



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

April 4, 2017

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

**RE: Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 842875**  
**AT&T Site ID: CT5139**  
**99 Day Hill Road, Windsor, CT 06095**  
**Latitude: 42° 52' 16.1" / Longitude: -72° 40' 16.0"**

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 168-foot level of the existing 168-foot monopole at 99 Day Hill Road in Windsor, CT. The tower is owned by Crown Castle. The property is owned by the Town of Windsor. AT&T now intends to add six (6) new RRHs to the ground and install six (6) tower mounted switches

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

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

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

Melanie A. Bachman

April 4, 2017

Page 2

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

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

Sincerely,

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

Attachments:

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

Tab 2: Exhibit-2: Structural Modification Report

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

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

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

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

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

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

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

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

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

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

 Chairperson

Public Act #75-317

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

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

RECEIVED FOR RECORD  
WINDSOR TOWN CLERK

00 NOV 30 PM 12: 58

VOL 1249 PG 156

BY Kathleen H. Quinn  
TOWN CLERK

## Property Cards

Address Search : 99 day hill road

Submit

[Clear Search](#)

### Your search returned multiple addresses

Additional addresses:

[99 DAY HILL RD](#)

#### 99 Day Hill Rd

**Property Owner:**

Windsor Town Of

**Property Co-Owner**

Public Works Garage

**Mailing Address:**275 Broad Street  
Windsor, CT  
06095**File Code**

9310

**Map:**

42

**Block:**

108

**Lot:**

1

**Census Tract:**

4735.01

**Property Type:**

Municipal MDL-96

**Land Area (Acres):**

11.76

**Zone:**

NZ

[Click to Enlarge](#)

#### Construction Details

**Year Built:**

1982

**Building Style:**

Garage/Office

**Stories:**

1

**Living Area:**

0 Sq/Ft

**Building ID**

3417

**Grade**

Average

**Exterior Wall**

Pre-Finsh Metl

**Total Rooms:****Bedrooms:****Bathrooms:****Half Baths:****Heating Type**

Hot Air-No Duc

**Heating Fuel**

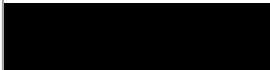
Gas

**AC Type**

None

**Valuation****Assessed Land Value:**  
\$536,830**Assessed Building Value:**  
\$1,076,250**Total Assessed Value:**  
\$1,613,080**Appraised Land Value:**  
\$766,900**Appraised Building Value:**  
\$1,537,500**Total Appraised Value:**  
\$2,304,400**Last Sale****Last Sale Date:**  
Friday, November 4th, 1977**Last Sale Price:**  
\$0**Qualified Sale:****Book/Page:**  
334/0257**Prior Owners**

Sale Date	Owner Name	Sale Price	Book / Page

**Parcel Sketch****Sub Area Detail**

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

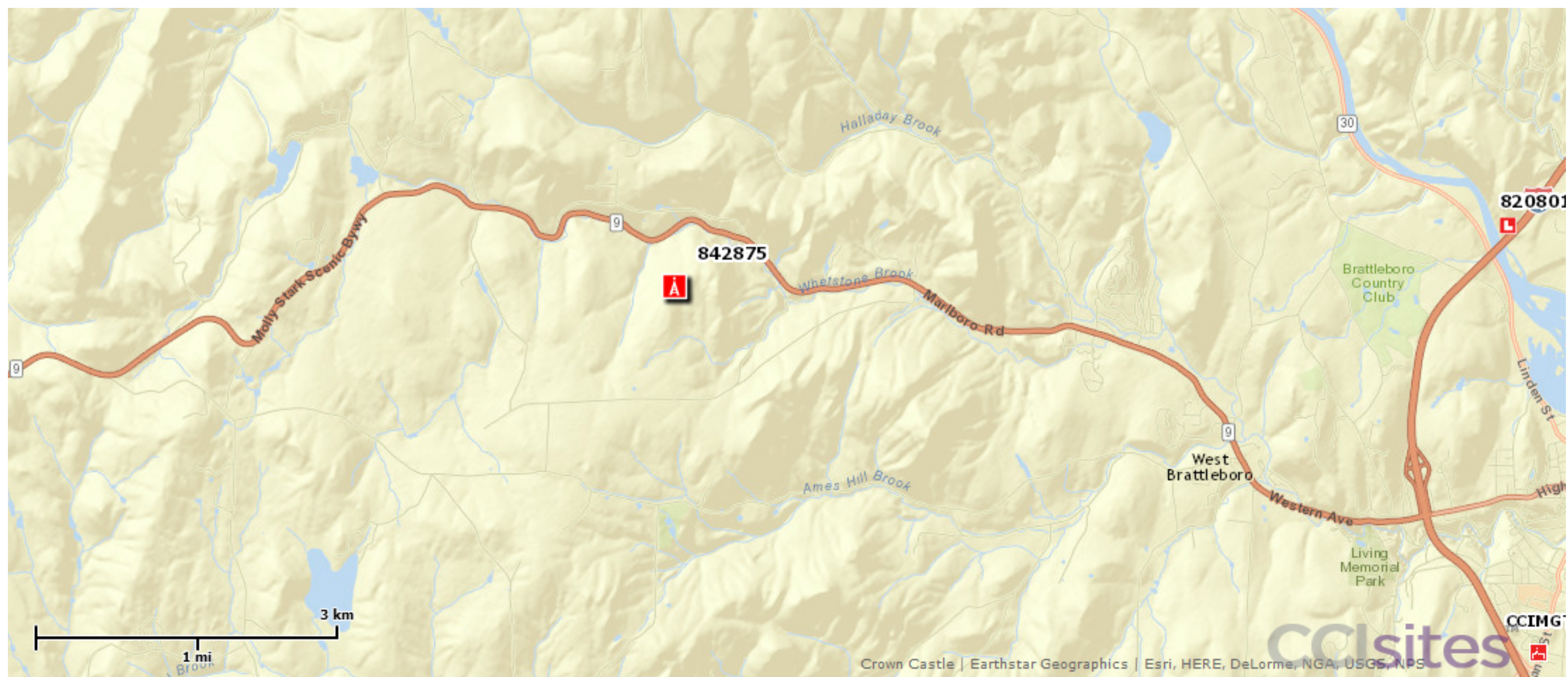
**Outbuildings & Extra Features**

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

**AOF** Office Area**APT** Apartment**BAS** First Floor**CAN** Canopy**CDN** Canopy (Det)**CLP** Loading Platform (Finished)**EA** Attic (Expan)(Finished)**EAU** Attic (Expan)(Unfinished)**FAT** Attic (Finished)**FBM** Basement (Finished)**FCB** Cabana (Encl)(Finished)**FCP** Carport (Framed)**FDC** Carport (Det)(Framed)**FDS** Porch (Scrn)(Det)(Finished)**FDU** Utility (Det)(Finished)

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









WIRELESS COMMUNICATIONS FACILITY  
CT5139 - LTE 4C/5C  
CROWN CASTLE SITE NO.: 842875  
WINDSORDAY HILL  
99 DAY HILL ROAD  
WINDSOR, CT 06095

GENERAL NOTES

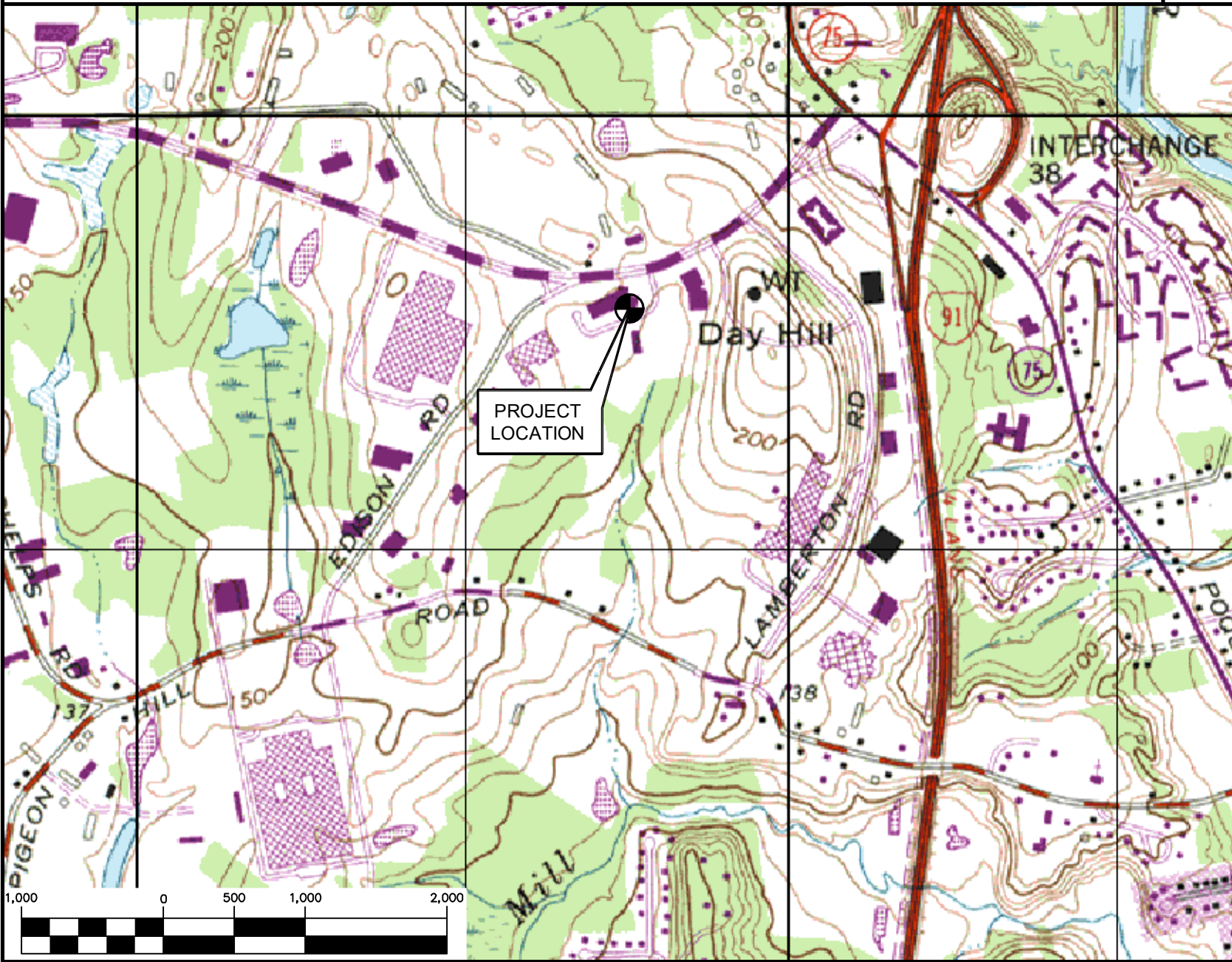
- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMENDMENTS, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
- CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
- CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
- CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
- CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
- CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
- LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
- THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
- DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
- ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
- CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
- THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
- COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
- ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
- CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

- FROM: 500 ENTERPRISE DRIVE  
ROCKY HILL, CONNECTICUT
- TO: 99 DAY HILL ROAD  
WINDSOR, CONNECTICUT
- HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD 0.31 MI
  - TURN LEFT ONTO CAPITAL BLVD 0.27 MI
  - TURN LEFT ONTO WEST ST 0.16 MI
  - TURN LEFT TO MERGE ONTO I-91 N TOWARD HARTFORD 15.26 MI
  - TAKE EXIT 37 TOWARD WINDSOR CENTER 0.24 MI
  - TURN LEFT ONTO CT-305/BLOOMFIELD AVE. 0.87 MI
  - TURN RIGHT ONTO ADDISON RD. 1.20 MI
  - TURN SLIGHT RIGHT ONTO DAY HILL RD. 0.09 MI
  - ARRIVE AT 99 DAY HILL RD ON RIGHT.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

- THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
  - INSTALL (3) NEW RRUS-E2 ON UNISTRUT FRAME IN EXISTING EQUIPMENT SHELTER.
  - INSTALL (3) NEW RRUS-11 ON UNISTRUT FRAME IN EXISTING EQUIPMENT SHELTER.
  - REMOVED AND REPLACE EXISTING DIPLEXERS WITH TRIPLEXERS ON EXISTING OVERHEAD CABLE LADDER.
  - INSTALL (2) NEW TRIPLEXERS BEHIND POSITION 2, (2) PER SECTOR/(6) TOTAL.

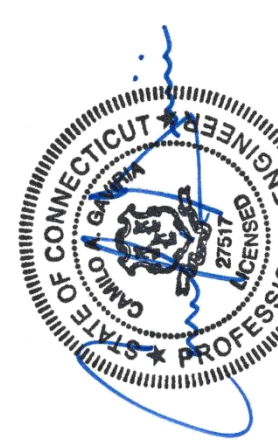
PROJECT INFORMATION

- AT&T SITE NUMBER: CT5139
- AT&T SITE NAME: WINDSORDAY HILL
- SITE ADDRESS: CROWN CASTLE SITE NO.: 842875  
99 DAY HILL ROAD  
WINDSOR, CT 06095
- LESSEE/APPLICANT: AT&T MOBILITY  
500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067
- CONTACT PERSON: LAUREN GROPP  
EMPIRE TELECOM, LLC  
(978) 430-2534
- ENGINEER: CENTEK ENGINEERING, INC.  
63-2 NORTH BRANFORD RD.  
BRANFORD, CT. 06405
- PROJECT COORDINATES: LATITUDE: 41°-37'-54.02" N  
LONGITUDE: 72°-43'-47.54" W  
GROUND ELEVATION: ±187' AMSL  
GROUND ELEVATION REFERENCED FROM  
GOOGLE EARTH. COORDINATES REFERENCED  
FROM RFDS DOCUMENTS.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES AND SPECIFICATIONS	0
C-1	PLANS AND ELEVATION	0
C-2	LTE 4C/5C EQUIPMENT DETAILS	0
E-1	LTE SCHEMATIC DIAGRAM AND NOTES	0
E-2	LTE WIRING DIAGRAM	0
E-3	TYPICAL ELECTRICAL DETAILS & NOTES	0

PROFESSIONAL ENGINEER SEAL



AT&T MOBILITY  
WIRELESS COMMUNICATIONS FACILITY  
**WINDSORDAY HILL**  
CT5139  
99 DAY HILL ROAD  
WINDSOR, CT 06095

DATE: 02/15/17

SCALE: AS NOTED

JOB NO. 17004.15

TITLE SHEET

T-1

Sheet No. 1 of 7



**AA** **FRAME BASE PLATE PLAN DETAIL**  
C-2 NOT TO SCALE

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.



AT&T ANTENNAS  
EL. ±168' AGL

T/EXISTING MONOPOLE  
EL. ±168' AGL

#### TOWER STRUCTURAL NOTES:

1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL AT&T RF DATA SHEET.

#### NOTES:

1. OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
2. A.G.L. = ABOVE GRADE LEVEL

NOTE:  
GROUND EQUIPMENT NOT  
SHOWN FOR CLARITY.

#### NOTES:

1. PROVIDE MOUNTING PIPES, CROSSOVERS & ASSOCIATED HARDWARE TO COMPLETE THE PROPOSED UPGRADE.
2. REFER TO CROWN CASTLE, INC. STRUCTURAL REPORT AND FINAL AT&T RF DATA SHEET PRIOR TO INSTALLATION OF TOWER MOUNTED LTE RELATED ANTENNAS, CABLES AND RELATED EQUIPMENT
3. COORDINATE ANTENNA CENTERLINE ELEVATION, RRU/SURGE ARRESTOR MOUNTING ELEVATION, ATTACHMENT HARDWARE WITH CROWN CASTLE, INC.

EXISTING ICE BRIDGE (TYP.)

EXISTING ±168' TALL MONOPOLE

ICE CANOPY OVER  
EXISTING EQUIPMENT

EXISTING EQUIPMENT PAD (BY OTHERS)

EXISTING NEXTEL EQUIPMENT SHELTER

EXISTING COMPOUND CHAINLINK FENCE

SECOND CABINET MOUNTED ON FRAME

EXISTING UTILITY BACKBOARD

1 COMPOUND PLAN  
C-1 SCALE: 3/16" = 1'-0"

EXISTING ±168' TALL MONOPOLE

EXISTING EQUIPMENT SHELTER (BY OTHERS)

EXISTING AT&T EQUIPMENT SHELTER

EXISTING COMPOUND CHAINLINK FENCE

GRADE

ERICSSON RRU

AT&T SUPPLIED  
POLE MOUNTING BRACKET

ISOMETRIC VIEW

MIN. 2" O.D. TO MAX. 6" O.D. PIPE,  
GALVANIZED

#### NOTES:

1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALL RRU AND MAKES CABLE TERMINATIONS.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

3 MOUNTING DETAIL  
C-1 SCALE: 3/4" = 1'-0"

EXISTING TMA, TYP. OF (1)  
PER SECTOR/(3) TOTAL.

- ALPHA/BETA - P/N: QUINTEL QS66512-2
- GAMMA - P/N: CCI TPA-65R-LCUUUU-H8

EXISTING AT&T TOWER MOUNT

280' GAMMA  
SECTOR  
EXISTING RRUS-32,  
TYP. OF (1) PER  
SECTOR/(3) TOTAL.

EXISTING RRUS-11,  
TYP. OF (1) PER  
SECTOR/(3) TOTAL.

EXISTING AT&T PANEL ANTENNA  
POS. 1 (P/N: KATHREIN  
800-10121), TYP. OF (1) PER  
SECTOR/(3) TOTAL.

EXISTING AT&T SURGE  
ARRESTOR, TYP. OF (2).

EXISTING AT&T PANEL ANTENNA,  
POS. 2

- ALPHA/BETA - P/N: KMW AM-X-CD-16-65-00T-RET
- GAMMA - P/N: POWERWAVE P65-17-XLH-RR

AT&T SURGE ARRESTOR (P/N:  
RAYCAP DC-6-48-60-18-8F),  
TYP. OF (1).

RRUS-32 B2, TYP. OF (1)  
PER SECTOR/(3) TOTAL.

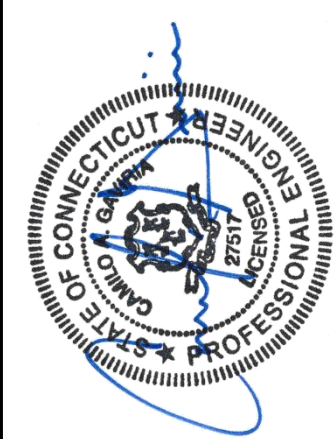
AT&T TRIPLEXER'S,  
(P/N: CCI TPX-070821)  
TYP. OF (2) PER SECTOR/(6) TOTAL.

EXISTING ±168' TALL MONOPOLE

2 PROPOSED ANTENNA PLAN  
C-1 SCALE: 1/2" = 1'-0" NORTH

4 TOWER ELEVATION  
C-1 SCALE: 1" = 10'

PROFESSIONAL ENGINEER SEAL



**CENTEK** engineering  
Centered on Solutions  
(203) 488-0380  
(203) 488-3387 Fax  
632 North Branford Road  
Branford, CT 06405  
www.CentekEng.com

AT&T MOBILITY  
WIRELESS COMMUNICATIONS FACILITY  
**WINDSORDAY HILL**  
CT5139  
99 DAY HILL ROAD  
WINDSOR, CT 06095

DATE: 02/15/17

SCALE: AS NOTED

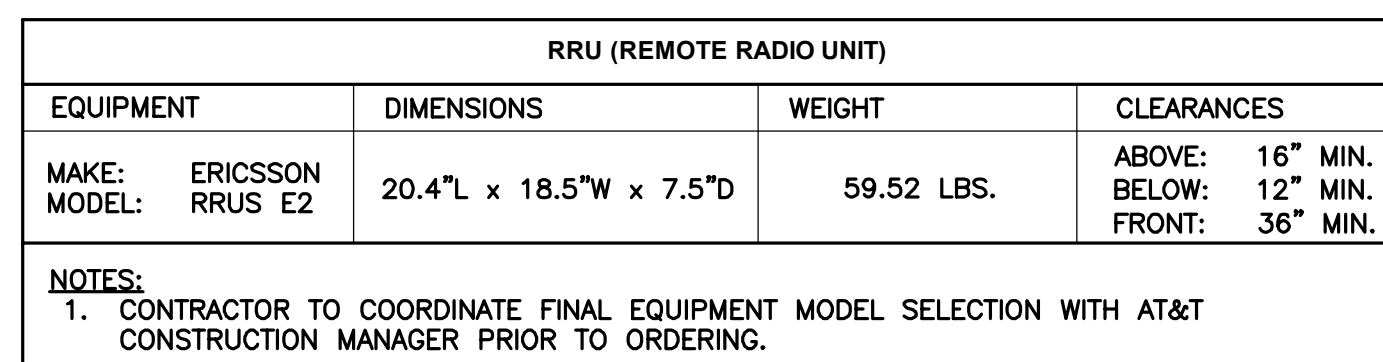
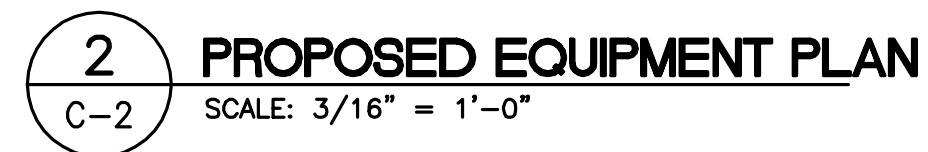
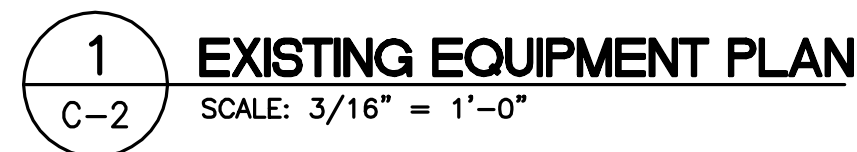
JOB NO. 17004.15

PLANS AND  
ELEVATION

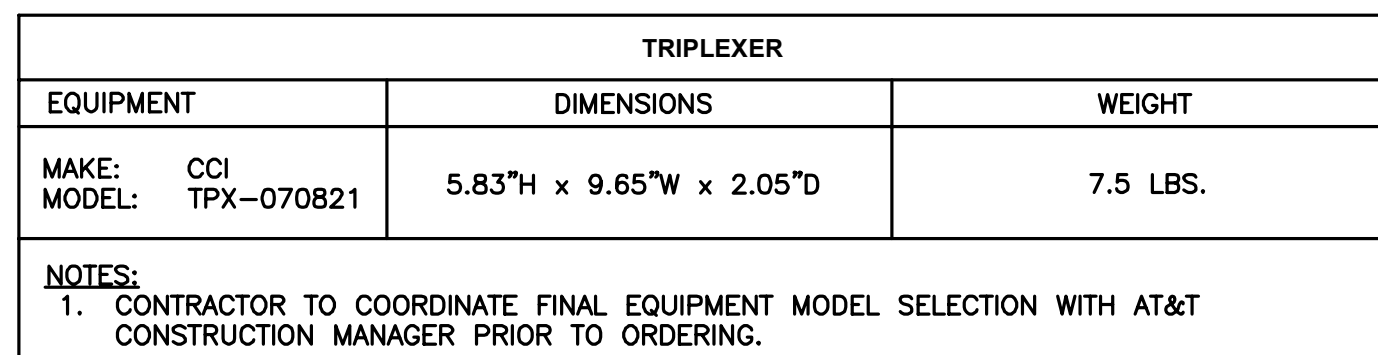
C-1

Sheet No. 3 of 7

CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION  
DRAWN BY CHKD BY DESCRIPTION  
CAG  
02/15/17  
DATE  
0  
REV



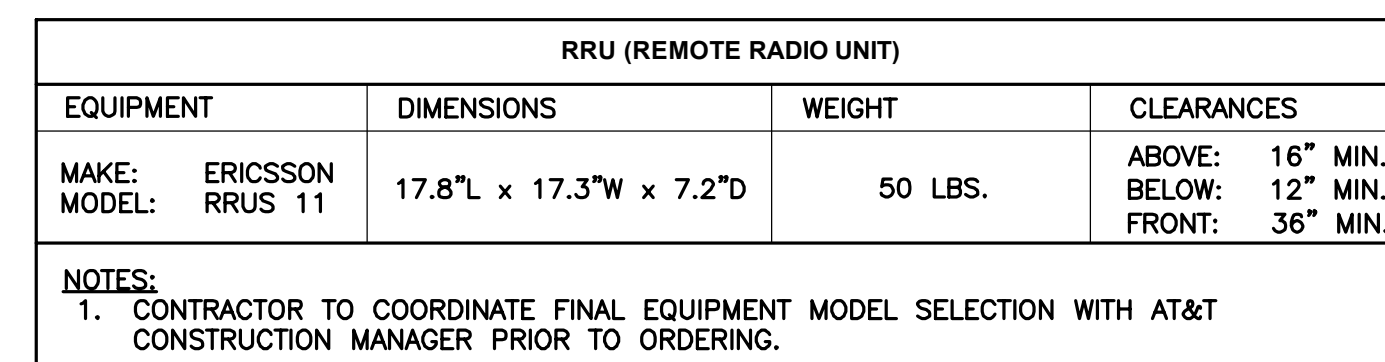
5 ERICSSON RRUS E2 DETAIL  
C-2 SCALE: 1" = 1'-0"



4  
C-3

**TRIPLEXER DETAIL**

SCALE: NONE



3  
C-2

C-2

Sheet No. 4 of 7





1. BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRRs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
2. LEAVE COILED AND PROTECTED UNTIL TERMINATED.
3. DC AND FIBER CABLE SHALL BE ROUTED WITH THE EXISTING COAX CABLE.
4. DC SURGE PROTECTION SHELF SHALL BE RAYCAP DCX-48-60-RM.
5. FIBER & DC DISTRIBUTION CABLES SHALL BE RAYCAP DCS-60-48-60-18-9F.
6. SUPPORT FIBER & DC POWER CABLES WITH SNAP-IN HANGERS SPACED NO GREATER THAN 3 FEET APART ON TOWER. SUPPORT FIBER AND DC POWER CABLES INSIDE MONOPOLE WITH CABLE HOISTING GRIPS AT 250 FT MAXIMUM INTERVALS. DRESS CABLES TO PREVENT CONTACT WITH ENTRANCE AND EXIT OPENINGS.
7. CONDUIT TO BE USED ON A TOWER IF THE RRU IS MORE THAN 10' FROM THE DISTRIBUTION UNITS. MAX CABLE LENGTH IS 16 FEET.
8. FIBER-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS2A194", COPPER, UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER), UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE I/II) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS I (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/75°C WET INSTALLATION.
9. GROUNDING WIRES SHALL BE COPPER, GREEN THHN/THWN UL LISTED FOR 90°C DRY/75°C WET INSTALLATION. MINIMUM SIZE IS 6 AWG UNLESS NOTED OTHERWISE.
10. OPTICAL CABLES SHALL BE INSTALLED IN FLEXIBLE CONDUIT AS SCOPED BY MARKET.
11. RET. CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
12. RBS 6601 VARIANT 2 REQUIRES A 25A BREAKER AND 10 AWG (MIN.) CONDUCTORS. REPLACE EXISTING 15A OR 20A BREAKERS AND 12 AWG CONDUCTORS WHEN UPGRADING AN EXISTING RBS 6601 VARIANT 1.

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEMS AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION.
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS' CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT  
PROFESSIONAL ENGINEER  
27817  
DAVID A. GAGLIARDI



DATE:	02/15/17
SCALE:	AS NOTED
JOB NO.	17004.15

**E-1**

Sheet No. 5 of 7





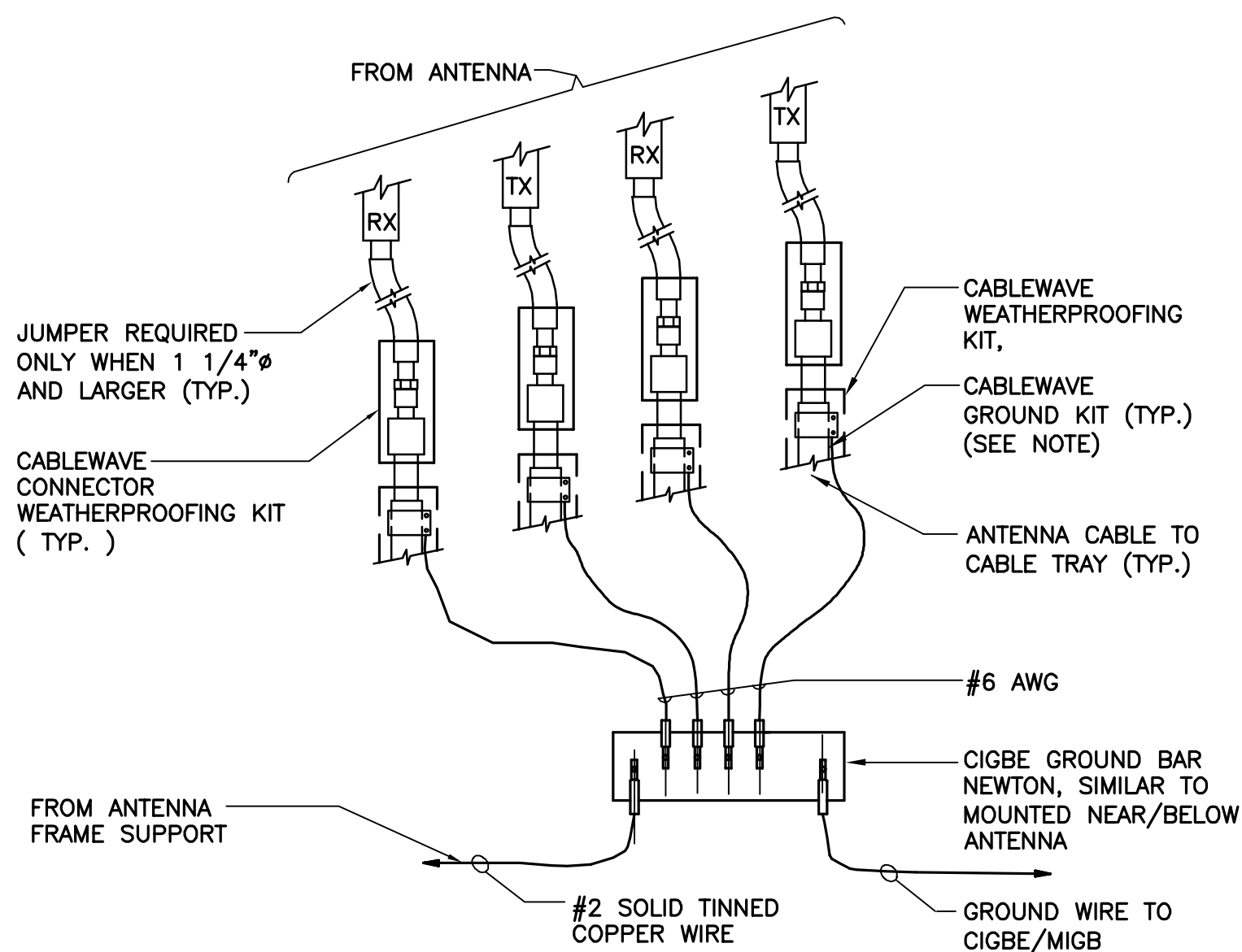
## LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20",  
NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH  
NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2.  
3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO.  
CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO.  
4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

3  
E-3

**GROUND BAR DETAIL**

NOT TO SCALE



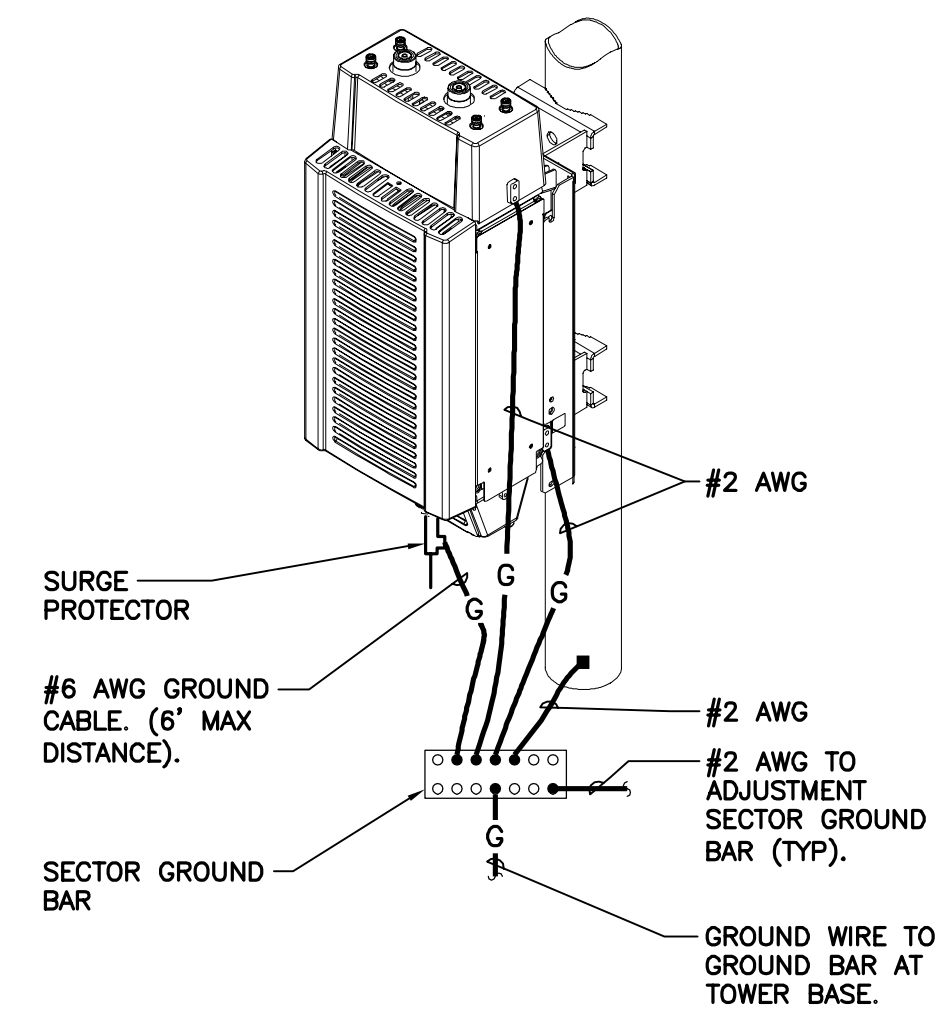
**NOTE:**

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

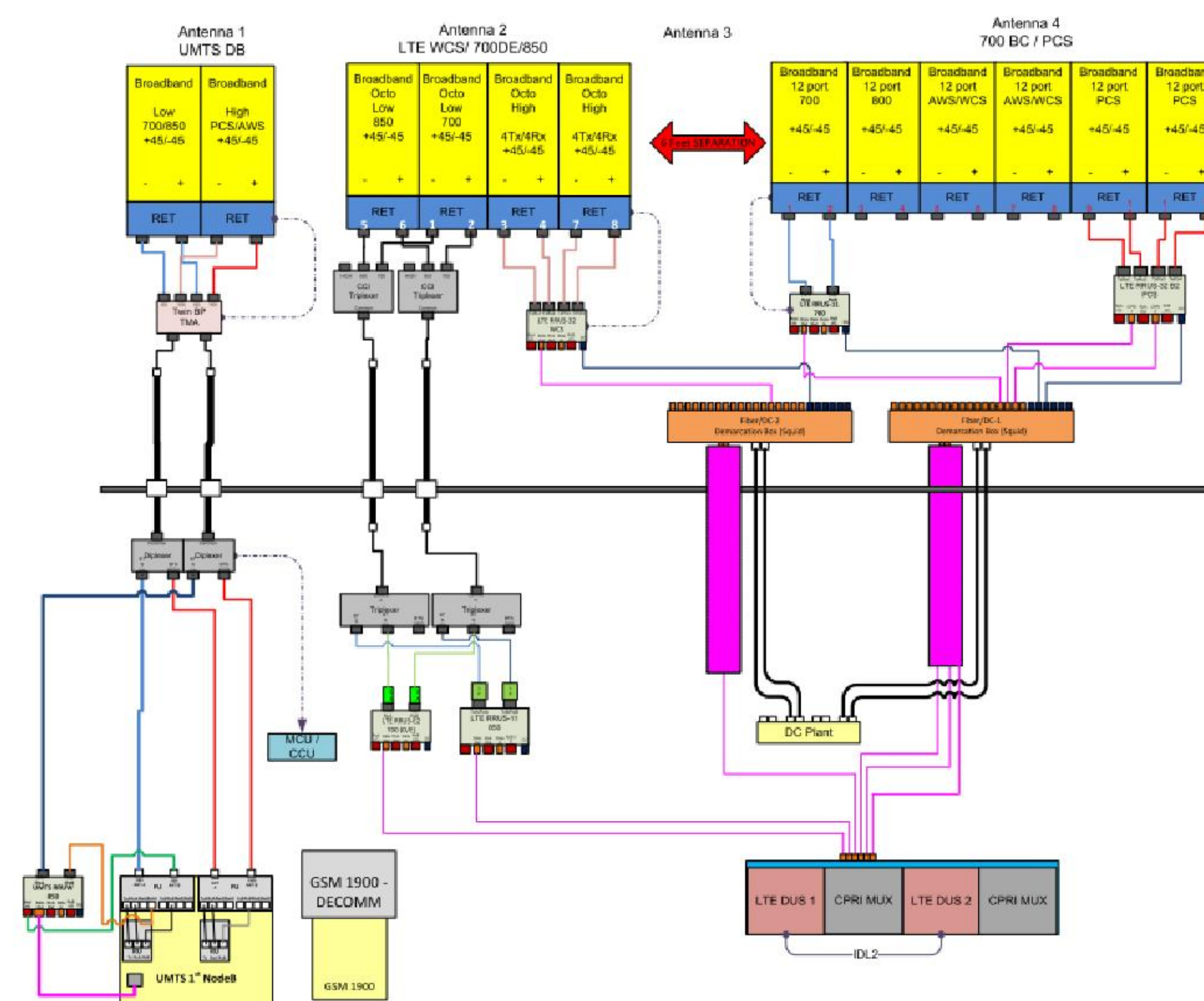
## 2 CONNECTION OF GROUND WIRES TO GROUND BAR

E-3 NOT TO SCALE

- EACH RRRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
  2. AT RIGHT SIDE OF THE CABINET.



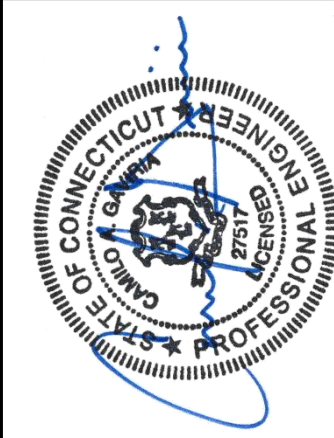
1 RRU POLE MOUNT GROUNDING  
E-3 NOT TO SCALE



**4 RF PLUMBING DIAGRAM**  
E-3 NOT TO SCALE

[illegible]

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WINDSOR, CT 06095

DATE: 02/15/17

DATE:	02/10/17
SCALE:	AS NOTED

JOB NO.	17004.15
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TYPICAL  
ELECTRICAL  
DETAILS & NOTES

**E-3**

Sheet No. 7 of 7



Date: February 20, 2017

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

**JACOBS**  
Jacobs Engineering Group, Inc.  
5449 Bells Ferry Road  
Acworth, GA 30102  
770-701-2500

**Subject:** Structural Analysis Report

**Carrier Designation:** AT&T Mobility Co-Locate  
Carrier Site Number: CT5139  
Carrier Site Name: Windsor CT

**Crown Castle Designation:** Crown Castle BU Number: 842875  
Crown Castle Site Name: WINDSOR DAY HILL  
Crown Castle JDE Job Number: 418461  
Crown Castle Work Order Number: 1364322  
Crown Castle Application Number: 376368 Rev. 0

**Engineering Firm Designation:** Jacobs Engineering Group Inc. Project Number: 1364322

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

Dear Charles Trask,

Jacobs Engineering Group Inc. is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1003466, in accordance with application 376368, revision 0.

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: Existing + Proposed Equipment

**Sufficient Capacity**

Note: See Table I and Table II for the proposed and existing loading, respectively.

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

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

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

Structural analysis prepared by:

Reviewed by:



Dustin Virgil M. Daulo  
Structural Engineer



Matthew E. Watkins, P.E.  
Engineering Project Manager

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### **7) APPENDIX C**

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## 1) INTRODUCTION

This tower is a 168 ft Monopole tower designed by Paul J. Ford and Company in November of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

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

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

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
168.0	168.0	3	cci antennas	DTMABP7819VG12A	2 1	3/4 3/8	-
		2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe			
		1	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe			
		6	cci antennas	TPX-070821			
		3	ericsson	RRUS 32			
		3	ericsson	RRUS 32 B30			
		6	kathrein	860 10025			
		2	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

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

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
168.0	169.0	2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2 1	3/4 3/8	2
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
	168.0	3	cci antennas	DTMABP7819VG12A			
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		3	ericsson	RRUS 32 B30			
		3	ericsson	RRUS-11 1900MHz			
		3	ericsson	RRUS 11-700			
		3	kathrein	800 10121 w/ Mount Pipe	12 2 1 1	1-5/8 3/4 3/8 7/8	1
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 1201-1]			
		1	kathrein	OG-4			
	174.0	1	kathrein	OG-4			



Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
159.0	164.0	2	andrew	VHLP2.5-11	6	5/16	1
		2	dragonwave	Horizon Compact			
	160.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		3	samsung telecommunications	RRH-2WB			
	159.0	1	tower mounts	Platform Mount [LP 1201-1]			
	156.0	1	andrew	VHLP2.5-11			
		1	dragonwave	Horizon Compact			
		1	rosenberger leoni	FB-15-ABOX			
147.0	147.0	1	andrew	VHLPX2-11	1	3/8	1
		1	kathrein	782 10876			
		1	tower mounts	Pipe Mount [PM 602-1]			
143.0	143.0	1	kathrein	782 10876	1	1/4	1
		1	pctel	MPRD2449			
		1	tower mounts	Pipe Mount [PM 602-1]			
140.0	140.0	1	ericsson	RIU	1	1/4	1
		1	motorola	PTP400			
		1	tower mounts	Side Arm Mount [SO 201-1]			
135.0	144.0	2	decibel	ASP 705K	2	7/8	1
	135.0	2	tower mounts	Side Arm Mount [SO 702-1]			
130.0	131.0	3	alcatel lucent	1900MHz RRH	3	1-1/4	1
		3	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe			
	130.0	1	tower mounts	Platform Mount [LP 1201-1]			
		1	tower mounts	Side Arm Mount [SO 102-3]			
	129.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
120.0	120.0	3	rfs celwave	APL199016-42T0 w/ Mount Pipe	6	1-5/8	3
79.0	79.0	2	tower mounts	Side Arm Mount [SO 202-1]	-	-	3
52.0	52.0	1	pctel	GPS-TMG-HR-26NCM	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) Equipment To Be Removed; Not Considered in this Analysis
- 3) Abandoned Equipment; Considered in this Analysis

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

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

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Northeast Electrical Testing, Inc.	4529457	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Paul J. Ford and Company	4529456	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Paul J. Ford and Company	4589719	CCISITES

#### 3.1) Analysis Method

tnxTower (version 7.0.7.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

#### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Specifications of the weld connecting the tower shaft to the base plate have not been provided to Jacobs and as a result are outside the scope of this report.
- 5) Porthole details and weld specifications were not provided to Jacobs prior to this analysis and as a result are outside the scope of this report.

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

#### 4) ANALYSIS RESULTS

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

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	168 - 119.25	Pole	TP34.288x24x0.25	1	-15.34	1794.53	51.7	Pass
L2	119.25 - 78.5	Pole	TP42.387x32.8911x0.2813	2	-23.00	2407.42	77.9	Pass
L3	78.5 - 38.75	Pole	TP50.213x40.7166x0.375	3	-34.42	3975.05	67.7	Pass
L4	38.75 - 0	Pole	TP57.64x48.1441x0.375	4	-49.89	4395.43	80.2	Pass
							Summary	
						Pole (L4)	80.2	Pass
						Rating =	80.2	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	75.5	Pass
1	Base Plate	0	54.9	Pass
1	Base Foundation Structural	0	63.3	Pass
1	Base Foundation Soil Interaction	0	27.3	Pass

<b>Structure Rating (max from all components) =</b>	<b>80.2%</b>
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Notes:

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

##### 4.1) Recommendations

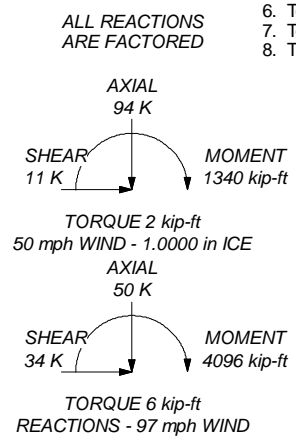
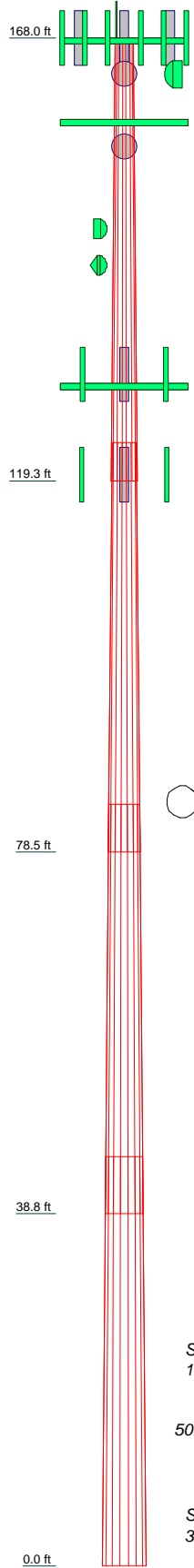
The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.



## **APPENDIX A**

### **TNXTOWER OUTPUT**

Section	4	3	2	1
Length (ft)	45.00	45.00	45.00	48.75
Number of Sides	18	18	18	18
Thickness (in)	0.3750	0.3750	0.2813	0.2500
Socket Length (ft)		6.25	5.25	4.25
Top Dia (in)	48.1441	40.7166	32.8911	24.0000
Bot Dia (in)	57.6400	50.2130	42.3870	34.2880
Grade	A607-65			
Weight (K)	26.7	8.2	5.1	3.8



## DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	168	(3) 4" x 2" Mount Pipe	159
800 10121 w/ Mount Pipe	168	6' x 2" mount pipe	159
800 10121 w/ Mount Pipe	168	6' x 2" mount pipe	159
800 10121 w/ Mount Pipe	168	6' x 2" mount pipe	159
OPA-65R-LCUU-H6 w/ Mount Pipe	168	Platform Mount [LP 1201-1]	159
OPA-65R-LCUU-H6 w/ Mount Pipe	168	VHLP2.5-11	159
OPA-65R-LCUU-H6 w/ Mount Pipe	168	VHLP2.5-11	159
QS66512-2 w/ Mount Pipe	168	VHLP2.5-11	159
QS66512-2 w/ Mount Pipe	168	782 10876	147
OG-4	168	Pipe Mount [PM 602-1]	147
TPA-65R-LCUUUU-H8 w/ Mount Pipe	168	VHLPX2-11	147
(2) 860 10025	168	Pipe Mount [PM 602-1]	143
(2) 860 10025	168	782 10876	143
(2) 860 10025	168	MPRD2449	143
DTMABP7819VG12A	168	Side Arm Mount [SO 201-1]	140
DTMABP7819VG12A	168	PTP400	140
DTMABP7819VG12A	168	RIU	140
(2) TPX-070821	168	Side Arm Mount [SO 702-1]	135
(2) TPX-070821	168	6' x 2" mount pipe	135
(2) TPX-070821	168	6' x 2" mount pipe	135
RRUS 32 B30	168	ASP 705K	135
RRUS 32 B30	168	Side Arm Mount [SO 702-1]	135
RRUS 32 B30	168	ASP 705K	135
RRUS 11-700	168	800MHz 2X50W RRH W/FILTER	130
RRUS 11-700	168	1900MHz RRH	130
RRUS 11-700	168	1900MHz RRH	130
RRUS 32	168	1900MHz RRH	130
RRUS 32	168	(2) 4" x 2" Mount Pipe	130
RRUS 32	168	(2) 4" x 2" Mount Pipe	130
DC6-48-60-18-8F	168	(2) 4" x 2" Mount Pipe	130
DC6-48-60-18-8F	168	6' x 2" mount pipe	130
4" x 2" Mount Pipe	168	6' x 2" mount pipe	130
4" x 2" Mount Pipe	168	6' x 2" mount pipe	130
4" x 2" Mount Pipe	168	Platform Mount [LP 1201-1]	130
Platform Mount [LP 1201-1]	168	Side Arm Mount [SO 102-3]	130
LLPX310R-V1 w/ Mount Pipe	159	APXV9ERR18-C-A20 w/ Mount Pipe	130
LLPX310R-V1 w/ Mount Pipe	159	APXV9ERR18-C-A20 w/ Mount Pipe	130
LLPX310R-V1 w/ Mount Pipe	159	APXV9ERR18-C-A20 w/ Mount Pipe	130
Horizon Compact	159	800MHz 2X50W RRH W/FILTER	130
Horizon Compact	159	800MHz 2X50W RRH W/FILTER	130
Horizon Compact	159	APL199016-42T0 w/ Mount Pipe	120
FB-15-ABOX	159	APL199016-42T0 w/ Mount Pipe	120
RRH-2WB	159	APL199016-42T0 w/ Mount Pipe	120
RRH-2WB	159	Side Arm Mount [SO 202-1]	79
RRH-2WB	159	Side Arm Mount [SO 202-1]	79
(3) 4" x 2" Mount Pipe	159	Side Arm Mount [SO 701-1]	52
(3) 4" x 2" Mount Pipe	159	GPS-TMG-HR-26NCM	52

## MATERIAL STRENGTH

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

## TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 80.2%

**Jacobs Engineering Group Inc.**

5449 Bells Ferry Road

Acworth, GA 30102

Phone: 770-701-2500

FAX: 770-701-2501

Job: **WINDSORDAY HILL**

Project: **BU#842875 WO#1364322**

Client: Crown Castle

Drawn by: Dustin Daulo

App'd:

Code: TIA-222-G

Date: 02/20/17

Scale: NTS

Path:

Dwg No. E-1

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 1) Tower is located in Hartford County, Connecticut.
- 2) Basic wind speed of 97 mph.
- 3) Structure Class II.
- 4) Exposure Category C.
- 5) Topographic Category 1.
- 6) Crest Height 0.00 ft.
- 7) Nominal ice thickness of 1.0000 in.
- 8) Ice thickness is considered to increase with height.
- 9) Ice density of 56 pcf.
- 10) A wind speed of 50 mph is used in combination with ice.
- 11) Temperature drop of 50 °F.
- 12) Deflections calculated using a wind speed of 60 mph.
- 13) A non-linear (P-delta) analysis was used.
- 14) Pressures are calculated at each section.
- 15) Stress ratio used in pole design is 1.
- 16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retention Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist.
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-G Tension Splice
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	
SR Members Are Concentric		

### Poles

- √ Include Shear-Torsion Interaction
- Always Use Sub-Critical Flow
- Use Top Mounted Sockets

## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	168.00-119.25	48.75	4.25	18	24.0000	34.2880	0.2500	1.0000	A607-65 (65 ksi)
L2	119.25-78.50	45.00	5.25	18	32.8911	42.3870	0.2813	1.1250	A607-65 (65 ksi)
L3	78.50-38.75	45.00	6.25	18	40.7166	50.2130	0.3750	1.5000	A607-65 (65 ksi)
L4	38.75-0.00	45.00		18	48.1441	57.6400	0.3750	1.5000	A607-65 (65 ksi)



### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	34.8169	27.0092	3953.4521	12.0835	17.4183	226.9711	7912.1063	13.5071	5.5947	22.379
L2	34.3092	29.1104	3910.9583	11.5765	16.7087	234.0675	7827.0628	14.5580	5.2938	18.823
	43.0409	37.5873	8419.0120	14.9475	21.5326	390.9892	16849.1019	18.7972	6.9651	24.765
L3	42.4698	48.0166	9872.7116	14.3213	20.6841	477.3102	19758.4140	24.0129	6.5061	17.35
	50.9876	59.3197	18614.7607	17.6925	25.5082	729.7558	37254.0152	29.6655	8.1775	21.807
L4	50.2260	56.8571	16391.3899	16.9580	24.4572	670.2076	32804.3480	28.4340	7.8134	20.836
	58.5292	68.1597	28238.6178	20.3291	29.2811	964.3968	56514.3927	34.0863	9.4846	25.292

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 in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft <sup>2</sup>	in							
L1 168.00-119.25				1	1	1			
L2 119.25-78.50				1	1	1			
L3 78.50-38.75				1	1	1			
L4 38.75-0.00				1	1	1			

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

Description	Section	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***									
5/8" Step Bolts	C	Surface Af (CaAa)	168.00 - 8.00	1	1	0.000 0.000	0.4167	1.3090	1.00
Safety Line 3/8	C	Surface Ar (CaAa)	168.00 - 8.00	1	1	-0.250 -0.250	0.3750		0.22
***level 52*** LDF4-50A(1/2")	C	Surface Ar (CaAa)	52.00 - 0.00	1	1	0.150 0.150	0.6300		0.15

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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
***level 168*** LDF7-50A(1-5/8")	C	No	Inside Pole	168.00 - 0.00	12	No Ice 1/2" Ice 1" Ice 0.00 0.00 0.00	0.82 0.82 0.82
FB-L98B-034-XXXXXX( 3/8")	B	No	Inside Pole	168.00 - 0.00	1	No Ice 1/2" Ice 1" Ice 0.00 0.00 0.00	0.05 0.05 0.05
WR-VG86ST-BRD(3/4")	B	No	Inside Pole	168.00 - 0.00	2	No Ice 1/2" Ice 1" Ice 0.00 0.00 0.00	0.58 0.58 0.58
2" Rigid Conduit	B	No	Inside Pole	168.00 - 0.00	1	No Ice 1/2" Ice 1" Ice 0.00 0.00 0.00	2.80 2.80 2.80

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		$C_A A_A$ ft <sup>2</sup> /ft	Weight plf
2.5" Rigid Conduit	C	No	Inside Pole	168.00 - 0.00	1	No Ice	0.00	3.00
						1/2" Ice	0.00	3.00
						1" Ice	0.00	3.00
FB-L98B-034-XXXXXX( 3/8")	C	No	Inside Pole	168.00 - 0.00	1	No Ice	0.00	0.05
						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	168.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
LDF5-50A(7/8)	C	No	Inside Pole	168.00 - 135.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
LDF5-50A(7/8")	C	No	Inside Pole	135.00 - 0.00	3	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
***level 159***								
ATCB-B01-003( 5/16")	B	No	Inside Pole	159.00 - 0.00	6	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
***level 147***								
LDF2-50(3/8")	C	No	Inside Pole	147.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
***level 130***								
HB114-13U3M12-XXXX(1-1/4)	B	No	Inside Pole	130.00 - 0.00	3	No Ice	0.00	0.99
						1/2" Ice	0.00	0.99
						1" Ice	0.00	0.99
***level 120***								
LDF7-50A(1-5/8")	C	No	Inside Pole	120.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
***level 140***								
CAT5e(1/4)	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	0.04
						1/2" Ice	0.00	0.04
						1" Ice	0.00	0.04
***level 143***								
LDF1-50A(1/4)	C	No	Inside Pole	143.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
L1	168.00-119.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.25
		C	0.000	0.000	5.213	0.000	0.78
L2	119.25-78.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	4.358	0.000	0.87
L3	78.50-38.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	5.086	0.000	0.85
L4	38.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.29
		C	0.000	0.000	5.730	0.000	0.82

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
L1	168.00-119.25	A	2.315	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.25
		C		0.000	0.000	50.354	0.000	1.59
L2	119.25-78.50	A	2.231	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.30
		C		0.000	0.000	42.091	0.000	1.55
L3	78.50-38.75	A	2.117	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.30
		C		0.000	0.000	46.466	0.000	1.57
L4	38.75-0.00	A	1.898	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.29
		C		0.000	0.000	48.184	0.000	1.53

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	168.00-119.25	0.0269	0.1457	0.2377	0.9150
L2	119.25-78.50	0.0271	0.1468	0.2592	0.9985
L3	78.50-38.75	0.0171	0.1774	0.1984	1.1790
L4	38.75-0.00	-0.0071	0.2012	0.0319	1.2769

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L1	2	5/8" Step Bolts	119.25 - 168.00	1.0000	1.0000
L1	3	Safety Line 3/8	119.25 - 168.00	1.0000	1.0000
L2	2	5/8" Step Bolts	78.50 - 119.25	1.0000	1.0000
L2	3	Safety Line 3/8	78.50 - 119.25	1.0000	1.0000
L2	23	LDF4-50A(1/2")	78.50 - 52.00	1.0000	1.0000
L3	2	5/8" Step Bolts	38.75 - 78.50	1.0000	1.0000
L3	3	Safety Line 3/8	38.75 - 78.50	1.0000	1.0000
L3	23	LDF4-50A(1/2")	38.75 - 52.00	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
***									
Lightning Rod 5/8x4'	C	From Leg	0.00 0.00 2.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.03 0.03 0.04
***LEVEL 168***									
800 10121 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	0.10 0.18 0.26
OPA-65R-LCUU-H8 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	12.98 13.67 14.36	9.32 10.79 12.24	0.12 0.21 0.32
QS66512-2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	0.14 0.21 0.30
OG-4	A	From Leg	4.00 0.00 6.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.00 7.14 7.86	4.00 7.14 7.86	0.02 0.06 0.11
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	13.54 14.24 14.95	10.96 12.49 14.04	0.11 0.22 0.33
(2) 860 10025	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	0.00 0.00 0.01
(2) 860 10025	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	0.00 0.00 0.01
(2) 860 10025	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.12 0.17 0.23	0.00 0.00 0.01
DTMABP7819VG12A	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
DTMABP7819VG12A	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
DTMABP7819VG12A	C	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
(2) TPX-070821	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	B	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	C	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
RRUS 32 B30	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.74 2.96 3.19	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B30	B	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.74 2.96 3.19	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B30	C	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.74 2.96 3.19	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 11-700	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.52 2.72 2.92	1.02 1.16 1.30	0.06 0.07 0.10
RRUS 11-700	B	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.52 2.72 2.92	1.02 1.16 1.30	0.06 0.07 0.10
RRUS 11-700	C	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.52 2.72 2.92	1.02 1.16 1.30	0.06 0.07 0.10
RRUS 32	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	B	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
RRUS 32	C	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	2.86 3.08 3.32	1.78 1.97 2.17	0.06 0.08 0.10
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.03 0.05 0.07
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.03 0.05 0.07
4" x 2' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	1" Ice No Ice 1/2" Ice	0.53 0.69 0.87	0.53 0.69 0.87	0.02 0.03 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
4" x 2' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.53 0.69 0.87	0.53 0.69 0.87	0.02 0.03 0.03
4" x 2' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.53 0.69 0.87	0.53 0.69 0.87	0.02 0.03 0.03
Platform Mount [LP 1201-1]	C	None		0.0000	168.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***level 159*** LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	4.54 4.89 5.25	2.98 3.53 4.09	0.05 0.08 0.13
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	4.54 4.89 5.25	2.98 3.53 4.09	0.05 0.08 0.13
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	4.54 4.89 5.25	2.98 3.53 4.09	0.05 0.08 0.13
Horizon Compact	A	From Leg	4.00 0.00 -3.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
Horizon Compact	A	From Leg	4.00 0.00 5.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
Horizon Compact	B	From Leg	4.00 0.00 5.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	0.72 0.83 0.94	0.37 0.45 0.54	0.01 0.02 0.03
FB-15-ABOX	A	From Leg	4.00 0.00 -3.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	2.70 2.90 3.11	0.51 0.63 0.75	0.01 0.03 0.04
RRH-2WB	A	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	2.30 2.50 2.69	0.78 0.92 1.06	0.04 0.06 0.08
RRH-2WB	B	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	2.30 2.50 2.69	0.78 0.92 1.06	0.04 0.06 0.08
RRH-2WB	C	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	2.30 2.50 2.69	0.78 0.92 1.06	0.04 0.06 0.08
(3) 4" x 2' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	0.53 0.69 0.87	0.53 0.69 0.87	0.02 0.03 0.03
(3) 4" x 2' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	0.53 0.69 0.87	0.53 0.69 0.87	0.02 0.03 0.03
(3) 4" x 2' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	0.53 0.69 0.87	0.53 0.69 0.87	0.02 0.03 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
6' x 2" mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	1.44 1.93 2.30	1.44 1.93 2.30	0.02 0.03 0.05
6' x 2" mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	1.44 1.93 2.30	1.44 1.93 2.30	0.02 0.03 0.05
6' x 2" mount pipe	C	From Leg	4.00 0.00 0.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice	1.44 1.93 2.30	1.44 1.93 2.30	0.02 0.03 0.05
Platform Mount [LP 1201-1]	C	None		0.0000	159.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
***level 147*** 782 10876	C	From Leg	1.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	0.59 0.69 0.80	0.23 0.31 0.39	0.01 0.01 0.02
Pipe Mount [PM 602-1]	C	From Leg	0.50 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	5.25 6.50 7.75	1.58 1.95 2.32	0.09 0.12 0.14
***level 143*** 782 10876	C	From Leg	1.00 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice	0.59 0.69 0.80	0.23 0.31 0.39	0.01 0.01 0.02
Pipe Mount [PM 602-1]	C	From Leg	0.50 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice 1" Ice	5.25 6.50 7.75	1.58 1.95 2.32	0.09 0.12 0.14
***level 140*** PTP400	B	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	1.75 1.92 2.09	0.48 0.58 0.69	0.01 0.02 0.04
RIU	B	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	0.16 0.21 0.27	0.12 0.16 0.22	0.00 0.00 0.01
Side Arm Mount [SO 201-1]	B	None		0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.96 4.10 5.24	2.11 2.93 3.75	0.10 0.12 0.14
***level 135*** ASP 705K	A	From Leg	6.00 0.00 9.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	5.50 7.37 9.25	5.50 7.37 9.25	0.02 0.06 0.11
ASP 705K	B	From Leg	6.00 0.00 9.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	5.50 7.37 9.25	5.50 7.37 9.25	0.02 0.06 0.11
6' x 2" mount pipe	A	From Leg	6.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.44 1.93 2.30	1.44 1.93 2.30	0.02 0.03 0.05
6' x 2" mount pipe	B	From Leg	6.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice	1.44 1.93 2.30	1.44 1.93 2.30	0.02 0.03 0.05
Side Arm Mount [SO 702-1]	A	None		0.0000	135.00	No Ice	1.00	1.43	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
1]						1/2" Ice	1.25 1.50	2.05 2.67	0.04 0.05
Side Arm Mount [SO 702-1]	B	None		0.0000	135.00	1" Ice No Ice	1.00 1.25 1.50	1.43 2.05 2.67	0.03 0.04 0.05
***level 130***						1" Ice			
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	130.00	No Ice 1/2" Ice	8.26 8.82 9.35	7.47 8.66 9.56	0.09 0.16 0.24
APXV9ERR18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	8.26 8.26 8.82 9.35	7.47 7.47 8.66 9.56	0.09 0.09 0.16 0.24
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 -1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	2.06 2.06 2.24 2.43	1.93 1.93 2.11 2.29	0.06 0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 -1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	2.06 2.06 2.24 2.43	1.93 1.93 2.11 2.29	0.06 0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 -1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	2.06 2.06 2.24 2.43	1.93 1.93 2.11 2.29	0.06 0.06 0.09 0.11
1900MHz RRH	A	From Leg	1.00 0.00 1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	2.49 2.49 2.70 2.91	3.26 3.26 3.48 3.72	0.04 0.04 0.08 0.11
1900MHz RRH	B	From Leg	1.00 0.00 1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	2.49 2.49 2.70 2.91	3.26 3.26 3.48 3.72	0.04 0.04 0.08 0.11
1900MHz RRH	C	From Leg	1.00 0.00 1.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	2.49 2.49 2.70 2.91	3.26 3.26 3.48 3.72	0.04 0.04 0.08 0.11
(2) 4" x 2' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	0.53 0.53 0.69 0.87	0.53 0.53 0.69 0.87	0.02 0.02 0.03 0.03
(2) 4" x 2' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	0.53 0.53 0.69 0.87	0.53 0.53 0.69 0.87	0.02 0.02 0.03 0.03
(2) 4" x 2' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	0.53 0.53 0.69 0.87	0.53 0.53 0.69 0.87	0.02 0.02 0.03 0.03
6' x 2" mount pipe	A	From Leg	0.50 0.00 0.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	1.44 1.44 1.93 2.30	1.44 1.44 1.93 2.30	0.02 0.02 0.03 0.05
6' x 2" mount pipe	B	From Leg	0.50 0.00 0.00	0.0000	130.00	1" Ice No Ice 1/2" Ice	1.44 1.44 1.93 2.30	1.44 1.44 1.93 2.30	0.02 0.02 0.03 0.05
6' x 2" mount pipe	C	From Leg	0.50	0.0000	130.00	No Ice	1.44	1.44	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
			0.00 0.00			1/2" Ice 1" Ice	1.93 2.30	1.93 2.30	0.03 0.05
Platform Mount [LP 1201-1]	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
Side Arm Mount [SO 102-3]	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	0.08 0.11 0.14
***level 120***									
APL199016-42T0 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	4.35 4.90 5.41	5.20 6.36 7.24	0.03 0.08 0.13
APL199016-42T0 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	4.35 4.90 5.41	5.20 6.36 7.24	0.03 0.08 0.13
APL199016-42T0 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	4.35 4.90 5.41	5.20 6.36 7.24	0.03 0.08 0.13
***level 79***									
Side Arm Mount [SO 202-1]	A	From Leg	1.00 0.00 0.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice	2.96 4.10 5.24	2.53 3.51 4.49	0.11 0.13 0.16
Side Arm Mount [SO 202-1]	B	From Leg	1.00 0.00 0.00	0.0000	79.00	No Ice 1/2" Ice 1" Ice	2.96 4.10 5.24	2.53 3.51 4.49	0.11 0.13 0.16
***level 52***									
GPS-TMG-HR-26NCM	A	From Leg	2.00 0.00 0.00	0.0000	52.00	No Ice 1/2" Ice 1" Ice	0.13 0.18 0.24	0.13 0.18 0.24	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	From Leg	1.00 0.00 0.00	0.0000	52.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 -3.00	17.0000		159.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 5.00	38.0000		159.00	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00	24.0000		159.00	2.92	No Ice 1/2" Ice	6.68 7.07



Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K
VHLPX2-11	C	Paraboloid w/Shroud (HP)	From Leg	5.00 1.00 0.00 0.00	0.0000		147.00	2.17	1" Ice 7.46 No Ice 3.72 1/2" Ice 4.01 1" Ice 4.30	0.12 0.03 0.05 0.07
***										
***										
MPRD2449	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	10.0000		143.00	2.17	No Ice 3.69 1/2" Ice 3.98 1" Ice 4.27	0.04 0.06 0.08

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	168 - 119.25	Pole	Max Tension	26	0.00	0.00	-0.00
			Max. Compression	26	-40.72	-2.74	6.35
			Max. Mx	20	-15.42	605.13	-10.93
			Max. My	14	-15.38	11.26	-617.11
			Max. Vy	8	20.65	-603.89	11.11
			Max. Vx	14	20.83	11.26	-617.11
			Max. Torque	20			-6.06
L2	119.25 - 78.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.25	-3.25	5.69
			Max. Mx	20	-23.06	1527.87	-27.10
			Max. My	14	-23.03	27.06	-1548.03
			Max. Vy	8	25.30	-1527.34	27.17
			Max. Vx	14	25.48	27.06	-1548.03
			Max. Torque	20			-6.05
L3	78.5 - 38.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.53	-4.11	5.23
			Max. Mx	8	-34.45	-2598.51	42.62
			Max. My	14	-34.44	41.68	-2625.71
			Max. Vy	8	29.74	-2598.51	42.62
			Max. Vx	14	29.89	41.68	-2625.71
			Max. Torque	20			-6.43
L4	38.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-93.51	-4.18	3.40
			Max. Mx	8	-49.89	-4029.27	59.44
			Max. My	14	-49.89	58.49	-4063.31
			Max. Vy	8	33.58	-4029.27	59.44
			Max. Vx	14	33.73	58.49	-4063.31
			Max. Torque	20			-6.43

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	29	93.51	-9.19	5.35
	Max. H <sub>x</sub>	20	49.91	33.53	-0.37
	Max. H <sub>z</sub>	2	49.91	-0.36	33.64
	Max. M <sub>x</sub>	2	4055.95	-0.36	33.64
	Max. M <sub>z</sub>	8	4029.27	-33.55	0.37
	Max. Torsion	8	6.10	-33.55	0.37
	Min. Vert	19	37.44	29.13	-17.25
	Min. H <sub>x</sub>	8	49.91	-33.55	0.37
	Min. H <sub>z</sub>	15	37.44	0.36	-33.69
	Min. M <sub>x</sub>	14	-4063.31	0.36	-33.69
	Min. M <sub>z</sub>	20	-4027.62	33.53	-0.37
	Min. Torsion	20	-6.42	33.53	-0.37

### 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	41.59	0.00	0.00	-0.58	-0.27	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	49.91	0.36	-33.64	-4055.95	-56.29	1.53

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
0.9 Dead+1.6 Wind 0 deg - No Ice	37.44	0.36	-33.64	-4004.05	-55.44	1.53
1.2 Dead+1.6 Wind 30 deg - No Ice	49.91	16.90	-29.31	-3541.12	-2032.15	-1.09
0.9 Dead+1.6 Wind 30 deg - No Ice	37.44	16.90	-29.31	-3495.76	-2006.24	-1.08
1.2 Dead+1.6 Wind 60 deg - No Ice	49.91	29.14	-17.10	-2072.18	-3502.87	-3.71
0.9 Dead+1.6 Wind 60 deg - No Ice	37.44	29.14	-17.10	-2045.54	-3458.23	-3.70
1.2 Dead+1.6 Wind 90 deg - No Ice	49.91	33.55	-0.37	-59.43	-4029.27	-6.10
0.9 Dead+1.6 Wind 90 deg - No Ice	37.44	33.55	-0.37	-58.43	-3977.96	-6.10
1.2 Dead+1.6 Wind 120 deg - No Ice	49.91	28.90	16.53	1979.94	-3465.36	-6.00
0.9 Dead+1.6 Wind 120 deg - No Ice	37.44	28.90	16.53	1954.93	-3421.25	-6.00
1.2 Dead+1.6 Wind 150 deg - No Ice	49.91	16.28	29.11	3508.43	-1934.01	-3.14
0.9 Dead+1.6 Wind 150 deg - No Ice	37.44	16.28	29.11	3463.88	-1909.47	-3.14
1.2 Dead+1.6 Wind 180 deg - No Ice	49.91	-0.36	33.69	4063.31	58.49	-0.77
0.9 Dead+1.6 Wind 180 deg - No Ice	37.44	-0.36	33.69	4011.68	57.75	-0.77
1.2 Dead+1.6 Wind 210 deg - No Ice	49.91	-16.97	29.36	3548.36	2045.79	1.49
0.9 Dead+1.6 Wind 210 deg - No Ice	37.44	-16.97	29.36	3503.26	2019.83	1.48
1.2 Dead+1.6 Wind 240 deg - No Ice	49.91	-29.13	17.25	2096.42	3502.58	4.04
0.9 Dead+1.6 Wind 240 deg - No Ice	37.44	-29.13	17.25	2069.78	3458.12	4.03
1.2 Dead+1.6 Wind 270 deg - No Ice	49.91	-33.53	0.37	59.58	4027.62	6.42
0.9 Dead+1.6 Wind 270 deg - No Ice	37.44	-33.53	0.37	58.91	3976.48	6.41
1.2 Dead+1.6 Wind 300 deg - No Ice	49.91	-28.86	-16.65	-2001.89	3459.12	6.12
0.9 Dead+1.6 Wind 300 deg - No Ice	37.44	-28.86	-16.65	-1976.20	3415.23	6.12
1.2 Dead+1.6 Wind 330 deg - No Ice	49.91	-16.40	-29.06	-3502.40	1954.14	3.90
0.9 Dead+1.6 Wind 330 deg - No Ice	37.44	-16.40	-29.06	-3457.55	1929.44	3.90
1.2 Dead+1.0 Ice+1.0 Temp	93.51	0.00	-0.00	-3.40	-4.18	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	93.51	0.10	-10.55	-1326.55	-20.54	0.73
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	93.51	5.33	-9.19	-1157.51	-673.27	-0.29
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	93.51	9.19	-5.35	-677.89	-1155.86	-1.30
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	93.51	10.58	-0.10	-20.22	-1328.62	-2.12
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	93.51	9.12	5.20	644.28	-1144.10	-2.19
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	93.51	5.17	9.12	1139.89	-645.13	-1.43
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	93.51	-0.10	10.56	1321.36	12.34	-0.57
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	93.51	-5.35	9.19	1152.21	667.74	0.37
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	93.51	-9.19	5.38	676.60	1147.12	1.36
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	93.51	-10.58	0.10	13.44	1319.53	2.19
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	93.51	-9.11	-5.22	-656.13	1133.97	2.21

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
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	93.51	-5.19	-9.11	-1145.27	641.22	1.59
Dead+Wind 0 deg - Service	41.59	0.08	-7.20	-862.44	-12.17	0.33
Dead+Wind 30 deg - Service	41.59	3.61	-6.27	-753.04	-432.09	-0.24
Dead+Wind 60 deg - Service	41.59	6.23	-3.66	-440.85	-744.64	-0.81
Dead+Wind 90 deg - Service	41.59	7.18	-0.08	-13.10	-856.48	-1.33
Dead+Wind 120 deg - Service	41.59	6.18	3.54	420.27	-736.63	-1.30
Dead+Wind 150 deg - Service	41.59	3.48	6.23	745.10	-411.22	-0.68
Dead+Wind 180 deg - Service	41.59	-0.08	7.21	863.07	12.22	-0.16
Dead+Wind 210 deg - Service	41.59	-3.63	6.28	753.65	434.59	0.32
Dead+Wind 240 deg - Service	41.59	-6.23	3.69	445.06	744.19	0.87
Dead+Wind 270 deg - Service	41.59	-7.17	0.08	12.17	855.72	1.39
Dead+Wind 300 deg - Service	41.59	-6.17	-3.56	-425.89	734.88	1.33
Dead+Wind 330 deg - Service	41.59	-3.51	-6.22	-744.76	415.07	0.85

## 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	-41.59	0.00	0.00	41.59	0.00	0.000%
2	0.36	-49.91	-33.64	-0.36	49.91	33.64	0.000%
3	0.36	-37.44	-33.64	-0.36	37.44	33.64	0.000%
4	16.90	-49.91	-29.31	-16.90	49.91	29.31	0.000%
5	16.90	-37.44	-29.31	-16.90	37.44	29.31	0.000%
6	29.14	-49.91	-17.10	-29.14	49.91	17.10	0.000%
7	29.14	-37.44	-17.10	-29.14	37.44	17.10	0.000%
8	33.55	-49.91	-0.37	-33.55	49.91	0.37	0.000%
9	33.55	-37.44	-0.37	-33.55	37.44	0.37	0.000%
10	28.90	-49.91	16.53	-28.90	49.91	-16.53	0.000%
11	28.90	-37.44	16.53	-28.90	37.44	-16.53	0.000%
12	16.28	-49.91	29.11	-16.28	49.91	-29.11	0.000%
13	16.28	-37.44	29.11	-16.28	37.44	-29.11	0.000%
14	-0.36	-49.91	33.69	0.36	49.91	-33.69	0.000%
15	-0.36	-37.44	33.69	0.36	37.44	-33.69	0.000%
16	-16.97	-49.91	29.36	16.97	49.91	-29.36	0.000%
17	-16.97	-37.44	29.36	16.97	37.44	-29.36	0.000%
18	-29.13	-49.91	17.25	29.13	49.91	-17.25	0.000%
19	-29.13	-37.44	17.25	29.13	37.44	-17.25	0.000%
20	-33.53	-49.91	0.37	33.53	49.91	-0.37	0.000%
21	-33.53	-37.44	0.37	33.53	37.44	-0.37	0.000%
22	-28.86	-49.91	-16.65	28.86	49.91	16.65	0.000%
23	-28.86	-37.44	-16.65	28.86	37.44	16.65	0.000%
24	-16.40	-49.91	-29.06	16.40	49.91	29.06	0.000%
25	-16.40	-37.44	-29.06	16.40	37.44	29.06	0.000%
26	0.00	-93.51	0.00	-0.00	93.51	0.00	0.000%
27	0.10	-93.51	-10.55	-0.10	93.51	10.55	0.000%
28	5.33	-93.51	-9.19	-5.33	93.51	9.19	0.000%
29	9.19	-93.51	-5.35	-9.19	93.51	5.35	0.000%
30	10.58	-93.51	-0.10	-10.58	93.51	0.10	0.000%
31	9.12	-93.51	5.20	-9.12	93.51	-5.20	0.000%
32	5.17	-93.51	9.12	-5.17	93.51	-9.12	0.000%
33	-0.10	-93.51	10.56	0.10	93.51	-10.56	0.000%
34	-5.35	-93.51	9.19	5.35	93.51	-9.19	0.000%
35	-9.19	-93.51	5.38	9.19	93.51	-5.38	0.000%
36	-10.58	-93.51	0.10	10.58	93.51	-0.10	0.000%
37	-9.11	-93.51	-5.22	9.11	93.51	5.22	0.000%
38	-5.19	-93.51	-9.11	5.19	93.51	9.11	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
39	0.08	-41.59	-7.20	-0.08	41.59	7.20	0.000%
40	3.61	-41.59	-6.27	-3.61	41.59	6.27	0.000%
41	6.23	-41.59	-3.66	-6.23	41.59	3.66	0.000%
42	7.18	-41.59	-0.08	-7.18	41.59	0.08	0.000%
43	6.18	-41.59	3.54	-6.18	41.59	-3.54	0.000%
44	3.48	-41.59	6.23	-3.48	41.59	-6.23	0.000%
45	-0.08	-41.59	7.21	0.08	41.59	-7.21	0.000%
46	-3.63	-41.59	6.28	3.63	41.59	-6.28	0.000%
47	-6.23	-41.59	3.69	6.23	41.59	-3.69	0.000%
48	-7.17	-41.59	0.08	7.17	41.59	-0.08	0.000%
49	-6.17	-41.59	-3.56	6.17	41.59	3.56	0.000%
50	-3.51	-41.59	-6.22	3.51	41.59	6.22	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	0.00015849
3	Yes	5	0.00000001	0.00007205
4	Yes	6	0.00000001	0.00013476
5	Yes	6	0.00000001	0.00004169
6	Yes	6	0.00000001	0.00014424
7	Yes	6	0.00000001	0.00004504
8	Yes	5	0.00000001	0.00040957
9	Yes	5	0.00000001	0.00018892
10	Yes	6	0.00000001	0.00012149
11	Yes	5	0.00000001	0.00092270
12	Yes	6	0.00000001	0.00013586
13	Yes	6	0.00000001	0.00004292
14	Yes	5	0.00000001	0.00007416
15	Yes	4	0.00000001	0.00078573
16	Yes	6	0.00000001	0.00014112
17	Yes	6	0.00000001	0.00004382
18	Yes	6	0.00000001	0.00013245
19	Yes	6	0.00000001	0.00004063
20	Yes	5	0.00000001	0.00024058
21	Yes	5	0.00000001	0.00011310
22	Yes	6	0.00000001	0.00014356
23	Yes	6	0.00000001	0.00004550
24	Yes	6	0.00000001	0.00012472
25	Yes	5	0.00000001	0.00094672
26	Yes	4	0.00000001	0.00009777
27	Yes	6	0.00000001	0.00018518
28	Yes	6	0.00000001	0.00027944
29	Yes	6	0.00000001	0.00028875
30	Yes	6	0.00000001	0.00018977
31	Yes	6	0.00000001	0.00025748
32	Yes	6	0.00000001	0.00026946
33	Yes	6	0.00000001	0.00018080
34	Yes	6	0.00000001	0.00027370
35	Yes	6	0.00000001	0.00026864
36	Yes	6	0.00000001	0.00018597
37	Yes	6	0.00000001	0.00027994
38	Yes	6	0.00000001	0.00026127
39	Yes	4	0.00000001	0.00011470
40	Yes	4	0.00000001	0.00052796
41	Yes	4	0.00000001	0.00065384
42	Yes	4	0.00000001	0.00031819
43	Yes	4	0.00000001	0.00045592
44	Yes	4	0.00000001	0.00058573
45	Yes	4	0.00000001	0.00008330
46	Yes	4	0.00000001	0.00059831
47	Yes	4	0.00000001	0.00051053
48	Yes	4	0.00000001	0.00029888

49	Yes	4	0.00000001	0.00069346
50	Yes	4	0.00000001	0.00045782

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	168 - 119.25	26.897	46	1.4175	0.0130
L2	123.5 - 78.5	14.537	46	1.1594	0.0056
L3	83.75 - 38.75	6.522	46	0.7320	0.0024
L4	45 - 0	1.912	46	0.3864	0.0010

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
168.00	Lightning Rod 5/8x4'	46	26.897	1.4175	0.0130	47879
164.00	VHLP2.5-11	46	25.720	1.4003	0.0122	47879
159.00	LLPX310R-V1 w/ Mount Pipe	46	24.254	1.3785	0.0113	26599
156.00	VHLP2.5-11	46	23.380	1.3649	0.0108	19949
147.00	VHLPX2-11	46	20.794	1.3207	0.0092	11399
143.00	MPRD2449	46	19.670	1.2987	0.0085	9575
140.00	PTP400	46	18.840	1.2810	0.0080	8549
135.00	ASP 705K	46	17.486	1.2488	0.0072	7253
130.00	APXV9ERR18-C-A20 w/ Mount Pipe	46	16.172	1.2129	0.0065	6299
120.00	APL199016-42T0 w/ Mount Pipe	46	13.694	1.1272	0.0052	5426
79.00	Side Arm Mount [SO 202-1]	46	5.785	0.6837	0.0021	5814
52.00	GPS-TMG-HR-26NCM	46	2.503	0.4445	0.0012	5392

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	168 - 119.25	126.634	16	6.6956	0.0601
L2	123.5 - 78.5	68.477	16	5.4715	0.0261
L3	83.75 - 38.75	30.730	16	3.4525	0.0109
L4	45 - 0	9.009	16	1.8213	0.0045

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
168.00	Lightning Rod 5/8x4'	16	126.634	6.6956	0.0601	10412
164.00	VHLP2.5-11	16	121.098	6.6141	0.0567	10412
159.00	LLPX310R-V1 w/ Mount Pipe	16	114.202	6.5101	0.0524	5784
156.00	VHLP2.5-11	16	110.088	6.4455	0.0499	4337
147.00	VHLPX2-11	16	97.923	6.2354	0.0426	2476
143.00	MPRD2449	16	92.634	6.1310	0.0394	2078
140.00	PTP400	16	88.729	6.0471	0.0372	1855
135.00	ASP 705K	16	82.354	5.8947	0.0335	1572
130.00	APXV9ERR18-C-A20 w/ Mount	16	76.174	5.7243	0.0301	1364



Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
	Pipe					
120.00	APL199016-42T0 w/ Mount Pipe	16	64.510	5.3192	0.0242	1171
79.00	Side Arm Mount [SO 202-1]	16	27.260	3.2248	0.0099	1241
52.00	GPS-TMG-HR-26NCM	16	11.794	2.0952	0.0054	1146

## Compression Checks

## Pole Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	KI/r	A	P <sub>u</sub>	φP <sub>n</sub>	Ratio P <sub>u</sub> φP <sub>n</sub>
	ft		ft	ft		in <sup>2</sup>	K	K	
L1	168 - 119.25 (1)	TP34.288x24x0.25	48.75	0.00	0.0	26.297 5	-15.34	1794.53	0.009
L2	119.25 - 78.5 (2)	TP42.387x32.8911x0.281 3	45.00	0.00	0.0	36.598 3	-23.00	2407.42	0.010
L3	78.5 - 38.75 (3)	TP50.213x40.7166x0.375	45.00	0.00	0.0	57.749 8	-34.42	3975.05	0.009
L4	38.75 - 0 (4)	TP57.64x48.1441x0.375	45.00	0.00	0.0	68.159 7	-49.89	4395.43	0.011

## Pole Bending Design Data

Section No.	Elevation	Size	M <sub>ux</sub>	φM <sub>nx</sub>	Ratio M <sub>ux</sub> φM <sub>nx</sub>	M <sub>uy</sub>	φM <sub>ny</sub>	Ratio M <sub>uy</sub> φM <sub>ny</sub>
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	168 - 119.25 (1)	TP34.288x24x0.25	621.65	1223.34	0.508	0.00	1223.34	0.000
L2	119.25 - 78.5 (2)	TP42.387x32.8911x0.281 3	1561.84	2031.59	0.769	0.00	2031.59	0.000
L3	78.5 - 38.75 (3)	TP50.213x40.7166x0.375	2648.13	3966.47	0.668	0.00	3966.47	0.000
L4	38.75 - 0 (4)	TP57.64x48.1441x0.375	4095.86	5182.60	0.790	0.00	5182.60	0.000

## Pole Shear Design Data

Section No.	Elevation	Size	Actual V <sub>u</sub>	φV <sub>n</sub>	Ratio V <sub>u</sub> φV <sub>n</sub>	Actual T <sub>u</sub>	φT <sub>n</sub>	Ratio T <sub>u</sub> φT <sub>n</sub>
	ft		K	K		kip-ft	kip-ft	
L1	168 - 119.25 (1)	TP34.288x24x0.25	21.07	897.27	0.023	1.56	2449.67	0.001
L2	119.25 - 78.5 (2)	TP42.387x32.8911x0.281 3	25.71	1203.71	0.021	1.55	4068.15	0.000
L3	78.5 - 38.75 (3)	TP50.213x40.7166x0.375	30.12	1987.52	0.015	1.49	7942.63	0.000
L4	38.75 - 0 (4)	TP57.64x48.1441x0.375	33.95	2197.71	0.015	1.49	10377.92	0.000

## Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	168 - 119.25 (1)	0.009	0.508	0.000	0.023	0.001	0.517 ✓	1.000	4.8.2 ✓
L2	119.25 - 78.5 (2)	0.010	0.769	0.000	0.021	0.000	0.779 ✓	1.000	4.8.2 ✓
L3	78.5 - 38.75 (3)	0.009	0.668	0.000	0.015	0.000	0.677 ✓	1.000	4.8.2 ✓
L4	38.75 - 0 (4)	0.011	0.790	0.000	0.015	0.000	0.802 ✓	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	168 - 119.25	Pole	TP34.288x24x0.25	1	-15.34	1794.53	51.7	Pass
L2	119.25 - 78.5	Pole	TP42.387x32.8911x0.2813	2	-23.00	2407.42	77.9	Pass
L3	78.5 - 38.75	Pole	TP50.213x40.7166x0.375	3	-34.42	3975.05	67.7	Pass
L4	38.75 - 0	Pole	TP57.64x48.1441x0.375	4	-49.89	4395.43	80.2	Pass
							Summary	
							Pole (L4)	80.2 Pass
							<b>RATING =</b>	<b>80.2 Pass</b>

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



CROWN REGION ADDRESS

USA

06/06/14	UPDATED PER WORK ORDER # 758703	CNV
28/07/14	AS-BUILT INFORMATION ADDED PER WORK ORDER # 764160	KT
28/07/14	UPDATED PER WORK ORDER # 801968	DAB
02/01/15	UPDATED PER WORK ORDER # 865941	DAB
15/07/15	AS-BUILT INFORMATION ADDED PER WORK ORDER # 1254188	ASB
13/10/2015	UPDATED PER WORK ORDER 1132782 11.85174	NBH
02/03/16	UPDATED PER WORK ORDER 1202788	CRN
18/08/16	UPDATED PER WORK ORDER 1240308	LAN
22/06/16	UPDATED PER WORK ORDER 1250005 1288338	SUV

DRAWN BY: DJW  
CHECKED BY: DJW  
DRAWING DATE: 3/10/14

SITE NUMBER:

SITE NAME:

SITE NAME

WINDSOR DAY HILL

BUSINESS UNIT NUMBER

842875

SITE ADDRESS

93 DAY HILL ROAD  
WINDSOR, CT 06095  
HARTFORD COUNTY  
USA

SHEET TITLE

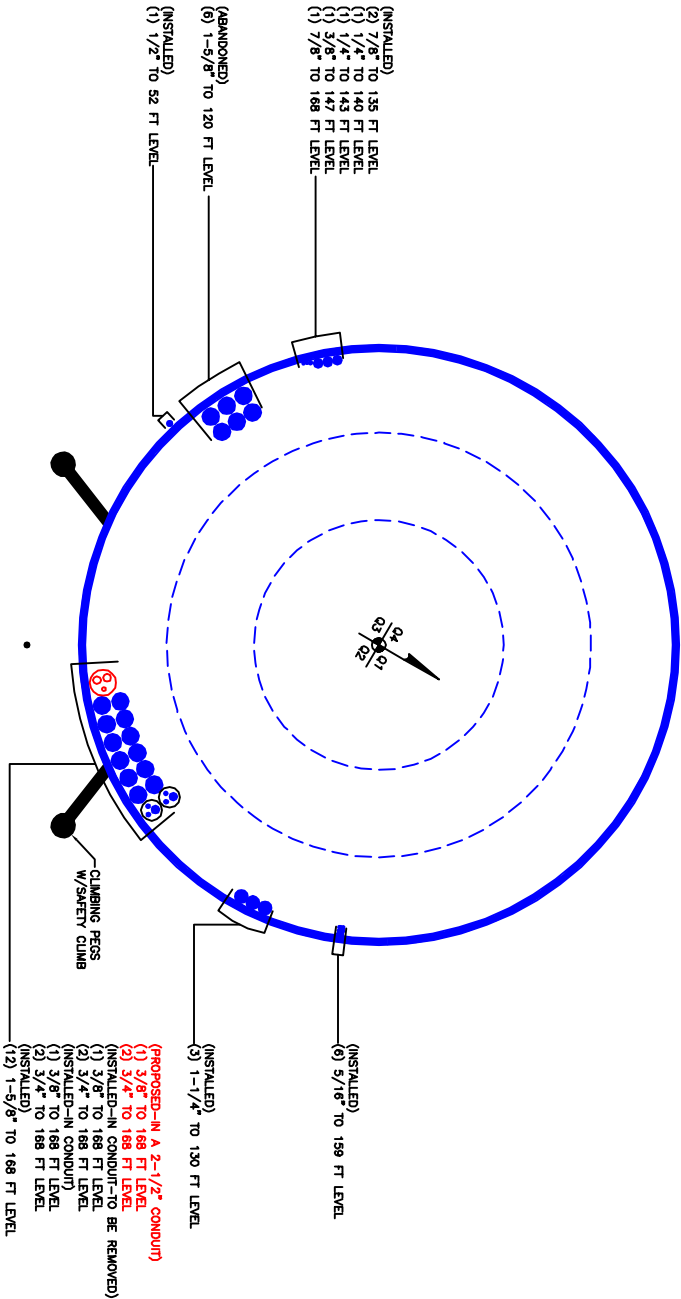
BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

PLOT DATE: 8/22/2016 FILE NAME: 842875\_BASELEVEL.DWG



BUSINESS UNIT: 842875 TOWER ID: C\_BASELEVEL

1\"/>

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## **APPENDIX C**

### **ADDITIONAL CALCULATIONS**

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

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

### Site Data

BU#: 842875		
Site Name: WINDSOR DAY HILL		
App #: 376368 Rev. 0		
Anchor Rod Data		
Eta Factor, $\eta$	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, $F_y$ :	75	ksi
Strength, $F_u$ :	100	ksi
Bolt Circle:	65	in
Anchor Spacing:	6	in

### Plate Data

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

### Stiffener Data (Welding at both sides)

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

### Pole Data

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

### Base Reactions

TIA Revision:	G	
Factored Moment, $M_u$ :	4096	ft-kips
Factored Axial, $P_u$ :	50	kips
Factored Shear, $V_u$ :	34	kips

### Anchor Rod Results

TIA G --> Max Rod ( $C_u + V_u/\eta$ ): 196.4 Kips  
 Axial Design Strength,  $\Phi F_u A_{net}$ : 260.0 Kips  
 Anchor Rod Stress Ratio: 75.5% **Pass**

### Base Plate Results

Base Plate Stress: 27.2 ksi  
 PL Design Bending Strength,  $\Phi F_y$ : 49.5 ksi  
 Base Plate Stress Ratio: 54.9% **Pass**

### Flexural Check

### PL Ref. Data

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

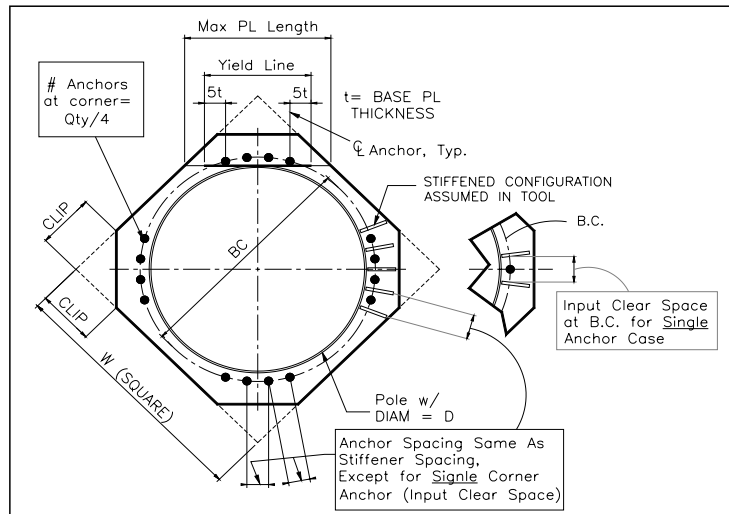
### N/A - Unstiffened

### Stiffener Results

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

### Pole Results

Pole Punching Shear Check: N/A



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

BU:	842875
Site Name:	WINDSOR DAY HILL
App Number:	376368 Rev. 0
Work Order:	1364322



### Monopole Drilled Pier

Input

Criteria	
TIA Revision:	G
ACI 318 Revision:	2008
Seismic Category:	B

## Forces

Compression	50 kips
Shear	34 kips
Moment	4096 k-ft
Swelling Force	0 kips

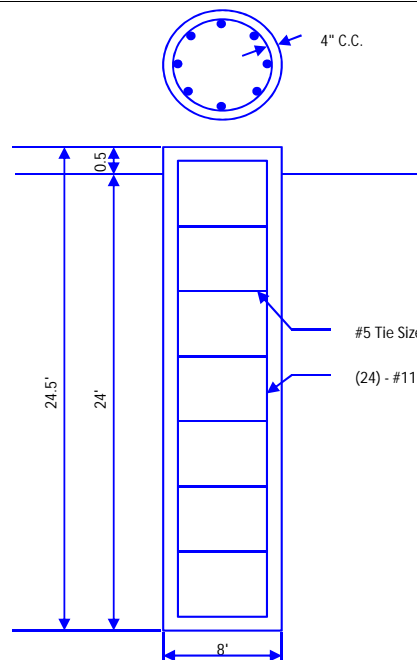
### Foundation Dimensions

Pier Diameter:	8 ft
Ext. above grade:	0.5 ft
Depth below grade:	24 ft

## Material Properties

Number of Rebar:	24
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	4 in

Soil Profile: 1

[illegible]

## Analysis Results

### Soil Lateral Capacity

Depth to Zero Shear:	8.14 ft
Max Moment, Mu:	4343.30 k-ft
Soil Safety Factor:	4.86
Safety Factor Req'd:	1.33
<b>RATING:</b>	<b>27.3%</b>

### Soil Axial Capacity

Skin Friction (k):	958.70 kips
End Bearing (k):	3015.93 kips
Comp. Capacity (k), $\phi C_n$ :	3974.63 kips
Comp. (k), $C_u$ :	50.00 kips
<b>RATING:</b>	<b>1.3%</b>

## Concrete/Steel Check

Mu (from soil analysis)	4343.30 k-ft
$\phi$ Mn	6865.34 k-ft
<b>RATING:</b>	<b>63.3%</b>

rho provided	0.52
rho required	0.33 OK

Rebar Spacing	9.76	
Spacing required	22.56	OK

Dev. Length required	15.53	
Dev. Length provided	61.78	OK

Overall Foundation Rating: 63.3%





# Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5139

Windsor Day Hill  
99 Day Hill Road  
Windsor, CT 6095

**March 28, 2017**

**Centerline Communications Project Number: 950006-046**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>4.95 %</b>



March 28, 2017

AT&T Mobility – New England  
Attn: John Benedetto, RF Manager  
550 Cochituate Road  
Suite 550 – 13&14  
Framingham, MA 06040

### Emissions Analysis for Site: **CT5139 – Windsor Day Hill**

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **99 Day Hill Road, Windsor, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 700 and 850 MHz Bands are approximately  $467 \mu\text{W}/\text{cm}^2$  and  $567 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.



## CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **99 Day Hill Road, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	850 MHz	2	60
LTE	700 MHz	4	60
LTE	2300 MHz (WCS)	2	60
LTE	1900 MHz (PCS)	2	60

*Table 1: Channel Data Table*



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Kathrein 800-10121	168
A	2	CCI OPA-65R-LCUU-H6	168
A	3	Quintel QS66512-2	168
B	1	Kathrein 800-10121	168
B	2	CCI OPA-65R-LCUU-H6	168
B	3	Quintel QS66512-2	168
C	1	Kathrein 800-10121	168
C	2	CCI OPA-65R-LCUU-H8	168
C	3	CCI TPA-65R-LCUUUU-H8	168

*Table 2: Antenna Data*

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

## RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.43
Antenna A2	CCI OPA-65R-LCUU-H6	850 MHz / 700 MHz / 2300 MHz (WCS)	12.45 / 11.65 / 15.45	6	360	8,073.14	1.60
Antenna A3	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	0.83
Sector A Composite MPE%							<b>2.85</b>
Antenna B1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.43
Antenna B2	CCI OPA-65R-LCUU-H6	850 MHz / 700 MHz / 2300 MHz (WCS)	12.45 / 11.65 / 15.45	6	360	8,073.14	1.60
Antenna B3	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	0.83
Sector B Composite MPE%							<b>2.85</b>
Antenna C1	Kathrein 800-10121	850 MHz / 1900 MHz (PCS)	11.45 / 14.35	4	120	2,471.44	0.43
Antenna C2	CCI OPA-65R-LCUU-H8	850 MHz / 700 MHz / 2300 MHz (WCS)	13.35 / 12.55 / 14.95	6	360	8,505.20	1.77
Antenna C3	CCI TPA-65R-LCUUUU-H8	700 MHz / 1900 MHz (PCS)	12.95 / 13.75	4	240	5,212.56	1.08
Sector C Composite MPE%							<b>3.28</b>

*Table 3: AT&T Emissions Levels*



The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, the sector with the largest calculated MPE% is Sector ABC. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
AT&T – Max Sector Value	<b>3.28 %</b>
Nextel	0.24 %
Sprint	0.06 %
Clearwire	0.08 %
MetroPCS CDMA	0.94 %
Bloomfield PD	0.01 %
Municipal Ant. 1	0.17 %
Municipal Ant. 2	0.17 %
Municipal MW 1	0.00 %
Municipal MW 2	0.00 %
<b>Site Total MPE %:</b>	<b>4.95 %</b>

*Table 4: All Carrier MPE Contributions*

AT&T Sector A Total:	2.85 %
AT&T Sector B Total:	2.85 %
AT&T Sector C Total:	3.28 %
Site Total:	4.95 %

*Table 5: Site MPE Summary*





FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, the sector with the largest calculated MPE% is Sector C.

AT&T _ Max Values Per Frequency Band / Technology (Sector C)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
AT&T 850 MHz UMTS	2	418.91	168	1.15	850 MHz	567	0.20%
AT&T 1900 MHz (PCS) UMTS	2	816.81	168	2.24	1900 MHz (PCS)	1000	0.22%
AT&T 850 MHz LTE	2	1,297.63	168	3.56	850 MHz	567	0.63%
AT&T 700 MHz LTE (Antenna 2)	2	1,079.32	168	2.96	700 MHz	467	0.63%
AT&T 2300 MHz (WCS) LTE	2	1,875.65	168	5.14	2300 MHz (WCS)	1000	0.51%
AT&T 700 MHz LTE (Antenna 3)	2	1,183.45	168	3.24	700 MHz	467	0.69%
AT&T 1900 MHz (PCS) LTE	2	1,422.82	168	3.90	1900 MHz (PCS)	1000	0.39%
						<b>Total:</b>	<b>3.28%</b>

*Table 6: AT&T Maximum Sector MPE Power Values*



## Summary

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

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	2.85 %
Sector B:	2.85 %
Sector C:	3.28 %
AT&T Maximum Total (per sector):	3.28 %
Site Total:	4.95 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **4.95 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

A handwritten signature in blue ink, appearing to read 'Scott Heffernan', is positioned above the printed name.

Scott Heffernan  
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