



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

February 21, 2019

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

**RE: Notice of Exempt Modification for Crown Site BU: 827873**  
**AT&T Site ID: CTL05160 – Shelton – River Rd.**  
**309 (320) River Road, Shelton, CT 06484**  
**Latitude: 41° 17' 44.00"/ Longitude: -73° 4' 21.32"**

Dear Ms. Bachman:

AT&T currently maintains (3) antennas at the 99-foot level of the existing 119-foot stealth flagpole monopole at 309 River Road in Shelton, Connecticut. The tower is owned by Crown Castle. The property is owned by Riverside Cemetery Association. AT&T intends to replace (3) antennas, replace (3) TMAs, and add (3) TMAs.

The facility was approved by the Connecticut Siting Council on August 15, 2002.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to the Honorable Mark Lauretti, City of Shelton, Mr. Rick Schultz, Planning and Zoning Administrator, as well as 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.

The Foundation for a Wireless World.

CrownCastle.com

Melanie A. Bachman

February 21, 2019

Page 2

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:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes  
Exhibit-B: Structural Modification Report  
Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Mark Lauretti, Mayor  
City of Shelton  
54 Hill Street  
Shelton, CT 06484  
203-924-1555

Mr. Rick Schultz, AICP  
Planning & Zoning Administrator  
54 Hill Street – Third Floor  
Shelton, CT 06484  
203-924-1555

Riverside Cemetery  
469 Howe Avenue  
Shelton, CT 06484

ORIGIN ID:GFLA (518) 373-3523  
WILL STONE  
CROMM CASTLE  
3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065  
UNITED STATES US

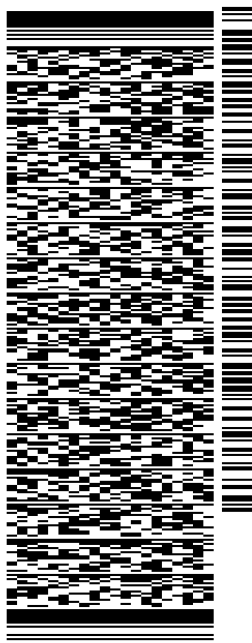
SHIP DATE: 21FEB19  
ACTWGT: 3.00 LB  
CAD: 104924194IN/ET4100

BILL SENDER

TO **MELANIE BACHMAN**  
**CONNECTICUT SITING COUNCIL**  
**10 FRANKLIN SQUARE**

**NEW BRITAIN CT 06051**

(860) 827-2951 REF: 1765 6880  
INV: DEPT:  
PO:



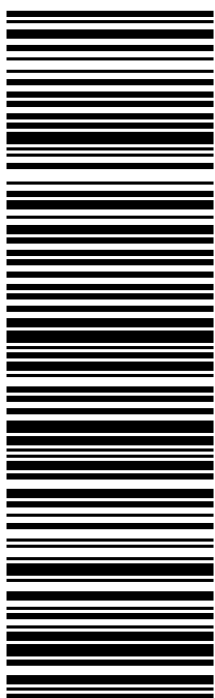
J191019010701uv

565J20E3D/23AD

TRK# 7745 2740 9525  
0201

FRI - 22 FEB 10:30A  
PRIORITY OVERNIGHT

**EB BDLA**  
06051  
CT-US BDL



**After printing this label:**

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID: GFLA (518) 373-3523  
WILL STONE  
CROWN CASTLE  
3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065  
UNITED STATES US

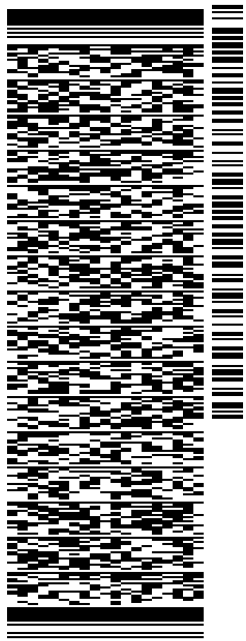
SHIP DATE: 21FEB19  
ACTWGT: 1.50 LB  
CAD: 104924194/INET4100

BILL SENDER

TO **MAYOR MARK LAURETTI**  
**CITY OF SHELTON**  
**54 HILL STREET**

**SHELTON CT 06484**

(518) 373-3543 REF: 1734.7890  
INV/ DEPT:  
PO:

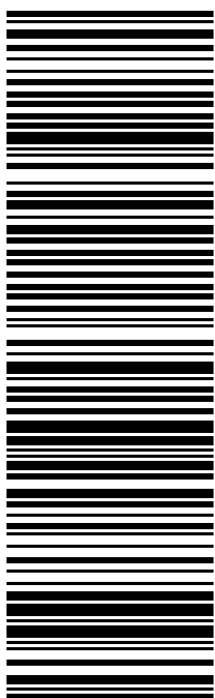


J191019010701uv

565J20E3D/23AD

TRK# 7745 2739 1060 FRI - 22 FEB 10:30A  
0201 PRIORITY OVERNIGHT

**EB CIVA** 06484  
CT-US BDL



**After printing this label:**

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID: GFLA (518) 373-3523  
WILL STONE  
CROWN CASTLE  
3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065  
UNITED STATES US

SHIP DATE: 21FEB19  
ACTWGT: 1.50 LB  
CAD: 104924194IN/ET4100

BILL SENDER

TO **RICK SCHULTZ, AICP**

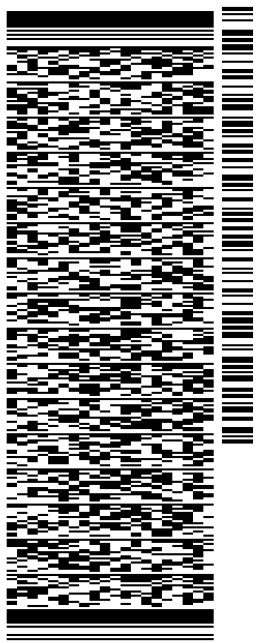
**CITY OF SHELTON**

**54 HILL STREET - THIRD FLOOR**

**SHELTON CT 06484**

(203) 924-1555 REF: 1734 7890  
INV: DEPT:  
PO:

565J20E3D/23AD



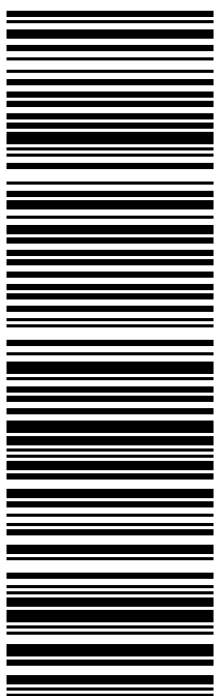
J191019010701uv

TRK# 7745 2743 7499  
0201

FRI - 22 FEB 10:30A  
PRIORITY OVERNIGHT

**EB CIVA**

06484  
CT-US BDL



**After printing this label:**

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on [fedex.com](http://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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID:GFLA (518) 373-3523  
WILL STONE  
CROWN CASTLE  
3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065  
UNITED STATES US

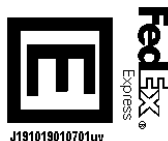
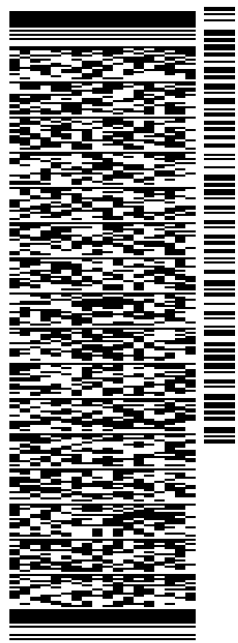
SHIP DATE: 21FEB19  
ACTWGT: 1.50 LB  
CAD: 104924194/IN/ET4100  
BILL SENDER

TO RIVERSIDE CEMETERY

469 HOWE AVENUE

SHELLTON CT 06484

(201) 236-9224 REF: 1734.7890  
INV/ PO: DEPT:



J191019010701uv

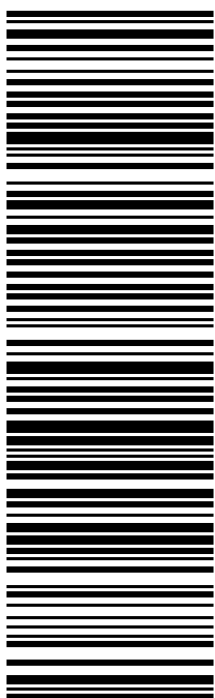
565.J20E3D/23AD

TRK# 7745 2748 7210  
0201

FRI - 22 FEB 10:30A  
PRIORITY OVERNIGHT

EB CIVA

06484  
CT-US BDL



**After printing this label:**

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2016.



## City of Shelton, Connecticut

*Vision to See, Faith to Believe, Courage to Do...*

Information on the Property Records for the Municipality of Shelton was last updated on 2/20/2019.

### Parcel Information

Location:	320 RIVER RD	Property Use:	Cell Tower	Primary Use:	Cell Site
Unique ID:	80 144 1	Map Block Lot:	80 144 1	Acres:	0.00
490 Acres:	0.00	Zone:	R-5	Volume / Page:	0000/0000
Developers Map / Lot:		Census:			

### Value Information

	Appraised Value	Assessed Value
Land	0	0
Buildings	100,000	70,000
Detached Outbuildings	0	0
Total	100,000	70,000

## Owner's Information

### Owner's Data

RIVERSIDE CEMETERY  
469 HOWE AVE  
SHELTON, CT 06484

## Building 1

Photo Not Available

Sketch Not Available

Category:	Cell Tower	Use:	Cell Site	GLA:	1
Stories:	1.00	Construction:	None	Year Built:	2017
Heating:		Fuel:		Cooling Percent:	0
Siding:		Roof Material:		Beds/Units:	0

## Special Features

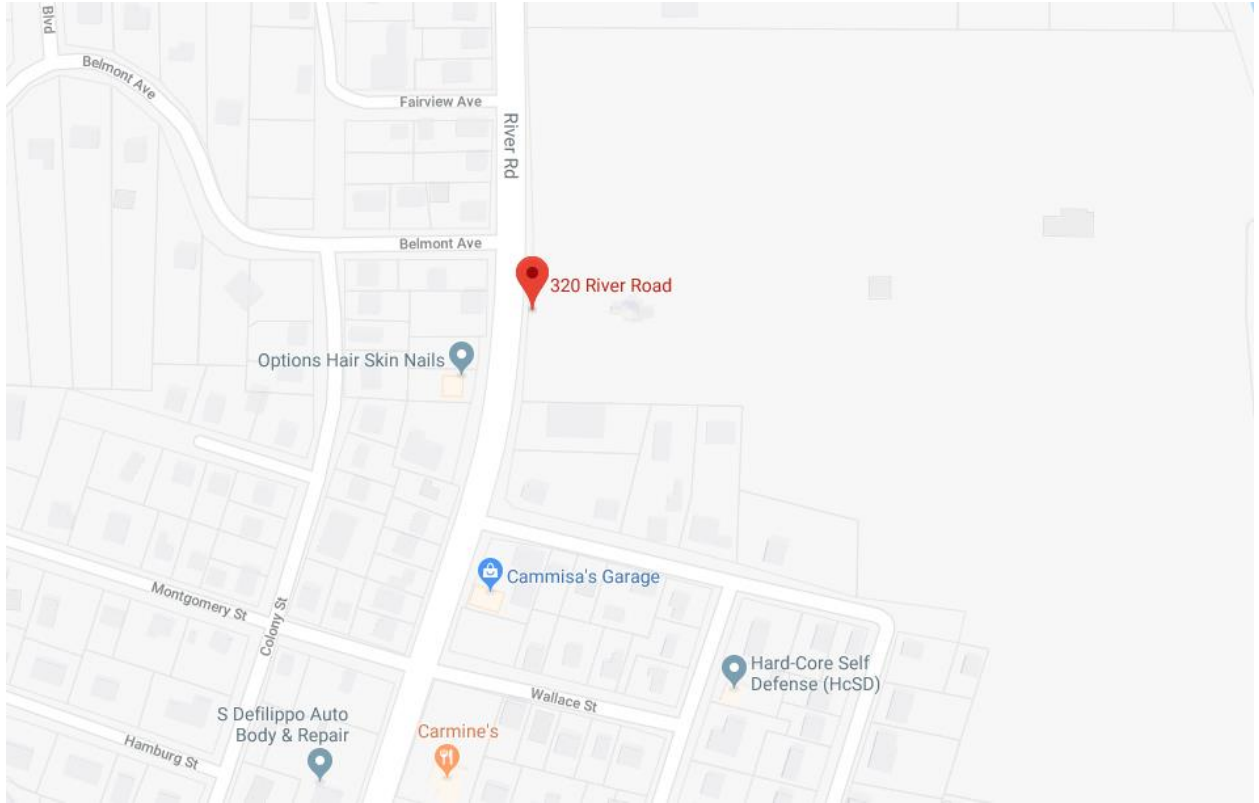


**Attached Components**

**Owner History - Sales**

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
RIVERSIDE CEMETERY	0000	0000			No	\$0

Information Published With Permission From The Assessor



PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING TOWER:

REMOVE (3) EXISTING ANTENNAS, & (3) TMA's

- INSTALL AT&T ANTENNA (HPA-65R-BU4A) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T TMA (TMABPD7823VG12A) (TYP. OF 2 PER SECTOR, TOTAL OF 6)
- INSTALL (6) 7/8" COAX

ITEMS TO BE MOUNTED ON EXISTING EQUIPMENT PAD:

- REMOVE (6) DIPLEXERS
- REMOVE RXAIT CABINET
- REMOVE (1) DC-6 SURGE SUPPRESSOR
- INSTALL (3) RRU-S-32 B2 (PCS) (TOTAL OF 3)
- INSTALL (3) RRU-S-32 (WCS) (TOTAL OF 3)
- INSTALL (12) QUADPLEXERS (QBC0007F1V51-1)
- INSTALL (1) OUTDOOR DC-12 SURGE SUPPRESSOR
- SWAP DUL WITH 5216
- INSTALL (1) XMU

ITEMS TO REMAIN:

- (9) RRU'S

SITE ADDRESS: 308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

LATITUDE (NAD 83): N 41° 17' 44.00"

LONGITUDE (NAD 83): W 73° 4' 21.32"

LANDLORD: CROWN CASTLE INTERNATIONAL  
500 W. CUMMINGS PARK, STE 3600  
WOBURN, MA 01801

TYPE OF SITE: MONOPOLE/OUTDOOR

TOWER HEIGHT: 120'

RAD CENTER: 98'

CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY



**SITE NUMBER: CT5160**

FA LOCATION CODE: 10050786

SITE NAME: SHELTON RIVER ROAD

CROWN SITE NAME: SHELTON-2/RT 110

PROJECT: LTE 2C/LTE 3C

PACE ID: MRCTB025440, MRCTB025483

**BU#: 827873**

NOTE:

ALL CONSTRUCTION ACTIVITIES ARE TO BE COMPLETED DIRECTLY THROUGH CROWN. CONTRACTOR MUST HAVE CONSTRUCTION PO AND NTP FROM CROWN DIRECT IN ORDER TO BEGIN. PRE-APPROVAL TO ENTER THE PROPERTY MUST BE OBTAINED. FOR ACCESS AUTHORIZATION, PLEASE CONTACT CROWN.



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS		
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

TITLE SHEET

T-1

DRAWING INDEX

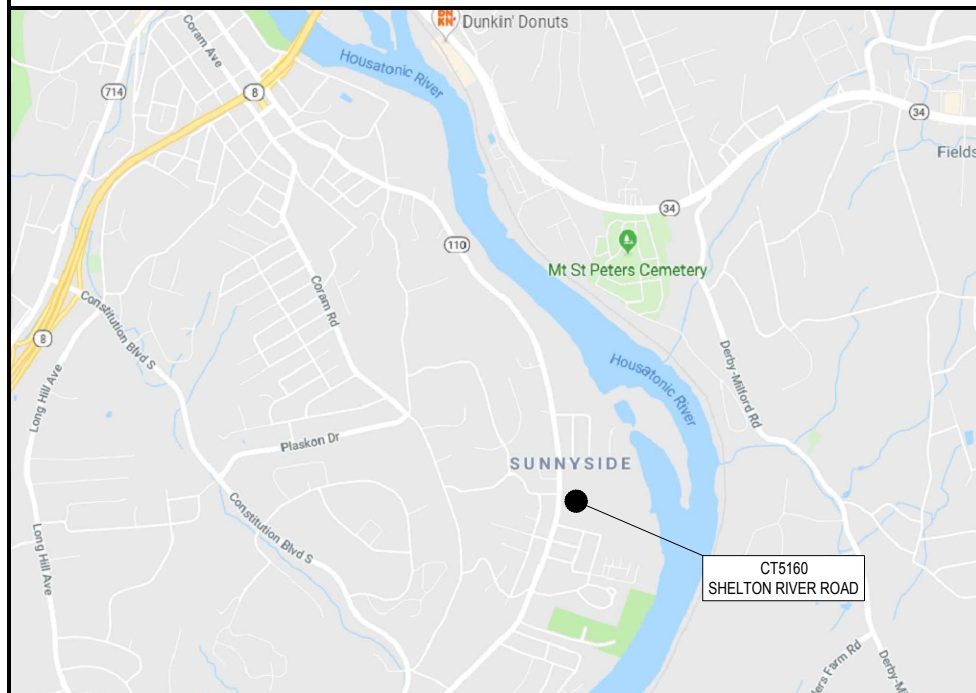
SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
C-1	SITE PLAN
C-2	EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION
C-3	EXISTING & PROPOSED ANTENNA LAYOUT
C-4	EQUIPMENT DETAILS I
RF-1	ANTENNA CHART & RF EQUIPMENT SCHEMATIC
G-1	GROUNDING DETAILS

**CROWN CASTLE SITE ID #: 827873**  
**CROWN CASTLE SITE NAME: SHELTON-2/RT 110**

ENGINEERING

- 2018 CONNECTICUT STATE BUILDING CODE
- 2018 AMENDMENT WITH 2015 INTERNATIONAL BUILDING CODE
- 2009 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
- 2015 INTERNATIONAL MECHANICAL CODE
- 2015 INTERNATIONAL ENERGY CONSERVATION CODE
- 2017 NATIONAL ELECTRICAL CODE (NFPA 70 2017)
- ANSI/TIA-222-G

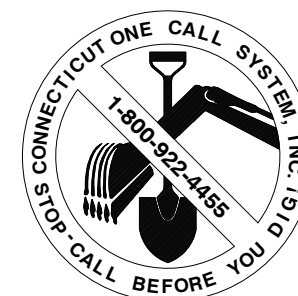
VICINITY MAP



SHELTON-5160 RIVERSIDE CEMETERY-95 NORTH (NEW ENGLAND THRUWAY). GET OFF EXIT 27A (RT-8 NORTH). FOLLOW TO EXIT 14; GO LEFT OFF THE EXIT AND THEN RIGHT ONTO ROUTE 110. SITE IS ABOUT 1 MILE DOWN ON LEFT. FLAGPOLE IN RIVERSIDE CEMETERY. GO PAST FIRST GATED ENTRANCE AND PROCEED TO THE NEXT METAL GATE ENTRANCE WHICH SHOULD BE OPEN, DRIVE THROUGH AND BEAR TO THE RIGHT AND FOLLOW THE ROAD TOWARD THE FLAG POLE.

GENERAL NOTES

1. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



UNDERGROUND SERVICE ALERT  
CONNECTICUT LAW REQUIRES  
TWO WORKING DAYS NOTICE PRIOR TO  
ANY EARTH MOVING ACTIVITIES BY  
CALLING 800-922-4455 OR DIAL 811

PART 1 - GENERAL

- 1.1 GENERAL CONDITIONS:
  - A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
  - B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.
  - C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.
- 1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.
  - A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.
- 1.3 REFERENCES:
  - A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.
    - 1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
    - 2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
    - 3. IECA (INSULATED CABLE ENGINEERS ASSOCIATION)
    - 4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
    - 5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
    - 6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
    - 7. UL (UNDERWRITERS LABORATORIES INC.)
    - 8. AT&T GROUNDING AND BONDING STANDARDS TP-76416
- 1.4 SCOPE OF WORK
  - A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.
  - B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.
  - C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.
  - D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.
  - E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

- 2.1 GENERAL:
  - A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.
  - B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.
  - C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
  - D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.
- 2.2 MATERIALS AND EQUIPMENT:
  - A. CONDUIT:
    - 1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
    - 2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
    - 3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
    - 4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.
  - B. CONDUCTORS AND CABLE:
    - 1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
    - 2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
    - 3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
    - 4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
    - 5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).
  - C. DISCONNECT SWITCHES:
    - 1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.
  - D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:
    - 1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(\*)CS OR K2L-(\*)CS (\*) LENGTH AS REQUIRED.
    - 2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID

NUMBERING, AND THE ELECTRICAL POWER SOURCE.

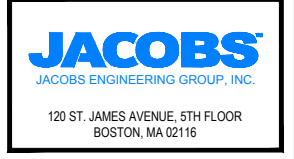
- 3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.
- E. SYSTEM GROUNDING:
  - 1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
  - 2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
  - 3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS, INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
  - 4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
  - 5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEM WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
  - 6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.
- F. OTHER MATERIALS:
  - 6. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
  - 7. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.
- G. PANELS AND LOAD CENTERS:
  - 1. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

- 3.1 GENERAL:
  - A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
  - B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.
- 3.2 LABOR AND WORKMANSHIP:
  - A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.
  - B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.
  - C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.
- 3.3 COORDINATION:
  - A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.
- 3.4 INSTALLATION:
  - A. CONDUIT:
    - 1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
    - 2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
    - 3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
    - 4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
    - 5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
    - 6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
    - 7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
    - 8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
    - 9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
    - 10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
    - 11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
    - 12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
    - 13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.
  - B. CONDUCTORS AND CABLE:
    - 1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:
 

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN
    - 2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.

- 3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
- 4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
- C. DISCONNECT SWITCHES:
  - 1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.
- D. GROUNDING:
  - 1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
  - 2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
  - 3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
  - 4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
  - 5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
  - 6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
  - 7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
  - 8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
  - 9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
  - 10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
  - 11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
  - 12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
  - 13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
  - 14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
  - 15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
  - 16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
- 3.5 ACCEPTANCE TESTING:
  - A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.
  - B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.
  - C. TEST PROCEDURES:
    - 1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
    - 2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
    - 3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
    - 4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS		
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

GENERAL NOTES I

GN-1

**ANTENNA MOUNTING**

- DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANS/ITIA-222 OR APPLICABLE LOCAL CODES.
- ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
- ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
- DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
- ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
- ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
- PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
- JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
- CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
- TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

**TORQUE REQUIREMENTS**

- ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
- ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
  - RF CONNECTION BOTH SIDES OF THE CONNECTOR.
  - GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
  - ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
- ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
- ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
- ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
- ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

**FIBER & POWER CABLE MOUNTING**

- THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
- THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
- WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

**COAXIAL CABLE NOTES**

- TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
- CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
- CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
- ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
- ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
- CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
- CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
- CONTRACTOR SHALL GROUND ALL EQUIPMENT, INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
- CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

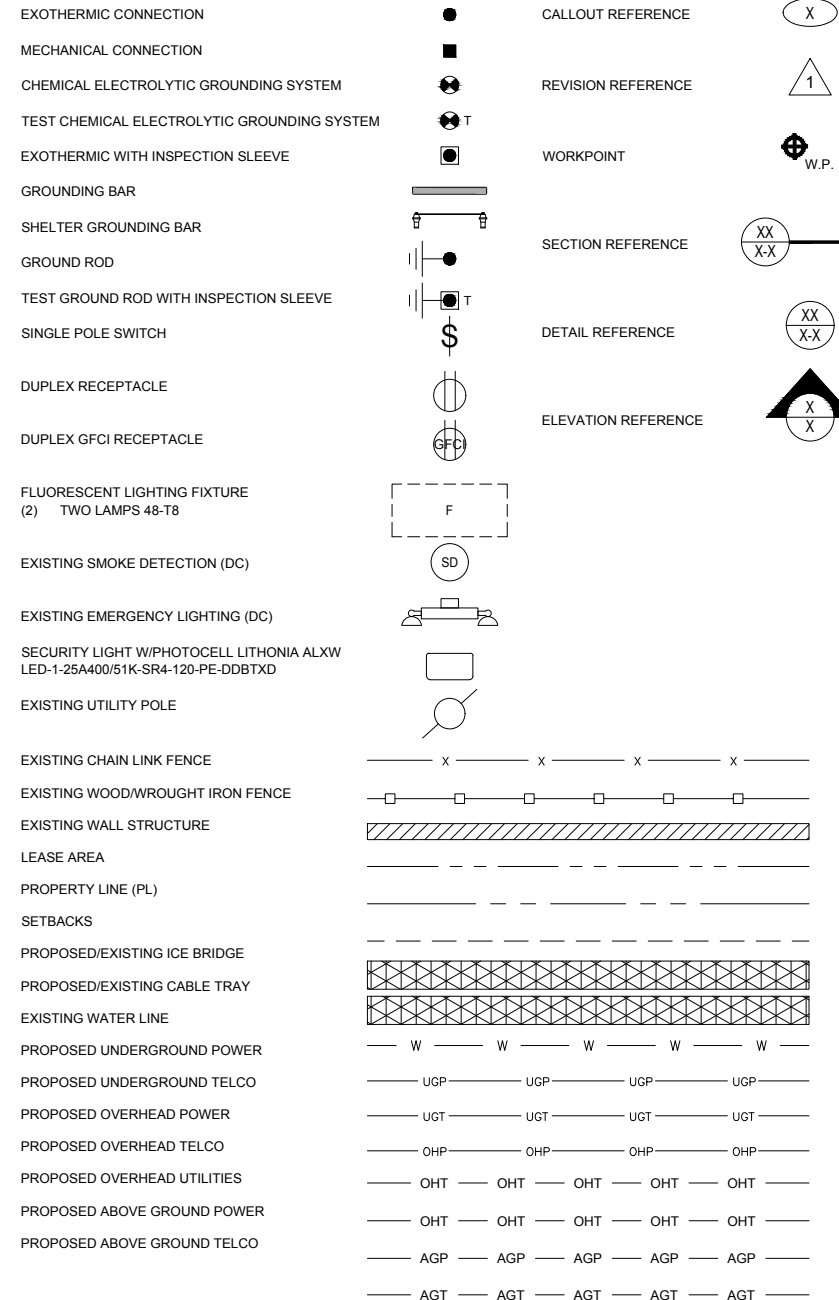
**GENERAL CABLE AND EQUIPMENT NOTES**

- CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
- ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.

- CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
- ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
- IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
  - TEMPERATURE SHALL BE ABOVE 50° F.
  - PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
  - FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
  - DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
- ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
  - GROUNDING AT THE ANTENNA LEVEL.
  - GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
  - GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
  - GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
  - GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
- ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND
- BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
- ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
- ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

**GROUNDING NOTES**

- GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
- CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
- ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
- ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
  - GROUNDING AT THE ANTENNA LEVEL.
  - GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
  - GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
  - GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
  - GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
- ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.



THESE DOCUMENTS ARE IN COMPLIANCE WITH AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOW CODES AND STANDARDS AS APPLICABLE: 2018 CONNECTICUT STATE BUILDING CODE, 2017 NATIONAL ELECTRIC CODE OR LATEST EDITION.

AB	ANCHOR BOLT	COL	COLUMN	FIN	FINISHED)	MAS	MASONRY	QTY	QUANTITY	TOF	TOP OF FOUNDATION
ABV	ABOVE	COMM	COMMON	FLR	FLOOR	MAX	MAXIMUM	RAD	RADIUS	TOP	TOP OF PLATE (PARAPET)
AC	ALTERNATING CURRENT	CONC	CONCRETE	FDN	FOUNDATION	MB	MACHINE BOLT	RECT	RECTIFIER	TOS	TOP OF STEEL
ADDL	ADDITIONAL	CONSTR	CONSTRUCTION	FOC	FACE OF CONCRETE	MECH	MECHANICAL	REF	REFERENCE	TOW	TOP OF WALL
AFF	ABOVE FINISHED FLOOR	DBL	DOUBLE	FOM	FACE OF MASONRY	MFR	MANUFACTURER	REINF	REINFORCEMENT	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
AFG	ABOVE FINISHED GRADE	DC	DIRECT CURRENT	FOS	FACE OF STUD	MGB	MASTER GROUND BAR	REQD	REQUIRED	TYP	TYPICAL
AIC	AMPERAGE INTERRUPTION CAPACITY	DEPT	DEPARTMENT	FOW	FACE OF WALL	MIN	MINIMUM	RET	REMOTE ELECTRIC TILT	UG	UNDERGROUND
ALUM	ALUMINUM	DF	DOUGLAS FIR	FS	FINISH SURFACE	MISC	MISCELLANEOUS	RMC	RIGID METALLIC CONDUIT	UL	UNDERWRITERS LABORATORY
ALT	ALTERNATE	DIA	DIAMETER	FT	FOOT	MTL	METAL	RRH	REMOTE RADIO HEAD	UNO	UNLESS NOTED OTHERWISE
ANT	ANTENNA	DIAG	DIAGONAL	FTG	FOOTING	MTS	MANUAL TRANSFER SWITCH	RRU	REMOTE RADIO UNIT	UMTS	UNIVERSAL MOBILE
APPROX	APPROXIMATE	DIM	DIMENSION	GA	GAUGE	MW	MICROWAVE	RWY	RACEWAY	SCH	SCHEDULE
ARCH	ARCHITECTURAL	DWG	DRAWING	GEN	GENERATOR	(N)	NEW	SHT	SHEET	UPS	UNINTERRUPTIBLE POWER SYSTEM
ATS	AUTOMATIC TRANSFER SWITCH	DWL	DOWEL	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NEC	NATIONAL ELECTRIC CODE	SIAD	SMART INTEGRATED DEVICE	VIF	VERIFIED IN FIELD
AWG	AMERICAN WIRE GAUGE	(E)	EXISTING	GLB	GLUE LAMINATED BEAM	NO.(#)	NUMBER	SIM	SIMILAR	W	WIDE
BATT	BATTERY	EA	EACH	GLV	GALVANIZED	NTS	NOT TO SCALE	SO	SQUARE	WD	WOOD
BLDG	BUILDING	EC	ELECTRICAL CONDUCTOR	GPS	GLOBAL POSITIONING SYSTEM	OC	ON CENTER	SS	STAINLESS STEEL	W.P.	WORK POINT
BLK	BLOCK	EL	ELEVATION	GND	GROUND	OPNG	OPENING	STD	STANDARD	WP	WEATHERPROOF
BLKG	BLOCKING	ELEC	ELECTRICAL	GSM	GLOBAL SYSTEM FOR MOBILE	(P)	PROPOSED	STL	STEEL	WT	WEIGHT
BM	BEAM	EMT	ELECTRICAL METALLIC TUBING	HDR	HEADER	PIC	PRECAST CONCRETE	STRUCT	STRUCTURAL		
BTC	BARE TINNED COPPER CONDUCTOR	ENG	ENGINEER	HGR	HANGER	PCS	PERSONAL COMMUNICATION SERVICES	TEMP	TEMPORARY		
BOF	BOTTOM OF FOOTING	EQ	EQUAL	HVAC	HEAT/VENTILATION/AIR CONDITIONING	PCU	PRIMARY CONTROL UNIT	THK	THICKNESS		
CAB	CABINET	EXP	EXPANSION	HT	HEIGHT	PRC	PRIMARY RADIO CABINET	TMA	TOWER MOUNTED AMPLIFIER		
CANT	CANTILEVERED	EXT	EXTERIOR	IGR	INTERIOR GROUND RING	PP	POLARIZING PRESERVING	TN	TOE NAIL		
CEC	CALIFORNIA ELECTRIC CODE	FAB	FABRICATION	IN	INCH	PSF	POUNDS PER SQUARE FOOT	TOA	TOP OF ANTENNA		
CHG	CHARGING	FF	FINISH FLOOR	INT	INTERIOR	PSI	POUNDS PER SQUARE INCH	TOC	TOP OF CURB		
CLG	CEILING	FG	FINISH GRADE	LB(S)	POUND(S)	PT	PRESSURE TREATED				
CLR	CLEAR	FIF	FACILITY INTERFACE FRAME	LF	LINEAR FEET	PWR	POWER CABINET				



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS		
NO.	DATE	DESCRIPTION
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

GENERAL NOTES II

GN-2



5841 BRIDGE STREET  
EAST SYRACUSE, NY 13057



3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065



JACOBS ENGINEERING GROUP, INC.  
120 ST. JAMES AVENUE, 5TH FLOOR  
BOSTON, MA 02116



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS

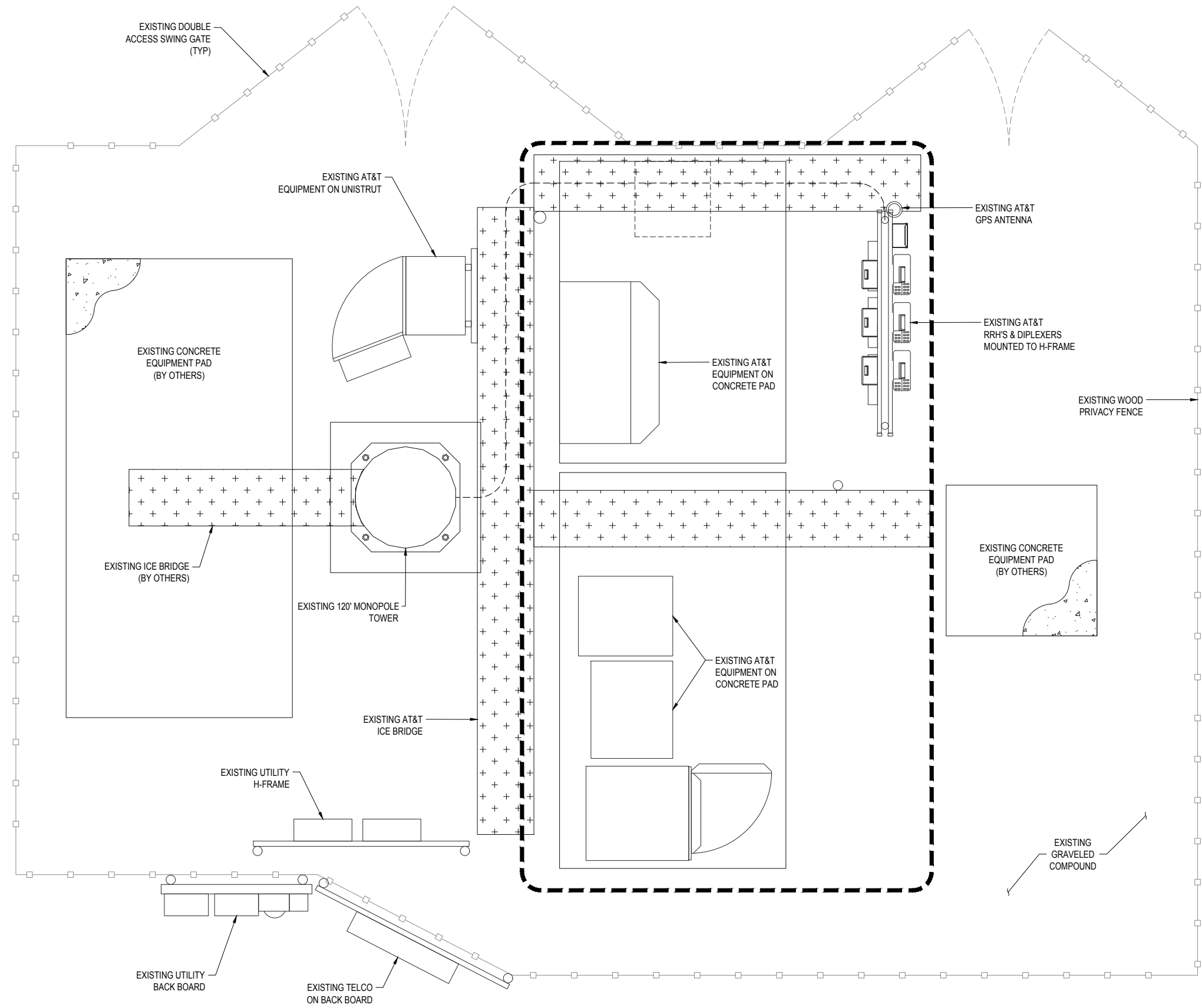
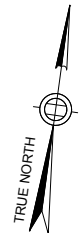
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

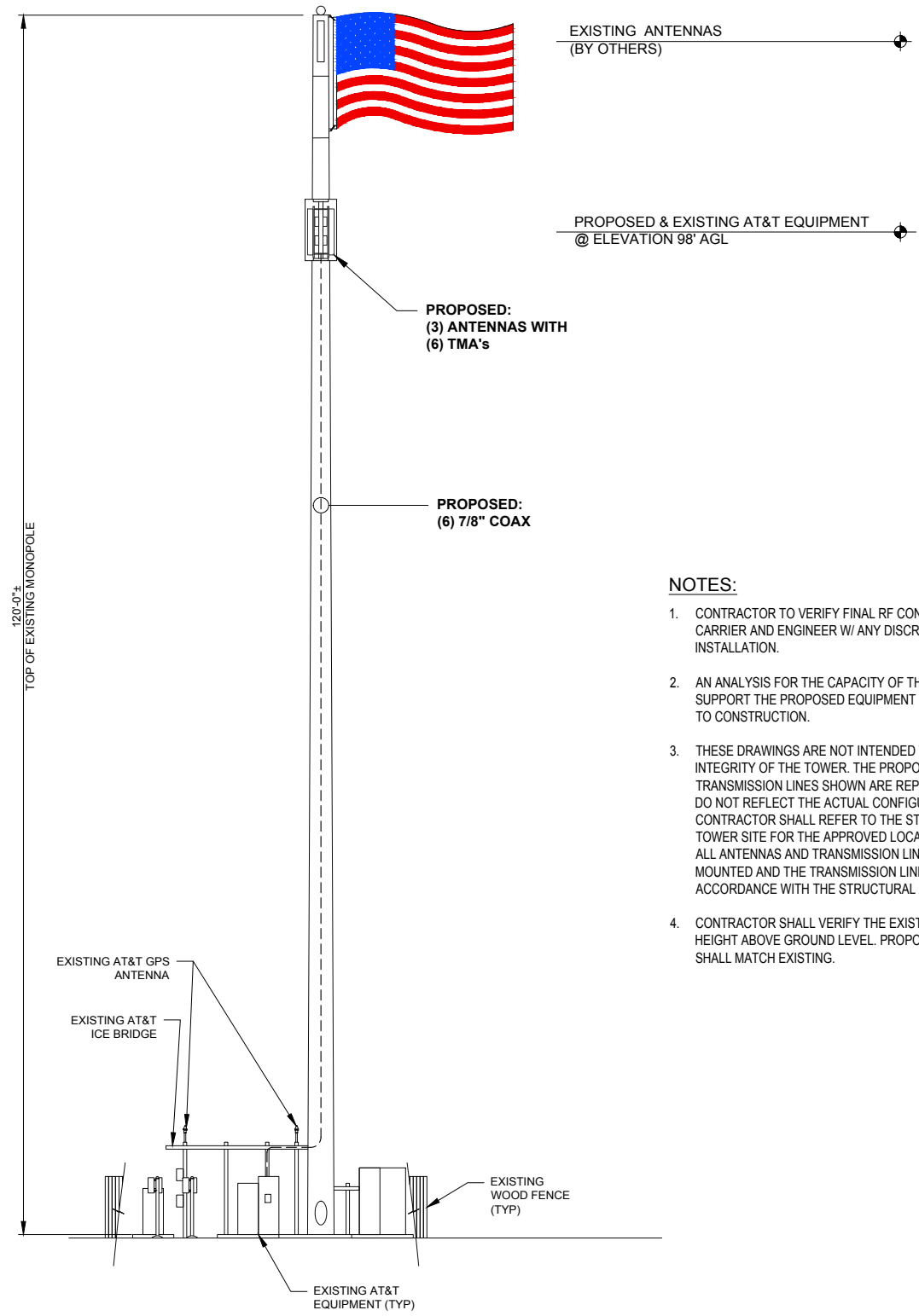
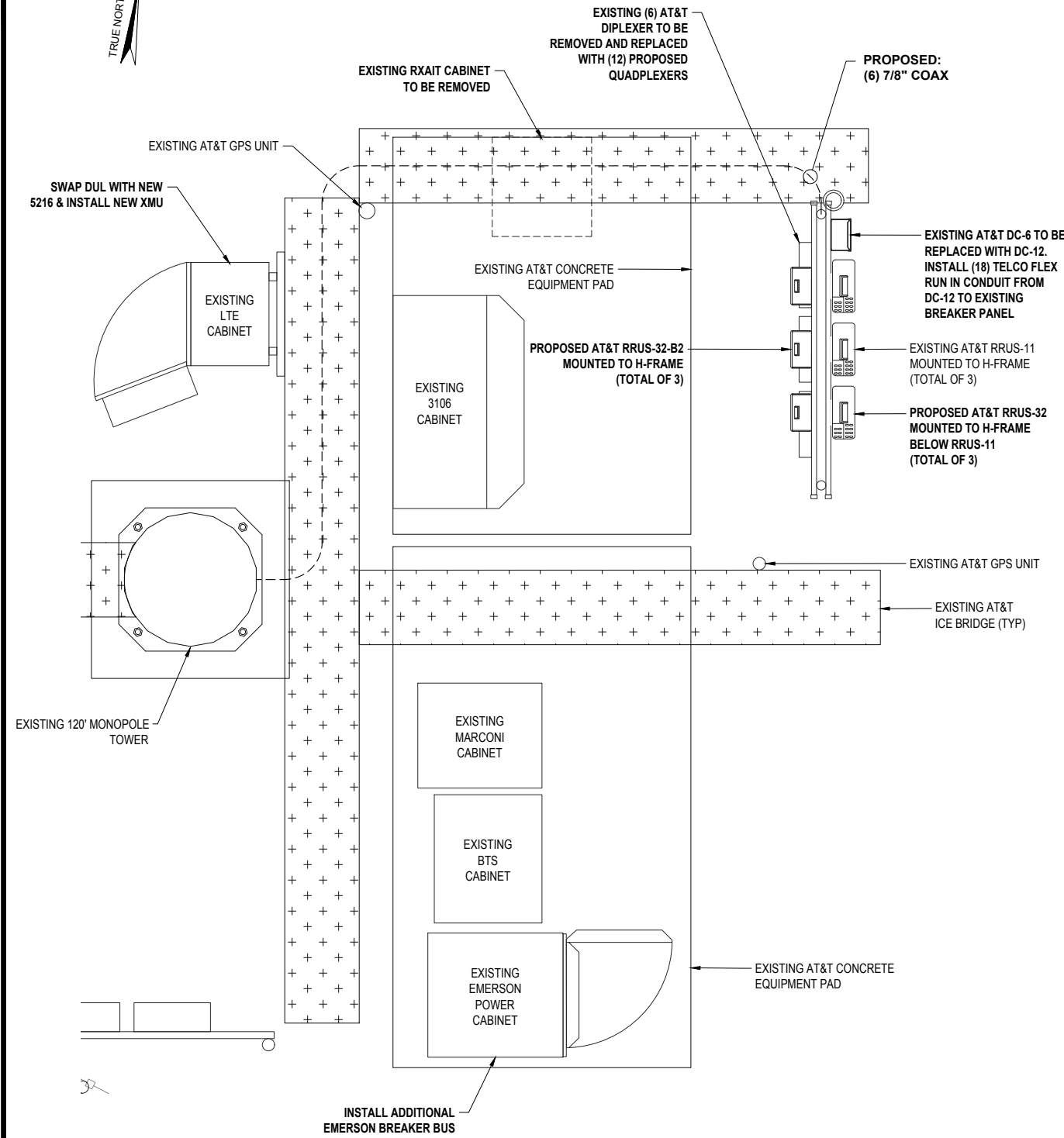
SITE PLAN

C-1



NOTES:

1. PLAN BASED ON CONSTRUCTION DRAWINGS ISSUED BY MASER CONSULTING CONNECTICUT ON 06/26/18. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.



**NOTES:**

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.
3. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND TRANSMISSION LINES SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE STRUCTURAL ANALYSIS OF THIS TOWER SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND TRANSMISSION LINES. ALL ANTENNAS MUST BE MOUNTED AND THE TRANSMISSION LINES CONFIGURED IN STRICT ACCORDANCE WITH THE STRUCTURAL ANALYSIS.
4. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.

5841 BRIDGE STREET  
EAST SYRACUSE, NY 13057

3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065

JACOBS ENGINEERING GROUP, INC.  
120 ST. JAMES AVENUE, 5TH FLOOR  
BOSTON, MA 02116

PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

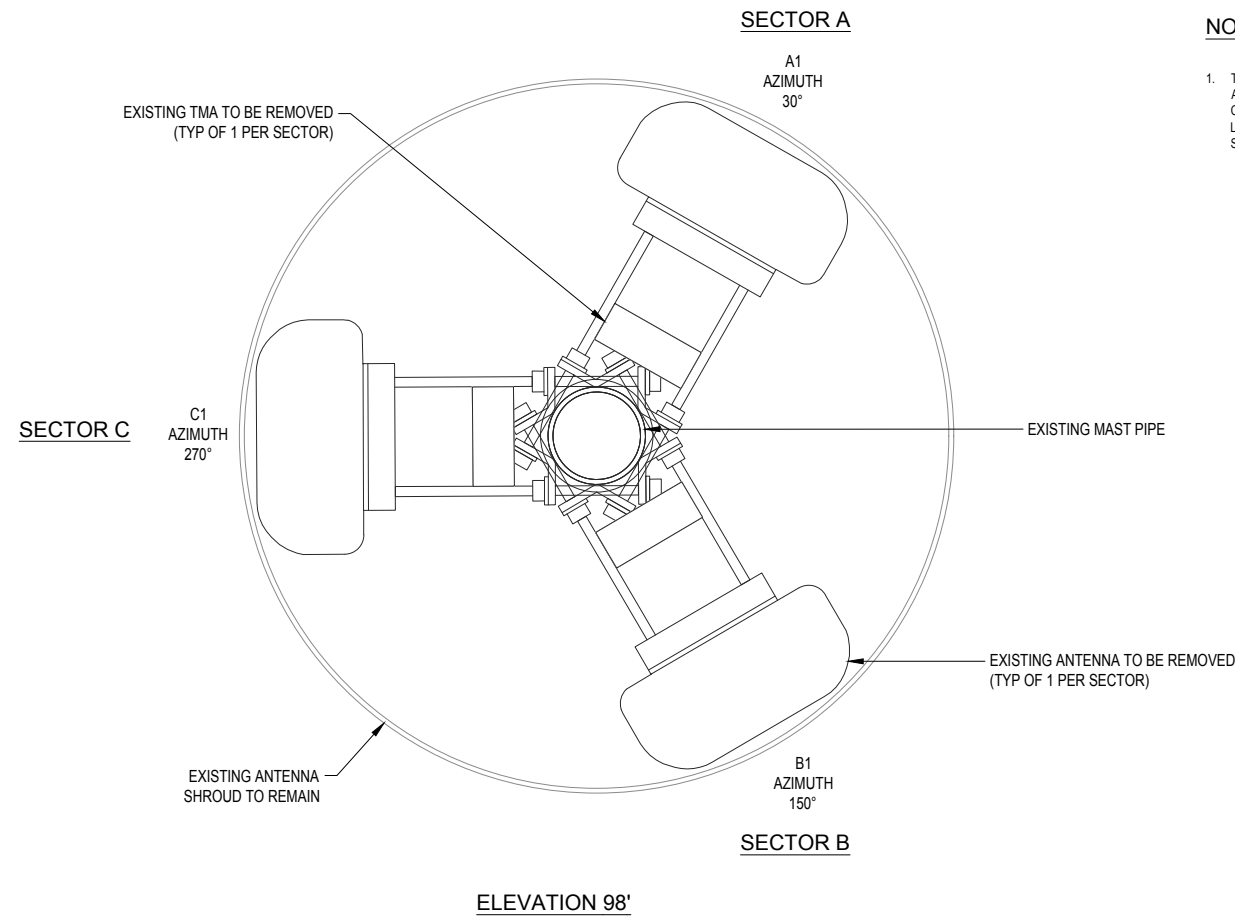
SUBMITTALS		
NO.	DATE	DESCRIPTION
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION

**C-2**

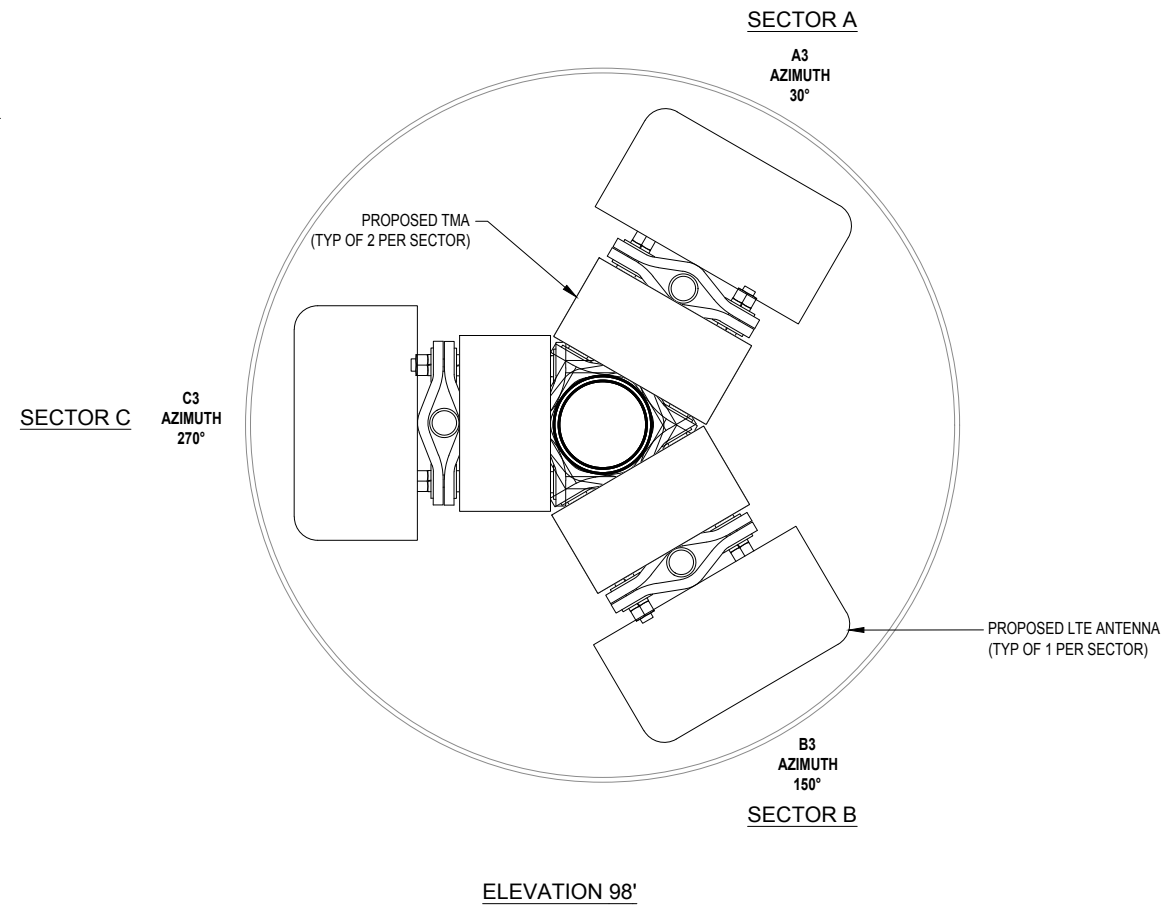


**NOTES:**

1. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND ASSOCIATED EQUIPMENT SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE MOUNT ANALYSIS OF THIS SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND EQUIPMENT. ALL ANTENNAS AND EQUIPMENT MUST BE MOUNTED IN STRICT ACCORDANCE WITH THE MOUNT ANALYSIS.

**1** EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



**1** PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

5841 BRIDGE STREET  
EAST SYRACUSE, NY 13057

3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065

JACOBS ENGINEERING GROUP, INC.  
120 ST. JAMES AVENUE, 5TH FLOOR  
BOSTON, MA 02116



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS			
NO.	DATE	DESCRIPTION	STATUS
1	01/29/19	ISSUED FOR CONSTRUCTION	
0	01/21/19	ISSUED FOR PERMITTING	

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

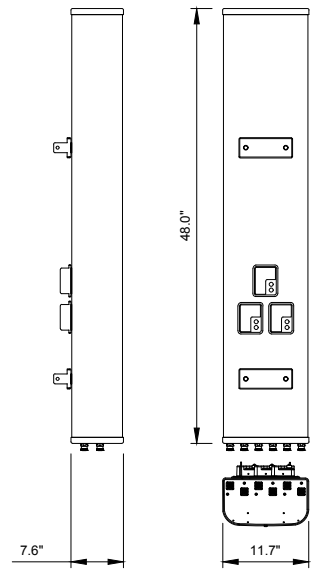
FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

EXISTING & PROPOSED  
ANTENNA LAYOUT

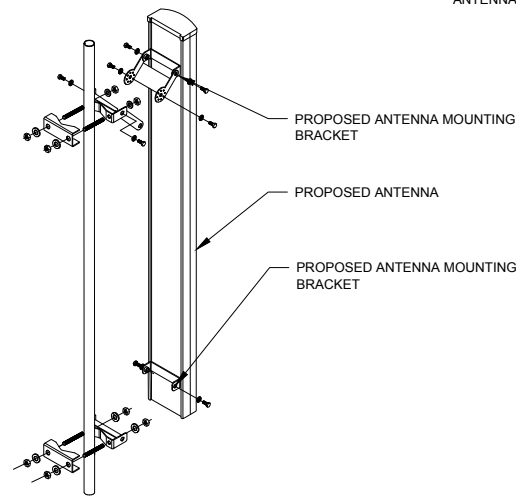
**C-3**



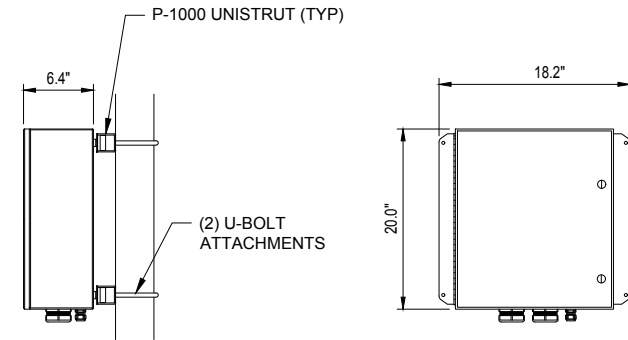
MANUFACTURER: CCI  
 MODEL NO.: HPA65R-BU4A  
 COLOR: LIGHT GRAY  
 DIMENSIONS (LxWxD): 48.0" x 11.7" x 7.6"  
 1219mm x 297mm x 193mm  
 WEIGHT (lbs): 28.7  
 CONNECTOR: 6 x 4.3-10 FEMALE  
 FRONT WIND LOAD: 127 LBS @ 100 MPH  
 564 N @ 161 KPH  
 SIDE WIND LOAD: 89 LBS @ 100 MPH  
 395 N @ 161 KPH  
 WIND SPEED MAX.: >150 MPH (>241 KPH)



**NOTE**  
 MOUNTING OPTIONS ARE INCLUDED PRODUCTS WITH ANTENNA PURCHASE



**RAYCAP DC12-48-60-0-25E**  
 DIMENSIONS (HxWxD): 20.0" x 18.2" x 6.4"  
 TOTAL WEIGHT (lbs): 56.3 ± (INCLUDING MOUNTING HARDWARE)



**1 ANTENNA SPECIFICATIONS**

SCALE: N.T.S.

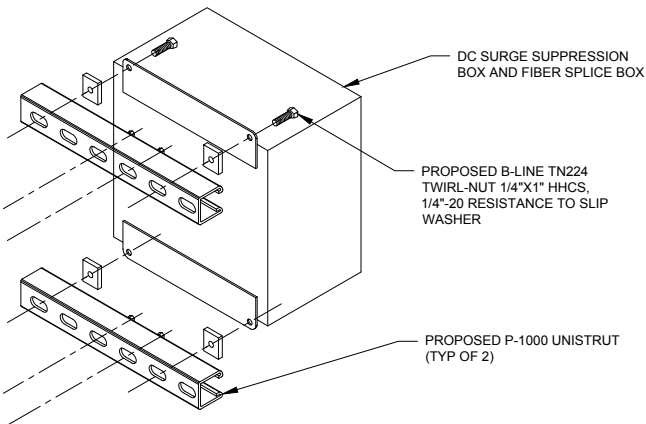
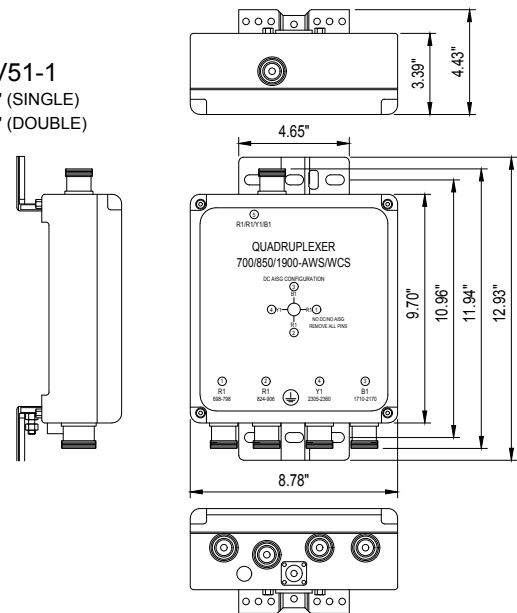
**2 ANTENNA MOUNTING DETAIL**

SCALE: N.T.S.

**3 DC12 SURGE SUPPRESSOR SPECIFICATIONS**

SCALE: N.T.S.

MANUFACTURER: KAELUS  
 MODEL: QBC0007F1V51-1  
 DIMENSIONS (HxWxD): 9.73" x 8.78" x 3.39" (SINGLE)  
 9.73" x 8.78" x 8.06" (DOUBLE)  
 TOTAL WEIGHT (lbs): 16.7 (SINGLE)  
 33.4 (DOUBLE)  
 TEMPERATURE: -40 °C TO +65 °C



**4 DIPLEXER SPECIFICATIONS**

SCALE: N.T.S.

**5 DC FIBER/DC DISTRIBUTION MOUNTING DETAIL**

SCALE: N.T.S.

NOT USED

NOT USED

NOT USED



5841 BRIDGE STREET  
 EAST SYRACUSE, NY 13057



3 CORPORATE PARK DRIVE  
 SUITE 101  
 CLIFTON PARK, NY 12065



120 ST. JAMES AVENUE, 5TH FLOOR  
 BOSTON, MA 02116



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS		
NO.	DATE	DESCRIPTION
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
 SITE# CT5160  
 SHELTON RIVER ROAD  
 308 RIVER ROAD (RT. 110)  
 SHELTON, CT 06484

EQUIPMENT  
 DETAILS I

C-4



5841 BRIDGE STREET  
EAST SYRACUSE, NY 13057



3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065



JACOBS ENGINEERING GROUP, INC.  
120 ST. JAMES AVENUE, 5TH FLOOR  
BOSTON, MA 02116



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS

1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

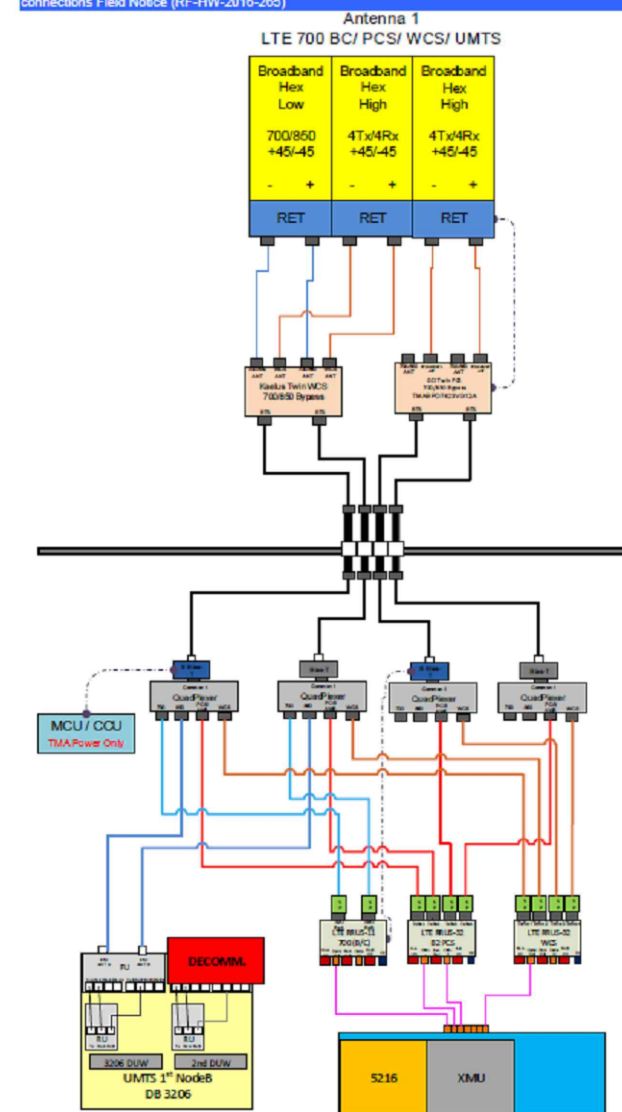
THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

ANTENNA CHART &  
RF EQUIPMENT  
SCHEMATIC

RF-1

Diagram - A Diagram File Name - CT5160\_ABC\_Multicarrier\_v2.1.vsd  
Sector - SHELTON  
Abolt Site Name - CT5160 Location Name - RIVER ROAD Market - CONNECTICUT Cluster - ENGLAND  
Comments: Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ Radio Port connections Field Notice (RF-HW-2016-265)

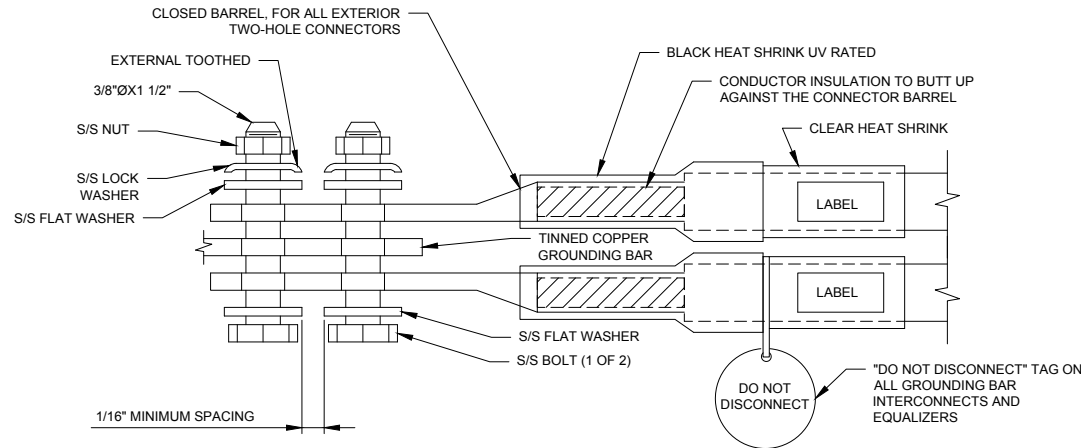


ANTENNA NUMBER	ANTENNA MODEL	ANTENNA BAND	AZIMUTH	ANTENNA CENTERLINE FROM GROUND	TMA's	RRH's	FEEDER	RAYCAP
A1	<b>HPA65R-BU4A</b> (48"x11.7"x7.6")	LTE	30°	98'	(2) TMABPD7823VG12A	(1) RRU-11 (700 B/C)* (1) RRU-32 B2 (PCS)* (1) RRU-32 (WCS)*	(2) 7/8" (E) (2) 7/8" (P) (LENGTH @ 148')	
B1	<b>HPA65R-BU4A</b> (48"x11.7"x7.6")	LTE	150°	98'	(2) TMABPD7823VG12A	(1) RRU-11 (700 B/C)* (1) RRU-32 B2 (PCS)* (1) RRU-32 (WCS)*	(2) 7/8" (E) (2) 7/8" (P) (LENGTH @ 148')	
G1	<b>HPA65R-BU4A</b> (48"x11.7"x7.6")	LTE	270°	98'	(2) TMABPD7823VG12A	(1) RRU-11 (700 B/C)* (1) RRU-32 B2 (PCS)* (1) RRU-32 (WCS)*	(2) 7/8" (E) (2) 7/8" (P) (LENGTH @ 148')	

- NOTES:
- EQUIPMENT LISTED IN **BOLD**, DELINEATES THAT THE EQUIPMENT IS PROPOSED.
  - \* DENOTES THAT EQUIPMENT IS TO BE GROUND MOUNTED.

**NOTES:**

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS. COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



**1 EXTERIOR TWO HOLE LUG DETAIL**

SCALE: NONE

**GENERAL NOTES:**

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

**GROUNDING NOTES:**

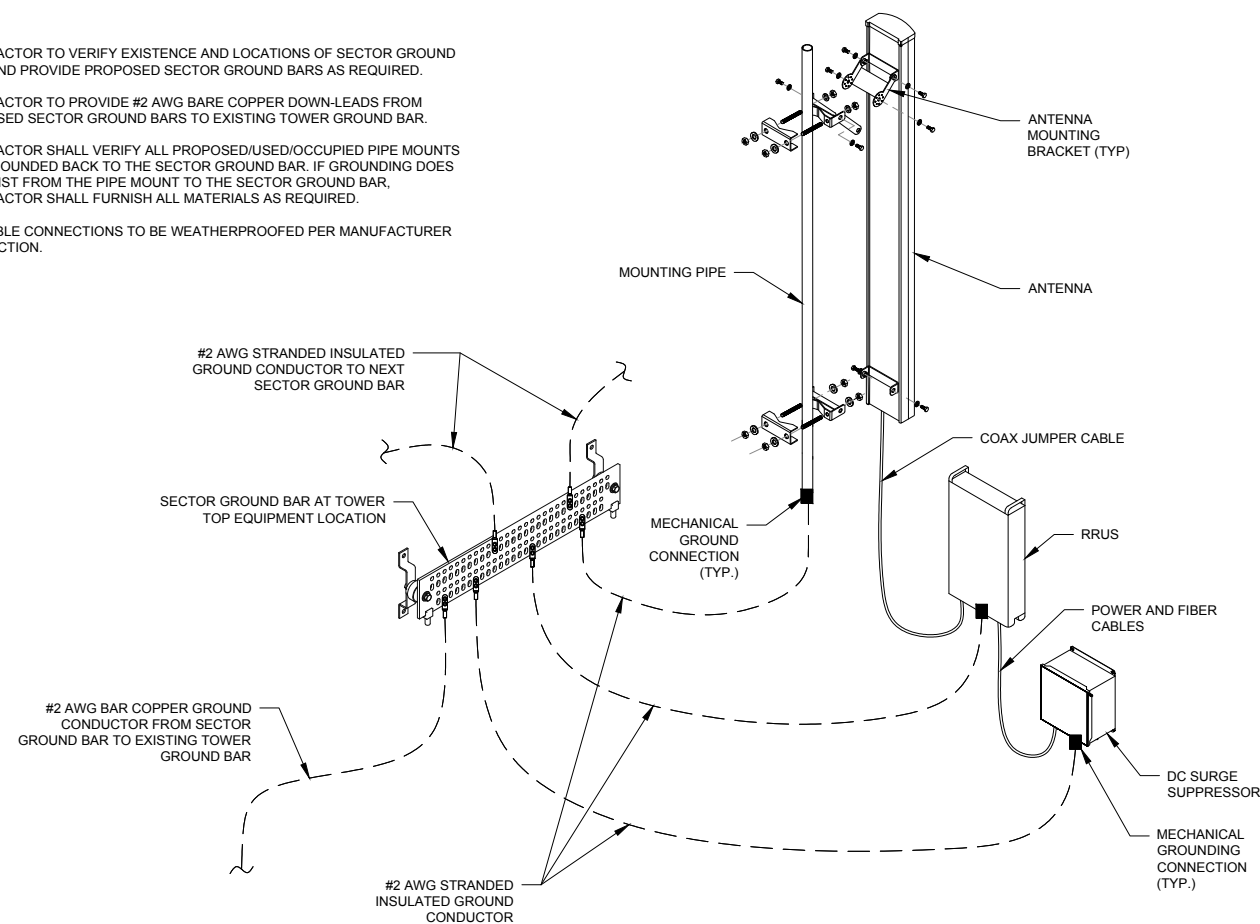
1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

**2 GROUNDING BAR DETAIL**

SCALE: NONE

**NOTES:**

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



**3 TYPICAL ANTENNA GROUNDING SCHEMATIC**

SCALE: NONE



5841 BRIDGE STREET  
EAST SYRACUSE, NY 13057



3 CORPORATE PARK DRIVE  
SUITE 101  
CLIFTON PARK, NY 12065



120 ST. JAMES AVENUE, 5TH FLOOR  
BOSTON, MA 02116



PROJECT NO: ERCC0004

DRAWN BY: JB

CHECKED BY: CAT

SUBMITTALS		
NO.	DATE	DESCRIPTION
1	01/29/19	ISSUED FOR CONSTRUCTION
0	01/21/19	ISSUED FOR PERMITTING

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T WIRELESS. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

FA# 10050786  
SITE# CT5160  
SHELTON RIVER ROAD  
308 RIVER ROAD (RT. 110)  
SHELTON, CT 06484

GROUNDING DETAILS

G-1



Date: **December 10, 2018**

Andrew Bazinet  
Crown Castle  
30 TRAP BROOK DR  
MACEDON, NY 14502

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

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Co-Locate**  
**Carrier Site Number:** CTL05160  
**Carrier Site Name:** SHELTON - RIVER RD

**Crown Castle Designation:** **Crown Castle BU Number:** 827873  
**Crown Castle Site Name:** Shelton-2/Rt 110  
**Crown Castle JDE Job Number:** 468150  
**Crown Castle Work Order Number:** 1662083  
**Crown Castle Order Number:** 413133 Rev. 3

**Engineering Firm Designation:** **Crown Castle Project Number:** 1662083

**Site Data:** **308RiverRoad (Rt. 110), Shelton, Fairfield County, CT**  
**Latitude 41° 17' 44", Longitude -73° 4' 21.324"**  
**118.5 Foot - Concealment Tower**

Dear Andrew Bazinet,

Crown Castle 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:

LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Alexander Greguric, E.I.T. / SM

Respectfully submitted by:

Maham Barimani, P.E.  
Senior Project Engineer

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

### 3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Component Stresses vs. Capacity – LC5

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 118.5 ft Concealment tower designed by STEALTH NETWORK TECHNOLOGIES INC. The base tower is 94.5 ft and the canister section is from 94.5 ft to 118.5 ft. The canister section is designed by POND Company.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	125 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.5in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

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

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
99.0	99.0	3	cci antennas	HPA65R-BU4A w/ Mount Pipe	6	7/8
	96.0	6	cci antennas	TMABPDB7823VG12A		
97.5	97.5	1	-	36" x 6' Concealment Canister	-	-

**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)
116.0	116.0	3	rfs/celwave	APXV18-206516S-C-A20 w/ Mount Pipe	6	7/8
115.5	115.5	1	-	16" x 6' Concealment Canister	-	-
111.0	112.0	1	radiowaves	FP.5-5-18 w/ Mount Pipe	6 3	7/8 5/16
	110.0	3	kathrein	840 10077 w/ Mount Pipe		
	108.0	3	kathrein	782 10254		
109.5	109.5	1	-	16" x 6' Concealment Canister	-	-
103.5	103.5	1	-	17" x 6' Concealment Canister	-	-

## 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	3563701	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Stealth	3940226	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals (Mapped) / Stealth	3563703	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pond and Company	22014-7	On File

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

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

## 4) ANALYSIS RESULTS

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

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	118.5 - 94.5	Pole	TP5x5x0.875	1	-2.10	750.09	30.1	Pass
L2	94.5 - 46.75	Pole	TP25.613x18x0.1875	2	-5.57	1046.80	31.8	Pass
L3	46.75 - 0	Pole	TP31.8x24.3x0.1875	3	-9.72	1196.99	62.0	Pass
							Summary	
						Pole (L3)	62.0	Pass
						Rating =	62.0	Pass

**Table 5 - Tower Component Stresses vs. Capacity – LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	94.5	28.2	Pass
1,2	Flange Plates	94.5	-	Pass
1	Spine Mast Weld	94.5	48.1	Pass
1	Anchor Rods	0	58.2	Pass
1	Base Plate	0	50.6	Pass
1	Base Foundation Structural	0	22.4	Pass
1	Base Foundation Soil Interaction	0	53.0	Pass

<b>Structure Rating (max from all components) =</b>	<b>62.0%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Flange plates capacity has been determined by conducting a finite element analysis using ANSYS 19.2.

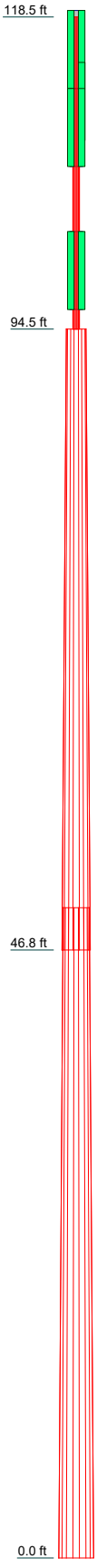
### 4.1) Recommendations

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

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



Section	1	2	3	
Length (ft)	24.00	47.75	50.00	
Number of Sides	0	18	18	
Thickness (in)	0.8750	0.1875	0.1875	
Socket Length (ft)		3.25		
Top Dia (in)	5.0000	18.0000	24.3000	
Bot Dia (in)	5.0000	25.6130	31.8000	
Grade		ATM A519 C.D.	A572-65	
Weight (K)	0.9	2.1	2.8	5.8



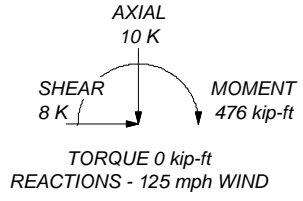
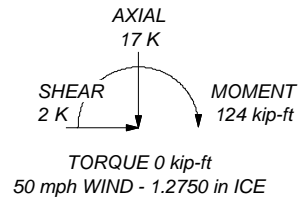
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
ATM A519 C.D.	70 ksi	85 ksi	A572-65	65 ksi	80 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 1.27 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 0.00 ft
7. TIA-222-H Annex S
8. TOWER RATING: 62%

ALL REACTIONS ARE FACTORED



**Crown Castle**  
 2000 Corporate Drive  
 Canonsburg, PA 15317  
 Phone: 724-416-2000  
 FAX: -

Job: <b>BU# 827873</b>		
Project:	Client: Crown Castle	Drawn by: SMandal
Code: TIA-222-H	Date: 12/10/18	App'd: NTS
Path:	Scale: NTS	
		Dwg No. E-1

©ISA Model - Letter/Work Area/Graphic/APP/827873 WD 166263 Consentment/CA-SM/Rev 1/827873

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- 1) Tower base elevation above sea level: 99.00 ft.
- 2) Basic wind speed of 125 mph.
- 3) Risk Category II.
- 4) Exposure Category C.
- 5) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 6) Topographic Category: 1.
- 7) Crest Height 0.00 ft.
- 8) Nominal ice thickness of 1.2750 in.
- 9) Ice thickness is considered to increase with height.
- 10) Ice density of 56 pcf.
- 11) A wind speed of 50 mph is used in combination with ice.
- 12) Temperature drop of 50 °F.
- 13) Deflections calculated using a wind speed of 60 mph.
- 14) TIA-222-H Annex S.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retention Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
--	---	---

## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	118.50-94.50	24.00	0.00	Round	5.0000	5.0000	0.8750		ATM A519 C.D. (70 ksi)
L2	94.50-46.75	47.75	3.25	18	18.0000	25.6130	0.1875	0.7500	A572-65 (65 ksi)
L3	46.75-0.00	50.00		18	24.3000	31.8000	0.1875	0.7500	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	5.0000	11.3392	25.2031	1.4909	2.5000	10.0812	50.4062	5.6662	0.0000	0
	5.0000	11.3392	25.2031	1.4909	2.5000	10.0812	50.4062	5.6662	0.0000	0
L2	18.2488	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	25.9792	15.1314	1235.8170	9.0261	13.0114	94.9795	2473.2600	7.5671	4.1779	22.282
L3	25.1410	14.3500	1054.0771	8.5599	12.3444	85.3891	2109.5411	7.1763	3.9468	21.05
	32.2616	18.8134	2375.3203	11.2224	16.1544	147.0386	4753.7660	9.4085	5.2668	28.09

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontal	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 118.50-94.50				1	0	1			
L2 94.50-46.75				1	1	1			
L3 46.75-0.00				1	1	1			

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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***											

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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C <sub>AA</sub>	Weight plf			
							ft <sup>2</sup> /ft				
AVA5-50(7/8")	C	No	No	Inside Pole	111.00 - 0.00	6	No Ice	0.30			
							1/2" Ice	0.30			
							1" Ice	0.30			
							2" Ice	0.30			
							No Ice	0.30			
AVA5-50(7/8")	C	No	No	Inside Pole	116.00 - 0.00	6	No Ice	0.30			
							1/2" Ice	0.30			
							1" Ice	0.30			
							2" Ice	0.30			
							No Ice	0.30			
ATCB-B01-060(5/16")	C	No	No	Inside Pole	111.00 - 0.00	3	No Ice	0.06			
							1/2" Ice	0.06			
							1" Ice	0.06			
							2" Ice	0.06			
							No Ice	0.06			
* FLC 78-50J(7/8")	C	No	No	Inside Pole	99.00 - 0.00	6	No Ice	0.40			
							1/2" Ice	0.40			
							1" Ice	0.40			
							2" Ice	0.40			
							No Ice	0.40			
***											

### Feed Line/Linear Appurtenances Section Areas

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face	$A_R$	$A_F$	$C_{AA}$	$C_{AA}$	Weight <i>K</i>
			<i>ft<sup>2</sup></i>	<i>ft<sup>2</sup></i>	In Face <i>ft<sup>2</sup></i>	Out Face <i>ft<sup>2</sup></i>	
L1	118.50-94.50	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	0.000	0.08
L2	94.50-46.75	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	0.000	0.29
L3	46.75-0.00	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	0.000	0.29

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

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face or Leg	Ice Thickness <i>in</i>	$A_R$	$A_F$	$C_{AA}$	$C_{AA}$	Weight <i>K</i>
				<i>ft<sup>2</sup></i>	<i>ft<sup>2</sup></i>	In Face <i>ft<sup>2</sup></i>	Out Face <i>ft<sup>2</sup></i>	
L1	118.50-94.50	A	1.433	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	0.000	0.08
L2	94.50-46.75	A	1.374	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	0.000	0.29
L3	46.75-0.00	A	1.232	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	0.000	0.29

### Feed Line Center of Pressure

Section	Elevation <i>ft</i>	$CP_x$	$CP_z$	$CP_x$	$CP_z$
		<i>in</i>	<i>in</i>	Ice <i>in</i>	Ice <i>in</i>
L1	118.50-94.50	0.0000	0.0000	0.0000	0.0000
L2	94.50-46.75	0.0000	0.0000	0.0000	0.0000
L3	46.75-0.00	0.0000	0.0000	0.0000	0.0000

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

### Shielding Factor $K_a$

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

### User Defined Loads

Description	Elevation <i>ft</i>	Offset From Centroid <i>ft</i>	Azimuth Angle <i>°</i>	Weight <i>K</i>	$F_x$	$F_z$	Wind Force <i>K</i>	$C_{AAc}$
					<i>K</i>	<i>K</i>		<i>ft<sup>2</sup></i>
Flag	118.50	0.00	0.0000	No Ice	0.02	0.00	0.48	<b>9.26</b>
				Ice	0.61	0.00	0.08	<b>9.57</b>
				Service	0.02	0.00	0.11	<b>10.35</b>

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement  ft		C <sub>AA</sub> Front  ft <sup>2</sup>	C <sub>AA</sub> Side  ft <sup>2</sup>	Weight  K
Canister Load1	C	None		0.0000	118.50	No Ice	1.81	1.81	0.03
						1/2" Ice	1.93	1.93	0.06
						Ice	2.04	2.04	0.09
						1" Ice	2.26	2.26	0.16
						2" Ice			
Canister Load2	C	None		0.0000	112.50	No Ice	3.70	3.70	0.07
						1/2" Ice	3.92	3.92	0.13
						Ice	4.15	4.15	0.19
						1" Ice	4.60	4.60	0.34
						2" Ice			
Canister Load3	C	None		0.0000	106.50	No Ice	3.84	3.84	0.07
						1/2" Ice	4.06	4.06	0.13
						Ice	4.29	4.29	0.20
						1" Ice	4.74	4.74	0.35
						2" Ice			
Canister Load4	C	None		0.0000	100.50	No Ice	7.62	7.62	0.10
						1/2" Ice	7.89	7.89	0.20
						Ice	8.16	8.16	0.30
						1" Ice	8.70	8.70	0.52
						2" Ice			
Canister Load5	C	None		0.0000	94.50	No Ice	5.67	5.67	0.78
						1/2" Ice	5.83	5.83	0.85
						Ice	5.99	5.99	0.91
						1" Ice	6.30	6.30	1.06
						2" Ice			
Truck Ball	C	None		0.0000	119.00	No Ice	0.39	0.39	0.05
						1/2" Ice	0.65	0.65	0.06
						Ice	0.75	0.75	0.07
						1" Ice	0.98	0.98	0.09
						2" Ice			
* APXV18-206516S-C-A20 w/ Mount Pipe	A	From Leg	0.25 0.00 0.00	0.0000	116.00	No Ice	0.00	0.00	0.04
						1/2" Ice	0.00	0.00	0.07
						Ice	0.00	0.00	0.11
						1" Ice	0.00	0.00	0.21
						2" Ice			
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Leg	0.25 0.00 0.00	0.0000	116.00	No Ice	0.00	0.00	0.04
						1/2" Ice	0.00	0.00	0.07
						Ice	0.00	0.00	0.11
						1" Ice	0.00	0.00	0.21
						2" Ice			
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Leg	0.25 0.00 0.00	0.0000	116.00	No Ice	0.00	0.00	0.04
						1/2" Ice	0.00	0.00	0.07
						Ice	0.00	0.00	0.11
						1" Ice	0.00	0.00	0.21
						2" Ice			
* 840 10077 w/ Mount Pipe	A	From Leg	0.25 0.00 -1.00	0.0000	111.00	No Ice	0.00	0.00	0.03
						1/2" Ice	0.00	0.00	0.05
						Ice	0.00	0.00	0.08
						1" Ice	0.00	0.00	0.16
						2" Ice			
840 10077 w/ Mount Pipe	B	From Leg	0.25 0.00 -1.00	0.0000	111.00	No Ice	0.00	0.00	0.03
						1/2" Ice	0.00	0.00	0.05
						Ice	0.00	0.00	0.08
						1" Ice	0.00	0.00	0.16
						2" Ice			
840 10077 w/ Mount Pipe	C	From Leg	0.25 0.00 -1.00	0.0000	111.00	No Ice	0.00	0.00	0.03
						1/2" Ice	0.00	0.00	0.05
						Ice	0.00	0.00	0.08
						1" Ice	0.00	0.00	0.16
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
FP.5-5-18 w/ Mount Pipe	B	From Leg	0.25 0.00 1.00	0.0000	111.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.01 0.01 0.02 0.04
782 10254	A	From Leg	0.25 0.00 -3.00	0.0000	111.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.01 0.01
782 10254	B	From Leg	0.25 0.00 -3.00	0.0000	111.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.01 0.01
782 10254	C	From Leg	0.25 0.00 -3.00	0.0000	111.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.01 0.01
* HPA65R-BU4A w/ Mount Pipe	A	From Leg	0.25 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.05 0.10 0.15 0.28
HPA65R-BU4A w/ Mount Pipe	B	From Leg	0.25 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.05 0.10 0.15 0.28
HPA65R-BU4A w/ Mount Pipe	C	From Leg	0.25 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.05 0.10 0.15 0.28
(2) TMABPDB7823VG12A	A	From Leg	0.25 0.00 -3.00	0.0000	99.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.02 0.03 0.04 0.06
(2) TMABPDB7823VG12A	B	From Leg	0.25 0.00 -3.00	0.0000	99.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.02 0.03 0.04 0.06
(2) TMABPDB7823VG12A	C	From Leg	0.25 0.00 -3.00	0.0000	99.00	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.02 0.03 0.04 0.06
*** 16" x 6'Concealment Canister	C	None		0.0000	115.50	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
16" x 6'Concealment Canister	C	None		0.0000	109.50	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
17" x 6'Concealment Canister	C	None		0.0000	103.50	No Ice 1/2"	0.00 0.00	0.00 0.00	0.00 0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
						Ice	0.00	0.00	0.00
						1" Ice	0.00	0.00	0.00
						2" Ice			
3' x 6' Concealment Canister	C	None		0.0000	97.50	No Ice	0.00	0.00	0.00
						1/2"	0.00	0.00	0.00
						Ice	0.00	0.00	0.00
						1" Ice	0.00	0.00	0.00
						2" Ice			
****									

## 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
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

Comb. No.	Description
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	118.5 - 94.5	Pole	Max Tension	30	0.00	0.00	0.00
			Max. Compression	26	-5.17	-0.01	-0.01
			Max. Mx	8	-2.10	-24.81	-0.00
			Max. My	14	-2.10	-0.00	-24.80
			Max. Vy	8	1.53	-19.34	-0.00
			Max. Vx	14	1.53	-0.00	-19.34
L2	94.5 - 46.75	Pole	Max. Torque	16			-0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.68	-0.01	-0.01
			Max. Mx	8	-5.57	-167.52	-0.00
			Max. My	14	-5.57	-0.00	-167.52
			Max. Vy	8	4.64	-167.52	-0.00
L3	46.75 - 0	Pole	Max. Vx	14	4.64	-0.00	-167.52
			Max. Torque	16			-0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.01	-0.01	-0.01
			Max. Mx	8	-9.72	-476.32	-0.00
			Max. My	14	-9.72	-0.00	-476.32
			Max. Vy	8	7.62	-476.32	-0.00
			Max. Vx	14	7.62	-0.00	-476.32
			Max. Torque	16			-0.00

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	17.01	-2.03	-0.00
	Max. H <sub>x</sub>	21	7.30	7.61	0.00
	Max. H <sub>z</sub>	2	9.73	0.00	7.61
	Max. M <sub>x</sub>	2	476.31	0.00	7.61
	Max. M <sub>z</sub>	8	476.32	-7.61	0.00
	Max. Torsion	6	0.00	-6.59	3.80
	Min. Vert	13	7.30	-3.80	-6.59
	Min. H <sub>x</sub>	8	9.73	-7.61	0.00
	Min. H <sub>z</sub>	14	9.73	0.00	-7.61
	Min. M <sub>x</sub>	14	-476.32	0.00	-7.61
	Min. M <sub>z</sub>	20	-476.31	7.61	0.00
	Min. Torsion	16	-0.00	3.80	-6.59

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	8.11	0.00	0.00	0.00	-0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	9.73	0.00	-7.61	-476.31	-0.00	-0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	7.30	0.00	-7.61	-470.51	-0.00	-0.00
1.2 Dead+1.0 Wind 30 deg -	9.73	3.80	-6.59	-412.50	-238.16	-0.00



Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	7.30	3.80	-6.59	-407.47	-235.26	-0.00
1.2 Dead+1.0 Wind 60 deg - No Ice	9.73	6.59	-3.80	-238.15	-412.50	-0.00
0.9 Dead+1.0 Wind 60 deg - No Ice	7.30	6.59	-3.80	-235.25	-407.48	-0.00
1.2 Dead+1.0 Wind 90 deg - No Ice	9.73	7.61	0.00	0.00	-476.32	-0.00
0.9 Dead+1.0 Wind 90 deg - No Ice	7.30	7.61	0.00	0.00	-470.52	-0.00
1.2 Dead+1.0 Wind 120 deg - No Ice	9.73	6.59	3.80	238.16	-412.50	0.00
0.9 Dead+1.0 Wind 120 deg - No Ice	7.30	6.59	3.80	235.26	-407.48	0.00
1.2 Dead+1.0 Wind 150 deg - No Ice	9.73	3.80	6.59	412.50	-238.16	0.00
0.9 Dead+1.0 Wind 150 deg - No Ice	7.30	3.80	6.59	407.48	-235.26	0.00
1.2 Dead+1.0 Wind 180 deg - No Ice	9.73	0.00	7.61	476.32	-0.00	0.00
0.9 Dead+1.0 Wind 180 deg - No Ice	7.30	0.00	7.61	470.52	-0.00	0.00
1.2 Dead+1.0 Wind 210 deg - No Ice	9.73	-3.80	6.59	412.50	238.15	0.00
0.9 Dead+1.0 Wind 210 deg - No Ice	7.30	-3.80	6.59	407.48	235.25	0.00
1.2 Dead+1.0 Wind 240 deg - No Ice	9.73	-6.59	3.80	238.16	412.50	0.00
0.9 Dead+1.0 Wind 240 deg - No Ice	7.30	-6.59	3.80	235.26	407.47	0.00
1.2 Dead+1.0 Wind 270 deg - No Ice	9.73	-7.61	0.00	0.00	476.31	0.00
0.9 Dead+1.0 Wind 270 deg - No Ice	7.30	-7.61	0.00	0.00	470.51	0.00
1.2 Dead+1.0 Wind 300 deg - No Ice	9.73	-6.59	-3.80	-238.15	412.50	0.00
0.9 Dead+1.0 Wind 300 deg - No Ice	7.30	-6.59	-3.80	-235.25	407.47	0.00
1.2 Dead+1.0 Wind 330 deg - No Ice	9.73	-3.80	-6.59	-412.50	238.15	-0.00
0.9 Dead+1.0 Wind 330 deg - No Ice	7.30	-3.80	-6.59	-407.47	235.25	-0.00
1.2 Dead+1.0 Ice+1.0 Temp	17.01	0.00	0.00	0.01	-0.01	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	17.01	0.00	-2.03	-123.94	-0.02	-0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	17.01	1.02	-1.76	-107.33	-61.99	-0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	17.01	1.76	-1.02	-61.96	-107.36	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	17.01	2.03	0.00	0.01	-123.97	-0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	17.01	1.76	1.02	61.98	-107.36	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	17.01	1.02	1.76	107.35	-61.99	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	17.01	0.00	2.03	123.96	-0.02	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	17.01	-1.02	1.76	107.35	61.96	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	17.01	-1.76	1.02	61.98	107.32	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	17.01	-2.03	0.00	0.01	123.93	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	17.01	-1.76	-1.02	-61.96	107.32	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	17.01	-1.02	-1.76	-107.33	61.96	-0.00
Dead+Wind 0 deg - Service	8.11	0.00	-1.58	-98.94	-0.00	-0.00

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg - Service	8.11	0.79	-1.37	-85.68	-49.47	-0.00
Dead+Wind 60 deg - Service	8.11	1.37	-0.79	-49.47	-85.69	-0.00
Dead+Wind 90 deg - Service	8.11	1.58	0.00	0.00	-98.94	-0.00
Dead+Wind 120 deg - Service	8.11	1.37	0.79	49.47	-85.69	0.00
Dead+Wind 150 deg - Service	8.11	0.79	1.37	85.69	-49.47	0.00
Dead+Wind 180 deg - Service	8.11	0.00	1.58	98.94	-0.00	0.00
Dead+Wind 210 deg - Service	8.11	-0.79	1.37	85.69	49.47	0.00
Dead+Wind 240 deg - Service	8.11	-1.37	0.79	49.47	85.68	0.00
Dead+Wind 270 deg - Service	8.11	-1.58	0.00	0.00	98.93	0.00
Dead+Wind 300 deg - Service	8.11	-1.37	-0.79	-49.47	85.68	0.00
Dead+Wind 330 deg - Service	8.11	-0.79	-1.37	-85.68	49.47	-0.00

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-8.11	0.00	0.00	8.11	0.00	0.000%
2	0.00	-9.73	-7.61	0.00	9.73	7.61	0.000%
3	0.00	-7.30	-7.61	0.00	7.30	7.61	0.000%
4	3.80	-9.73	-6.59	-3.80	9.73	6.59	0.000%
5	3.80	-7.30	-6.59	-3.80	7.30	6.59	0.000%
6	6.59	-9.73	-3.80	-6.59	9.73	3.80	0.000%
7	6.59	-7.30	-3.80	-6.59	7.30	3.80	0.000%
8	7.61	-9.73	0.00	-7.61	9.73	0.00	0.000%
9	7.61	-7.30	0.00	-7.61	7.30	0.00	0.000%
10	6.59	-9.73	3.80	-6.59	9.73	-3.80	0.000%
11	6.59	-7.30	3.80	-6.59	7.30	-3.80	0.000%
12	3.80	-9.73	6.59	-3.80	9.73	-6.59	0.000%
13	3.80	-7.30	6.59	-3.80	7.30	-6.59	0.000%
14	0.00	-9.73	7.61	0.00	9.73	-7.61	0.000%
15	0.00	-7.30	7.61	0.00	7.30	-7.61	0.000%
16	-3.80	-9.73	6.59	3.80	9.73	-6.59	0.000%
17	-3.80	-7.30	6.59	3.80	7.30	-6.59	0.000%
18	-6.59	-9.73	3.80	6.59	9.73	-3.80	0.000%
19	-6.59	-7.30	3.80	6.59	7.30	-3.80	0.000%
20	-7.61	-9.73	0.00	7.61	9.73	0.00	0.000%
21	-7.61	-7.30	0.00	7.61	7.30	0.00	0.000%
22	-6.59	-9.73	-3.80	6.59	9.73	3.80	0.000%
23	-6.59	-7.30	-3.80	6.59	7.30	3.80	0.000%
24	-3.80	-9.73	-6.59	3.80	9.73	6.59	0.000%
25	-3.80	-7.30	-6.59	3.80	7.30	6.59	0.000%
26	0.00	-17.01	0.00	0.00	17.01	0.00	0.000%
27	0.00	-17.01	-2.03	-0.00	17.01	2.03	0.000%
28	1.02	-17.01	-1.76	-1.02	17.01	1.76	0.000%
29	1.76	-17.01	-1.02	-1.76	17.01	1.02	0.000%
30	2.03	-17.01	0.00	-2.03	17.01	-0.00	0.000%
31	1.76	-17.01	1.02	-1.76	17.01	-1.02	0.000%
32	1.02	-17.01	1.76	-1.02	17.01	-1.76	0.000%
33	0.00	-17.01	2.03	-0.00	17.01	-2.03	0.000%
34	-1.02	-17.01	1.76	1.02	17.01	-1.76	0.000%
35	-1.76	-17.01	1.02	1.76	17.01	-1.02	0.000%
36	-2.03	-17.01	0.00	2.03	17.01	-0.00	0.000%
37	-1.76	-17.01	-1.02	1.76	17.01	1.02	0.000%
38	-1.02	-17.01	-1.76	1.02	17.01	1.76	0.000%
39	0.00	-8.11	-1.58	0.00	8.11	1.58	0.000%
40	0.79	-8.11	-1.37	-0.79	8.11	1.37	0.000%
41	1.37	-8.11	-0.79	-1.37	8.11	0.79	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
42	1.58	-8.11	0.00	-1.58	8.11	0.00	0.000%
43	1.37	-8.11	0.79	-1.37	8.11	-0.79	0.000%
44	0.79	-8.11	1.37	-0.79	8.11	-1.37	0.000%
45	0.00	-8.11	1.58	0.00	8.11	-1.58	0.000%
46	-0.79	-8.11	1.37	0.79	8.11	-1.37	0.000%
47	-1.37	-8.11	0.79	1.37	8.11	-0.79	0.000%
48	-1.58	-8.11	0.00	1.58	8.11	0.00	0.000%
49	-1.37	-8.11	-0.79	1.37	8.11	0.79	0.000%
50	-0.79	-8.11	-1.37	0.79	8.11	1.37	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00001936
3	Yes	5	0.00000001	0.00000001
4	Yes	5	0.00000001	0.00085461
5	Yes	5	0.00000001	0.00039009
6	Yes	5	0.00000001	0.00085467
7	Yes	5	0.00000001	0.00039011
8	Yes	5	0.00000001	0.00001936
9	Yes	5	0.00000001	0.00000001
10	Yes	5	0.00000001	0.00085475
11	Yes	5	0.00000001	0.00039013
12	Yes	5	0.00000001	0.00085473
13	Yes	5	0.00000001	0.00039013
14	Yes	5	0.00000001	0.00001936
15	Yes	5	0.00000001	0.00000001
16	Yes	5	0.00000001	0.00085460
17	Yes	5	0.00000001	0.00039009
18	Yes	5	0.00000001	0.00085454
19	Yes	5	0.00000001	0.00039007
20	Yes	5	0.00000001	0.00001936
21	Yes	5	0.00000001	0.00000001
22	Yes	5	0.00000001	0.00085447
23	Yes	5	0.00000001	0.00039005
24	Yes	5	0.00000001	0.00085448
25	Yes	5	0.00000001	0.00039006
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00028579
28	Yes	5	0.00000001	0.00034553
29	Yes	5	0.00000001	0.00034561
30	Yes	5	0.00000001	0.00028626
31	Yes	5	0.00000001	0.00034597
32	Yes	5	0.00000001	0.00034594
33	Yes	5	0.00000001	0.00028613
34	Yes	5	0.00000001	0.00034533
35	Yes	5	0.00000001	0.00034525
36	Yes	5	0.00000001	0.00028566
37	Yes	5	0.00000001	0.00034490
38	Yes	5	0.00000001	0.00034492
39	Yes	4	0.00000001	0.00017543
40	Yes	4	0.00000001	0.00021462
41	Yes	4	0.00000001	0.00021468
42	Yes	4	0.00000001	0.00017554
43	Yes	4	0.00000001	0.00021475
44	Yes	4	0.00000001	0.00021473
45	Yes	4	0.00000001	0.00017551
46	Yes	4	0.00000001	0.00021461
47	Yes	4	0.00000001	0.00021455
48	Yes	4	0.00000001	0.00017540
49	Yes	4	0.00000001	0.00021448
50	Yes	4	0.00000001	0.00021450

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118.5 - 94.5	15.599	42	1.4197	0.0000
L2	94.5 - 46.75	9.387	42	0.8145	0.0000
L3	50 - 0	2.955	43	0.5291	0.0000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	Truck Ball	42	15.599	1.4197	0.0000	12907
118.50	Canister Load1	42	15.599	1.4197	0.0000	12907
116.00	APXV18-206516S-C-A20 w/ Mount Pipe	42	14.907	1.3473	0.0000	12907
115.50	16" x 6'Concealment Canister	42	14.769	1.3329	0.0000	12907
112.50	Canister Load2	42	13.945	1.2473	0.0000	10756
111.00	840 10077 w/ Mount Pipe	42	13.537	1.2051	0.0000	8605
109.50	16" x 6'Concealment Canister	42	13.131	1.1637	0.0000	7170
106.50	Canister Load3	42	12.332	1.0833	0.0000	5378
103.50	17" x 6'Concealment Canister	42	11.553	1.0071	0.0000	4302
100.50	Canister Load4	42	10.799	0.9362	0.0000	3585
99.00	HPA65R-BU4A w/ Mount Pipe	42	10.433	0.9031	0.0000	3309
97.50	3' x 6'Concealment Canister	42	10.075	0.8717	0.0000	3083
94.50	Canister Load5	42	9.387	0.8145	0.0000	2819

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	118.5 - 94.5	74.358	8	6.6731	0.0001
L2	94.5 - 46.75	45.062	8	3.9003	0.0000
L3	50 - 0	14.212	8	2.5439	0.0000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.00	Truck Ball	8	74.358	6.6731	0.0001	2867
118.50	Canister Load1	8	74.358	6.6731	0.0001	2867
116.00	APXV18-206516S-C-A20 w/ Mount Pipe	8	71.104	6.3421	0.0001	2867
115.50	16" x 6'Concealment Canister	8	70.455	6.2762	0.0001	2867
112.50	Canister Load2	8	66.574	5.8840	0.0001	2388
111.00	840 10077 w/ Mount Pipe	8	64.650	5.6912	0.0001	1910
109.50	16" x 6'Concealment Canister	8	62.740	5.5015	0.0000	1592
106.50	Canister Load3	8	58.974	5.1333	0.0000	1193
103.50	17" x 6'Concealment Canister	8	55.301	4.7843	0.0000	953
100.50	Canister Load4	8	51.742	4.4592	0.0000	794
99.00	HPA65R-BU4A w/ Mount Pipe	8	50.013	4.3072	0.0000	732
97.50	3' x 6'Concealment Canister	8	48.322	4.1630	0.0000	682
94.50	Canister Load5	8	45.062	3.9003	0.0000	622

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	118.5 - 94.5 (1)	TP5x5x0.875	24.00	0.00	0.0	11.339 2	-2.10	714.37	0.003
L2	94.5 - 46.75 (2)	TP25.613x18x0.1875	47.75	0.00	0.0	14.823 0	-5.57	996.95	0.006
L3	46.75 - 0 (3)	TP31.8x24.3x0.1875	50.00	0.00	0.0	18.813 4	-9.72	1139.99	0.009

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	118.5 - 94.5 (1)	TP5x5x0.875	24.81	79.34	0.313	0.00	79.34	0.000
L2	94.5 - 46.75 (2)	TP25.613x18x0.1875	167.52	510.78	0.328	0.00	510.78	0.000
L3	46.75 - 0 (3)	TP31.8x24.3x0.1875	476.32	742.48	0.642	0.00	742.48	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	118.5 - 94.5 (1)	TP5x5x0.875	1.52	214.31	0.007	0.00	77.72	0.000
L2	94.5 - 46.75 (2)	TP25.613x18x0.1875	4.64	260.14	0.018	0.00	558.93	0.000
L3	46.75 - 0 (3)	TP31.8x24.3x0.1875	7.62	330.18	0.023	0.00	903.27	0.000

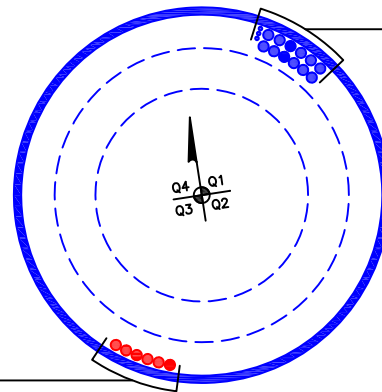
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	118.5 - 94.5 (1)	0.003	0.313	0.000	0.007	0.000	0.316	1.050	4.8.2
L2	94.5 - 46.75 (2)	0.006	0.328	0.000	0.018	0.000	0.334	1.050	4.8.2
L3	46.75 - 0 (3)	0.009	0.642	0.000	0.023	0.000	0.651	1.050	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	118.5 - 94.5	Pole	TP5x5x0.875	1	-2.10	750.09	30.1	Pass
L2	94.5 - 46.75	Pole	TP25.613x18x0.1875	2	-5.57	1046.80	31.8	Pass
L3	46.75 - 0	Pole	TP31.8x24.3x0.1875	3	-9.72	1196.99	62.0	Pass
Summary								
Pole (L3)							62.0	Pass
<b>RATING =</b>							<b>62.0</b>	<b>Pass</b>

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



(OTHER CONSIDERED EQUIPMENT)  
(3) 5/16" TO 111 FT LEVEL  
(6) 7/8" TO 111 FT LEVEL  
(6) 7/8" TO 116 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)  
(6) 7/8" TO 99 FT LEVEL



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

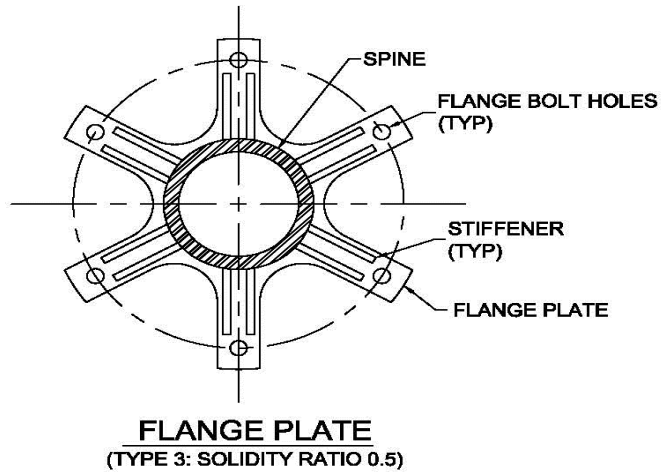
# CCI Flagpole Tool



Site Data	
BU#:	827873
Site Name:	Shelton-2/RT 110
Order #:	413133 Rev. 3

Code	
Code:	TIA-222-H
Ice Thickness:	1.275 in
Windspeed (V):	125 mph
Ice Wind Speed (V):	50 mph
Exposure Category:	C
Topographic Feature:	N/A
Risk Category:	II

Tower Information	
Total Tower Height:	118.5 ft
Base Tower Height:	94.5 ft
Total Canister Length:	24 ft
Number of Canister Assembly Sections:	4



Canister Section Number *:	Canister Assembly Length (ft):	Canister Assembly Diameter (in):	Number of Sides Canister Section	Plate Type:	Mating Flange Plate Thickness (in)**:	Mating Flange Plate Diameter (in):	Solidity Ratio	Plate Weight (Kip):	Canister Weight (Kip)
1	6	16.125	Round	3	0.25	16	0.5	0.014	0.051
2	6	16.75	Round	3	0.25	16.5	0.5	0.015	0.053
3	6	17.375	Round	3	0.25	17	0.5	0.016	0.055
4	6	36	18	3	2.50	36	0.5	0.722	0.113

\* Sections are numbered from the top of the tower down

\*\* Mating Flange Plate Thickness at the bottom of canister section

Flag on Tower:	Yes
Flag Width:	18 ft
Flag Height:	12 ft
Flag Elevation(z):	118.5 ft

Truck Ball on Tower:	Yes
Diameter of Ball:	12 in

### Geometry : Base Tower + Spine

BU#827873 Rev H.eri (last saved 12/10 8:33 am)

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
118.5	24	0	0	5	5	0.875	n/a	ATM A519 C.D.
94.5	47.75	3.25	18	18	25.613	0.1875	0.75	A572-65
50	50	0	18	24.3	31.8	0.1875	0.75	A572-65

Delete

[x]

[x]

[x]

--	--	--	--	--	--	--	--	--

Discrete Loads: Truck Ball	Apply $C_a A_A$ at Elevation(z) (ft)	$C_a A_A$ No Ice (ft <sup>2</sup> )	$C_a A_A$ 1/2" Ice (ft <sup>2</sup> )	$C_a A_A$ 1" Ice (ft <sup>2</sup> )	$C_a A_A$ 2" Ice (ft <sup>2</sup> )	$C_a A_A$ 4" Ice (ft <sup>2</sup> )	Weight No Ice (Kip)	Weight 1/2" Ice (Kip)
		119	0.393	0.645	0.748	0.977	1.527	0.05

Discrete Loads : $C_F A_F$ for Canister Assembly								
Canister Loading	Apply $C_F A_F$ at Elevation(z) (ft)	$C_F A_F$ No Ice (ft <sup>2</sup> )	$C_F A_F$ 1/2" Ice (ft <sup>2</sup> )	$C_F A_F$ 1" Ice (ft <sup>2</sup> )	$C_F A_F$ 2" Ice (ft <sup>2</sup> )	$C_F A_F$ 4" Ice (ft <sup>2</sup> )	Canister Assembly Weight No Ice (Kip)	Canister Assembly Weight 1/2" Ice (Kip)
	Canister Load 1	118.5	1.814	1.927	2.039	2.264	2.714	0.025
Canister Load 2	112.5	3.698	3.923	4.148	4.598	5.498	0.066	0.128
Canister Load 3	106.5	3.839	4.064	4.289	4.739	5.639	0.069	0.133
Canister Load 4	100.5	7.625	7.895	8.165	8.705	9.785	0.100	0.200
Canister Load 5	94.5	5.670	5.828	5.985	6.300	6.930	0.778	0.845

User Forces: Flag Force Calculation Per ANSI/NAAMM FP 1001-07	
Wind <sub>FORCE</sub> =	0.481 Kip
Weight=	0.023 Kip
Wind <sub>FORCE, ICE</sub> =	0.079 Kip
Weight <sub>ICE</sub> =	0.607 Kip
W <sub>FORCE, SERVICE WIND</sub> =	0.111 Kip
Weight=	0.023 Kip

← Flag force should be included at the top of the flag attachment elevation. If the attachment of the flag to the halyard distributes forces equally to the pole, apply flag forces accordingly in tnx file.

Deflection Check Required:	Yes	<a href="#">Import Deflection Results</a>
3% Spine Deflection Check		
Allowable (3%) Horizontal Spine Deflection (inches)	Actual Deflection *** (inches)	Sufficient/ Insufficient
8.640	6.212	Sufficient

\*\*\* Relative deflection under service level wind speed

# Monopole Flange Plate Connection

Elevation = 94.5 ft.



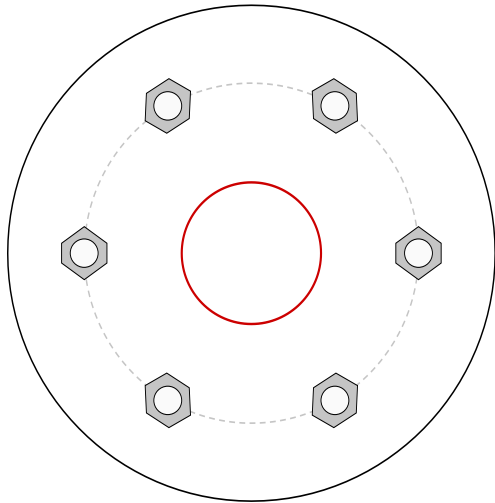
BU #	827873
Site Name	Shelton-2 RT/110
Order #	413133 Rev. 3

Applied Loads	
Moment (kip-ft)	24.81
Axial Force (kips)	2.10
Shear Force (kips)	1.52

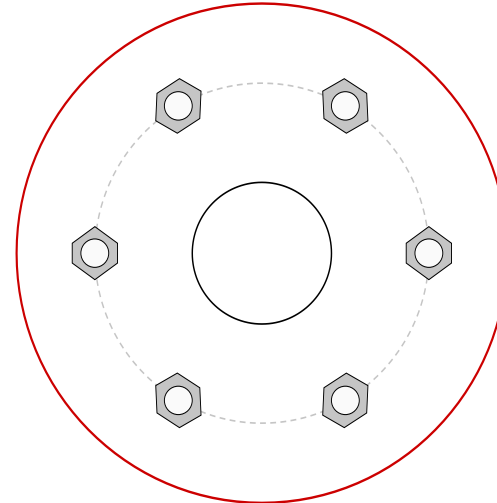
TIA-222 Revision	H
------------------	---

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



## Connection Properties

### Bolt Data

(6) 1"  $\phi$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 12" BC

### Top Plate Data

17.5" OD x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

### Bottom Plate Data

5" ID x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

### Top Stiffener Data

N/A

### Bottom Stiffener Data

N/A

### Top Pole Data

5" x 0.875" round pole (ATM A519 C.D.; Fy=70 ksi, Fu=85 ksi)

### Bottom Pole Data

18" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	16.14
Allowable (kips)	54.54
Stress Rating:	<b>28.2% Pass</b>

### Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	<b>N/A</b>
Tension Side Stress Rating:	<b>N/A</b>

### Bottom Plate Capacity

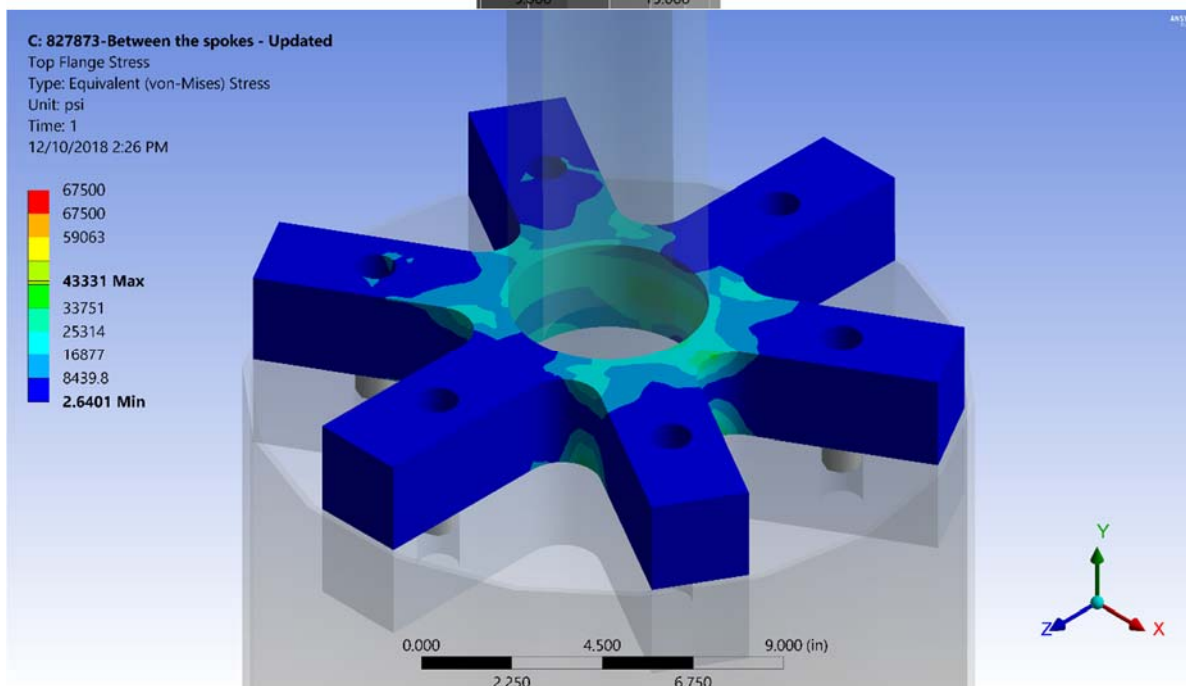
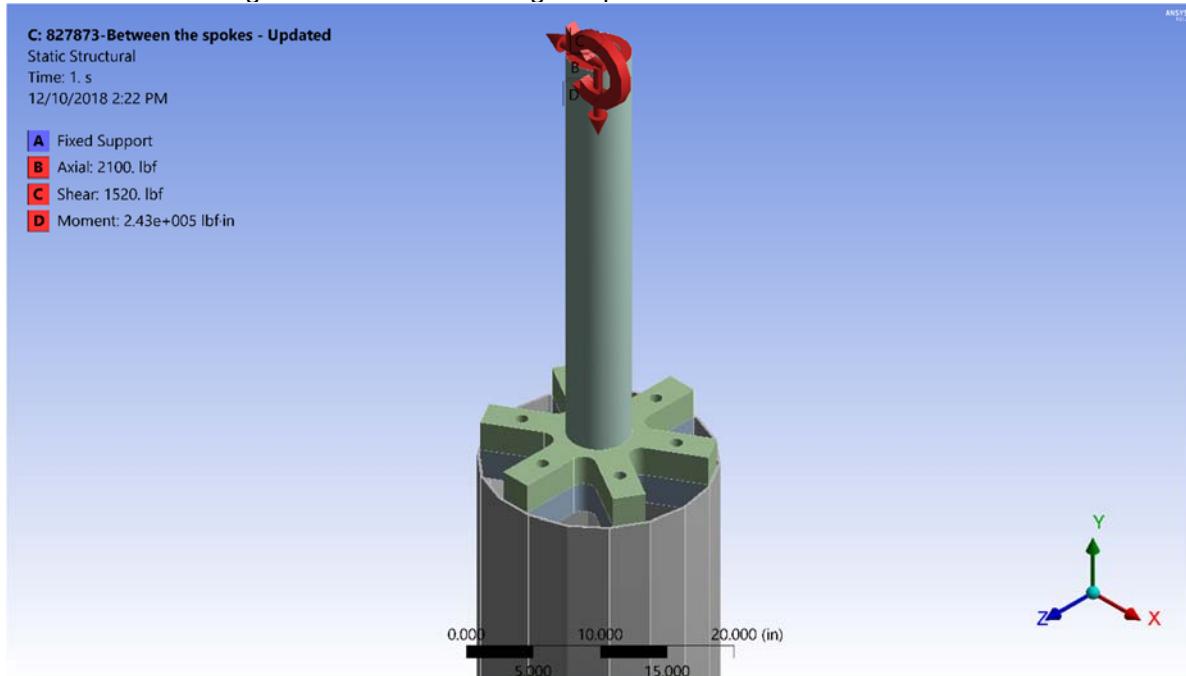
Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	<b>N/A</b>
Tension Side Stress Rating:	<b>N/A</b>

## Finite Element Analysis- 94.5' Flange Plate Connection

Controlling Component: Top Flange

Status: **Pass**

A finite element analysis was completed on the 94.5 ft flange plate connection. The purpose of this analysis was to determine the suitability of the tower's flange plate connection using the corresponding level reactions provided by tnxTower (see Appendix A). A 3D solid model was created of the 94.5 ft flange plate connection using SpaceClaim. A full analysis was performed of all components of the flange plate connection using ANSYS Structural (version 19.2). The images illustrate the controlling force direction and stress gradient of the controlling component.



## Spine Fillet Weld Check

*TIA Rev. H*



**Description:**

*This sheet is used to check the fillet welds that connect the spine to the flange plate on flagpole and concealment towers. Depending on the type of connection, the spine can be connected to the flange plate with an upper weld, lower weld and multiple horizontal welds. This sheet should only be used for **round/tubular** spines.*

**Assumptions:**

- 1. Prequalified fillet welds were used.*
- 2. When stiffeners are present, they are located symmetrically around the spine.*

## 1. Inputs

**Flange Location: 94.5'**

### 1.1 Reactions

Moment:  $M_u := 24.81 \text{ kip}\cdot\text{ft}$

Shear:  $V_u := 1.52 \text{ kip}$

Compression:  $P_u := 2.10 \text{ kip}$

### 1.2 Pole Properties

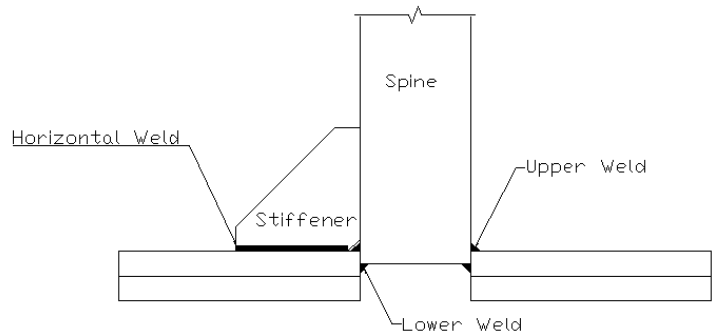
Connection Type (x):  
 Lap-Welded  
 Butt-Welded

Pipe Diameter:  $D := 5 \text{ in}$

Upper Weld Size:  $w_u := \frac{10}{16} \text{ in}$

Lower Weld Size:  $w_l := x \cdot w_u = \frac{5}{8} \text{ in}$

Stiffener Quantity (n):  
 0  
 3  
 4  
 6  
 8  
 9  
 10



Note: -Symmetrical loading only  
 -Verify stiffener capacity in CClplate

Horizontal Weld Size:  $w_h := \frac{0}{16} \text{ in}$

Note: Neglect if stiffener qty. is 0

Stiffener Width:  $L_s := 0 \text{ in}$

Note: Neglect if stiffener qty. is 0

Stiffener Notch Size:  $N_{\text{stiffener}} := 0 \text{ in}$

Note: Neglect if stiffener qty. is 0

Weld Strength:  $F_{\text{exx}} := 80 \text{ ksi}$

Spine Tensile Strength:  $F_{\text{us}} := 85 \text{ ksi}$

Flange Tensile Strength:  $F_{\text{uf}} := 65 \text{ ksi}$

Flange Thickness:  $t := 2.5 \text{ in}$

## 2. Weld Properties

Moment of inertia following weld line approach:

[AISC 14th ed; Fig. 8-6, pg 8-13]

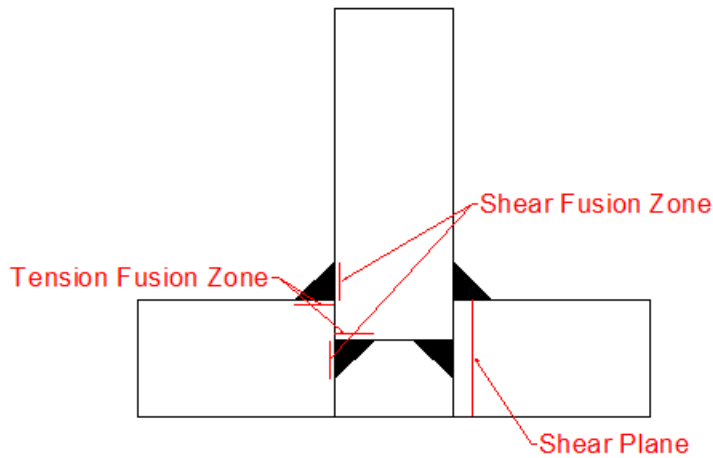
	Upper	Lower	Horizontal
Length:	$L_u := \pi \cdot D = 15.71 \cdot \text{in}$	$L_l := x \cdot L_u = 15.71 \cdot \text{in}$	$L_h := n \cdot 2 \cdot L_s = 0 \cdot \text{in}$
Inertia:	$I_u := \pi \cdot \left(\frac{D}{2}\right)^3 = 49.09 \cdot \text{in}^3$	$I_l := x \cdot I_u = 49.09 \cdot \text{in}^3$	$I_h = 0 \cdot \text{in}^3$
Effective Throat:	$\text{throat}_u := w_u \cdot \frac{\sqrt{2}}{2} = 0.44 \cdot \text{in}$	$\text{throat}_l := w_l \cdot \frac{\sqrt{2}}{2} = 0.44 \cdot \text{in}$	$\text{throat}_h := w_h \cdot \frac{\sqrt{2}}{2} = 0 \cdot \text{in}$
Total Area:	$A_{\text{tot}} := L_u \cdot \text{throat}_u + L_l \cdot \text{throat}_l + L_h \cdot \text{throat}_h = 13.88 \cdot \text{in}^2$		
Total Inertia:	$I_{\text{tot}} := I_u \cdot \text{throat}_u + I_l \cdot \text{throat}_l + I_h \cdot \text{throat}_h = 43.39 \cdot \text{in}^4$		
Extreme Fiber:	$c := \begin{cases} \frac{D}{2} + L_s & \text{if } n > 0 \\ \frac{D}{2} & \text{otherwise} \end{cases}$ $c = 2.5 \cdot \text{in}$		
Elastic Section Modulus:	$S := \frac{I_{\text{tot}}}{c} = 17.36 \cdot \text{in}^3$		

## 3. Weld Check

Weld Stress:	$r_{\text{mu}} := \frac{M_u}{S} = 17.15 \cdot \text{ksi}$ $r_{\text{vu}} := \frac{V_u}{A_{\text{tot}}} = 0.11 \cdot \text{ksi}$ $r_{\text{pu}} := \frac{P_u}{A_{\text{tot}}} = 0.15 \cdot \text{ksi}$	
Resultant Force:	$r_u := \sqrt{(r_{\text{mu}} + r_{\text{pu}})^2 + r_{\text{vu}}^2} = 17.31 \cdot \text{ksi}$	[AISC 14th ed; 8-11a, pg. 8-14]
Weld Capacity:	$f_w := 0.75 \cdot 0.6 \cdot F_{\text{exx}} = 36 \cdot \text{ksi}$	[AISC 14th ed; Table J2.5, pg 16.1-115]
Capacity Ratio:	<div style="background-color: #90EE90; padding: 2px;">Rating<sub>w</sub> = 48.1·%</div> <div style="background-color: #00CED1; padding: 2px;">Results = "Pass"</div>	



#### 4. Base Metal Check for Circumferential Weld



##### 4.1 Shear Fusion Zone

Controlling Tensile Strength:

$$F_{u1} = 65 \cdot \text{ksi}$$

Base Metal Capacity:

$$R_{BM1} := 0.75 \cdot 0.6 \cdot F_{u1} \cdot w_u = 18.28 \cdot \frac{\text{kip}}{\text{in}} \quad [\text{AISC 14th ed; J4-4, pg. 16.1-129}]$$

##### 4.2 Tensile Fusion Zone

Controlling Tensile Strength:

$$F_{u2} = 65 \cdot \text{ksi}$$

Base Metal Capacity:

$$R_{BM2} := 0.75 \cdot F_{u2} \cdot w_u = 30.47 \cdot \frac{\text{kip}}{\text{in}} \quad [\text{AISC 14th ed; J4-2, pg. 16.1-128}]$$

$$R_{BM} := \min(R_{BM1}, R_{BM2}) = 18.28 \cdot \frac{\text{kip}}{\text{in}}$$

Weld Capacity:

$$f_{\text{ww}} := 0.75 \cdot 0.6 \cdot F_{\text{exx}} \cdot \text{throat}_u = 15.91 \cdot \frac{\text{kip}}{\text{in}} \quad [\text{AISC 14th ed; Table J2.5, pg 16.1-115}]$$

Check:

Check<sub>fusionzone</sub> = "OK"

##### 4.3 Flange Shear Plane Check

Base Metal Capacity:

$$R_{BM3} := 0.75 \cdot 0.6 \cdot F_{uf} \cdot t = 73.12 \cdot \frac{\text{kip}}{\text{in}} \quad [\text{AISC 14th ed; J4-4, pg. 16.1-129}]$$

Weld Capacity:

$$f_{\text{ww}} := 0.75 \cdot 0.6 \cdot F_{\text{exx}} \cdot (\text{throat}_u + \text{throat}_l) = 31.82 \cdot \frac{\text{kip}}{\text{in}} \quad [\text{AISC 14th ed; Table J2.5, pg 16.1-115}]$$

Minimum Flange Thickness:

$$t_{\text{min}} := \frac{f_w}{0.75 \cdot 0.6 \cdot F_{uf}} = 1.09 \cdot \text{in}$$

Check:

Check<sub>thickness</sub> = "OK"

Capacity Ratio:

$$\text{Rating} := \frac{t_{\text{min}}}{t} \cdot (\text{Rating}_w)$$

Rating = 20.9-%

# Monopole Base Plate Connection

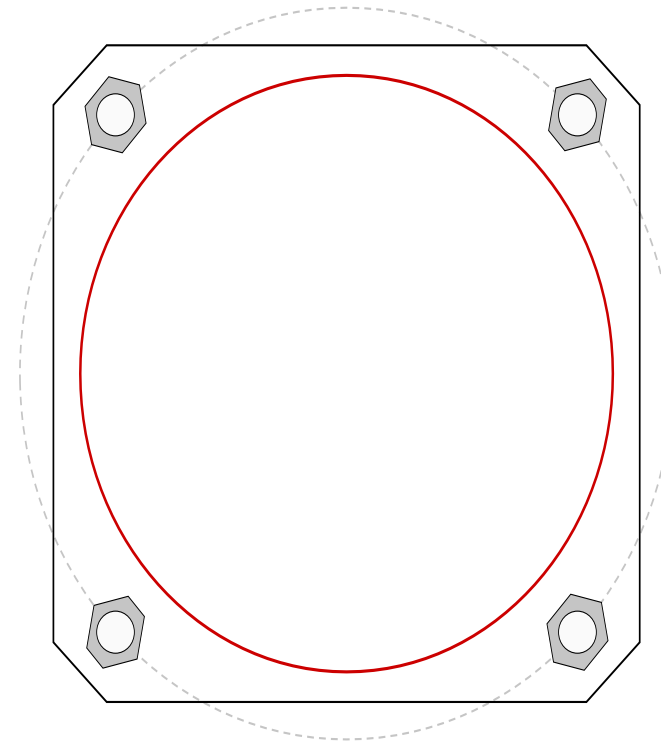


Site Info	
BU #	827873
Site Name	Shelton-2 RT/110
Order #	413133 Rev. 3

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	1.25

Applied Loads	
Moment (kip-ft)	476.32
Axial Force (kips)	9.72
Shear Force (kips)	7.62

\*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
<b>Anchor Rod Data</b>		<b>Anchor Rod Summary</b> <i>(units of kips, kip-in)</i>	
(4) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 39" BC		$P_{u_c} = 148.79$	$\phi P_{n_c} = 243.75$ <b>Stress Rating</b>
<b>Base Plate Data</b>		$V_u = 1.9$	$\phi V_n = 73.13$ <b>58.2%</b>
35" OD x 2.25" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)		$M_u = n/a$	$\phi M_n = n/a$ <b>Pass</b>
<b>Stiffener Data</b>		<b>Base Plate Summary</b>	
N/A		Max Stress (ksi):	23.91 (Flexural)
<b>Pole Data</b>		Allowable Stress (ksi):	45
31.8" x 0.1875" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)		Stress Rating:	<b>50.6%</b> <b>Pass</b>

# Pier and Pad Foundation



**BU #:** 827873  
**Site Name:** Shelton-2/RT 110  
**App. Number:** 413133 Rev. 3

**TIA-222 Revision:** H  
**Tower Type:** Monopole

Block Foundation?:

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	10	kips
Base Shear, $Vu_{comp}$ :	8	kips
Moment, $M_u$ :	476	ft-kips
Tower Height, $H$ :	118.5	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	93.83	8.00	8.1%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	2.91	30.8%	Pass
<i>Overturning (kip*ft)</i>	1007.44	534.17	53.0%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	2159.22	508.00	22.4%	Pass
<i>Pier Compression (kip)</i>	11934.00	28.00	0.2%	Pass
<i>Pad Flexure (kip*ft)</i>	1908.35	147.97	7.4%	Pass
<i>Pad Shear - 1-way (kips)</i>	416.70	30.05	6.9%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.009	5.2%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	1908.35	304.80	15.2%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	5	ft
Ext. Above Grade, $E$ :	0.5	ft
Pier Rebar Size, $Sc$ :	9	
Pier Rebar Quantity, $mc$ :	20	
Pier Tie/Spiral Size, $St$ :	5	
Pier Tie/Spiral Quantity, $mt$ :	11	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Soil Rating*:	53.0%
Structural Rating*:	22.4%

Pad Properties		
Depth, $D$ :	6.5	ft
Pad Width, $W$ :	13.5	ft
Pad Thickness, $T$ :	3	ft
Pad Rebar Size, $Sp$ :	9	
Pad Rebar Quantity, $mp$ :	14	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	60000	psi
Concrete Compressive Strength, $F'c$ :	3000	psi
Dry Concrete Density, $\delta c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	115	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	12.000	ksf
Cohesion, $Cu$ :		ksf
Friction Angle, $\phi$ :	30	degrees
SPT Blow Count, $N_{blows}$ :		
Base Friction, $\mu$ :		
Neglected Depth, $N$ :	3.50	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	N/A	ft

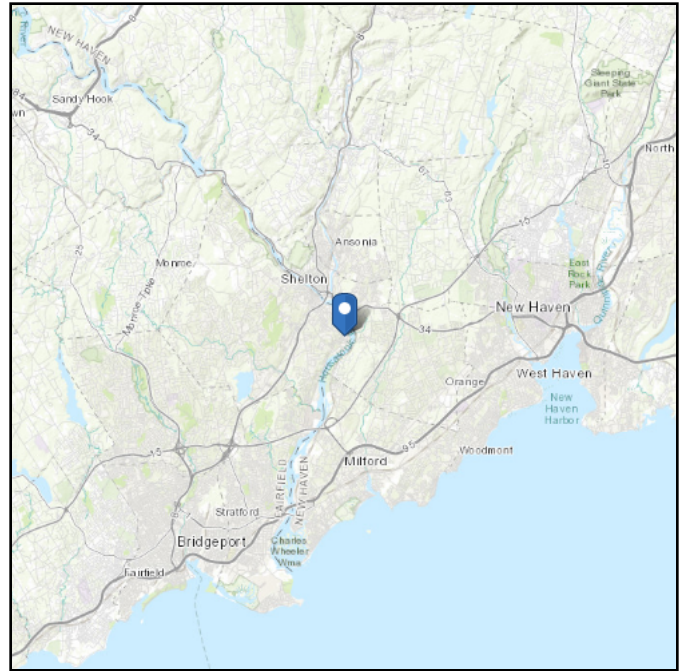
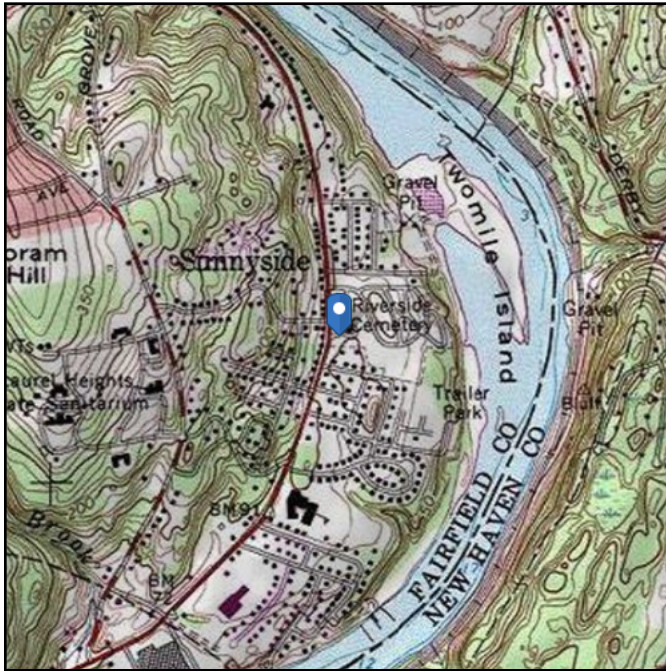
--Toggle between Gross and Net

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 99.37 ft (NAVD 88)  
**Latitude:** 41.295556  
**Longitude:** -73.07259



## Wind

**Results:** **77 Vmph**

Wind Speed: 124 Vmph

10-year MRI 77 Vmph

25-year MRI 87 Vmph

50-year MRI 93 Vmph

100-year MRI 100 Vmph

125 mph WIND SPEED WAS USED PER JURISDICTION

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

**Date Accessed:** Tue Dec 04 2018

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

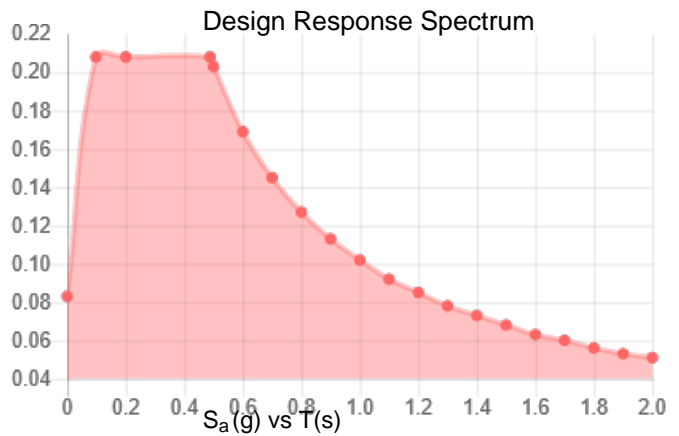
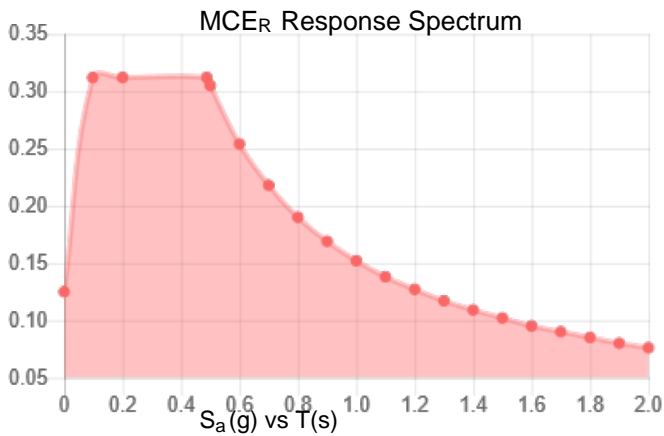
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_S$ :	0.195	$S_{DS}$ :	0.208
$S_1$ :	0.063	$S_{D1}$ :	0.102
$F_a$ :	1.600	$T_L$ :	6.000
$F_v$ :	2.400	PGA :	0.104
$S_{MS}$ :	0.312	PGA <sub>M</sub> :	0.165
$S_{M1}$ :	0.152	F <sub>PGA</sub> :	1.593
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Tue Dec 04 2018

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

## Ice

---

**Results:**

Ice Thickness: 0.75 in.  
Concurrent Temperature: 15 F  
Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Tue Dec 04 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.



# RF EMISSIONS COMPLIANCE REPORT

## Crown Castle on behalf of AT&T Mobility, LLC

**Crown Castle Site Name: Shelton-2/Rt 110**  
**Crown Castle Site BU: 827873**  
**AT&T Mobility, LLC FA #: 10050786**  
**308 River Road (Rt. 110)**  
**Shelton, CT**  
**2/1/2019**

### Report Status:

**AT&T Mobility, LLC Is Compliant**



Sealed 1Feb2019 mike@h2dc.com  
H2DC PLLC Ct CoA#: 0001714

**Prepared By:**

**Sitesafe, LLC**

Engineering Statement in Re:  
Electromagnetic Energy Analysis  
Crown Castle  
Shelton, CT

My signature on the cover of this document indicates:

That I, Michael A McGuire, am currently and actively licensed to provide (in this state/jurisdiction as indicated within the professional electrical engineering seal on the cover of this document) professional electrical engineering services, as an employee of Hurricane Hill Development Company, PLLC , a duly authorized/registered engineering firm (in this state, as applicable) on behalf of SiteSafe, LLC; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "Shelton-2/Rt 110" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and



That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 1.546% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 1.925% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

**Crown Castle  
Shelton-2/Rt 110  
Site Summary**

<b>Carrier</b>	<b>Area Maximum Percentage MPE</b>
AT&T Mobility, LLC (Proposed)	0.198 %
AT&T Mobility, LLC (Proposed)	0.909 %
AT&T Mobility, LLC (Proposed)	0.09 %
AT&T Mobility, LLC (Proposed)	0.349 %
T-Mobile	0.125 %
T-Mobile	0.255 %
 <b>Composite Site MPE:</b>	 1.925 %

**AT&T Mobility, LLC (Proposed)**  
**Shelton-2/Rt 110**  
**Carrier Summary**

Frequency: 2300 MHz  
Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.97976  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.19798 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	HPA65R-BU4A	99	30	785	1.58034	0.158034	1.973073	0.197307
CCI Antennas	HPA65R-BU4A	99	150	785	1.571879	0.157188	1.973073	0.197307
CCI Antennas	HPA65R-BU4A	99	270	785	1.58034	0.158034	1.973073	0.197307

**AT&T Mobility, LLC (Proposed)  
Shelton-2/Rt 110  
Carrier Summary**

Frequency: 1900 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 9.08561  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.90856 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	HPA65R-BU4A	99	30	2958	7.390112	0.739011	9.041235	0.904123
CCI Antennas	HPA65R-BU4A	99	150	2958	7.246198	0.72462	9.041235	0.904123
CCI Antennas	HPA65R-BU4A	99	270	2958	7.246198	0.72462	9.041235	0.904123

**AT&T Mobility, LLC (Proposed)**  
**Shelton-2/Rt 110**  
**Carrier Summary**

Frequency: 850 MHz  
Maximum Permissible Exposure (MPE): 566.67  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 0.50831  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.0897 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	HPA65R-BU4A	99	30	288	0.488284	0.086168	0.50712	0.089492
CCI Antennas	HPA65R-BU4A	99	150	288	0.489302	0.086347	0.50712	0.089492
CCI Antennas	HPA65R-BU4A	99	270	288	0.488284	0.086168	0.50712	0.089492

**AT&T Mobility, LLC (Proposed)**  
**Shelton-2/Rt 110**  
**Carrier Summary**

Frequency: 737 MHz  
Maximum Permissible Exposure (MPE): 491.33  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.71238  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.34852 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	HPA65R-BU4A	99	30	901	1.651211	0.336067	1.697525	0.345493
CCI Antennas	HPA65R-BU4A	99	150	901	1.651705	0.336168	1.697525	0.345493
CCI Antennas	HPA65R-BU4A	99	270	901	1.651211	0.336067	1.697525	0.345493

## T-Mobile Shelton-2/Rt 110 Carrier Summary

**Frequency:** 2100 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 1.25173  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.12517 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXV18-206516L-C	116	0	2313	0.776651	0.077665	1.159524	0.115952
RFS	APXV18-206516L-C	116	120	2313	0.776256	0.077626	1.159524	0.115952
RFS	APXV18-206516L-C	116	240	2313	0.776651	0.077665	1.159524	0.115952

**T-Mobile  
Shelton-2/Rt 110  
Carrier Summary**

**Frequency:** 1900 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 2.55158  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.25516 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	84010077	110	30	1575	1.010275	0.101028	1.656746	0.165675
Kathrein-Scala	84010077	110	150	1575	1.005139	0.100514	1.656746	0.165675
Kathrein-Scala	84010077	110	270	1575	1.005139	0.100514	1.656746	0.165675
RFS	APXV18-206516L-C	116	0	2313	0.776651	0.077665	1.159524	0.115952
RFS	APXV18-206516L-C	116	120	2313	0.776256	0.077626	1.159524	0.115952
RFS	APXV18-206516L-C	116	240	2313	0.776651	0.077665	1.159524	0.115952