Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

February 26, 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 / L700 Crown Site BU: 806352**
AT&T Site ID: CT2104
Located at: 126 Ledge Road, Darien, CT 06820
Latitude: 41° 4' 20.75" / Longitude: -73° 28' 41.0

Dear Ms. Bachman,

AT&T currently maintains nine (9) antennas at the 89 foot level of the existing 117 foot monopole located at 126 Ledge Road, Darien, CT. The tower is owned by Crown Castle. The property is owned by the Town of Darien. AT&T now proposes to replace three (3) antennas and add three (3) RRUs (non-antennas), one (1) surge suppressor; two (2) DC power cables; and, one (1) fiber cable. The antennas would be installed at the same 89 foot level of the tower.

This facility was approved by the Connecticut Siting Council on December 30, 1992, Docket No.155. This approval included the condition(s) that:

1. The self-supporting monopole tower shall be no taller than necessary to provide the proposed communications service and the tower shall not exceed a total height of 113 feet above ground level (AGL), with antennas and appurtenances.
2. The Certificate holder shall prepare a Development and Management (D&M) plan for this site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall include detailed plans of the tower, tower foundation, equipment building, access road including all upgrades, utility connection, security fence, and detailed plans for drainage, erosion, and sedimentation controls consistent with the Connecticut Guidelines for Soil

Erosion, and Sedimentation Control. In addition, the D&M plan shall include detailed landscaping plans for the facility site, with options to provide landscaping on the Town property boundary north of the site and on the Middlesex Common Condominium property to their approval.

3. The Certificate Holder shall comply with any existing and future radio frequency (RF) standard promulgated by State or Federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facility granted herein shall be brought into compliance with such standards.
4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
6. If the facility does not initially provide, or permanently ceases to provide cellular or other services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.
7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

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 Ms. Jayme Stevenson, First Selectman for the Town of Darien, as well as the property owner and the tower owner.

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

2. The proposed modification 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-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Amanda Goodall.

Sincerely,

Amanda Goodall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Goodall@crowncastle.com
Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 4: Exhibit-3: General Power Density Table report (RF Emissions Analysis Report)

cc: Ms. Jayme Stevenson, First Selectman
Town of Darien
2 Renshaw Road, Room 202
Darien, CT 06820

Crown Castle, Tower Owner
12 Gill Street, Suite 5800
Woburn, MA 01801

Clerk's Office
Town of Darien
2 Renshaw Road, Room 101
Darien, CT 06820

SITE NAME: DARIEN
FA NUMBER: 10035058
SITE NUMBER: CTL02104

126 LEDGE ROAD
DARIEN, CT 06820
COUNTY: FAIRFIELD

CROWN SITE ADDRESS: BRG 302 943052
CROWN CASTLE SITE ID#: 806352

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY:	SMARTLINK, LLC
ADDRESS:	1362 MELLON ROAD, SUITE 140
CITY, STATE, ZIP:	HANOVER, MD 21076
CONTACT:	RICH WAGNER
E-MAIL:	RWAGNER@SMARTLINKLLC.COM

SITE ACQUISITION

COMPANY:	SMARTLINK, LLC
ADDRESS:	33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	TODD OLIVER
PHONE:	(774) 369-3618
E-MAIL:	TODD.OLIVER@SMARTLINKLLC.COM

ENGINEER

COMPANY:	MASER CONSULTING CONNECTICUT
ADDRESS:	331NEWMAN SPRINGS ROAD, SUITE 203
CITY, STATE, ZIP:	RED BANK, NJ 077701-5699
CONTACT:	FRANK PAZDEN
PHONE:	(973) 398-3110 x4505
E-MAIL:	FPAZDEN@MASERCONSULTING.COM

RF ENGINEER

COMPANY:	NEW CINGULAR WIRELESS PCS, LLC
ADDRESS:	550 COCHITUATE RD.
CITY, STATE, ZIP:	FRAMINGHAM, MA 01701
CONTACT:	CAMERON SYME
E-MAIL:	CS6970@ATT.COM

CONSTRUCTION MANAGER

COMPANY:	SMARTLINK, LLC.
ADDRESS:	33 BOSTON POST ROAD WEST, SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	MARK DONNELLY
PHONE:	(617) 515-2080
E-MAIL:	MARK.DONNELLY@SMARTLINKLLC.COM

SITE INFORMATION

APPLICANT/LESSEE

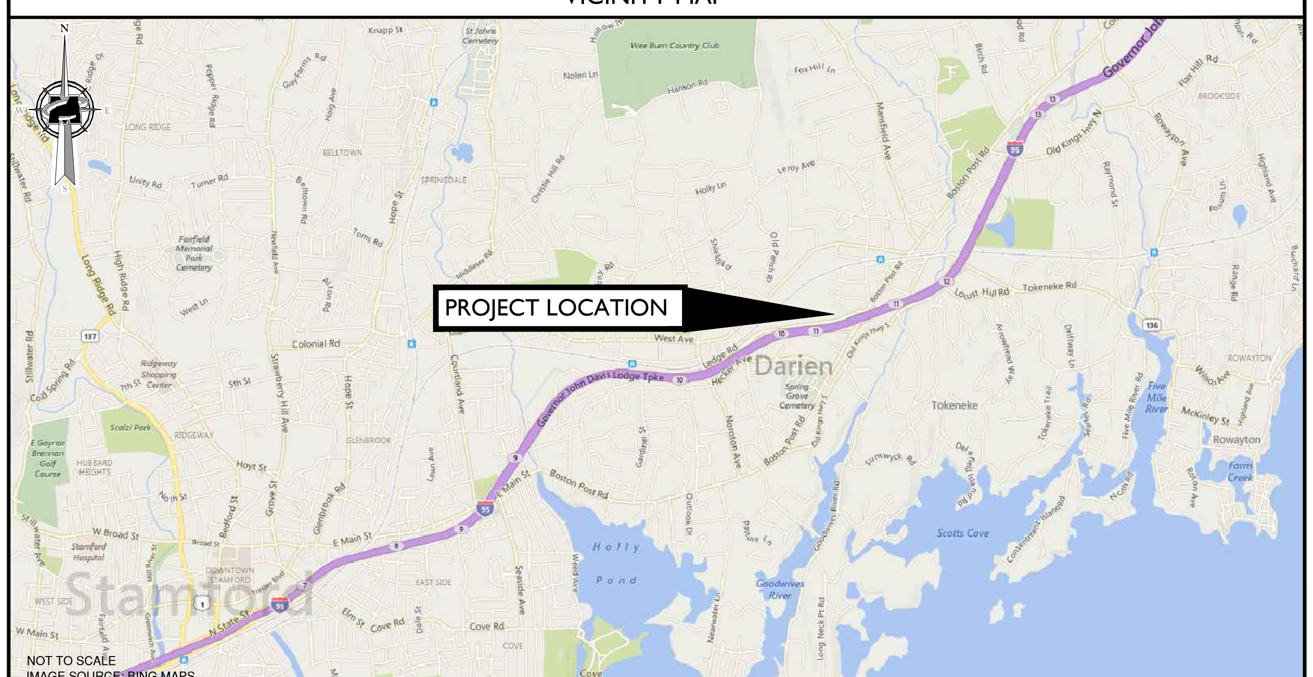
at&t

NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE RD.
FRAMINGHAM, MA 01701

PROPERTY/TOWER OWNER:

NAME:	CROWN CASTLE
ADDRESS:	12 GILL ST., # 5800
CITY, STATE, ZIP:	WOBURN, MA 01801
SITE ID#:	806352
LATITUDE:	41.072431° N
LONGITUDE:	73.4781° W
LAT./LONG. TYPE:	NAD 83
AREA OF CONSTRUCTION:	EXISTING EQUIPMENT SHELTER AND MONOPOLE
ZONING/JURISDICTION:	CITY OF DARIEN
CURRENT USE/PROPOSED USE:	UNMANNED TELECOMMUNICATIONS FACILITY
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.
CONSTRUCTION TYPE:	IIB
USE GROUP:	U

VICINITY MAP



CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES.

1. CONNECTICUT STATE BUILDING CODE (2005) & ALL SUBSEQUENT AMENDMENTS
2. NATIONAL ELECTRIC CODE 2011
3. NATIONAL FIRE PROTECTION ASSOCIATION 70 - 2011
4. LIGHTNING PROTECTION CODE 201
5. AMERICAN CONCRETE INSTITUTE 318
6. AMERICAN INSTITUTE OF STEEL CONSTRUCTION 14 ED.
7. EIA/TIA-222 REVISION F
8. TIA 607 FOR GROUNDING
9. INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
10. IEEE C2 LATEST EDITION
11. TELCORDIA GR-1275 12, ANSI T1.311

GENERAL CONTRACTOR NOTES

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

PROJECT DESCRIPTION/SCOPE OF WORK

LTE WCS WILL BE 3C AT THE SITE WITH BRONZE STANDARD CONFIGURATION.

PROPOSED PROJECT SCOPE HEREIN BASED ON RFDS ID# 758581, VERSION 2.00, LAST UPDATED 10/04/15.

THIS PROJECT WILL BE COMPRISED OF:

- (3) NEW ANTENNAS TO REPLACE (3) EXISTING ANTENNAS, (1) PER SECTOR
- (3) NEW LTE RRH'S, (1) PER SECTOR
- ADD (1) DC-6 SURGE SUPPRESSOR
- ADD (2) DC TRUNK LINES
- ADD (1) FIBER CABLE
- ADD XMU
- ROTATE EXISTING PLATFORM

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1362 MELLON ROAD
SUITE 140
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TEL: (410) 582-8043 FAX: (443) 221-2962

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig.

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ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE :	JOB NUMBER :
AS SHOWN	15946019A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
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1	02/24/16	REVISED PER SMARTLINK'S COMMENTS	JRF	FEP
0	12/28/15	ISSUED FOR REVIEW	SMG	FEP

STATE OF CONNECTICUT FRANK E. PAZDEN No. 28188 LICENSED PROFESSIONAL ENGINEER

FRANK E. PAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFFESIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME:

DARIEN
FA# 10035058
SITE # CTL02104
CROWN CASTLE ID#: 806352

126 LEDGE ROAD
DARIEN, CT 06820
COUNTY OF FAIRFIELD

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE :
TITLE SHEET

SHEET NUMBER :
T-1

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5O HMS OR LESS.
4. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
5. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
6. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
7. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE EQUIPMENT GROUND RING WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK TO BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
10. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
11. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. ALL BENDS SHALL BE MADE WITH 12" RADIUS OR LARGER.
12. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
13. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS EXCEPT FOR GROUND BAR CONNECTION FROM MGB TO OUTSIDE EXTERIOR GROUND SHALL ALL BE CADWELD CONNECTIONS.
14. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
15. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED TO THE TOWER GROUND BAR.
16. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
17. ALL EXTERIOR AND INTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
18. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
19. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
20. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G. NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
21. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/4" IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50.

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SMARTLINK
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T (NEW CINGULAR WIRELESS PCS, LLC)

2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
3. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
4. 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.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
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. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
11. 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 THE RESPONSIBLE ENGINEER. 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.
12. 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, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
13. THE AREAS OF THE OWNER'S 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.
14. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
15. 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.
16. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
18. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
19. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
20. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
21. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR.
22. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILITIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
23. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
24. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS.
25. ALL STRUCTUAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
26. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
27. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DESCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
28. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION, ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
29. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN ALERT OF DANGEROUS EXOPOSURE LEVELS.

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at&t

NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE:	JOB NUMBER:
AS SHOWN	15946019A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
1	02/24/16	REVISED PER SMARTLINK'S COMMENTS	JRF	FEP
0	12/28/15	ISSUED FOR REVIEW	SMG	FEP

STATE OF CONNECTICUT – PROFESSIONAL ENGINEER – No. 28188 – REGISTERED PROFESSIONAL ENGINEER

FRANK E. PERSICHETTI JR.
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

SITE NAME:

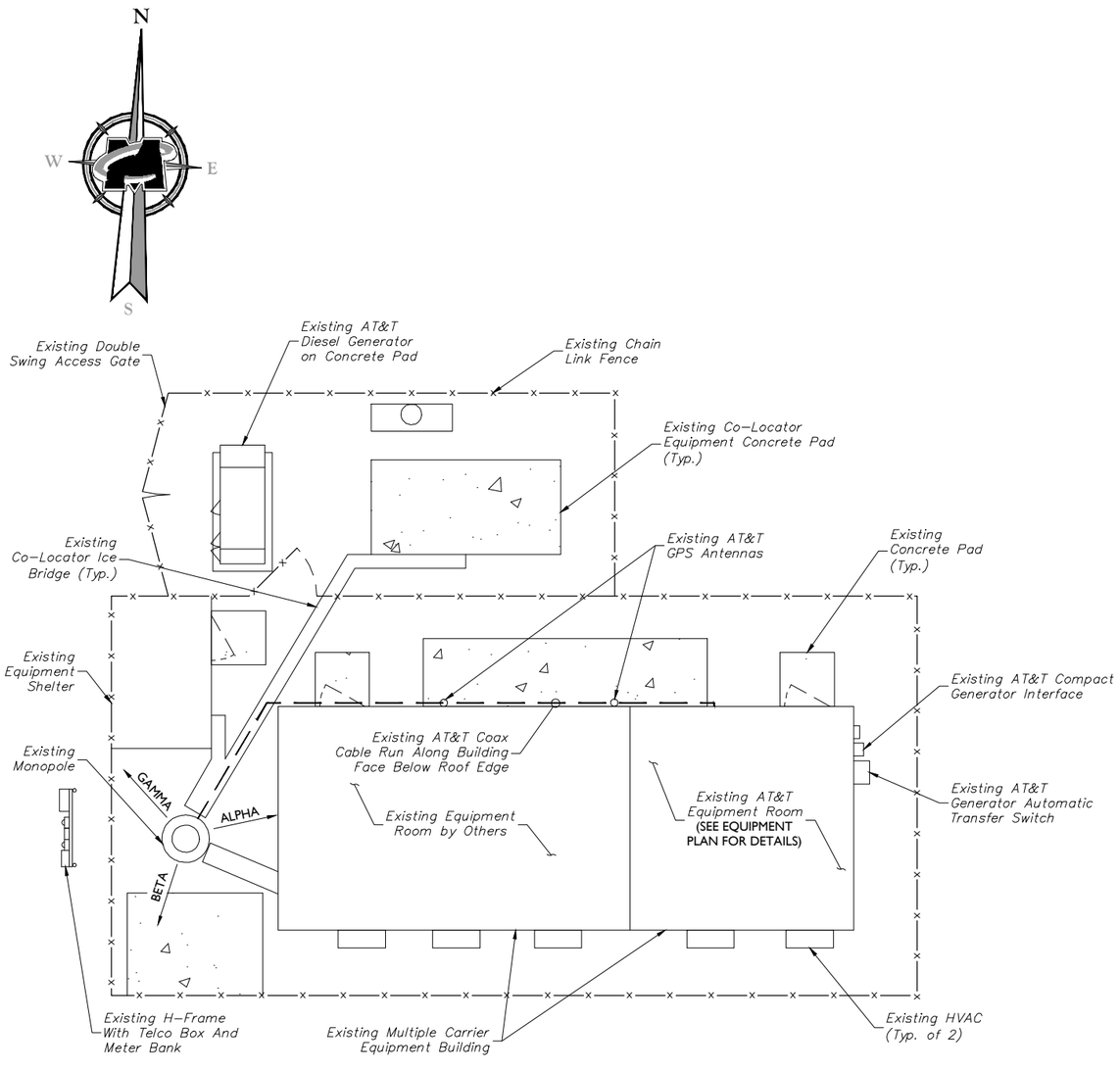
DARIEN
FA# 10035058
SITE # CTL02104
CROWN CASTLE ID#: 806352

126 LEDGE ROAD
DARIEN, CT 06820
COUNTY OF FAIRFIELD

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE:
GENERAL NOTES

SHEET NUMBER:
GN-1



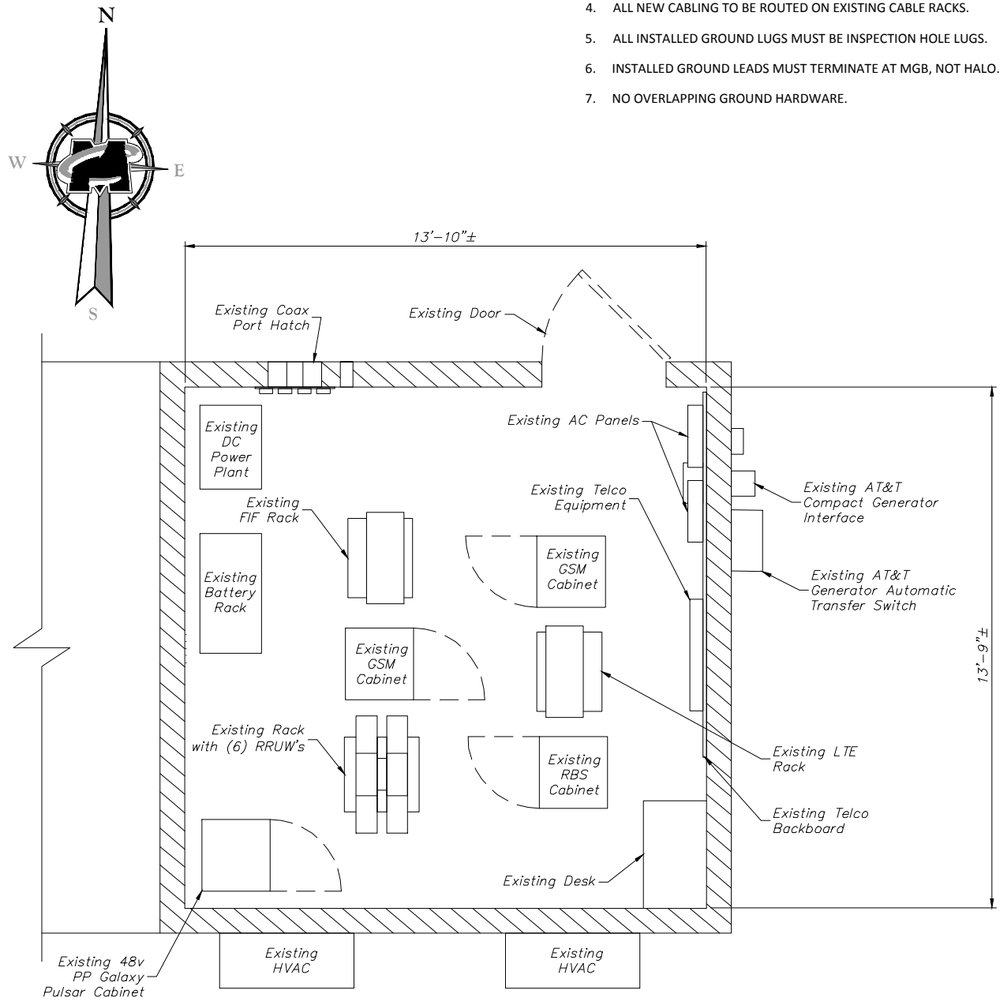
COMPOUND PLAN

GRAPHIC SCALE

5 0 2.5 5 10

(IN FEET)

SCALE: 1" = 5' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)



EQUIPMENT PLAN

GRAPHIC SCALE

2 0 1 2 4

(IN FEET)

SCALE: 1" = 2' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)

NOTES:

1. THE CONDUIT ROUTING IS DIAGRAMMATICALLY SHOWN ON THE PLANS AND ARE ONLY APPROXIMATIONS. THE EXACT LOCATION AND ROUTING SHALL BE FIELD VERIFIED.
2. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES, INDICATING THE CIRCUITS ORIGINATION AND ALL EQUIPMENT TERMINATIONS.
3. SUBCONTRACTOR SHALL PROVIDE ALL CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETED SYSTEM AND SHALL BE IN COMPLIANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
4. ALL NEW CABLING TO BE ROUTED ON EXISTING CABLE RACKS.
5. ALL INSTALLED GROUND LUGS MUST BE INSPECTION HOLE LUGS.
6. INSTALLED GROUND LEADS MUST TERMINATE AT MGB, NOT HALO.
7. NO OVERLAPPING GROUND HARDWARE.

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SCALE:	JOB NUMBER:
AS SHOWN	15946019A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
1	02/24/16	REVISED PER SMARTLINK'S COMMENTS	JRF	FEP
0	12/28/15	ISSUED FOR REVIEW	SMG	FEP

STATE OF CONNECTICUT · FRANK E. PERSICHETTI · No. 28188 · REGISTERED PROFESSIONAL ENGINEER

FRANK E. PERSICHETTI
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

SITE NAME:

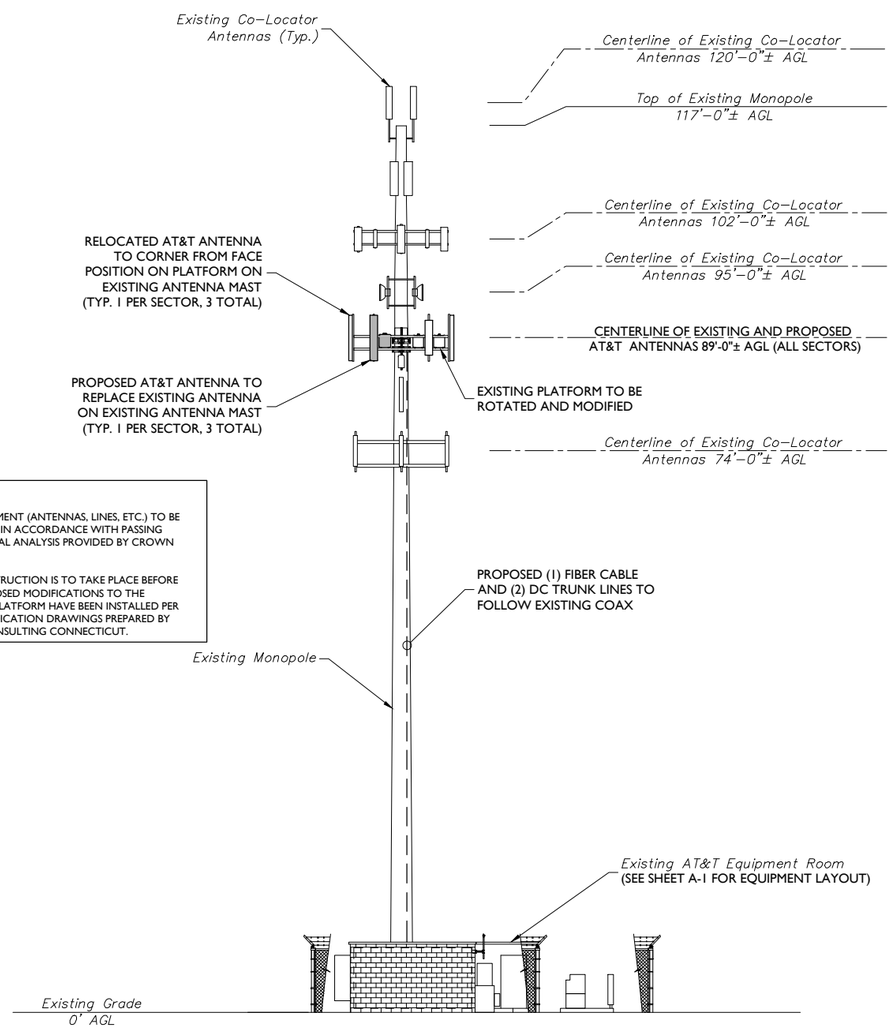
DARIEN
FA# 10035058
SITE # CTL02104
CROWN CASTLE ID#: 806352

126 LEDGE ROAD
DARIEN, CT 06820
COUNTY OF FAIRFIELD

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE:
COMPOUND PLAN AND EQUIPMENT PLAN

SHEET NUMBER:
A-1



NOTES:

1. ALL EQUIPMENT (ANTENNAS, LINES, ETC.) TO BE INSTALLED IN ACCORDANCE WITH PASSING STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE.
2. NO CONSTRUCTION IS TO TAKE PLACE BEFORE THE PROPOSED MODIFICATIONS TO THE EXISTING PLATFORM HAVE BEEN INSTALLED PER THE MODIFICATION DRAWINGS PREPARED BY MASER CONSULTING CONNECTICUT.

ELEVATION VIEW

GRAPHIC SCALE

10 0 5 10 20

(IN FEET)

SCALE: 1" = 10' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)

PROPOSED ANTENNA AND RRH CONFIGURATION

SECTOR		EXISTING ANTENNA CONFIGURATION	SECTOR	PROPOSED ANTENNA CONFIGURATION	TECHNOLOGY	ANTENNA STATUS	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)	ANTENNA AZIMUTH	ANT. CL ELEV (ft.)	RRUS CONFIGURATION	STATUS
ALPHA	A1	Powerwave P65-16-XLH-RR	A1	Powerwave P65-16-XLH-RR	LTE 700/1900	RELOCATE	72.00	12.00	6.00	64.00	75°	89'	(2) RRUS-11	RELOCATE
	A3	Powerwave 7770	A2	CCI OPA-65R-LCUU-H6	LTE WCS/GSM	NEW	72.00	14.80	7.40	73.00	75°	89'	RRUS-32	NEW
	A4	Powerwave 7770	A4	Powerwave 7770	UMTS	RELOCATE	55.00	11.00	5.00	35.00	142°	89'	-	-
BETA	B1	Powerwave P65-16-XLH-RR	B1	Powerwave P65-16-XLH-RR	LTE 700/1900	RELOCATE	72.00	12.00	6.00	64.00	195°	89'	(2) RRUS-11	RELOCATE
	B3	Powerwave 7770	B2	CCI OPA-65R-LCUU-H6	LTE WCS/GSM	NEW	72.00	14.80	7.40	73.00	195°	89'	RRUS-32	NEW
	B4	Powerwave 7770	B4	Powerwave 7770	UMTS	RELOCATE	55.00	11.00	5.00	35.00	262°	89'	-	-
GAMMA	C1	Powerwave P65-17-XLH-RR	C1	Powerwave P65-17-XLH-RR	LTE 700/1900	RELOCATE	96.00	12.00	6.00	70.00	315°	89'	(2) RRUS-11	RELOCATE
	C3	Powerwave 7770	C2	CCI OPA-65R-LCUU-H8	LTE WCS/GSM	NEW	92.70	14.40	7.00	88.00	315°	89'	RRUS-32	NEW
	C4	Powerwave 7770	C4	Powerwave 7770	UMTS	RELOCATE	55.00	11.00	5.00	35.00	22°	89'	-	-

ANTENNA SCHEDULE

STRUCTURAL NOTES:

1. NO CONSTRUCTION OF THE PROPOSED LOADING SHOWN SHALL PROCEED UNTIL ADEQUACY OF THE EXISTING STRUCTURE AND FOUNDATION, INCLUDING THE PROPOSED AT&T ANTENNA MOUNTING CONFIGURATION SHOWN HEREIN, HAS BEEN COMPLETED.
2. THE STRUCTURE ELEVATION IS SHOWN FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT REFLECT AS-BUILT FIELD CONDITIONS FOR ALL EXISTING INVENTORY LOADING/ANTENNAS/APPURTANENCES ON STRUCTURE. REFER TO THE LATEST STRUCTURAL ANALYSIS FOR EXISTING STRUCTURE LOADING AND THE PROPOSED METHOD OF ATTACHMENT OF THE PROPOSED ANTENNAS/CABLES.
3. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, CABLES, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

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FRANK E. PERSICHETTI
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

SITE NAME:

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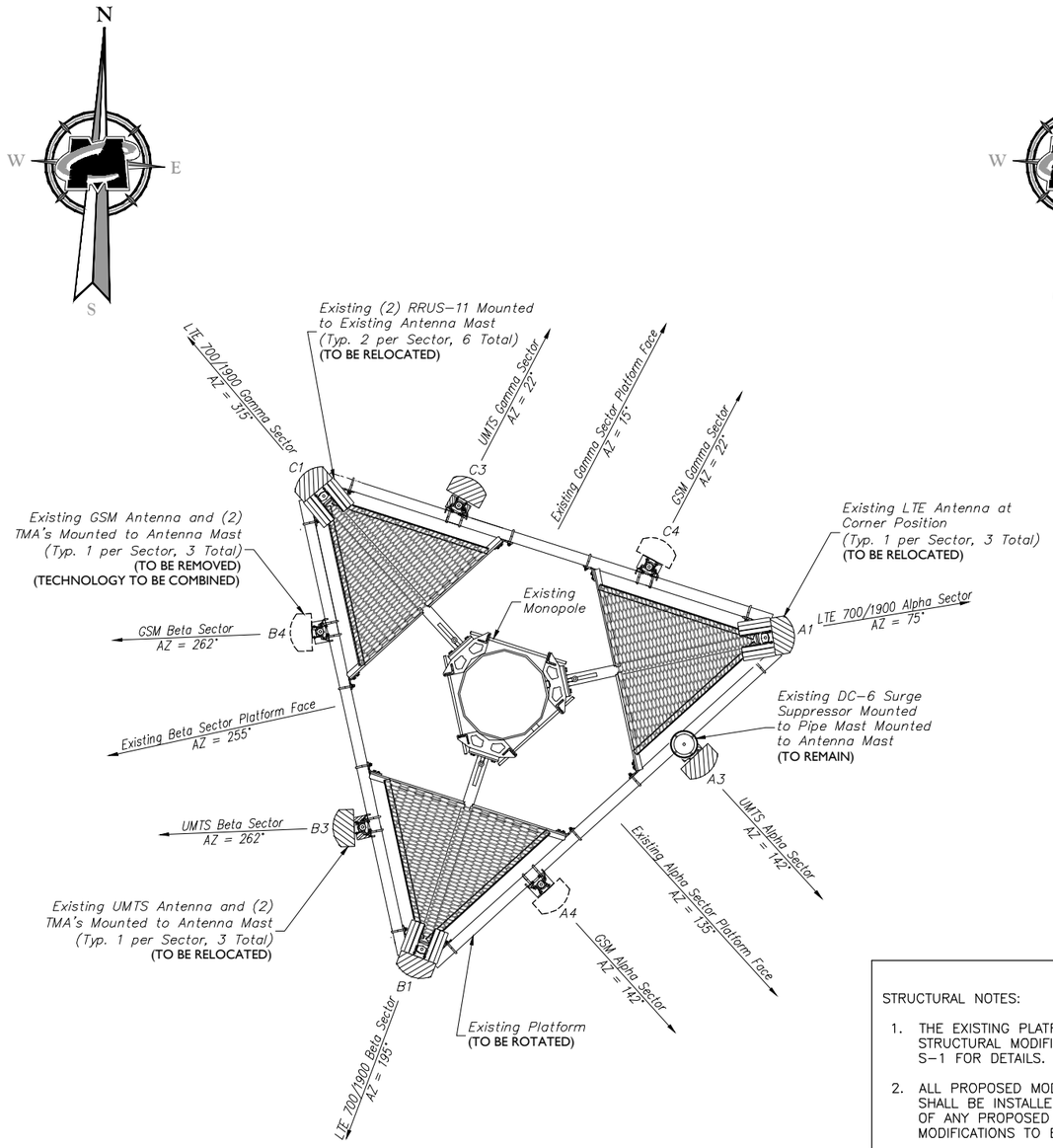
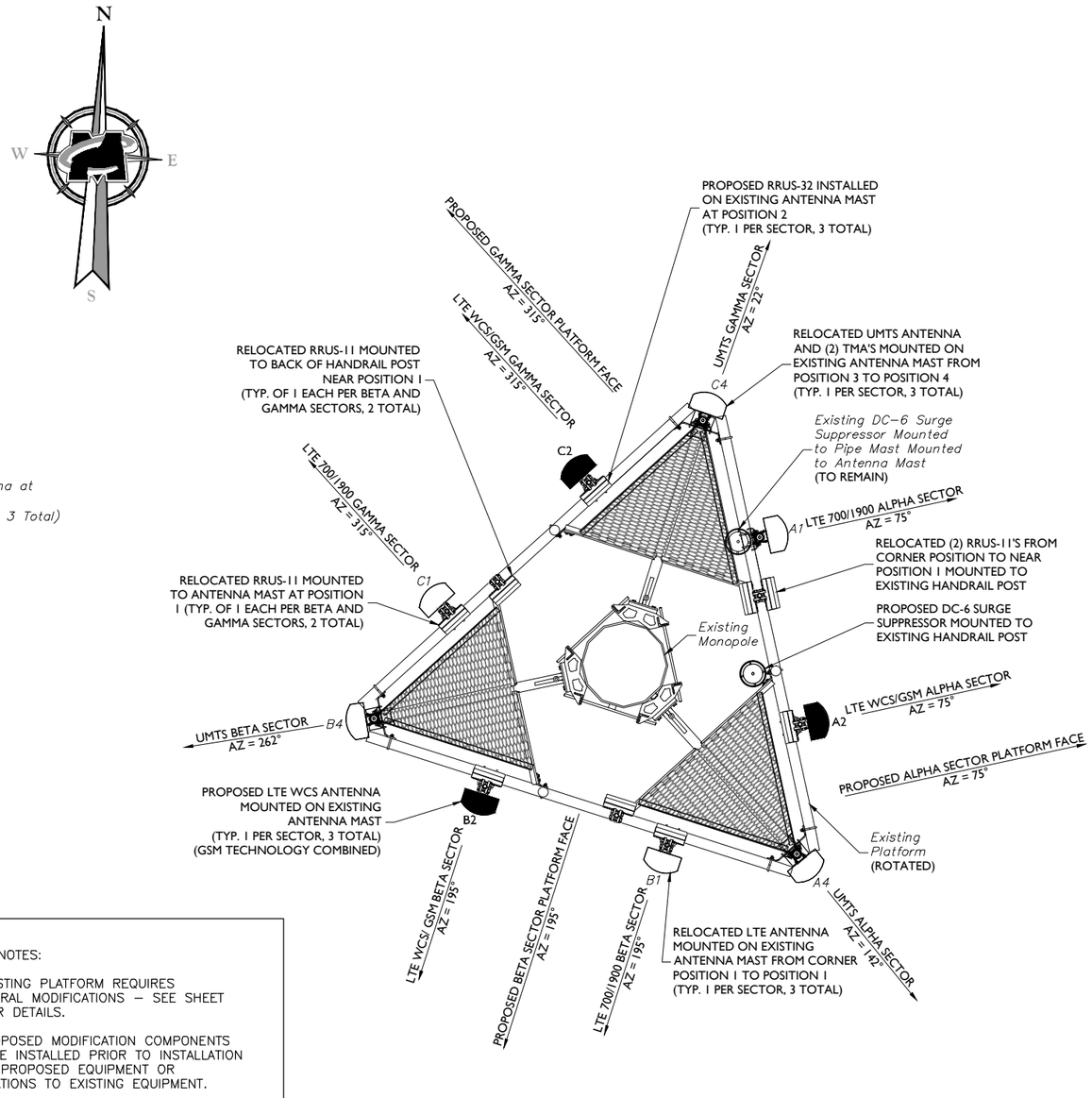
SHEET TITLE:
ELEVATION VIEW AND ANTENNA SCHEDULE

SHEET NUMBER:
A-2



EXISTING - ANTENNA LAYOUT
NOT TO SCALE



PROPOSED - ANTENNA LAYOUT
NOT TO SCALE

STRUCTURAL NOTES:

1. THE EXISTING PLATFORM REQUIRES STRUCTURAL MODIFICATIONS – SEE SHEET S-1 FOR DETAILS.
2. ALL PROPOSED MODIFICATION COMPONENTS SHALL BE INSTALLED PRIOR TO INSTALLATION OF ANY PROPOSED EQUIPMENT OR MODIFICATIONS TO EXISTING EQUIPMENT.

NOTES:

1. EXISTING BIRDS NEST ON TOWER: CONTRACTOR RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOLLOWING ALL REGULATIONS FOR WORKING AROUND NEST.
2. EXISTING PLATFORM FACES TO BE ROTATED TO THE FOLLOWING AZIMUTHS:

   ALPHA - 75°

   BETA - 195°

   GAMMA - 315°

ANTENNA LEGEND

- EXISTING ANTENNA
- EXISTING ANTENNA (TO BE RELOCATED)
- EXISTING ANTENNA (TO BE REMOVED)
- PROPOSED ANTENNA

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FRANK E. PERRY
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

SITE NAME:

DARIEN
FA# 10035058
SITE # CTL02104
CROWN CASTLE ID#: 806352

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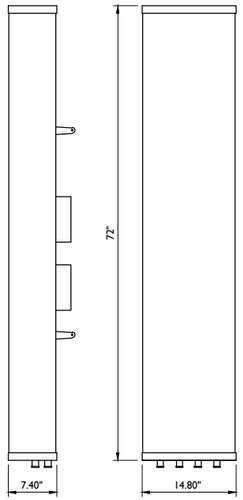
SHEET TITLE:
ANTENNA LAYOUTS

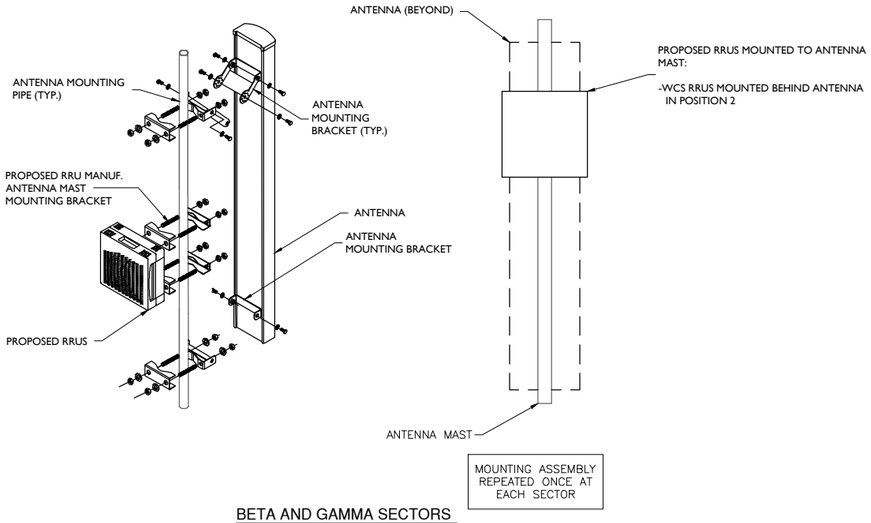
SHEET NUMBER:
A-3



WEIGHT = 73 LBS

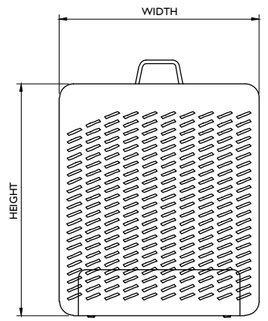
CCI OPA-65R-LCUU-H6

ANTENNA DETAIL
NOT TO SCALE



BETA AND GAMMA SECTORS

ANTENNA AND RRUS MOUNTING DETAILS
NOT TO SCALE



RRUS FRONT VIEW

SIZE AND WEIGHT TABLE

RRUS	WIDTH	DEPTH	HEIGHT	WEIGHT W/O BRACKET
RRUS-32 4X25-1900 (WITH SOLAR SHIELD)	12.1	6.7	26.7	60
RRUS-32 4X25-1900 (WITHOUT SOLAR SHIELD)	-	-	-	-

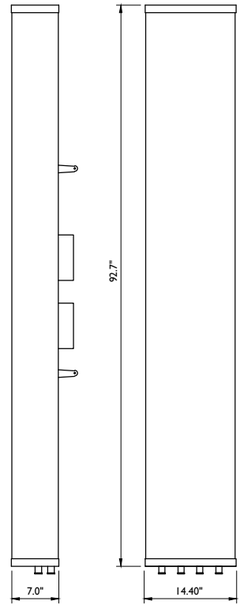
MINIMUM CLEARANCE TABLE

RRH CABINET	CLEARANCES (INCHES)	COMMENTS
FRONT	36"	INSTALLATION ACCESS
REAR	2"	ZERO REAR CLEARANCE IS ALLOWED USING SUPPLIED MOUNTING BRACKETS
RIGHT	4"	AIR FLOW
LEFT	4"	AIR FLOW
TOP	12"	AIR FLOW
BOTTOM	12"	CONDUIT ROUTING

NOTE:

USE 1/2" COAXIAL CABLE W/7/16 DIN MALE CONNECTORS ON BOTH ENDS.

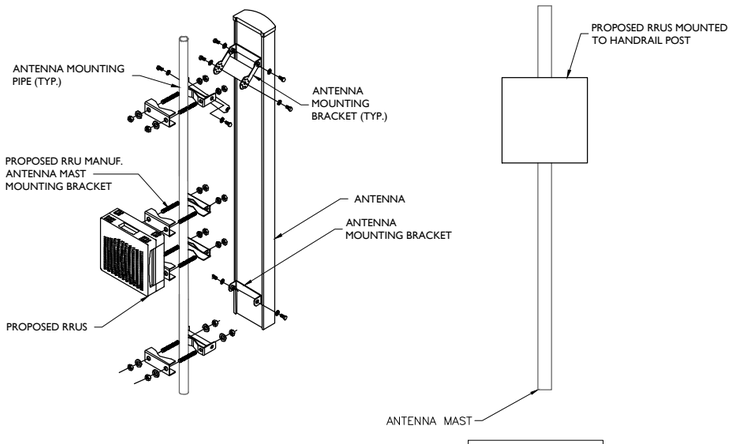
RRUS DETAIL
NOT TO SCALE



WEIGHT = 88 LBS

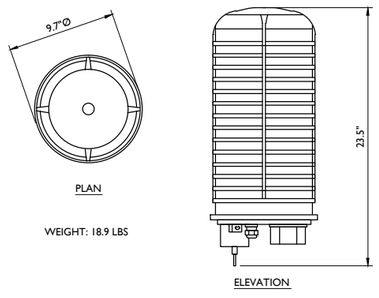
CCI OPA-65R-LCUU-H8

ANTENNA DETAIL
NOT TO SCALE



BETA AND GAMMA SECTORS

ANTENNA AND RRUS MOUNTING DETAILS
NOT TO SCALE

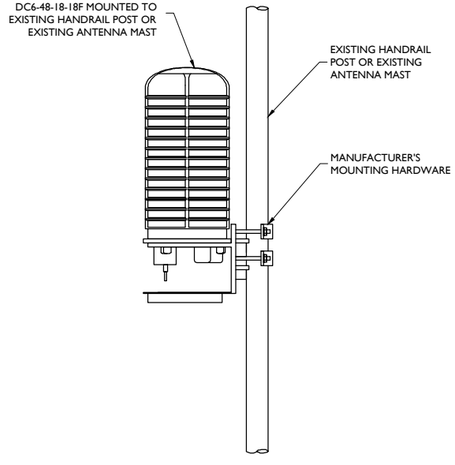


PLAN

WEIGHT: 18.9 LBS

ELEVATION

RAYCAP DC6-48-60-18-8F SURGE SUPPRESSOR
NOT TO SCALE



SURGE ARRESTOR MOUNTING DETAIL
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FRANK E. PERRETTA
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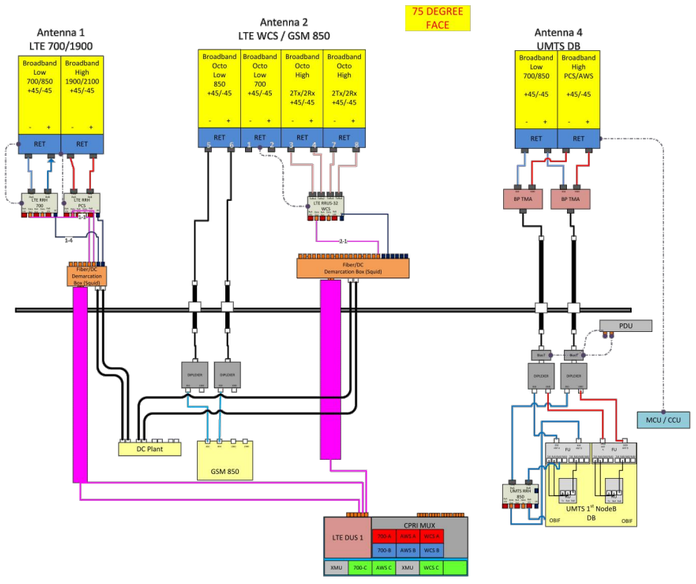
SHEET TITLE: DETAILS

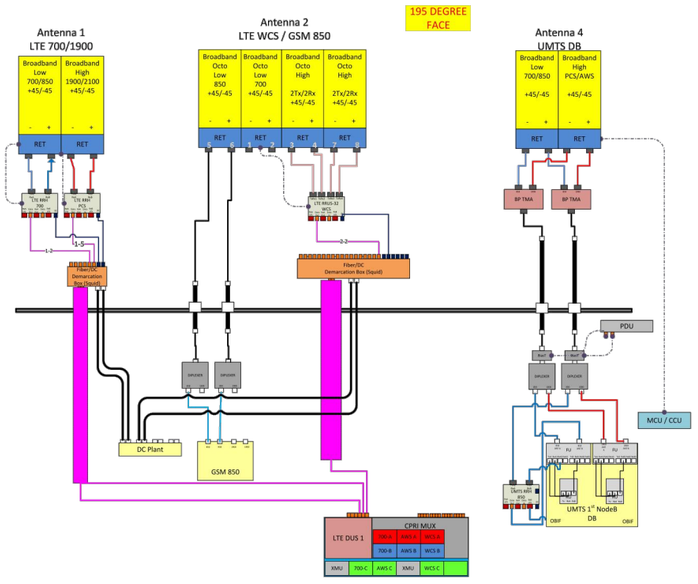
SHEET NUMBER: A-4

Diagram - Sector A | Diagram File Name - CT2104_75.vsd
Atoll Site Name - CT2104 | Location Name - DARIEN | Market - CONNECTICUT | Market Cluster - NEW ENGLAND
Comments:



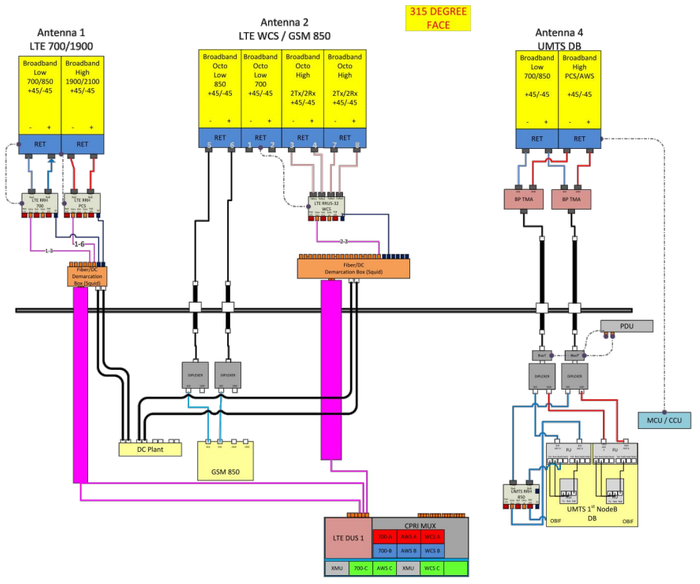
ALPHA SECTOR

Diagram - Sector B | Diagram File Name - CT2104_195.vsd
Atoll Site Name - CT2104 | Location Name - DARIEN | Market - CONNECTICUT | Market Cluster - NEW ENGLAND
Comments:



BETA SECTOR

Diagram - Sector C | Diagram File Name - CT2104_315.vsd
Atoll Site Name - CT2104 | Location Name - DARIEN | Market - CONNECTICUT | Market Cluster - NEW ENGLAND
Comments:



GAMMA SECTOR

BASED ON RF ENGINEERING DESIGN ENTITLED "NEW-ENGLAND_CONNECTICUT_CT2104_2016-LTE-Next-Carrier_LTE-3C_ra9161_PTN_10035058_60391_07-06-2015_Preliminary-Approved_v2.00"

RF PLUMBING DIAGRAMS

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FRANK E. PERRETTA
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME:

DARIEN
FA# 10035058
SITE # CTL02104
CROWN CASTLE ID#: 806352

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DARIEN, CT 06820
COUNTY OF FAIRFIELD

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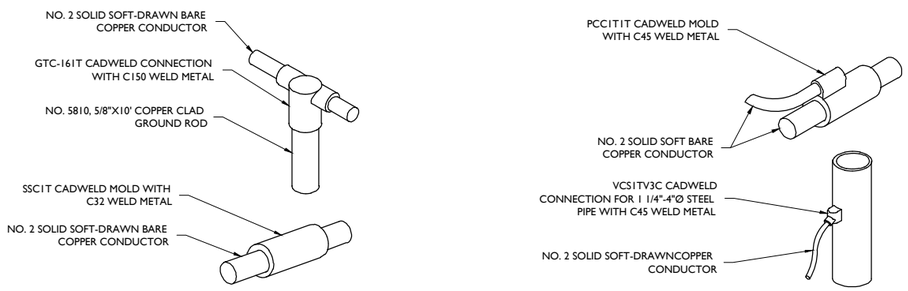
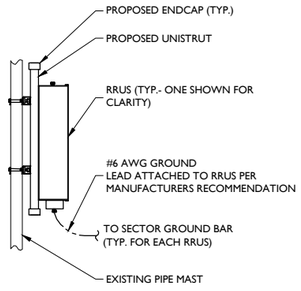
SHEET TITLE :
RF PLUMBING DIAGRAMS

SHEET NUMBER :
A-5



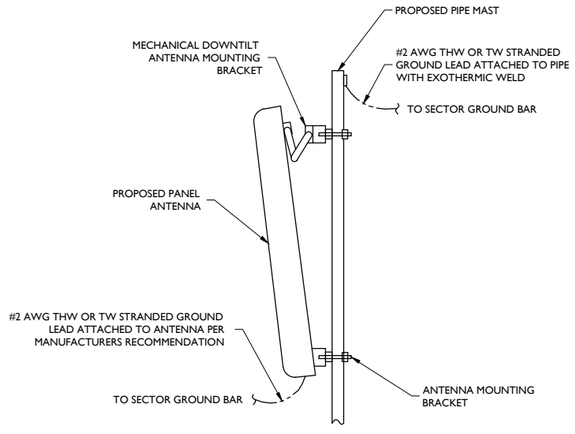
CADWELD DETAILS

NOT TO SCALE



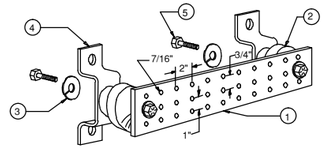
RRH GROUNDING

NOT TO SCALE



ANTENNA GROUNDING

NOT TO SCALE



LEGEND

1- TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.

2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4

3- 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8

4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-5056

5- 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

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

SECTION "P" - SURGE PRODUCERS

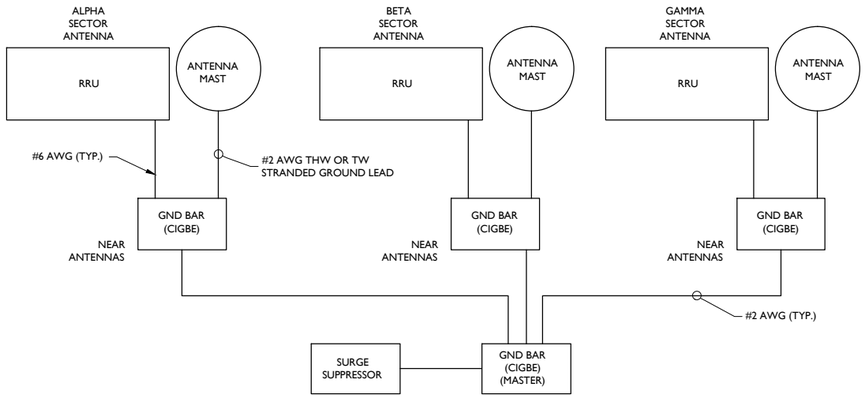
CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLT RETURN BAR (#2)
RECTIFIER FRAMES.

SECTION "A" - SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

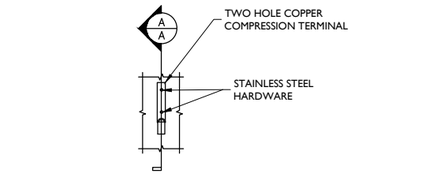
MASTER GROUND BAR

NOT TO SCALE

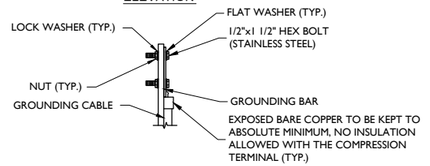


SCHEMATIC DIAGRAM GROUNDING SYSTEM

NOT TO SCALE



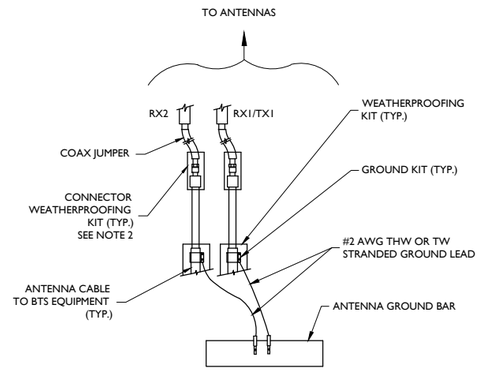
ELEVATION



SECTION A-A

TYPICAL GROUND BAR CONNECTION DETAIL

NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

TYPICAL GROUND WIRE TO GROUNDING BAR

NOT TO SCALE

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1	02/24/16	REVISED PER SMARTLINK'S COMMENTS	JRF	FEP
0	12/28/15	ISSUED FOR REVIEW	SMG	FEP

STATE OF CONNECTICUT — FRANK E. PERSICHETTI — No. 28188 — REGISTERED PROFESSIONAL ENGINEER
FRANK E. PERSICHETTI
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28188

SITE NAME:

DARIEN
FA# 10035058
SITE # CTL02104
CROWN CASTLE ID#: 806352

126 LEDGE ROAD
DARIEN, CT 06820
COUNTY OF FAIRFIELD

RED BANK OFFICE
331 Newman Springs Road
Suite 203
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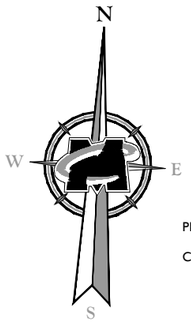
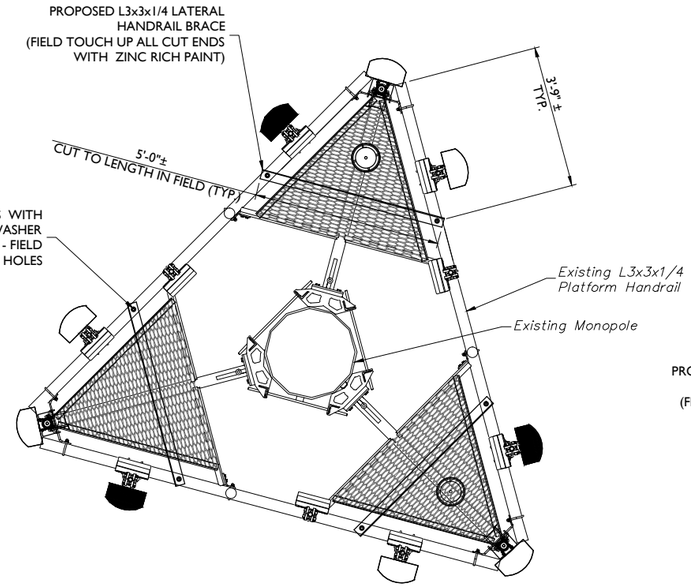
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE:
GROUNDING DETAILS

SHEET NUMBER:
G-1





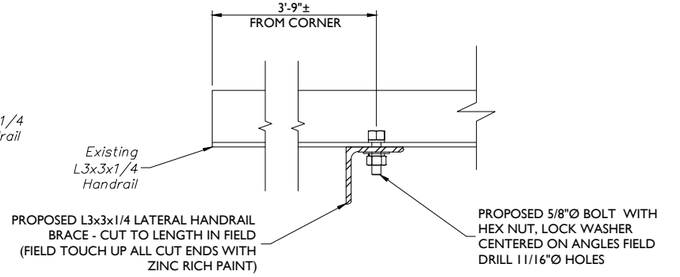
PLAN VIEW

GRAPHIC SCALE

2 0 1 2 4

(IN FEET)

SCALE: 1" = 2' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)

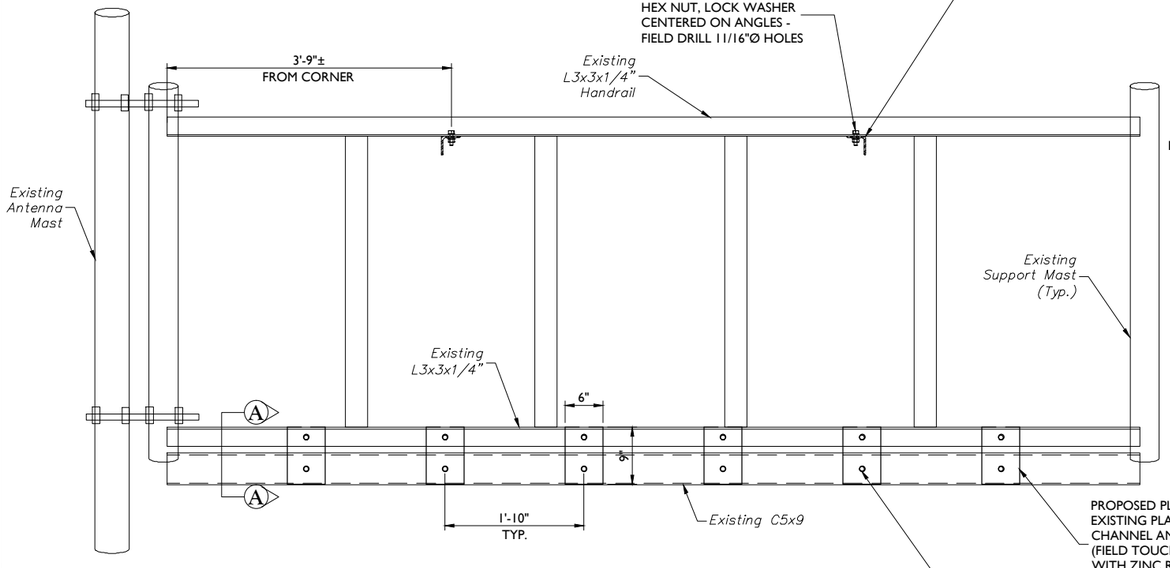


CONNECTION DETAIL

SCALE: 3" = 1'-0"

ALL PROPOSED MODIFICATION COMPONENTS SHALL BE INSTALLED PRIOR TO INSTALLATION OF ANY PROPOSED EQUIPMENT OR MODIFICATIONS TO EXISTING EQUIPMENT.

TOUCH-UP ALL FIELD DRILLED HOLES AND CUT ENDS WITH ZINC RICH PAINT PRIOR TO INSTALLING HARDWARE



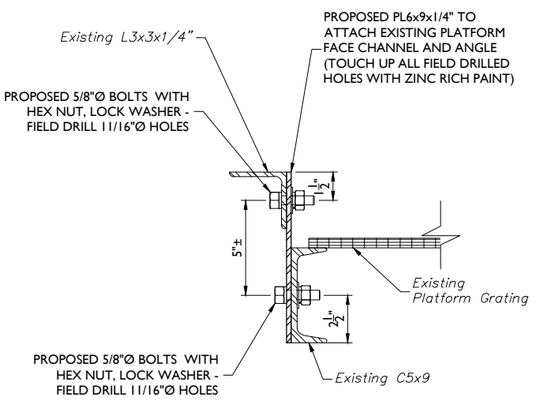
ELEVATION VIEW

GRAPHIC SCALE

1 0 .5 1 2

(IN FEET)

SCALE: 1" = 1' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)



SECTION A-A

SCALE: 3" = 1'-0"

MODIFICATION NOTES:

1. IF THE EXISTING CONDITIONS ARE NOT AS REPRESENTED ON THESE DRAWINGS, MASER CONSULTING SHOULD BE CONTACTED IMMEDIATELY TO RE-RVALUATE THE STRUCTURE BASED ON THE FIELD CONDITIONS AND DIMENSIONS FOUND.
2. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE DRAWINGS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH TOWER CONSTRUCTION EXPERIENCE.
3. THIS DRAWING DOES NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTORS SHALL SUPERVISE AND DIRECT THE WORK AND THEY SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES.
4. CONTRACTOR SHALL VERIFY PLACEMENT OF ALL NEW PIECES FOR ADEQUATE FIT, CLEARANCES, AND DESIGN INTENT BEFORE FABRICATION STARTS.
5. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE STABILITY, SAFETY OF THE STRUCTURE AND MOUNTS (AS APPLICABLE), AND THE ADEQUACY OF TEMPORARY OR INCOMPLETE CONNECTIONS DURING CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THIS INCLUDES WHATEVER PROVISIONS NEED TO BE TAKEN TO PROTECT THE PROPERTY IN THE VICINITY OF THE TOWER DURING CONSTRUCTION.
7. DURING CONSTRUCTION THE CONTRACTOR SHALL COORDINATE WITH THE TOWER/STRUCTURE OWNER AND CORDON OFF AREAS BELOW AND AROUND THE WORK TO PREVENT INJURY TO PERSONS AND/OR PROPERTY. DAMAGES RESULTING FROM THE CONTRATORS WORK SHALL BE REPAIRED AT TEH CONTRACTORS EXPENSE.
8. BACKCHARGES FOR CORRETIVE WORK OR REPLACEMENT MATERIALS WILL NOT BE ACCEPTED UNLESS EXPRESSLY AUTHORIZED BY MASER CONSULTING BEFORE ANY SUCH COSTS ARE INCURRED.
9. POST CONSTRUCTION INSPECTION TO BE COMPLETED BY OTHERS.
10. ALL FIELD CONNECTIONS, UNLESS NOTED OTHERWISE , SHALL BE BOLTED.
11. CUTTING OR BURNING OF STEEL IN THE FIELD IS STRICTLY PROHIBITED.
12. WHERE STEEL IS IN CONTACT WITH ALUMINUM PROVIDE ADEQUATE BARRIER TO PREVENT OXIDATION OF THE STEEL AND ALUMINUM.
13. ALL BOLT HOLES SHALL BE $\frac{1}{16}$" LARGER THAN BOLT DIAMETER. ALL BOLTS SHALL HAVE ONE FLAT WHASER, ONE LOCK WASHER, AND ONE NUT UNLESS NOTED OTHERWISE.
14. COMPLY WITH ALL APPLICABLE REQUIREMENTS OF THE CURRENT EDITIONS OF THE FOLLOWING STANDARDS AND CODES:
    - 14.1. AMERICAN INSTITURE OF STEEL CONSTRUCTION (AISC) "SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
    - 14.2. AMERICAN IRON AND STEEL INSTITUTE (AISI) "DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS".
    - 14.3. ASTM A563-04 "STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS".
    - 14.4. ASTM F436-03 "STANDARD SPECIFICATION FOR HARDENED STEEL WASHERS"
    - 14.5. ASTM A325-04 "STANDARD SPECIFICATION FOR STRUCTURAL BOLTS, STEEL, HEAT TREATED, $\frac{120}{105}$ KSI MENIMUM TENSILE STRENGTH".
    - 14.6. ASTM A153/A153M-09 "STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
    - 14.7. ASTM 123/A1123M-09 "STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS".
15. ALL STEEL WORK SHALL BE ASTM A572 GRADE 50 FOR W-FLANGE SECTIONS AND A36 FOR ALL OTHER SHAPES AND GALVANIZED UNLESS NOTED OTHERWISE, GALVANIZED COATING THICKNESS TO BE G90.
16. SHOP WELDING SHALL BE PERFORMED BY WELDERS THAT ARE CERTIFIED (AWS "STANDARD QUALIFICATION PROCEDURE") TO PERFORM THE TYPE OF WORK REQUIRED. WELDS SHALL CONFORM TO AMERICAN WELDING SOCIETY (AWS) D1.1 "STRUCTURAL WELDING CODE - STEEL". PROVIDE THE MINIMUM SIZE PER PART 8 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". LRFD 3RD EDITION, WHEN WELD SIZES ARE NOT SHOWN. USE E70XX ELECTRODES FOR ALL WELDING.
17. ALL CONNECTIONS, UNLESS OTHERWISE NOTED, SHALL BE CONSTRUCTION WITH A MINIMUM EDGE DISTANCE OF 1 1/2 INCHES AND BOLT SPACING OF 3 INCHES.
18. UNLESS NOTED OTHERWISE ALL BOLTS SHALL BE INSTALLED WITH HEADS UP OR TOWARD THE OUTSIDE FACE, AND NUTS DOWN OR ON THE SIDE MOST PROTECTED FROM WEATHER.
19. USE PRECAUTIONS & PROCEDURES PER AWS D1.1 WHEN WELDING GALVANIZED MATERIALS. AT COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
20. TOUCHUP ALL DAMAGE GALVANIZED STEEL WITH COLD ZINC, "GALVANOX", "DRY GALV.", "ZINC-IT" OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCHUP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.
21. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE CURRENT EDITION OF AISC "SPECIFICATIONS FOR DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS - LOAD AND RESISTANCE FACTOR DESIGN".
22. MEMBERS SHALL BE LAID PLUMB AND TRUE AS SHOWN ON THE DRAWINGS.
23. COPE ALL FRAMING AT ENDS AS NECESSARY, UNLESS NOTED OTHERWISE.
24. THE GENERAL CONTRACTOR AND THEIR SUBCONSULTANTS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK.

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STATE OF CONNECTICUT · FRANK E. PERSSICHETTI · No. 28188 · REGISTERED PROFESSIONAL ENGINEER

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SITE NAME:

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SITE # CTL02104
CROWN CASTLE ID#: 806352

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DARIEN, CT 06820
COUNTY OF FAIRFIELD

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Phone: 732.383.1950
Fax: 732.383.1984
email: solutions @maserconsulting.com

SHEET TITLE:
STRUCTURAL DETAILS AND NOTES

SHEET NUMBER:
S-1

PJF PAUL J. FORD & COMPANY

Date: **February 1, 2016**

Jay Patton
Crown Castle
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Charlotte, NC 28277
980.209.8250

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

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL02104
	Carrier Site Name:	Darien
Crown Castle Designation:	**Crown Castle BU Number:**	806352
	Crown Castle Site Name:	BRG 302 943052
	Crown Castle JDE Job Number:	347970
	Crown Castle Work Order Number:	1182893
	Crown Castle Application Number:	311214 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-0051.002.7700
Site Data:	**126 Ledge Road, DARIEN, Fairfield County, CT** **Latitude *41° 4' 20.75"*, Longitude *-73° 28' 41.4"*** **117 Foot - Monopole Tower**	

Dear Jay Patton,

Paul J Ford and Company is pleased to submit this **"Structural Modification 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 865796, in accordance with application 311214, 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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

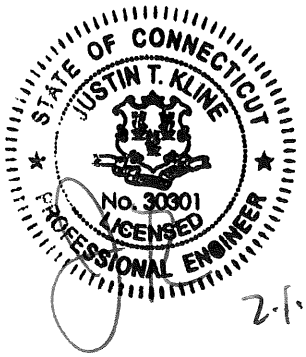
All modifications and equipment proposed in this report shall be installed in accordance with the attached and the referenced drawings for the determined available structural capacity to be effective.

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:

Bob Koors, E.I.
Structural Designer

tnxTower Report - version 6.1.4.1



2.1.16

Date: **February 1, 2016**

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Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 117 ft Monopole tower designed by VALMONT in May of 1992. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
88.0	89.0	1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe	-	-	-
		2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe			
		3	ericsson	RRUS 32 B30			
	88.0	1	tower mounts	Site Pro PRK - 1245			

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
117.0	118.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	3	1-1/4	1
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	117.0	1	tower mounts	Pipe Mount [PM 601-3]			
115.0	115.0	3	alcatel lucent	TME-800MHZ RRH	-	-	1
		3	alcatel lucent	TME-PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-3]			
110.0	110.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12	1-5/8	1
		3	ericsson	KRY 112 144/1			
		3	ericsson	Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	1	1-5/8	2
		3	ericsson	RRUS 11 B12			
		1	tower mounts	T-Arm Mount [TA 602-3]			
100.0	100.0	3	alcatel lucent	RRH2X40-07-U	2	1-5/8	2
		3	alcatel lucent	RRH2X60-AWS			
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6516DS-A2M w/ Mount Pipe			
		3	kathrein	800 10735V01 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	decibel	DB844G65ZAXY w/ Mount Pipe	1 12	1-1/4 7/8	1
		1	gps	GPS_A			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 715-1]			
93.0	95.0	1	andrew	VHLP1-23	4	1/2	1
	94.0	1	andrew	VHLP2-11			
		1	andrew	VHLP2.5-11			
	93.0	1	tower mounts	Pipe Mount [PM 601-3]			
	92.0	1	andrew	VHLP1-23			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
88.0	89.0	3	powerwave technologies	7770.00 w/ Mount Pipe	-	-	3
		3	ericsson	RRUS-11	12 1 2	1-1/4 3/8 5/8	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		2	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
	88.0	1	tower mounts	Platform Mount [LP 715-1]			
	87.0	6	powerwave technologies	LGP13519			
		3	ericsson	RRUS-11			
		6	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F			
81.0	81.0	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
72.0	72.0	3	andrew	LBX-9012DS-VTM w/ Mount Pipe	-	-	1
		3	decibel	DB844H90E-XY w/ Mount Pipe			
		1	tower mounts	Platform Mount (LP 101-1)			

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	FDH, 1307951600, 9/26/13	217769	CCISITES
4-POST-MODIFICATION INSPECTION	Sabre, 11-1114, 12/7/10	2785508	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.806352, 11/7/13	4069331	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25562, 5/12/14	5077215	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FDH, 1308201500, 6/7/13	3907710	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 10844-92, 5/19/92	217772	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2007278.24, 03/11/08	2218625	CCISITES
PROPOSED MODIFICATION DRAWINGS	PJF, 37515-1078.002.7700, 04/01/2015	5632030	CCISITES
PROPOSED MODIFICATION DRAWINGS	PJF, 37515-1078.005.7700, 11/10/2015	5969651	CCISITES
MONOPOLE PRE-MOD MAPPING	FDH, 146IQW1500, 1/9/2015	-	PJF

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.
5) Monopole will be reinforced in conformance with the attached and the referenced proposed 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	117 - 110	Pole	TP15.94x14.36x0.188	1	-0.86	495.73	10.6	Pass
L2	110 - 100	Pole	TP18.2x15.94x0.188	2	-2.89	566.85	38.2	Pass
L3	100 - 82.4167	Pole	TP22.1761x18.2x0.25	3	-10.21	917.60	95.0	Pass
L4	82.4167 - 76.0833	Pole	TP23.6083x22.1761x0.3261	4	-11.39	1153.09	98.9	Pass
L5	76.0833 - 71	Pole	TP24.7578x23.6083x0.4532	5	-13.89	1450.73	93.6	Pass
L6	71 - 68.0833	Pole	TP25.4174x24.7578x0.6477	6	-14.55	1833.33	82.0	Pass
L7	68.0833 - 63.5	Pole	TP26.4538x25.4174x0.6838	7	-15.67	2117.82	80.0	Pass
L8	63.5 - 47.42	Pole	TP30.09x26.4538x0.8127	8	-19.04	2768.65	77.2	Pass
L9	47.42 - 38.0833	Pole	TP31.6978x27.429x0.8034	9	-22.18	2747.90	89.3	Pass
L10	38.0833 - 35	Pole	TP32.3942x31.6978x0.7395	10	-25.45	2794.85	97.2	Pass
L11	35 - 12.5	Pole	TP37.4765x32.3942x0.7644	11	-33.24	3497.94	95.4	Pass
L12	12.5 - 11	Pole	TP37.8153x37.4765x0.7493	12	-33.79	3473.88	97.1	Pass
L13	11 - 2.5	Pole	TP39.7353x37.8153x0.9195	13	-37.52	4469.80	80.7	Pass
L14	2.5 - 0	Pole	TP40.3x39.7353x0.9631	14	-38.69	4895.92	75.1	Pass
							Summary	
						Pole (L4)	98.9	Pass
						Rating =	98.9	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	81.9	Pass
1	Base Plate	0	55.5	Pass
1	Base Foundation	0	96.1	Pass
1	Base Foundation Soil Interaction	0	74.9	Pass
1	Flange	100	30.3	Pass
1	Flange	110	8.7	Pass

Structure Rating (max from all components) =	**98.9%**

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

4.1) Recommendations

Reinforce the monopole in conformance with the attached and the referenced proposed modification drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

4) Tower is located in Fairfield County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.7500 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.00 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	117.0000-110.0000	7.0000	0.00	12	14.3600	15.9400	0.1880	0.7520	A572-65 (65 ksi)
L2	110.0000-100.0000	10.0000	0.00	12	15.9400	18.2000	0.1880	0.7520	A572-65 (65 ksi)
L3	100.0000-82.4167	17.5833	0.00	12	18.2000	22.1761	0.2500	1.0000	A572-65 (65 ksi)
L4	82.4167-76.0833	6.3334	0.00	12	22.1761	23.6083	0.3261	1.3042	Reinf 58.98 ksi (59 ksi)
L5	76.0833-71.0000	5.0833	0.00	12	23.6083	24.7578	0.4532	1.8128	Reinf 51.14 ksi (51 ksi)
L6	71.0000-68.0833	2.9167	0.00	12	24.7578	25.4174	0.6477	2.5909	Reinf 44.37 ksi (44 ksi)
L7	68.0833-63.5000	4.5833	0.00	12	25.4174	26.4538	0.6837	2.7350	Reinf 46.67 ksi (47 ksi)
L8	63.5000-47.4200	16.0800	4.58	12	26.4538	30.0900	0.8127	3.2508	Reinf 46.84 ksi (47 ksi)
L9	47.4200-38.0833	13.9167	0.00	12	27.4290	31.6978	0.8034	3.2135	Reinf 46.33 ksi (46 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
L10	38.0833-35.0000	3.0833	0.00	12	31.6978	32.3942	0.7395	2.9580	Reinf 46.36 ksi (46 ksi)
L11	35.0000-12.5000	22.5000	0.00	12	32.3942	37.4765	0.7644	3.0576	Reinf 48.40 ksi (48 ksi)
L12	12.5000-11.0000	1.5000	0.00	12	37.4765	37.8153	0.7493	2.9970	Reinf 48.57 ksi (49 ksi)
L13	11.0000-2.5000	8.5000	0.00	12	37.8153	39.7353	0.9195	3.6779	Reinf 48.63 ksi (49 ksi)
L14	2.5000-0.0000	2.5000		12	39.7353	40.3000	0.9631	3.8524	Reinf 50.18 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	14.8666	8.5792	219.9344	5.0736	7.4385	29.5671	445.6467	4.2224	3.3446	17.791
	16.5023	9.5356	301.9999	5.6392	8.2569	36.5754	611.9336	4.6931	3.7681	20.043
L2	16.5023	9.5356	301.9999	5.6392	8.2569	36.5754	611.9336	4.6931	3.7681	20.043
	18.8420	10.9037	451.5288	6.4483	9.4276	47.8944	914.9198	5.3665	4.3738	23.265
L3	18.8420	14.4498	594.2582	6.4261	9.4276	63.0339	1204.1282	7.1117	4.2076	16.83
	22.9584	17.6505	1083.0996	7.8496	11.4872	94.2872	2194.6533	8.6871	5.2732	21.093
L4	22.9584	22.9407	1397.9719	7.8223	11.4872	121.6978	2832.6701	11.2907	5.0694	15.547
	24.4411	24.4444	1691.2770	8.3350	12.2291	138.2993	3426.9858	12.0308	5.4532	16.724
L5	24.4411	33.7911	2312.5006	8.2895	12.2291	189.0980	4685.7531	16.6309	5.1124	11.28
	25.6312	35.4686	2674.2825	8.7011	12.8246	208.5284	5418.8213	17.4566	5.4205	11.96
L6	25.6312	50.2862	3731.0608	8.6314	12.8246	290.9311	7560.1408	24.7493	4.8992	7.564
	26.3140	51.6618	4045.7116	8.8675	13.1662	307.2802	8197.7085	25.4264	5.0759	7.837
L7	26.3140	54.4554	4252.0877	8.8546	13.1662	322.9549	8615.8825	26.8013	4.9794	7.282
	27.3870	56.7373	4809.3341	9.2257	13.7031	350.9677	9745.0147	27.9244	5.2572	7.689
L8	27.3870	67.0992	5630.8921	9.1795	13.7031	410.9220	11409.7139	33.0242	4.9116	6.044
	31.1515	76.6147	8382.2431	10.4813	15.5866	537.7845	16984.6970	37.7074	5.8861	7.243
L9	29.8510	68.8773	6232.4611	9.5320	14.2082	438.6525	12628.6560	33.8993	5.1979	6.47
	32.8160	79.9202	9736.4930	11.0602	16.4195	592.9851	19728.7745	39.3343	6.3419	7.894
L10	32.8160	73.7176	9018.0137	11.0831	16.4195	549.2273	18272.9407	36.2815	6.5131	8.808
	33.5370	75.3760	9640.4266	11.3324	16.7802	574.5115	19534.1179	37.0977	6.6998	9.06
L11	33.5370	77.8527	9941.5359	11.3235	16.7802	592.4558	20144.2470	38.3167	6.6331	8.677
	38.7985	90.3620	15544.9933	13.1429	19.4128	800.7586	31498.3708	44.4734	7.9951	10.459
L12	38.7985	88.6088	15255.9622	13.1484	19.4128	785.8700	30912.7155	43.6106	8.0357	10.725
	39.1493	89.4262	15682.0919	13.2697	19.5883	800.5830	31776.1698	44.0129	8.1265	10.846
L13	39.1493	109.2373	18980.7032	13.2087	19.5883	968.9796	38460.0507	53.7633	7.6703	8.342
	41.1370	114.9218	22100.6994	13.8961	20.5829	1073.7416	44782.0087	56.5610	8.1849	8.902
L14	41.1370	120.2384	23071.2096	13.8805	20.5829	1120.8929	46748.5255	59.1777	8.0680	8.377
	41.7216	121.9897	24094.0286	14.0826	20.8754	1154.1828	48821.0342	60.0396	8.2193	8.534

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 117.0000-				1	1	1		

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
110.0000								
L2 110.0000-100.0000				1	1	1		
L3 100.0000-82.4167				1	1	1		
L4 82.4167-76.0833				1	1	1		
L5 76.0833-71.0000				1	1	1		
L6 71.0000-68.0833				1	1	1		
L7 68.0833-63.5000				1	1	1		
L8 63.5000-47.4200				1	1	1		
L9 47.4200-38.0833				1	1	1		
L10 38.0833-35.0000				1	1	1		
L11 35.0000-12.5000				1	1	1		
L12 12.5000-11.0000				1	1	1		
L13 11.0000-2.5000				1	1	1		
L14 2.5000-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF6-50A(1-1/4")	C	No	Inside Pole	117.0000 - 0.0000	3	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	1	No Ice	0.1625	1.07
						1/2" Ice	0.2625	2.37
						1" Ice	0.3625	4.28
						2" Ice	0.5625	9.93
						4" Ice	0.9625	28.56
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
LDF5-50A(7/8")	C	No	Inside Pole	100.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	100.0000 - 0.0000	2	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30
						2" Ice	0.0000	1.30
						4" Ice	0.0000	1.30
***								
7983A(1/2")	C	No	CaAa (Out Of Face)	93.0000 - 0.0000	3	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
						2" Ice	0.0000	6.39
						4" Ice	0.0000	22.47
7983A(1/2")	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	1	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
						2" Ice	0.0000	6.39
						4" Ice	0.0000	22.47
7983A(1/2")	C	No	CaAa (Out Of Face)	93.0000 - 81.0000	1	No Ice	0.0580	0.08
						1/2" Ice	0.1580	0.74
						1" Ice	0.2580	2.01
						2" Ice	0.4580	6.39
						4" Ice	0.8580	22.47
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	88.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
FB-L98-002-XXX(3/8)	C	No	Inside Pole	88.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG82ST-BRDA(5/8")	C	No	Inside Pole	88.0000 - 0.0000	2	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
						2" Ice	0.0000	0.31
						4" Ice	0.0000	0.31
2" Rigid Conduit	C	No	Inside Pole	88.0000 - 0.0000	1	No Ice	0.0000	2.80
						1/2" Ice	0.0000	2.80
						1" Ice	0.0000	2.80
						2" Ice	0.0000	2.80
						4" Ice	0.0000	2.80
***								
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	2	No Ice	0.2010	0.70
						1/2" Ice	0.3010	2.23
						1" Ice	0.4010	4.38
						2" Ice	0.6010	10.50
						4" Ice	1.0010	30.07
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	81.0000 - 0.0000	4	No Ice	0.0000	0.70
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.38
						2" Ice	0.0000	10.50
						4" Ice	0.0000	30.07
**								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	72.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	77.0800 - 72.5000	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	85.7500 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	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	117.0000-110.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.01
L2	110.0000-100.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.625	0.13
L3	100.0000-82.4167	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.027	0.42
L4	82.4167-76.0833	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	4.268	0.22
L5	76.0833-71.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.415	0.18
L6	71.0000-68.0833	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	2.619	0.11
L7	68.0833-63.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.115	0.17
L8	63.5000-47.4200	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	14.437	0.58
L9	47.4200-38.0833	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	8.383	0.34
L10	38.0833-35.0000	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	2.768	0.11
L11	35.0000-12.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	20.201	0.81
L12	12.5000-11.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.347	0.05
L13	11.0000-2.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.632	0.31
L14	2.5000-0.0000	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	2.245	0.09

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

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	117.0000-110.0000	A	0.870	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	110.0000-100.0000	A	0.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.348	0.16
L3	100.0000-82.4167	A	0.847	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	9.425	0.53
L4	82.4167-76.0833	A	0.833	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	8.555	0.36
L5	76.0833-71.0000	A	0.826	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	8.798	0.32
L6	71.0000-68.0833	A	0.820	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.117	0.18
L7	68.0833-63.5000	A	0.815	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	8.015	0.28
L8	63.5000-47.4200	A	0.798	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	27.838	0.98
L9	47.4200-38.0833	A	0.774	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	16.164	0.57
L10	38.0833-35.0000	A	0.759	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.213	0.18
L11	35.0000-12.5000	A	0.750	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	37.826	1.33
L12	12.5000-11.0000	A	0.750	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	2.522	0.09
L13	11.0000-2.5000	A	0.750	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	14.290	0.50
L14	2.5000-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.203	0.15

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	117.0000-110.0000	0.0000	0.0000	0.0000	0.0000
L2	110.0000-100.0000	-0.1895	0.1094	-0.3255	0.1879
L3	100.0000-82.4167	-0.2663	0.1537	-0.5064	0.2924
L4	82.4167-76.0833	-0.6492	0.3748	-0.9883	0.5706
L5	76.0833-71.0000	-0.7886	0.4553	-1.1668	0.6737
L6	71.0000-68.0833	-0.8159	0.4711	-1.1966	0.6909
L7	68.0833-63.5000	-0.8240	0.4757	-1.2136	0.7006
L8	63.5000-47.4200	-0.8445	0.4876	-1.2555	0.7249
L9	47.4200-38.0833	-0.8601	0.4966	-1.2931	0.7466
L10	38.0833-35.0000	-0.8729	0.5039	-1.3070	0.7546
L11	35.0000-12.5000	-0.8914	0.5147	-1.3478	0.7781
L12	12.5000-11.0000	-0.9068	0.5235	-1.3860	0.8002
L13	11.0000-2.5000	-0.9127	0.5270	-1.4009	0.8088
L14	2.5000-0.0000	-0.9189	0.5305	-1.4166	0.8179

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
800 EXTERNAL NOTCH FILTER	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7701 0.8898 1.0181 1.3007 1.9696	0.3747 0.4647 0.5634 0.7868 1.3372	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	A	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Face	4.0000 0.00 1.00	0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0778 0.1210 0.1728 0.3025 0.6654	0.1361 0.1890 0.2506 0.3997 0.8015	0.00 0.00 0.00 0.01 0.04
Pipe Mount [PM 601-3]	C	None		0.00	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.3900 5.4800 6.5700 8.7500 13.1100	4.3900 5.4800 6.5700 8.7500 13.1100	0.20 0.24 0.28 0.36 0.53

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*
						4" Ice			
***									
TME-PCS 1900MHz 4x45W-65MHz	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
TME-PCS 1900MHz 4x45W-65MHz	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
TME-PCS 1900MHz 4x45W-65MHz	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
TME-800MHZ RRH	A	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
TME-800MHZ RRH	B	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
TME-800MHZ RRH	C	From Face	2.0000 0.00 0.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
Side Arm Mount [SO 102-3]	C	None		0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.0000 3.4800 3.9600 4.9200 6.8400	3.0000 3.4800 3.9600 4.9200 6.8400	0.08 0.11 0.14 0.20 0.32
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
KRY 112 144/1	A	From Face	1.0000 0.00	0.00	110.0000	No Ice 1/2"	0.4083 0.4969	0.2042 0.2733	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
			0.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
KRY 112 144/1	B	From Face	1.0000	0.00	110.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			0.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
KRY 112 144/1	B	From Face	1.0000	0.00	110.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			0.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	A	From Face	4.0000	0.00	110.0000	No Ice	8.6756	7.0193	0.16
			0.00			1/2"	9.2033	7.8091	0.23
			0.00			Ice	9.7410	8.6169	0.31
						1" Ice	10.8459	10.2860	0.49
						2" Ice	13.1747	13.8405	0.98
						4" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	B	From Face	4.0000	0.00	110.0000	No Ice	8.6756	7.0193	0.16
			0.00			1/2"	9.2033	7.8091	0.23
			0.00			Ice	9.7410	8.6169	0.31
						1" Ice	10.8459	10.2860	0.49
						2" Ice	13.1747	13.8405	0.98
						4" Ice			
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	C	From Face	4.0000	0.00	110.0000	No Ice	8.6756	7.0193	0.16
			0.00			1/2"	9.2033	7.8091	0.23
			0.00			Ice	9.7410	8.6169	0.31
						1" Ice	10.8459	10.2860	0.49
						2" Ice	13.1747	13.8405	0.98
						4" Ice			
RRUS 11 B12	A	From Face	4.0000	0.00	110.0000	No Ice	3.3056	1.3611	0.05
			0.00			1/2"	3.5497	1.5404	0.07
			0.00			Ice	3.8025	1.7284	0.10
						1" Ice	4.3340	2.1302	0.15
						2" Ice	5.5006	3.0377	0.31
						4" Ice			
RRUS 11 B12	B	From Face	4.0000	0.00	110.0000	No Ice	3.3056	1.3611	0.05
			0.00			1/2"	3.5497	1.5404	0.07
			0.00			Ice	3.8025	1.7284	0.10
						1" Ice	4.3340	2.1302	0.15
						2" Ice	5.5006	3.0377	0.31
						4" Ice			
RRUS 11 B12	C	From Face	4.0000	0.00	110.0000	No Ice	3.3056	1.3611	0.05
			0.00			1/2"	3.5497	1.5404	0.07
			0.00			Ice	3.8025	1.7284	0.10
						1" Ice	4.3340	2.1302	0.15
						2" Ice	5.5006	3.0377	0.31
						4" Ice			
T-Arm Mount [TA 602-3]	C	None		0.00	110.0000	No Ice	11.5900	11.5900	0.77
						1/2"	15.4400	15.4400	0.99
						Ice	19.2900	19.2900	1.21
						1" Ice	26.9900	26.9900	1.64
						2" Ice	42.3900	42.3900	2.50
						4" Ice			
(2) 2.375" OD x 4' Mount Pipe	A	From Face	4.0000	0.00	110.0000	No Ice	0.8657	0.8657	0.02
			0.00			1/2"	1.1106	1.1106	0.03
			0.00			Ice	1.3648	1.3648	0.04
						1" Ice	1.9008	1.9008	0.06
						2" Ice	3.2278	3.2278	0.16
						4" Ice			
(2) 2.375" OD x 4' Mount	B	From Face	4.0000	0.00	110.0000	No Ice	0.8657	0.8657	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 2" Ice 4" Ice	1.1106 1.3648 1.9008 3.2278	1.1106 1.3648 1.9008 3.2278	0.03 0.04 0.06 0.16
(2) 2.375" OD x 4' Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	110.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8657 1.1106 1.3648 1.9008 3.2278	0.8657 1.1106 1.3648 1.9008 3.2278	0.02 0.03 0.04 0.06 0.16
***									
(2) HBXX-6516DS-A2M w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1872 8.1406 9.1119 10.6910 13.8831	5.5365 6.8440 8.2071 10.2892 14.4310	0.07 0.13 0.19 0.35 0.82
(2) HBXX-6516DS-A2M w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1872 8.1406 9.1119 10.6910 13.8831	5.5365 6.8440 8.2071 10.2892 14.4310	0.07 0.13 0.19 0.35 0.82
(2) HBXX-6516DS-A2M w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.1872 8.1406 9.1119 10.6910 13.8831	5.5365 6.8440 8.2071 10.2892 14.4310	0.07 0.13 0.19 0.35 0.82
RRH2X60-AWS	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.1904 2.3976 2.6134 3.0710 4.0899	1.4290 1.6109 1.8015 2.2085 3.1263	0.04 0.06 0.08 0.13 0.26
RRH2X60-AWS	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.1904 2.3976 2.6134 3.0710 4.0899	1.4290 1.6109 1.8015 2.2085 3.1263	0.04 0.06 0.08 0.13 0.26
RRH2X60-AWS	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.1904 2.3976 2.6134 3.0710 4.0899	1.4290 1.6109 1.8015 2.2085 3.1263	0.04 0.06 0.08 0.13 0.26
RRH2X60-PCS	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31

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
						4" Ice			
800 10735V01 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	9.0418	5.4888	0.06
						1/2" Ice	9.7204	6.7103	0.12
						1" Ice	10.3733	7.6880	0.19
						2" Ice	11.6912	9.5633	0.36
						4" Ice	14.4457	13.5141	0.85
800 10735V01 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	9.0418	5.4888	0.06
						1/2" Ice	9.7204	6.7103	0.12
						1" Ice	10.3733	7.6880	0.19
						2" Ice	11.6912	9.5633	0.36
						4" Ice	14.4457	13.5141	0.85
800 10735V01 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	9.0418	5.4888	0.06
						1/2" Ice	9.7204	6.7103	0.12
						1" Ice	10.3733	7.6880	0.19
						2" Ice	11.6912	9.5633	0.36
						4" Ice	14.4457	13.5141	0.85
RRH2X40-07-U	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	2.2458	1.2277	0.05
						1/2" Ice	2.4472	1.3850	0.07
						1" Ice	2.6572	1.5509	0.09
						2" Ice	3.1031	1.9087	0.13
						4" Ice	4.0987	2.7280	0.27
RRH2X40-07-U	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	2.2458	1.2277	0.05
						1/2" Ice	2.4472	1.3850	0.07
						1" Ice	2.6572	1.5509	0.09
						2" Ice	3.1031	1.9087	0.13
						4" Ice	4.0987	2.7280	0.27
RRH2X40-07-U	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	2.2458	1.2277	0.05
						1/2" Ice	2.4472	1.3850	0.07
						1" Ice	2.6572	1.5509	0.09
						2" Ice	3.1031	1.9087	0.13
						4" Ice	4.0987	2.7280	0.27
DB-T1-6Z-8AB-0Z	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	5.6000	2.3333	0.04
						1/2" Ice	5.9154	2.5580	0.08
						1" Ice	6.2395	2.7914	0.12
						2" Ice	6.9136	3.2840	0.21
						4" Ice	8.3654	4.3728	0.45
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice	4.9042	4.9208	0.03
						1/2" Ice	5.3460	5.5962	0.08
						1" Ice	5.7972	6.2837	0.13
						2" Ice	6.7311	7.7123	0.26
						4" Ice	8.7345	10.8330	0.62
(2) DB844G65ZAXY w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice	4.9042	4.9208	0.03
						1/2" Ice	5.3460	5.5962	0.08
						1" Ice	5.7972	6.2837	0.13
						2" Ice	6.7311	7.7123	0.26
						4" Ice	8.7345	10.8330	0.62
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice	4.9042	4.9208	0.03
						1/2" Ice	5.3460	5.5962	0.08
						1" Ice	5.7972	6.2837	0.13
						2" Ice	6.7311	7.7123	0.26
						4" Ice	8.7345	10.8330	0.62
GPS_A	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice	0.2975	0.2975	0.00
						1/2" Ice	0.3739	0.3739	0.00
						1" Ice	0.4589	0.4589	0.01
						2" Ice	0.6549	0.6549	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
						2" Ice 4" Ice	1.1506	1.1506	0.08
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
DB-T1-6Z-8AB-0Z	A	From Face	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
Platform Mount [LP 715-1]	C	None		0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	44.2100 53.9700 63.7300 83.2500 122.2900	44.2100 53.9700 63.7300 83.2500 122.2900	1.77 2.32 2.87 3.97 6.16
***									
Pipe Mount [PM 601-3]	C	None		0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.3900 5.4800 6.5700 8.7500 13.1100	4.3900 5.4800 6.5700 8.7500 13.1100	0.20 0.24 0.28 0.36 0.53
***									
P65-17-XLH-RR w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.8229 12.5940 13.3752 14.9400 18.3336	9.0563 10.6186 12.2051 14.6968 19.6430	0.09 0.18 0.28 0.51 1.14
P65-16-XLH-RR w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
P65-16-XLH-RR w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.3625 7.5378 8.4270 10.2390 14.0988	0.08 0.14 0.22 0.39 0.89
7770.00 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.2208 6.7144 7.2182 8.2568 10.4762	4.8204 5.5082 6.2127 7.6716 11.0613	0.09 0.14 0.21 0.36 0.76
7770.00 w/ Mount Pipe	B	From Face	4.0000	0.00	88.0000	No Ice	6.2208	4.8204	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 1.00			1/2" Ice 1" Ice 2" Ice 4" Ice	6.7144 7.2182 8.2568 10.4762	5.5082 6.2127 7.6716 11.0613	0.14 0.21 0.36 0.76
7770.00 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.2208 6.7144 7.2182 8.2568 10.4762	4.8204 5.5082 6.2127 7.6716 11.0613	0.09 0.14 0.21 0.36 0.76
(2) LGP2140X	A	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2600 1.4160 1.5806 1.9358 2.7499	0.3780 0.4932 0.6170 0.8905 1.5412	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	B	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2600 1.4160 1.5806 1.9358 2.7499	0.3780 0.4932 0.6170 0.8905 1.5412	0.01 0.02 0.03 0.05 0.13
(2) LGP2140X	C	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2600 1.4160 1.5806 1.9358 2.7499	0.3780 0.4932 0.6170 0.8905 1.5412	0.01 0.02 0.03 0.05 0.13
(2) LGP13519	A	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3379 0.4220 0.5147 0.7260 1.2523	0.2074 0.2804 0.3621 0.5513 1.0335	0.01 0.01 0.01 0.02 0.07
(2) LGP13519	B	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3379 0.4220 0.5147 0.7260 1.2523	0.2074 0.2804 0.3621 0.5513 1.0335	0.01 0.01 0.01 0.02 0.07
(2) LGP13519	C	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3379 0.4220 0.5147 0.7260 1.2523	0.2074 0.2804 0.3621 0.5513 1.0335	0.01 0.01 0.01 0.02 0.07
RRUS-11	A	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
RRUS-11	B	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
RRUS-11	C	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31

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
RRUS-11	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
RRUS-11	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
RRUS-11	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
DC6-48-60-18-8F	A	From Face	4.0000 0.00 -1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4667 1.6667 1.8778 2.3333 3.3778	1.4667 1.6667 1.8778 2.3333 3.3778	0.02 0.04 0.06 0.11 0.24
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.5975 11.2684 11.9061 13.2089 15.9341	7.1792 8.3621 9.2588 11.0860 15.1514	0.10 0.18 0.26 0.46 1.00
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.5975 11.2684 11.9061 13.2089 15.9341	7.1792 8.3621 9.2588 11.0860 15.1514	0.10 0.18 0.26 0.46 1.00
OPA-65R-LCUU-H8 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.2155 14.0172 14.8244 16.3882 19.6323	9.3187 10.7901 12.2416 14.4988 19.2133	0.12 0.21 0.32 0.56 1.22
RRUS 32 B30	A	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.8662 4.1506 4.4435 5.0554 6.3828	2.7616 3.0213 3.2896 3.8522 5.0811	0.08 0.10 0.14 0.21 0.41
RRUS 32 B30	B	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.8662 4.1506 4.4435 5.0554 6.3828	2.7616 3.0213 3.2896 3.8522 5.0811	0.08 0.10 0.14 0.21 0.41
RRUS 32 B30	C	From Face	4.0000 0.00 1.00	0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.8662 4.1506 4.4435 5.0554 6.3828	2.7616 3.0213 3.2896 3.8522 5.0811	0.08 0.10 0.14 0.21 0.41
Platform Mount [LP 715-1]	C	None		0.00	88.0000	No Ice 1/2" Ice 1" Ice 2" Ice	44.2100 53.9700 63.7300 83.2500 122.2900	44.2100 53.9700 63.7300 83.2500 122.2900	1.77 2.32 2.87 3.97 6.16

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* K
						4" Ice			
Miscellaneous [NA 509-3]	C	None		0.00	88.0000	No Ice	11.8400	11.8400	0.28
						1/2" Ice	16.9600	16.9600	0.30
						1" Ice	22.0800	22.0800	0.32
						2" Ice	32.3200	32.3200	0.36
						4" Ice	52.8000	52.8000	0.44
***									
800 10504 w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice	3.5887	3.1779	0.04
						1/2" Ice	4.0069	3.9053	0.07
						1" Ice	4.4217	4.5808	0.11
						2" Ice	5.3391	5.9816	0.21
						4" Ice	7.3849	8.9834	0.51
800 10504 w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice	3.5887	3.1779	0.04
						1/2" Ice	4.0069	3.9053	0.07
						1" Ice	4.4217	4.5808	0.11
						2" Ice	5.3391	5.9816	0.21
						4" Ice	7.3849	8.9834	0.51
800 10504 w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	81.0000	No Ice	3.5887	3.1779	0.04
						1/2" Ice	4.0069	3.9053	0.07
						1" Ice	4.4217	4.5808	0.11
						2" Ice	5.3391	5.9816	0.21
						4" Ice	7.3849	8.9834	0.51
Pipe Mount [PM 601-3]	C	None		0.00	81.0000	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
						2" Ice	8.7500	8.7500	0.36
						4" Ice	13.1100	13.1100	0.53
***									
LBX-9012DS-VTM w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice	5.4437	3.9976	0.05
						1/2" Ice	5.9137	4.6725	0.09
						1" Ice	6.3874	5.3288	0.14
						2" Ice	7.3659	6.7088	0.26
						4" Ice	9.4512	9.8613	0.61
LBX-9012DS-VTM w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice	5.4437	3.9976	0.05
						1/2" Ice	5.9137	4.6725	0.09
						1" Ice	6.3874	5.3288	0.14
						2" Ice	7.3659	6.7088	0.26
						4" Ice	9.4512	9.8613	0.61
LBX-9012DS-VTM w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice	5.4437	3.9976	0.05
						1/2" Ice	5.9137	4.6725	0.09
						1" Ice	6.3874	5.3288	0.14
						2" Ice	7.3659	6.7088	0.26
						4" Ice	9.4512	9.8613	0.61
DB844H90E-XY w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice	3.2986	4.9208	0.03
						1/2" Ice	3.6900	5.5962	0.07
						1" Ice	4.1185	6.2837	0.12
						2" Ice	5.0070	7.7123	0.23
						4" Ice	6.9197	10.8330	0.56
DB844H90E-XY w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	72.0000	No Ice	3.2986	4.9208	0.03
						1/2" Ice	3.6900	5.5962	0.07
						1" Ice	4.1185	6.2837	0.12
						2" Ice	5.0070	7.7123	0.23
						4" Ice	6.9197	10.8330	0.56
DB844H90E-XY w/ Mount Pipe	C	From Face	4.0000 0.00	0.00	72.0000	No Ice	3.2986	4.9208	0.03
						1/2"	3.6900	5.5962	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				Ice	4.1185	6.2837	0.12
							1" Ice	5.0070	7.7123	0.23
							2" Ice	6.9197	10.8330	0.56
							4" Ice			
Platform Mount (LP 101-1)	C	None			0.00	72.0000	No Ice	36.2100	36.2100	1.50
							1/2" Ice	42.8200	42.8200	2.30
							1" Ice	49.4300	49.4300	3.10
							2" Ice	62.6500	62.6500	4.70
							4" Ice	89.0900	89.0900	7.89
**										

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	A	Paraboloid w/o Radome	From Leg	2.0000	0.00	48.00		93.0000	2.1750	No Ice	3.7200	0.03
					1.00					1/2" Ice	4.0100	0.05
										1" Ice	4.3000	0.07
										2" Ice	4.8800	0.11
										4" Ice	6.0400	0.19
VHLP1-23	A	Paraboloid w/o Radome	From Leg	2.0000	0.00	68.00		93.0000	1.2750	No Ice	1.2800	0.01
					2.00					1/2" Ice	1.4500	0.02
										1" Ice	1.6200	0.03
										2" Ice	1.9700	0.04
										4" Ice	2.6600	0.07
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	2.0000	0.00	-2.00		93.0000	2.9167	No Ice	6.6800	0.05
					1.00					1/2" Ice	7.0700	0.08
										1" Ice	7.4600	0.12
										2" Ice	8.2300	0.19
										4" Ice	9.7800	0.34
VHLP1-23	A	Paraboloid w/o Radome	From Leg	2.0000	0.00	68.00		93.0000	1.2750	No Ice	1.2800	0.01
					-1.00					1/2" Ice	1.4500	0.02
										1" Ice	1.6200	0.03
										2" Ice	1.9700	0.04
										4" Ice	2.6600	0.07
**												

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 117.0000-110.0000	113.4392	1.423	26.320	8.838	A	0.000	8.838	8.838	100.00	0.000	0.000
					B	0.000	8.838		100.00	0.000	0.000
					C	0.000	8.838		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.392	25.738	14.225	A	0.000	14.225	14.225	100.00	0.000	0.000
					B	0.000	14.225		100.00	0.000	0.000
					C	0.000	14.225		100.00	0.000	1.625
L3 100.0000-	90.9198	1.336	24.70	29.581	A	0.000	29.581	29.581	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
82.4167			8		B	0.000	29.581		100.00	0.000	0.000
					C	0.000	29.581		100.00	0.000	4.027
L4 82.4167-76.0833	79.2170	1.284	23.754	12.082	A	0.000	12.082	12.082	100.00	0.000	0.000
					B	0.000	12.082		100.00	0.000	0.000
					C	0.000	12.082		100.00	0.000	4.268
L5 76.0833-71.0000	73.5215	1.257	23.253	10.244	A	0.000	10.244	10.244	100.00	0.000	0.000
					B	0.000	10.244		100.00	0.000	0.000
					C	0.000	10.244		100.00	0.000	4.415
L6 71.0000-68.0833	69.5353	1.237	22.886	6.098	A	0.000	6.098	6.098	100.00	0.000	0.000
					B	0.000	6.098		100.00	0.000	0.000
					C	0.000	6.098		100.00	0.000	2.619
L7 68.0833-63.5000	65.7764	1.218	22.525	9.906	A	0.000	9.906	9.906	100.00	0.000	0.000
					B	0.000	9.906		100.00	0.000	0.000
					C	0.000	9.906		100.00	0.000	4.115
L8 63.5000-47.4200	55.2877	1.159	21.434	37.884	A	0.000	37.884	37.884	100.00	0.000	0.000
					B	0.000	37.884		100.00	0.000	0.000
					C	0.000	37.884		100.00	0.000	14.437
L9 47.4200-38.0833	42.6780	1.076	19.906	23.549	A	0.000	23.549	23.549	100.00	0.000	0.000
					B	0.000	23.549		100.00	0.000	0.000
					C	0.000	23.549		100.00	0.000	8.383
L10 38.0833-35.0000	36.5361	1.03	19.042	8.234	A	0.000	8.234	8.234	100.00	0.000	0.000
					B	0.000	8.234		100.00	0.000	0.000
					C	0.000	8.234		100.00	0.000	2.768
L11 35.0000-12.5000	23.4772	1	18.496	65.504	A	0.000	65.504	65.504	100.00	0.000	0.000
					B	0.000	65.504		100.00	0.000	0.000
					C	0.000	65.504		100.00	0.000	20.201
L12 12.5000-11.0000	11.7489	1	18.496	4.706	A	0.000	4.706	4.706	100.00	0.000	0.000
					B	0.000	4.706		100.00	0.000	0.000
					C	0.000	4.706		100.00	0.000	1.347
L13 11.0000-2.5000	6.7149	1	18.496	27.466	A	0.000	27.466	27.466	100.00	0.000	0.000
					B	0.000	27.466		100.00	0.000	0.000
					C	0.000	27.466		100.00	0.000	7.632
L14 2.5000-0.0000	1.2471	1	18.496	8.337	A	0.000	8.337	8.337	100.00	0.000	0.000
					B	0.000	8.337		100.00	0.000	0.000
					C	0.000	8.337		100.00	0.000	2.245

Tower Pressure - With Ice

G_H = 1.690

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 117.0000-110.0000	113.4392	1.423	5.150	0.8698	9.852	A	0.000	9.852	9.852	100.00	0.000	0.000
						B	0.000	9.852		100.00	0.000	0.000
						C	0.000	9.852		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.392	5.036	0.8616	15.661	A	0.000	15.661	15.661	100.00	0.000	0.000
						B	0.000	15.661		100.00	0.000	0.000
						C	0.000	15.661		100.00	0.000	3.348
L3 100.0000-82.4167	90.9198	1.336	4.835	0.8470	32.063	A	0.000	32.063	32.063	100.00	0.000	0.000
						B	0.000	32.063		100.00	0.000	0.000
						C	0.000	32.063		100.00	0.000	9.425
L4 82.4167-76.0833	79.2170	1.284	4.648	0.8331	12.962	A	0.000	12.962	12.962	100.00	0.000	0.000
						B	0.000	12.962		100.00	0.000	0.000
						C	0.000	12.962		100.00	0.000	8.555
L5 76.0833-71.0000	73.5215	1.257	4.550	0.8257	10.944	A	0.000	10.944	10.944	100.00	0.000	0.000
						B	0.000	10.944		100.00	0.000	0.000
						C	0.000	10.944		100.00	0.000	8.798
L6 71.0000-68.0833	69.5353	1.237	4.478	0.8202	6.496	A	0.000	6.496	6.496	100.00	0.000	0.000
						B	0.000	6.496		100.00	0.000	0.000
						C	0.000	6.496		100.00	0.000	5.117
L7 68.0833-63.5000	65.7764	1.218	4.408	0.8147	10.528	A	0.000	10.528	10.528	100.00	0.000	0.000
						B	0.000	10.528		100.00	0.000	0.000
						C	0.000	10.528		100.00	0.000	8.015

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
L8 63.5000-47.4200	55.2877	1.159	4.194	0.7979	40.023	A	0.000	40.023	40.023	100.00	0.000	0.000
						B	0.000	40.023		100.00	0.000	0.000
						C	0.000	40.023		100.00	0.000	27.838
L9 47.4200-38.0833	42.6780	1.076	3.895	0.7735	24.790	A	0.000	24.790	24.790	100.00	0.000	0.000
						B	0.000	24.790		100.00	0.000	0.000
						C	0.000	24.790		100.00	0.000	16.164
L10 38.0833-35.0000	36.5361	1.03	3.726	0.7592	8.624	A	0.000	8.624	8.624	100.00	0.000	0.000
						B	0.000	8.624		100.00	0.000	0.000
						C	0.000	8.624		100.00	0.000	5.213
L11 35.0000-12.5000	23.4772	1	3.619	0.7500	68.316	A	0.000	68.316	68.316	100.00	0.000	0.000
						B	0.000	68.316		100.00	0.000	0.000
						C	0.000	68.316		100.00	0.000	37.826
L12 12.5000-11.0000	11.7489	1	3.619	0.7500	4.893	A	0.000	4.893	4.893	100.00	0.000	0.000
						B	0.000	4.893		100.00	0.000	0.000
						C	0.000	4.893		100.00	0.000	2.522
L13 11.0000-2.5000	6.7149	1	3.619	0.7500	28.528	A	0.000	28.528	28.528	100.00	0.000	0.000
						B	0.000	28.528		100.00	0.000	0.000
						C	0.000	28.528		100.00	0.000	14.290
L14 2.5000-0.0000	1.2471	1	3.619	0.7500	8.650	A	0.000	8.650	8.650	100.00	0.000	0.000
						B	0.000	8.650		100.00	0.000	0.000
						C	0.000	8.650		100.00	0.000	4.203

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 117.0000-110.0000	113.4392	1.423	9.107	8.838	A	0.000	8.838	8.838	100.00	0.000	0.000
					B	0.000	8.838		100.00	0.000	0.000
					C	0.000	8.838		100.00	0.000	0.000
L2 110.0000-100.0000	104.8897	1.392	8.906	14.225	A	0.000	14.225	14.225	100.00	0.000	0.000
					B	0.000	14.225		100.00	0.000	0.000
					C	0.000	14.225		100.00	0.000	1.625
L3 100.0000-82.4167	90.9198	1.336	8.549	29.581	A	0.000	29.581	29.581	100.00	0.000	0.000
					B	0.000	29.581		100.00	0.000	0.000
					C	0.000	29.581		100.00	0.000	4.027
L4 82.4167-76.0833	79.2170	1.284	8.219	12.082	A	0.000	12.082	12.082	100.00	0.000	0.000
					B	0.000	12.082		100.00	0.000	0.000
					C	0.000	12.082		100.00	0.000	4.268
L5 76.0833-71.0000	73.5215	1.257	8.046	10.244	A	0.000	10.244	10.244	100.00	0.000	0.000
					B	0.000	10.244		100.00	0.000	0.000
					C	0.000	10.244		100.00	0.000	4.415
L6 71.0000-68.0833	69.5353	1.237	7.919	6.098	A	0.000	6.098	6.098	100.00	0.000	0.000
					B	0.000	6.098		100.00	0.000	0.000
					C	0.000	6.098		100.00	0.000	2.619
L7 68.0833-63.5000	65.7764	1.218	7.794	9.906	A	0.000	9.906	9.906	100.00	0.000	0.000
					B	0.000	9.906		100.00	0.000	0.000
					C	0.000	9.906		100.00	0.000	4.115
L8 63.5000-47.4200	55.2877	1.159	7.417	37.884	A	0.000	37.884	37.884	100.00	0.000	0.000
					B	0.000	37.884		100.00	0.000	0.000
					C	0.000	37.884		100.00	0.000	14.437
L9 47.4200-38.0833	42.6780	1.076	6.888	23.549	A	0.000	23.549	23.549	100.00	0.000	0.000
					B	0.000	23.549		100.00	0.000	0.000
					C	0.000	23.549		100.00	0.000	8.383
L10 38.0833-35.0000	36.5361	1.03	6.589	8.234	A	0.000	8.234	8.234	100.00	0.000	0.000
					B	0.000	8.234		100.00	0.000	0.000
					C	0.000	8.234		100.00	0.000	2.768
L11 35.0000-12.5000	23.4772	1	6.400	65.504	A	0.000	65.504	65.504	100.00	0.000	0.000
					B	0.000	65.504		100.00	0.000	0.000
					C	0.000	65.504		100.00	0.000	20.201

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
L12 12.5000-11.0000	11.7489	1	6.400	4.706	A	0.000	4.706	4.706	100.00	0.000	0.000
					B	0.000	4.706		100.00	0.000	0.000
					C	0.000	4.706		100.00	0.000	1.347
L13 11.0000-2.5000	6.7149	1	6.400	27.466	A	0.000	27.466	27.466	100.00	0.000	0.000
					B	0.000	27.466		100.00	0.000	0.000
					C	0.000	27.466		100.00	0.000	7.632
L14 2.5000-0.0000	1.2471	1	6.400	8.337	A	0.000	8.337	8.337	100.00	0.000	0.000
					B	0.000	8.337		100.00	0.000	0.000
					C	0.000	8.337		100.00	0.000	2.245

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	117 - 110	Pole	Max Tension	36	0.00	-0.00	-0.00
			Max. Compression	14	-2.06	0.00	0.00
			Max. Mx	11	-0.86	16.58	0.00
			Max. My	8	-0.86	0.01	-16.58

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-2.66	16.58	0.00
			Max. Vx	8	2.66	0.01	-16.58
			Max. Torque	12			-0.00
L2	110 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-5.93	0.01	0.03
			Max. Mx	5	-2.89	-78.03	0.07
			Max. My	2	-2.90	-0.02	77.89
			Max. Vy	11	-6.52	78.03	-0.02
			Max. Vx	8	6.50	0.10	-77.85
			Max. Torque	12			-0.03
L3	100 - 82.4167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.42	1.75	0.64
			Max. Mx	11	-10.21	382.63	-1.60
			Max. My	8	-10.24	3.40	-377.69
			Max. Vy	11	-22.78	382.63	-1.60
			Max. Vx	8	22.52	3.40	-377.69
			Max. Torque	8			-2.92
L4	82.4167 - 76.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-22.01	1.91	0.56
			Max. Mx	11	-11.39	531.78	-2.93
			Max. My	8	-11.42	5.40	-525.18
			Max. Vy	11	-24.00	531.78	-2.93
			Max. Vx	8	23.74	5.40	-525.18
			Max. Torque	8			-2.96
L5	76.0833 - 71	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.54	2.06	0.48
			Max. Mx	11	-13.89	657.72	-4.00
			Max. My	8	-13.92	7.00	-649.80
			Max. Vy	11	-27.10	657.72	-4.00
			Max. Vx	8	26.84	7.00	-649.80
			Max. Torque	8			-3.00
L6	71 - 68.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.31	2.15	0.43
			Max. Mx	11	-14.55	737.25	-4.61
			Max. My	8	-14.58	7.92	-728.57
			Max. Vy	11	-27.44	737.25	-4.61
			Max. Vx	8	27.18	7.92	-728.57
			Max. Torque	8			-3.02
L7	68.0833 - 63.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.58	2.28	0.35
			Max. Mx	11	-15.67	864.22	-5.58
			Max. My	8	-15.70	9.36	-854.34
			Max. Vy	11	-27.98	864.22	-5.58
			Max. Vx	8	27.72	9.36	-854.34
			Max. Torque	8			-3.05
L8	63.5 - 47.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.37	2.62	0.14
			Max. Mx	11	-19.04	1193.55	-8.02
			Max. My	8	-19.06	12.98	-1180.67
			Max. Vy	11	-29.32	1193.55	-8.02
			Max. Vx	8	29.06	12.98	-1180.67
			Max. Torque	8			-3.15
L9	47.42 - 38.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.47	3.06	-0.12
			Max. Mx	11	-24.48	1613.46	-10.98
			Max. My	8	-24.50	17.36	-1596.94
			Max. Vy	11	-30.95	1613.46	-10.98
			Max. Vx	8	30.69	17.36	-1596.94
			Max. Torque	8			-3.26
L10	38.0833 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.53	3.16	-0.18
			Max. Mx	11	-25.45	1709.37	-11.63
			Max. My	8	-25.46	18.33	-1692.05
			Max. Vy	11	-31.27	1709.37	-11.63
			Max. Vx	8	31.01	18.33	-1692.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	8			-3.29
L11	35 - 12.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.06	3.94	-0.66
			Max. Mx	11	-33.24	2438.70	-16.39
			Max. My	8	-33.25	25.33	-2415.55
			Max. Vy	11	-33.60	2438.70	-16.39
			Max. Vx	8	33.35	25.33	-2415.55
			Max. Torque	8			-3.49
L12	12.5 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-48.65	4.00	-0.69
			Max. Mx	11	-33.79	2489.21	-16.71
			Max. My	8	-33.79	25.80	-2465.68
			Max. Vy	11	-33.76	2489.21	-16.71
			Max. Vx	8	33.51	25.80	-2465.68
			Max. Torque	8			-3.51
L13	11 - 2.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.71	4.32	-0.89
			Max. Mx	11	-37.52	2780.10	-18.49
			Max. My	8	-37.52	28.41	-2754.39
			Max. Vy	11	-34.70	2780.10	-18.49
			Max. Vx	8	34.45	28.41	-2754.39
			Max. Torque	8			-3.59
L14	2.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.99	4.42	-0.95
			Max. Mx	11	-38.69	2867.19	-19.02
			Max. My	8	-38.69	29.18	-2840.84
			Max. Vy	11	-34.99	2867.19	-19.02
			Max. Vx	8	34.73	29.18	-2840.84
			Max. Torque	8			-3.62

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	53.99	-0.00	-0.00
	Max. H_x	11	38.71	34.97	-0.20
	Max. H_z	2	38.71	-0.09	34.63
	Max. M_x	2	2831.81	-0.09	34.63
	Max. M_z	5	2858.61	-34.90	0.00
	Max. Torsion	2	2.63	-0.09	34.63
	Min. Vert	11	38.71	34.97	-0.20
	Min. H_x	5	38.71	-34.90	0.00
	Min. H_z	8	38.71	0.30	-34.72
	Min. M_x	8	-2840.84	0.30	-34.72
	Min. M_z	11	-2867.19	34.97	-0.20
	Min. Torsion	8	-3.62	0.30	-34.72

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	38.71	0.00	0.00	0.05	1.10	0.00
Dead+Wind 0 deg - No Ice	38.71	0.09	-34.63	-2831.81	-6.91	-2.63
Dead+Wind 30 deg - No Ice	38.71	17.45	-30.01	-2454.05	-1428.43	-2.45
Dead+Wind 60 deg - No Ice	38.71	30.23	-17.32	-1415.68	-2475.20	-1.80
Dead+Wind 90 deg - No Ice	38.71	34.90	-0.00	0.40	-2858.61	-0.53
Dead+Wind 120 deg - No Ice	38.71	30.26	17.21	1406.87	-2479.21	0.90
Dead+Wind 150 deg - No Ice	38.71	17.34	30.04	2458.11	-1418.32	2.55
Dead+Wind 180 deg - No Ice	38.71	-0.30	34.72	2840.84	29.18	3.62

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - No Ice	38.71	-17.63	29.99	2452.01	1447.05	3.18
Dead+Wind 240 deg - No Ice	38.71	-30.28	17.38	1421.60	2482.40	2.08
Dead+Wind 270 deg - No Ice	38.71	-34.97	0.20	19.02	2867.19	0.77
Dead+Wind 300 deg - No Ice	38.71	-30.42	-17.10	-1395.80	2496.87	-0.56
Dead+Wind 330 deg - No Ice	38.71	-17.46	-29.95	-2449.31	1432.76	-2.29
Dead+Ice+Temp	53.99	0.00	0.00	0.95	4.42	0.00
Dead+Wind 0 deg+Ice+Temp	53.99	0.02	-8.56	-711.73	2.48	-0.74
Dead+Wind 30 deg+Ice+Temp	53.99	4.32	-7.42	-616.84	-354.99	-0.65
Dead+Wind 60 deg+Ice+Temp	53.99	7.47	-4.29	-355.72	-618.02	-0.43
Dead+Wind 90 deg+Ice+Temp	53.99	8.62	-0.00	0.65	-714.21	-0.07
Dead+Wind 120 deg+Ice+Temp	53.99	7.47	4.26	354.93	-618.46	0.32
Dead+Wind 150 deg+Ice+Temp	53.99	4.28	7.42	619.13	-352.09	0.73
Dead+Wind 180 deg+Ice+Temp	53.99	-0.07	8.58	715.71	11.57	0.97
Dead+Wind 210 deg+Ice+Temp	53.99	-4.36	7.42	618.26	368.24	0.82
Dead+Wind 240 deg+Ice+Temp	53.99	-7.48	4.30	358.95	628.61	0.50
Dead+Wind 270 deg+Ice+Temp	53.99	-8.64	0.05	5.71	725.10	0.12
Dead+Wind 300 deg+Ice+Temp	53.99	-7.51	-4.23	-350.41	631.47	-0.24
Dead+Wind 330 deg+Ice+Temp	53.99	-4.31	-7.40	-615.29	364.18	-0.67
Dead+Wind 0 deg - Service	38.71	0.03	-11.98	-980.56	-1.64	-0.92
Dead+Wind 30 deg - Service	38.71	6.04	-10.38	-849.83	-493.93	-0.85
Dead+Wind 60 deg - Service	38.71	10.46	-5.99	-490.24	-856.44	-0.63
Dead+Wind 90 deg - Service	38.71	12.08	-0.00	0.17	-989.17	-0.19
Dead+Wind 120 deg - Service	38.71	10.47	5.96	487.24	-857.83	0.31
Dead+Wind 150 deg - Service	38.71	6.00	10.39	851.29	-490.43	0.89
Dead+Wind 180 deg - Service	38.71	-0.10	12.01	983.75	10.85	1.26
Dead+Wind 210 deg - Service	38.71	-6.10	10.38	849.18	501.87	1.11
Dead+Wind 240 deg - Service	38.71	-10.48	6.01	492.35	860.43	0.73
Dead+Wind 270 deg - Service	38.71	-12.10	0.07	6.61	993.64	0.27
Dead+Wind 300 deg - Service	38.71	-10.53	-5.92	-483.35	865.45	-0.19
Dead+Wind 330 deg - Service	38.71	-6.04	-10.36	-848.18	496.92	-0.80

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	-38.71	0.00	-0.00	38.71	-0.00	0.000%
2	0.09	-38.71	-34.63	-0.09	38.71	34.63	0.001%
3	17.45	-38.71	-30.01	-17.45	38.71	30.01	0.000%
4	30.23	-38.71	-17.32	-30.23	38.71	17.32	0.000%
5	34.91	-38.71	-0.00	-34.90	38.71	0.00	0.003%
6	30.26	-38.71	17.21	-30.26	38.71	-17.21	0.000%
7	17.34	-38.71	30.04	-17.34	38.71	-30.04	0.000%
8	-0.30	-38.71	34.72	0.30	38.71	-34.72	0.001%
9	-17.63	-38.71	29.99	17.63	38.71	-29.99	0.000%
10	-30.28	-38.71	17.38	30.28	38.71	-17.38	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	-34.97	-38.71	0.20	34.97	38.71	-0.20	0.003%
12	-30.42	-38.71	-17.10	30.42	38.71	17.10	0.000%
13	-17.46	-38.71	-29.95	17.46	38.71	29.95	0.000%
14	0.00	-53.99	0.00	-0.00	53.99	-0.00	0.002%
15	0.02	-53.99	-8.56	-0.02	53.99	8.56	0.000%
16	4.32	-53.99	-7.42	-4.32	53.99	7.42	0.000%
17	7.47	-53.99	-4.29	-7.47	53.99	4.29	0.000%
18	8.62	-53.99	-0.00	-8.62	53.99	0.00	0.000%
19	7.47	-53.99	4.26	-7.47	53.99	-4.26	0.000%
20	4.28	-53.99	7.42	-4.28	53.99	-7.42	0.000%
21	-0.07	-53.99	8.58	0.07	53.99	-8.58	0.000%
22	-4.36	-53.99	7.42	4.36	53.99	-7.42	0.000%
23	-7.48	-53.99	4.30	7.48	53.99	-4.30	0.000%
24	-8.64	-53.99	0.05	8.64	53.99	-0.05	0.000%
25	-7.51	-53.99	-4.23	7.51	53.99	4.23	0.000%
26	-4.31	-53.99	-7.40	4.31	53.99	7.40	0.000%
27	0.03	-38.71	-11.98	-0.03	38.71	11.98	0.004%
28	6.04	-38.71	-10.38	-6.04	38.71	10.38	0.002%
29	10.46	-38.71	-5.99	-10.46	38.71	5.99	0.002%
30	12.08	-38.71	-0.00	-12.08	38.71	0.00	0.004%
31	10.47	-38.71	5.96	-10.47	38.71	-5.96	0.002%
32	6.00	-38.71	10.40	-6.00	38.71	-10.39	0.002%
33	-0.10	-38.71	12.01	0.10	38.71	-12.01	0.004%
34	-6.10	-38.71	10.38	6.10	38.71	-10.38	0.002%
35	-10.48	-38.71	6.01	10.48	38.71	-6.01	0.002%
36	-12.10	-38.71	0.07	12.10	38.71	-0.07	0.004%
37	-10.53	-38.71	-5.92	10.53	38.71	5.92	0.002%
38	-6.04	-38.71	-10.36	6.04	38.71	10.36	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	0.00000001	0.00006374
3	Yes	16	0.00000001	0.00008846
4	Yes	16	0.00000001	0.00009730
5	Yes	13	0.00004088	0.00008563
6	Yes	16	0.00000001	0.00009355
7	Yes	16	0.00000001	0.00008839
8	Yes	14	0.00000001	0.00011116
9	Yes	16	0.00000001	0.00010091
10	Yes	16	0.00000001	0.00008945
11	Yes	13	0.00004087	0.00008050
12	Yes	16	0.00000001	0.00009278
13	Yes	16	0.00000001	0.00009715
14	Yes	6	0.00000001	0.00004119
15	Yes	14	0.00000001	0.00011287
16	Yes	14	0.00000001	0.00012669
17	Yes	14	0.00000001	0.00012807
18	Yes	14	0.00000001	0.00011237
19	Yes	14	0.00000001	0.00012716
20	Yes	14	0.00000001	0.00012622
21	Yes	14	0.00000001	0.00011338
22	Yes	14	0.00000001	0.00013083
23	Yes	14	0.00000001	0.00012949
24	Yes	14	0.00000001	0.00011482
25	Yes	14	0.00000001	0.00012962
26	Yes	14	0.00000001	0.00012977
27	Yes	12	0.00011363	0.00009983
28	Yes	13	0.00000001	0.00007462
29	Yes	13	0.00000001	0.00010373
30	Yes	12	0.00011360	0.00008313
31	Yes	13	0.00000001	0.00009067
32	Yes	13	0.00000001	0.00007480

33	Yes	12	0.00011361	0.00012474
34	Yes	13	0.00000001	0.00011479
35	Yes	13	0.00000001	0.00007635
36	Yes	12	0.00011362	0.00008468
37	Yes	13	0.00000001	0.00008836
38	Yes	13	0.00000001	0.00010270

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	23.74	36	1.97	0.01
L2	110 - 100	20.86	36	1.95	0.01
L3	100 - 82.4167	16.89	36	1.83	0.01
L4	82.4167 - 76.0833	10.84	36	1.39	0.01
L5	76.0833 - 71	9.11	36	1.21	0.00
L6	71 - 68.0833	7.88	36	1.09	0.00
L7	68.0833 - 63.5	7.23	36	1.04	0.00
L8	63.5 - 47.42	6.28	36	0.96	0.00
L9	52 - 38.0833	4.18	36	0.78	0.00
L10	38.0833 - 35	2.16	36	0.58	0.00
L11	35 - 12.5	1.81	36	0.53	0.00
L12	12.5 - 11	0.20	36	0.16	0.00
L13	11 - 2.5	0.16	36	0.14	0.00
L14	2.5 - 0	0.01	36	0.03	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.0000	APXVSPP18-C-A20 w/ Mount Pipe	36	23.74	1.97	0.01	12335
115.0000	TME-PCS 1900MHz 4x45W-65MHz	36	22.91	1.97	0.01	12335
110.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	36	20.86	1.95	0.01	8798
100.0000	(2) HBXX-6516DS-A2M w/ Mount Pipe	36	16.89	1.83	0.01	3553
95.0000	VHLP1-23	36	15.01	1.73	0.01	2741
94.0000	VHLP2-11	36	14.65	1.71	0.01	2622
93.0000	Pipe Mount [PM 601-3]	36	14.29	1.68	0.01	2512
92.0000	VHLP1-23	36	13.94	1.66	0.01	2412
88.0000	P65-17-XLH-RR w/ Mount Pipe	36	12.58	1.55	0.01	2078
81.0000	800 10504 w/ Mount Pipe	36	10.43	1.35	0.01	1853
72.0000	LBX-9012DS-VTM w/ Mount Pipe	36	8.12	1.11	0.00	2621

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117 - 110	68.32	11	5.67	0.03
L2	110 - 100	60.06	11	5.61	0.03
L3	100 - 82.4167	48.63	11	5.26	0.03
L4	82.4167 - 76.0833	31.24	11	4.02	0.02

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	76.0833 - 71	26.26	11	3.49	0.01
L6	71 - 68.0833	22.73	11	3.14	0.01
L7	68.0833 - 63.5	20.86	11	2.99	0.01
L8	63.5 - 47.42	18.10	11	2.76	0.01
L9	52 - 38.0833	12.06	11	2.25	0.01
L10	38.0833 - 35	6.24	11	1.67	0.00
L11	35 - 12.5	5.21	11	1.52	0.00
L12	12.5 - 11	0.58	11	0.46	0.00
L13	11 - 2.5	0.45	11	0.40	0.00
L14	2.5 - 0	0.02	11	0.09	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.0000	APXVSPP18-C-A20 w/ Mount Pipe	11	68.32	5.67	0.03	4370
115.0000	TME-PCS 1900MHz 4x45W-65MHz	11	65.95	5.66	0.03	4370
110.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	11	60.06	5.61	0.03	3113
100.0000	(2) HBXX-6516DS-A2M w/ Mount Pipe	11	48.63	5.26	0.03	1259
95.0000	VHLP1-23	11	43.25	4.98	0.03	969
94.0000	VHLP2-11	11	42.21	4.91	0.03	926
93.0000	Pipe Mount [PM 601-3]	11	41.18	4.84	0.03	887
92.0000	VHLP1-23	11	40.16	4.77	0.03	851
88.0000	P65-17-XLH-RR w/ Mount Pipe	11	36.25	4.48	0.02	732
81.0000	800 10504 w/ Mount Pipe	11	30.06	3.90	0.01	651
72.0000	LBX-9012DS-VTM w/ Mount Pipe	11	23.40	3.20	0.01	916

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	117 - 110 (1)	TP15.94x14.36x0.188	7.0000	0.0000	0.0	39.00	9.5356	-0.86	371.89	0.002
L2	110 - 100 (2)	TP18.2x15.94x0.188	10.0000	0.0000	0.0	39.00	10.9037	-2.89	425.25	0.007
L3	100 - 82.4167 (3)	TP22.1761x18.2x0.25	17.5833	0.0000	0.0	39.00	17.6505	-10.21	688.37	0.015
L4	82.4167 - 76.0833 (4)	TP23.6083x22.1761x0.3261	6.3334	0.0000	0.0	35.39	24.4444	-11.39	865.04	0.013
L5	76.0833 - 71 (5)	TP24.7578x23.6083x0.4532	5.0833	0.0000	0.0	30.68	35.4686	-13.89	1088.32	0.013
L6	71 - 68.0833 (6)	TP25.4174x24.7578x0.6477	2.9167	0.0000	0.0	26.62	51.6618	-14.55	1375.34	0.011
L7	68.0833 - 63.5 (7)	TP26.4538x25.4174x0.6838	4.5833	0.0000	0.0	28.00	56.7373	-15.67	1588.76	0.010
L8	63.5 - 47.42 (8)	TP30.09x26.4538x0.8127	16.0800	0.0000	0.0	28.10	73.9044	-19.04	2077.01	0.009
L9	47.42 - 38.0833 (9)	TP31.6978x27.429x0.8034	13.9167	0.0000	0.0	27.80	74.1579	-22.18	2061.44	0.011
L10	38.0833 - 35 (10)	TP32.3942x31.6978x0.7395	3.0833	0.0000	0.0	27.82	75.3760	-25.45	2096.66	0.012

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L11	35 - 12.5 (11)	TP37.4765x32.3942x0.7644	22.5000	0.0000	0.0	29.04	90.3620	-33.24	2624.11	0.013
L12	12.5 - 11 (12)	TP37.8153x37.4765x0.7493	1.5000	0.0000	0.0	29.14	89.4262	-33.79	2606.06	0.013
L13	11 - 2.5 (13)	TP39.7353x37.8153x0.9195	8.5000	0.0000	0.0	29.18	114.9220	-37.52	3353.19	0.011
L14	2.5 - 0 (14)	TP40.3x39.7353x0.9631	2.5000	0.0000	0.0	30.11	121.9900	-38.69	3672.86	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	117 - 110 (1)	TP15.94x14.36x0.188	16.58	5.44	39.00	0.140	0.00	0.00	39.00	0.000
L2	110 - 100 (2)	TP18.2x15.94x0.188	78.04	19.55	39.00	0.501	0.00	0.00	39.00	0.000
L3	100 - 82.4167 (3)	TP22.1761x18.2x0.25	382.63	48.70	39.00	1.249	0.00	0.00	39.00	0.000
L4	82.4167 - 76.0833 (4)	TP23.6083x22.1761x0.3261	531.79	46.14	35.39	1.304	0.00	0.00	35.39	0.000
L5	76.0833 - 71 (5)	TP24.7578x23.6083x0.4532	657.73	37.85	30.68	1.234	0.00	0.00	30.68	0.000
L6	71 - 68.0833 (6)	TP25.4174x24.7578x0.6477	737.26	28.79	26.62	1.082	0.00	0.00	26.62	0.000
L7	68.0833 - 63.5 (7)	TP26.4538x25.4174x0.6838	864.24	29.55	28.00	1.055	0.00	0.00	28.00	0.000
L8	63.5 - 47.42 (8)	TP30.09x26.4538x0.8127	1193.58	28.65	28.10	1.019	0.00	0.00	28.10	0.000
L9	47.42 - 38.0833 (9)	TP31.6978x27.429x0.8034	1391.64	32.77	27.80	1.179	0.00	0.00	27.80	0.000
L10	38.0833 - 35 (10)	TP32.3942x31.6978x0.7395	1709.42	35.70	27.82	1.284	0.00	0.00	27.82	0.000
L11	35 - 12.5 (11)	TP37.4765x32.3942x0.7644	2438.76	36.55	29.04	1.258	0.00	0.00	29.04	0.000
L12	12.5 - 11 (12)	TP37.8153x37.4765x0.7493	2489.27	37.31	29.14	1.280	0.00	0.00	29.14	0.000
L13	11 - 2.5 (13)	TP39.7353x37.8153x0.9195	2780.16	31.07	29.18	1.065	0.00	0.00	29.18	0.000
L14	2.5 - 0 (14)	TP40.3x39.7353x0.9631	2867.25	29.81	30.11	0.990	0.00	0.00	30.11	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	117 - 110 (1)	TP15.94x14.36x0.188	2.66	0.28	26.00	0.022	0.00	0.00	26.00	0.000
L2	110 - 100 (2)	TP18.2x15.94x0.188	6.52	0.60	26.00	0.047	0.01	0.00	26.00	0.000
L3	100 - 82.4167 (3)	TP22.1761x18.2x0.25	22.78	1.29	26.00	0.101	1.18	0.07	26.00	0.003
L4	82.4167 - 76.0833 (4)	TP23.6083x22.1761x0.3261	24.00	0.98	23.59	0.085	1.16	0.05	23.59	0.002
L5	76.0833 - 71 (5)	TP24.7578x23.6083x0.4532	27.10	0.76	20.46	0.076	1.14	0.03	20.46	0.001
L6	71 - 68.0833 (6)	TP25.4174x24.7578x0.6477	27.44	0.53	17.75	0.061	1.13	0.02	17.75	0.001
L7	68.0833 - 63.5 (7)	TP26.4538x25.4174x0.6838	27.98	0.49	18.67	0.054	1.10	0.02	18.67	0.001
L8	63.5 - 47.42 (8)	TP30.09x26.4538x0.8127	29.32	0.40	18.74	0.043	1.05	0.01	18.74	0.001
L9	47.42 -	TP31.6978x27.429x0.803	30.28	0.41	18.53	0.044	1.01	0.01	18.53	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	38.0833 (9)	4								
L10	38.0833 - 35 (10)	TP32.3942x31.6978x0.7395	31.27	0.41	18.54	0.045	0.96	0.01	18.54	0.001
L11	35 - 12.5 (11)	TP37.4765x32.3942x0.7644	33.60	0.37	19.36	0.039	0.84	0.01	19.36	0.000
L12	12.5 - 11 (12)	TP37.8153x37.4765x0.7493	33.76	0.38	19.43	0.039	0.84	0.01	19.43	0.000
L13	11 - 2.5 (13)	TP39.7353x37.8153x0.9195	34.70	0.30	19.45	0.032	0.79	0.00	19.45	0.000
L14	2.5 - 0 (14)	TP40.3x39.7353x0.9631	34.99	0.29	20.07	0.029	0.77	0.00	20.07	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	117 - 110 (1)	0.002	0.140	0.000	0.022	0.000	0.142 ✔	1.333	H1-3+VT ✔
L2	110 - 100 (2)	0.007	0.501	0.000	0.047	0.000	0.509 ✔	1.333	H1-3+VT ✔
L3	100 - 82.4167 (3)	0.015	1.249	0.000	0.101	0.003	1.266 ✔	1.333	H1-3+VT ✔
L4	82.4167 - 76.0833 (4)	0.013	1.304	0.000	0.085	0.002	1.319 ✔	1.333	H1-3+VT ✔
L5	76.0833 - 71 (5)	0.013	1.234	0.000	0.076	0.001	1.248 ✔	1.333	H1-3+VT ✔
L6	71 - 68.0833 (6)	0.011	1.082	0.000	0.061	0.001	1.093 ✔	1.333	H1-3+VT ✔
L7	68.0833 - 63.5 (7)	0.010	1.055	0.000	0.054	0.001	1.066 ✔	1.333	H1-3+VT ✔
L8	63.5 - 47.42 (8)	0.009	1.019	0.000	0.043	0.001	1.029 ✔	1.333	H1-3+VT ✔
L9	47.42 - 38.0833 (9)	0.011	1.179	0.000	0.044	0.001	1.190 ✔	1.333	H1-3+VT ✔
L10	38.0833 - 35 (10)	0.012	1.284	0.000	0.045	0.001	1.296 ✔	1.333	H1-3+VT ✔
L11	35 - 12.5 (11)	0.013	1.258	0.000	0.039	0.000	1.272 ✔	1.333	H1-3+VT ✔
L12	12.5 - 11 (12)	0.013	1.280	0.000	0.039	0.000	1.294 ✔	1.333	H1-3+VT ✔
L13	11 - 2.5 (13)	0.011	1.065	0.000	0.032	0.000	1.076 ✔	1.333	H1-3+VT ✔
L14	2.5 - 0 (14)	0.011	0.990	0.000	0.029	0.000	1.001 ✔	1.333	H1-3+VT ✔

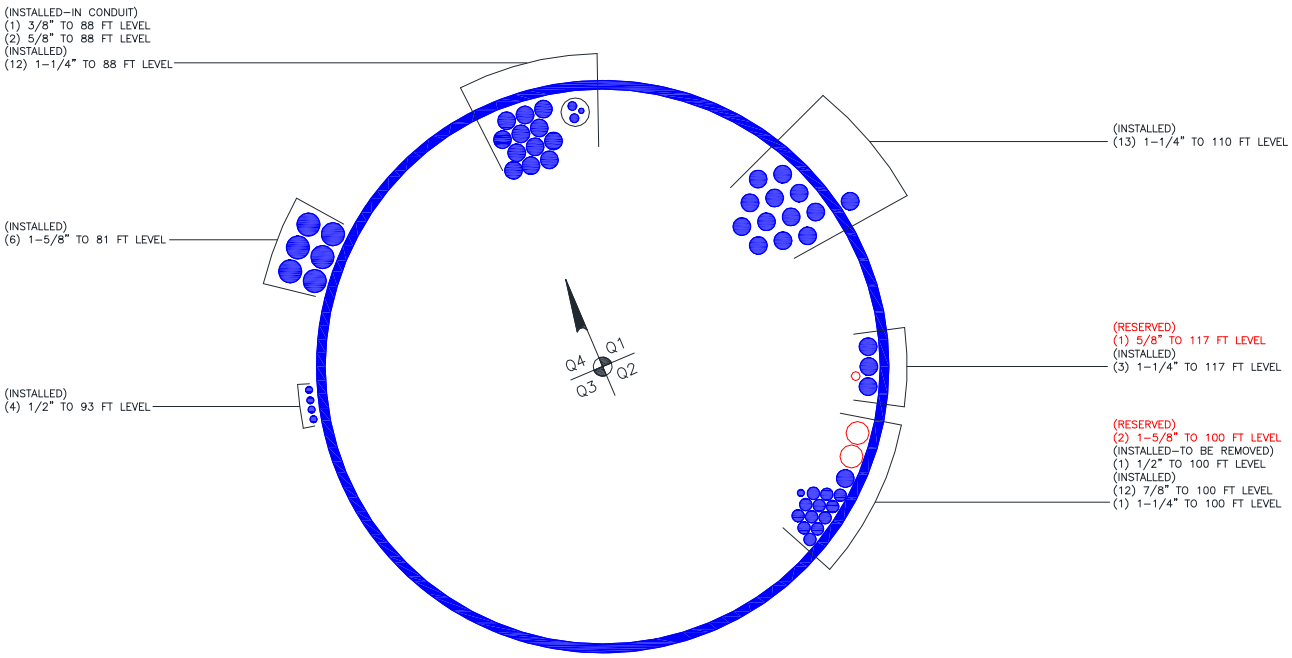
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
L1	117 - 110	Pole	TP15.94x14.36x0.188	1	-0.86	495.73	10.6	Pass
L2	110 - 100	Pole	TP18.2x15.94x0.188	2	-2.89	566.85	38.2	Pass
L3	100 - 82.4167	Pole	TP22.1761x18.2x0.25	3	-10.21	917.60	95.0	Pass
L4	82.4167 -	Pole	TP23.6083x22.1761x0.3261	4	-11.39	1153.09	98.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
	76.0833							
L5	76.0833 - 71	Pole	TP24.7578x23.6083x0.4532	5	-13.89	1450.73	93.6	Pass
L6	71 - 68.0833	Pole	TP25.4174x24.7578x0.6477	6	-14.55	1833.33	82.0	Pass
L7	68.0833 - 63.5	Pole	TP26.4538x25.4174x0.6838	7	-15.67	2117.82	80.0	Pass
L8	63.5 - 47.42	Pole	TP30.09x26.4538x0.8127	8	-19.04	2768.65	77.2	Pass
L9	47.42 - 38.0833	Pole	TP31.6978x27.429x0.8034	9	-22.18	2747.90	89.3	Pass
L10	38.0833 - 35	Pole	TP32.3942x31.6978x0.7395	10	-25.45	2794.85	97.2	Pass
L11	35 - 12.5	Pole	TP37.4765x32.3942x0.7644	11	-33.24	3497.94	95.4	Pass
L12	12.5 - 11	Pole	TP37.8153x37.4765x0.7493	12	-33.79	3473.88	97.1	Pass
L13	11 - 2.5	Pole	TP39.7353x37.8153x0.9195	13	-37.52	4469.80	80.7	Pass
L14	2.5 - 0	Pole	TP40.3x39.7353x0.9631	14	-38.69	4895.92	75.1	Pass
							Summary	
						Pole (L4)	98.9	Pass
						RATING =	**98.9**	**Pass**

APPENDIX B

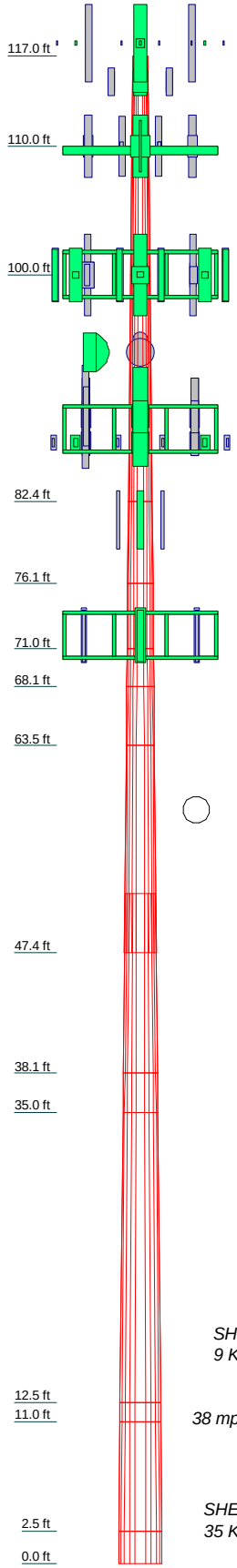
BASE LEVEL DRAWING

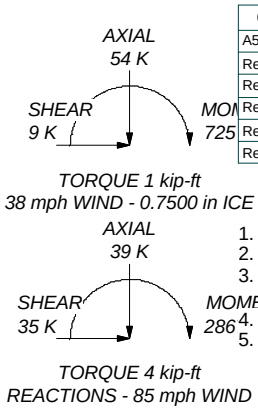

(INSTALLED–IN CONDUIT)
(1) 3/8" TO 88 FT LEVEL
(2) 5/8" TO 88 FT LEVEL
(INSTALLED)
(12) 1–1/4" TO 88 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 81 FT LEVEL
(INSTALLED)
(4) 1/2" TO 93 FT LEVEL
(INSTALLED)
(13) 1–1/4" TO 110 FT LEVEL
(RESERVED)
(1) 5/8" TO 117 FT LEVEL
(INSTALLED)
(3) 1–1/4" TO 117 FT LEVEL
(RESERVED)
(2) 1–5/8" TO 100 FT LEVEL
(INSTALLED–TO BE REMOVED)
(1) 1/2" TO 100 FT LEVEL
(INSTALLED)
(12) 7/8" TO 100 FT LEVEL
(1) 1–1/4" TO 100 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Length (ft)	7.0000	10.0000	17.5833	6.3334	5.0833	2.9167	4.5833	16.0800	13.9167	3.0833	22.5000	1.5000	8.5000	2.5000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1880	0.1880	0.2500	0.3261	0.4532	0.6477	0.6837	0.8127	0.8034	0.7395	0.7644	0.7493	0.9195	0.9631
Socket Length (ft)								4.5800						
Top Dia (in)	14.3600	15.9400	18.2000	22.1761	23.6083	24.7578	25.4174	26.4538	27.4290	31.6978	32.3942	37.4765	37.8153	39.7353
Bot Dia (in)	15.9400	18.2000	22.1761	23.6083	24.7578	25.4174	26.4538	30.0900	31.6978	32.3942	37.4765	37.8153	39.7353	40.3000
Grade	A572-65	A572-65	A572-65	Reinf 58.98 ksi	Reinf 51.14 ksi	Reinf 44.37 ksi	Reinf 46.67 ksi	Reinf 46.84 ksi	Reinf 46.33 ksi	Reinf 46.36 ksi	Reinf 48.40 ksi	Reinf 48.57 ksi	Reinf 48.63 ksi	Reinf 50.18 ksi
Weight (K)	0.2	0.3	1.0	0.5	0.6	0.5	0.9	3.9	3.5	0.8	6.4	0.5	3.2	1.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	117	DB-T1-6Z-8AB-0Z	100
APXVSPP18-C-A20 w/ Mount Pipe	117	(2) DB844G65ZAXY w/ Mount Pipe	100
APXVSPP18-C-A20 w/ Mount Pipe	117	(2) DB844G65ZAXY w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117	(2) DB844G65ZAXY w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117	GPS_A	100
800 EXTERNAL NOTCH FILTER	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	DB-T1-6Z-8AB-0Z	100
Pipe Mount [PM 601-3]	117	Platform Mount [LP 715-1]	100
TME-PCS 1900MHz 4x45W-65MHz	115	Pipe Mount [PM 601-3]	93
TME-PCS 1900MHz 4x45W-65MHz	115	VHLP2-11	93
TME-PCS 1900MHz 4x45W-65MHz	115	VHLP1-23	93
TME-800MHZ RRH	115	VHLP2.5-11	93
TME-800MHZ RRH	115	VHLP1-23	93
TME-800MHZ RRH	115	7770.00 w/ Mount Pipe	88
Side Arm Mount [SO 102-3]	115	7770.00 w/ Mount Pipe	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	(2) LGP2140X	88
		(2) LGP2140X	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	(2) LGP2140X	88
		(2) LGP13519	88
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	(2) LGP13519	88
		(2) LGP13519	88
KRY 112 144/1	110	RRUS-11	88
KRY 112 144/1	110	RRUS-11	88
KRY 112 144/1	110	RRUS-11	88
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS-11	88
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	RRUS-11	88
Ericsson Air 21 B4A B12P-B8P 4FT w/ Mount Pipe	110	DC6-48-60-18-8F	88
		OPA-65R-LCUU-H6 w/ Mount Pipe	88
RRUS 11 B12	110	OPA-65R-LCUU-H6 w/ Mount Pipe	88
RRUS 11 B12	110	OPA-65R-LCUU-H8 w/ Mount Pipe	88
RRUS 11 B12	110	RRUS 32 B30	88
T-Arm Mount [TA 602-3]	110	RRUS 32 B30	88
(2) 2.375" OD x 4' Mount Pipe	110	RRUS 32 B30	88
(2) 2.375" OD x 4' Mount Pipe	110	Platform Mount [LP 715-1]	88
(2) 2.375" OD x 4' Mount Pipe	110	Miscellaneous [NA 509-3]	88
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	P65-17-XLH-RR w/ Mount Pipe	88
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	P65-16-XLH-RR w/ Mount Pipe	88
(2) HBXX-6516DS-A2M w/ Mount Pipe	100	P65-16-XLH-RR w/ Mount Pipe	88
RRH2X60-AWS	100	7770.00 w/ Mount Pipe	88
RRH2X60-AWS	100	800 10504 w/ Mount Pipe	81
RRH2X60-AWS	100	800 10504 w/ Mount Pipe	81
RRH2X60-PCS	100	800 10504 w/ Mount Pipe	81
RRH2X60-PCS	100	Pipe Mount [PM 601-3]	81
RRH2X60-PCS	100	DB844H90E-XY w/ Mount Pipe	72
800 10735V01 w/ Mount Pipe	100	DB844H90E-XY w/ Mount Pipe	72
800 10735V01 w/ Mount Pipe	100	Platform Mount (LP 101-1)	72
800 10735V01 w/ Mount Pipe	100	LBX-9012DS-VTM w/ Mount Pipe	72
RRH2X40-07-U	100	LBX-9012DS-VTM w/ Mount Pipe	72
RRH2X40-07-U	100	LBX-9012DS-VTM w/ Mount Pipe	72
RRH2X40-07-U	100	DB844H90E-XY w/ Mount Pipe	72

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 46.33 ksi	46 ksi	58 ksi
Reinf 58.98 ksi	59 ksi	74 ksi	Reinf 46.36 ksi	46 ksi	58 ksi
Reinf 51.14 ksi	51 ksi	64 ksi	Reinf 48.40 ksi	48 ksi	61 ksi
Reinf 44.37 ksi	44 ksi	56 ksi	Reinf 48.57 ksi	49 ksi	61 ksi
Reinf 46.67 ksi	47 ksi	59 ksi	Reinf 48.63 ksi	49 ksi	61 ksi
Reinf 46.84 ksi	47 ksi	59 ksi	Reinf 50.18 ksi	50 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.9%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.44105

Job: **117' Monopole / Darien, CT**			
Project: **PJF 37516-0051 / BU 806352**			
Client: Crown Castle	Drawn by: Robert Koors	App'd:	
Code: TIA/EIA-222-F	Date: 01/27/16	Scale: NTS	
Path:		Dwg No. E-1	

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

Site Data

BU#: *806352*
Site Name:
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	16.58	ft-kips
Axial:	0.86	kips
Shear:	2.66	kips
Elevation:	110	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	10		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	19.5		

Plate Data		
Diam:	22	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.13	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	15.94	in
Thick:	0.188	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	4.00	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.401	in	
Min PL "treq" for actual **T w/ Pry**:	0.309	in	
Min PL "t1" for actual **T w/o Pry**:	0.413	in	
T allowable w/o Prying:	46.07	kips	α'<0 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	4.00	kips	
Non-Prying Bolt Stress Ratio, T/B:	8.7%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	2.5	ksi	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	6.8%	**Pass**	Comp. Y.L. Length:
No Prying			11.23
Tension Side Stress Ratio, (treq/t)^2:	4.2%	**Pass**	

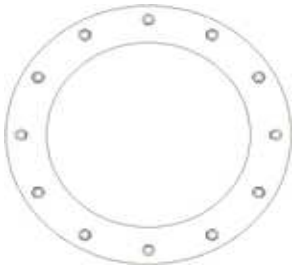
n/a

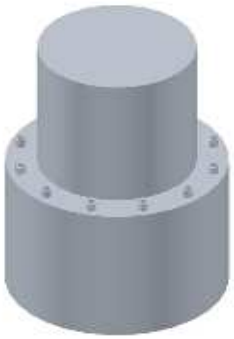
Stiffener Results

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

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

Site Data

BU#: *806352*
Site Name:
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	78.04	ft-kips
Axial:	2.89	kips
Shear:	6.52	kips
Elevation:	100	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	22		

Plate Data		
Diam:	24	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.88	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	18.2	in
Thick:	0.188	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	46.07	kips	Service, ASD
Max Bolt directly applied T:	13.95	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.502	in	
Min PL "treq" for actual **T w/ Pry**:	0.620	in	
Min PL "t1" for actual **T w/o Pry**:	0.827	in	
T allowable with Prying:	46.00	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	13.95	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	30.3%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	9.2	ksi	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	25.5%	**Pass**	Comp. Y.L. Length:
No Prying			12.36
Tension Side Stress Ratio, (treq/t)^2:	17.1%	**Pass**	

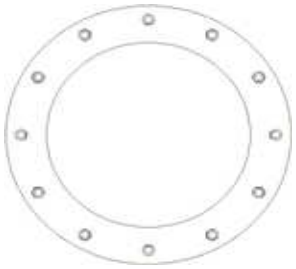
n/a

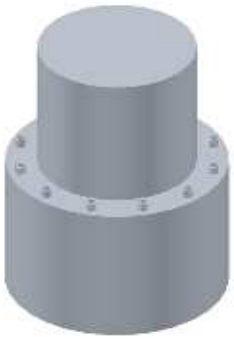
Stiffener Results

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

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

v4.4 - Effective 7-12-13

Date: 1/27/2016
PJF Project: 37516-0051.002.7700
Client Ref. # BU 806352
Site Name: BRG 302 943052
Description: 100-ft Tapered Pole w/ 10-ft and 7-ft Extensions
Owner: Crown Castle
Engineer: RMK

Asymmetric Anchor Rod Analysis

Moment =	2867	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	39.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	35.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	18							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
2	2.250	#18J A615 Gr 75	75	100	30.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
3	2.250	#18J A615 Gr 75	75	100	60.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
4	2.250	#18J A615 Gr 75	75	100	90.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
5	2.250	#18J A615 Gr 75	75	100	120.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
6	2.250	#18J A615 Gr 75	75	100	150.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
7	2.250	#18J A615 Gr 75	75	100	180.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
8	2.250	#18J A615 Gr 75	75	100	210.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
9	2.250	#18J A615 Gr 75	75	100	240.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
10	2.250	#18J A615 Gr 75	75	100	270.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
11	2.250	#18J A615 Gr 75	75	100	300.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
12	2.250	#18J A615 Gr 75	75	100	330.0	48.22	0.00	3.98	151.48	146.84	146.84	0.00	195.00	75.3%
13	1.750	A193 Gr B7	105	125	105.0	58.72	0.00	2.41	111.18	108.37	108.37	0.00	132.29	81.9%
14	1.750	A193 Gr B7	105	125	225.0	58.72	0.00	2.41	111.18	108.37	108.37	0.00	132.29	81.9%
15	1.750	A193 Gr B7	105	125	345.0	58.72	0.00	2.41	111.18	108.37	108.37	0.00	132.29	81.9%
16	2.250	A193 Gr B7	105	125	15.0	58.72	0.00	3.98	183.78	179.15	179.15	0.00	218.68	81.9%
17	2.250	A193 Gr B7	105	125	135.0	58.72	0.00	3.98	183.78	179.15	179.15	0.00	218.68	81.9%
18	2.250	A193 Gr B7	105	125	255.0	58.72	0.00	3.98	183.78	179.15	179.15	0.00	218.68	81.9%
								66.90						

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#:	*806352*
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	1798.2	ft-kips
Axial:	27.8	kips
Shear:	25	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	48.22	in

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	146.8 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
See asymmetric spreadsheet		Fty*ASIF

Plate Data		
Diam:	54.22	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	10.80	in

Base Plate Results

Base Plate Stress:	33.3 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	55.5% **Pass**	0.75*Fy*ASIF
Flexural Check		Y.L. Length: 26.48

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Both	
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

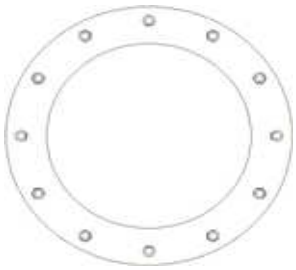
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	40.3	in
Thick:	0.344	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



* 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

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

Job Number: 37516-0051.002.7700
Site Number: 806352
Site Name: BRG 302 943052

By: RMK
Date: 1/27/2016

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

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	2867.0		k-ft
Shear, V =	35.0		kips
Axial Load, P =	39.0		kips
OTM =	2874.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

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

Drilled Pier Parameters

Diameter =	6.5	ft
Height Above Grade =	0.2	ft
Depth Below Grade =	16.4	ft
fc' =	3	ksi
εc =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

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

Load Combinations Checked per TIA/EIA-222-F

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

Steel Parameters

Number of Bars =	22	
Rebar Size =	#10	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#6	
Side Clear Cover to Ties =	5	in

Soil Parameters

Water Table Depth =	99.00	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	4	115		30	Sand				4
2	2	120		39	Sand	23000	420		6
3	5	135		45	Sand	30900	2150		11
4	5.4	155	14000		Clay	36900	4740		16.4
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.29	ft, from Grade	Shear, V =	35.00	kips
Bending Moment, M =	3339.18	k-ft, from COR	Resisting Shear, Va =	46.70	kips
Resisting Moment, Ma =	4455.62	k-ft, from COR			

MOMENT RATIO = 74.9% OK **SHEAR RATIO = 74.9% OK**

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	66.10	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	39.00	kips
Allowable Comp. Cap., Ca =	982.68	kips

COMPRESSION RATIO = 4.0% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	15.93	sq in	Axial Load, P =	65.31	kips @ 5.50 ft Below Grade
Actual Steel Area =	27.94	sq in	Moment, M =	3047.71	k-ft @ 5.50 ft Below Grade
			Allowable Moment, Ma =	3169.76	k-ft
Allowable Min Axial, Pa =	-1160.58	kips, Where Ma = 0 k-ft			
Allowable Max Axial, Pa =	5515.99	kips, Where Ma = 0 k-ft			

MOMENT RATIO = 96.1% 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#: *806352*
Site Name: *BRG 302 943052*
App #:

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

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	5.00	in
Horiz. **Tie** Bar Size=	6	
Vert. Cage Diameter =	5.44	ft
Vert. Cage Diameter =	65.23	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	22	
As Total=	27.94	in^2
A s/ Aconc, Rho:	0.0058	0.58%

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:	0.58%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	7170.79	kips
at Mu=(ϕ=0.65)Mn=	3988.84	ft-kips
Max Tu, (φ=0.9) Tn =	1508.76	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	3047.71	ft-kips **(* Note)**
Max. Service Shaft P:	65.31	kips
Max Axial Force Type:	Comp.	

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

Load Factor	**Shaft Factored Loads**		
1.30	Mu:	3962.023	ft-kips
1.30	Pu:	84.903	kips

Material Properties

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

ACI 318 Code

Select Analysis ACI Code=	2002	

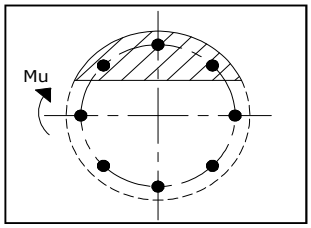
Seismic Properties

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

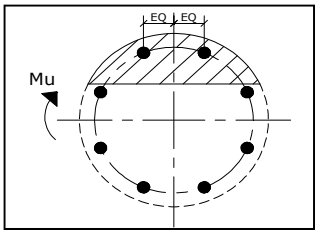
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.63**	in
Extreme Steel Strain, ϵt:	**0.0127**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	84.90	kips
Drilled Shaft Moment Capacity, φMn:	**4120.68**	ft-kips
Drilled Shaft Superimposed Mu:	**3962.02**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**96.1%**

MODIFICATION OF AN EXISTING 117'-0" MONOPOLE

BU #806352; BRG 302 943052

126 LEDGE ROAD
DARIEN, CONNECTICUT 06820
FAIRFIELD COUNTY
LAT: 41° 4' 20.75"; LONG: -73° 28' 41.4"
APP: 311214 REV. 1; WO: 1182893

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
FIELD WELDED STIFFENERS
REMOVE AND REPLACE STEP BOLTS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	MONOPOLE PROFILE
S-3	BASE PLATE DETAILS
S-4	MI CHECKLIST

WIND DESIGN DATA	
REFERENCE STANDARD	TIA/EIA-222-F
LOCAL CODE	2005 CONNECTICUT BUILDING CODE
BASIC WIND SPEED (FASTEST-MILE)	85 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	37.6 MPH
SERVICE WIND SPEED	50 MPH

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1124720

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
2-1-16

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250 E Broad St, Ste 600- Columbus, OH 43215
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CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHAROLTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 117'-0" MONOPOLE
BU #806352; BRG 302 943052
DARIEN, CONNECTICUT

PROJECT No:	37516-0051.002.7700
DRAWN BY:	C.A.W.
DESIGNED BY:	R.M.K.
CHECKED BY:	RMK
DATE:	02/01/2016

TITLE SHEET

T-1

37516-0051.002.DWG

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. GENERAL NOTES

1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.

1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK.

1.3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.

1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.

1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

1.8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.

1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.

1.10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED AND RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.

1.11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS.

1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.

1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.

1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
3434 ENCRETE LANE, MORAINE, OHIO 45439
PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. STRUCTURAL STEEL

2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"

2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS', DEC. 31, 2009.

2.3. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.

2.4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.

2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.

2.9. FIELD CUTTING OF STEEL:
2.9.1. IMPORTANT CUTTING AND WELDING SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
2.9.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. BASE PLATE GROUT- (NOT REQUIRED)

4. FOUNDATION WORK- (NOT REQUIRED)

5. CAST-IN-PLACE CONCRETE- (NOT REQUIRED)

6. EPOXY GROUTED REINFORCING ANCHOR RODS- (NOT REQUIRED)

7. TOUCH UP OF GALVANIZING

7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.

7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.

7.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. HOT-DIP GALVANIZING

8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.

8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.

8.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.

9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.

9.3. CROWN CASTLE SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHAROLTTE, NC 28277
PH: (724) 416-2000

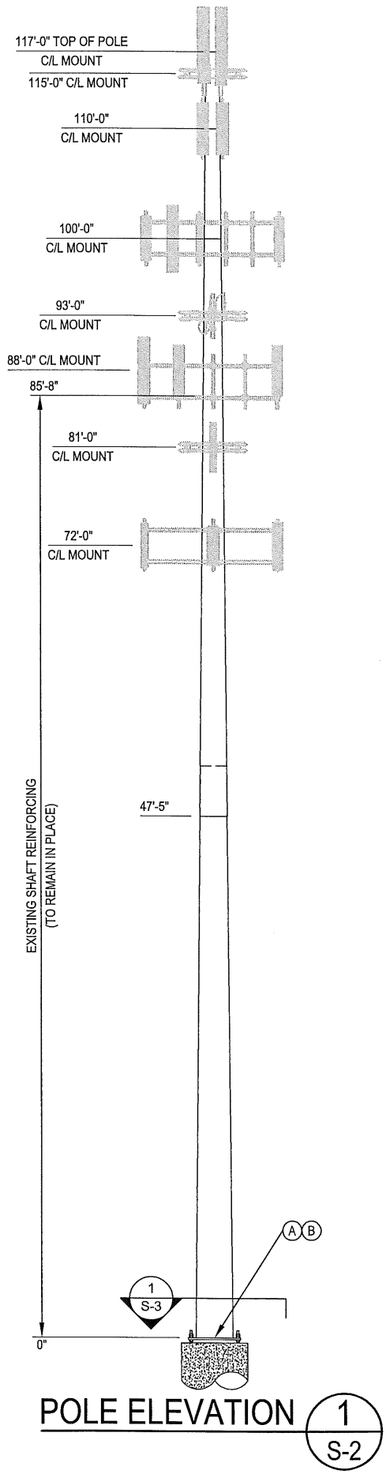
MODIFICATION OF AN EXISTING
117'-0" MONOPOLE
BU #806352; BRG 302 943052
DARIEN, CONNECTICUT

PROJECT No:	37516-0051.002.7700
DRAWN BY:	C.A.W.
DESIGNED BY:	R.M.K.
CHECKED BY:	KMK
DATE:	02/01/2016

GENERAL NOTES

S-1

37516-0051.002.DWG



POLE ELEVATION 1 / S-2

SHAFT SECTION DATA							
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (ksi)	POLE SHAPE
1	7.00	0.1875		14.360	15.940	A572-65	12-SIDED
2	10.00	0.1875		15.940	18.200	A572-65	12-SIDED
3	52.58	0.2500	55.00	18.200	30.090	A572-65	12-SIDED
4	52.00	0.3438		28.472	40.300	A572-65	12-SIDED
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES							

MODIFICATIONS:

(A) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-3.

(B) REMOVE AND REPLACE STEP BOLTS AS REQUIRED. COORDINATE WITH TUF-TUG. SEE NOTE 1.14 ON SHEET S-1.

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING
117'-0" MONOPOLE
BU #806352; BRG 302 943052
DARIEN, CONNECTICUT

PROJECT No:	37516-0051.002.7700
DRAWN BY:	C.A.W.
DESIGNED BY:	R.M.K.
CHECKED BY:	KAT
DATE:	02/01/2016

MONOPOLE PROFILE

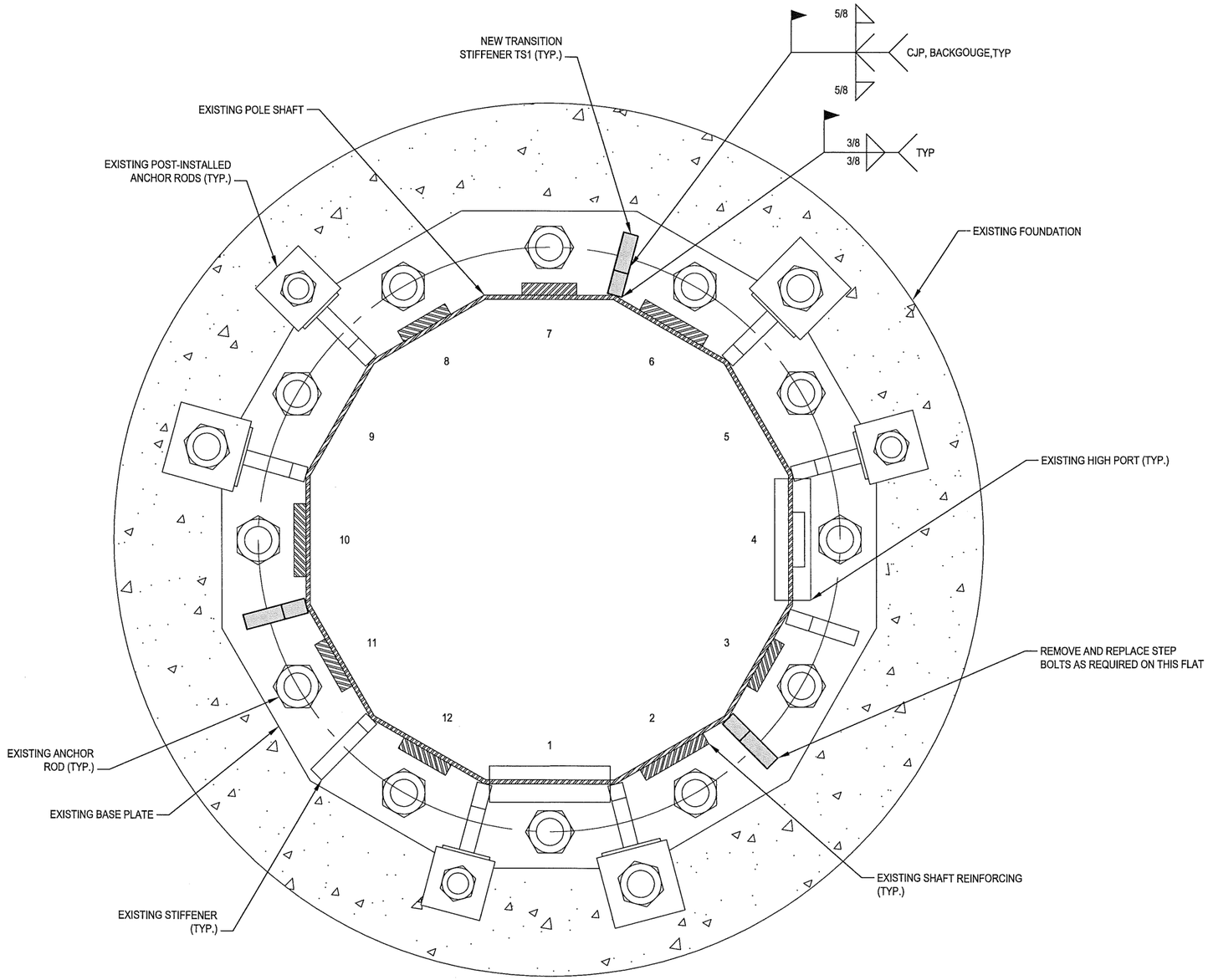
S-2

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
2/1/16

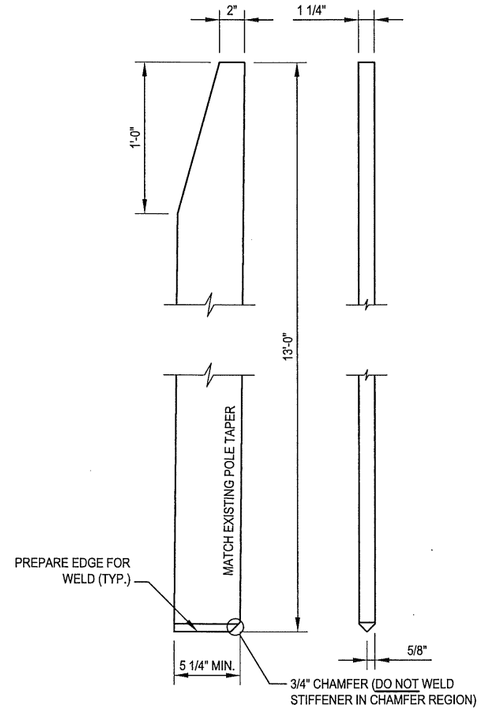
CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

37516-0051.002.DWG

BASE SPECIFICATIONS	
BASE PLATE:	54.22" 12-SIDED; 2 1/2" THK.; Fy=60 KSI
ANCHOR RODS:	(12) 2 1/4"ø; A615 GRADE 75; 48.22" B.C.; (3) 1 3/4" ø; A193 GR B7; 58.72" B.C.; (3) 2 1/4" ø; A193 GR B7; 58.72" B.C.



BASE PLATE 1 / S-3



TRANSITION STIFFENER MK~TS1

(3 REQUIRED) (Fy = 65 KSI)

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MODIFICATION OF AN EXISTING
117'-0" MONOPOLE
BU #806352; BRG 302 943052
DARIEN, CONNECTICUT

PROJECT No:	37516-0051.002.7700
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DATE:	02/01/2016

BASE PLATE DETAILS

S-3

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

2-1-16

37516-0051.002.DWG

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   - 1.1. THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE EOR.
   - 1.2. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN CASTLE.

3. **GENERAL CONTRACTOR**
   - 3.1. THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

4. **RECOMMENDATIONS**
   - 4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
     - 4.1.1. IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
     - 4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
     - 4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
     - 4.1.4. IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
     - 4.1.5. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

5. **CANCELLATION OR DELAYS IN SCHEDULED MI**
   - 5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CASTLE CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

6. **CORRECTION OF FAILING MI'S**
   - 6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
     - 6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
     - 6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. **MI VERIFICATION INSPECTIONS**
   - 7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

8. **PHOTOGRAPHS**
   - 8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
     - 8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
     - 8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - 8.1.3. RAW MATERIALS
     - 8.1.4. PHOTOS OF ALL CRITICAL DETAILS
     - 8.1.5. FOUNDATION MODIFICATIONS
     - 8.1.6. WELD PREPARATION
     - 8.1.7. BOLT INSTALLATION AND TORQUE
     - 8.1.8. FINAL INSTALLED CONDITION
     - 8.1.9. SURFACE COATING REPAIR
     - 8.1.10. POST CONSTRUCTION PHOTOGRAPHS
     - 8.1.11. FINAL INFIELD CONDITION
     - 8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
     - 8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

9. **INSPECTION AND TESTING**
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   - 9.6. GENERAL
     - 9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. FOUNDATIONS AND SOIL PREPARATION- (NOT REQUIRED)
   - 9.8. CONCRETE TESTING PER ACI- (NOT REQUIRED)
   - 9.9. STRUCTURAL STEEL
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
     - 9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.8. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. WELDING:
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
       - 9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
       - 9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   - 9.11. REPORTS:
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

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MODIFICATION OF AN EXISTING
117'-0" MONOPOLE
BU #806352; BRG 302 943052
DARIEN, CONNECTICUT

PROJECT No:	37516-0051.002.7700
DRAWN BY:	C.A.W.
DESIGNED BY:	R.M.K.
CHECKED BY:	KAG
DATE:	02/01/2016

MI CHECKLIST

S-4

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
2-1-16

37516-0051.002.DWG

SITESAFE
RF COMPLIANCE EXPERTS
A BUSINESS OF FDH VELOCITEL

200 North Glebe Road, Suite 1000, Arlington, VA 22203-3728
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

SmartLink, LLC on behalf of AT&T Mobility, LLC
Site FA – 10035058
Site ID – CTL02104 (3C)
USID – 60391
Site Name – Darien
Site Compliance Report

126 Ledge Road
Darien, CT 06820

Latitude: N41-4-20.75
Longitude: W73-28-41.16
Structure Type: Monopole

Report generated date: February 9, 2016
Report by: Sam Cosgrove
Customer Contact: Kristen Smith

AT&T Mobility, LLC will be compliant when the remediation recommended in section 5.2 or other appropriate remediation is implemented.

Registered Professional Engineer (Electrical)
CERTIFICATE NO.
45335
KLAUS
BENDER
Signed: 2/11/2016
Date Signed
ARIZONA U.S.A.

Klaus Bender
Registered Professional Engineer (Electrical)
Expires December 31, 2018

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Access to Antennas Locked?	Yes
RF Sign(s) @ access point(s)	None
RF Sign(s) @ antennas	None
Barrier(s) @ sectors	None
Max cumulative simulated Radio Frequency Exposure (RFE) level on the Ground Level	<5% of General Public limit
FCC & AT&T Compliant?	Will Be Compliant

The following documents were provided by the client and were utilized to create this report:

RFDS: NEW-ENGLAND_CONNECTICUT_CT2104_2016-LTE-Next-Carrier_LTE-3C_ra9161_PTN_1...

CD's: 10035058_AE201_151228_CTL02104.Rev0.CD

RF Configuration Datasheet: CT_33 sites with power density form

2 Map of Site

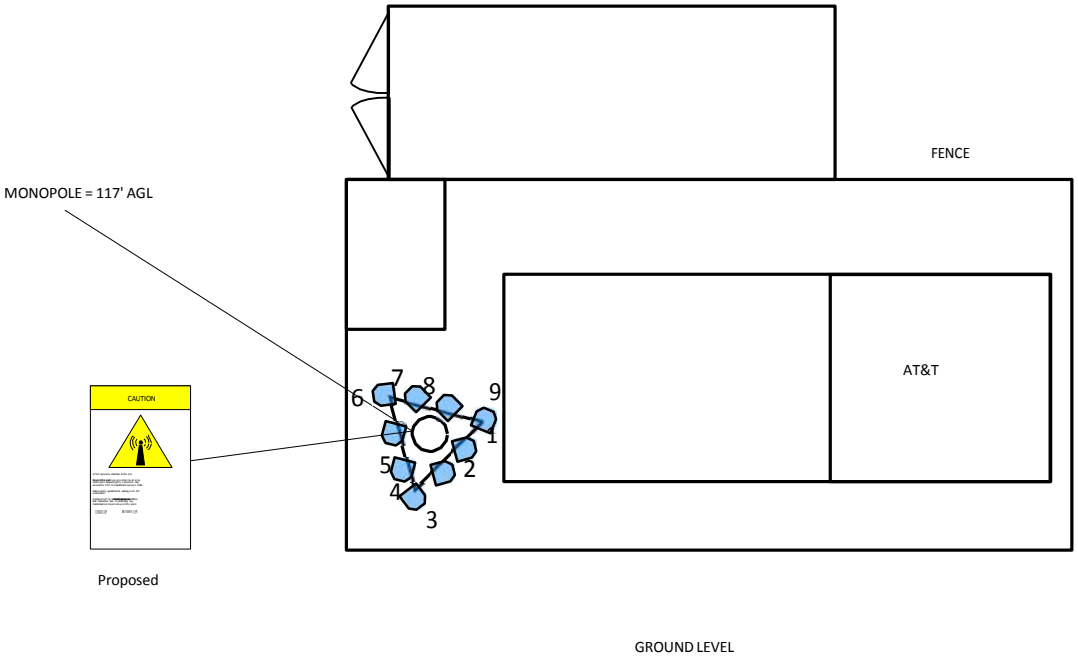
In the RF Emissions Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas.

The Antenna Inventory heights are referenced to the same level.

The following diagrams are included:

- Site Map
- RF Emissions Diagram
- Elevation View

Site Map For: Darien



(Feet)

0 7.5 14.9

www.sitesafe.com
Site Name:Darien

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

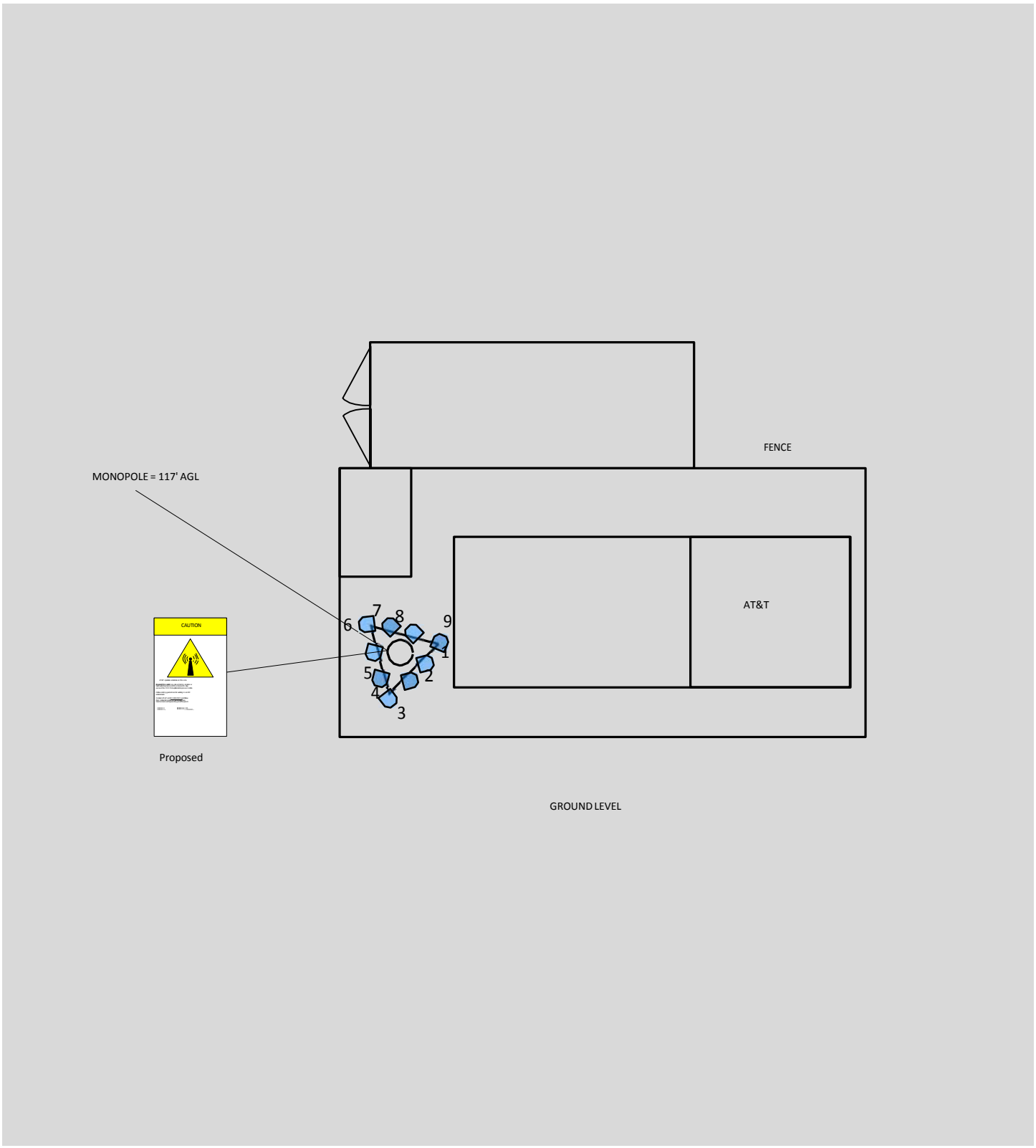
3 Antenna Inventory

The following antenna inventory on this and the following page, were obtained by the customer and were utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP	X	Y	Z (AGL
1	AT&T MOBILITY LLC	Powerwave P65-16-XLH-RR	Panel	737	75	66	6	12.71	0	0	1	899.8	86.1'	112.6'	86'
1	AT&T MOBILITY LLC	Powerwave P65-16-XLH-RR	Panel	1900	75	63	6	15.06	0	0	1	1476.2	86.1'	112.6'	86'
2	AT&T MOBILITY LLC (PROPOSED)	CCI Antennas OPA-65R-LCUU-H6	Panel	850	75	61	6	12.46	1	0	0	97.5	84.4'	110.7'	86'
2	AT&T MOBILITY LLC (PROPOSED)	CCI Antennas OPA-65R-LCUU-H6	Panel	2300	75	60	6	15.46	0	0	1	748.4	84.4'	110.7'	86'
3	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	142	82	4.6	11.51	0	2	0	362.4	82.2'	108.7'	87.7'
3	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	142	86	4.6	13.41	0	2	0	714.8	82.2'	108.7'	87.7'
4	AT&T MOBILITY LLC	Powerwave P65-16-XLH-RR	Panel	737	195	66	6	12.71	0	0	1	899.8	81.2'	110.9'	86'
4	AT&T MOBILITY LLC	Powerwave P65-16-XLH-RR	Panel	1900	195	63	6	15.06	0	0	1	1476.2	81.2'	110.9'	86'
5	AT&T MOBILITY LLC (PROPOSED)	CCI Antennas OPA-65R-LCUU-H6	Panel	850	195	61	6	12.46	1	0	0	97.5	80.5'	113.7'	86'
5	AT&T MOBILITY LLC (PROPOSED)	CCI Antennas OPA-65R-LCUU-H6	Panel	2300	195	60	6	15.46	0	0	1	748.4	80.5'	113.7'	86'
6	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	262	82	4.6	11.51	0	2	0	362.4	79.8'	116.7'	87.7'
6	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	262	86	4.6	13.41	0	2	0	714.8	79.8'	116.7'	87.7'
7	AT&T MOBILITY LLC	Powerwave P65-17-XLH-RR	Panel	737	315	70	8	13.41	0	0	1	899.8	82.3'	116.6'	85'
7	AT&T MOBILITY LLC	Powerwave P65-17-XLH-RR	Panel	1900	315	63	8	14.51	0	0	1	1476.2	82.3'	116.6'	85'
8	AT&T MOBILITY LLC (PROPOSED)	CCI Antennas OPA-65R-LCUU-H8	Panel	850	315	59.2	7.7	13.86	1	0	0	43.6	84.8'	115.9'	85.1'
8	AT&T MOBILITY LLC (PROPOSED)	CCI Antennas OPA-65R-LCUU-H8	Panel	2300	315	63.7	7.7	14.66	0	0	1	698.5	84.8'	115.9'	85.1'
9	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	22	82	4.6	11.51	0	2	0	362.4	87.6'	114.8'	87.7'
9	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	22	86	4.6	13.41	0	2	0	714.8	87.6'	114.8'	87.7'

NOTE: X, Y and Z indicate relative position of the bottom of the antenna to the origin location on the site, displayed in the model results diagram. Specifically, the Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. The distance to the bottom of the antenna is calculated by subtracting half of the length of the antenna from the antenna centerline**.** Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience.

RF Emissions Simulation For: Darien



% of FCC Public Exposure Limit
Spatial average 0' - 6'

>= 5000	>= 500	>= 100	>= 5	< 5

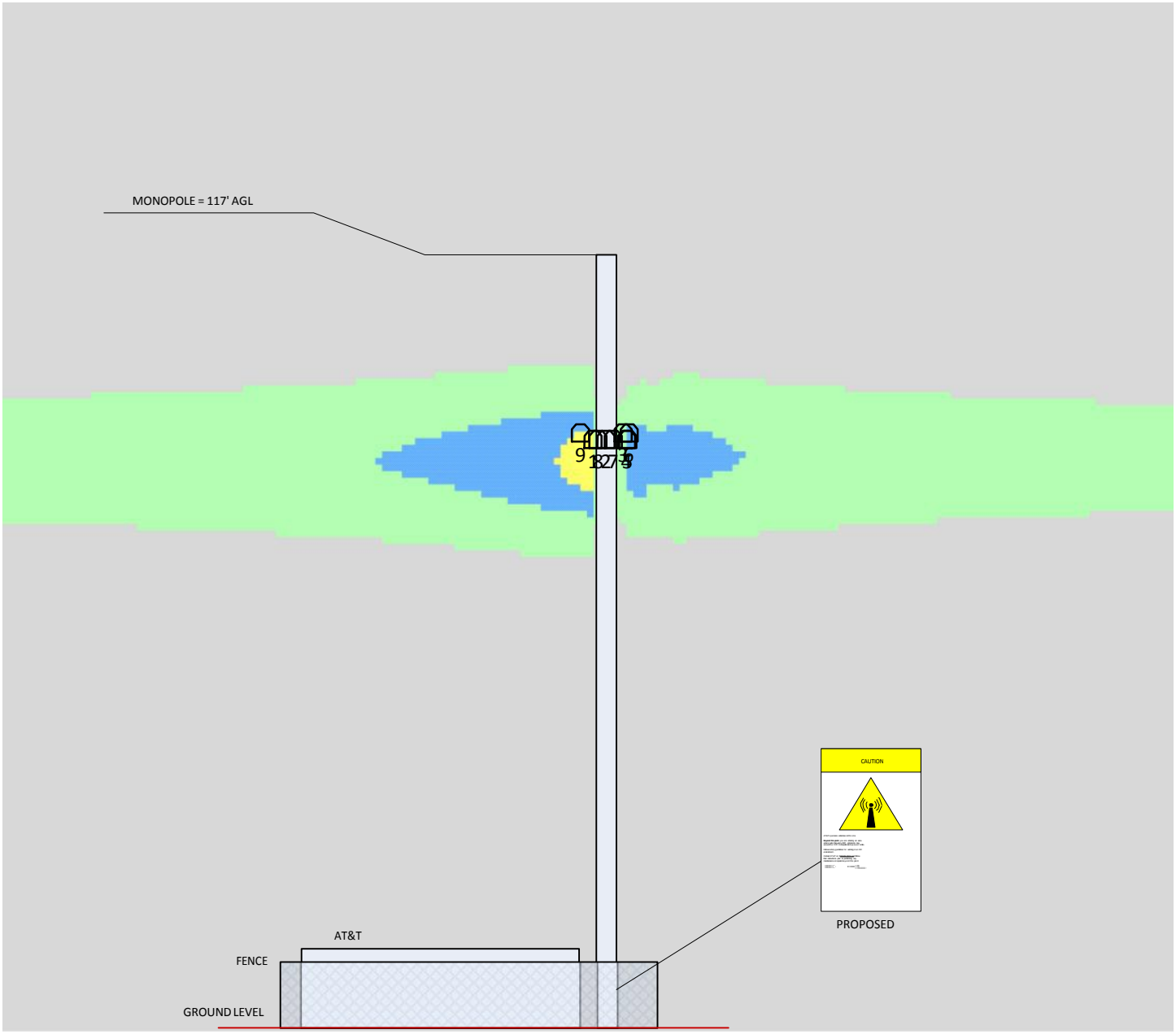
AT&T MOBILITY LLC	VERIZONWIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

(Feet)

0 7.4 14.8

www.sitesafe.com
Site Name:Darien

RF Emissions Simulation For: Darien
Elevation View



% of FCC Public Exposure Limit
Spatial average 0' - 6'

>= 5000 >= 500 >= 100 >= 5 < 5

(Feet)
0 11.8 23.6

www.sitesafe.com

Site Name:Darien

AT&T MOBILITY LLC VERIZON SPRINT

Sitesafe Inc. assumes no responsiblity for modeling results not verified by Sitesafe personnel.
Contact Sitesafe Inc. for modeling assistance at (703) 276-1100
SitesafeTC Version: 1.0.0.0
2/9/2016 4:21:21 PM

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant when the remediation recommended in section 5.2 or other appropriate remediation is implemented.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the AT&T Mobility, LLC's proposed deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

The site will be made compliant if the following changes are implemented:

Site Access Location

Yellow caution 2 sign required.

AT&T Mobility, LLC Proposed Alpha Sector Location

No action required.

AT&T Mobility, LLC Proposed Beta Sector Location

No action required.

AT&T Mobility, LLC Proposed Gamma Sector Location

No action required.

6 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms that:

I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Sitesafe, Inc., in Arlington, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Sam Cosgrove.

February 9, 2016

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communication Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

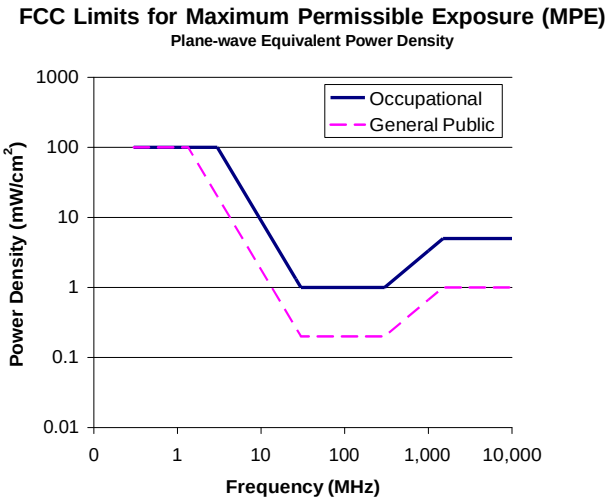
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lock Out Tag Out procedure aimed to control the unexpected energization or start up of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3 foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram: Section 4 of this report contains an RF Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. **Gray represents areas more than 20 times below the most conservative exposure limit**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone**.
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels**.
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur, but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.

Gain (of an antenna) – The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antennas as compared to an omni directional antenna.

General Population/Uncontrolled Environment – Defined by the FCC, as an area where exposure to RF energy may occur to persons who are **unaware** of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The maximum levels of RF exposure a person may be exposed to without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are **aware** of the

potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of Radio Frequency radiation on Humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency (RF) – The frequencies of electromagnetic waves which are used for radio communications. Approximately 3 kHz to 300 GHz.

Radio Frequency Exposure (RFE) – The amount of RF power density that a person is or might be exposed to.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average power density an average sized human will be exposed to at a location.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix F – References

The following references can be followed for further information about RF Health and Safety.

Sitesafe, Inc.
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteareа=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-ionising Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf