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

November 7, 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: 881364**
AT&T Site ID: CT1108
123 Costello Road, Newington, CT 06111
Latitude: 41° 39' 18.72" / Longitude: -72° 43' 17.19"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 105-foot level of the existing 145-foot monopole at 123 Costello Road in Newington, CT. The tower is owned by Crown Castle. The property is owned by Costello Industries Inc. AT&T now intends to replace three (3) antennas with three (3) new antennas. These antennas would be installed at the 105-foot level of the tower. AT&T also intends to replace three (3) RRU11s with three (3) RRU32 B2s, and install six (6) diplexers.

This facility was approved by Newington Town Plan and Zoning Commisision in Petition 65-01 on November 28, 2001. This approval included the conditions that:

1. All ground equipment shall be located within a 8' fence enclosure, no equipment shall be placed within 10' side setback area.

This modification complies with the aforementioned condition(s).

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 Stephen Woods, Mayor, Town of Newington 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 Stephen Woods, Mayor, Town of Newington
131 Cedar Street
Newington, CT 06111

Costello Industries Inc.
123 Costello Road
Newington, CT 06111

TOWN OF NEWINGTON

Town Hall • 131 Cedar Street, Newington, Connecticut 06111
Central Telephone (860) 665-8500
Department Telephone (860) 665-8575
Department Fax No. (860) 665-8577

Certified Mail No. 7106 4575 1292 0696 5209
OFFICE OF THE TOWN PLANNER

CERTIFICATE OF ACTION

TO: Kenneth C. Baldwin
Robinson & Cole LLP
280 Trumbull Street
Harford CT 06103-3597

DATE: December 3, 2001

SUBJECT: PETITION 65-01 123 Costello Road, Costello Industries owner, Cellco Partnership d/b/a Verizon Wireless applicant, represented by Kenneth C. Baldwin, Robinson & Cole LLP, 280 Trumbull Street Hartford, CT 06103-3597 requests Special Exception Section 3.2.7 PCS antenna co location and ground base equipment, PD Zone District.

At a meeting held November 28, 2001, the Newington Town Plan and Zoning Commission voted to approve the above referenced PETITION subject to the following conditions:

1. Approval is granted for the placement of Verizon Wireless PCS platform and antenna as a co-locator on the existing monopole at the elevation of 125' as shown on plans prepared by URS Corporation AES, 795 Brook Street Rocky Hill, CT, dated 10-11-01, Sheets T-1, Z-1 and Z-2, entitled "123 Costello Road", Newington, Connecticut."

2. All ground equipment shall be located within an 8' fence enclosure, no equipment shall be placed within 10' side setback area.

3. The approval of this special exception shall be void and of no effect unless construction of the project commences within one year from the date of the Commission's approval. The term "construction" pertains to the installation of the antenna and support ground facilities by the Verizon Wireless.

4. Prior to the installation of the Verizon Wireless antenna building permits shall be obtained.

Certified by:

Edmund J. Meehan

Edmund J. Meehan
Town Planner

This Special Exception will not become effective until this Certificate of Action is filed by the applicant on the Land Records of the Town of Newington.

This Site Plan Modification will not become effective until 1) a transparency of the Certificate of Action is affixed to the original site plan mylar, 2) the modification is incorporated into the site plan and noted as a revision and 3) a mylar copy of the modified signed site plan original mylar is filed in the Town Plan and Zoning Office.

An Autocad DXF File shall be provided to the Town Planner for incorporation into the Town's GIS database at the time of submission of the plan mylar.

ca1128-2/3

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2015.

Information on the Property Records for the Municipality of Newington was last updated on 11/5/2016.

Parcel Information

Location:	123 COSTELLO RD	Property Use:	Industrial	Primary Use:	Office Warehouse
Unique ID:	C0685500	Map Block Lot:	32/018/00A	Acres:	2.84
490 Acres:	0.00	Zone:	PD	Volume / Page:	0573/0098
Developers Map / Lot:	S/E 2020 & 2815	Census:			

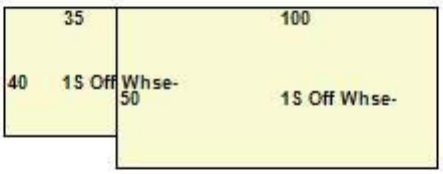
Value Information

	Appraised Value	70% Assessed Value
Land	382,500	267,750
Buildings	118,943	83,260
Detached Outbuildings	287,500	201,250
Total	788,943	552,260

Owner's Information

Owner's Data
COSTELLO INDUSTRIES INC 123 COSTELLO RD NEWINGTON CT 06111

Building 1



Category:	Industrial	Use:	Warehouse	GLA:	6,400
Stories:	1.00	Construction:	Steel	Year Built:	1975
Heating:	Unit Heater/AC	Fuel:	Natural Gas	Cooling Percent:	0

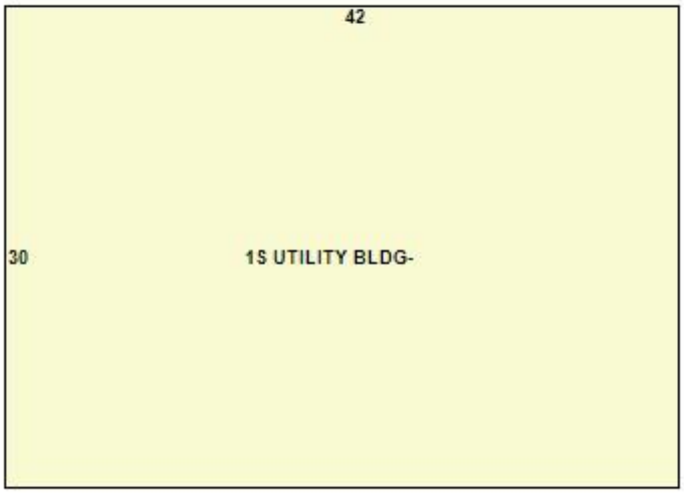
Siding:	Concrete Block	Roof Material:	Other	Beds/Units:	0

Special Features

Overhead Doors	2

Attached Components

Building 2



Category:	Industrial	Use:	Utility Building	GLA:	1,260

Stories:	1.00	Construction:	Steel	Year Built:	1981
Heating:	Unit Heater/AC	Fuel:	Natural Gas	Cooling Percent:	0
Siding:	Metal	Roof Material:	Other	Beds/Units:	0

Special Features

Overhead Doors	1

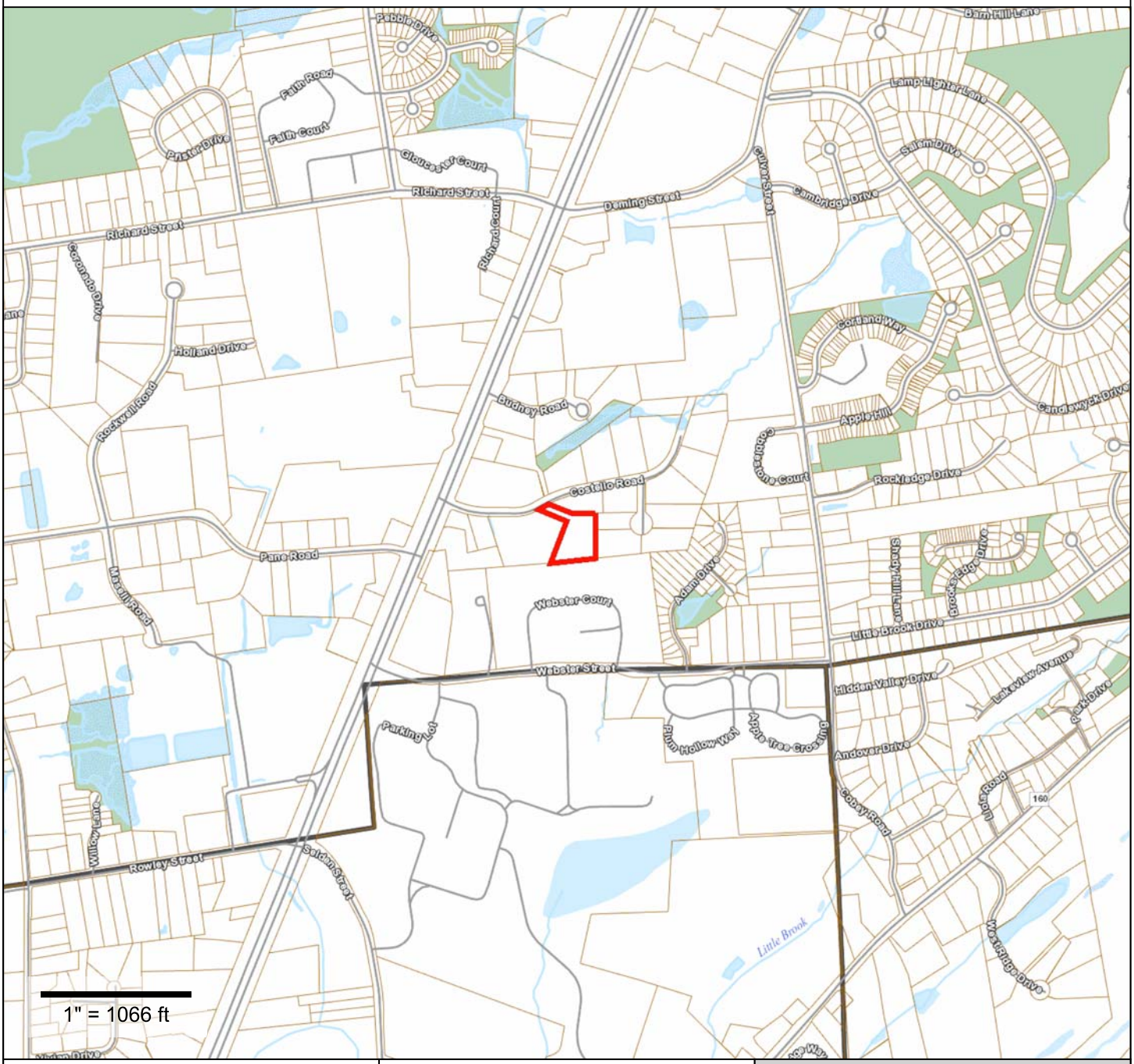
Attached Components

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Paving	1975	1.00	25,000.00	25,000
Cell Tower	1975	0.00	0.00	1

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
COSTELLO INDUSTRIES INC	573	98	03/31/1986		No	$0
COSTELLO INDUSTRIES INC	399	332	08/18/1980		No	$0
COSTELLO INDUSTRIES INC	385	280	12/18/1979		No	$0
COSTELLO INDUSTRIES INC	385	278	12/18/1979		No	$0
COSTELLO INDUSTRIES INC	314	129	06/06/1977		No	$0
COSTELLO CONSTRUCTION CORP THE	284	147	02/19/1976		No	$0
COSTELLO CONSTRUCTION CORP THE	271	180	06/17/1975		No	$0



Property Information

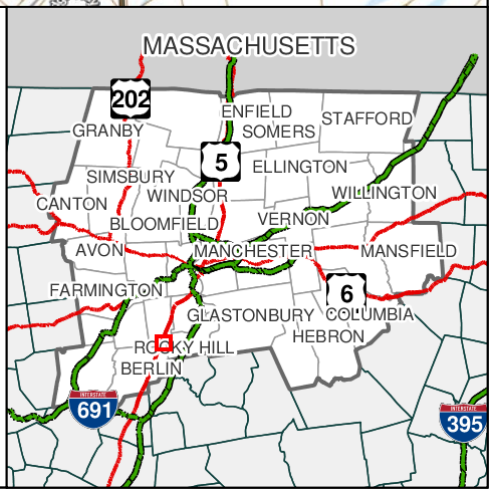
Property ID 09003094-C0685500
Location 123 COSTELLO RD
Owner Current Owner

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

CRCOG and AppGeo make no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated October 1, 2013



PROJECT INFORMATION

SCOPE OF WORK	UNMANNED COMMUNICATIONS FACILITY MODIFICATIONS INCLUDING THE REPLACEMENT OF EXISTING GSM PANELS WITH NEW LTE QUINTEL/CCI 12 PORT ANTENNAS IN POSITION #4. REPLACE GSM DIPLEXERS WITH NEW CCI TRIPLEXERS TOP & BOTTOM. REPLACE EXISTING TOP MOUNTED (3) RRUS-11 WITH NEW (3) RRUS-32, NEW SHELTER LOCATED (3) RRUS-11. RE-USE EXISTING (2) FIBER TRUNKS, EXISTING (4) DC TRUNKS, EXISTING (2) RAYCAP SURGE ARRESTORS AND ASSOCIATED JUMPER CABLES.
SITE NUMBER:	CT1108
SITE NAME:	NEWINGTON SOUTH
SITE ADDRESS:	123 COSTELO ROAD NEWINGTON, CT 06111
TOWER OWNER:	CROWN ATLANTIC COMPANY 2000 CORPORATE DRIVE CANONSBURG , PA 15317
APPLICANT:	AT&T MOBILITY 550 COCHITUATE RD SUITES 13 & 14 FRAMINGHAM, MA 01701
NOC CONTACT:	TEL 866-915-5600
COORDINATES	LAT. N41°39'18.7" LONG. W72°43'17.1"
GROUND LEVEL:	±135'
DEED REFERENCE:	N/A
SITE PARCEL NO.:	N/A
CURRENT ZONING:	N/A
HORIZONTAL DATUM:	(NAD) 1983

DRAWING INDEX

ONE CALL 1-800-922-4455

AT LEAST 2 WORKING DAYS PRIOR TO DIGGING, THE CONTRACTOR IS REQUIRED TO CONNECTICUT ONE CALL SYSTEM AT 1-800-922-4455

CONTACT & UTILITY INFORMATION

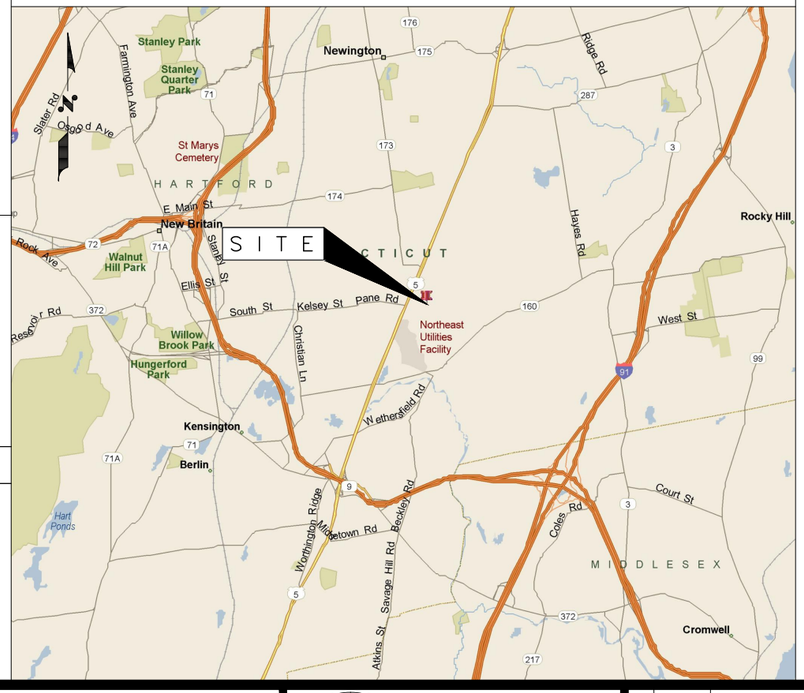
CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	MIGUEL NOBRE	VRG	(508) 981-9590
SITE ACQUISITION:	DAVID COOPER	EMPIRE	(484) 683-5349
CONSTRUCTION:	BILL DANIELS	EMPIRE	(484) 683-5349
UTILITIES			
POWER:	WORK REQUEST GROUP	NATIONAL GRID	(800) 375-7405
TELCO:	.	VERIZON	(800) 941-9900

SITE NUMBER: CT1108
SITE NAME: NEWINGTON SOUTH
PROJECT: LTE 4C 850, BWE 1900

LOCATION MAP

DIRECTIONS: FROM ROCKY HILL, TAKE EXIT 23 OFF I-91, GO WEST TO ROUTE 3. TAKE ROUTE 3 NORTH TO ROUTE 160 WEST. FOLLOW ROUTE 160 WEST TO THE BERLIN TURNPIKE (RT-5/15). TURN RIGHT ONTO TURNPIKE. LOOK FOR COSTELLO ROAD ON RIGHT (DUNKIN DONUTS ON THE CORNER). TOWER SITE ENTRANCE IS 2/10 MILE ON RIGHT BEHIND COSTELLO EXCAVATION COMPANY. ENTER THROUGH EXCAVATION COMPANY DRIVEWAY.

SITE ACCESS: LOCKED GATE



APPLICABLE BUILDING CODES AND STANDARDS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARDS AND SPECIFICATIONS. SUBCONTRACTOR 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.

BUILDING CODE:
CONNECTICUT STATE BUILDING CODE

ELECTRICAL CODE:
NATIONAL ELECTRICAL CODE LATEST EDITION
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, ASD, NINTH EDITION
AMERICAN NATIONAL STANDARDS INSTITUTE/TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA) 222-F OR G AS APPLICABLE, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

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.

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 - 8939
mnobre@verticalresourcesgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1108
SITE NAME: NEWINGTON S
CROWN SITE ID: 881364
123 COSTELO ROAD
NEWINGTON, CT 06111
HARTFORD COUNTY

at&t Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

NO.	DATE	REVISION	BY	CHK	APP'D
1	10/17/16	FOR CONSTRUCTION	E.L.P.	G.A.M.	
0	09/12/16	FOR REVIEW	E.L.P.	G.A.M.	

SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT JAMES P. SYSOE No. 8657 REGISTERED PROFESSIONAL ENGINEER

AT&T MOBILITY

TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
50-145	01	1

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – PRIME CONTRACTOR
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T WIRELESS
   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.

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 SCALE UNLESS OTHERWISE NOTED 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 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. ROUTING OF CONDUIT FOR POWER AND TELCO SHALL BE APPROVED BY OWNER OF SITE.

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 OF 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.

SITE WORK GENERAL NOTES

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.

2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING & EXCAVATION.

3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.

6. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.

7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE OWNER SPECIFICATION FOR SITE SIGNAGE.

8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.

9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE DETAIL 303.

11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.

12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

13. ALL EARTH WORK SHALL BE PERFORMED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 (HOT–DIP) UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".

2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.

3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE. STEEL FASTENER HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (HOT–DIP)

4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.

5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD, HILTI OR APPROVED EQUAL.

6. ALL STRUCTURAL STEEL SHALL BE SUPPLIED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.

2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED.

3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.

4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:

   #6 AND LARGER .....2 INCH
   #5 AND SMALLER & WWF.....1 1/2 INCH

   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:

   SLAB AND WALL .....3/4 INCH
   BEAMS AND COLUMNS.....1 1/2 INCH

5. A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD HILTI OR APPROVED EQUAL.

7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,

   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.

   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.

8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.

9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

10. ALL CONCRETE SHALL BE SUPPLIED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION AND TOPSOIL, EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.

2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.

3. AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.

4. COMPACTED SUBBASE SHALL BE UNIFORM AND LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING 1" SIEVE.

5. AS AN ALTERNATIVE TO ITEMS 2 AND 3 PROOF ROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND–OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL–GRADED GRANULAR FILL, AND COMPACTED AS STATED ABOVE.

6. COMPACTION CRITERIA FOR OTHER FILL AREAS ON SITE SHALL MEET THE SAME REQUIREMENTS AS NOTED ABOVE.

7. SOIL COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH TECHNICAL SPECIFICATION FOR CONSTRUCTION OF RADIO ACCESS NETWORK SITES.

COMPACTION EQUIPMENT:

HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

ELECTRICAL INSTALLATION NOTES

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.

2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.

4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.

5. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.

6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA.

7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PERMANENT LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S). NO HAND WRITTEN LABELS ALLOWED.

8. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED. NO HAND WRITTEN LABELS ALLOWED.

9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

10. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

13. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).

14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.

ELECTRICAL INSTALLATION NOTES (cont.)

15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

17. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.

18. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

19. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

20. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

21. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.

22. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS

24. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED, OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

25. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981– 9590
Fax (508) 519 – 8939
mnobre@verticalresourcesgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1108
SITE NAME: NEWINGTON S
CROWN SITE ID: 881364
123 COSTELO ROAD
NEWINGTON, CT 06111
HARTFORD COUNTY

at&t Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

NO.	DATE	REVISION	BY	CHK	APP'D
1	10/17/16	FOR CONSTRUCTION	E.L.P.	G.A.M.	
0	09/12/16	FOR REVIEW	E.L.P.	G.A.M.	

SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT · JAMES P. SILVESTRONE · No. 8657 · REGISTERED PROFESSIONAL ENGINEER

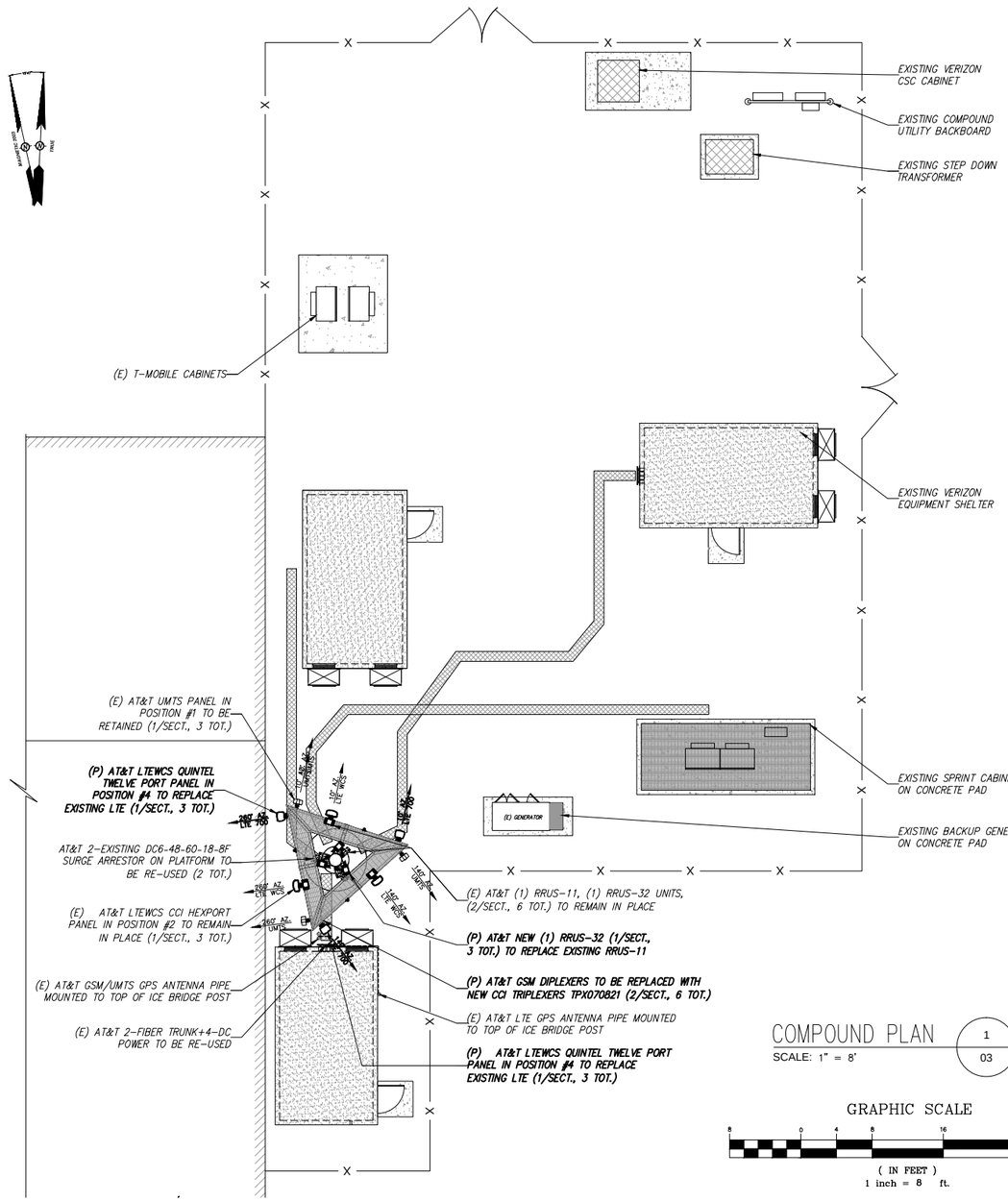
AT&T MOBILITY

NOTES

JOB NUMBER	DRAWING NUMBER	REV.
50–145	02	1

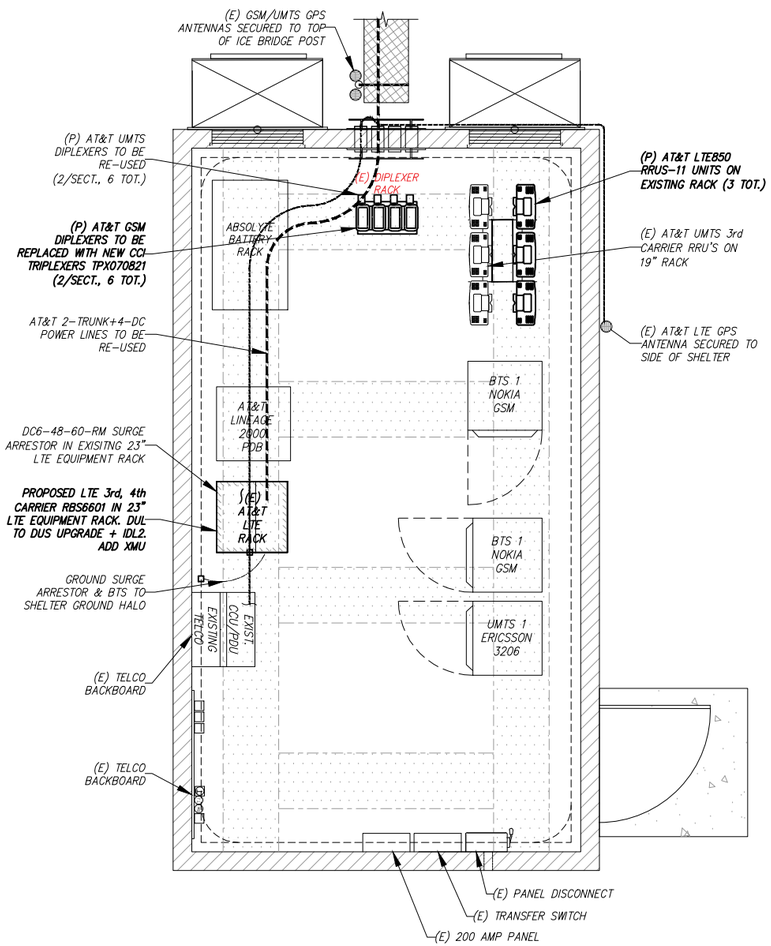
GENERAL NOTES

1. THE TYPE, DIMENSIONS, MOUNTING HARDWARE, AND THE POSITIONS OF ALL EQUIPMENT IN THE COMPOUND ARE SHOWN IN ILLUSTRATIVE FASHION. THESE DRAWINGS ARE NOT INTENDED FOR CONSTRUCTION. ACTUAL HARDWARE DETAILS AND FINAL LOCATIONS MAY DIFFER SLIGHTLY FROM WHAT IS SHOWN.
2. THE CELLULAR INSTALLATION IS AN UNMANNED PRIVATE AND SECURED COMPOUND. 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. CONSTRUCTION, MAINTENANCE & OPERATION OF PROPOSED TOWER FACILITY WILL BE HELD IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE & FEDERAL REGULATIONS AND GUIDELINES.



COMPOUND PLAN 1/03
SCALE: 1" = 8'

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.



EQUIPMENT PLAN 2/03
SCALE: 1" = 2'

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 - 8939
mnobre@verticalresourcesgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1108
SITE NAME: NEWINGTON S
CROWN SITE ID: 881364
123 COSTELO ROAD
NEWINGTON, CT 06111
HARTFORD COUNTY

at&t Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

NO.	DATE	REVISION	BY	CHK	APP'D
1	10/17/16	FOR CONSTRUCTION	E.L.P.	G.A.M.	
0	09/12/16	FOR REVIEW	E.L.P.	G.A.M.	

SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT JAMES P. STROVE No. 8657 REGISTERED PROFESSIONAL ENGINEER

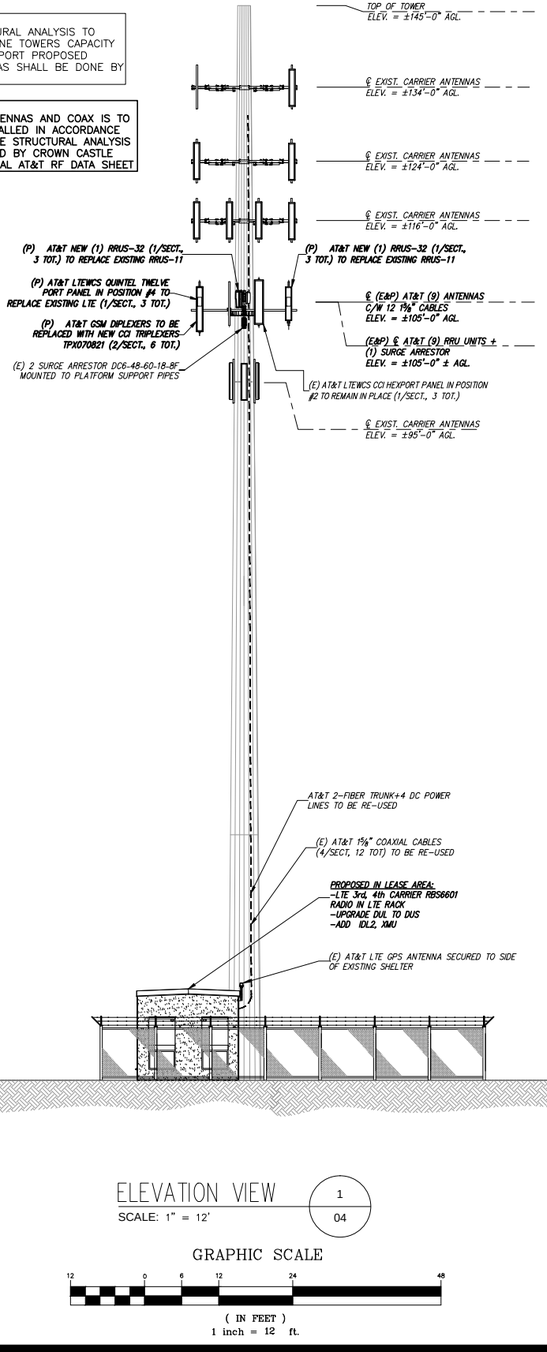
AT&T MOBILITY

SITE PLAN & EQUIPMENT PLAN

JOB NUMBER	DRAWING NUMBER	REV.
50-145	03	1

NOTES:
STRUCTURAL ANALYSIS TO DETERMINE TOWERS CAPACITY TO SUPPORT PROPOSED ANTENNAS SHALL BE DONE BY OTHERS

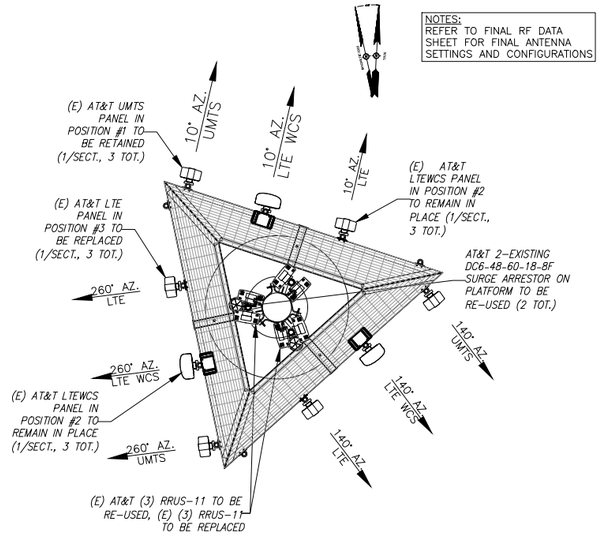
NOTES:
ALL ANTENNAS AND COAX IS TO BE INSTALLED IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET



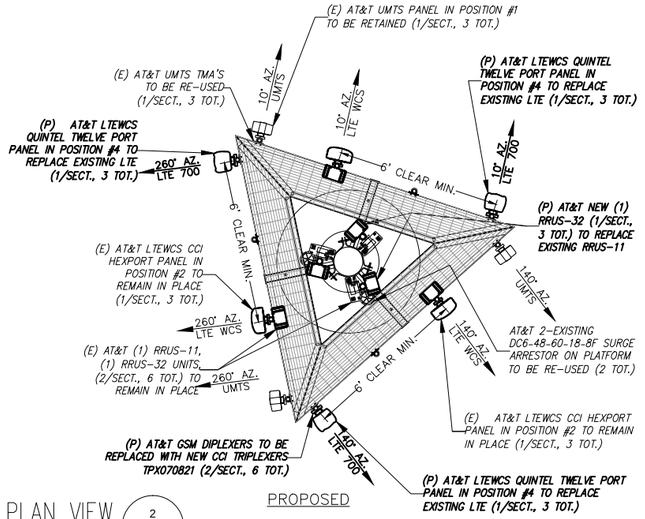
ELEVATION VIEW
SCALE: 1" = 12'
1 / 04

GRAPHIC SCALE
12 0 6 12 24 48
(IN FEET)
1 inch = 12 ft.

NOTES:
REFER TO FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS AND CONFIGURATIONS

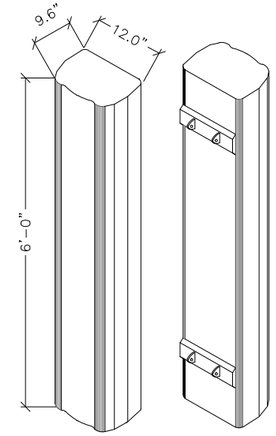


EXISTING



PROPOSED

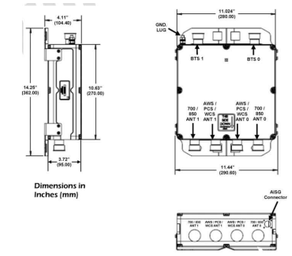
ANTENNA MOUNTING PLAN VIEW
SCALE: N.T.S.
2 / 04



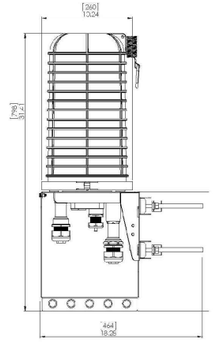
ISOMETRIC FRONT VIEW

ISOMETRIC REAR VIEW

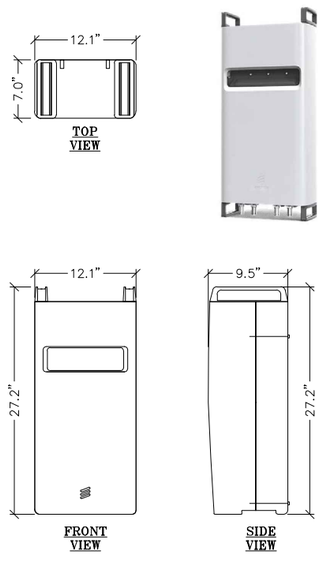
LTE WCS TWELVEPORT PANEL ANTENNA
SCALE: N.T.S.
3 / 04



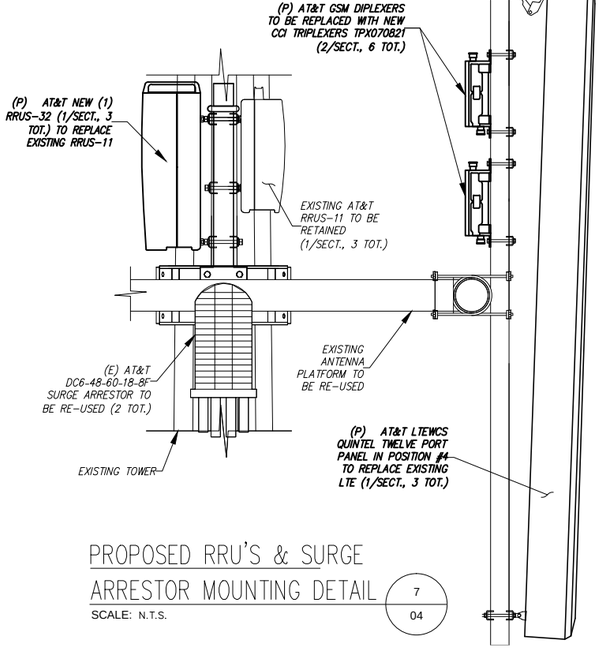
CCI DTMABP7819VG12A
SCALE: N.T.S.
5 / 04



RAYCAP SURGE SUPPRESSOR DC64860188F
SCALE: N.T.S.
5 / 04



PROPOSED ERICSSON DUAL PA RRH
SCALE: N.T.S.
6 / 04



PROPOSED RRU'S & SURGE ARRESTOR MOUNTING DETAIL
SCALE: N.T.S.
7 / 04

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 - 8939
mnobre@verticalresourcesgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1108
SITE NAME: NEWINGTON S
CROWN SITE ID: 881364

123 COSTELO ROAD
NEWINGTON, CT 06111
HARTFORD COUNTY

at&t Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

NO.	DATE	REVISION	BY	CHK	APP'D
1	10/17/16	FOR CONSTRUCTION	E.L.P.	G.A.M.	
0	09/12/16	FOR REVIEW	E.L.P.	G.A.M.	

SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

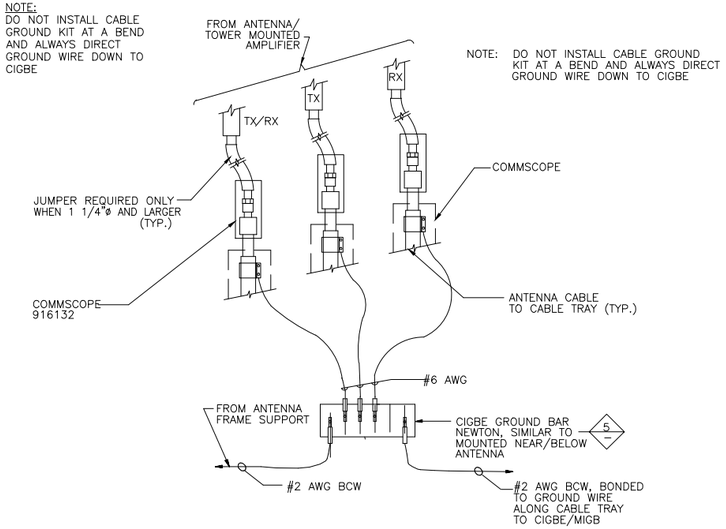
STATE OF CONNECTICUT
JAMES P. STOCKLE
No. 8657
REGISTERED PROFESSIONAL ENGINEER

AT&T MOBILITY

ELEVATION VIEW & ANTENNA LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
50-145	04	1

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

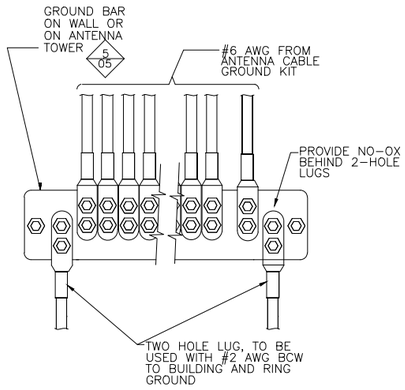


NOTE: DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)

1 / 05

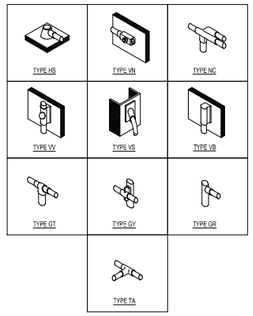
SCALE: N.T.S.



INSTALLATION OF GROUND WIRE TO GROUND BAR

2 / 05

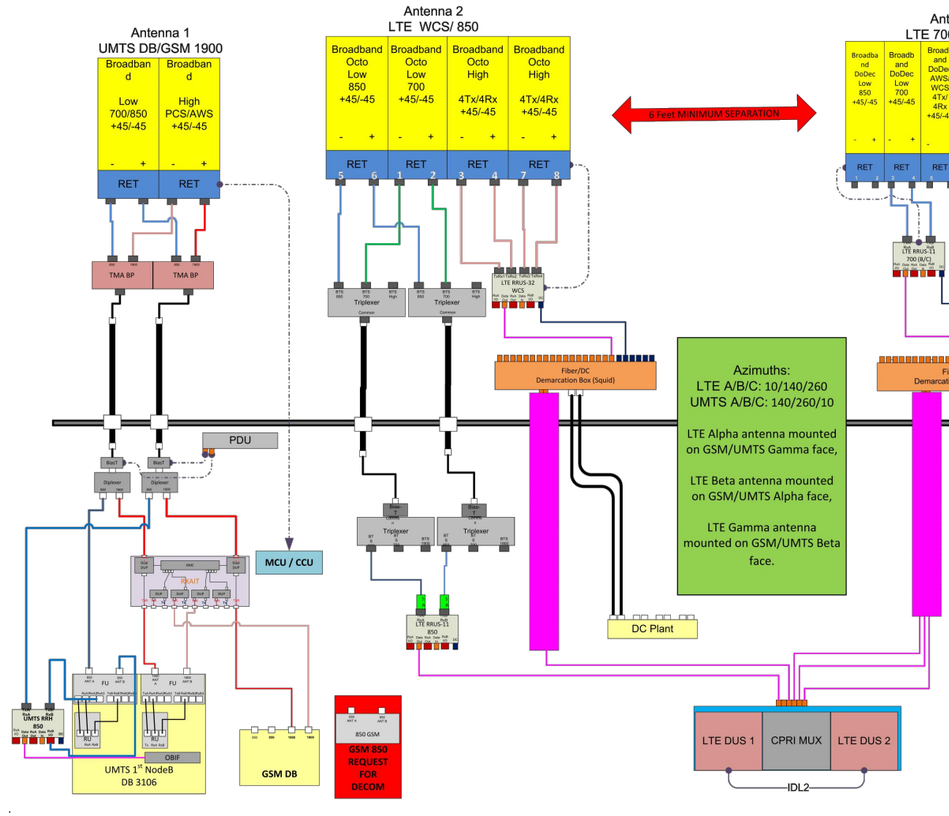
SCALE: N.T.S.

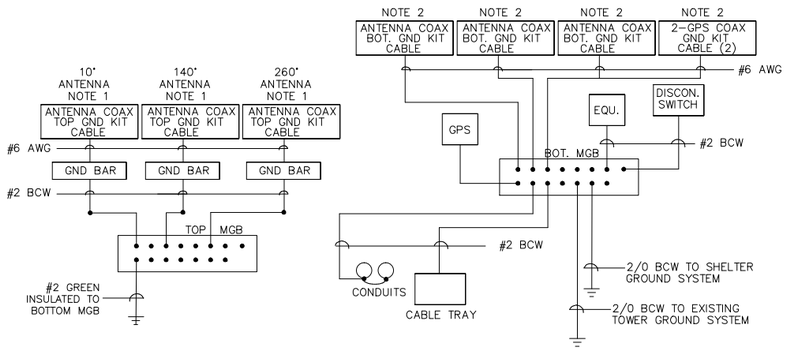


GROUNDING CONNECTION DETAIL

5 / 05

SCALE: N.T.S.





NOTE:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE

SCHEMATIC GROUNDING DIAGRAM

4 / 05

SCALE: N.T.S.

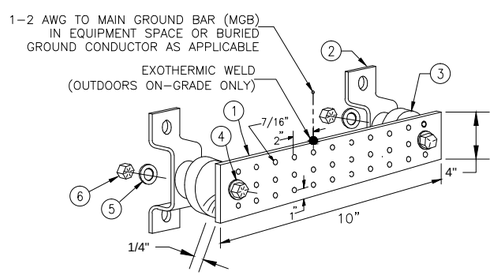
NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS
2. INSTALL ALL EQUIPMENT PER MANUFACTURERS RECOMMENDATIONS

PLUMBING DIAGRAM FACE

3 / 05

SCALE: N.T.S.

NEWTON INSTRUMENT COMPANY, INC. BUTNER, N.C. OR APPROVED EQUAL			
ITEM	REQ.	PART NO.	DESCRIPTION
1	1	1/4"x4"x12"	PRE DRILLED GND. BAR
2	2	A-6056	WALL MTG. BRKT.
3	2	3061-4	INSULATORS
4	2	3012-13	5/8"-11x4" H.H.C.S.
5	4	3015-8	5/8 LOCKWASHER
6	2	3014-8	5/8"-11 HEX NUT



GROUND BAR DETAIL

6 / 05

SCALE: N.T.S.

VRG
VERTICAL RESOURCES GRP.
489 Washington Street
Auburn, MA 01501
Tel. (508) 981- 9590
Fax (508) 519 - 8939
mnobre@verticalresourcesgrp.com

EMPIRE telecom
EMPIRE TELECOM USA, LLC
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1108
SITE NAME: NEWINGTON S
CROWN SITE ID: 881364

123 COSTELO ROAD
NEWINGTON, CT 06111
HARTFORD COUNTY

at&t Mobility
550 COCHITUATE RD
SUITES 13 & 14
FRAMINGHAM, MA 01701

NO.	DATE	REVISION	BY	CHK	APP'D
1	10/17/16	FOR CONSTRUCTION	E.L.P.	G.A.M.	
0	09/12/16	FOR REVIEW	E.L.P.	G.A.M.	

SCALE | DESIGNED BY: M.N. | DRAWN BY: G.A.M.

STATE OF CONNECTICUT JAMES P. STROKE No. 8657 REGISTERED PROFESSIONAL ENGINEER

AT&T MOBILITY

GROUNDING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
50-145	05	1

PAUL J. FORD & COMPANY

Date: **October 03, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6565

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:	CT1108
	Carrier Site Name:	Newington South
Crown Castle Designation:	**Crown Castle BU Number:**	881364
	Crown Castle Site Name:	Newington
	Crown Castle JDE Job Number:	396678
	Crown Castle Work Order Number:	1305121
	Crown Castle Application Number:	361688 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37516-0225.004.7805
Site Data:	**123 Costelo Road, Newington, Hartford County, CT**	
	Latitude *41° 39' 18.72"*, Longitude *-72° 43' 17.19"*	
	145 Foot - Monopole Tower	

Dear Sean Dempsey,

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 953548, in accordance with application 361688, 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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category C were used in this analysis.

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

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

10.4.16

tnxTower Report - version 7.0.5.1

Date: **October 03, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6565

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:	CT1108
	Carrier Site Name:	Newington South
Crown Castle Designation:	**Crown Castle BU Number:**	881364
	Crown Castle Site Name:	Newington
	Crown Castle JDE Job Number:	396678
	Crown Castle Work Order Number:	1305121
	Crown Castle Application Number:	361688 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37516-0225.004.7805
Site Data:	**123 Costelo Road, Newington, Hartford County, CT** **Latitude *41° 39' 18.72"*, Longitude *-72° 43' 17.19"*** **145 Foot - Monopole Tower**	

Dear Sean Dempsey,

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 953548, in accordance with application 361688, 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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category C were used in this analysis.

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

tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 145 ft. monopole tower designed by Summit in August of 1999. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category C were used in this analysis.

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
105.0	105.0	6	cci antennas	TPX-070821	--	--	--
		3	ericsson	RRUS 32 B2			
		3	quintel technology	QS66512-2 w/ Mount Pipe			

Table 2 - Existing and Reserved 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
133.0	139.0	2	andrew	VHLP2.5-11	6 2	5/16 1/2	1
		2	dragonwave	HORIZON COMPACT			
		2	samsung telecommunications	WIMAX DAP HEAD			
	135.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		1	motorola	TIMING 2000			
		1	samsung telecommunications	WIMAX DAP HEAD			
	133.0	1	tower mounts	Platform Mount [LP 712-1]			
124.0	124.0	3	alcatel lucent	TD-RRH8x20-25	4	1-1/4	1
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		1	tower mounts	Platform Mount [LP 712-1]			
122.0	122.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	--	--	1
		1	tower mounts	Pipe Mount [PM 601-3]			
	118.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
114.0	116.0	1	lucent	KS24019-L112A	1 7	1/2 1-5/8	1
	114.0	3	antel	BXA-80063/4CFx5 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 712-1]			
		3	alcatel lucent	B25 RRH4X30	1	1-5/8	2
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		9	andrew	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
105.0	105.0	3	ericsson	RRUS-11	--	--	3
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	2 4 12	3/8 3/4 1-5/8	1
		3	ericsson	RRUS 32 B30			
		3	ericsson	RRUS-11			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP2140X			
		2	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 712-1]			
94.0	95.0	3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	1	1-1/4	2
		3	commscope	LNX-6515DS-A1M w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	12	1-5/8	1
		3	ericsson	KRY 112 144/1			
	94.0	1	tower mounts	Platform Mount [LP 712-1]			
87.0	87.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
77.0	77.0	1	symmetricom	58532A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 08/10/1999	1425352	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit/PJF, 5153/29299-105, 08/11/1999	1425473	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit, 5153, 08/10/1999	1425417	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 160020, 02/29/2016	6120832	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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.
4) For existing modifications: monopole was modified in conformance with the referenced modification 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	145 - 130	Pole	TP26.77x24x0.1875	1	-2.74	1052.41	4.9	Pass
L2	130 - 84.75	Pole	TP35.27x26.77x0.25	2	-19.14	1829.61	58.4	Pass
L3	84.75 - 58.0833	Pole	TP39.6977x33.9247x0.3125	3	-26.94	2713.34	80.9	Pass
L4	58.0833 - 44.25	Pole	TP42.26x39.6977x0.3959	4	-29.41	2783.89	89.0	Pass
L5	44.25 - 31.25	Pole	TP44.0424x40.4957x0.4537	5	-36.43	3338.55	92.3	Pass
L6	31.25 - 4.75	Pole	TP48.9503x44.0424x0.4996	6	-46.55	4246.55	90.0	Pass
L7	4.75 - 0	Pole	TP49.83x48.9503x0.5478	7	-48.60	4926.71	80.2	Pass
							Summary	
						Pole (L5)	92.3	Pass
						Rating =	92.3	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	82.9	Pass
1	Base Plate	0	77.5	Pass
1	Base Foundation Structural Steel	0	62.2	Pass
1	Base Foundation Soil Interaction	0	61.0	Pass
1	Flange Connection	130	7.3	Pass

Structure Rating (max from all components) =	**92.3%**

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 proposed loading configuration. 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-222-G standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.0 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 1.0000 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56 pcf.
11) A wind speed of 50.0 mph is used in combination with ice.
12) Temperature drop of 50 °F.
13) Deflections calculated using a wind speed of 60.0 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	145.0000-130.0000	15.0000	0.00	18	24.0000	26.7700	0.1875	0.7500	A607-65 (65 ksi)
L2	130.0000-84.7500	45.2500	4.50	18	26.7700	35.2700	0.2500	1.0000	A607-65 (65 ksi)
L3	84.7500-58.0833	31.1667	0.00	18	33.9247	39.6977	0.3125	1.2500	A607-65 (65 ksi)
L4	58.0833-44.2500	13.8333	5.25	18	39.6977	42.2600	0.3959	1.5836	Reinf 47.40 ksi (47 ksi)
L5	44.2500-31.2500	18.2500	0.00	18	40.4957	44.0424	0.4537	1.8149	Reinf 46.53 ksi (47 ksi)
L6	31.2500-	26.5000	0.00	18	44.0424	48.9503	0.4996	1.9983	Reinf 48.36 ksi

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
	4.7500								(48 ksi)
L7	4.7500-0.0000	4.7500		18	48.9503	49.8300	0.5478	2.1913	Reinf 50.30 ksi (50 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
L1	24.3702	14.1714	1015.2211	8.4534	12.1920	83.2694	2031.7780	7.0871	3.8940	20.768
	27.1830	15.8199	1412.3200	9.4368	13.5992	103.8535	2826.4984	7.9115	4.3815	23.368
L2	27.1830	21.0436	1869.8421	9.4146	13.5992	137.4969	3742.1446	10.5238	4.2715	17.086
	35.8141	27.7884	4305.5913	12.4321	17.9172	240.3055	8616.8481	13.8968	5.7675	23.07
L3	35.2944	33.3391	4758.6659	11.9323	17.2337	276.1248	9523.5933	16.6727	5.4207	17.346
	40.3101	39.0652	7655.8350	13.9817	20.1664	379.6329	15321.7438	19.5363	6.4368	20.598
L4	40.3101	49.3861	9637.5402	13.9521	20.1664	477.9005	19287.7618	24.6977	6.2900	15.888
	42.9119	52.6059	11648.1016	14.8618	21.4681	542.5777	23311.5302	26.3079	6.7410	17.027
L5	42.1565	57.6661	11681.2543	14.2149	20.5718	567.8275	23377.8790	28.8385	6.3287	13.948
	44.7219	62.7738	15068.2882	15.4740	22.3736	673.4864	30156.4036	31.3929	6.9529	15.324
L6	44.7219	69.0431	16538.3385	15.4577	22.3736	739.1912	33098.4385	34.5281	6.8722	13.756
	49.7054	76.8252	22784.6011	17.2000	24.8667	916.2678	45599.1827	38.4199	7.7360	15.485
L7	49.7054	84.1628	24911.0761	17.1829	24.8667	1001.7827	49854.9308	42.0894	7.6511	13.966
	50.5987	85.6924	26294.1812	17.4952	25.3136	1038.7357	52622.9609	42.8544	7.8059	14.249

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	Double Angle Stitch Bolt Spacing Redundants in
L1 145.0000-130.0000				1	1	1			
L2 130.0000-84.7500				1	1	1			
L3 84.7500-58.0833				1	1	1			
L4 58.0833-44.2500				1	1	1			
L5 44.2500-31.2500				1	1	1			
L6 31.2500-4.7500				1	1	1			
L7 4.7500-0.0000				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
ATCB-B01-005(5/16")	C	No	Inside Pole	133.0000 - 0.0000	6	No Ice	0.0000	0.07
						1/2" Ice	0.0000	0.07
						1" Ice	0.0000	0.07
FSJ4-50B(1/2)	C	No	Inside Pole	133.0000 - 0.0000	2	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.14

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Total Number*		*C_AA_A* *ft^2/ft*	*Weight* *plf*
						1" Ice	0.0000	0.14
2" (Nominal) Conduit	C	No	Inside Pole	133.0000 - 0.0000	2	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
***								
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	124.0000 - 0.0000	3	No Ice	0.0000	1.08
						1/2" Ice	0.0000	1.08
						1" Ice	0.0000	1.08
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	124.0000 - 0.0000	1	No Ice	0.0000	1.22
						1/2" Ice	0.0000	1.22
						1" Ice	0.0000	1.22
***								
LDF4-50A(1/2)	C	No	Inside Pole	114.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	114.0000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30
LDF7-50A(1-5/8)	C	No	Inside Pole	114.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	114.0000 - 0.0000	1	No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
***								
FB-L98B-002-75000(3/8)	C	No	Inside Pole	105.0000 - 0.0000	2	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	105.0000 - 0.0000	4	No Ice	0.0000	0.59
						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
LCF158-50A(1-5/8")	C	No	Inside Pole	105.0000 - 0.0000	12	No Ice	0.0000	0.80
						1/2" Ice	0.0000	0.80
						1" Ice	0.0000	0.80
2" (Nominal) Conduit	C	No	Inside Pole	105.0000 - 0.0000	2	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72
***								
HJ7-50A(1-5/8")	C	No	Inside Pole	94.0000 - 0.0000	6	No Ice	0.0000	1.04
						1/2" Ice	0.0000	1.04
						1" Ice	0.0000	1.04
HJ7-50A(1-5/8")	C	No	CaAa (Out Of Face)	94.0000 - 0.0000	5	No Ice	0.0000	1.04
						1/2" Ice	0.0000	2.55
						1" Ice	0.0000	4.68
HJ7-50A(1-5/8")	C	No	CaAa (Out Of Face)	94.0000 - 0.0000	1	No Ice	0.1980	1.04
						1/2" Ice	0.2980	2.55
						1" Ice	0.3980	4.68
MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4")	C	No	CaAa (Out Of Face)	94.0000 - 0.0000	1	No Ice	0.0000	0.46
						1/2" Ice	0.0000	1.53
						1" Ice	0.0000	3.21
***								
AVA7-50(1-5/8)	C	No	Inside Pole	87.0000 - 0.0000	6	No Ice	0.0000	0.70
						1/2" Ice	0.0000	0.70
						1" Ice	0.0000	0.70
***								
LDF4-50A(1/2)	C	No	CaAa (Out Of Face)	77.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	35.5000 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	60.5800 - 35.5000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	145.0000-130.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.01
L2	130.0000-84.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.623	0.90
L3	84.7500-58.0833	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	10.976	1.20
L4	58.0833-44.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.784	0.62
L5	44.2500-31.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.492	0.59
L6	31.2500-4.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	16.015	1.20
L7	4.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.871	0.21

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	145.0000-130.0000	A	2.307	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	0.01
L2	130.0000-84.7500	A	2.249	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	24.939	2.02
L3	84.7500-58.0833	A	2.160	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	36.211	3.90
L4	58.0833-44.2500	A	2.089	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	25.767	1.87
L5	44.2500-31.2500	A	2.027	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	24.392	1.76
L6	31.2500-4.7500	A	1.880	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	47.012	3.21
L7	4.7500-0.0000	A	1.537	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	7.413	0.49

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	145.0000-130.0000	0.0000	0.0000	0.0000	0.0000
L2	130.0000-84.7500	-0.2153	0.1243	-0.5540	0.3199
L3	84.7500-58.0833	-0.4668	0.2695	-1.1238	0.6488
L4	58.0833-44.2500	-0.6193	0.3576	-1.4552	0.8401
L5	44.2500-31.2500	-0.6363	0.3674	-1.4870	0.8585

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L6	31.2500-4.7500	-0.6702	0.3869	-1.4828	0.8561
L7	4.7500-0.0000	-0.6755	0.3900	-1.3915	0.8034

Shielding Factor Ka

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	K
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	4.5378 4.8914 5.2539	2.9834 3.5263 4.0859	0.05 0.08 0.13
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	4.5378 4.8914 5.2539	2.9834 3.5263 4.0859	0.05 0.08 0.13
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	4.5378 4.8914 5.2539	2.9834 3.5263 4.0859	0.05 0.08 0.13
TIMING 2000	A	From Leg	4.0000 0.00 2.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	0.1079 0.1518 0.2031	0.1079 0.1518 0.2031	0.00 0.00 0.01
WIMAX DAP HEAD	A	From Leg	4.0000 0.00 6.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	1.5467 1.7037 1.8681	0.6840 0.7999 0.9228	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	4.0000 0.00 6.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	1.5467 1.7037 1.8681	0.6840 0.7999 0.9228	0.03 0.04 0.06
WIMAX DAP HEAD	C	From Leg	4.0000 0.00 2.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	1.5467 1.7037 1.8681	0.6840 0.7999 0.9228	0.03 0.04 0.06
HORIZON COMPACT	A	From Leg	4.0000 0.00 6.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	0.7208 0.8278 0.9422	0.3681 0.4499 0.5391	0.01 0.02 0.03
HORIZON COMPACT	B	From Leg	4.0000 0.00 6.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	0.7208 0.8278 0.9422	0.3681 0.4499 0.5391	0.01 0.02 0.03
(3) 2.375" OD x 5' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
(3) 2.375" OD x 5' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	133.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
(3) 2.375" OD x 5' Mount	C	From Leg	4.0000	0.000	133.0000	No Ice	1.1875	1.1875	0.02

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*
Pipe			0.00 0.00			1/2" Ice 1" Ice	1.4956 1.8071	1.4956 1.8071	0.03 0.04
Platform Mount [LP 712-1]	C	None		0.000	133.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
IBC1900HG-2A	A	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.9660 1.0908 1.2230	0.4635 0.5576 0.6599	0.02 0.03 0.04
IBC1900HG-2A	B	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.9660 1.0908 1.2230	0.4635 0.5576 0.6599	0.02 0.03 0.04
IBC1900HG-2A	C	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.9660 1.0908 1.2230	0.4635 0.5576 0.6599	0.02 0.03 0.04
IBC1900BB-1	A	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.9660 1.0908 1.2230	0.4635 0.5576 0.6599	0.02 0.03 0.04
IBC1900BB-1	B	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	0.9660 1.0908 1.2230	0.4635 0.5576 0.6599	0.02 0.03 0.04
IBC1900BB-1	C	From Leg	4.0000	0.000	124.0000	No Ice	0.9660	0.4635	0.02

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 0.00			1/2" Ice 1" Ice	1.0908 1.2230	0.5576 0.6599	0.03 0.04
2.375" OD x 5' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	124.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
Platform Mount [LP 712-1]	C	None		0.000	124.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	1.0000 0.00 -4.00	0.000	122.0000	No Ice 1/2" Ice 1" Ice	2.0583 2.2398 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.0000 0.00 -4.00	0.000	122.0000	No Ice 1/2" Ice 1" Ice	2.0583 2.2398 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.0000 0.00 -4.00	0.000	122.0000	No Ice 1/2" Ice 1" Ice	2.0583 2.2398 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.0000 0.00 0.00	0.000	122.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.0000 0.00 0.00	0.000	122.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.0000 0.00 0.00	0.000	122.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
Pipe Mount [PM 601-3]	C	None		0.000	122.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700	4.3900 5.4800 6.5700	0.20 0.24 0.28
***									
BXA-80063/4CFx5 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	4.9453 5.3243 5.7120	3.6158 4.2169 4.8343	0.03 0.07 0.12
BXA-80063/4CFx5 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	4.9453 5.3243 5.7120	3.6158 4.2169 4.8343	0.03 0.07 0.12
BXA-80063/4CFx5 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	4.9453 5.3243 5.7120	3.6158 4.2169 4.8343	0.03 0.07 0.12
KS24019-L112A	B	From Leg	4.0000 0.00 2.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	0.1407 0.1979 0.2621	0.1407 0.1979 0.2621	0.01 0.01 0.01

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
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	8.4186 8.9558 9.4801	7.4197 8.4535 9.3468	0.08 0.15 0.23
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	8.4186 8.9558 9.4801	7.4197 8.4535 9.3468	0.08 0.15 0.23
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	8.4186 8.9558 9.4801	7.4197 8.4535 9.3468	0.08 0.15 0.23
RRH4X45-AWS4 B66	A	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
RRH4X45-AWS4 B66	B	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
RRH4X45-AWS4 B66	C	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	2.6600 2.8781 3.1037	1.5861 1.7690 1.9588	0.06 0.08 0.11
B25 RRH4X30	A	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7417 1.9204 2.1065	0.06 0.08 0.10
B25 RRH4X30	B	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7417 1.9204 2.1065	0.06 0.08 0.10
B25 RRH4X30	C	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	2.2000 2.3926 2.5926	1.7417 1.9204 2.1065	0.06 0.08 0.10
RRH2x60-700	A	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
RRH2x60-700	B	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	3.5002 3.7609 4.0285	1.8157 2.0519 2.2894	0.06 0.08 0.11
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 0.00	0.000	114.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
Platform Mount [LP 712-1]	C	None		0.000	114.0000	No Ice 1/2" Ice 1" Ice	24.5300 29.9400 35.3500	24.5300 29.9400 35.3500	1.34 1.65 1.96
***									
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26

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
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	9.8953 10.4700 11.0098	7.1792 8.3621 9.2588	0.10 0.18 0.26
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	5.8142 6.2677 6.6966	4.6350 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	5.8142 6.2677 6.6966	4.6350 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	5.8142 6.2677 6.6966	4.6350 5.5082 6.2127	0.09 0.14 0.21
RRUS 32 B30	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	B	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
RRUS 32 B30	C	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	2.7427 2.9647 3.1941	1.6681 1.8552 2.0493	0.05 0.07 0.10
(2) LGP2140X	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	1.0800 1.2137 1.3548	0.3580 0.4536 0.5563	0.01 0.02 0.03
(2) LGP2140X	B	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	1.0800 1.2137 1.3548	0.3580 0.4536 0.5563	0.01 0.02 0.03
(2) LGP2140X	C	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	1.0800 1.2137 1.3548	0.3580 0.4536 0.5563	0.01 0.02 0.03
RRUS-11	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-11	B	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-11	C	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
(2) DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	0.9167 1.4583 1.6431	0.9167 1.4583 1.6431	0.02 0.04 0.06
QS66512-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.000	105.0000	No Ice 1/2" Ice 1" Ice	8.3708 8.9314 9.4571	8.4625 9.6573 10.5478	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.0000	0.000	105.0000	No Ice	8.3708	8.4625	0.14

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			1/2" Ice	8.9314	9.6573	0.21
			0.00			1" Ice	9.4571	10.5478	0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.0000	0.000	105.0000	No Ice	8.3708	8.4625	0.14
			0.00			1/2" Ice	8.9314	9.6573	0.21
			0.00			1" Ice	9.4571	10.5478	0.30
RRUS 32 B2	A	From Leg	4.0000	0.000	105.0000	No Ice	2.7313	1.6681	0.05
			0.00			1/2" Ice	2.9531	1.8552	0.07
			0.00			1" Ice	3.1823	2.0493	0.10
RRUS 32 B2	B	From Leg	4.0000	0.000	105.0000	No Ice	2.7313	1.6681	0.05
			0.00			1/2" Ice	2.9531	1.8552	0.07
			0.00			1" Ice	3.1823	2.0493	0.10
RRUS 32 B2	C	From Leg	4.0000	0.000	105.0000	No Ice	2.7313	1.6681	0.05
			0.00			1/2" Ice	2.9531	1.8552	0.07
			0.00			1" Ice	3.1823	2.0493	0.10
(2) TPX-070821	A	From Leg	4.0000	0.000	105.0000	No Ice	0.4688	0.1009	0.01
			0.00			1/2" Ice	0.5585	0.1471	0.01
			0.00			1" Ice	0.6556	0.2020	0.02
(2) TPX-070821	B	From Leg	4.0000	0.000	105.0000	No Ice	0.4688	0.1009	0.01
			0.00			1/2" Ice	0.5585	0.1471	0.01
			0.00			1" Ice	0.6556	0.2020	0.02
(2) TPX-070821	C	From Leg	4.0000	0.000	105.0000	No Ice	0.4688	0.1009	0.01
			0.00			1/2" Ice	0.5585	0.1471	0.01
			0.00			1" Ice	0.6556	0.2020	0.02
Platform Mount [LP 712-1]	C	None		0.000	105.0000	No Ice	24.5300	24.5300	1.34
						1/2" Ice	29.9400	29.9400	1.65
						1" Ice	35.3500	35.3500	1.96
***									
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000	0.000	94.0000	No Ice	6.3186	5.6334	0.11
			0.00			1/2" Ice	6.7646	6.4160	0.17
			1.00			1" Ice	7.2032	7.1208	0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000	0.000	94.0000	No Ice	6.3186	5.6334	0.11
			0.00			1/2" Ice	6.7646	6.4160	0.17
			1.00			1" Ice	7.2032	7.1208	0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000	0.000	94.0000	No Ice	6.3186	5.6334	0.11
			0.00			1/2" Ice	6.7646	6.4160	0.17
			1.00			1" Ice	7.2032	7.1208	0.23
KRY 112 144/1	A	From Leg	4.0000	0.000	94.0000	No Ice	0.3500	0.1750	0.01
			0.00			1/2" Ice	0.4259	0.2343	0.01
			1.00			1" Ice	0.5093	0.3009	0.02
KRY 112 144/1	B	From Leg	4.0000	0.000	94.0000	No Ice	0.3500	0.1750	0.01
			0.00			1/2" Ice	0.4259	0.2343	0.01
			1.00			1" Ice	0.5093	0.3009	0.02
KRY 112 144/1	C	From Leg	4.0000	0.000	94.0000	No Ice	0.3500	0.1750	0.01
			0.00			1/2" Ice	0.4259	0.2343	0.01
			1.00			1" Ice	0.5093	0.3009	0.02
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.0000	0.000	95.0000	No Ice	6.7474	6.0700	0.15
			0.00			1/2" Ice	7.2017	6.8671	0.21
			1.00			1" Ice	7.6475	7.5828	0.28
AIR -32 B2A/B66AA w/	B	From Leg	4.0000	0.000	95.0000	No Ice	6.7474	6.0700	0.15

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
Mount Pipe			0.00			1/2" Ice	7.2017	6.8671	0.21
			1.00			1" Ice	7.6475	7.5828	0.28
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.0000	0.000	95.0000	No Ice	6.7474	6.0700	0.15
			0.00			1/2" Ice	7.2017	6.8671	0.21
			1.00			1" Ice	7.6475	7.5828	0.28
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.0000	0.000	94.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2" Ice	12.4043	11.3657	0.17
			1.00			1" Ice	13.1351	12.9138	0.27
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.0000	0.000	94.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2" Ice	12.4043	11.3657	0.17
			1.00			1" Ice	13.1351	12.9138	0.27
LNX-6515DS-A1M w/ Mount Pipe	C	From Leg	4.0000	0.000	94.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2" Ice	12.4043	11.3657	0.17
			1.00			1" Ice	13.1351	12.9138	0.27
RRUS 11 B12	A	From Leg	4.0000	0.000	94.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2" Ice	3.0426	1.3299	0.07
			1.00			1" Ice	3.2593	1.4848	0.10
RRUS 11 B12	B	From Leg	4.0000	0.000	94.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2" Ice	3.0426	1.3299	0.07
			1.00			1" Ice	3.2593	1.4848	0.10
RRUS 11 B12	C	From Leg	4.0000	0.000	94.0000	No Ice	2.8333	1.1821	0.05
			0.00			1/2" Ice	3.0426	1.3299	0.07
			1.00			1" Ice	3.2593	1.4848	0.10
2.375" OD x 5' Mount Pipe	A	From Leg	4.0000	0.000	94.0000	No Ice	1.1875	1.1875	0.02
			0.00			1/2" Ice	1.4956	1.4956	0.03
			0.00			1" Ice	1.8071	1.8071	0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.0000	0.000	94.0000	No Ice	1.1875	1.1875	0.02
			0.00			1/2" Ice	1.4956	1.4956	0.03
			0.00			1" Ice	1.8071	1.8071	0.04
2.375" OD x 5' Mount Pipe	C	From Leg	4.0000	0.000	94.0000	No Ice	1.1875	1.1875	0.02
			0.00			1/2" Ice	1.4956	1.4956	0.03
			0.00			1" Ice	1.8071	1.8071	0.04
Platform Mount [LP 712-1]	C	None		0.000	94.0000	No Ice	24.5300	24.5300	1.34
						1/2" Ice	29.9400	29.9400	1.65
						1" Ice	35.3500	35.3500	1.96
***									
742 213 w/ Mount Pipe	A	From Leg	1.0000	0.000	87.0000	No Ice	5.3729	4.6203	0.05
			0.00			1/2" Ice	5.9502	6.0004	0.09
			0.00			1" Ice	6.5014	6.9816	0.15
742 213 w/ Mount Pipe	B	From Leg	1.0000	0.000	87.0000	No Ice	5.3729	4.6203	0.05
			0.00			1/2" Ice	5.9502	6.0004	0.09
			0.00			1" Ice	6.5014	6.9816	0.15
742 213 w/ Mount Pipe	C	From Leg	1.0000	0.000	87.0000	No Ice	5.3729	4.6203	0.05
			0.00			1/2" Ice	5.9502	6.0004	0.09
			0.00			1" Ice	6.5014	6.9816	0.15
Pipe Mount [PM 601-3]	C	None		0.000	87.0000	No Ice	4.3900	4.3900	0.20
						1/2" Ice	5.4800	5.4800	0.24
						1" Ice	6.5700	6.5700	0.28
***									

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
58532A	A	From Leg	3.0000 0.00 0.00	0.000	77.0000	No Ice 1/2" Ice 1" Ice	0.1893 0.2483 0.3147	0.1893 0.2483 0.3147	0.00 0.00 0.01
Side Arm Mount [SO 701-1]	A	None		0.000	77.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Leg	4.0000 0.00 6.00	0.000		133.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.05 0.08 0.12
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.0000 0.00 6.00	0.000		133.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.05 0.08 0.12

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 145.0000-130.0000	137.3636	1.353	31	32.221	A	0.000	32.221	32.221	100.00	0.000	0.000
					B	0.000	32.221		100.00	0.000	0.000
					C	0.000	32.221		100.00	0.000	0.000
L2 130.0000-84.7500	106.5926	1.283	29	118.776	A	0.000	118.776	118.776	100.00	0.000	0.000
					B	0.000	118.776		100.00	0.000	0.000
					C	0.000	118.776		100.00	0.000	7.623
L3 84.7500-58.0833	71.1218	1.178	27	84.005	A	0.000	84.005	84.005	100.00	0.000	0.000
					B	0.000	84.005		100.00	0.000	0.000
					C	0.000	84.005		100.00	0.000	10.976
L4 58.0833-44.2500	51.0946	1.099	25	47.968	A	0.000	47.968	47.968	100.00	0.000	0.000
					B	0.000	47.968		100.00	0.000	0.000
					C	0.000	47.968		100.00	0.000	7.784
L5 44.2500-31.2500	37.6860	1.031	24	47.059	A	0.000	47.059	47.059	100.00	0.000	0.000
					B	0.000	47.059		100.00	0.000	0.000
					C	0.000	47.059		100.00	0.000	7.492
L6 31.2500-4.7500	17.7669	0.88	20	104.263	A	0.000	104.263	104.263	100.00	0.000	0.000
					B	0.000	104.263		100.00	0.000	0.000
					C	0.000	104.263		100.00	0.000	16.015
L7 4.7500-0.0000	2.3679	0.85	19	19.852	A	0.000	19.852	19.852	100.00	0.000	0.000
					B	0.000	19.852		100.00	0.000	0.000
					C	0.000	19.852		100.00	0.000	2.871

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 145.0000-130.0000	137.3636	1.353	8	2.3066	37.987	A	0.000	37.987	37.987	100.00	0.000	0.000
						B	0.000	37.987		100.00	0.000	0.000
						C	0.000	37.987		100.00	0.000	0.000
L2 130.0000-84.7500	106.5926	1.283	8	2.2488	135.735	A	0.000	135.735	135.735	100.00	0.000	0.000
						B	0.000	135.735		100.00	0.000	0.000
						C	0.000	135.735		100.00	0.000	24.939
L3 84.7500-58.0833	71.1218	1.178	7	2.1596	94.000	A	0.000	94.000	94.000	100.00	0.000	0.000
						B	0.000	94.000		100.00	0.000	0.000
						C	0.000	94.000		100.00	0.000	36.211
L4 58.0833-44.2500	51.0946	1.099	7	2.0894	52.785	A	0.000	52.785	52.785	100.00	0.000	0.000
						B	0.000	52.785		100.00	0.000	0.000
						C	0.000	52.785		100.00	0.000	25.767
L5 44.2500-31.2500	37.6860	1.031	6	2.0267	51.586	A	0.000	51.586	51.586	100.00	0.000	0.000
						B	0.000	51.586		100.00	0.000	0.000
						C	0.000	51.586		100.00	0.000	24.392
L6 31.2500-4.7500	17.7669	0.88	5	1.8799	112.566	A	0.000	112.566	112.566	100.00	0.000	0.000
						B	0.000	112.566		100.00	0.000	0.000
						C	0.000	112.566		100.00	0.000	47.012
L7 4.7500-0.0000	2.3679	0.85	5	1.5368	21.068	A	0.000	21.068	21.068	100.00	0.000	0.000
						B	0.000	21.068		100.00	0.000	0.000
						C	0.000	21.068		100.00	0.000	7.413

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 145.0000-130.0000	137.3636	1.353	11	32.221	A	0.000	32.221	32.221	100.00	0.000	0.000
					B	0.000	32.221		100.00	0.000	0.000
					C	0.000	32.221		100.00	0.000	0.000
L2 130.0000-84.7500	106.5926	1.283	10	118.776	A	0.000	118.776	118.776	100.00	0.000	0.000
					B	0.000	118.776		100.00	0.000	0.000
					C	0.000	118.776		100.00	0.000	7.623
L3 84.7500-58.0833	71.1218	1.178	9	84.005	A	0.000	84.005	84.005	100.00	0.000	0.000
					B	0.000	84.005		100.00	0.000	0.000
					C	0.000	84.005		100.00	0.000	10.976
L4 58.0833-44.2500	51.0946	1.099	9	47.968	A	0.000	47.968	47.968	100.00	0.000	0.000
					B	0.000	47.968		100.00	0.000	0.000
					C	0.000	47.968		100.00	0.000	7.784
L5 44.2500-31.2500	37.6860	1.031	8	47.059	A	0.000	47.059	47.059	100.00	0.000	0.000
					B	0.000	47.059		100.00	0.000	0.000
					C	0.000	47.059		100.00	0.000	7.492
L6 31.2500-4.7500	17.7669	0.88	7	104.263	A	0.000	104.263	104.263	100.00	0.000	0.000
					B	0.000	104.263		100.00	0.000	0.000
					C	0.000	104.263		100.00	0.000	16.015
L7 4.7500-0.0000	2.3679	0.85	7	19.852	A	0.000	19.852	19.852	100.00	0.000	0.000
					B	0.000	19.852		100.00	0.000	0.000
					C	0.000	19.852		100.00	0.000	2.871

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	145 - 130	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	26	-7.82	-1.25	0.82
			Max. Mx	20	-2.75	24.87	1.93
			Max. My	14	-2.74	-1.67	-25.82
			Max. Vy	20	-4.66	24.87	1.93
			Max. Vx	14	4.75	-1.67	-25.82
			Max. Torque	22			-1.04
L2	130 - 84.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.04	-1.03	1.98
			Max. Mx	20	-19.18	727.13	11.85
			Max. My	14	-19.16	-9.62	-732.95
			Max. Vy	20	-29.90	727.13	11.85
			Max. Vx	14	30.05	-9.62	-732.95
			Max. Torque	22			-1.50

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	84.75 - 58.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.77	3.36	-0.39
			Max. Mx	20	-26.97	1738.20	19.79
			Max. My	14	-26.95	-16.00	-1748.50
			Max. Vy	20	-34.22	1738.20	19.79
			Max. Vx	14	34.37	-16.00	-1748.50
			Max. Torque	20			-1.28
L4	58.0833 - 44.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.73	4.70	-1.14
			Max. Mx	20	-29.43	2036.23	21.92
			Max. My	14	-29.42	-17.70	-2047.74
			Max. Vy	20	-35.23	2036.23	21.92
			Max. Vx	14	35.38	-17.70	-2047.74
			Max. Torque	20			-0.91
L5	44.25 - 31.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.59	7.54	-2.78
			Max. Mx	20	-36.44	2700.24	26.43
			Max. My	14	-36.43	-21.29	-2714.32
			Max. Vy	20	-37.42	2700.24	26.43
			Max. Vx	14	37.56	-21.29	-2714.32
			Max. Torque	3			1.00
L6	31.25 - 4.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-99.91	11.34	-4.98
			Max. Mx	20	-46.55	3723.80	32.80
			Max. My	14	-46.55	-26.34	-3741.51
			Max. Vy	20	-39.83	3723.80	32.80
			Max. Vx	14	39.97	-26.34	-3741.51
			Max. Torque	25			2.05
L7	4.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-102.55	11.91	-5.31
			Max. Mx	20	-48.60	3913.92	33.91
			Max. My	14	-48.60	-27.23	-3932.27
			Max. Vy	20	-40.23	3913.92	33.91
			Max. Vx	14	40.37	-27.23	-3932.27
			Max. Torque	25			2.25

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	102.55	-0.00	0.00
	Max. H_x	21	36.46	40.21	0.24
	Max. H_z	3	36.46	0.29	40.28
	Max. M_x	2	3921.48	0.29	40.28
	Max. M_z	8	3898.79	-40.12	-0.14
	Max. Torsion	25	2.25	20.23	34.99
	Min. Vert	15	36.46	-0.20	-40.35
	Min. H_x	9	36.46	-40.12	-0.14
	Min. H_z	14	48.62	-0.20	-40.35
	Min. M_x	14	-3932.27	-0.20	-40.35
	Min. M_z	20	-3913.92	40.21	0.24
	Min. Torsion	13	-2.25	-20.18	-35.02

Tower Mast Reaction Summary

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 Only	40.51	0.00	-0.00	0.22	0.71	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	48.62	-0.29	-40.28	-3921.48	41.54	-2.12
0.9 Dead+1.6 Wind 0 deg - No Ice	36.46	-0.29	-40.28	-3885.57	40.87	-2.13
1.2 Dead+1.6 Wind 30 deg - No Ice	48.62	19.94	-34.81	-3386.62	-1933.13	-0.96
0.9 Dead+1.6 Wind 30 deg - No Ice	36.46	19.94	-34.81	-3355.50	-1915.58	-0.97
1.2 Dead+1.6 Wind 60 deg - No Ice	48.62	34.69	-20.03	-1945.84	-3369.88	-0.36
0.9 Dead+1.6 Wind 60 deg - No Ice	36.46	34.69	-20.03	-1928.00	-3339.09	-0.36
1.2 Dead+1.6 Wind 90 deg - No Ice	48.62	40.12	0.14	18.80	-3898.79	0.34
0.9 Dead+1.6 Wind 90 deg - No Ice	36.46	40.12	0.14	18.54	-3863.27	0.34
1.2 Dead+1.6 Wind 120 deg - No Ice	48.62	34.74	20.39	1996.59	-3375.52	1.76
0.9 Dead+1.6 Wind 120 deg - No Ice	36.46	34.74	20.39	1978.07	-3344.68	1.77
1.2 Dead+1.6 Wind 150 deg - No Ice	48.62	20.18	35.02	3415.13	-1966.07	2.24
0.9 Dead+1.6 Wind 150 deg - No Ice	36.46	20.18	35.02	3383.59	-1948.16	2.25
1.2 Dead+1.6 Wind 180 deg - No Ice	48.62	0.20	40.35	3932.27	-27.23	1.87
0.9 Dead+1.6 Wind 180 deg - No Ice	36.46	0.20	40.35	3895.85	-27.13	1.87
1.2 Dead+1.6 Wind 210 deg - No Ice	48.62	-19.89	34.95	3406.31	1927.89	0.94
0.9 Dead+1.6 Wind 210 deg - No Ice	36.46	-19.89	34.95	3374.85	1909.99	0.94
1.2 Dead+1.6 Wind 240 deg - No Ice	48.62	-34.73	20.05	1949.31	3376.73	0.36
0.9 Dead+1.6 Wind 240 deg - No Ice	36.46	-34.73	20.05	1931.32	3345.45	0.36
1.2 Dead+1.6 Wind 270 deg - No Ice	48.62	-40.21	-0.24	-33.91	3913.92	-0.31
0.9 Dead+1.6 Wind 270 deg - No Ice	36.46	-40.21	-0.24	-33.60	3877.73	-0.31
1.2 Dead+1.6 Wind 300 deg - No Ice	48.62	-34.84	-20.35	-1990.17	3392.20	-1.51
0.9 Dead+1.6 Wind 300 deg - No Ice	36.46	-34.84	-20.35	-1971.85	3360.76	-1.51
1.2 Dead+1.6 Wind 330 deg - No Ice	48.62	-20.23	-34.99	-3410.60	1974.77	-2.24
0.9 Dead+1.6 Wind 330 deg - No Ice	36.46	-20.23	-34.99	-3379.22	1956.35	-2.25
1.2 Dead+1.0 Ice+1.0 Temp	102.55	0.00	-0.00	5.31	11.91	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	102.55	-0.06	-13.32	-1357.91	21.65	-1.39
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	102.55	6.62	-11.52	-1172.91	-662.97	-0.80
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	102.55	11.50	-6.64	-672.67	-1162.20	-0.17
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	102.55	13.29	0.03	9.80	-1345.81	0.50
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	102.55	11.51	6.72	695.20	-1163.71	1.21
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	102.55	6.67	11.57	1190.26	-670.82	1.50
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	102.55	0.04	13.34	1370.95	5.64	1.33
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	102.55	-6.61	11.55	1188.03	685.83	0.80
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	102.55	-11.50	6.64	684.11	1187.81	0.17
1.2 Dead+1.0 Wind 270	102.55	-13.31	-0.05	-2.58	1373.23	-0.50

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
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	102.55	-11.53	-6.71	-683.10	1191.54	-1.16
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	102.55	-6.68	-11.56	-1178.58	696.83	-1.50
Dead+Wind 0 deg - Service	40.51	-0.06	-8.62	-834.84	9.37	0.25
Dead+Wind 30 deg - Service	40.51	4.27	-7.45	-720.85	-411.04	0.20
Dead+Wind 60 deg - Service	40.51	7.42	-4.29	-414.11	-716.91	-0.08
Dead+Wind 90 deg - Service	40.51	8.58	0.03	4.15	-829.62	-0.34
Dead+Wind 120 deg - Service	40.51	7.43	4.36	425.23	-718.13	-0.33
Dead+Wind 150 deg - Service	40.51	4.32	7.49	727.26	-418.06	-0.33
Dead+Wind 180 deg - Service	40.51	0.04	8.63	837.39	-5.26	-0.30
Dead+Wind 210 deg - Service	40.51	-4.26	7.48	725.36	410.98	-0.20
Dead+Wind 240 deg - Service	40.51	-7.43	4.29	415.16	719.43	0.08
Dead+Wind 270 deg - Service	40.51	-8.60	-0.05	-7.06	833.85	0.34
Dead+Wind 300 deg - Service	40.51	-7.45	-4.35	-423.56	722.75	0.38
Dead+Wind 330 deg - Service	40.51	-4.33	-7.49	-725.98	420.97	0.33

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	-40.51	0.00	0.00	40.51	0.00	0.000%
2	-0.29	-48.62	-40.28	0.29	48.62	40.28	0.006%
3	-0.29	-36.46	-40.28	0.29	36.46	40.28	0.005%
4	19.94	-48.62	-34.81	-19.94	48.62	34.81	0.000%
5	19.94	-36.46	-34.81	-19.94	36.46	34.81	0.000%
6	34.69	-48.62	-20.03	-34.69	48.62	20.03	0.000%
7	34.69	-36.46	-20.03	-34.69	36.46	20.03	0.000%
8	40.12	-48.62	0.14	-40.12	48.62	-0.14	0.006%
9	40.12	-36.46	0.14	-40.12	36.46	-0.14	0.005%
10	34.74	-48.62	20.39	-34.74	48.62	-20.39	0.000%
11	34.74	-36.46	20.39	-34.74	36.46	-20.39	0.000%
12	20.18	-48.62	35.02	-20.18	48.62	-35.02	0.000%
13	20.18	-36.46	35.02	-20.18	36.46	-35.02	0.000%
14	0.20	-48.62	40.35	-0.20	48.62	-40.35	0.003%
15	0.20	-36.46	40.35	-0.20	36.46	-40.35	0.005%
16	-19.89	-48.62	34.95	19.89	48.62	-34.95	0.000%
17	-19.89	-36.46	34.95	19.89	36.46	-34.95	0.000%
18	-34.73	-48.62	20.05	34.73	48.62	-20.05	0.000%
19	-34.73	-36.46	20.05	34.73	36.46	-20.05	0.000%
20	-40.21	-48.62	-0.24	40.21	48.62	0.24	0.003%
21	-40.21	-36.46	-0.24	40.21	36.46	0.24	0.002%
22	-34.84	-48.62	-20.35	34.84	48.62	20.35	0.000%
23	-34.84	-36.46	-20.35	34.84	36.46	20.35	0.000%
24	-20.23	-48.62	-34.99	20.23	48.62	34.99	0.000%
25	-20.23	-36.46	-34.99	20.23	36.46	34.99	0.000%
26	0.00	-102.55	0.00	-0.00	102.55	0.00	0.001%
27	-0.06	-102.55	-13.32	0.06	102.55	13.32	0.000%
28	6.62	-102.55	-11.52	-6.62	102.55	11.52	0.000%
29	11.50	-102.55	-6.64	-11.50	102.55	6.64	0.000%
30	13.29	-102.55	0.03	-13.29	102.55	-0.03	0.000%
31	11.51	-102.55	6.72	-11.51	102.55	-6.72	0.000%
32	6.67	-102.55	11.57	-6.67	102.55	-11.57	0.000%
33	0.04	-102.55	13.34	-0.04	102.55	-13.34	0.000%
34	-6.61	-102.55	11.55	6.61	102.55	-11.55	0.000%
35	-11.50	-102.55	6.64	11.50	102.55	-6.64	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	-13.31	-102.55	-0.05	13.31	102.55	0.05	0.000%
37	-11.53	-102.55	-6.71	11.53	102.55	6.71	0.000%
38	-6.68	-102.55	-11.56	6.68	102.55	11.56	0.000%
39	-0.06	-40.51	-8.62	0.06	40.51	8.62	0.002%
40	4.27	-40.51	-7.45	-4.27	40.51	7.45	0.002%
41	7.42	-40.51	-4.29	-7.42	40.51	4.29	0.002%
42	8.58	-40.51	0.03	-8.58	40.51	-0.03	0.002%
43	7.43	-40.51	4.36	-7.43	40.51	-4.36	0.002%
44	4.32	-40.51	7.49	-4.32	40.51	-7.49	0.002%
45	0.04	-40.51	8.63	-0.04	40.51	-8.63	0.002%
46	-4.26	-40.51	7.48	4.26	40.51	-7.48	0.002%
47	-7.43	-40.51	4.29	7.43	40.51	-4.29	0.002%
48	-8.60	-40.51	-0.05	8.60	40.51	0.05	0.002%
49	-7.46	-40.51	-4.35	7.45	40.51	4.35	0.002%
50	-4.33	-40.51	-7.49	4.33	40.51	7.49	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00008073	0.00012646
3	Yes	14	0.00005501	0.00010267
4	Yes	18	0.00000001	0.00012599
5	Yes	18	0.00000001	0.00009083
6	Yes	18	0.00000001	0.00012540
7	Yes	18	0.00000001	0.00009041
8	Yes	14	0.00008081	0.00010764
9	Yes	14	0.00005507	0.00008963
10	Yes	18	0.00000001	0.00012862
11	Yes	18	0.00000001	0.00009259
12	Yes	18	0.00000001	0.00013042
13	Yes	18	0.00000001	0.00009389
14	Yes	15	0.00003428	0.00007442
15	Yes	14	0.00005499	0.00013006
16	Yes	18	0.00000001	0.00012447
17	Yes	18	0.00000001	0.00008967
18	Yes	18	0.00000001	0.00012478
19	Yes	18	0.00000001	0.00008994
20	Yes	15	0.00003431	0.00009718
21	Yes	15	0.00002298	0.00007603
22	Yes	18	0.00000001	0.00013164
23	Yes	18	0.00000001	0.00009479
24	Yes	18	0.00000001	0.00012935
25	Yes	18	0.00000001	0.00009308
26	Yes	9	0.00000001	0.00002001
27	Yes	17	0.00000001	0.00008173
28	Yes	17	0.00000001	0.00010759
29	Yes	17	0.00000001	0.00010793
30	Yes	17	0.00000001	0.00008084
31	Yes	17	0.00000001	0.00010970
32	Yes	17	0.00000001	0.00010924
33	Yes	17	0.00000001	0.00008195
34	Yes	17	0.00000001	0.00010980
35	Yes	17	0.00000001	0.00010919
36	Yes	17	0.00000001	0.00008198
37	Yes	17	0.00000001	0.00011073
38	Yes	17	0.00000001	0.00011134
39	Yes	14	0.00000001	0.00002287
40	Yes	14	0.00000001	0.00004465
41	Yes	14	0.00000001	0.00004070
42	Yes	14	0.00000001	0.00002391
43	Yes	14	0.00000001	0.00003662
44	Yes	14	0.00000001	0.00004837
45	Yes	14	0.00000001	0.00002461
46	Yes	14	0.00000001	0.00003602

47	Yes	14	0.00000001	0.00003863
48	Yes	14	0.00000001	0.00002481
49	Yes	14	0.00000001	0.00004924
50	Yes	14	0.00000001	0.00003665

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 130	21.34	50	1.154	0.003
L2	130 - 84.75	17.71	50	1.150	0.003
L3	89.25 - 58.0833	8.53	50	0.929	0.001
L4	58.0833 - 44.25	3.49	50	0.575	0.000
L5	49.5 - 31.25	2.54	50	0.479	0.000
L6	31.25 - 4.75	1.00	50	0.308	0.000
L7	4.75 - 0	0.02	50	0.043	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
139.0000	VHLP2.5-11	50	19.88	1.155	0.003	209292
133.0000	LLPX310R-V1 w/ Mount Pipe	50	18.44	1.153	0.003	102952
124.0000	APXVSPP18-C-A20 w/ Mount Pipe	50	16.27	1.138	0.002	29054
122.0000	800MHz 2X50W RRH W/FILTER	50	15.80	1.133	0.002	23849
114.0000	BXA-80063/4CFx5 w/ Mount Pipe	50	13.91	1.103	0.002	13893
105.0000	OPA-65R-LCUU-H6 w/ Mount Pipe	50	11.86	1.054	0.002	9453
95.0000	AIR -32 B2A/B66AA w/ Mount Pipe	50	9.70	0.981	0.001	6976
94.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	50	9.49	0.972	0.001	6798
87.0000	742 213 w/ Mount Pipe	50	8.09	0.907	0.001	5868
77.0000	58532A	50	6.27	0.799	0.001	5110

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 130	100.13	24	5.426	0.009
L2	130 - 84.75	83.15	24	5.406	0.007
L3	89.25 - 58.0833	40.06	24	4.369	0.002
L4	58.0833 - 44.25	16.39	24	2.704	0.001
L5	49.5 - 31.25	11.93	24	2.250	0.001
L6	31.25 - 4.75	4.68	24	1.449	0.001
L7	4.75 - 0	0.10	24	0.203	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
139.0000	VHLP2.5-11	24	93.33	5.430	0.010	45724
133.0000	LLPX310R-V1 w/ Mount Pipe	24	86.54	5.420	0.009	22485

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	APXVSPP18-C-A20 w/ Mount Pipe	24	76.39	5.352	0.008	6300
122.0000	800MHz 2X50W RRH W/FILTER	24	74.15	5.327	0.007	5169
114.0000	BXA-80063/4CFx5 w/ Mount Pipe	24	65.31	5.187	0.006	3007
105.0000	OPA-65R-LCUU-H6 w/ Mount Pipe	24	55.67	4.958	0.005	2044
95.0000	AIR -32 B2A/B66AA w/ Mount Pipe	24	45.54	4.612	0.003	1506
94.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	24	44.56	4.572	0.003	1467
87.0000	742 213 w/ Mount Pipe	24	38.00	4.266	0.002	1264
77.0000	58532A	24	29.44	3.759	0.001	1098

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	145 - 130 (1)	TP26.77x24x0.1875	15.0000	0.0000	0.0	15.8199	-2.74	1052.41	0.003
L2	130 - 84.75 (2)	TP35.27x26.77x0.25	45.2500	0.0000	0.0	27.1176	-19.14	1829.61	0.010
L3	84.75 - 58.0833 (3)	TP39.6977x33.9247x0.3125	31.1667	0.0000	0.0	39.0652	-26.94	2713.34	0.010
L4	58.0833 - 44.25 (4)	TP42.26x39.6977x0.3959	13.8333	0.0000	0.0	51.3839	-29.41	2783.89	0.011
L5	44.25 - 31.25 (5)	TP44.0424x40.4957x0.4537	18.2500	0.0000	0.0	62.7738	-36.43	3338.55	0.011
L6	31.25 - 4.75 (6)	TP48.9503x44.0424x0.4996	26.5000	0.0000	0.0	76.8252	-46.55	4246.55	0.011
L7	4.75 - 0 (7)	TP49.83x48.9503x0.5478	4.7500	0.0000	0.0	85.6925	-48.60	4926.71	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	145 - 130 (1)	TP26.77x24x0.1875	26.38	575.73	0.046	0.00	575.73	0.000
L2	130 - 84.75 (2)	TP35.27x26.77x0.25	736.31	1286.44	0.572	0.00	1286.44	0.000
L3	84.75 - 58.0833 (3)	TP39.6977x33.9247x0.3125	1753.85	2197.33	0.798	0.00	2197.33	0.000
L4	58.0833 - 44.25 (4)	TP42.26x39.6977x0.3959	2053.62	2336.65	0.879	0.00	2336.65	0.000
L5	44.25 - 31.25 (5)	TP44.0424x40.4957x0.4537	2721.29	2984.88	0.912	0.00	2984.88	0.000
L6	31.25 - 4.75 (6)	TP48.9503x44.0424x0.4996	3750.03	4220.59	0.889	0.00	4220.59	0.000
L7	4.75 - 0 (7)	TP49.83x48.9503x0.5478	3941.05	4976.66	0.792	0.00	4976.66	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	145 - 130 (1)	TP26.77x24x0.1875	4.79	526.20	0.009	0.89	1152.87	0.001
L2	130 - 84.75 (2)	TP35.27x26.77x0.25	30.12	914.81	0.033	1.08	2576.03	0.000
L3	84.75 - 58.0833 (3)	TP39.6977x33.9247x0.3125	34.44	1356.67	0.025	0.24	4400.04	0.000
L4	58.0833 - 44.25 (4)	TP42.26x39.6977x0.3959	35.45	1391.94	0.025	0.16	4679.02	0.000
L5	44.25 - 31.25 (5)	TP44.0424x40.4957x0.4537	37.63	1669.27	0.023	0.94	5977.06	0.000
L6	31.25 - 4.75 (6)	TP48.9503x44.0424x0.4996	40.04	2123.27	0.019	2.04	8451.50	0.000
L7	4.75 - 0 (7)	TP49.83x48.9503x0.5478	40.44	2463.35	0.016	2.24	9965.50	0.000

Pole Interaction Design Data

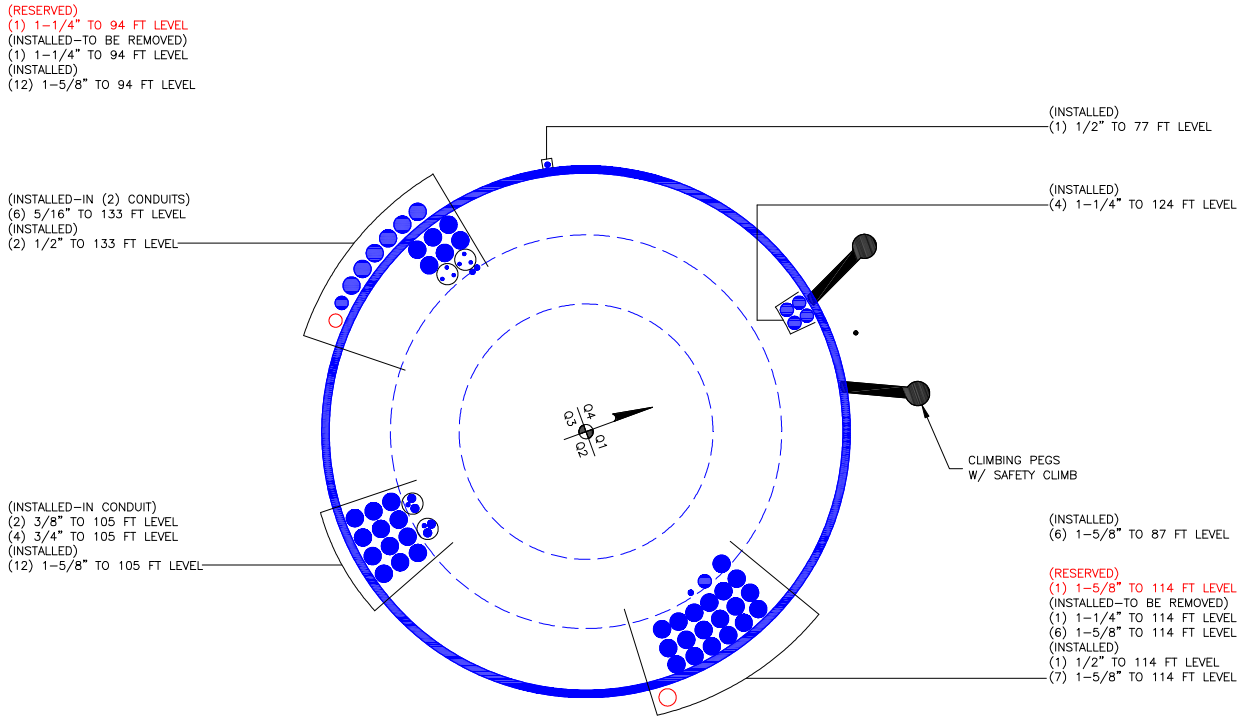
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	145 - 130 (1)	0.003	0.046	0.000	0.009	0.001	0.049 ✔	1.000	4.8.2 ✔
L2	130 - 84.75 (2)	0.010	0.572	0.000	0.033	0.000	0.584 ✔	1.000	4.8.2 ✔
L3	84.75 - 58.0833 (3)	0.010	0.798	0.000	0.025	0.000	0.809 ✔	1.000	4.8.2 ✔
L4	58.0833 - 44.25 (4)	0.011	0.879	0.000	0.025	0.000	0.890 ✔	1.000	4.8.2 ✔
L5	44.25 - 31.25 (5)	0.011	0.912	0.000	0.023	0.000	0.923 ✔	1.000	4.8.2 ✔
L6	31.25 - 4.75 (6)	0.011	0.889	0.000	0.019	0.000	0.900 ✔	1.000	4.8.2 ✔
L7	4.75 - 0 (7)	0.010	0.792	0.000	0.016	0.000	0.802 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	145 - 130	Pole	TP26.77x24x0.1875	1	-2.74	1052.41	4.9	Pass
L2	130 - 84.75	Pole	TP35.27x26.77x0.25	2	-19.14	1829.61	58.4	Pass
L3	84.75 - 58.0833	Pole	TP39.6977x33.9247x0.3125	3	-26.94	2713.34	80.9	Pass
L4	58.0833 - 44.25	Pole	TP42.26x39.6977x0.3959	4	-29.41	2783.89	89.0	Pass
L5	44.25 - 31.25	Pole	TP44.0424x40.4957x0.4537	5	-36.43	3338.55	92.3	Pass
L6	31.25 - 4.75	Pole	TP48.9503x44.0424x0.4996	6	-46.55	4246.55	90.0	Pass
L7	4.75 - 0	Pole	TP49.83x48.9503x0.5478	7	-48.60	4926.71	80.2	Pass
							Summary	
						Pole (L5)	92.3	Pass
						RATING =	**92.3**	**Pass**

APPENDIX B

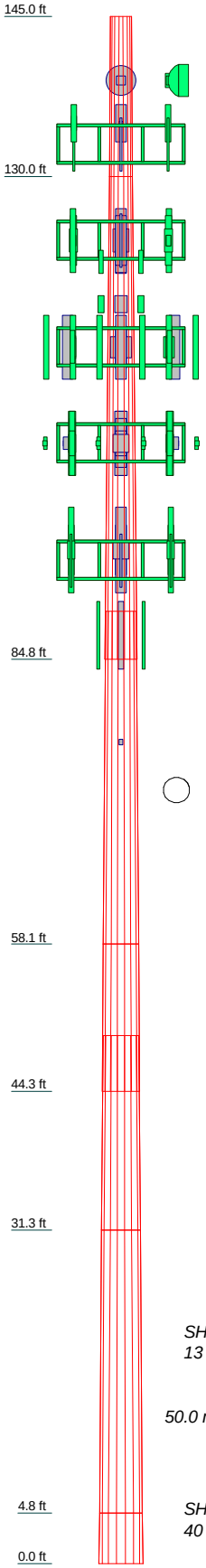
BASE LEVEL DRAWING


(RESERVED)
(1) 1-1/4" TO 94 FT LEVEL
(INSTALLED-TO BE REMOVED)
(1) 1-1/4" TO 94 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 94 FT LEVEL
(INSTALLED)
(1) 1/2" TO 77 FT LEVEL
(INSTALLED)
(4) 1-1/4" TO 124 FT LEVEL
(INSTALLED-IN (2) CONDUITS)
(6) 5/16" TO 133 FT LEVEL
(INSTALLED)
(2) 1/2" TO 133 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
(INSTALLED-IN CONDUIT)
(2) 3/8" TO 105 FT LEVEL
(4) 3/4" TO 105 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 105 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 87 FT LEVEL
(RESERVED)
(1) 1-5/8" TO 114 FT LEVEL
(INSTALLED-TO BE REMOVED)
(1) 1-1/4" TO 114 FT LEVEL
(6) 1-5/8" TO 114 FT LEVEL
(INSTALLED)
(1) 1/2" TO 114 FT LEVEL
(7) 1-5/8" TO 114 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7
Length (ft)	15.0000	45.2500	31.1667	13.8333	18.2500	26.5000	4.7500
Number of Sides	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.3959	0.4537	0.4996	0.5478
Socket Length (ft)		4.5000		5.2500			
Top Dia (in)	24.0000	26.7700	33.9247	39.6977	40.4957	44.0424	48.9503
Bot Dia (in)	26.7700	35.2700	39.6977	42.2600	44.0424	48.9503	49.8300
Grade	A607-65			Reinf 47.40 ksi	Reinf 46.53 ksi	Reinf 48.36 ksi	Reinf 50.30 ksi
Weight (K)	0.8	3.8	3.8	2.4	3.7	6.6	1.4



ALL REACTIONS ARE FACTORED

AXIAL 103 K

SHEAR 13 K

MOM 1373

TORQUE 2 kip-ft

50.0 mph WIND - 1.0000 in ICE

AXIAL 49 K

SHEAR 40 K

MOM 3940 kip-ft

TORQUE 2 kip-ft

REACTIONS - 97.0 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R-V1 w/ Mount Pipe	133	Platform Mount [LP 712-1]	114
LLPX310R-V1 w/ Mount Pipe	133	BXA-80063/4CFx5 w/ Mount Pipe	114
LLPX310R-V1 w/ Mount Pipe	133	BXA-80063/4CFx5 w/ Mount Pipe	114
TIMING 2000	133	OPA-65R-LCUU-H6 w/ Mount Pipe	105
WIMAX DAP HEAD	133	7770.00 w/ Mount Pipe	105
WIMAX DAP HEAD	133	7770.00 w/ Mount Pipe	105
WIMAX DAP HEAD	133	7770.00 w/ Mount Pipe	105
HORIZON COMPACT	133	RRUS 32 B30	105
HORIZON COMPACT	133	RRUS 32 B30	105
(3) 2.375" OD x 5' Mount Pipe	133	RRUS 32 B30	105
(3) 2.375" OD x 5' Mount Pipe	133	(2) LGP2140X	105
(3) 2.375" OD x 5' Mount Pipe	133	(2) LGP2140X	105
Platform Mount [LP 712-1]	133	(2) LGP2140X	105
VHLP2.5-11	133	RRUS-11	105
VHLP2.5-11	133	RRUS-11	105
APXVSPP18-C-A20 w/ Mount Pipe	124	RRUS-11	105
APXVTM14-C-120 w/ Mount Pipe	124	(2) DC6-48-60-18-8F	105
APXVTM14-C-120 w/ Mount Pipe	124	QS66512-2 w/ Mount Pipe	105
APXVTM14-C-120 w/ Mount Pipe	124	QS66512-2 w/ Mount Pipe	105
TD-RRH8x20-25	124	QS66512-2 w/ Mount Pipe	105
TD-RRH8x20-25	124	RRUS 32 B2	105
TD-RRH8x20-25	124	RRUS 32 B2	105
IBC1900HG-2A	124	RRUS 32 B2	105
IBC1900HG-2A	124	(2) TPX-070821	105
IBC1900HG-2A	124	(2) TPX-070821	105
IBC1900BB-1	124	(2) TPX-070821	105
IBC1900BB-1	124	Platform Mount [LP 712-1]	105
IBC1900BB-1	124	OPA-65R-LCUU-H6 w/ Mount Pipe	105
2.375" OD x 5' Mount Pipe	124	OPA-65R-LCUU-H6 w/ Mount Pipe	105
2.375" OD x 5' Mount Pipe	124	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	94
2.375" OD x 5' Mount Pipe	124	KRY 112 144/1	94
Platform Mount [LP 712-1]	124	KRY 112 144/1	94
APXVSPP18-C-A20 w/ Mount Pipe	124	KRY 112 144/1	94
APXVSPP18-C-A20 w/ Mount Pipe	124	AIR -32 B2A/B66AA w/ Mount Pipe	94
800MHz 2X50W RRH W/FILTER	122	AIR -32 B2A/B66AA w/ Mount Pipe	94
PCS 1900MHz 4x45W-65MHz	122	AIR -32 B2A/B66AA w/ Mount Pipe	94
PCS 1900MHz 4x45W-65MHz	122	LNX-6515DS-A1M w/ Mount Pipe	94
PCS 1900MHz 4x45W-65MHz	122	LNX-6515DS-A1M w/ Mount Pipe	94
Pipe Mount [PM 601-3]	122	LNX-6515DS-A1M w/ Mount Pipe	94
800MHz 2X50W RRH W/FILTER	122	RRUS 11 B12	94
800MHz 2X50W RRH W/FILTER	122	RRUS 11 B12	94
BXA-80063/4CFx5 w/ Mount Pipe	114	RRUS 11 B12	94
KS24019-L112A	114	2.375" OD x 5' Mount Pipe	94
DB-T1-6Z-8AB-0Z	114	2.375" OD x 5' Mount Pipe	94
(3) SBNHH-1D65B w/ Mount Pipe	114	2.375" OD x 5' Mount Pipe	94
(3) SBNHH-1D65B w/ Mount Pipe	114	Platform Mount [LP 712-1]	94
(3) SBNHH-1D65B w/ Mount Pipe	114	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	94
RRH4X45-AWS4 B66	114	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	94
RRH4X45-AWS4 B66	114	742 213 w/ Mount Pipe	87
RRH4X45-AWS4 B66	114	Pipe Mount [PM 601-3]	87
B25 RRH4X30	114	742 213 w/ Mount Pipe	87
B25 RRH4X30	114	742 213 w/ Mount Pipe	87
B25 RRH4X30	114	58532A	77
RRH2x60-700	114	Side Arm Mount [SO 701-1]	77
RRH2x60-700	114		
RRH2x60-700	114		
DB-T1-6Z-8AB-0Z	114		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi	Reinf 48.36 ksi	48 ksi	61 ksi
Reinf 47.40 ksi	47 ksi	60 ksi	Reinf 50.30 ksi	50 ksi	63 ksi
Reinf 46.53 ksi	47 ksi	59 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 92.3%

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

Job: **145 ft Monopole / Newington**			
Project: **PJF 37516-0225 / BU 881364**			
Client: Crown Castle	Drawn by: Joey Meinerding		App'd:
Code: TIA-222-G	Date: 10/03/16		Scale: NTS
Path: T:\375_Crown_Castle\2016\37516-0225_881364_NEWINGTON\37516-0225.004.7805_SA_1305121\37516-0225.004.7805_Reinforced.eri			Dwg No. E-1

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *881364*
Site Name: *Newington*
App #:

Reactions		
Mu	26.38	ft-kips
Axial, Pu:	2.74	kips
Shear, Vu:	4.79	kips
Elevation:	130	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Pole Manufacturer:	Other

Bolt Data			
Qty:	18		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	30		

Plate Data		
Diam:	34	in
Thick, t:	1.5	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	4.72	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
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:	26.77	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.06	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	2.19	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.738	in	
Min PL "treq" for actual **T w/ Pry**:	0.148	in	
Min PL "t1" for actual **T w/o Pry**:	0.199	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	2.19	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	7.3%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	1.0	ksi	TIA G
Allowable Plate Stress:	45.0	ksi	φ*Fy
Compression Plate Stress Ratio:	2.2%	**Pass**	Comp. Y.L. Length:
No Prying			13.54
Tension Side Stress Ratio, (treq/t)^2:	1.0%	**Pass**	

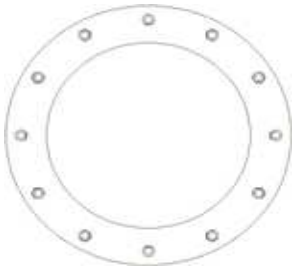
n/a

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



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

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#: *881364*
Site Name: *Newington*
App #:

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	57	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	56	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	12	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:	49.83	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	3940	ft-kips
Factored Axial, Pu:	49	kips
Factored Shear, Vu:	40	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	215.4	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	82.9%	**Pass**

Base Plate Results	Flexural Check	
Base Plate Stress:	34.9	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	77.5%	**Pass**

PL Ref. Data
Yield Line (in): 29.37
Max PL Length: 29.37

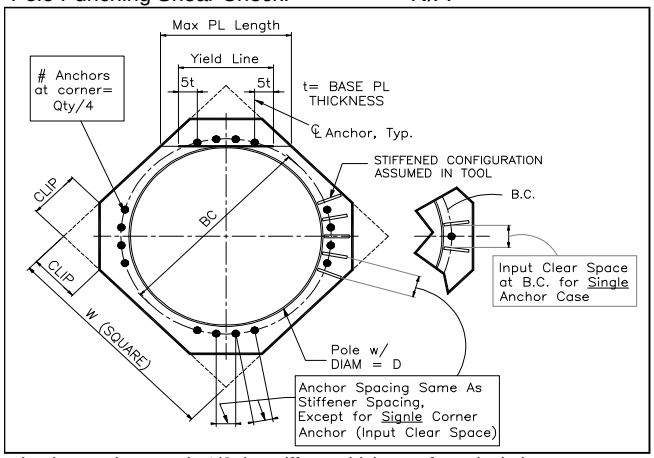
N/A - Unstiffened

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:	37516-0225.004.7805	**Page:**	1
Site Number:	881364	**By:**	JWM
Site Name:	Newington	**Date:**	10/3/2016

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	3940.0		k-ft
Shear, Vu =	40.0		kips
Axial Load, Pu1 =	49.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	36.8	0.0	kips (from 0.9D + 1.6W)**
OTMu =	3960.0	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**

****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-05
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	25	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	3.64	
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-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	28	
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 =	10.00	ft
Depth to Ignore Soil =	4.00	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 =	100.0%
Maximum Steel Ratio =	100.0%

*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	12	125	0	34	Sand				12
2	16	125	0	30	Sand	6000			28
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	16.99	ft, from Grade
Bending Moment, Mu =	4639.44	k-ft, from COR
Resisting Moment, ΦMn =	7604.87	k-ft, from COR

MOMENT RATIO = 61.0% OK

Shear, Vu =	40.00	kips
Resisting Shear, ΦVn =	65.57	kips

SHEAR RATIO = 61.0% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	100.06	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	49.00	kips
Comp. Capacity, ΦCn =	140.85	kips

COMPRESSION RATIO = 34.8% OK

Steel Results (ACI 318-05):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	43.68	sq in
Axial, ΦPn (min) =	-2358.72	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	8653.28	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	67.92	kips @ 5.50 ft Below Grade
Moment, Mu =	4158.49	k-ft @ 5.50 ft Below Grade
Moment, ΦMn =	6691.19	k-ft

MOMENT RATIO = 62.1% OK

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#: *881364*
Site Name: *Newington*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

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 =	28	
As Total=	43.68	in^2
A s/ Aconc, Rho:	0.0079	0.79%

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:	0.79%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8653.28	kips
at Mu=(ϕ=0.65)Mn=	5213.79	ft-kips
Max Tu, (φ=0.9) Tn =	2358.72	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	4158.49	ft-kips **(* Note)**
Max. Factored Shaft Pu:	67.92	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**		
1.00	Mu:	4158.49	ft-kips
1.00	Pu:	67.92	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=	2005

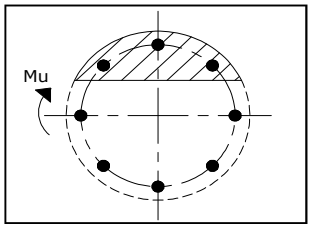
Seismic Properties

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

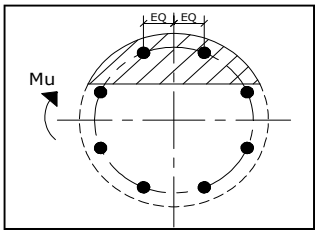
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**16.01**	in
Extreme Steel Strain, ϵt:	**0.0117**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	67.92	kips
Drilled Shaft Moment Capacity, φMn:	**6691.19**	ft-kips
Drilled Shaft Superimposed Mu:	**4158.49**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**62.1%**

EBI Consulting
environmental | engineering | due diligence

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

AT&T Existing Facility

Site ID: CT1108

Newington South
123 Costelo Road
Newington, CT 06111

October 21, 2016

EBI Project Number: 6216004767

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	21.74 %

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

EBI Consulting
environmental | engineering | due diligence

October 21, 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: **CT1108 – Newington South**

EBI Consulting was directed to analyze the proposed AT&T facility located at **123 Costelo Road, Newington, 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 **123 Costelo Road, Newington, 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) 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.

2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (850 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 (2300 MHz (WCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 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.

7) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

8) 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.

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB 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.

10) The antennas used in this modeling are the **Powerwave 7770, CCI OPA-65R-LCUU-H6 and the Quintel QS66512-2** for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerlines of the proposed antennas are **105 feet** above ground level (AGL) for **Sector A**, **105 feet** above ground level (AGL) for **Sector B** and **105 feet** above ground level (AGL) for Sector C.

12) 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 by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**105 feet**	Height (AGL):	**105 feet**	Height (AGL):	**105 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 Watts	Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts
ERP (W):	3,453.54	ERP (W):	3,453.54	ERP (W):	3,453.54
Antenna A1 MPE%	**1.50 %**	Antenna B1 MPE%	**1.50 %**	Antenna C1 MPE%	**1.50 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	12.45 / 15.45 dBd	Gain:	12.45 / 15.45 dBd	Gain:	12.45 / 15.45 dBd
Height (AGL):	**105 feet**	Height (AGL):	**105 feet**	Height (AGL):	**105 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):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	6,318.53	ERP (W):	6,318.53	ERP (W):	6,318.53
Antenna A2 MPE%	**2.91 %**	Antenna B2 MPE%	**2.91 %**	Antenna C2 MPE%	**2.91 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Gain:	10.85 / 13.85 dBd	Gain:	10.85 / 13.85 dBd	Gain:	10.85 / 13.85 dBd
Height (AGL):	**105 feet**	Height (AGL):	**105 feet**	Height (AGL):	**105 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 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	4,371.36	ERP (W):	4,371.36	ERP (W):	4,371.36
Antenna A3 MPE%	**2.21 %**	Antenna B3 MPE%	**2.21 %**	Antenna C3 MPE%	**2.21 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**6.62 %**
Verizon Wireless	4.41 %
MetroPCS	1.85 %
Clearwire	0.12 %
Sprint	0.14 %
Nextel	0.34 %
T-Mobile	8.26 %
Site Total MPE %:	**21.74 %**

AT&T Sector A Total:	6.62 %
AT&T Sector B Total:	6.62 %
AT&T Sector C Total:	6.62 %
Site Total:	21.74 %

AT&T _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	105	3.04	850 MHz	567	0.54%
AT&T 1900 MHz (PCS) UMTS	2	656.33	105	4.81	1900 MHz (PCS)	1000	0.48%
AT&T 1900 MHz (PCS) GSM	2	656.33	105	4.81	1900 MHz (PCS)	1000	0.48%
AT&T 850 MHz LTE	2	1,054.75	105	7.74	850 MHz	567	1.36%
AT&T 2300 MHz (WCS) LTE	2	2,104.51	105	15.44	2300 MHz (WCS)	1000	1.54%
AT&T 700 MHz LTE	2	729.71	105	5.35	700 MHz	467	1.15%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	105	10.68	1900 MHz (PCS)	1000	1.07%
						Total:	6.62%

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 A:	6.62 %
Sector B:	6.62 %
Sector C:	6.62 %
AT&T Maximum Total (per sector):	6.62 %
Site Total:	21.74 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **21.74 %** 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.