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

January 25, 2016

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: 841793**
AT&T Site ID: CT1137
50 Pine Lane, Windsor, CT 06095
Latitude: 41° 49' 11.1" / Longitude: -72° 40' 1.1"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 130-foot level of the existing 150-foot monopole at 50 Pine Lane in Windsor, CT. The tower is owned by Crown Castle. The property is owned by the Town of Windsor. AT&T now intends to replace three (3) antennas with three (3) new 700 MHz antennas. AT&T also intends to install three (3) RRU32s and three (3) A2s.

This facility was approved by the Windsor Town Planning and Zoning Commission in Special Use Application #547 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, as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

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

SUA547

A.M.
TP+ZC
10.10.00

TOWN OF WINDSOR
First in Connecticut. First for its citizens.

RECEIVED
SEP 08 2000
TOWN OF WINDSOR
PLANNING DEPT.

Application for a Special Use

Town Planning and Zoning Commission

Your Name Town of Windsor
AT&T Wireless PCS, LLC

Your Phone # 860-285-1877
203-831-4011

Your Address 275 Broad Street, Windsor, Connecticut 06095
149 Water Street, Norwalk, Connecticut 06854

Are You the..... (X) Owner ( ) Optionee ( ) Buyer ( ) Agent (X) Other

If Other please explain Lessee

Owner's Name (If other than applicant) Town of Windsor

Owner's Phone # 860-285-1877

Owner's Address 275 Broad Street, Windsor, Connecticut 06095

Address of Subject Parcel(s) 50 Pine Lane

Size of Subject Parcel(s) 258,311 Sq. Ft.

Zone of Subject Parcel(s) NZ

Please describe the Special Use

Wilson Firehouse Municipal Tower Facility/Wireless Facility Co-location

Applicable Section(s) of Zoning Regulations 12.2 & 2.2.19E(1)

Please describe how the Special Use will benefit the Town of Windsor (feel free to use the other side).

Additional material to be supplied.

Your Signature Christopher B. Fisher
Attorney for the Applicant

Date September 5, 2000

Owner's Signature Patrick J. McMahon

Date 9/6/00

Office Use Only **********

Fee Paid _____ **Application#** _____ **Application Received By** _____

Date of Action _____ **Approved** _____ **Disapproved** _____

Approved 5/98

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 #547 for a Wireless Telecommunications Tower with a monopole height of 150 feet plus 13-foot Town public service whip antennas for a total height of 163 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 fall zone distance requirement for 73 feet in relation to the distance of the tower from the easterly property line, 163 feet being required and 90 feet being proposed;**

2) **a waiver of the fall zone distance requirement for 236 feet in relation to the distance of the tower from I-91 to the east, 326 feet being required and 90 feet being proposed;**

3) **a waiver of the fall zone distance requirement for 245 feet in relation to the distance of the tower from the residential zone to the north, 576 feet being required and 331 feet being proposed; and**

4) **a waiver of the fall zone requirement for 52 feet in relation to the distance of the tower from Putnam Memorial Highway to the south, 326 feet being required and 274 feet being proposed.**

Said Special Use was granted for the property located at: **50 Pine Lane**

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

Dated at Windsor, Connecticut, this 30th **day of November, 2000**

_____ **Chairperson**

Public Act #75-317

Received for Record this _____ **day of** _____**, 2000**

_____ **Attest: Town Clerk**

LH 5-14-04

TOWN OF WINDSOR

BUILDING PERMIT APPLICATION

Town Hall • Windsor, CT 06095-2994

PERMIT #: B-041172

ADDRESS OF WORK LOCATION: 50 PINE LANE WINDSOR, CT

TYPE OF PERMIT (Check One)

☒ **BUILDING** (List size or sq. ft.)
Foundation 12' x 20'
Addition NA
Acc. Structure 12' x 20'
Deck NA
Roofing/Siding (# Squares) NA
Pool: Aboveground: NA Inground: NA
Other NA

☐ **ELECTRICAL**
☐ S. Change
☐ New Residential
☐ New Commercial
☐ Addition
☐ Pool Wiring
☐ Temporary Service
☐ Low Voltage
☐ Other

☐ **PLUMBING**
☐ New Residential
☐ New Commercial
☐ Addition
☐ Fire Suppression
☐ Water Heater
☐ Other

☐ **HVAC**
☐ New Residential
☐ New Commercial
☐ Addition
☐ Central Air
☐ Replace/Repair
☐ Other

New Residential (Total Gross Square Feet) NA
Residential Renovation NA
New Commercial (Total Gross Square Feet) 240 SQ FT
Commercial Renovation (Square Feet of Renovated Space) NA
Signs (size & type) NA

Copy to FMO

DESCRIPTION OF WORK (must fill out for all permits): Addition of Cingular Wireless antennas and pre-fab concrete equipment shelter to existing ATT Wireless monopole and Compound.

Retail Market Value $ 40,500 Fee: 550 Work Start Date: 5-24-04

Owner: ATT WIRELESS (land), Town of Windsor (land)
Address: (ATT) 15 East Midland Ave 5th Floor PARAMUS, NJ Zip 07652
Phone # (Days): 201-576-2416

Applicant: CINGULAR WIRELESS (TIM BURKS)
Address: 500 Enterprise Drive Suite 3A ROCKY HILL, CT Zip 06067
Phone # (Days): 860 513 7218
License #: MCO.900137 Type: MA Jour CONTRACTOR Exp.: 6-30-04
CFM CONSTRUCTION ✓OK

I understand that applying for this permit does not guarantee that it will be issued, and no work shall be done prior to the issuance of said permit or the approval of the **Building Official**. I agree to be in compliance with all applicable codes, standards, statutes, and ordinances which may pertain.

Applicant's Signature: Timothy M. Burks Print Name: TIMOTHY M. BURKS Date 5/12/04

STAFF MEMBER Check Pertinent Items and initial:

Zoning 3.90 on Addition OK - TP+Z Taxes Exempt/OK Worker's Comp. OK - CFM Wetlands N/A 6/8/04

Other: _____ Septic _____ Sewer _____ Letter of Authorization ✓ T.O.W.

Use Group: S-1 Construction Type: 2-C

Fee: ☒ Check ☐ Cash Transaction/Receipt #: 1172 Blanket Not Electrical

Special Conditions or Comments: All Work Per '99 CT State Bldg Code Reqmts Incl. Section 114 Threshold Structures & Section 1705 Spec. Insp. All Steel/Mech Work Req's Seper. Permits. Call For Inspections Noted - Allow 48 HR Notice. Completion Letters + Documentation Req'd. for C/O PRIOR TO USE. This Is Cingular Colocate.

Reviewed & Issued By: Stephen Dupre CBO Date: June 17, 2004

PROJECT INFORMATION

SCOPE OF WORK:

- AT&T ANTENNAS: (1) NEW ANTENNA PER SECTOR, FOR A TOTAL (3) NEW ANTENNAS. (2) EXISTING ANTENNAS PER SECTOR FOR 3 SECTORS, FOR A TOTAL OF (6) EXISTING ANTENNAS TO REMAIN. (1) EXISTING ANTENNA PER SECTOR FOR (3) SECTORS, FOR A TOTAL OF (3) EXISTING ANTENNAS TO BE REMOVED.
- AT&T RRUs: (1) NEW RRUs PER SECTOR AND (1) A2 MODULE WITH (3) SECTORS, FOR A TOTAL OF (3) NEW RRUs AND (3) A2 MODULES; (1) EXISTING RRU PER SECTOR TO BE REUSED, FOR A TOTAL OF (6) EXISTING RRUs.

SITE ADDRESS:	50 PINE LANE WINDSOR, CT 06095
LATITUDE:	41.8198281 41'–49'–11.38"N
LONGITUDE:	–72.6671881 72'–40'–01.877"W
USID:	59433
TOWER OWNER:	TBD
TYPE OF SITE:	MONOPOLE/INDOOR EQUIPMENT
MONOPOLE HEIGHT:	150'–0"±
RAD CENTER:	130'–0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

DRAWING INDEX

		REV.
T–1	TITLE SHEET	0
GN–1	GROUNDING & GENERAL NOTES	0
A–1	COMPOUND LAYOUT	0
A–2	EQUIPMENT LAYOUTS	0
A–3	ANTENNA LAYOUTS & ELEVATIONS	0
A–4	DETAILS	0
G–1	GROUNDING, ONE–LINE DIAGRAM & DETAILS	0

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

at&t MOBILITY

FA CODE: 10042353
SITE NUMBER: CT1137
SITE NAME: WINDSOR PINE LANE
CROWN BU: 84179

VICINITY MAP

PROCEED EAST ON ENTERPRISE DR. TURN LEFT ON CAPITOL BLVD. TURN LEFT ON WEST ST. LEFT TURN HARTFORD/I–91 N. EXIT RIGHT FOLLOWING THE SIGN WINDSOR/BLOOMFIELD (EXIT 35A–35B). AT RAMP'S END, TAKE A LEFT TO PUTNAM HWY/CT–218. TURN RIGHT ON PINE LN. SITE WILL BE ON THE RIGHT.

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

ZONING:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:

COMPANY: COM–EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46, SUITE E39, MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862–209–4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:

COMPANY: AT&T MOBILITY – NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508–596–7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484–683–1750
EMAIL: gdorman@empiretelecomm.com

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY, AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP · CALL BEFORE YOU DIG!

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

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1137
SITE NAME: WINDSOR PINE LANE
50 PINE LANE
WINDSOR, CT 06095
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/11/16	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT · NICHOLAS D. BARILE · REGISTERED PROFESSIONAL ENGINEER · No. 28643

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15054–EMP	T–1	0

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR – EMPIRE TELECOM
   - SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER – AT&T MOBILITY
   - OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR (EMPIRE TELECOM).

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
   - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
   - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

22. 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 AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1137
SITE NAME: WINDSOR PINE LANE

50 PINE LANE
WINDSOR, CT 06095
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/11/16	ISSUED AS FINAL	KCD	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

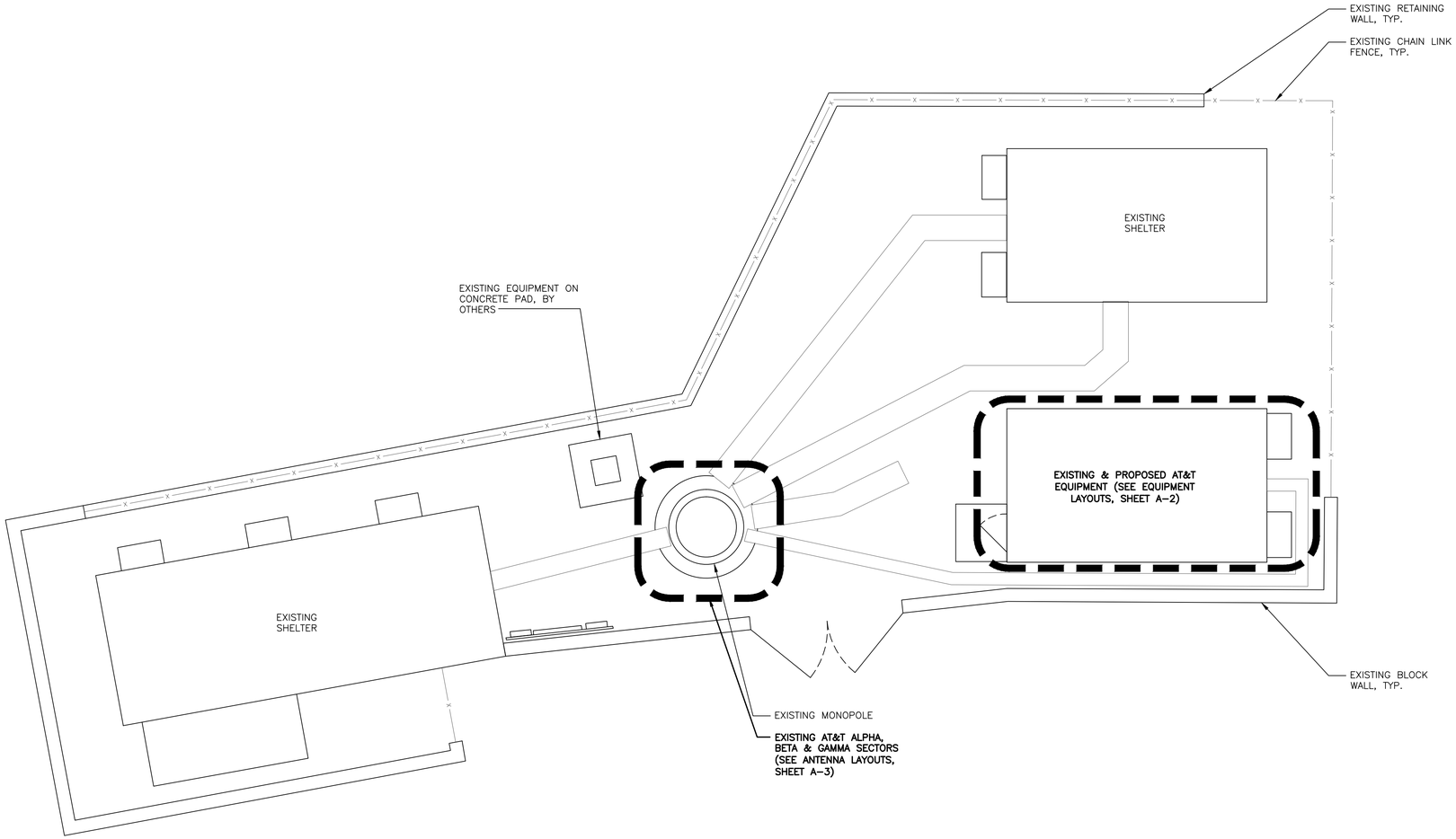
SEAL:

STATE OF CONNECTICUT
DOUGLAS D. BAILEY
12/31/2016
DOUGLAS D. BAILEY
PROFESSIONAL ENGINEER
CT 29643

AT&T

DRAWING TITLE:
GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
15054-EMP	GN-1	0



NORTH

COMPOUND LAYOUT

SCALE: 3/16" = 1'-0"

0 2'-5" 5'-1" 10'-8"

GRAPHIC SCALE: 3/16"=1'-0"

NOTE:
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 AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1137
SITE NAME: WINDSOR PINE LANE

50 PINE LANE
WINDSOR, CT 06095
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/11/16	ISSUED AS FINAL	KCD	NDB	NDB

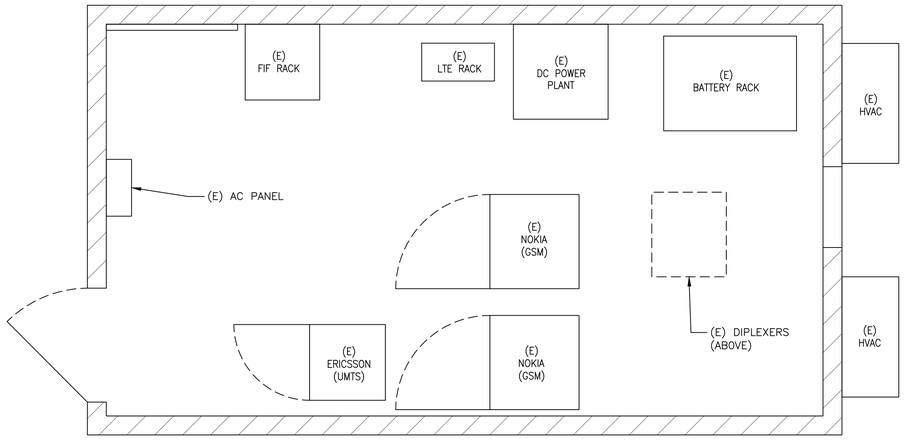
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BOWLING
CAROLINA 28643
PROFESSIONAL ENGINEER
CT LICENSED PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE:
COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15054-EMP	A-1	0



PROPOSED EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)

1/2 Inch = 1 Foot

NO GROUND EQUIPMENT MODIFICATIONS ARE BEING MADE AS PART OF THIS SCOPE. EXISTING GROUND EQUIPMENT CONFIGURATION TO REMAIN.

NORTH

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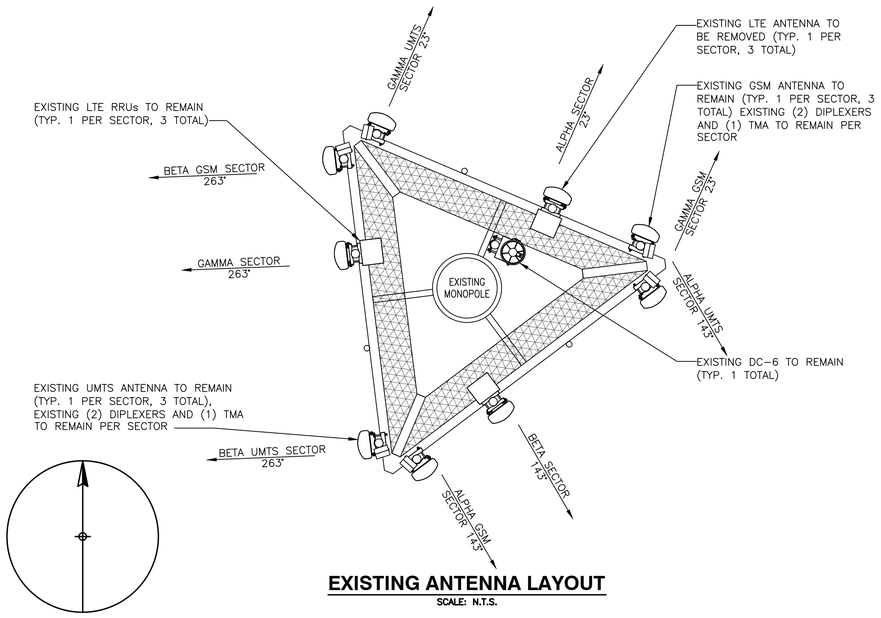
SEAL:

STATE OF CONNECTICUT
DOUGLAS B. BIANCHI
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

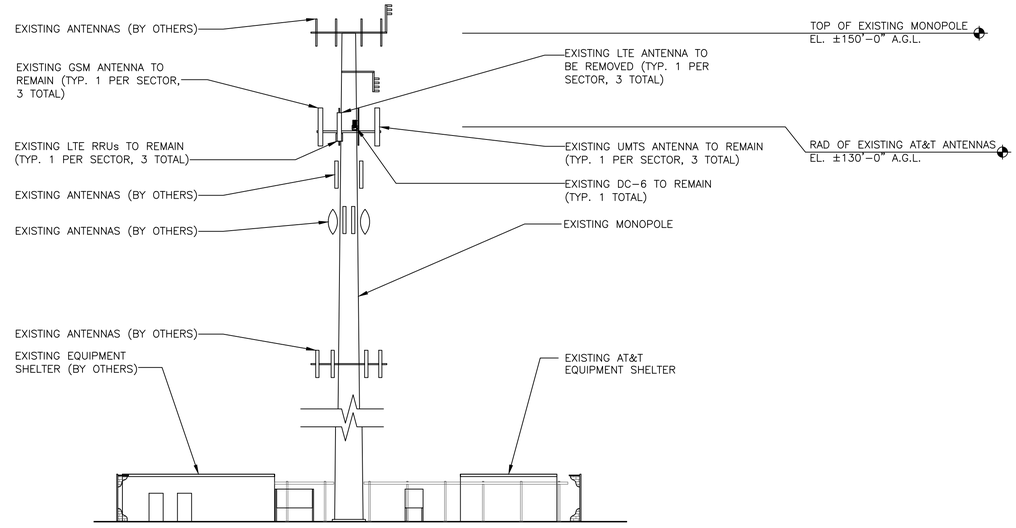
DRAWING TITLE:
EQUIPMENT LAYOUTS

JOB NUMBER	DRAWING NUMBER	REV
15054-EMP	A-2	0



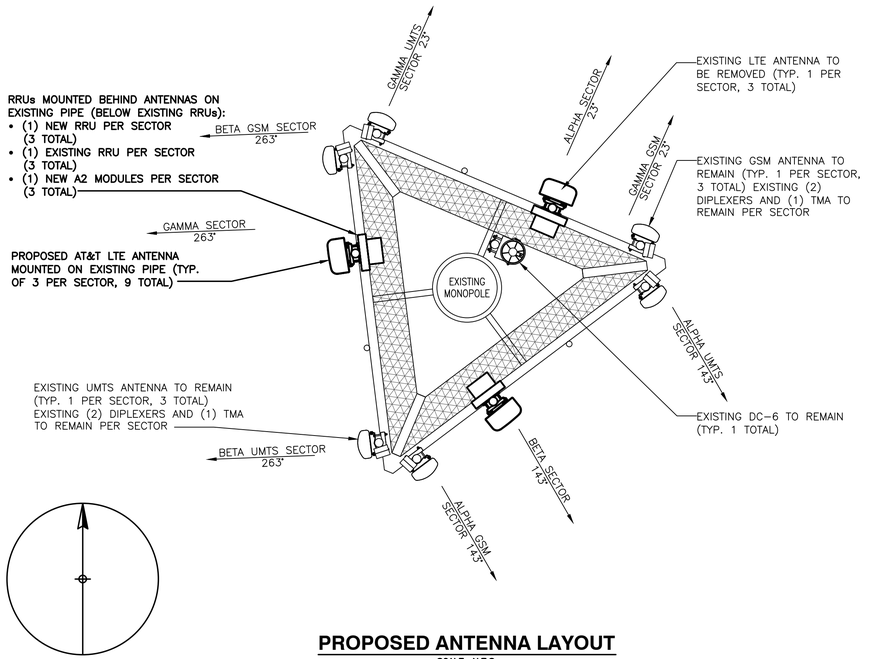
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



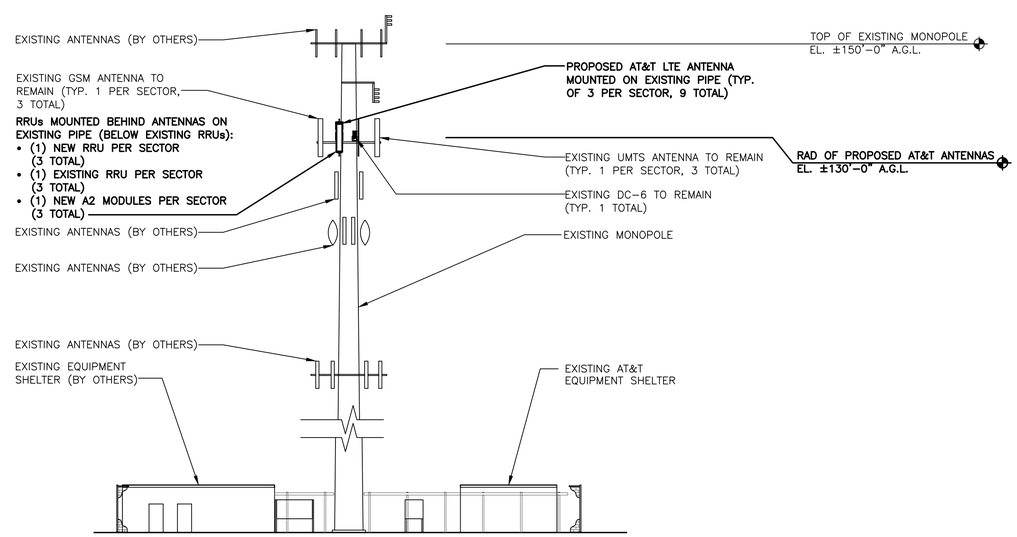
EXISTING TOWER ELEVATION

SCALE: NTS



PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.



PROPOSED TOWER ELEVATION

SCALE: NTS

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

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SEAL: STATE OF CONNECTICUT — NICHOLAS D. BARLOW — 29643 — PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
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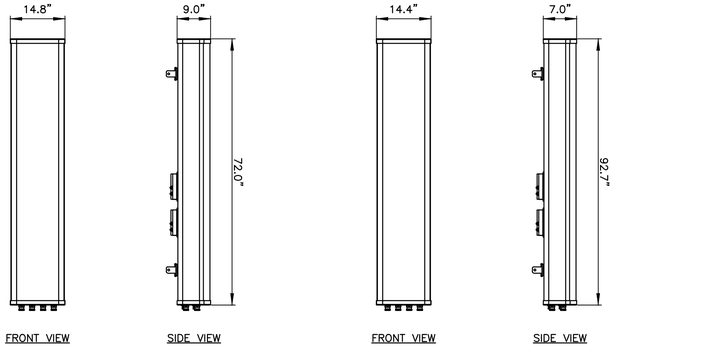
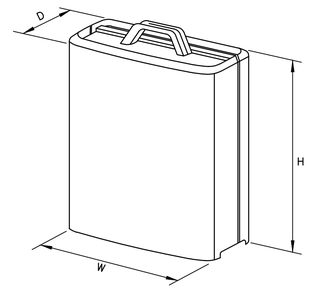


MANUFACTURER	CCI
MODEL	OPA-65R-BUU-H6
WEIGHT	50.7 LBS

MANUFACTURER	CCI
MODEL	OPA-65R-LCUU-H8
WEIGHT	88.0 LBS

LTE ANTENNA DETAIL

SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

*DENOTES EXISTING.

RRUS DETAIL

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
	A2	–	–	–
	A3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	A4	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
BETA	B1	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	B2	–	–	–
	B3	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
	B4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
GAMMA	G1	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	G2	–	–	–
	G3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	G4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
	A2	–	–	–
	A3	**CCI**	**OPA-65R-BUU-H6**	**72"x14.8"x9"**
	A4	POWERWAVE	P65-17-XLH-RR	96"x12"x6"
BETA	B1	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	B2	–	–	–
	B3	**CCI**	**OPA-65R-BUU-H8**	**92.7"x14.4"x7"**
	B4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
GAMMA	G1	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	G2	–	–	–
	G3	**CCI**	**OPA-65R-BUU-H6**	**72"x14.8"x9"**
	G4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	**ERICSSON**	**RRUS-11**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
BETA	**ERICSSON**	**RRUS-11**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
GAMMA	**ERICSSON**	**RRUS-11**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		

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SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

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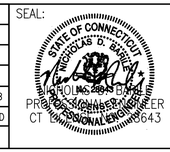

AT&T

DRAWING TITLE: DETAILS

JOB NUMBER	DRAWING NUMBER	REV
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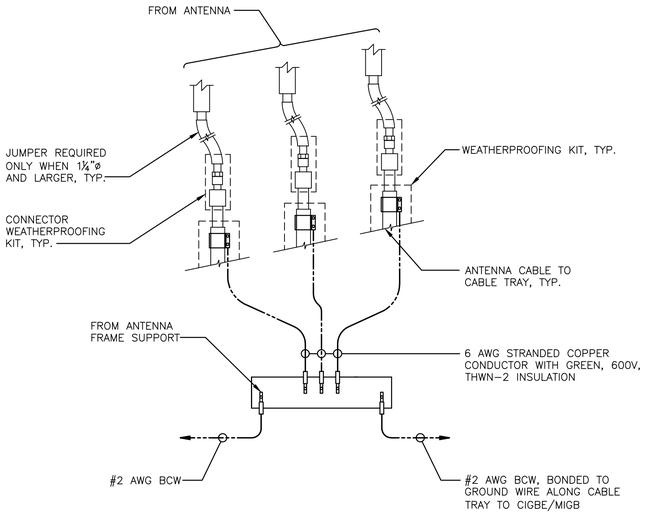
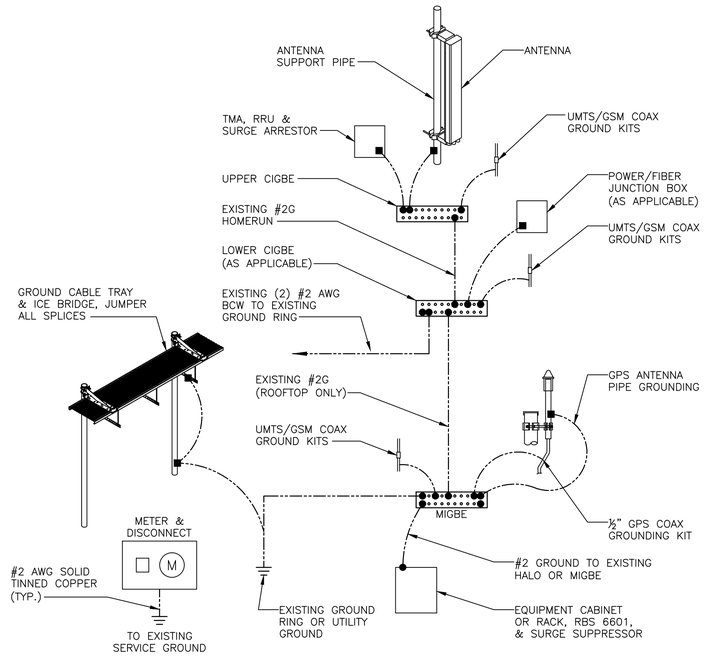


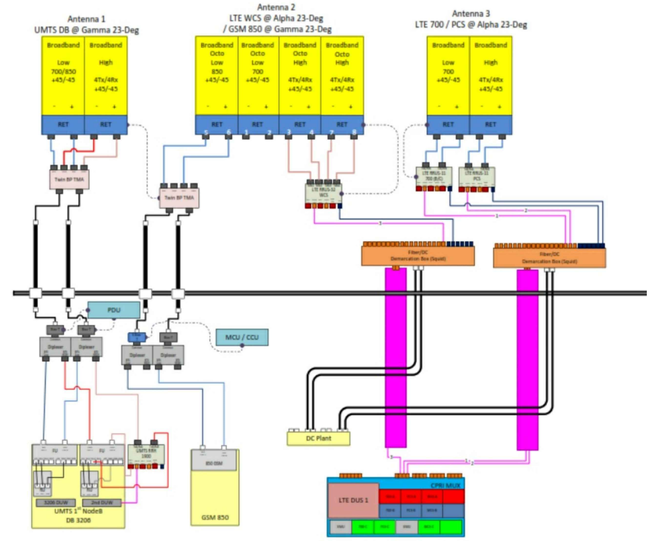
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



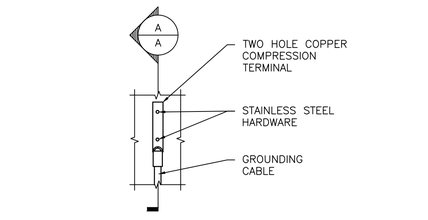
GROUNDING RISER DIAGRAM

SCALE: N.T.S.

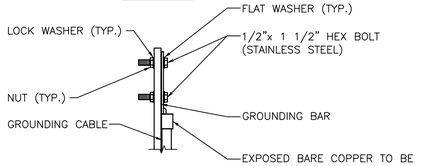


TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.



ELEVATION



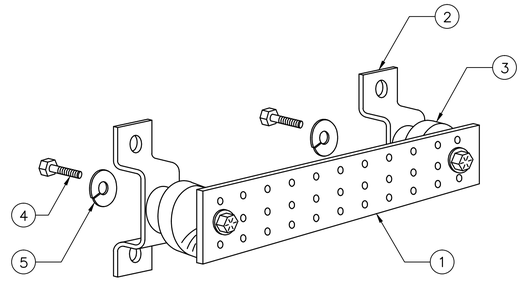
SECTION "A–A"

NOTE:

1. "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION "P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

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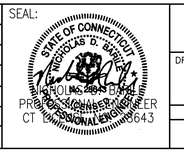

AT&T

DRAWING TITLE:
GROUNDING, ONE–LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15054–EMP	G–1	0

PJF PAUL J. FORD & COMPANY

Date: **November 25, 2015**

Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6535

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jmeinerding@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1137
	Carrier Site Name:	Windsor Pine Lane
Crown Castle Designation:	**Crown Castle BU Number:**	841793
	Crown Castle Site Name:	WINDSOR PINE LANE
	Crown Castle JDE Job Number:	357375
	Crown Castle Work Order Number:	1158369
	Crown Castle Application Number:	312704 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-3365.001.7805
Site Data:	**50 PINE LANE, WINDSOR, Hartford County, CT** **Latitude *41° 49' 11.1"*, Longitude *-72° 40' 1.1"*** **148 Foot - Monopole Tower**	

Dear Holly Haas,

Paul J. Ford and Company 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 849750, in accordance with application 312704, revision 1.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

We at *Paul J. Ford and Company* 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.

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

11-30-15

Date: **November 25, 2015**

Holly Haas
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Subject: Structural Analysis Report

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	Carrier Site Name:	Windsor Pine Lane
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Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft. monopole tower designed by Summit 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 the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	2	cci antennas	HPA-65R-BUU-H6	2 4	3/8 3/4	--
		1	cci antennas	HPA-65R-BUU-H8			
		1	cci antennas	TPA-65R-LCUUUU-H8			
		3	ericsson	RRUS 11			
		3	ericsson	RRUS 32			
		3	ericsson	RRUS A2			
		2	quintel technology	QS66512-3			
		2	raycap	DC6-48-60-18-8F			
		1	tower mounts	MTC3607 [LP 1301-1]			

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
149.0	153.0	1	decibel	DB225-C	1	7/8	1
	149.0	1	tower mounts	Platform Mount [LP 1201-1]			
140.0	140.0	1	andrew	HP2-102	1 2	3/8 3/4	1
		1	tower mounts	Pipe Mount [PM 601-1]			
139.0	139.0	1	tower mounts	Side Arm Mount [SO 701-1]	1	7/8	1
	134.0	1	decibel	DB225-C			
130.0	130.0	6	cci antennas	DTMABP0721VG12A	12	1-5/8	1
		3	ericsson	RRU-11			
		2	kmw communications	AM-X-CD-16-65-00T-RET			
		1	powerwave technologies	P65-17-XLH-RR			
		4	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	--	--	2
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
118.0	118.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
108.0	109.0	2	andrew	VHLP800-11	6 4	5/16 1/2	1
	108.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		3	samsung telecommunications	RRH-2WB			
		1	tower mounts	Side Arm Mount [SO 103-3]			
	107.0	2	andrew	VHLP2-18			

Notes:
1) Existing Equipment
2) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI, 2009-994, 12/30/2009	4469790	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit/PJF, 12008/29200-1653, 11/08/2000	--	--
4-TOWER MANUFACTURER DRAWINGS	Summit/PJF, 12008/29200-1653, 11/08/2000	--	--

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 116	Pole	TP30.241x24x0.2188	1	-7.40	1057.26	25.4	Pass
L2	116 - 74.75	Pole	TP37.847x29.0721x0.25	2	-12.99	1512.73	65.3	Pass
L3	74.75 - 39.5	Pole	TP44.222x36.4208x0.3125	3	-19.20	2208.86	69.8	Pass
L4	39.5 - 0	Pole	TP51.3x42.5243x0.375	4	-30.04	3151.12	68.9	Pass
							Summary	
						Pole (L3)	69.8	Pass
						Rating =	69.8	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	58.6	Pass
1	Base Plate	0	58.6	Pass
1	Base Foundation Structural Steel	0	60.7	Pass
1	Base Foundation Soil Interaction	0	94.0	Pass

Structure Rating (max from all components) =	94.0%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.0000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

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	148.00-116.00	32.00	3.75	18	24.0000	30.2410	0.2188	0.8750	A607-65 (65 ksi)
L2	116.00-74.75	45.00	4.75	18	29.0721	37.8470	0.2500	1.0000	A607-65 (65 ksi)
L3	74.75-39.50	40.00	5.50	18	36.4208	44.2220	0.3125	1.2500	A607-65 (65 ksi)
L4	39.50-0.00	45.00		18	42.5243	51.3000	0.3750	1.5000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.3702	16.5116	1179.7676	8.4423	12.1920	96.7657	2361.0876	8.2574	3.8390	17.55
	30.7075	20.8448	2373.6799	10.6579	15.3624	154.5120	4750.4831	10.4244	4.9374	22.571
L2	30.2631	22.8704	2400.2845	10.2319	14.7686	162.5257	4803.7274	11.4374	4.6767	18.707
	38.4309	29.8332	5327.7515	13.3469	19.2263	277.1078	10662.5134	14.9194	6.2211	24.884
L3	37.9233	35.8149	5899.4866	12.8184	18.5017	318.8610	11806.7360	17.9108	5.8601	18.752
	44.9042	43.5527	10608.8881	15.5879	22.4648	472.2454	21231.7357	21.7805	7.2331	23.146
L4	44.2695	50.1682	11260.2406	14.9630	21.6024	521.2505	22535.2976	25.0889	6.8243	18.198
	52.0914	60.6135	19859.5203	18.0784	26.0604	762.0574	39745.1722	30.3125	8.3688	22.317

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.00-116.00				1	1	1		
L2 116.00-74.75				1	1	1		
L3 74.75-39.50				1	1	1		
L4 39.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF5-50A(7/8)	C	No	Inside Pole	148.00 - 0.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
***								
LDF2-50(3/8)	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
						2" Ice	0.00	0.08
						4" Ice	0.00	0.08
WR-VG86T(3/4")	C	No	Inside Pole	140.00 - 0.00	2	No Ice	0.00	0.53
						1/2" Ice	0.00	0.53
						1" Ice	0.00	0.53
						2" Ice	0.00	0.53
						4" Ice	0.00	0.53
2" Conduit	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
						2" Ice	0.00	1.16
						4" Ice	0.00	1.16
***								
LDF5-50A(7/8)	C	No	Inside Pole	139.00 - 0.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
***								
LDF7-50A(1-5/8)	C	No	Inside Pole	130.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	0.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	130.00 - 0.00	4	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
						2" Ice	0.00	0.58
						4" Ice	0.00	0.58
***								
LDF7-50A(1-5/8)	C	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
LDF4-50A(1/2")	C	No	Inside Pole	108.00 - 0.00	4	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
9207(5/16")	C	No	Inside Pole	108.00 - 0.00	6	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
2" Conduit	C	No	Inside Pole	108.00 - 0.00	3	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
						2" Ice	0.00	1.16
						4" Ice	0.00	1.16

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-116.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.26
L2	116.00-74.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.98
L3	74.75-39.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.87
L4	39.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.97

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-116.00	A	1.180	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.26
L2	116.00-74.75	A	1.135	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.98
L3	74.75-39.50	A	1.068	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.87
L4	39.50-0.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.97

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.00-116.00	0.0000	0.0000	0.0000	0.0000
L2	116.00-74.75	0.0000	0.0000	0.0000	0.0000
L3	74.75-39.50	0.0000	0.0000	0.0000	0.0000
L4	39.50-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DB225-C	A	From Leg	4.00 0.00 4.00	0.000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.32 4.18 6.03 9.74 17.17	2.32 4.18 6.03 9.74 17.17	0.03 0.04 0.04 0.06 0.10
(4) 2.375" OD x 5' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.19 1.50 1.81 2.46 3.92	1.19 1.50 1.81 2.46 3.92	0.02 0.03 0.04 0.08 0.20
(4) 2.375" OD x 5' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.19 1.50 1.81 2.46 3.92	1.19 1.50 1.81 2.46 3.92	0.02 0.03 0.04 0.08 0.20
(4) 2.375" OD x 5' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.19 1.50 1.81 2.46 3.92	1.19 1.50 1.81 2.46 3.92	0.02 0.03 0.04 0.08 0.20
Platform Mount [LP 1201-1]	C	None		0.000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.10 26.80 30.50 37.90 52.70	23.10 26.80 30.50 37.90 52.70	2.10 2.50 2.90 3.70 5.30
***									
Pipe Mount [PM 601-1]	A	None		0.000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.74 4.48 5.96 8.92	0.90 1.12 1.34 1.78 2.66	0.07 0.08 0.09 0.12 0.18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
DB225-C	B	From Leg	3.00 0.00 -5.00	0.000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.32 4.18 6.03 9.74 17.17	2.32 4.18 6.03 9.74 17.17	0.03 0.04 0.04 0.06 0.10
Side Arm Mount [SO 701-1]	B	None		0.000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
***									
P65-17-XLH-RR	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.47 12.08 12.71 14.07 17.08	6.80 7.38 7.98 9.18 11.68	0.06 0.12 0.19 0.35 0.78
AM-X-CD-16-65-00T-RET	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	4.64 5.09 5.54 6.47 8.45	0.05 0.09 0.15 0.27 0.60
AM-X-CD-16-65-00T-RET	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	4.64 5.09 5.54 6.47 8.45	0.05 0.09 0.15 0.27 0.60
(2) DTMABP0721VG12A	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.34 0.43 0.54 0.77 1.34	0.02 0.03 0.04 0.06 0.14
(2) DTMABP0721VG12A	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.34 0.43 0.54 0.77 1.34	0.02 0.03 0.04 0.06 0.14
(2) DTMABP0721VG12A	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.34 0.43 0.54 0.77 1.34	0.02 0.03 0.04 0.06 0.14
RRU-11	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.91 2.10 2.30 2.72 3.68	1.47 1.65 1.83 2.22 3.10	0.04 0.06 0.08 0.12 0.25
RRU-11	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.91 2.10 2.30 2.72 3.68	1.47 1.65 1.83 2.22 3.10	0.04 0.06 0.08 0.12 0.25
RRU-11	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice	1.91 2.10 2.30	1.47 1.65 1.83	0.04 0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	2.72	2.22	0.12
						2" Ice	3.68	3.10	0.25
						4" Ice			
HPA-65R-BUU-H6	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.36 10.93 11.50 12.68 15.14	6.45 6.91 7.38 8.47 10.78	0.05 0.11 0.18 0.34 0.75
HPA-65R-BUU-H6	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.36 10.93 11.50 12.68 15.14	6.45 6.91 7.38 8.47 10.78	0.05 0.11 0.18 0.34 0.75
HPA-65R-BUU-H8	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.30 13.99 14.70 16.14 19.13	7.52 8.09 8.67 9.85 12.29	0.07 0.14 0.22 0.41 0.88
QS66512-3	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.40 8.95 9.51 10.65 13.03	6.80 7.27 7.80 8.90 11.23	0.11 0.16 0.23 0.37 0.75
QS66512-3	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.40 8.95 9.51 10.65 13.03	6.80 7.27 7.80 8.90 11.23	0.11 0.16 0.23 0.37 0.75
TPA-65R-LCUUUU-H8	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.44 14.16 14.89 16.37 19.44	8.82 9.42 10.03 11.26 13.82	0.08 0.16 0.25 0.45 0.95
RRUS A2	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.41 2.62 2.84 3.30 4.32	0.53 0.67 0.81 1.12 1.84	0.02 0.03 0.05 0.09 0.20
RRUS A2	B	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.41 2.62 2.84 3.30 4.32	0.53 0.67 0.81 1.12 1.84	0.02 0.03 0.05 0.09 0.20
RRUS A2	C	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.41 2.62 2.84 3.30 4.32	0.53 0.67 0.81 1.12 1.84	0.02 0.03 0.05 0.09 0.20
RRUS 32	A	From Leg	4.00 0.00 0.00	0.000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.33 3.60 3.87 4.44 5.68	1.98 2.21 2.45 2.96 4.07	0.06 0.08 0.10 0.16 0.34
RRUS 32	B	From Leg	4.00 0.00	0.000	130.00	No Ice 1/2"	3.33 3.60	1.98 2.21	0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	3.87	2.45	0.10
						1" Ice	4.44	2.96	0.16
						2" Ice	5.68	4.07	0.34
						4" Ice			
RRUS 32	C	From Leg	4.00	0.000	130.00	No Ice	3.33	1.98	0.06
			0.00			1/2"	3.60	2.21	0.08
			0.00			Ice	3.87	2.45	0.10
						1" Ice	4.44	2.96	0.16
						2" Ice	5.68	4.07	0.34
						4" Ice			
RRUS 11	A	From Leg	4.00	0.000	130.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.10
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS 11	B	From Leg	4.00	0.000	130.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.10
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS 11	C	From Leg	4.00	0.000	130.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.10
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
(2) DC6-48-60-18-8F	A	From Leg	4.00	0.000	130.00	No Ice	1.47	1.47	0.02
			0.00			1/2"	1.67	1.67	0.04
			0.00			Ice	1.88	1.88	0.06
						1" Ice	2.33	2.33	0.11
						2" Ice	3.38	3.38	0.24
						4" Ice			
Platform Mount [LP 1301-1]	C	None		0.000	130.00	No Ice	51.70	51.70	2.26
						1/2"	62.70	62.70	2.94
						Ice	73.70	73.70	3.61
						1" Ice	95.70	95.70	4.95
						2" Ice	139.70	139.70	7.65
						4" Ice			
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00	0.000	118.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			0.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00	0.000	118.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			0.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00	0.000	118.00	No Ice	5.40	4.70	0.05
			0.00			1/2"	5.96	5.86	0.10
			0.00			Ice	6.48	6.73	0.15
						1" Ice	7.55	8.51	0.28
						2" Ice	9.92	12.28	0.68
						4" Ice			
Pipe Mount [PM 601-3]	C	None		0.000	118.00	No Ice	4.39	4.39	0.20
						1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28
						1" Ice	8.75	8.75	0.36
						2" Ice	13.11	13.11	0.53
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
LLPX310R w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.96 5.35 5.75 6.58 8.37	2.85 3.37 3.90 5.08 7.84	0.04 0.08 0.12 0.23 0.53
LLPX310R w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.96 5.35 5.75 6.58 8.37	2.85 3.37 3.90 5.08 7.84	0.04 0.08 0.12 0.23 0.53
LLPX310R w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.96 5.35 5.75 6.58 8.37	2.85 3.37 3.90 5.08 7.84	0.04 0.08 0.12 0.23 0.53
RRH-2WB	A	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.69 2.91 3.14 3.63 4.72	0.85 1.01 1.18 1.55 2.38	0.04 0.06 0.08 0.12 0.25
RRH-2WB	B	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.69 2.91 3.14 3.63 4.72	0.85 1.01 1.18 1.55 2.38	0.04 0.06 0.08 0.12 0.25
RRH-2WB	C	From Leg	4.00 0.00 0.00	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.69 2.91 3.14 3.63 4.72	0.85 1.01 1.18 1.55 2.38	0.04 0.06 0.08 0.12 0.25
Side Arm Mount [SO 103-3]	C	None		0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	9.50 11.80 14.10 18.70 27.90	9.50 11.80 14.10 18.70 27.90	0.22 0.32 0.41 0.60 0.97

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-102	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	0.000		140.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.41 3.68 4.21 5.28	0.03 0.04 0.06 0.09 0.16
***											
VHLP2-18	A	Paraboloid w/o Radome	From Leg	2.00 0.00	0.000		108.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
				-1.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP800-11	A	Paraboloid w/o Radome	From Leg	2.00	0.000		108.00	2.92	No Ice	6.68	0.02
				0.00					1/2" Ice	7.07	0.06
				1.00					1" Ice	7.46	0.09
									2" Ice	8.23	0.17
									4" Ice	9.78	0.31
VHLP2-18	B	Paraboloid w/o Radome	From Leg	2.00	0.000		108.00	2.17	No Ice	3.72	0.03
				0.00					1/2" Ice	4.01	0.05
				-1.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP800-11	C	Paraboloid w/o Radome	From Leg	2.00	0.000		108.00	2.92	No Ice	6.68	0.02
				0.00					1/2" Ice	7.07	0.06
				1.00					1" Ice	7.46	0.09
									2" Ice	8.23	0.17
									4" Ice	9.78	0.31

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.00-116.00	131.52	1.484	24.31	72.321	A	0.000	72.321	72.321	100.00	0.000	0.000
					B	0.000	72.321		100.00	0.000	0.000
					C	0.000	72.321		100.00	0.000	0.000
L2 116.00-74.75	94.88	1.352	22.11	116.274	A	0.000	116.274	116.274	100.00	0.000	0.000
					B	0.000	116.274		100.00	0.000	0.000
					C	0.000	116.274		100.00	0.000	0.000
L3 74.75-39.50	57.02	1.169	19.07	119.805	A	0.000	119.805	119.805	100.00	0.000	0.000
					B	0.000	119.805		100.00	0.000	0.000
					C	0.000	119.805		100.00	0.000	0.000
L4 39.50-0.00	19.22	1	16.38	156.185	A	0.000	156.185	156.185	100.00	0.000	0.000
					B	0.000	156.185		100.00	0.000	0.000
					C	0.000	156.185		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 148.00-116.00	131.52	1.484	5.37	1.1805	78.617	A	0.000	78.617	78.617	100.00	0.000	0.000
						B	0.000	78.617		100.00	0.000	0.000
						C	0.000	78.617		100.00	0.000	0.000
L2 116.00-74.75	94.88	1.352	4.88	1.1351	124.390	A	0.000	124.390	124.390	100.00	0.000	0.000
						B	0.000	124.390		100.00	0.000	0.000
						C	0.000	124.390		100.00	0.000	0.000
L3 74.75-39.50	57.02	1.169	4.21	1.0678	126.473	A	0.000	126.473	126.473	100.00	0.000	0.000
						B	0.000	126.473		100.00	0.000	0.000
						C	0.000	126.473		100.00	0.000	0.000
L4 39.50-0.00	19.22	1	3.62	1.0000	163.214	A	0.000	163.214	163.214	100.00	0.000	0.000
						B	0.000	163.214		100.00	0.000	0.000
						C	0.000	163.214		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.00-116.00	131.52	1.484	9.49	72.321	A	0.000	72.321	72.321	100.00	0.000	0.000
					B	0.000	72.321		100.00	0.000	0.000
					C	0.000	72.321		100.00	0.000	0.000
L2 116.00-74.75	94.88	1.352	8.64	116.274	A	0.000	116.274	116.274	100.00	0.000	0.000
					B	0.000	116.274		100.00	0.000	0.000
					C	0.000	116.274		100.00	0.000	0.000
L3 74.75-39.50	57.02	1.169	7.45	119.805	A	0.000	119.805	119.805	100.00	0.000	0.000
					B	0.000	119.805		100.00	0.000	0.000
					C	0.000	119.805		100.00	0.000	0.000
L4 39.50-0.00	19.22	1	6.40	156.185	A	0.000	156.185	156.185	100.00	0.000	0.000
					B	0.000	156.185		100.00	0.000	0.000
					C	0.000	156.185		100.00	0.000	0.000

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 116	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	14	-14.47	-0.11	1.04
			Max. Mx	11	-7.40	156.14	0.94
			Max. My	2	-7.39	0.31	156.99
			Max. Vy	5	10.82	-155.91	0.54
			Max. Vx	8	10.85	-0.06	-156.81
			Max. Torque	12			-1.32
L2	116 - 74.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-23.59	-0.04	1.34
			Max. Mx	5	-13.02	-725.77	6.77
			Max. My	8	-12.99	-0.32	-735.58
			Max. Vy	5	16.05	-725.77	6.77
			Max. Vx	8	16.35	-0.32	-735.58
			Max. Torque	5			1.71
L3	74.75 - 39.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.64	-0.04	1.32
			Max. Mx	5	-19.21	-1320.55	13.93
			Max. My	8	-19.20	-0.36	-1340.82
			Max. Vy	5	18.38	-1320.55	13.93
			Max. Vx	8	18.68	-0.36	-1340.82
			Max. Torque	5			1.69
L4	39.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-45.03	-0.04	1.30
			Max. Mx	5	-30.04	-2209.84	23.12
			Max. My	8	-30.04	-0.41	-2243.56
			Max. Vy	5	21.12	-2209.84	23.12
			Max. Vx	8	21.41	-0.41	-2243.56
			Max. Torque	5			1.68

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	45.03	0.00	-0.00
	Max. H_x	11	30.06	21.05	0.14
	Max. H_z	2	30.06	-0.13	21.33
	Max. M_x	2	2236.07	-0.13	21.33
	Max. M_z	5	2209.84	-21.10	0.20
	Max. Torsion	5	1.68	-21.10	0.20
	Min. Vert	8	30.06	-0.00	-21.40
	Min. H_x	5	30.06	-21.10	0.20
	Min. H_z	8	30.06	-0.00	-21.40
	Min. M_x	8	-2243.56	-0.00	-21.40
	Min. M_z	11	-2203.84	21.05	0.14
	Min. Torsion	12	-1.57	18.29	10.63

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	30.06	-0.00	-0.00	-0.51	0.10	0.00
Dead+Wind 0 deg - No Ice	30.06	0.13	-21.33	-2236.07	-14.57	0.45
Dead+Wind 30 deg - No Ice	30.06	10.75	-18.29	-1916.83	-1126.16	-0.53
Dead+Wind 60 deg - No Ice	30.06	18.35	-10.66	-1118.79	-1921.27	-1.30
Dead+Wind 90 deg - No Ice	30.06	21.10	-0.20	-23.12	-2209.84	-1.68

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 120 deg - No Ice	30.06	18.37	10.90	1145.74	-1923.55	-1.35
Dead+Wind 150 deg - No Ice	30.06	10.35	18.61	1952.35	-1082.60	-0.76
Dead+Wind 180 deg - No Ice	30.06	0.00	21.40	2243.56	-0.41	-0.27
Dead+Wind 210 deg - No Ice	30.06	-10.35	18.64	1955.23	1082.23	0.27
Dead+Wind 240 deg - No Ice	30.06	-18.27	11.00	1156.21	1912.55	0.90
Dead+Wind 270 deg - No Ice	30.06	-21.05	-0.14	-17.24	2203.84	1.46
Dead+Wind 300 deg - No Ice	30.06	-18.29	-10.63	-1115.43	1914.64	1.57
Dead+Wind 330 deg - No Ice	30.06	-10.65	-18.26	-1913.46	1115.39	1.24
Dead+Ice+Temp	45.03	-0.00	0.00	-1.30	-0.04	0.00
Dead+Wind 0 deg+Ice+Temp	45.03	0.03	-5.74	-643.12	-3.62	0.25
Dead+Wind 30 deg+Ice+Temp	45.03	2.89	-4.93	-551.95	-322.92	-0.10
Dead+Wind 60 deg+Ice+Temp	45.03	4.94	-2.87	-322.40	-551.78	-0.40
Dead+Wind 90 deg+Ice+Temp	45.03	5.68	-0.05	-7.30	-634.95	-0.58
Dead+Wind 120 deg+Ice+Temp	45.03	4.94	2.93	326.95	-552.32	-0.54
Dead+Wind 150 deg+Ice+Temp	45.03	2.79	5.01	558.67	-311.71	-0.38
Dead+Wind 180 deg+Ice+Temp	45.03	0.00	5.76	642.51	-0.17	-0.20
Dead+Wind 210 deg+Ice+Temp	45.03	-2.79	5.01	559.37	311.47	0.03
Dead+Wind 240 deg+Ice+Temp	45.03	-4.92	2.95	329.50	549.50	0.29
Dead+Wind 270 deg+Ice+Temp	45.03	-5.67	-0.04	-5.86	633.35	0.52
Dead+Wind 300 deg+Ice+Temp	45.03	-4.92	-2.86	-321.58	550.02	0.60
Dead+Wind 330 deg+Ice+Temp	45.03	-2.87	-4.92	-551.13	320.15	0.50
Dead+Wind 0 deg - Service	30.06	0.05	-8.33	-874.42	-5.63	0.18
Dead+Wind 30 deg - Service	30.06	4.20	-7.14	-749.52	-440.10	-0.21
Dead+Wind 60 deg - Service	30.06	7.17	-4.16	-437.61	-750.86	-0.51
Dead+Wind 90 deg - Service	30.06	8.24	-0.08	-9.37	-863.69	-0.66
Dead+Wind 120 deg - Service	30.06	7.17	4.26	447.48	-751.76	-0.53
Dead+Wind 150 deg - Service	30.06	4.04	7.27	762.75	-423.07	-0.30
Dead+Wind 180 deg - Service	30.06	0.00	8.36	876.69	-0.10	-0.11
Dead+Wind 210 deg - Service	30.06	-4.04	7.28	763.87	423.05	0.10
Dead+Wind 240 deg - Service	30.06	-7.14	4.30	451.57	747.58	0.35
Dead+Wind 270 deg - Service	30.06	-8.22	-0.06	-7.07	861.47	0.57
Dead+Wind 300 deg - Service	30.06	-7.14	-4.15	-436.30	748.39	0.62
Dead+Wind 330 deg - Service	30.06	-4.16	-7.13	-748.20	436.01	0.49

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-30.06	0.00	0.00	30.06	0.00	0.000%
2	0.13	-30.06	-21.33	-0.13	30.06	21.33	0.007%
3	10.75	-30.06	-18.29	-10.75	30.06	18.29	0.000%
4	18.35	-30.06	-10.66	-18.35	30.06	10.66	0.000%
5	21.10	-30.06	-0.20	-21.10	30.06	0.20	0.003%
6	18.37	-30.06	10.90	-18.37	30.06	-10.90	0.000%
7	10.35	-30.06	18.61	-10.35	30.06	-18.61	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
8	0.00	-30.06	21.40	-0.00	30.06	-21.40	0.007%
9	-10.35	-30.06	18.64	10.35	30.06	-18.64	0.000%
10	-18.27	-30.06	11.00	18.27	30.06	-11.00	0.000%
11	-21.05	-30.06	-0.14	21.05	30.06	0.14	0.003%
12	-18.29	-30.06	-10.63	18.29	30.06	10.63	0.000%
13	-10.65	-30.06	-18.26	10.65	30.06	18.26	0.000%
14	0.00	-45.03	0.00	0.00	45.03	-0.00	0.001%
15	0.03	-45.03	-5.74	-0.03	45.03	5.74	0.001%
16	2.89	-45.03	-4.93	-2.89	45.03	4.93	0.001%
17	4.94	-45.03	-2.87	-4.94	45.03	2.87	0.001%
18	5.68	-45.03	-0.05	-5.68	45.03	0.05	0.001%
19	4.94	-45.03	2.93	-4.94	45.03	-2.93	0.001%
20	2.79	-45.03	5.01	-2.79	45.03	-5.01	0.001%
21	0.00	-45.03	5.76	-0.00	45.03	-5.76	0.001%
22	-2.79	-45.03	5.01	2.79	45.03	-5.01	0.001%
23	-4.92	-45.03	2.96	4.92	45.03	-2.95	0.001%
24	-5.67	-45.03	-0.04	5.67	45.03	0.04	0.001%
25	-4.92	-45.03	-2.86	4.92	45.03	2.86	0.001%
26	-2.87	-45.03	-4.92	2.87	45.03	4.92	0.001%
27	0.05	-30.06	-8.33	-0.05	30.06	8.33	0.003%
28	4.20	-30.06	-7.15	-4.20	30.06	7.14	0.003%
29	7.17	-30.06	-4.17	-7.17	30.06	4.16	0.003%
30	8.24	-30.06	-0.08	-8.24	30.06	0.08	0.003%
31	7.17	-30.06	4.26	-7.17	30.06	-4.26	0.003%
32	4.04	-30.06	7.27	-4.04	30.06	-7.27	0.003%
33	0.00	-30.06	8.36	-0.00	30.06	-8.36	0.003%
34	-4.04	-30.06	7.28	4.04	30.06	-7.28	0.003%
35	-7.14	-30.06	4.30	7.14	30.06	-4.30	0.003%
36	-8.22	-30.06	-0.06	8.22	30.06	0.06	0.003%
37	-7.14	-30.06	-4.15	7.14	30.06	4.15	0.003%
38	-4.16	-30.06	-7.13	4.16	30.06	7.13	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00008198	0.00012669
3	Yes	18	0.00000001	0.00006573
4	Yes	18	0.00000001	0.00006919
5	Yes	15	0.00003568	0.00010733
6	Yes	18	0.00000001	0.00006540
7	Yes	18	0.00000001	0.00006757
8	Yes	14	0.00008196	0.00010977
9	Yes	18	0.00000001	0.00006610
10	Yes	18	0.00000001	0.00006644
11	Yes	15	0.00003569	0.00009579
12	Yes	18	0.00000001	0.00006969
13	Yes	17	0.00000001	0.00014739
14	Yes	6	0.00000001	0.00000899
15	Yes	15	0.00000001	0.00009570
16	Yes	15	0.00000001	0.00012212
17	Yes	15	0.00000001	0.00012390
18	Yes	15	0.00000001	0.00009535
19	Yes	15	0.00000001	0.00012137
20	Yes	15	0.00000001	0.00012266
21	Yes	15	0.00000001	0.00009506
22	Yes	15	0.00000001	0.00012082
23	Yes	15	0.00000001	0.00012163
24	Yes	15	0.00000001	0.00009493
25	Yes	15	0.00000001	0.00012473
26	Yes	15	0.00000001	0.00012056
27	Yes	14	0.00008445	0.00005358
28	Yes	14	0.00008427	0.00010750
29	Yes	14	0.00008427	0.00012738

30	Yes	14	0.00008447	0.00006299
31	Yes	14	0.00008424	0.00010174
32	Yes	14	0.00008426	0.00012176
33	Yes	14	0.00008443	0.00005282
34	Yes	14	0.00008426	0.00011375
35	Yes	14	0.00008424	0.00010576
36	Yes	14	0.00008448	0.00006056
37	Yes	14	0.00008428	0.00013159
38	Yes	14	0.00008429	0.00009916

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116	29.03	33	1.616	0.006
L2	119.75 - 74.75	19.63	33	1.529	0.004
L3	79.5 - 39.5	8.54	33	1.028	0.002
L4	45 - 0	2.71	33	0.551	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DB225-C	33	29.03	1.616	0.006	41882
140.00	HP2-102	33	26.32	1.606	0.006	26176
139.00	DB225-C	33	25.98	1.604	0.005	23267
130.00	P65-17-XLH-RR	33	22.96	1.581	0.005	11633
118.00	APXV18-206517S-C w/ Mount Pipe	33	19.08	1.516	0.004	7157
109.00	VHLP800-11	33	16.32	1.431	0.003	5990
108.00	LLPX310R w/ Mount Pipe	33	16.02	1.420	0.003	5885
107.00	VHLP2-18	33	15.72	1.408	0.003	5783

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 116	74.27	8	4.136	0.015
L2	119.75 - 74.75	50.22	8	3.912	0.010
L3	79.5 - 39.5	21.84	8	2.631	0.004
L4	45 - 0	6.94	8	1.409	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DB225-C	8	74.27	4.136	0.016	16612
140.00	HP2-102	8	67.32	4.110	0.014	10382
139.00	DB225-C	8	66.45	4.106	0.014	9228
130.00	P65-17-XLH-RR	8	58.74	4.048	0.013	4613
118.00	APXV18-206517S-C w/ Mount Pipe	8	48.80	3.879	0.011	2835

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
109.00	VHLP800-11	8	41.74	3.661	0.009	2367
108.00	LLPX310R w/ Mount Pipe	8	40.98	3.633	0.009	2325
107.00	VHLP2-18	8	40.22	3.604	0.009	2284

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	148 - 116 (1)	TP30.241x24x0.2188	32.00	0.00	0.0	39.00	20.3370	-7.40	793.14	0.009
L2	116 - 74.75 (2)	TP37.847x29.0721x0.25	45.00	0.00	0.0	39.00	29.0983	-12.99	1134.83	0.011
L3	74.75 - 39.5 (3)	TP44.222x36.4208x0.3125	40.00	0.00	0.0	39.00	42.4888	-19.20	1657.06	0.012
L4	39.5 - 0 (4)	TP51.3x42.5243x0.375	45.00	0.00	0.0	39.00	60.6135	-30.04	2363.93	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	148 - 116 (1)	TP30.241x24x0.2188	157.02	12.81	39.00	0.329	0.00	0.00	39.00	0.000
L2	116 - 74.75 (2)	TP37.847x29.0721x0.25	735.58	33.49	39.00	0.859	0.00	0.00	39.00	0.000
L3	74.75 - 39.5 (3)	TP44.222x36.4208x0.3125	1340.82	35.80	39.00	0.918	0.00	0.00	39.00	0.000
L4	39.5 - 0 (4)	TP51.3x42.5243x0.375	2243.57	35.33	39.00	0.906	0.00	0.00	39.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	148 - 116 (1)	TP30.241x24x0.2188	10.84	0.53	26.00	0.041	1.04	0.04	26.00	0.002
L2	116 - 74.75 (2)	TP37.847x29.0721x0.25	16.35	0.56	26.00	0.043	0.27	0.01	26.00	0.000
L3	74.75 - 39.5 (3)	TP44.222x36.4208x0.3125	18.68	0.44	26.00	0.034	0.27	0.00	26.00	0.000
L4	39.5 - 0 (4)	TP51.3x42.5243x0.375	21.41	0.35	26.00	0.027	0.27	0.00	26.00	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 116 (1)	0.009	0.329	0.000	0.041	0.002	0.338	1.333	H1-3+VT ✔

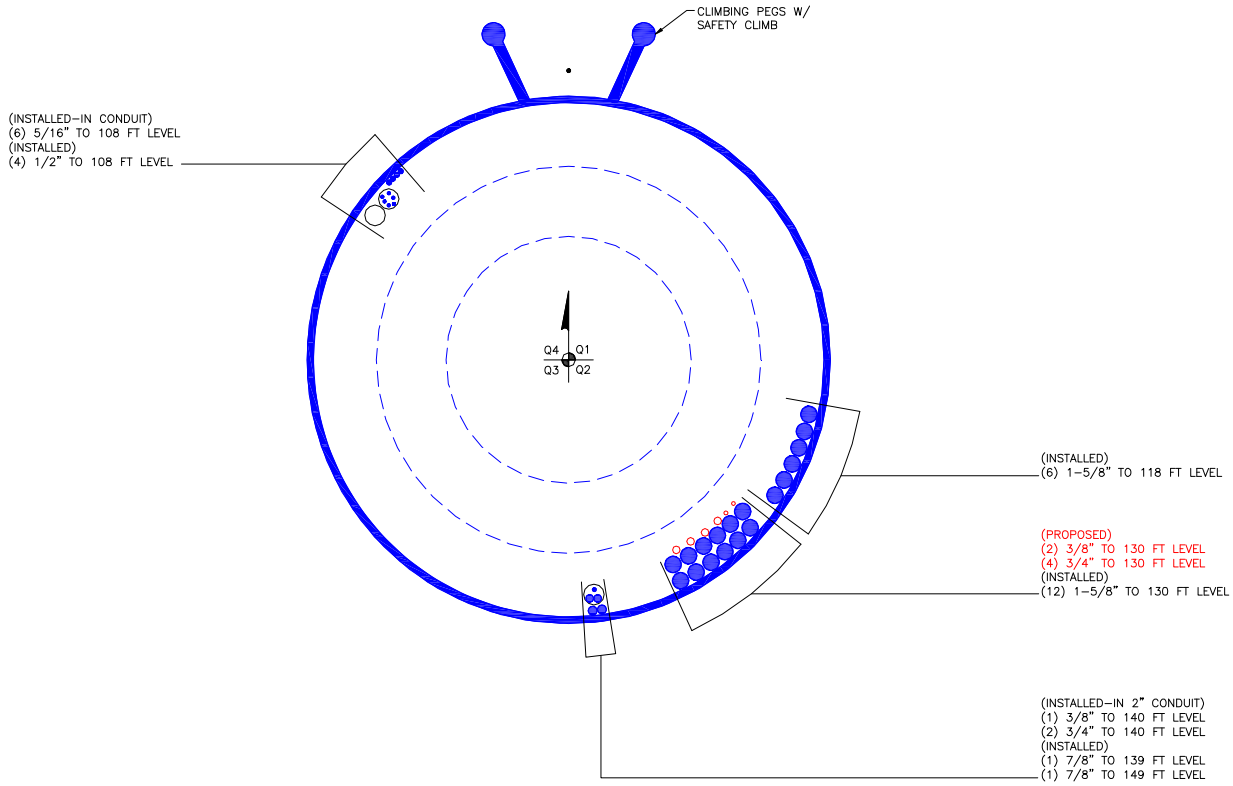
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	116 - 74.75 (2)	0.011	0.859	0.000	0.043	0.000	0.871	1.333	H1-3+VT
L3	74.75 - 39.5 (3)	0.012	0.918	0.000	0.034	0.000	0.930	1.333	H1-3+VT
L4	39.5 - 0 (4)	0.013	0.906	0.000	0.027	0.000	0.919	1.333	H1-3+VT

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	148 - 116	Pole	TP30.241x24x0.2188	1	-7.40	1057.26	25.4	Pass
L2	116 - 74.75	Pole	TP37.847x29.0721x0.25	2	-12.99	1512.73	65.3	Pass
L3	74.75 - 39.5	Pole	TP44.222x36.4208x0.3125	3	-19.20	2208.86	69.8	Pass
L4	39.5 - 0	Pole	TP51.3x42.5243x0.375	4	-30.04	3151.12	68.9	Pass
						Summary		
						Pole (L3)	69.8	Pass
						RATING =	**69.8**	**Pass**

APPENDIX B

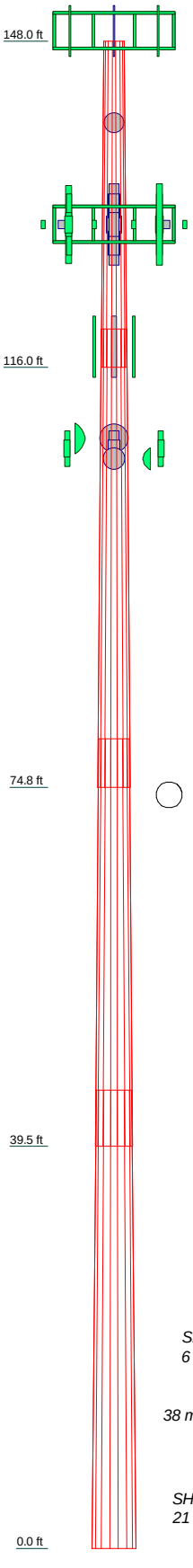
BASE LEVEL DRAWING

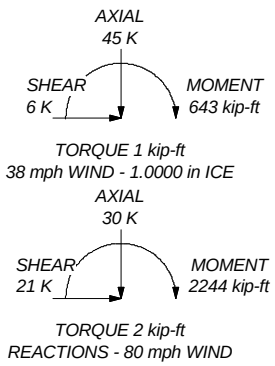

CLIMBING PEGS W/
SAFETY CLIMB
(INSTALLED-IN CONDUIT)
(6) 5/16" TO 108 FT LEVEL
(INSTALLED)
(4) 1/2" TO 108 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED)
(6) 1-5/8" TO 118 FT LEVEL
(PROPOSED)
(2) 3/8" TO 130 FT LEVEL
(4) 3/4" TO 130 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 130 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 140 FT LEVEL
(2) 3/4" TO 140 FT LEVEL
(INSTALLED)
(1) 7/8" TO 139 FT LEVEL
(1) 7/8" TO 149 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	32.00	18	0.2188	3.75	24.0000	30.2410		2.0
2	45.00	18	0.2500	4.75	29.0721	37.8470		4.0
3	40.00	18	0.3125	5.50	36.4208	44.2220		5.4
4	45.00	18	0.3750		42.5243	51.3000		8.5
							A607-65	20.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB225-C	149	RRUS A2	130
(4) 2.375" OD x 5' Mount Pipe	149	RRUS 32	130
(4) 2.375" OD x 5' Mount Pipe	149	RRUS 32	130
(4) 2.375" OD x 5' Mount Pipe	149	RRUS 32	130
Platform Mount [LP 1201-1]	149	RRUS 11	130
Pipe Mount [PM 601-1]	140	RRUS 11	130
HP2-102	140	RRUS 11	130
Side Arm Mount [SO 701-1]	139	(2) DC6-48-60-18-8F	130
DB225-C	139	Platform Mount [LP 1301-1]	130
AM-X-CD-16-65-00T-RET	130	P65-17-XLH-RR	130
AM-X-CD-16-65-00T-RET	130	APXV18-206517S-C w/ Mount Pipe	118
(2) DTMABP0721VG12A	130	APXV18-206517S-C w/ Mount Pipe	118
(2) DTMABP0721VG12A	130	Pipe Mount [PM 601-3]	118
(2) DTMABP0721VG12A	130	APXV18-206517S-C w/ Mount Pipe	118
RRU-11	130	LLPX310R w/ Mount Pipe	108
RRU-11	130	LLPX310R w/ Mount Pipe	108
RRU-11	130	RRH-2WB	108
HPA-65R-BUU-H6	130	RRH-2WB	108
HPA-65R-BUU-H6	130	RRH-2WB	108
HPA-65R-BUU-H8	130	Side Arm Mount [SO 103-3]	108
QS66512-3	130	LLPX310R w/ Mount Pipe	108
QS66512-3	130	VHLP2-18	108
TPA-65R-LCUUUU-H8	130	VHLP800-11	108
RRUS A2	130	VHLP2-18	108
RRUS A2	130	VHLP800-11	108

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 a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 69.8%

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job:	***148 ft Monopole / Windsor Pine Lane***		
Project:	***PJF 37515-3365 / BU 841793***		
Client: Crown Castle	Drawn by: Joey Meinerding		App'd:
Code: TIA/EIA-222-F	Date: 11/25/15		Scale: NTS
Path: T:\375 Crown Castle\2015\37515-3365_841793_WINDSOR PINE LANE\37515-3365.001.7805_SA_115836\37515-3365.001.7805.eri			Dwg No. E-1

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#: *841793*
Site Name: *Windsor Pine Lane*
App #:

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	57	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	15	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	51.3	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2244	ft-kips
Unfactored Axial, P:	30	kips
Unfactored Shear, V:	21	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	114.2	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	58.6%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	32.2	ksi
Allowable PL Bending Stress:	55.0	ksi
Base Plate Stress Ratio:	58.6%	**Pass**

PL Ref. Data
Yield Line (in):
29.31
Max PL Length:
29.31

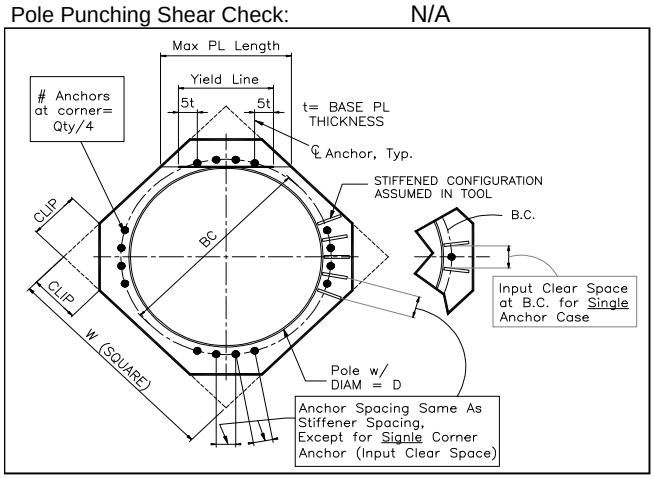
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^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

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number: 37515-3365.001.7805
Site Number: 841793
Site Name: Windsor Pine Lane

By: JWM
Date: 11/25/2015

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	2244.0		k-ft
Shear, V =	21.0		kips
Axial Load, P =	30.0		kips
OTM =	2254.5	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	30.5	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00
 + Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	20	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	7.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	3	120	0	0	Sand				3
2	4	120	0	30	Sand				7
3	25	112.4	500	0	Clay	4500			32
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	17.07	ft, from Grade	Shear, V =	21.00	kips
Bending Moment, M =	2612.91	k-ft, from COR	Resisting Shear, Va =	22.34	kips
Resisting Moment, Ma =	2779.81	k-ft, from COR			
MOMENT RATIO =	**94.0%**	**OK**	**SHEAR RATIO =**	**94.0%**	**OK**

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	98.02	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, C =	30.00	kips
Allowable Comp. Cap., Ca =	41.62	kips
COMPRESSION RATIO =	**72.1%**	**OK**

Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in	Axial Load, P =	58.86	kips @ 4.50 ft Below Grade
Actual Steel Area =	31.20	sq in	Moment, M =	2342.19	k-ft @ 4.50 ft Below Grade
			Allowable Moment, Ma =	3856.43	k-ft
Allowable Min Axial, Pa =	-1296.00	kips, Where Ma = 0 k-ft	**MOMENT RATIO =**	**60.7%**	**OK**
Allowable Max Axial, Pa =	6369.58	kips, Where Ma = 0 k-ft			

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *841793*
Site Name: *Windsor Pine Lane*
App #:

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	20	
As Total=	31.2	in^2
A s/ Aconc, Rho:	0.0056	0.56%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.56%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8280.46	kips
at Mu=(ϕ=0.65)Mn=	5016.69	ft-kips
Max Tu, (φ=0.9) Tn =	1684.8	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	2342.19	ft-kips **(* Note)**
Max. Service Shaft P:	58.86	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	**Shaft Factored Loads**		
1.30	Mu:	3044.847	ft-kips
1.30	Pu:	76.518	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code= 2002

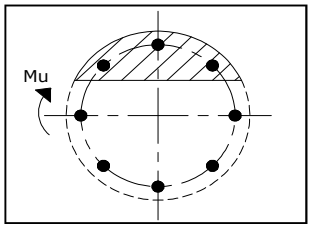
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

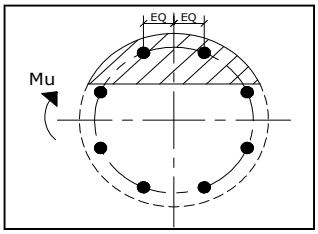
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.82**	in
Extreme Steel Strain, ϵt:	**0.0141**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	76.52	kips
Drilled Shaft Moment Capacity, φMn:	**5013.35**	ft-kips
Drilled Shaft Superimposed Mu:	**3044.85**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**60.7%**

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

AT&T Existing Facility

Site ID: CT1137

Windsor Pine Lane
50 Pine Lane
Windsor, CT 06095

January 5, 2016

EBI Project Number: 6616000018

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.83 %

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

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January 5, 2016

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

Emissions Analysis for Site: **CT1137 – Windsor Pine Lane**

EBI Consulting was directed to analyze the proposed AT&T facility located at **50 Pine Lane, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

General population/uncontrolled exposure limits apply to situations in which the general public 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 public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **50 Pine Lane, 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.

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

1) 4 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (WCS Band – 2300 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

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

9) The antennas used in this modeling are the **Powerwave P65-17-HLH-RR, CCI HPA-65R-BUU-H6, Quintel QS66512-3, CCI HPA-65R-BUU-H8 and the KWM AM-X-CD-16-65-00T-RET** for transmission at 700 MHz, 850 MHz, 1900 MHz (PCS), 2100 MHz (AWS 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.

10) The antenna mounting height centerline of the proposed antennas is **130 feet** above ground level (AGL).

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

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

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave P65-17-XLH-RR	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	15.1 dBd	Gain:	13.85 / 15.25 dBd	Gain:	13.85 / 15.25 dBd
Height (AGL):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,824.69	ERP (W):	5,475.55	ERP (W):	5,475.55
Antenna A1 MPE%	**1.71**	Antenna B1 MPE%	**1.54**	Antenna C1 MPE%	**1.54**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-BUU-H6	Make / Model:	CCI OPA-65R-BUU-H8	Make / Model:	CCI OPA-65R-BUU-H6
Gain:	11.95 / 14.75 dBd	Gain:	13.15 / 14.95 dBd	Gain:	11.95 / 14.75 dBd
Height (AGL):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	5,462.56	ERP (W):	5,462.56	ERP (W):	5,462.56
Antenna A2 MPE%	**1.78**	Antenna B2 MPE%	**2.12**	Antenna C2 MPE%	**1.78**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Quintel QS66512-3	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	Quintel QS66512-3
Gain:	12.15 / 14.85 dBd	Gain:	13.45 / 14.45 dBd	Gain:	12.15 / 14.85 dBd
Height (AGL):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 feet
Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	4,650.26	ERP (W):	4,671.20	ERP (W):	4,650.26
Antenna A3 MPE%	**1.26**	Antenna B3 MPE%	**1.33**	Antenna C3 MPE%	**1.26**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**4.99 %**
Cingular	0.40 %
Town of Windsor	0.25 %
MetroPCS	0.84 %
Clearwire	0.15 %
Nextel	1.39 %
Police UHF	0.24 %
Police Back up repeater	0.09 %
Hartford County Fire	0.07 %
State Police	0.30 %
NPSAC	0.01 %
RAFS	0.10 %
Site Total MPE %:	**8.83 %**

AT&T Sector 1 Total:	4.75 %
AT&T Sector 2 Total:	4.99 %
AT&T Sector 3 Total:	4.58 %
Site Total:	8.83 %

Highest Calculated Sector Values:

AT&T _ Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	727.98	130	3.40	850	567	0.60 %
AT&T 1900 MHz (PCS) UMTS	4	1004.90	130	9.40	1900	1000	0.94 %
AT&T 850 MHz GSM	2	663.93	130	3.10	850	567	0.55 %
AT&T 2300 MHz (WCS) LTE	2	1671.67	130	7.82	2300	1000	0.78 %
AT&T 700 MHz LTE	2	1239.23	130	5.79	700	467	1.24 %
AT&T 1900 MHz (PCS) LTE	2	1875.65	130	8.77	1900	1000	0.88 %
						Total:	4.99 %

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Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public 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 public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector 1:	4.75%
Sector 2:	4.99 %
Sector 3 :	4.58%
AT&T Maximum Total (per sector):	4.99 %
Site Total:	8.83 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.83%** of the allowable FCC established general public 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.

Scott Heffernan
RF Engineering Director

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