0000 ft
7. TIA-222-H Annex S

Section	Size	Length (ft)	Grade	Weight (K)
1	P18.0x0.375	5.0000	A53-B-42	0.5
2	P17.394x0.375	5.0000		0.5
3	P16.794x0.375	5.0000		0.5
4	P16.194x0.375	5.0000		0.5
5	P15.594x0.375	5.0000		0.2
6	P15.0x0.375	5.0000		0.6
7	P14.4x0.375	5.0000		0.6
8	P13.8x0.375	5.0000		0.6
9	P13.2x0.375	5.0000		0.6
10	P12.6x0.375	5.0000		0.6
11	P12.0x0.375	5.0000		0.7
12	P11.4x0.375	5.0000		0.9
14	P10.8x0.375	5.0000		0.9
15	P10.2x0.375	5.0000		0.9
16	P9.6x0.375	5.0000		0.7
17	P9.0x0.375	5.0000		1.2
18	P8.4x0.5	5.0000		1.2
19	P7.8x0.5	5.0000		1.2
20	P7.2x0.5	5.0000		1.2
21	P6.6x0.5	5.0000		1.2
22	P6.0x0.5	5.0000		1.5
23	P5.4x0.5	5.0000		1.5
24	P4.8x0.5	5.0000		1.5
25	P4.2x0.5	5.0000		1.4
26	P3.6x0.5	5.0000		1.8
27	P3.0x0.5	5.0000		1.8
28	P2.5x0.5	5.0000		1.8
29	P2.5x0.625	5.0000		1.7
30	P2.5x0.625	5.0000		1.9
31	P2.5x0.625	5.0000		1.9
32	P2.5x0.625	5.0000		1.9
35	P2.5x0.625	5.0000		1.4
36	P2.5x0.625	6.0000		34.4
37	P2.5x0.625	5.0000		
38	P2.5x0.625	3.7500		



ALL REACTIONS ARE FACTORED

AXIAL 129 K

SHEAR 14 K *MOMENT 1410 kip-ft*

TORQUE 6 kip-ft
50 mph WIND - 1.7000 in ICE

AXIAL 64 K

SHEAR 42 K *MOMENT 4325 kip-ft*

TORQUE 13 kip-ft
REACTIONS - 125 mph WIND

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

Job:	*148-ft Monopole | Rocky Hill / Rte 160_1*
Project:	*37518-0273.003.7805 / BU 827050*
Client: Crown Castle International	Drawn by: gpenumatsa App'd:
Code: TIA-222-H	Date: 10/01/18 Scale: NTS
Path:	Dwg No. E-

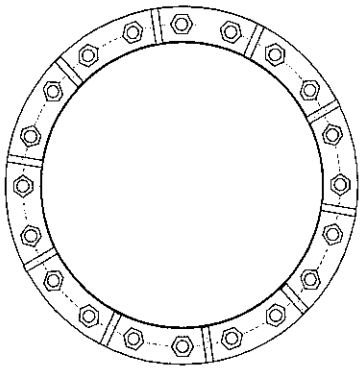
Monopole Flange Plate Connection

Elevation = 125 ft.

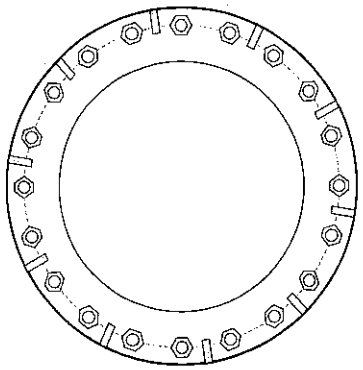
BU #	827050
Site Name	
Order #	
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	301.65
Axial Force (kips)	12.34
Shear Force (kips)	18.34

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(20) 1" ø bolts (A325; Fy=92 ksi, Fu=120 ksi) on 27" BC

Top Plate Data

30" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

21" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(10) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(10) 3.5"H x 2"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	26.18	
Allowable (kips)	54.52	
Stress Ratio:	45.7%	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Ratio:	Pirod OK
Tension Side Stress Ratio:	Pirod OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Ratio:	Pirod OK
Tension Side Stress Ratio:	Pirod OK

Top Pole Capacity

Punching Shear:	24.5%	Pass

Bottom Pole Capacity

Punching Shear:	15.4%	Pass

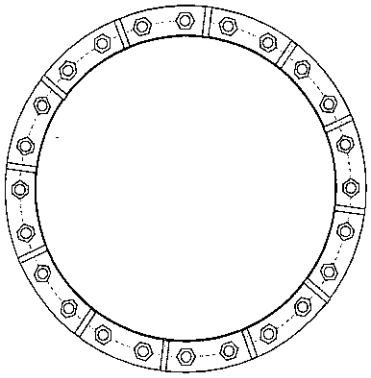
Monopole Flange Plate Connection

Elevation = 100 ft.

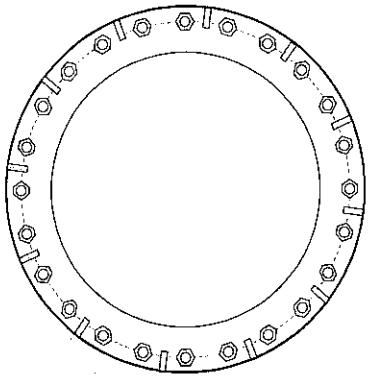
BU #	827050
Site Name	
Order #	
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	819.94
Axial Force (kips)	20.96
Shear Force (kips)	26.96

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(24) 1" ø bolts (A325; Fy=92 ksi, Fu=120 ksi) on 33" BC

Top Plate Data

36" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

27" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(12) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(12) 3.5"H x 2"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	48.80	
Allowable (kips)	54.51	
Stress Ratio:	85.3%	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Ratio:	Pirod OK
Tension Side Stress Ratio:	Pirod OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Ratio:	Pirod OK
Tension Side Stress Ratio:	Pirod OK

Top Pole Capacity

Punching Shear:	42.8%	Pass

Bottom Pole Capacity

Punching Shear:	29.2%	Pass

PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com
Effective Date: 3/21/2016 Verison 1.3

DATE:	10/1/2018
PROJECT NO:	37518-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	80.00	ft
TIA Reference Standard:		
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	1394.91	k-ft
Axial, Puf:	26.48	kips
Shear, Vf:	30.33	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	36.00	42.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	42.00	42.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	28		
Bolt Diameter:	1.00		in
Bolt Circle:	39.00		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:			degrees
Bolt Area, Ag:	0.7854	0.0000	in²

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	26.35	0.00	kips
Max. Net Tension:	25.90	0.00	kips
Max. Net Compression:	26.80	0.00	kips
Moment to Bolt Circle:	599.52	0.00	k-ft
Axial to Bolt Circle:	12.66	0.00	kips
Shear to Bolt Circle:	30.33	0.00	kips
Equivalent Bolt Circle:	39.00	0.00	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-060100				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	APPROVED BLIND BOLT				
Bolt Tension Method	Case 2				
Top Bolt Quantity	17				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	12				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	43.00				in
Clearance Check	OK				
Qty. Jump Plates	4				in
Location 1	40				deg
Location 2	130				deg
Location 3	220				deg
Location 4	310				deg
Location 5					deg
Location 6					deg

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Effective Date: 3/21/2016 Verison 1.3

DATE:	10/1/2018
PROJECT NO:	37618-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	225.42				kips
Hole Diameter	1.19				in
Gross Area (Ag)	6.00				in^2
Net Area (An)	4.81				in^2
b/t Ratio	6.00				
Radius of Gyration (r)	0.29				in
K L / r	41.57				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	55.15				ksi
Nominal Compressive Capacity	297.83				kips
Nominal Tensile Capacity	288.75				kips
Controlling Stress Ratio	78.1%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	13.260				kips
Top Bolt Tension Load (Tu)	3.653				kips
Top Eccentricity (e)	3.500				in
Top Bolt Bearing Capacity (Rn)	47.581				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	14.175				kips
Top Connection Length Reduction	20%				
Top Bolt Combined Stress Ratio	26.7%				

Bottom Bolt Shear Load (Vu)	18.785				kips
Bottom Bolt Tension Load (Tu)	1.044				kips
Bottom Eccentricity (e)	0.500				in
Bottom Bolt Bearing Capacity (Rn)	47.581				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	14.175				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	26.3%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	78.1%			
TOP BOLT COMBINED STRESS RATIO	26.7%			
BOTTOM BOLT COMBINED STRESS RATIO	26.3%			

RATING = 74.3% (TIA-222H-Annex S)

Monopole Flange Plate Connection

Elevation = 80 ft.

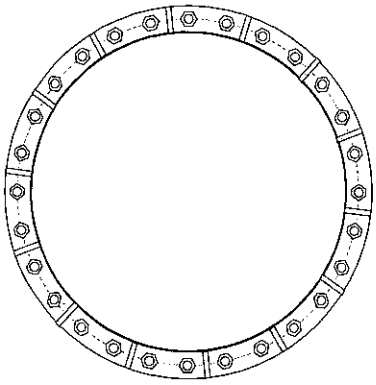
CROWN CASTLE

BU #	827050
Site Name	
Order #	

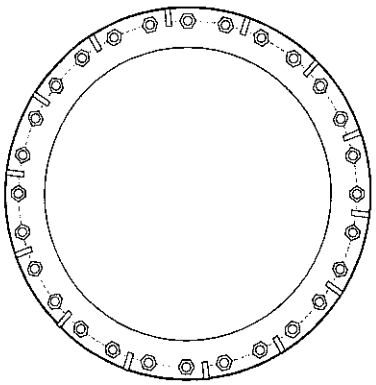
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	599.52
Axial Force (kips)	12.66
Shear Force (kips)	30.33

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(28) 1" ø bolts (A325; Fy=92 ksi, Fu=120 ksi) on 39" BC

Top Plate Data

42" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

33" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(14) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(14) 3.5"H x 2"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

42" x 0.575" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	25.89	
Allowable (kips)	54.51	
Stress Ratio:	45.2%	Pass

Top Plate Capacity

Max Stress (ksi):	16.03	
Allowable Stress (ksi):	32.40	
Stress Ratio:	47.1%	Pass
Tension Side Stress Ratio:	17.2%	Pass

Bottom Plate Capacity

Max Stress (ksi):	13.85	
Allowable Stress (ksi):	32.40	
Stress Ratio:	40.7%	Pass
Tension Side Stress Ratio:	6.3%	Pass

Top Stiffener Capacity

Horizontal Weld:	53.0%	Pass
Vertical Weld:	36.0%	Pass
Plate Flexure+Shear:	31.4%	Pass
Plate Tension+Shear:	48.4%	Pass
Plate Compression:	89.1%	Pass

Bottom Stiffener Capacity

Horizontal Weld:	30.7%	Pass
Vertical Weld:	18.4%	Pass
Plate Flexure+Shear:	13.3%	Pass
Plate Tension+Shear:	25.7%	Pass
Plate Compression:	56.8%	Pass

Top Pole Capacity

Punching Shear:	21.8%	Pass

Bottom Pole Capacity

Punching Shear:	7.2%	Pass

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Effective Date: 3/21/2016 Verison 1.3

DATE:	10/1/2018
PROJECT NO:	37518-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	60.00	ft
TIA Reference Standard:		
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	2031.34	k-ft
Axial, Puf:	33.81	kips
Shear, Vf:	33.33	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	42.00	48.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	48.00	48.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	32		
Bolt Diameter:	1.00		in
Bolt Circle:	45.00		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:			degrees
Bolt Area, Ag:	0.7854	0.0000	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	26.56	0.00	kips
Max. Net Tension:	26.10	0.00	kips
Max. Net Compression:	27.03	0.00	kips
Moment to Bolt Circle:	796.94	0.00	k-ft
Axial to Bolt Circle:	14.74	0.00	kips
Shear to Bolt Circle:	33.33	0.00	kips
Equivalent Bolt Circle:	45.00	0.00	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-065125				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	55				ksi
Jump Plate Fu	80				ksi
Bolt Type	APPROVED BLIND BOLT				
Bolt Tension Method	Case 2				
Top Bolt Quantity	21				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	15				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	49.25				in
Clearance Check	OK				
Qty. Jump Plates	4				in
Location 1	70				deg
Location 2	160				deg
Location 3	250				deg
Location 4	340				deg
Location 5					deg
Location 6					deg

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Phone 614.221.6679 www.pauljford.com
Effective Date: 3/21/2016 Verison 1.3

DATE:	10/1/2018
PROJECT NO:	37518-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	305.53				kips
Hole Diameter	1.19				in
Gross Area (Ag)	8.13				in^2
Net Area (An)	6.84				in^2
b/t Ratio	5.20				
Radius of Gyration (r)	0.36				in
K L / r	33.26				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	58.51				ksi
Nominal Compressive Capacity	427.88				kips
Nominal Tensile Capacity	398.44				kips
Controlling Stress Ratio	76.7%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	14.549				kips
Top Bolt Tension Load (Tu)	3.356				kips
Top Eccentricity (e)	3.625				in
Top Bolt Bearing Capacity (Rn)	47.581				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	14.175				kips
Top Connection Length Reduction	20%				
Top Bolt Combined Stress Ratio	29.8%				

Bottom Bolt Shear Load (Vu)	20.369				kips
Bottom Bolt Tension Load (Tu)	1.137				kips
Bottom Eccentricity (e)	0.625				in
Bottom Bolt Bearing Capacity (Rn)	47.581				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	14.175				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	30.9%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	76.7%			
TOP BOLT COMBINED STRESS RATIO	29.8%			
BOTTOM BOLT COMBINED STRESS RATIO	30.9%			

RATING = 73.0% (TIA-222H-Annex S)

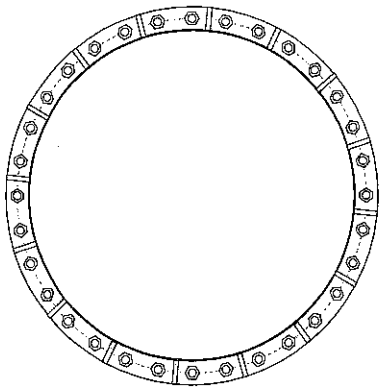
Monopole Flange Plate Connection

Elevation = 60 ft.

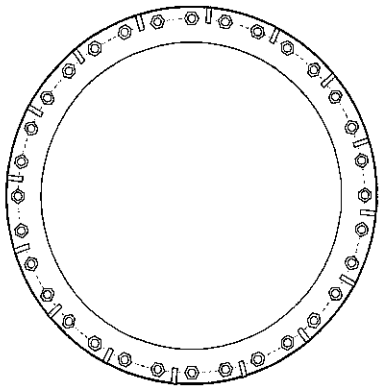
BU #	827050
Site Name	
Order #	
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	796.94
Axial Force (kips)	14.74
Shear Force (kips)	33.33

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(32) 1" ø bolts (A325; Fy=92 ksi, Fu=120 ksi) on 45" BC

Top Plate Data

48" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

39" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(16) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(16) 3.5"H x 2"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

48" x 0.6125" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	26.10	
Allowable (kips)	54.52	
Stress Ratio:	45.6%	Pass

Top Plate Capacity

Max Stress (ksi):	16.22	
Allowable Stress (ksi):	32.40	
Stress Ratio:	47.7%	Pass
Tension Side Stress Ratio:	17.0%	Pass

Bottom Plate Capacity

Max Stress (ksi):	13.49	
Allowable Stress (ksi):	32.40	
Stress Ratio:	39.7%	Pass
Tension Side Stress Ratio:	5.9%	Pass

Top Stiffener Capacity

Horizontal Weld:	51.9%	Pass
Vertical Weld:	35.2%	Pass
Plate Flexure+Shear:	30.5%	Pass
Plate Tension+Shear:	47.2%	Pass
Plate Compression:	87.3%	Pass

Bottom Stiffener Capacity

Horizontal Weld:	29.7%	Pass
Vertical Weld:	17.9%	Pass
Plate Flexure+Shear:	12.7%	Pass
Plate Tension+Shear:	24.7%	Pass
Plate Compression:	55.0%	Pass

Top Pole Capacity

Punching Shear:	21.4%	Pass

Bottom Pole Capacity

Punching Shear:	6.5%	Pass

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Effective Date: 3/21/2016 Verison 1.3

DATE:	10/1/2018
PROJECT NO:	37518-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	40.00	ft
TIA Reference Standard:		
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	2736.48	k-ft
Axial, Puf:	42.72	kips
Shear, Vf:	36.85	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	48.00	54.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	54.00	54.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	36		
Bolt Diameter:	1.00		in
Bolt Circle:	51.00		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:			degrees
Bolt Area, Ag:	0.7854	0.0000	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	30.46	0.00	Kips
Max. Net Tension:	29.90	0.00	Kips
Max. Net Compression:	31.01	0.00	Kips
Moment to Bolt Circle:	1164.94	0.00	k-ft
Axial to Bolt Circle:	19.87	0.00	Kips
Shear to Bolt Circle:	36.85	0.00	Kips
Equivalent Bolt Circle:	51.00	0.00	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-065126				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	APPROVED BLIND BOLT				
Bolt Tension Method	Case 2				
Top Bolt Quantity	21				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	15				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	55.25				in
Clearance Check	OK				
Qty. Jump Plates	4				in
Location 1	70				deg
Location 2	160				deg
Location 3	250				deg
Location 4	340				deg
Location 5					deg
Location 6					deg

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SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	347.04				kips
Hole Diameter	1.19				in
Gross Area (Ag)	8.13				in^2
Net Area (An)	6.64				in^2
b/t Ratio	5.20				
Radius of Gyration (r)	0.36				in
K L / r	33.26				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	58.51				ksi
Nominal Compressive Capacity	427.88				kips
Nominal Tensile Capacity	398.44				kips
Controlling Stress Ratio	87.1%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	16.525				kips
Top Bolt Tension Load (Tu)	3.812				kips
Top Eccentricity (e)	3.625				in
Top Bolt Bearing Capacity (Rn)	47.581				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	14.175				kips
Top Connection Length Reduction	20%				
Top Bolt Combined Stress Ratio	38.4%				

Bottom Bolt Shear Load (Vu)	23.136				kips
Bottom Bolt Tension Load (Tu)	1.291				kips
Bottom Eccentricity (e)	0.625				in
Bottom Bolt Bearing Capacity (Rn)	47.581				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	14.175				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	39.9%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	87.1%			
TOP BOLT COMBINED STRESS RATIO	38.4%			
BOTTOM BOLT COMBINED STRESS RATIO	39.9%			

RATING = 82.9% (TIA-222H-Annex S)

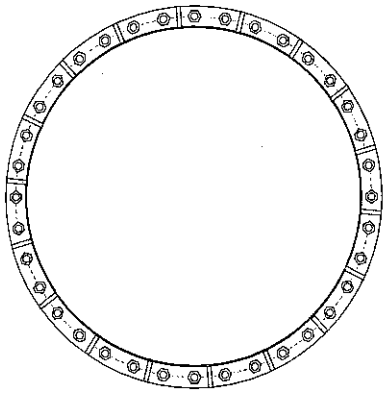
Monopole Flange Plate Connection

Elevation = 40 ft.

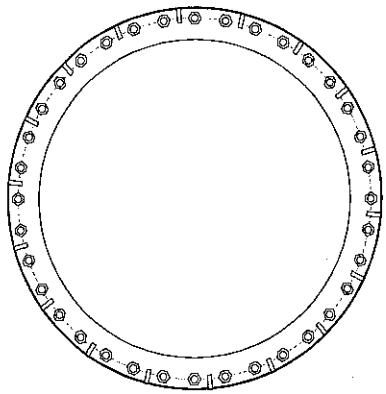
BU #	827050
Site Name	
Order #	
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	1164.94
Axial Force (kips)	19.87
Shear Force (kips)	36.85

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(36) 1" ø bolts (A325; Fy=92 ksi, Fu=120 ksi) on 51" BC

Top Plate Data

54" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

45" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(18) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(18) 3.5"H x 2"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

54" x 0.65" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	29.90	
Allowable (kips)	54.52	
Stress Ratio:	52.2%	Pass

Top Plate Capacity

Max Stress (ksi):	18.49	
Allowable Stress (ksi):	32.40	
Stress Ratio:	54.4%	Pass
Tension Side Stress Ratio:	19.1%	Pass

Bottom Plate Capacity

Max Stress (ksi):	15.33	
Allowable Stress (ksi):	32.40	
Stress Ratio:	45.1%	Pass
Tension Side Stress Ratio:	6.3%	Pass

Top Stiffener Capacity

Horizontal Weld:	58.2%	Pass
Vertical Weld:	39.5%	Pass
Plate Flexure+Shear:	35.6%	Pass
Plate Tension+Shear:	54.2%	Pass
Plate Compression:	97.9%	Pass

Bottom Stiffener Capacity

Horizontal Weld:	32.7%	Pass
Vertical Weld:	19.7%	Pass
Plate Flexure+Shear:	14.4%	Pass
Plate Tension+Shear:	27.6%	Pass
Plate Compression:	60.5%	Pass

Top Pole Capacity

Punching Shear:	24.0%	Pass

Bottom Pole Capacity

Punching Shear:	6.8%	Pass

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DATE:	10/1/2018
PROJECT NO:	37518-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	20.00	ft
TIA Reference Standard:		
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	3503.46	k-ft
Axial, Puf:	52.89	kips
Shear, Vf:	39.78	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	54.00	60.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	60.00	60.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	48		
Bolt Diameter:	1.00		in
Bolt Circle:	57.00		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:			degrees
Bolt Area, Ag:	0.7854	0.0000	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	26.70	0.00	kips
Max. Net Tension:	26.19	0.00	kips
Max. Net Compression:	27.22	0.00	kips
Moment to Bolt Circle:	1522.10	0.00	k-ft
Axial to Bolt Circle:	24.86	0.00	kips
Shear to Bolt Circle:	39.78	0.00	kips
Equivalent Bolt Circle:	57.00	0.00	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-055125				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	55				ksi
Jump Plate Fu	80				ksi
Bolt Type	APPROVED BLIND BOLT				
Bolt Tension Method	Case 2				
Top Bolt Quantity	25				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	21				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	61.25				in
Clearance Check	OK				
Qty. Jump Plates	4				in
Location 1	70				deg
Location 2	160				deg
Location 3	250				deg
Location 4	340				deg
Location 5					deg
Location 6					deg

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PROJECT NO:	37518-0273.003.7805
SITE NAME:	ROCKY HILL / RTE 160_1
SITE NUMBER/BUN:	827050.00
DESCRIPTION:	148.5' Monopole
OWNER:	CCI
ENGINEER:	GP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	395.19				kips
Hole Diameter	1.19				in
Gross Area (Ag)	10.63				in^2
Net Area (An)	9.14				in^2
b/t Ratio	6.80				
Radius of Gyration (r)	0.36				in
K L / r	33.26				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	58.51				ksi
Nominal Compressive Capacity	559.54				kips
Nominal Tensile Capacity	548.44				kips
Controlling Stress Ratio	72.1%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	15.808				kips
Top Bolt Tension Load (Tu)	3.061				kips
Top Eccentricity (e)	3.625				in
Top Bolt Bearing Capacity (Rn)	47.581				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	14.175				kips
Top Connection Length Reduction	20%				
Top Bolt Combined Stress Ratio	33.2%				

Bottom Bolt Shear Load (Vu)	18.819				kips
Bottom Bolt Tension Load (Tu)	0.748				kips
Bottom Eccentricity (e)	0.625				in
Bottom Bolt Bearing Capacity (Rn)	47.581				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	14.175				kips
Bottom Connection Length Reduction	20%				
Bottom Bolt Combined Stress Ratio	40.7%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	72.1%			
TOP BOLT COMBINED STRESS RATIO	33.2%			
BOTTOM BOLT COMBINED STRESS RATIO	40.7%			

RATING = 68.6% (TIA-222H-Annex S)

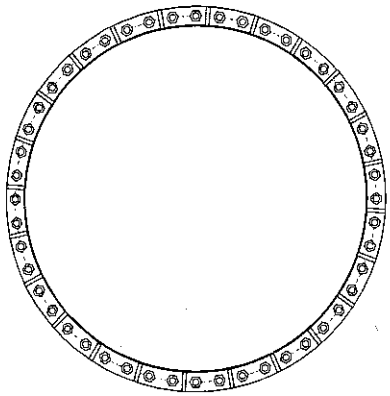
Monopole Flange Plate Connection

Elevation = 20 ft.

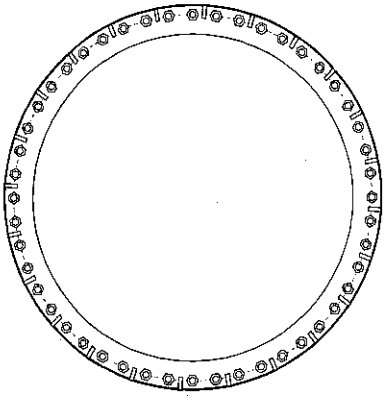
BU #	827050
Site Name	
Order #	
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	1522.10
Axial Force (kips)	24.86
Shear Force (kips)	39.78

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(48) 1" ø bolts (A325; Fy=92 ksi, Fu=120 ksi) on 57" BC

Top Plate Data

60" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

51" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

(24) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Bottom Stiffener Data

(24) 3.5"H x 2"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.625" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	26.18	
Allowable (kips)	54.53	
Stress Ratio:	45.7%	Pass

Top Plate Capacity

Max Stress (ksi):	24.47	
Allowable Stress (ksi):	32.40	
Stress Ratio:	71.9%	Pass
Tension Side Stress Ratio:	N/A	

Bottom Plate Capacity

Max Stress (ksi):	15.86	
Allowable Stress (ksi):	32.40	
Stress Ratio:	46.6%	Pass
Tension Side Stress Ratio:	6.9%	Pass

Top Stiffener Capacity

Horizontal Weld:	56.2%	Pass
Vertical Weld:	38.1%	Pass
Plate Flexure+Shear:	33.9%	Pass
Plate Tension+Shear:	51.9%	Pass
Plate Compression:	94.5%	Pass

Bottom Stiffener Capacity

Horizontal Weld:	35.0%	Pass
Vertical Weld:	21.1%	Pass
Plate Flexure+Shear:	15.6%	Pass
Plate Tension+Shear:	29.9%	Pass
Plate Compression:	64.9%	Pass

Top Pole Capacity

Punching Shear:	23.1%	Pass

Bottom Pole Capacity

Punching Shear:	7.6%	Pass

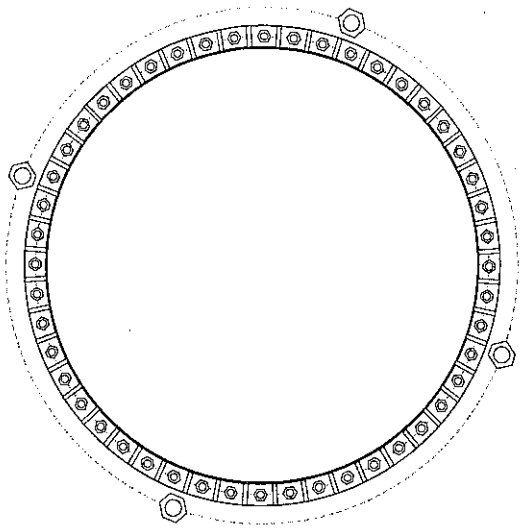
Monopole Base Plate Connection

CROWN CASTLE

Site Info	
BU #	827050
Site Name	
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.5

Applied Loads	
Moment (kip-ft)	4325.00
Axial Force (kips)	64.00
Shear Force (kips)	42.00



Connection Properties

Anchor Rod Data

GROUP 1: (48) 1" ø bolts (A687; Fy=105 ksi, Fu=150 ksi) on 63" BC
GROUP 2: (4) 2-1/4" ø bolts (Williams R71; Fy=98.77 ksi, Fu=102.89 ksi) on 71" BC

Base Plate Data

66" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Stiffener Data

(48) 5"H x 3"W x 0.625"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-ft)*

GROUP 1:		
Pu = 40.93	ϕPn = 63.63	**Stress Rating**
Vu = 0.56	ϕVn = 19.09	**66.2%**
Mu = 0.55	ϕMn = 10.67	**Pass**
GROUP 2:		
Pu = 0	ϕPn = 402.98	**Stress Rating**
Vu = 3.77	ϕVn = 120.89	**85.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	5.46	
Allowable Stress (ksi):	21.6	
Stress Ratio:	**24.1%**	**Pass**

Stiffener Summary

Horizontal Weld:	**57.7%**	**Pass**
Vertical Weld:	**39.2%**	**Pass**
Plate Flexure+Shear:	**35.2%**	**Pass**
Plate Tension+Shear:	**53.7%**	**Pass**
Plate Compression:	**97.1%**	**Pass**

Pole Summary

Punching Shear:	**23.8%**	**Pass**

Drilled Pier Foundation

BU # :	827050
Site Name:	
Order Number:	

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	4325	
Axial Force (kips)	64	
Shear Force (kips)	42	

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

Pier Design Data		
Depth	36	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 36' below grade		
Pier Diameter	7	ft
Rebar Quantity	28	
Rebar Size	9	
Clear Cover to Ties	3	in
Tie Size	5	
Rebar Quantity	4	
Rebar Size	18	
Rebar Cage Diameter	71	in

Analysis Results	Compression	Uplift
Soil Lateral Capacity		
$D_{v=0}$ (ft from TOC)	7.67	-
Soil Safety Factor	4.15	-
Max Moment (kip-ft)	4644.77	-
Rating*	*30.5%*	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	0.00	-
End Bearing (kips)	5137.68	-
Weight of Concrete (kips)	165.24	-
Total Capacity (kips)	5137.68	-
Axial (kips)	229.24	-
Rating*	*4.2%*	-
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	7.34	-
Critical Moment (kip-ft)	4644.08	-
Critical Moment Capacity	6621.73	-
Rating*	*66.8%*	-

Soil Interaction Rating*	**30.5%**
Structural Foundation Rating*	**66.8%**

Check Limitation	
Apply TIA-222-H Section 15.5:	☑

*Rating per TIA-222-H Section 15.5

Soil Profile					
Groundwater Depth	5.6	ft	# of Layers	10	

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	126	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	4	0.5	117	150		31	0.000	0.000	0.00	0.00			Cohesionless
3	4	5.6	1.6	124	150		35	0.000	0.000	0.00	0.00			Cohesionless
4	5.6	6	0.4	61.6	87.6		35	0.000	0.000	0.00	0.00			Cohesionless
5	6	8	2	57.6	87.6		33	0.000	0.000	0.00	0.00			Cohesionless
6	8	10	2	55.6	87.6		32	0.000	0.000	0.00	0.00			Cohesionless
7	10	15	5	52.6	87.6		29	0.00	0.00	0.00	0.00			Cohesionless
8	15	30	15	42.6	87.6	0.5		0.28	0.28	0.00	0.00			Cohesive
9	30	34	4	53.6	87.6		31	0.00	0.00	0.00	0.00			Cohesionless
10	34	36	2	92.6	87.6	20		9.00	9.00	0.00	0.00	178		Cohesive

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

SPRINT Existing Facility

Site ID: CT23XC556

Rocky Hill/ RTE 160_1
699 Old Main Street
Rocky Hill, CT 06067

December 11, 2018

EBI Project Number: 6218007358

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**18.52 %**

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

EBI Consulting

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December 11, 2018

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

Emissions Analysis for Site: **CT23XC556 – Rocky Hill/ RTE 160_1**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **699 Old Main Street, Rocky Hill, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **699 Old Main Street, Rocky Hill, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **Commscope NNVV-65B-R4 and the Nokia AAHC** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed panel antennas are **130 feet** above ground level (AGL) for **Sector A**, **130 feet** above ground level (AGL) for **Sector B** and **130 feet** above ground level (AGL) for Sector C.

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

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SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**130 feet**	Height (AGL):	**130 feet**	Height (AGL):	**130 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W)	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W)	7,378.61
Antenna A1 MPE%	**2.13 %**	Antenna B1 MPE%	**2.13 %**	Antenna C1 MPE%	**2.13 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC
Gain:	15.05 dBd	Gain:	15.05 dBd	Gain:	15.05 dBd
Height (AGL):	**130 feet**	Height (AGL):	**130 feet**	Height (AGL):	**130 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	5,118.23	ERP (W):	5,118.23	ERP (W)	5,118.23
Antenna A2 MPE%	**1.20 %**	Antenna B2 MPE%	**1.20 %**	Antenna C2 MPE%	**1.20 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**3.33 %**
Rocky Hill PD	0.96 %
Rocky Hill FD	0.02 %
Rocky Hill PW	0.08 %
Rocky Hill Hotline	0.36 %
Rocky Hill Intercity	0.39 %
RAFS	0.30 %
Wethersfield	0.74 %
T-Mobile	0.89 %
MetroPCS	1.54 %
AT&T	6.33 %
Verizon Wireless	2.94 %
Nextel	0.64 %
Site Total MPE %:	**18.52 %**

SPRINT Sector A Total:	3.33 %
SPRINT Sector B Total:	3.33 %
SPRINT Sector C Total:	3.33 %
Site Total:	18.52 %

SPRINT _ Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	130	0.88	850 MHz	567	0.16%
Sprint 850 MHz LTE	2	941.82	130	4.40	850 MHz	567	0.77%
Sprint 1900 MHz (PCS) CDMA	5	511.82	130	5.98	1900 MHz (PCS)	1000	0.60%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	130	5.98	1900 MHz (PCS)	1000	0.60%
Sprint 2500 MHz (BRS) LTE	8	639.78	130	11.97	2500 MHz (BRS)	1000	1.20%
						Total:	**3.33%**

Summary

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

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

SPRINT Sector	Power Density Value (%)
Sector A:	3.33 %
Sector B:	3.33 %
Sector C:	3.33 %
SPRINT Maximum MPE % (per sector):	3.33 %
Site Total:	18.52 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **18.52 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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